Part 1

ANT-20, ANT-20E, ANT-20SE
DominoCOM ANT-20

“Mainframe”

Remote Control Operating Manual
SCPI Command List

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Introduction

1 ANT-20, ANT-20E, ANT-20SE

1.1 General information

The following information also applies to the ABT-20.
For "ANT-20", read "ABT-20".

1.1.1 Overview

The ANT-20 can be remotely controlled using the

- IEEE 488 (IEC 625) interface, often referred to as GPIB:
  Option BN 3035/92.10, Remote Control GPIB (PCMCIA)

– or –

- V.24/V.28 (RS 232) interface:
  Option BN 3035/91.01, Remote Control V.24

The programming commands are identical, regardless of the type of remote control interface that is used.

The ANT-20 must be switched to remote control mode manually. In remote control mode, manual control of the ANT-20 is not possible.

To set the ANT-20 to remote control mode, follow these steps

ANT-20, ANT-20E with Windows 3.11:
⇒ Double-click on the "Remote" icon in the "ANT-20" group in the "Program Manager" window.

Windows 95:
1. Enable remote control mode using the taskbar: "Start/ANT-20/Remote On".
2. Double-click on the "ANT-20" icon on the desktop
   – or –
   use the taskbar: "Start/ANT-20/ANT-20".

To switch back to normal manual control, follow these steps

ANT-20, ANT-20E with Windows 3.11:
⇒ Double-click on the "Remote Disable" icon in the "ANT-20" group in the "Program Manager" window.

Windows 95:
1. Disable remote control mode using the taskbar: "Start/ANT-20/Remote Off".
2. Double-click on the "ANT-20" icon on the desktop
   – or –
   use the taskbar: "Start/ANT-20/ANT-20".

From the viewpoint of remote control, each measuring module in the ANT-20 is a fully remote-controllable instrument with its own SCPI command tree, status reporting system and common command set.

The measuring module to be controlled is selected using the command MODule:SELect <module_name> (see Sec. 1.1.2).

The instrument's display shows which measuring modules exist and which one is selected for remote control.

A built-in monitor function can be switched on for debugging purposes (see Sec. 1.1.3).

To change the type of the remote control interface and/or its accompanying configuration parameters, the batch file remote.bat must be edited.

ANT-20, ANT-20E with Windows 3.11:

1. Double-click on the "Remote Configuration" icon in the "ANT-20" group in the "Program Manager" window to edit the remote.bat file.
2. Follow the on-screen instructions.

Windows 95:

1. Click on the "Remote Configuration" icon via taskbar: "Start/ ANT-20/Remote Configuration" to edit the remote.bat file.
2. Follow the on-screen instructions.

1.1.2 Module selection

The remote control interface of the ANT-20 supports multiple internal measuring modules. The module selection provides a mechanism to select one of these measuring modules for remote control.

Keyword	Parameter form	Notes
MODule:SELect	<module_name> [1]	[no query]
1 <module_name>: BASIC | JITTER | JITT16 | BAG		

Table I-1 Module selection

This command selects the measuring module specified by <module_name> for remote control and deselects all others. All subsequent commands (including commands in subsequent program messages) are passed to the selected measuring module. All other measuring modules are unavailable for programming until selected.

<module_name>:

BASIC: Selects BASIC Module
JITTER: Selects JITTER Module for bit rates up to STM4/OC12 (extension slot) (not available for ABT-20)
JITT16: Selects JITTER Module for bit rates of STM16/OC48 (extension slot) (not available for ABT-20)
BAG: Selects BAG Module (Broadband Analyzer/Generator)

Note:
- This command has no query form.
- After power-on, the BASIC measuring module is selected.
- If the MODule:SELect <module_name> command is required in a program message, it must be the first (or the only) command in that program message.

1.1.3 Monitor mode

A monitor function can be switched on or off in remote control mode. If it is switched on, the instrument displays all messages sent to and from the instrument, corresponding to each operating step performed.

1.1.4 LabWindows/CVI driver

A LabWindows/CVI instrument driver is available for each measuring module.

Instrument drivers reduce application program development time and simplify instrument control by eliminating the need to learn the complex programming commands for each measuring module.

1.2 GPIB Remote Control interface

This section describes the GPIB Remote Control interface for applications using the ANT-20 as a remote controlled instrument.

Other applications using the ANT-20 as a GPIB controller for controlling external instruments are also possible (e.g. running the WG CATS Test Executive BN 3045 on the ANT-20 to control the ANT-20 measurement hardware plus external instruments).

To allow both these mutually exclusive operating modes to be used, the GPIB Remote Control interface and installation comprises all the software required for both operating modes.

1.2.1 Items included

The Remote Control GPIB (PCMCIA) Option BN 3035/92.10 comprises:

ANT-20, ANT-20E with Windows 3.11:

- PCMCIA GPIB card including PCMCIA to GPIB cable (2 meters)
- CardWare User’s Manual (Award Software Inc.)
- Distribution disk: CardWare Version 2.0 (Award Software Inc.)
- Installation disks: ANT-20 PCMCIA System (configured CardWare 2.0),
  ANT-20 GPIB Remote Control (includes NI-488.2)
- ANT-20 GPIB (NI-488.2) for Windows 3.x
- Operating Manual: Remote Control
- Brochure “SCPI and IEEE 488, Programmer‘s Introduction”

Windows 95:

- PCMCIA GPIB card including PCMCIA to GPIB cable (2 meters)
- Installation disks: ANT-20 GPIB Remote Control for Windows 95 (includes NI-488.2M)
- Operating Manual: Remote Control
- Brochure “SCPI and IEEE 488, Programmer‘s Introduction”

1.2.2 Installation

1.2.2.1 Overview

The PCMCIA GPIB interface from National Instruments Corp. (NI) is used with the NI-488.2/ NI-488.2M software for GPIB Remote Control.

For ANT-20 with Windows 3.11 only:

- The NI-488.2 software requires standardized PCMCIA system software with Socket and Card Services (version 2.0 or higher) to be installed.
- A software called CardWare (written by Award Software Inc.) is used as PCMCIA system software. It can also be used with a wide variety of other PCMCIA cards.
- The CardWare software contained on the installation disk is already configured for use with the ANT-20.

1.2.2.2 Software installation

Software installation under Windows 3.11

If you ordered the Remote Control GPIB Option BN 3035/92.10 together with your ANT-20, the required software packages are already installed on the ANT-20 and the icons “Remote”, “Remote Disable” and “Remote Configuration” are shown in the “ANT-20” group in the “Program Manager” window.

Note: A release code is required to enable the Remote Control GPIB Option.
For detailed information contact your nearest Wavetek Wandel Goltermann Service Center. The addresses are listed at the end of this manual.
When contacting the Service Center, always quote:
- The serial number of the ANT-20
- The version number of the ANT-20 software package

If you ordered the Remote Control GPIB Option BN 3035/92.10 separately, install the software packages as follows:

Installing the PCMCIA System software

1. Start or return to Windows.
2. Insert the ANT-20 PCMCIA System installation disk into drive A:.
3. Choose “Run ...” from the “File” menu in the “Program Manager” window and type the following command into the dialog box:
   A:\setup
   Confirm with “OK”.
4. After complete installation exit Windows, remove the installation disk from drive A:, and reboot the ANT-20.

Installing the GPIB Remote Control software

1. Start or return to Windows.
2. Insert the ANT-20 GPIB Remote Control installation disk into drive A:.

3. Choose “Run ...” from the “File” menu in the “Program Manager” window and type the following command into the dialog box:
   A:\setup
   Confirm with “OK”.
4. After complete installation exit Windows, remove the installation disk from drive A:, and reboot the ANT-20.

Installing the ANT-20 Remote Control software

1. Start or return to Windows
2. Choose “Run...” from the “File” menu in the “Program Manager” window and type the following command into the dialog box:
   C:\ANT20.SUP\DISK1\setup.exe
   Confirm with “OK”.
3. Follow the on-screen instructions to install the ANT-20 Remote Control.
4. After complete installation exit Windows, and reboot the ANT-20.

After this installation procedure, the ANT-20 can be set to remote control mode by double-clicking on the “Remote” icon in the “ANT-20” group in the “Program Manager” window.

Installing the GPIB (NI-488.2) for Windows 3.x

This software is required for applications that use the ANT-20 as a GPIB controller for controlling external instruments (e.g. for running the WG CATS Test Executive BN 3045 on the ANT-20 to control the ANT-20 measurement hardware plus external instruments).

1. Start or return to Windows.
2. Insert the installation disk ANT-20 GPIB (NI-488.2) for Windows 3.x into drive A:.
3. Choose “Run...” from the “File” menu in the “Program Manager” window and type the following command into the dialog box:
   A:\setup
   Confirm with “OK”.
4. Follow the on-screen instructions to complete the installation.
5. After complete installation exit Windows, remove the installation disk from drive A:, and reboot the ANT-20.

After this installation procedure, you can access the “NI-488.2 PCMCIA GPIB Software” group in the “Program Manager” window.

To view or modify the NI-488.2 software configuration, double-click the “GPIB” icon from the “Control Panel” in the “Main” group of the “Program Manager” window.

Software installation under Windows 95

If you ordered the Remote Control GPIB Option BN 3035/92.10 together with your ANT-20, the required software packages are already installed on the ANT-20 and the icons “Remote On”, “Remote Off” and “Remote Configuration” are shown in the Windows 95 file folder “ANT-20”.

Note: A release code is required to enable the Remote Control GPIB Option.
For detailed information contact your nearest Wavetek Wandel Goltermann Service Center. The addresses are listed at the end of this manual.
When contacting the Service Center, always quote:
- The serial number of the ANT-20
- The version number of the ANT-20 software package

Verify the PCMCIA GPIB card installation as described in section “Verify the PCMCIA GPIB card installation” below.

If you ordered the Remote Control GPIB Option BN 3035/92.10 separately, install the software packages as follows:

Installing the GPIB Remote Control software

1. Start or return to Windows 95.
2. Insert the ANT-20 GPIB Remote Control for Windows 95 installation disk 1 into drive A:.
3. Click the Windows 95 “Start” button, choose “Run ...” and
   type the following command into the dialog box:
   A:\setup
   Confirm with “OK”.
4. Follow the on-screen instructions during the installation procedure and enter
   C:\Tmp\Gpib
   as GPIB distribution directory.
5. After completion, click the Windows 95 “Start” button, choose “Run...” and
   type the following command into the dialog box:
   C:\Tmp\Gpib\gpib9513.exe
   Confirm with “OK”.
6. Follow the on-screen instructions during the setup procedure and use the default selection for components to install (all components selected).
7. After complete installation:
   – Shut down the ANT-20.
   – Remove the installation disk from drive A:.
   – Insert the PCMCIA GPIB card into a free PCMCIA slot.
   – Reboot the ANT-20.

Enable support for DOS applications as described below (by default, DOS support is disabled):

1. Return to Windows 95, click the Windows 95 “Start” button, choose “Settings” and then choose “Control Panel” from the submenu.
   In the “Control Panel” window, double-click the “System” icon.
2. In the “Device Manager” tab of the “System Properties” window,
   choose “View devices by type”,
   click on the “National Instruments GPIB Interfaces” icon in the list and then
   click on the “Properties” button.
3. In the “General” tab in the “National Instruments GPIB Interfaces Properties” window select the checkbox “Enable Support for DOS GPIB Applications” and confirm with “OK”.
4. Reboot the ANT-20.

Verify the PCMCIA GPIB card installation

1. The PCMCIA GPIB card must be in the slot!
2. Click the Windows 95 “Start” button, choose “Settings” and then
   choose “Control Panel” from the submenu.
   In the “Control Panel” window, double-click the “System” icon.
3. In the “Device Manager” tab of the “System Properties” window,
   choose “View devices by type”,
   double-click the “National Instruments GPIB Interfaces” icon in the list and then
   double-click “PCMCIA GPIB” in the sublist.
4. In the “GPIB Settings” tab of the “PCMCIA GPIB Properties” window, the entry for “Interface Name” must be “GPIB0”. If it is not, change it to “GPIB0”.
5. Deactivate the “System Controller” checkbox.
   (All other parameters are properly set by starting the ANT-20 remote control mode after completion of the installation procedure.)
6. Confirm with “OK”.

Installing the ANT-20 Remote Control software

1. Start or return to Windows 95.
2. Click the Windows 95 “Start” button,
   choose “Run...” and type the following command into the dialog box:
   C:\ANT20.SUP\DISK1\setup.exe
   Confirm with “OK”.
3. Follow the on-screen instructions to install the ANT-20 Remote Control and select only the “Remote Control Software” as component to install.

The following patch installation described in steps 4, 5 and 6 is only required for ANT-20 software versions less or equal 7.0. It has no effect on versions greater than 7.0.

4. Insert the ANT-20 GPIB Remote Control for Windows 95 installation disk 3 into drive A:.
5. Click on the Windows 95 “Start” button, choose “Run...” and
   type the following command into the dialog box:
   A:\setup
   Confirm with “OK”.
6. Follow the on-screen instructions.
   After completion, remove the installation disk from drive A:.

Note: Only for ANT-20 software versions less or equal 7.0:
If there is any need to execute C:\ANT20.SUP\DISK1\setup.exe (with the component “Remote Control Software” selected) at a later time again, the above described patch installation (steps 4, 5 and 6) must also be executed again.

7. Exit Windows 95 and reboot the ANT-20.

After this installation procedure, you can enable the remote control mode by using the taskbar:

1. “Start/ANT-20/Remote On”.
2. Then double-click on the “ANT-20” icon on the desktop or
   use the taskbar: “Start/ANT-20/ANT-20”.

1.2.2.3 Hardware installation

1. Insert the PCMCIA GPIB card into a free PCMCIA socket the same way you insert a disk into a floppy drive.
   The PCMCIA GPIB has no jumpers or switches to set, and you do not need to power down the ANT-20 when you insert or remove the card.
2. Connect the PCMCIA GPIB cable to the PCMCIA GPIB card.

1.2.3 Connecting to GPIB

The GPIB Remote Control interface is equipped with a standard 24-way connector conforming to IEEE 488.1.

GPIB cables of various lengths are available for connecting the ANT-20 to other instruments and to the bus controller:

- 1.2 m long: Part number K 420
- 2.0 m long: Part number K 421

Note:
- The total length of GPIB cable must not exceed 2 meters x the number of instruments in the interface system.
- Up to 15 instruments can be connected to the interface system. The maximum cable run used to connect a group of instruments is 20 meters. For more information refer to the IEEE 488.1 standard.
- Longer distances can be bridged using interface couplers (2-wire or 4-wire connections, if necessary with suitable modems).

1.2.4 Device address

Each instrument in the interface system must have a unique address to allow the controller to access each one individually.

The ANT-20 address can be changed by editing the remote.bat batch file.
Any address in the range 0 to 30 can be selected.

ANT-20, ANT-20E with Windows 3.11:

1. Double-click on the “Remote Configuration” icon in the “ANT-20” group in the “Program Manager” window to edit the remote.bat file.
2. Follow the on-screen instructions.

Windows 95:

1. Click on the “Remote Configuration” icon via taskbar: “Start/ ANT-20/Remote Configuration” to edit the remote.bat file.
2. Follow the on-screen instructions.

Note: Make sure that a given address is used only once within the interface system. The controller address is reserved for the controller.

1.2.5 Interface functions

1.2.5.1 Overview

Interface function		Note
SH1	Source Handshake	Complete capability
AH1	Acceptor Handshake	Complete capability
T8	Talker	No Talk Only capability No Serial Poll capability
L4	Listener	No Listen Only capability
SR0	Service Request	No capability
RL0	Remote/Local	No capability
PP0	Parallel Poll	No capability
DC1	Device Clear	Complete capability
DT0	Device Trigger	No capability
C0	Controller	No capability

Table I-2 Interface functions conforming to the IEEE 488.1 standard

1.2.5.2 Device Clear

When the IEEE 488 interface message Device Clear (DCL) or Selected Device Clear (SDC) is sent to the ANT-20, a device clear message is routed to all internal measuring modules, regardless of whether they are selected or deselected.

The device clear message initializes remote control of the instrument and ensures that a subsequently sent program message will be accepted and processed.

No instrument initialization is performed by DCL or SDC. To initialize the instrument, select every measuring module and send the reset command
*RST (MODule:SELect <module_name>; *RST).

1.3 V.24/V.28 (RS 232) Remote Control interface

1.3.1 Items included

The Remote Control V.24/RS 232 Option BN 3035/91.01 consists of

- Remote Control Operating Manual
- Brochure “SCPI and IEEE 488, Programmer’s Introduction”

1.3.2 Installation

For remote control via RS 232 the built-in serial port (COM1) of the embedded PC-AT is used.

1.3.2.1 Software installation

Software installation under Windows 3.11

If you ordered the Remote Control V.24/V.28 (RS 232) Option BN 3035/91.01 together with your ANT-20, the required software package is already installed on the ANT-20 and the icons "Remote", "Remote Disable" and "Remote Configuration" are shown in the "ANT-20" group in the "Program Manager" window.

Note: A release code is required to enable the Remote Control V.24/V.28 (RS 232) Option. For detailed information contact your nearest Wavetek Wandel Goltermann Service Center. The addresses are listed at the end of this manual.
When contacting the Service Center, always quote:
- The serial number of the ANT-20
- The version number of the ANT-20 software package

If you ordered the Remote Control V.24/V.28 (RS 232) Option BN 3035/91.01 separately, install the software package as follows:

Installing the ANT-20 Remote Control software

1. Start or return to Windows
2. Choose "Run..." from the "File" menu in the "Program Manager" window and type the following command into the dialog box:
   C:\ANT20.SUP\DISK1\setup.exe
   Confirm with "OK".
3. Follow the on-screen instructions to install the ANT-20 Remote Control.
4. After complete installation exit Windows, and reboot the ANT-20.

After this installation procedure, the ANT-20 can be set to remote control mode by double-clicking on the "Remote" icon in the "ANT-20" group in the "Program Manager" window.

Software installation under Windows 95

If you ordered the Remote Control V.24/V.28 (RS 232) Option BN 3035/91.01 together with your ANT-20, the required software package is already installed on the ANT-20 and the icons "Remote On", "Remote Off" and "Remote Configuration" are shown in the Windows 95 file folder "ANT-20".

Note: A release code is required to enable the Remote Control V.24/V.28 (RS 232) Option. For detailed information contact your nearest Wavetek Wandel Goltermann Service Center. The addresses are listed at the end of this manual.
When contacting the Service Center, always quote:
- The serial number of the ANT-20
- The version number of the ANT-20 software package

If you ordered the Remote Control V.24/V.28 (RS 232) Option BN 3035/91.01 separately, install the software package as follows:

Installing the ANT-20 Remote Control software

1. Start or return to Windows 95.
2. Click the Windows 95 “Start” button,
   choose “Run...” and type the following command into the dialog box:
   C:\ANT20.SUP\DISK1\setup.exe
   Confirm with “OK”.
3. Follow the on-screen instructions to install the ANT-20 Remote Control.
4. After complete installation exit Windows 95, and reboot the ANT-20.

After this installation procedure, you can enable the remote control mode by using the taskbar:

1. “Start/ANT-20/Remote On”.
2. Then double-click on the “ANT-20” icon on the desktop or
   use the taskbar: “Start/ANT-20/ANT-20”.

1.3.3 Connecting to V.24/V.28 (RS 232)

The interface connector (serial port COM1) is a 9-way SUB-D male connector.

Pin	ITU-T V.24	DIN 66 020	EIA/TIA RS 232	Description ITU-T V.24 (RS 232)		Input (I) or Output (O)
3	103	D1	BA	TXD	Transmitted data	O
2	104	D2	BB	RXD	Received data	I
7	105	S2	CA	RTS	Request to send	O
8	106	M2	CB	CTS	Ready for sending/Clear to send	I
6	107	M1	CC	DSR	Date set ready	I
5	102	E2	AB	SGND	Signal ground or common return	-
1	109	M5	CF	DCD	Data channel received line signal detector/Data carrier detect	I
4	108.2	S1.2	CD	DTR	Data terminal ready	O
9	125	M3	CE	RI	Calling indicator/Ring indicator	I

Table I-3 Pinning and signal description

The connection of an ANT-20 to a PC is shown below. Both the ANT-20 and the PC function as Data Terminal Equipment (DTE):

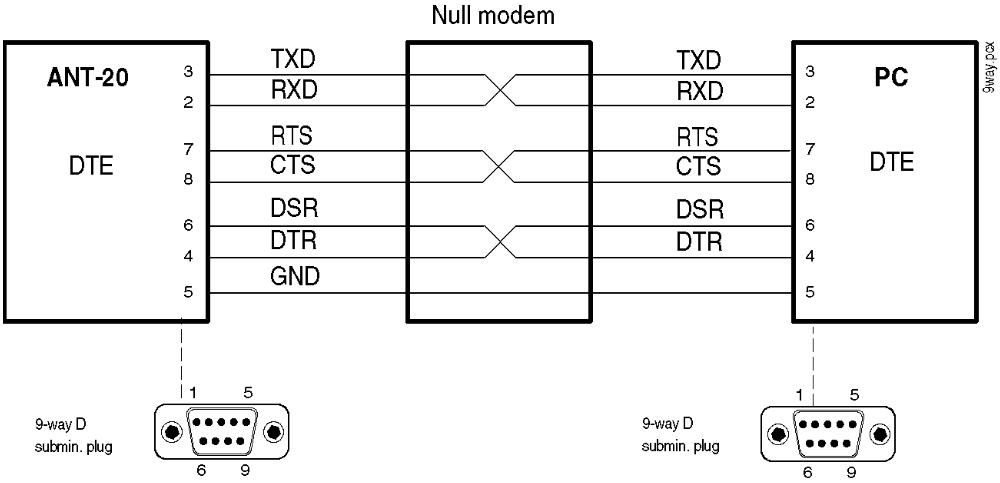


Fig. I-1 9-way connection

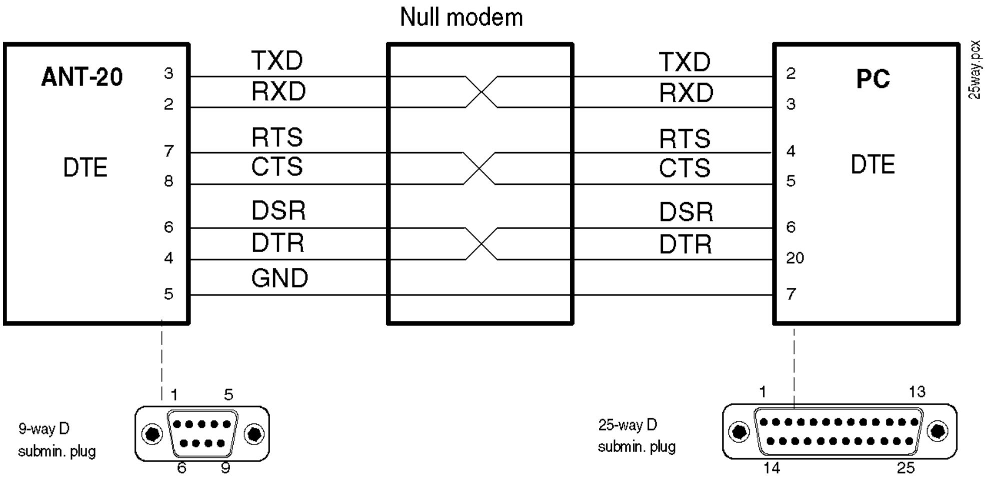


Fig. I-2 25-way connection

An appropriate cable with both 9-way and 25-way SUB-D female connectors on each end is available:

Part number K 764 (3.0 m long)

1.3.4 Transmission parameters

The **baud rate** can be changed by editing the remote.bat batch file.

ANT-20, ANT-20E with Windows 3.11:

1. Double-click on the “Remote Configuration” icon in the “ANT-20” group in the “Program Manager” window to edit the remote.bat file.
2. Follow the on-screen instructions.

Windows 95:

1. Click on the “Remote Configuration” icon via taskbar: “Start/ ANT-20/Remote Configuration” to edit the remote.bat file.
2. Follow the on-screen instructions.

The following baud rates can be selected:

- 1200 bit/s
- 2400 bit/s
- 4800 bit/s
- 9600 bit/s
- 19200 bit/s
- 38400 bit/s
- 57600 bit/s

The interface operates in full-duplex (FDX) mode.

The other transmission parameters are fixed and cannot be changed:

Parameter	Setting
Parity	None
Number of stop bits per character	1
Number of data bits per character	8
Flow control	Hardware handshake by control lines RTS/CTS

Table I-4 Fixed V.24/RS 232 Transmission parameters

1.3.5 Interface functions

1.3.5.1 Overview

There is no functional equivalence to the GPIB interface functions Service Request and Serial Poll.

However, the GPIB interface function Device Clear is simulated by a BREAK signal (see Sec. 1.3.5.2, Page I-14).

1.3.5.2 Device Clear

When the BREAK signal is sent to the ANT-20, a device clear message is routed to all internal measuring modules, regardless of whether they are selected or deselected.

BREAK is detected when the RXD input is at positive voltage (i.e. logical 0 or SPACE) for the entire character frame including the stop bit.

The device clear message initializes remote control of the instrument and ensures that a subsequently sent program message will be accepted and processed.

No instrument initialization is performed by the device clear message.

To initialize the instrument, select every measuring module and send the reset command *RST (MODule:SELect <module_name>; *RST).

2 DominoCOM ANT-20

2.1 General information

2.1.1 Items included

The delivery includes the following items relating to remote control:

- PCMCIA GPIB card including PCMCIA to GPIB cable (2 meters)
- Configuration disk: DominoCOM ANT-20 Remote Control
- Remote Control Operating Manual
- Brochure “SCPI and IEEE 488, Programmer‘s Introduction”

For DominoCOM ANT-20 with Windows 3.11 only:

- CardWare User´s Manual (Award Software Inc.)
- Distribution disk: CardWare Version 2.0 (Award Software Inc.)

2.1.2 Overview

The DominoCOM ANT-20 can be remotely controlled using the

- IEEE 488 (IEC 625) interface, often referred to as GPIB

– or –

- V.24/V.28 (RS 232) interface

The programming commands are identical, regardless of the type of remote control interface that is used.

From the viewpoint of remote control, each measuring module in the DominoCOM ANT-20 is a fully remote-controllable instrument with its own SCPI command tree, status reporting system and common command set.

The measuring module to be controlled is selected using the command MODule:SELect <module_name> (see Sec. 2.1.5, Page I-17).

Factory-set configuration:	Interface type	V.24/V.28 (RS 232)
	Baud rate	9600 bit/s

Refer to Sec. 2.1.3, Page I-15 for changing the type of remote control interface and/or its accompanying configuration parameters.

DominoCOM ANT-20 can operate in the ANT-20 mode with the use of an external monitor, keyboard and mouse. Refer to Sec. 2.1.4, Page I-16, for detailed information.

2.1.3 Changing the configuration

To change the type of remote control interface and/or its accompanying configuration parameters, follow these steps

1. Edit the remote.bat batch file (on the configuration disk) by using an external PC. Refer to the readme.txt file (on the configuration disk) for detailed editing information.
2. Insert the configuration disk into drive A: of the DominoCOM ANT-20 and reboot the DominoCOM ANT-20 (switch power off, then power on).

2.1.4 ANT-20 mode

By connecting an external monitor, keyboard and mouse to the embedded PC-AT, the DominoCOM ANT-20 can be operated in the same way as an ANT-20.

The display shows which measuring modules exist and which one is selected for remote control.

A monitor function can be switched on for debugging purposes during remote control mode that displays all messages sent to and from the DominoCOM ANT-20, corresponding to each operating step performed.

Edit the remote.bat batch file (for changing the type of the remote control interface and/or its accompanying configuration parameters) as follows:

DominoCOM ANT-20 with Windows 3.11:

1. Double-click on the “Remote Configuration” icon in the “ANT-20” group in the “Program Manager” window.
2. Follow the on-screen instructions.

Windows 95:

1. Click on the “Remote Configuration” icon via taskbar: “Start/ANT-20/Remote Configuration”.
2. Follow the on-screen instructions.

To leave remote control mode and enter normal manual control, follow these steps

DominoCOM ANT-20 with Windows 3.11:

⇒ Double-click on the “Remote Disable” icon in the “ANT-20” group in the “Program Manager” window.

Windows 95:

1. Disable remote mode using the taskbar: “Start/ANT-20/Remote Off”.
2. Then double-click on the “ANT-20” icon on the desktop or use the taskbar: “Start/ANT-20/ANT-20”.

To switch back to remote control mode, follow these steps

DominoCOM ANT-20 with Windows 3.11:

⇒ Double-click on the “Remote” icon in the “ANT-20” group in the “Program Manager” window.

Windows 95:

1. Enable remote mode using the taskbar: “Start/ANT-20/Remote On”.
2. Then double-click on the “ANT-20” icon on the desktop or use the taskbar: “Start/ANT-20/ANT-20”.

2.1.5 Module selection

The remote control interface of the DominoCOM ANT-20 supports multiple internal measuring modules. The module selection provides a mechanism to select one of these measuring modules for remote control.

Keyword	Parameter form	Notes
MODule:SELect	<module_name>[1]	[no query]
1 <module_name>: BASIC | JITTER | JITT16 | BAG		

Table I-5 Module selection

This command selects the measuring module specified by <module_name> for remote control and deselects all others. All subsequent commands (including commands in subsequent program messages) are passed to the selected measuring module. All other measuring modules are unavailable for programming until selected.

<module_name>:

BASIC: Selects BASIC Module
JITTER: Selects JITTER Module for bit rates up to STM4/OC12 (extension slot) (not available for ABT-20)
JITT16: Selects JITTER Module for bit rates of STM16/OC48 (extension slot) (not available for ABT-20)
BAG: Selects BAG Module (Broadband Analyzer/Generator)

Note:
- This command has no query form.
- After power-on, the BASIC measuring module is selected.
- If the MODule:SELect <module_name> command is required in a program message, it must be the first (or the only) command in that program message.

2.1.6 LabWindows/CVI driver

A LabWindows/CVI instrument driver is available for each measuring module.

Instrument drivers reduce application program development time and simplify instrument control by eliminating the need to learn the complex programming commands for each measuring module.

2.2 GPIB Remote Control interface

This section describes the GPIB Remote Control interface for applications using the DominoCOM ANT-20 as a remote controlled instrument.

Applications using the DominoCOM ANT-20 as a GPIB Controller for controlling external instruments are also possible (e.g. running the WG CATS Test Executive BN 3045 on the DominoCOM ANT-20 to control the DominoCOM ANT-20 measurement hardware plus external instruments).

To allow both these mutually exclusive operating modes to be used, the GPIB Remote Control interface and installation comprises all the software required for both operating modes.

2.2.1 Installation

2.2.1.1 Overview

The PCMCIA GPIB interface from National Instruments Corp. (NI) is used with the NI-488.2/ NI-488.2M software for GPIB Remote Control. This software is already installed on the DominoCOM ANT-20.

For DominoCOM ANT-20 with Windows 3.11 only:

- The NI-488.2 software requires standardized PCMCIA system software with Socket and Card Services (version 2.0 or higher) to be installed.
- A software called CardWare (written by Award Software Inc.) is used as PCMCIA system software. It can also be used with a wide variety of other PCMCIA cards.
- The CardWare software is already installed on the DominoCOM ANT-20 and suitably configured.

2.2.1.2 Configuration for GPIB

Set the configuration parameters:

- Interface type GPIB
- Device address

by editing the remote.bat batch file.
Refer to Sec. 2.1.3, Page I-15, for detailed information.

Each instrument in the interface system must have an unique address to allow the controller to access each one individually.

Any address in the range 0 to 30 can be selected.

Note: Make sure that a given address is used only once within the interface system. The controller address is reserved for the controller.

2.2.1.3 Hardware installation

1. Insert the PCMCIA GPIB card into a free PCMCIA socket the same way you insert a disk into a floppy drive.
   The PCMCIA GPIB has no jumpers or switches to set, and you do not need to power down the DominoCOM ANT-20 when you insert or remove the card.
2. Connect the PCMCIA GPIB cable to the PCMCIA GPIB card.

2.2.2 Connecting to GPIB

The GPIB Remote Control interface is equipped with a standard 24-way connector conforming to IEEE 488.1.

GPIB cables of various lengths are available for connecting the DominoCOM ANT-20 to other instruments and to the bus controller:

- 1.2 m long: Part number K 420
- 2.0 m long: Part number K 421

Note:
- The total length of GPIB cable must not exceed 2 meters x the number of instruments in the interface system.
- Up to 15 instruments can be connected to the interface system. The maximum cable run used to connect a group of instruments is 20 meters. For more information refer to the IEEE 488.1 standard.
- Longer distances can be bridged using interface couplers (2-wire or 4-wire connections, if necessary with suitable modems).

2.2.3 Interface functions

2.2.3.1 Overview

Interface function		Note
SH1	Source Handshake	Complete capability
AH1	Acceptor Handshake	Complete capability
T8	Talker	No Talk Only capability No Serial Poll capability
L4	Listener	No Listen Only capability
SR0	Service Request	No capability
RL0	Remote/Local	No capability
PP0	Parallel Poll	No capability
DC1	Device Clear	Complete capability
DT0	Device Trigger	No capability
C0	Controller	No capability

Table I-6 Interface functions conforming to the IEEE 488.1 standard

2.2.3.2 Device Clear

When the IEEE 488 interface message Device Clear (DCL) or Selected Device Clear (SDC) is sent to the DominoCOM ANT-20, a device clear message is routed to all internal measuring modules, regardless of whether they are selected or deselected.

The device clear message initializes remote control of the instrument and ensures that a subsequently sent program message will be accepted and processed.

No instrument initialization is performed by DCL or SDC.

To initialize the instrument, select every measuring module and send the reset command *RST (MODule:SELect <module_name>; *RST).

2.3 V.24/V.28 (RS 232) Remote Control interface

2.3.1 Installation

2.3.1.1 Overview

For remote control via RS 232 the built-in serial port (COM1) of the embedded PC-AT is used.

2.3.1.2 Configuration for V.24/V.28 (RS 232)

Set the configuration parameters:

- Interface type V.24/V.28 (RS 232)
- Baud rate

by editing the remote.bat batch file.
Refer to Sec. 2.1.3, Page I-15.

The following baud rates can be selected:

- 1200 bit/s
- 2400 bit/s
- 4800 bit/s
- 9600 bit/s
- 19200 bit/s
- 38400 bit/s
- 57600 bit/s

The interface operates in full-duplex (FDX) mode.

The other transmission parameters are fixed and cannot be changed:

Parameter	Setting
Parity	None
Number of stop bits per character	1
Number of data bits per character	8
Flow control	Hardware handshake by control lines RTS/CTS

Table I-7 Fixed V.24/RS 232 Transmission parameters

2.3.2 Connecting to V.24/V.28 (RS 232)

The interface connector (serial port COM1) is a 9-way SUB-D male connector.

Pin	ITU-T V.24	DIN 66 020	EIA/TIA RS 232	Description ITU-T V.24 (RS 232)		Input (I) or Output (O)
3	103	D1	BA	TXD	Transmitted data	O
2	104	D2	BB	RXD	Received data	I
7	105	S2	CA	RTS	Request to send	O
8	106	M2	CB	CTS	Ready for sending/Clear to send	I
6	107	M1	CC	DSR	Date set ready	I
5	102	E2	AB	SGND	Signal ground or common return	-
1	109	M5	CF	DCD	Data channel received line signal detector/Data carrier detect	I
4	108.2	S1.2	CD	DTR	Data terminal ready	O
9	125	M3	CE	RI	Calling indicator/Ring indicator	I

Table I-8 Pinning and signal description

The connection of a DominoCOM ANT-20 to a PC is shown below.
Both the DominoCOM ANT-20 and the PC function as Data Terminal Equipment (DTE):

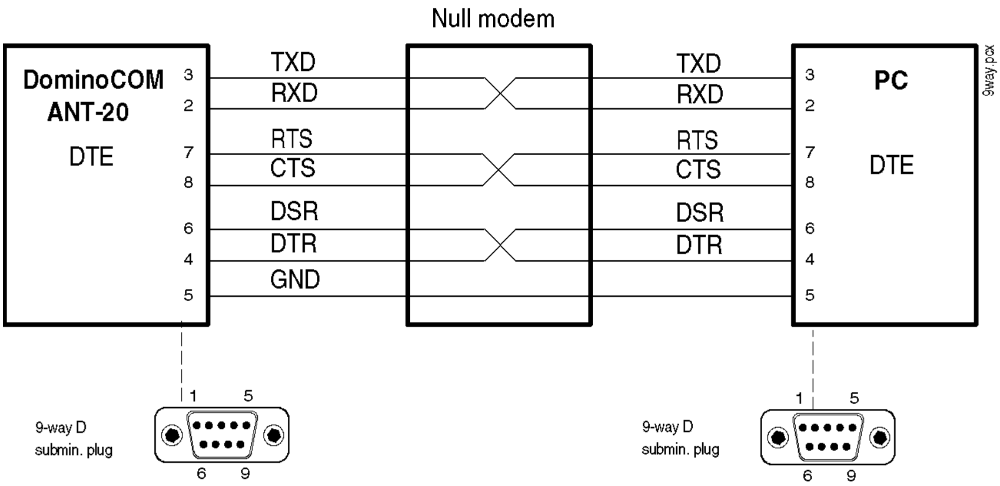


Fig. I-3 9-way connection

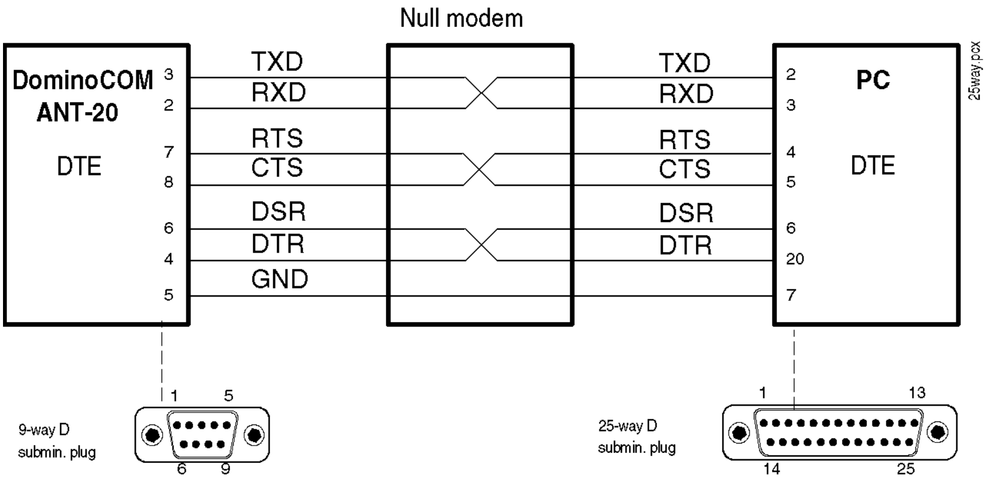


Fig. I-4 25-way connection

An appropriate cable with both 9-way and 25-way SUB-D female connectors on each end is available:

Part number K 764 (3.0 m long)

2.3.3 Interface functions

2.3.3.1 Overview

There is no functional equivalence to the GPIB interface functions Service Request and Serial Poll.

However, the GPIB interface function Device Clear is simulated by a BREAK signal (see Sec. 2.3.3.2, Page I-24).

2.3.3.2 Device Clear

When the BREAK signal is sent to the DominoCOM ANT-20, a device clear message is routed to all internal measuring modules, regardless of whether they are selected or deselected.

BREAK is detected when the RXD input is at positive voltage (i.e. logical 0 or SPACE) for the entire character frame including the stop bit.

The device clear message initializes remote control of the instrument and ensures that a subsequently sent program message will be accepted and processed.

No instrument initialization is performed by the device clear message.

To initialize the instrument, select every measuring module and send the reset command *RST (MODule:SELect <module_name>; *RST).

3 TX/RX SCPI block diagram

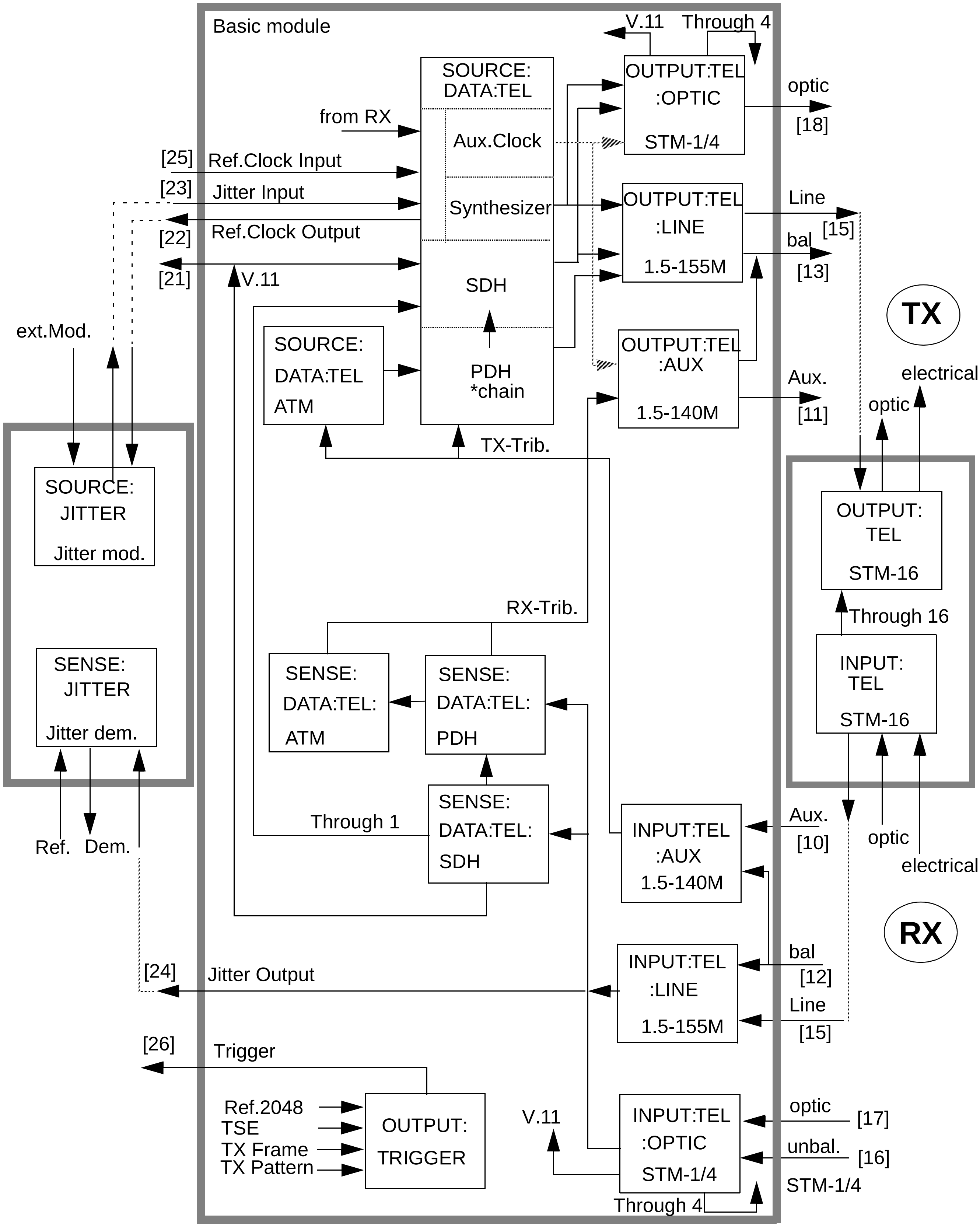


Fig. I-5 TX/RX SCPI block diagram

4 Operating information

This chapter gives the programmer some basic information which should make it easier to program this device.

- Program messages are executed in the order they are received from the controller. However, the execution of any command does not start before the PMT (Program Message Terminator <NL>) or any other sequential command is received. This gives full flexibility in controlling the device without the need to worry about the dependencies between individual commands, because the settings of coupled commands received within a single message are checked after the whole message is received.
- Commands are treated as “overlapped commands” except where otherwise noted. Overlapped commands allow the next command to be executed before the preceding command has finished execution. This gives better performance and makes it possible to change some settings while a measurement is running, for example. You can use the common command *WAI to force sequential operation whenever you need to.
- Any error detected within a program message is written into the error queue. You can read entries out of the error queue using the SYST:ERR? command. Any program message is read from the input buffer and parsed as far as possible to detect potential errors. Nevertheless, the device setting may be undefined after any error.
- Queries are not allowed to have side effects. Thus, queries of commands set in the same program message will return the old command setting.
- Note that using the SCPI short form of the commands (capital letters) will reduce operational overhead and can increase your system performance.
- The input buffer size is 4096 bytes (4 kB).
- The output buffer size is 8192 bytes (8 kB). Requesting a response with more than 8192 bytes would cause a query error.

5 Command hierarchy

5.1 Introduction

This section is intended to give programmers an overview of the hierarchical relationships between the commands.

Each command is independent. However, since the parameters are related, each parameter has a priority between 1 and 4, with 1 being the highest and 4 the lowest.

If a higher-priority parameter is modified, lower-priority parameters may be automatically modified as well. This automatic mechanism assures logically consistent instrument settings that comply with standards, thereby avoiding error messages. It also simplifies programming since many settings are made automatically and do not need to be programmed.

The priorities come into play when individual commands are sent to the instrument. However, if multiple commands are grouped in a command sequence, the priorities are inactive within the command sequence.

Note: Send individual commands in order of decreasing priority so that settings are not overwritten by subsequent commands.

If you transmit command sequences, be careful to provide consistent data since the instrument does not make automatic corrections in this case.

5.2 Command hierarchy (generator)

Remote Command	Priority
*RST on page R-5	1
:SOUR:DATA[:TEL]:STAN on page R-254	2
:SOUR:MODE on page R-255	3
:SOUR:DATA[:TEL]:NEL on page R-86	4
:SOUR:DATA[:TEL]:SOUR:DIV on page R-252	5
:SOUR:DATA[:TEL]:SDH:RATE on page R-213	6
:SOUR:DATA[:TEL]:SOUR[:SOCK] on page R-253	7
:SOUR:DATA[:TEL]:SDH:MAPP on page R-168	8
:SOUR:DATA[:TEL]:SDH:MAPP:CONC[:MODE] on page R-170	9
:SOUR:DATA[:TEL]:SDH:MAPP:TUFL on page R-172	9
:SOUR:DATA[:TEL]:SDH:PAYL:TYPE on page R-195	10
:SOUR:DATA[:TEL]:SDH:TRIB:MAPP on page R-235	11
:SOUR:DATA[:TEL]:SDH:CHAN on page R-144	12
:SOUR:DATA[:TEL]:SDH:STMN:CHAN on page R-217	12
all other commands of node :SOUR:DATA[:TEL]:SDH on page R-135 ff	13

Table I-9 Command hierarchy (generator)

Remote Command	Priority
:SOUR:DATA[:TEL]:PDH:RATE on page R-129	12
:SOUR:DATA[:TEL]:PDH:FRAM on page R-104	13
:SOUR:DATA[:TEL]:PDH:PAYL:TYPE on page R-128	14
:SOUR:DATA[:TEL]:PDH:M2:FRAM on page R-107	15
:SOUR:DATA[:TEL]:PDH:M34:FTYP on page R-116	15
:SOUR:DATA[:TEL]:PDH:M140:FTYP on page R-123	15
:SOUR:DATA[:TEL]:PDH:DS1:FRAM on page R-96	15
:SOUR:DATA[:TEL]:PDH:DS3:FRAM on page R-101	15
all other commands of node :SOUR:DATA[:TEL]:PDH on page R-91 ff	16
:SOUR:DATA[:TEL]:ATM:NINT on page R-74	17
:SOUR:DATA[:TEL]:ATM:PAYL:TYPE on page R-75	18
:SOUR:DATA[:TEL]:ATM:HEAD:CLP on page R-70 and other commands of the ...:HEAD node.	19
:SOUR:DATA[:TEL]:ATM:DIST:TYPE on page R-66	20
all other commands of node :SOUR:DATA[:TEL]:ATM on page R-58 ff	21
all other transmitter commands	22

Table I-9 Command hierarchy (generator) *(continued)*

5.3 Command hierarchy (receiver)

Remote Command	Priority
*RST on page R-5	1
[:SENS]:DATA[:TEL]:STAN on page R-378	2
[:SENS]:MODE on page R-406	3
[:SENS]:DATA[:TEL]:SDH:RATE on page R-370	6
[:SENS]:DATA[:TEL]:SENS on page R-378	7
[:SENS]:DATA[:TEL]:SDH:MAPP on page R-357	8
[:SENS]:DATA[:TEL]:SDH:MAPP:CONC[:MODE] on page R-358	9
[:SENS]:DATA[:TEL]:SDH:MAPP:TUFL on page R-360	9
[:SENS]:DATA[:TEL]:SDH:PAYL:TYPE on page R-365	10
[:SENS]:DATA[:TEL]:SDH:TRIB:MAPP on page R-375	11
[:SENS]:DATA[:TEL]:SDH:CHAN on page R-353	12
[:SENS]:DATA[:TEL]:SDH:STMN:CHAN on page R-372	12

Table I-10 Command hierarchy (receiver)

Remote Command	Priority
all other commands of node [:SENS]:DATA[:TEL]:SDH on page R-352 ff	13
[:SENS]:DATA[:TEL]:PDH:RATE on page R-350	12
[:SENS]:DATA[:TEL]:PDH:FRAM on page R-334	13
[:SENS]:DATA[:TEL]:PDH:PAYL:TYPE on page R-349	14
[:SENS]:DATA[:TEL]:PDH:M2:FRAM on page R-336	15
[:SENS]:DATA[:TEL]:PDH:M34:FTYP on page R-340	15
[:SENS]:DATA[:TEL]:PDH:M140:FTYP on page R-345	15
[:SENS]:DATA[:TEL]:PDH:DS1:FRAM on page R-331	15
[:SENS]:DATA[:TEL]:PDH:DS3:FRAM on page R-333	15
all other commands of node [:SENS]:DATA[:TEL]:PDH on page R-330 ff	16
[:SENS]:DATA[:TEL]:ATM:NINT on page R-320	17
[:SENS]:DATA[:TEL]:ATM:VCI on page R-323	18
[:SENS]:DATA[:TEL]:ATM:VCI:FILT on page R-323	18
[:SENS]:DATA[:TEL]:ATM:VPI on page R-324	18
[:SENS]:DATA[:TEL]:ATM:PAYL:TYPE on page R-321	19
all other commands of node [:SENS]:DATA[:TEL]:ATM on page R-316 ff	20
all other receiver commands	21

Table I-10 Command hierarchy (receiver) *(continued)*

6 Programming examples

This chapter contains some short sample programs to help you get familiar with the remote control operation of this device.

6.1 Notation

The sample programs are written in C programming language style using the functions “clear”, “write”, “wait” and “read” as placeholders for the different functions used by programmers depending on their programing language.

Note: A “NOEND” as the second parameter of the function “write” indicates that the same program message is continued in the next line without sending a program message terminator (PMT). An “END” indicates that a program message terminator (PMT) should be sent.
Multiple commands can be appended into one “big” program message using NOEND.
Checking of coupled parameters and the execution of all commands starts after the PMT or any sequential command is received.

6.2 Example 1 (PDH measurement)

This sample program performs a simple 2 Mbit/s FAS (frame alignment signal) measurement. Note that the default device setting after a *RST command is a 2 Mbit/s framed PDH signal.

```
      // Send device clear to reset input buffer
      // and output queue.
      // Initialize communication protocol.
clear();
      // Clear status register and error queue.
write (“*CLS”, END);
      // Reset device to standard setting.
      // TX and RX set to 2 Mbit/s (E1) framed signal.
write (“*RST”, END);
      // Select 2 Mbit/s FAS error
      // count and alarm ratio as requested results.
write (“SENS:FUNC:ON ’ARAT:PDH:M2:FAS’”,END);
write (“SENS:FUNC:ON ’ECO:PDH:M2:FAS’",END);
      // Set measurement duration to 1 sec.
write (“SENS:SWE:TIME 1 s”, END);
      // start measurement.
write (“INIT”, END);
      // Wait until measurement has finished and
      // place results into the output queue.
write (“*WAI;SENS:DATA:FIN?”,END);
      // Read response from device.
read();
```

6.3 Example 2 (SDH C4 measurement)

This sample program performs a STM1 155 Mbit/s measurement using a C4 mapping which includes a PDH 140 Mbit/s signal.

```
      // Send device clear to reset input buffer
      // and output queue.
      // Initialize communication protocol.
clear();
      // Clear status register and error queue.
write (“*CLS”, END);
      // Reset device to standard setting.
      // TX and RX set to 2 Mbit/s (E1) framed signal.
write (“*RST”, END);
      // Set transmitter to SDH mode.
write (“:SOUR:MODE SDH;” ,NOEND);
      // Set transmitter bit rate to STM1/STS3 (is default).
write (“:SOUR:DATA:SDH:RATE STM1;”,NOEND);
      // Set C4/STS3CSPE mapping.
write (“:SOUR:DATA:SDH:MAPP C4;”,NOEND);
      // Included PDH 140 Mbit/s MUX chain
      // deactivated.
write (“:SOUR:DATA:SDH:PAYL:TYPE PDH;”,NOEND);
write (“:SOUR:DATA:PDH:RATE M140,M140;”,END);

      // Set receiver to SDH mode.
write (“:SENS:MODE SDH;”,NOEND);
      // Set receiver bit rate to STM1 (is default).
write (“:SENS:DATA:SDH:RATE STM1;”,NOEND);
      // Set C4/STS3CSPE mapping.
write (“:SENS:DATA:SDH:MAPP C4;”,NOEND);
      // Included PDH 140 Mbit/s DEMUX chain
      // deactivated.
write (“:SENS:DATA:SDH:PAYL:TYPE PDH;”,NOEND);
write (“:SENS:DATA:PDH:RATE M140,M140;”,END);

      // Select requested results.
write (“:SENS:FUNC:ON ’ACO:TSE’", END);
      // Add more requested results.
write (“:FUNC ’ECO:TSE’", END);
write (“:FUNC ’ACO:SDH:MSB’", END);
write (“:FUNC ’ECO:SDH:MSB’", END);
      // Set measurement duration to 1 hour.
write (“:SENS:SWE:TIME 1 hr”, END);
      // Start measurement.
write (“:INIT”, END);
      // Wait 1 hour.
wait 3600;
      // Place results into the output queue.
write (“:SENS:DATA:FIN?”,END);
      // Read response from device.
read();
```

6.4 Example 3 (SDH overhead)

This sample program performs a receiver STM1/STS3 155 Mbit/s section overhead (SOH/TOH) capture.

```
      // Send device clear to reset input buffer
      // and output queue.
      // Initialize communication protocol.
clear();
      // Clear status register and error queue.
write (“*CLS”, END);
      // Reset device to standard setting.
      // TX and RX set to 2 Mbit/s framed signal.
write (“*RST”, END);
      // Set receiver to SDH mode.
write (“:SENS:MODE SDH;” ,NOEND);
      // Set receiver bit rate to STM1/STS3 (is default).
write (“:SENS:DATA:SDH:RATE STM1;” ,NOEND);
      // Take an overhead snapshot and place data into the
      // output queue.
write (“:FETC:OVER?”,END);
      // Read response from device.
read();
```

6.5 Example 4 (SDH overhead measurement)

This sample program performs a STM1/STS3 155 Mbit/s measurement within the communication channel (D1..D3) bytes of the STM1/STS3 overhead.

```
      // Send device clear to reset input buffer
      // and output queue.
      // Initialize communication protocol.
clear();
      // Clear status register and error queue.
write (“*CLS”, END);
      // Reset device to standard setting.
      // TX and RX set to 2 Mbit/s framed signal.
write (“*RST”, END);
      // Set transmitter to SDH mode.
write (“:SOUR:MODE SDH;” ,NOEND);
      // Set overhead insertion into D1..D3 bytes.
write (“:SOUR:DATA:SDH:OVER:BYT SDCC;” ,NOEND);
      // Activate overhead insertion from internal source.
write (“:SOUR:DATA:SDH:OVER:INS INT;” ,END);

      // Set receiver to SDH mode.
write (“:SENS:MODE SDH;” ,NOEND);
      // Set overhead drop to D1..D3 bytes.
write (“:SENS:DATA:SDH:OVER:BYT SDCC;” ,NOEND);
      // Select measurement for test sequence errors within
      // the overhead instead of the payload.
write (“:SENS:DATA:SDH:ERR:TSE:SOUR OVER;” ,END);

      // Select requested results.
```

```
write (“SENS:FUNC:ON ’CST:SIGN’", END);
write (“FUNC ’ECO:TSE’", END);
      // Set measurement duration to 1 minute.
write (“SENS:SWE:TIME 1 min”, END);
      // start measurement.
write (“INIT”, END);
      // Wait until measurement has finished and
      // place results into the output queue.
write (“*WAI;SENS:DATA:FIN?”,END);
      // Read response from device.
read();
```

6.6 Example 5 (SONET STS1-SPE measurement)

This sample program performs a STS1 51 Mbit/s measurement using a STS1SPE mapping which includes a DS3 signal.

```
      // Send device clear to reset input buffer
      // and output queue.
      // Initialize communication protocol.
clear();
      // Clear status register and error queue.
write (“*CLS”, END);
      // Reset device to standard setting.
write (“*RST”, END);
      // Set ANSI mode (SONET instead of SDH)
write (“SOUR:DATA:STAN ANSI;” , END);
      // Set transmitter to synchronous mode instead of
      // asynchronous (PDH)
write (“:SOUR:MODE SDH;” ,NOEND);
      // Set transmitter bit rate to STS1.
write (“:SOUR:DATA:SDH:RATE STS1;”,NOEND);
      // Set STS1SPE mapping.
write (“:SOUR:DATA:SDH:MAPP STS1SPE;”,NOEND);
      // select payload type (can be ATM or PATT (bulk) or PDH (DSn)|
write (“:SOUR:DATA:SDH:PAYL:TYPE PDH;”,NOEND);
write (“:SOUR:DATA:PDH:RATE DS3,DS3;”,END);
      // Set receiver to synchronous mode (SONET).
write (“:SENS:DATA:STAN ANSI;” , END);
write (“:SENS:MODE SDH;”,NOEND);
      // Set receiver bit rate to STM1 (is default).
write (“:SENS:DATA:SDH:RATE STS1;”,NOEND);
      // Set STS1SPE mapping.
write (“:SENS:DATA:SDH:MAPP STS1SPE;”,NOEND);
      // select payload type (can be ATM or PATT (bulk) or PDH (DSn)|
write (“:SENS:DATA:SDH:PAYL:TYPE PDH;”,NOEND);
write (“:SENS:DATA:PDH:RATE DS3,DS3;”,END);
      // Select requested results.
write (“:SENS:FUNC:ON ‘ACO:TSE’”, END);
      // Add more requested results.
write (“:FUNC ‘ECO:TSE’”, END);
write (“:FUNC ‘ACO:SDH:MSB’”, END);
write (“:FUNC ‘ECO:SDH:MSB’”, END);
      // Set measurement duration to 1 hour.
```

```
write (“:SENS:SWE:TIME 1 hr”, END);
      // Start measurement.
write (“:INIT”, END);
      // Wait 1 hour.
wait 3600;
      // Place results into the output queue.
write (“:SENS:DATA:FIN?”,END);
      // Read response from device.
read();
```

6.7 Example 6 (SONET Transport overhead measurement)

This sample program performs a receiver STM1/STS3 155 Mbit/s Transport overhead (TOH) capture.

```
      // Send device clear to reset input buffer
      // and output queue.
      // Initialize communication protocol.
clear();
      // Clear status register and error queue.
write (“*CLS”, END);
      // Reset device to standard setting (E1).
write (“*RST”, END);
      // Set receiver to synchronous mode (SONET).
write (“:SENS:DATA:STAN ANSI;” , END);
write (“:SENS:MODE SDH;” ,NOEND);
      // Set receiver bit rate to STS3 (is default).
write (“:SENS:DATA:SDH:RATE STS3;” ,NOEND);
      // Take an overhead snapshot and place data into the
      // output queue.
write (“:FETC:OVER?”,END);
      // Read response from device.
read();
```

6.8 Example 7 (SONET DS1 ESF testing with LOF inserted)

```
      // Reset values
write (“*RST;”, END)
write (“:func:off:all;”, END)
      // Line code & framing
write (“:outp:line:code B8ZS;”, NOEND)
write (“:inp:line:code B8ZS;”, NOEND)
write (“:sour:mode pdh;”, NOEND)
write (“:sens:mode pdh;”, NOEND)
write (“:sour:data:pdh:fram fram;”, NOEND)
write (“:sens:data:pdh:fram fram;”, NOEND)
write (“:sour:data:pdh:ds1:fram esf107;”, NOEND)
write (“:sens:data:pdh:ds1:fram esf107;”, NOEND)
write (“:sour:data:pdh:rate ds1, ds1;”, NOEND)
write (“:sens:data:pdh:rate ds1, ds1;”, NOEND)
      // Test pattern
write (“:sour:data:payl:patt qrss20;”, NOEND)
write (“:sens:data:payl:patt qrss20;”, END)
```

```
      // Insert LOF
write (“:sour:data:pdh:alar lof1_5, cont;”, END)
      // Start/Stop measurement
write (“:sens:func ““CST:SIGN””,””CST:PDH2””,””ECO:TSE””,
      ””ECO:CODE””;”, END)
wait 2;
write (“:init;”, END)
wait 3;
write (“:abort;”, END)
      // read and compare results
write (“:sens:data:act?;”, END)
read();
test int 50 “test status of CST:SIGN”
test mask 0 245 “LOS !”
test int 53 “test status of CST:PDH2 result (Defects DS1)”
test mask 2 253 “Defect not LOF1.5”
test int 100 “test status ECO:TSE result”
test float 0 “bit error not 0”
test int 130 “test status ECO:CODE result”
test float 0 “BPV not 0”
```

7 Release Notes

This section contains a summary of all additions included from Software Release V6.6 onwards.

7.1 New commands

Summary of all new commands included from Software Release V6.6 onwards

:SOUR:DATA[:TEL]:PDH:DS3:FEAC[:ALAR] on page R-98
:SOUR:DATA[:TEL]:PDH:DS3:FEAC:LOOP[:TYPE] on page R-99
:SOUR:DATA[:TEL]:PDH:DS3:FEAC:LOOP:CODE on page R-100
:SOUR:DATA[:TEL]:SDH:ERR:FLEN on page R-162
:SOUR:DATA[:TEL]:SDH:MAPP:OFFS on page R-169
:SOUR:DATA[:TEL]:SDH:OVER:SEQ[:ACT] on page R-186
:SOUR:DATA[:TEL]:SDH:OVER:SEQ:MNP:DATA on page R-187
:SOUR:DATA[:TEL]:SDH:OVER:SEQ:POS:POH on page R-189
:SOUR:DATA[:TEL]:SDH:OVER:SEQ:POS:SOH | TOH on page R-190
:SOUR:DATA[:TEL]:SDH:OVER:SEQ:TYPE on page R-192
[:SENS]:DATA[:TEL]:PDH:DS3:FEAC:LOOP:RES on page R-332
[:SENS]:DATA[:TEL]:SDH:OVER:TCM:RES on page R-364
:FETC:SCAL[:DATA][:TEL][:SDH]:OVER? on page R-423
:FETC:STR[:DATA][:TEL][:SDH]:TCMonitoring:TRACe? on page R-432

Summary of all new commands included from Software Release V7.0 onwards

:SOUR:DATA[:TEL]:SDH:MAPP:CONC:CSIZ on page R-171
:SOUR:DATA[:TEL]:SDH:POIN:SSB on page R-207
:SOUR:DATA[:TEL]:SDH:OVER:SEQ:TCM:DATA on page R-191
:SOUR:DATA[:TEL]:SDH:OVER:SEQ:TCM:DATA:BLOC on page R-193

:INP:CLOC:WAND[:STAT] on page R-257

[:SENS]:DATA[:TEL]:SDH:MAPP:CONC:CSIZ on page R-359

Summary of all new commands included from Software Release V7.1 onwards

:OUTP[:TEL]:OPT3[:STAT] on page R-50
:SOUR:DATA[:TEL]:SDH:OVER[i]:DATA on page R-175
:SOUR:DATA[:TEL]:SDH:OVER[i]:DATA:BLOC on page R-177
:SOUR:DATA[:TEL]:SDH:OVER[i]:PRES on page R-179
:SOUR:DATA[:TEL]:SDH:OVER[i]:RDAT on page R-182
:SOUR:DATA[:TEL]:SDH:OVER[i]:RDAT:BLOC on page R-183
[:SENS]:DATA[:TEL]:ANAL:M2101:ALL on page R-304
[:SENS]:DATA[:TEL]:ANAL:M2101:ALL? on page R-304
[:SENS]:DATA[:TEL]:ANAL:M2101:BISO:BBE? on page R-304
[:SENS]:DATA[:TEL]:ANAL:M2101:BISO:ES? on page R-305
[:SENS]:DATA[:TEL]:ANAL:M2101:BISO:MULT on page R-305
[:SENS]:DATA[:TEL]:ANAL:M2101:BISO:MULT? on page R-305
[:SENS]:DATA[:TEL]:ANAL:M2101:BISO:SEP? on page R-306
[:SENS]:DATA[:TEL]:ANAL:M2101:BISO:SES? on page R-306
[:SENS]:DATA[:TEL]:ANAL:M2101:EVAL on page R-306
[:SENS]:DATA[:TEL]:ANAL:M2101:EVAL? on page R-307
[:SENS]:DATA[:TEL]:ANAL:M2101:S1:BBE? on page R-307
[:SENS]:DATA[:TEL]:ANAL:M2101:S1:ES? on page R-307
[:SENS]:DATA[:TEL]:ANAL:M2101:S1:SEP? on page R-308

[:SENS]:DATA[:TEL]:ANAL:M2101:S1:SES? on page R-308
[:SENS]:DATA[:TEL]:ANAL:M2101:S2:BBE? on page R-308
[:SENS]:DATA[:TEL]:ANAL:M2101:S2:ES? on page R-308
[:SENS]:DATA[:TEL]:ANAL:M2101:S2:SEP? on page R-309
[:SENS]:DATA[:TEL]:ANAL:M2101:S2:SES? on page R-309
[:SENS]:DATA[:TEL]:ANAL:M2101:UAS:LIM[:STAT] on page R-310
[:SENS]:DATA[:TEL]:ANAL:M2101:UAS:LIM[:STAT]? on page R-310
[:SENS]:DATA[:TEL]:ANAL:M2101:UAS:LIM:UPP on page R-310
[:SENS]:DATA[:TEL]:ANAL:M2101:UAS:LIM:UPP? on page R-311
[:SENS]:DATA[:TEL]:ANAL:M2101:UAS:MODE on page R-311
[:SENS]:DATA[:TEL]:ANAL:M2101:UAS:MODE? on page R-311
[:SENS]:DATA[:TEL]:LED:AUL[:STAT] on page R-325
[:SENS]:DATA[:TEL]:LED:TUL[:STAT] on page R-326
:[SENS]:DATA[:TEL]:SDH:OVER:TCM:TYPE on page R-364

Summary of all new commands included from Software Release V7.2 onwards

:SOUR:DATA[:TEL]:SDH:STSN:CHAN on page R-218
:SOUR:DATA[:TEL]:SDH:STSV:CHAN on page R-219
[:SENS]:DATA[:TEL]:SDH:STSN:CHAN on page R-373
[:SENS]:DATA[:TEL]:SDH:STSV:CHAN on page R-374
[:SENS]:DATA[:TEL]:ANAL:G828:ALL on page R-291
[:SENS]:DATA[:TEL]:ANAL:G828:ALL? on page R-291
[:SENS]:DATA[:TEL]:ANAL:G828:EVAL on page R-291
[:SENS]:DATA[:TEL]:ANAL:G828:EVAL? on page R-292
[:SENS]:DATA[:TEL]:ANAL:G828:SEPI[:STAT] on page R-292
[:SENS]:DATA[:TEL]:ANAL:G828:SEPI[:STAT]? on page R-292
[:SENS]:DATA[:TEL]:ANAL:G828:SES:THR on page R-292
[:SENS]:DATA[:TEL]:ANAL:G828:SES:THR? on page R-293
[:SENS]:DATA[:TEL]:ANAL:G828:SES:THR:AUTO on page R-293
[:SENS]:DATA[:TEL]:ANAL:G828:SES:THR:AUTO? on page R-293
[:SENS]:DATA[:TEL]:ANAL:G828:UAS:LIM[:STAT] on page R-294
[:SENS]:DATA[:TEL]:ANAL:G828:UAS:LIM[:STAT]? on page R-294
[:SENS]:DATA[:TEL]:ANAL:G828:UAS:LIM:UPP on page R-294
[:SENS]:DATA[:TEL]:ANAL:G828:UAS:LIM:UPP? on page R-294
[:SENS]:DATA[:TEL]:ANAL:G828:UAS:MODE on page R-295
[:SENS]:DATA[:TEL]:ANAL:G826:UAS:MODE? on page R-290
[:SENS]:DATA[:TEL]:ANAL:G829:EVAL on page R-295
[:SENS]:DATA[:TEL]:ANAL:G829:EVAL? on page R-296
[:SENS]:DATA[:TEL]:ANAL:G829:SES:THR on page R-296
[:SENS]:DATA[:TEL]:ANAL:G829:SES:THR? on page R-296
[:SENS]:DATA[:TEL]:ANAL:G829:SES:THR:AUTO on page R-297
[:SENS]:DATA[:TEL]:ANAL:G829:SES:THR:AUTO? on page R-297
[:SENS]:DATA[:TEL]:ANAL:M2101:SEPI[:STAT] on page R-309
[:SENS]:DATA[:TEL]:ANAL:M2101:SEPI[:STAT]? on page R-309
[:SENS]:DATA[:TEL]:ANAL:M2101:VERSion on page R-311
[:SENS]:DATA[:TEL]:ANAL:M2101:VERSion? on page R-312

7.2 Changed commands

Summary of all changed commands included from Software Release V6.6 onwards

:TRIG2[:SEQ]:LOG:SOUR on page R-30 <source> TCMF added
:SOUR:DATA[:TEL]:PAYL:PATT on page R-88 <pattern> IQRSS20 added
:SOUR:DATA[:TEL]:PDH:ALAR[:MODE] on page R-92 <alarm> FEAC added
:SOUR:DATA[:TEL]:PDH:ERR[:MODE] on page R-102 <error> CP45 added
:SOUR:DATA[:TEL]:SDH:ERR[:MODE] on page R-165 <mode> PER added
[:SENS]:DATA[:TEL]:PAYL:PATT on page R-328 <pattern> IQRSS20 added
[:SENS]:DATA:EVEN:NUMB? on page R-267 added new codes for the event memory
[:SENS]:FUNC[:ON] on page R-381 added new results for previous commands:

- Result IDs for :SENS:DATA and :SENS:FUNC commands on page R-382
- Result IDs for SDH/SONET results on page R-384
- Alarm field “CSTatus:SDH2”/“HSTatus:SDH2” on page R-274
- Alarm field “CSTatus:PDH2”/“HSTatus:PDH2” on page R-279
- Result field “CSTatus:TCMonitoring”/“HSTatus:TCMonitoring” on page R-281
- Result field “CSTatus:FEAC:LOOP:ON”/“CSTatus:FEAC:LOOP:OFF”/ “HSTatus:FEAC:LOOP:ON”/“HSTatus:FEAC:LOOP:OFF” on page R-280

Summary of all changed commands included from Software Release V7.0 onwards

:SOUR:DATA[:TEL]:SDH:ALAR[:MODE] on page R-136 <alarm> AISC5 ... 16 and LOPC5 ... 16 added
:SOUR:DATA[:TEL]:SDH:STMN:BCH on page R-216 mode EQUipped added
:SOUR:DATA[:TEL]:SDH:OVER:SEQ[:ACT] on page R-186 mode FSEQ added

An index [i] has been introduced for the STM-16/STS-48 SOH bytes in the following commands:
:SOUR:DATA[:TEL]:SDH:OVER[i]:DATA on page R-175
:SOUR:DATA[:TEL]:SDH:OVER[i]:DATA:BLOC on page R-177
:SOUR:DATA[:TEL]:SDH:OVER[i]:PRES on page R-179
:SOUR:DATA[:TEL]:SDH:OVER[i]:RDAT on page R-182
:SOUR:DATA[:TEL]:SDH:OVER[i]:RDAT:BLOC on page R-183

:OUTP:CLOC[1]:DIV[:STAT] on page R-35: the exact settings ON | OFF are explained only in conjunction with the Jitter Module and O.171/O.172 options.

Summary of all changed commands included from Software Release V7.1 onwards

:STAT:QUES:COND? on page R-16
:SOUR:CLOC:FOFF:OFFS on page R-53
:SOUR:DATA[:TEL]:SDH:ALAR:FLEN on page R-135
:SOUR:DATA[:TEL]:SDH:ERR:FLEN on page R-162
:SOUR:DATA[:TEL]:SDH:ERR[:MODE] on page R-165
:SOUR:DATA[:TEL]:SDH:RATE on page R-213
:OUTP[:TEL]:OPT2:WLEN on page R-49
[:SENS]:DATA[:TEL]:ANAL[:TYPE] on page R-314
[:SENS]:DATA[:TEL]:ANAL[:TYPE]? on page R-314
:FETC[:ARR][:DATA][:TEL][:SDH]:OVER? on page R-414
:FETC[:ARR][:DATA][:TEL][:SDH]:OVER:PART[i]? on page R-415
:FETC[:ARR][:DATA][:TEL][:SDH]:OVER:CPARt[i]? on page R-416
:FETC:SCAL[:DATA][:TEL][:SDH]:OVER? on page R-423
:FETC:SCAL[:DATA][:TEL][:SDH]:OVER:PART[i]? on page R-425
:FETC:SCAL[:DATA][:TEL][:SDH]:OVER:CPARt[i]? on page R-426

Summary of all changed commands included from Software Release V7.2 onwards

:SOUR:DATA[:TEL]:SDH:CHAN on page R-144
:SOUR:DATA[:TEL]:SDH:STMN:CHAN on page R-217
[:SENS]:DATA[:TEL]:SDH:CHAN on page R-353
[:SENS]:DATA[:TEL]:SDH:STMN:CHAN on page R-372
[:SENS]:DATA[:TEL]:ANAL:G826:EVAL on page R-286
[:SENS]:DATA[:TEL]:ANAL:G826:EVAL? on page R-287

Notes:

Command reference

1 Common commands

Instrument behavior is based on:

IEEE Standard Codes, Formats, ANSI/IEEE Std 488.2-1992.

The common commands that are implemented are given below in alphabetical order.

*CAL?

Instrument calibration query.

Parameter
None

Comments
Requests the instrument to perform an internal self calibration and to return the result. The response indicates whether or not the instrument completed the calibration without error. A value of 0 indicates that the calibration has been completed successfully.
The instrument signals the need for calibration using the bit 8 of the “questionable status register” (see Status register structure on page R-11).

See also “WG SCPI and IEEE488 Programmer’s Introduction” for more details.

Note: The instrument is set to the reset state (as set by a *RST command) after a *CAL? command.

Response

0:	Calibration has been completed successfully
-1:	Calibration failed
-2:	Calibration failed (warm-up time not reached)
-3:	calibration failed (EEPROM write error)
-10:	Calibration failed (calibration currently not possible)

Example
*CAL?
Response: 0

Related commands
None

*CLS

Clear Status Command.

Parameter None

Comments Clears the data accumulated in the registers. Causes a partial initialization of remote control. The masks contained in the registers (ENABLE Register) are not altered (see also SCPI Syntax and Style Section 4.1.3.2).

The following actions take place:

- Clearing of all EVENT registers in the status register structure.
- Clearing of the error queue and all other queues which affect the status register structure.
- Interruption of an *OPC synchronization possibly underway, without a 1 being entered into bit 0 of the standard event status register.
- Interruption of an *OPC? synchronization possibly underway, without a 1 being entered into the output queue.

See also “WG SCPI and IEEE488 Programmer’s Introduction” for more details.

Example *CLS

Related commands *RST on page R-5

*ESE

*ESE <mask> Standard Event Status Enable Command.

Parameter

Name	Type	Range	Default
mask	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	0

Comments Sets the mask for the ESR register.

See also “WG SCPI and IEEE488 Programmer’s Introduction” for more details.

Example *ESE 32

Related commands *ESR? on page R-3
*ESE? on page R-3

*ESE?

Standard Event Status Enable Query.

Parameter None

Comments Reads the mask for the ESR register.

See also “WG SCPI and IEEE488 Programmer’s Introduction” for more details.

Example *ESE?
Response: 64

Related commands *ESR? on page R-3
*ESE on page R-2

*ESR?

Standard Event Status Register Query.

Parameter None

Comments Reads out the status register ESR. Range from 0 - 255.

See also “WG SCPI and IEEE488 Programmer’s Introduction” for more details.

Example *ESR?
Response: 64

Related commands *ESE on page R-2

*IDN?

Identification Query.

Parameter
None

Comments
Reads out the instrument identification consisting of 4 fields, separated by “,”:
<Manufacturer>,<Instrument name>,<Serial no.>,<Firmware level>
<Manufacturer>:WANDEL&GOLTERMANN
<Instrument name>:ANT-20 / <Keycode no.>
<Serial no.>: A-0050
<Firmware level>:<Software version>/<Product no.>/<Version>/
<VXI code(HEX)>/<Card ID(HEX)>

Example
*IDN?
Response: WANDEL&GOLTERMANN,ANT-20/0A1234500000,B-0078,6.00/3035/01/0C01/0255<NL>

Related commands
None

Note: This command must always be the last query in a programming command (see also IEEE 488.2 Section 10.14.2.2). The response is always terminated with a <NL> (0A HEX).

*OPC

Operation Complete Command.

Parameter
None

Comments
Sets the OPC bit in the standard event status register ESR as soon as the instrument has assumed the idle state. Used to synchronize overlapping commands.
Use of this command makes sense only in conjunction with a service request (SRQ).

See also “WG SCPI and IEEE488 Programmer’s Introduction” for more details.

Note: Execution of this command is started after all previously received commands (sequential command).

Example
*OPC

Related commands
*OPC? on page R-5
*WAI on page R-7

*OPC?

Operation Complete Query.

Parameter None

Comments Outputs an ASCII “1” to the output buffer of the instrument as soon as it is in the idle state.
As soon as all settings in the instrument are complete, a “1” is written to the output buffer. Used to synchronize the user and instrument for overlapping commands.

Example *OPC?

Related commands *OPC on page R-4
*WAI on page R-7

*OPT?

Option Identification Query.

Parameter None

Comments Outputs a list of the options available in the instrument.

Note: This command must always be the last query in a programming command (see also IEEE 488.2 Section 10.20.2.2). The response is always terminated with a <NL> (0A HEX).

Example *OPT?
Response: 3035/90.33,3035/90.48 with various options set.

Related commands None

*RST

Reset Command.

Parameter None

Comments Instrument initialization.
The instrument goes to the STOP state and sets itself to defined default settings. The result memory, event FIFO and list of desired results formed with :SENS:FUNC are cleared! “*RST” does not include the initialization operations which are executed with “*CLS”!

See also “WG SCPI and IEEE488 Programmer’s Introduction” for more details.

Note: Execution of this command is started after all previously received commands (sequential command).

Example *RST

Related commands *CLS on page R-2

*SRE

*SRE <mask> Service Request Enable Command.

Parameter

Name	Type	Range	Default
mask	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	0

Comments

Sets the mask for service request (SRQ).

See also “WG SCPI and IEEE488 Programmer’s Introduction” for more details

Note: Bit number 6 (MSS) cannot be set and is ignored.

Example

*SRE 128

Related commands

*SRE? on page R-6
*STB? on page R-7

*SRE?

Service Request Enable Query.

Parameter

None

Comments

Reads out the bit mask (0 - 191) for forming the service request (SRQ).

See also “WG SCPI and IEEE488 Programmer’s Introduction” for more details.

Note: Bit number 6 (MSS) cannot be set and is always read as 0.

Example

*SRE?
Response: 128

Related commands

*SRE on page R-6
*STB? on page R-7

*STB?

Read Status Byte Query.

Parameter None

Comments Reads out the status byte register (0 - 255).

See also “WG SCPI and IEEE488 Programmer’s Introduction” for more details

Example *STB?
Response: 128

Related commands *SRE on page R-6
STATUS subsystem on page R-11 ff.

*TST?

Self Test Query.

Parameter None

Comments Reads out the result of the power-on self-test.

0 test completed without errors
1 test found errors

Example *TST?
Response: 0

Related commands None

*WAI

Wait to Continue Command.

Parameter None

Comments Waits until all previously started commands have finished.

See also “WG SCPI and IEEE488 Programmer’s Introduction” for more details

Note: This command is started after all previously received commands are executed (sequential command).

Example *WAI

Related commands *OPC on page R-4
*OPC? on page R-5

Notes:

2 SYSTEM subsystem

:SYST:DATE

:SYSTem:DATE <year>, <month>, <day> sets the current date in the instrument.

Parameter

Name	Type	Range	Default
year	numeric	1970 - 2037	1970
month	numeric	1 - 12	1
day	numeric	1 - 31	1

Note: The setting is synchronized to the next, device-internal complete second. As a result, erroneous values can be read if you do a read-out immediately after a previous setting!
The setting is not changed by a *RST command.

Dependencies None

Example SYST:DATE 1995,5,1 sets the date to May 1, 1995

Related commands :SYST:TIME on page R-10

:SYST:DATE?

:SYSTem:DATE? provides the current date in the instrument.

Example :SYST:DATE?
Response: 1995,5,1

:SYST:ERR[:NEXT]?

:SYSTem:ERRor[:NEXT]? reads the oldest entry out of the SCPI error queue.

See SCPI handbook “Command Reference”
or “WG SCPI and IEEE488 Programmer’s Introduction” for more details.

Example :SYST:ERR?
Response: 0,”No error” if error queue is empty.

:SYST:TIME

:SYSTem:TIME <hour>, <minute>, <second> sets the current time of day of the instrument.

Parameter

Name	Type	Range	Default
hour	numeric	0 - 23	0
minute	numeric	0 - 59	0
second	numeric	0 - 59	0

Note: The setting is synchronized to the next, device-internal complete second. As a result, erroneous values can be read if you do a read-out immediately after a previous setting!
The setting is not changed by a *RST command.

Dependencies None

Example SYST:TIME 12,10,0 sets the time of day to 12:10:0.

Related commands :SYST:DATE on page R-9

:SYST:TIME?

:SYSTem:TIME? provides the current time of day of the instrument.

Example :SYST:TIME?
Response: 23,50,59

:SYST:VERS?

:SYSTem:VERSion? provides the SCPI version number on which this instrument is based.

Example :SYST:VERS?
Response: 1996.0 for version 1996 release 0.

3 STATUS subsystem

3.1 Status register structure

The status register structure is oriented towards the one issued by the SCPI, but with the addition of :STATus:SEQuence register and the event and capture FIFOs. The following figure shows the status register structure:

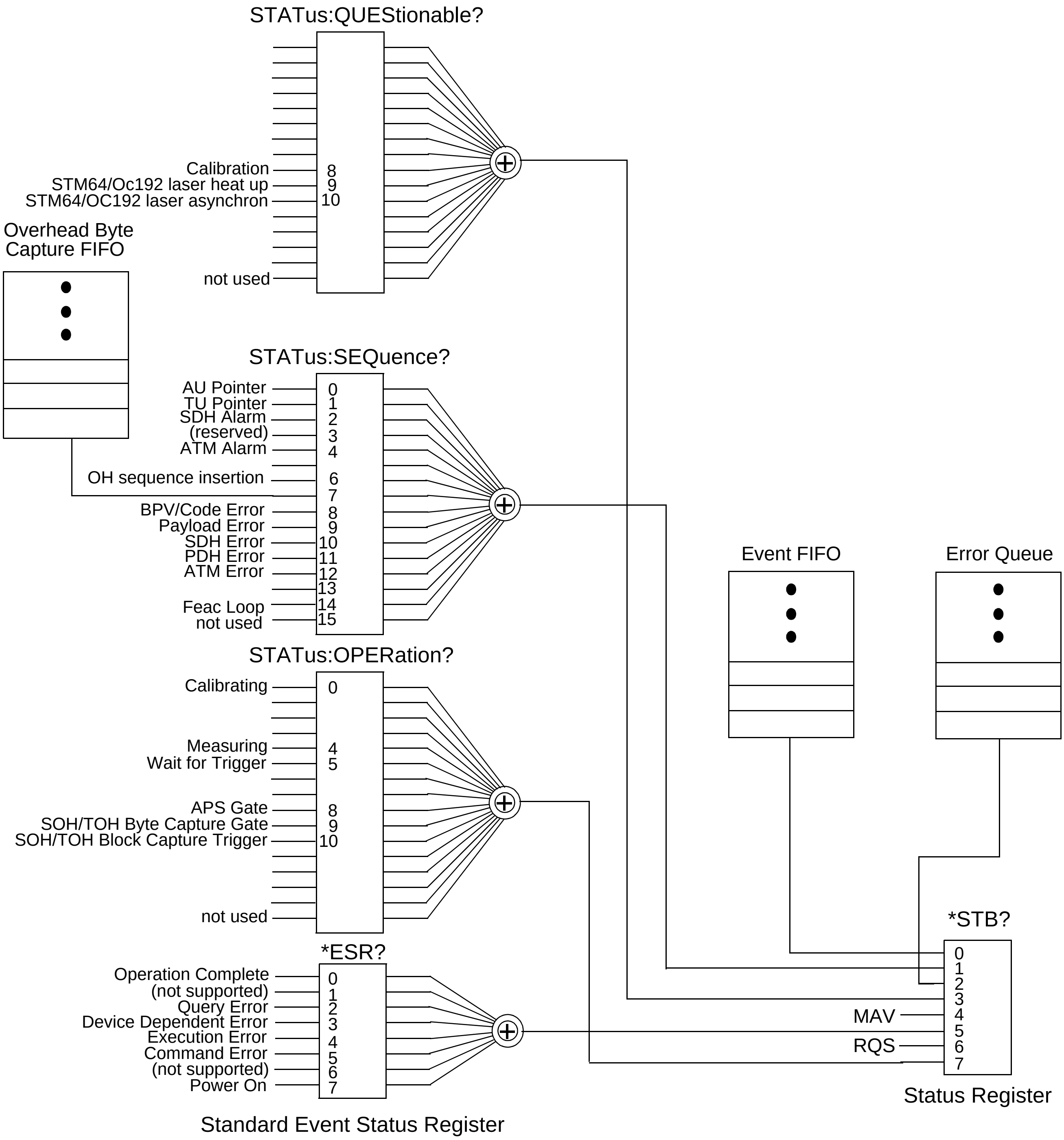


Fig. R-1 Status register structure

3.2 STATUS commands

:STATus:OPERation register

The OPERation status register contains conditions which are part of the instrument’s normal operation.

:STAT:OPER:COND?

:STATus:OPERation:CONDition? provides the current value of the condition register.

Comments

Bit position	Meaning
0	If this bit is set the instrument is currently performing a calibration.
4	If this bit is set the instrument is currently measuring.
5	If this bit is set the instrument is in a “wait for trigger” state of the trigger model (e.g. waiting for the start time during a timer controlled measurement).
8	This bit indicates the start and end of the measurement interval for the APS (Automatic Protection Switch) measurement. A “1” indicates that the switching condition has been attained corresponding to the set sensor ([:SENS]:DATA[:TEL]:APS:SENS on page R-315). A “0” indicates the end of the following measurement interval, see also [:SENS]:DATA[:TEL]:APS:GATE on page R-315.
9	If this bit is set the instrument is currently performing a SDH/ SONET overhead byte capture measurement. See also TRIGGER 2 subsystem on page R-27 ff.
10	If this bit is set the instrument is currently performing the capture process for a complete homogeneous SDH/SONET overhead fetch result. See also TRIGGER 3 subsystem on page R-33 ff.

See SCPI handbook “Command Reference”
or “WG SCPI and IEEE488 Programmer’s Introduction” for more details.

Example

:STAT:OPER:COND?
Response: 0

:STAT:OPER:ENAB

:STATus:OPERation:ENABle <value> specifies the value of the enable register.

See SCPI handbook “Command Reference”
or “WG SCPI and IEEE488 Programmer’s Introduction” for more details.

Parameter

Name	Type	Range	Default
value	numeric	#H0000 - #H7FFF or #B0000000000000000 - #B0111111111111111 or 0 - 32767	#H0

Note: Bit 15 cannot be set.

Example :STAT:OPER:ENAB 16

:STAT:OPER:ENAB?

:STATus:OPERation:ENABle? provides the current setting of the enable register.

See SCPI handbook “Command Reference”
or “WG SCPI and IEEE488 Programmer’s Introduction” for more details.

Example :STAT:OPER:ENAB?
Response: 0STAT:OPER:ENAB 16

:STAT:OPER[:EVEN]?

:STATus:OPERation[:EVENt]? reads the event register.

See SCPI handbook “Command Reference”
or “WG SCPI and IEEE488 Programmer’s Introduction” for more details.

Note: Reading the event register clears its content.

Example :STAT:OPER?
Response: 16 if measuring event was detected.

:STAT:OPER:NTR

:STATus:OPERation:NTRansition <value> specifies the value of the negative transition register.

See SCPI handbook “Command Reference”
or “WG SCPI and IEEE488 Programmer’s Introduction” for more details.

Parameter

Name	Type	Range	Default
value	numeric	#H0000 - #H7FFF or #B0000000000000000 - #B0111111111111111 or 0 - 32767	#H0

Note: Bit 15 cannot be set.

Example :STAT:OPER:NTR 16

:STAT:OPER:NTR?

:STATus:OPERation:NTRansition? provides the current setting of the negative transition register.

See SCPI handbook “Command Reference”
or “WG SCPI and IEEE488 Programmer’s Introduction” for more details.

Example :STAT:OPER:NTR?
Response: 0

:STAT:OPER:PTR

:STATus:OPERation:PTRansition <value> specifies the value of the positive transition register.

See SCPI handbook “Command Reference”
or “WG SCPI and IEEE488 Programmer’s Introduction” for more details.

Parameter

Name	Type	Range	Default
value	numeric	#H0000 - #H7FFF or #B0000000000000000 - #B0111111111111111 or 0 - 32767	#H0

Note: Bit 15 cannot be set.

Example :STAT:OPER:PTR 16

:STAT:OPER:PTR?

:STATus:OPERation:PTRansition? provides the current setting of the positive transition register.

See SCPI handbook “Command Reference”
or “WG SCPI and IEEE488 Programmer’s Introduction” for more details.

Example

:STAT:OPER:PTR?
Response: 0

:STAT:PRES

:STATus:PRESet performs a preset of the status register structure.

See SCPI handbook “Command Reference” for more details.

Parameter

None

Comments

The following actions are taken:
- :STAT:OPER:ENAB is set to all 0’s.
- :STAT:QUES:ENAB is set to all 0’s.
- :STAT:SEQ:ENAB is set to all 1’s.
- all positive transition registers (…:PTR) are set to all 1’s.

Example

:STAT:PRES

:STATus:QUEStionable register

The QUEStionable status register set contains bits which give an indication of the quality of various aspects of the signal.

:STAT:QUES:COND?

:STATus:QUEStionable:CONDition? provides the current value of the questionable status register.

Comments

Bit position	Meaning
8	If this bit is set results can be questionable because the module needs a calibration (use the *CAL? query to initiate a calibration).
9	This bit is set while the laser is in the warm-up phase. This phase always starts at power on. The bit is only activated for STM60/OC192 operation.
10	This bit is set while the laser is in an unsettled state. This state occurs each time the laser is switched on. The bit is only activated for STM60/OC192 operation.

See SCPI handbook “Command Reference”
or “WG SCPI and IEEE488 Programmer’s Introduction” for more details.

Example :STAT:QUES:COND?
Response: 0

:STAT:QUES:ENAB

:STATus:QUEStionable:ENABle <value> specifies the value of the enable register.

See SCPI handbook “Command Reference”
or “WG SCPI and IEEE488 Programmer’s Introduction” for more details.

Parameter

Name	Type	Range	Default
value	numeric	#H0000 - #H7FFF or #B0000000000000000 - #B0111111111111111 or 0 - 32767	#H0

Note: Bit 15 cannot be set.

Example :STAT:QUES:ENAB 16

:STAT:QUES:ENAB?

:STATus:QUEStionable:ENABle? provides the current setting of the enable register.

See SCPI handbook “Command Reference”
or “WG SCPI and IEEE488 Programmer’s Introduction” for more details.

Example :STAT:QUES:ENAB?
Response: 0

:STAT:QUES[:EVEN]?

:STATus:QUEStionable[:EVENt]? reads the event register.

See SCPI handbook “Command Reference”
or “WG SCPI and IEEE488 Programmer’s Introduction” for more details.

Note: Reading the event register clears its content.

Example :STAT:QUES?
Response: 16 if measuring event was detected.

:STAT:QUES:NTR

:STATus:QUEStionable:NTRansition <value> specifies the value of the negative transition register.

See SCPI handbook “Command Reference”
or “WG SCPI and IEEE488 Programmer’s Introduction” for more details.

Parameter

Name	Type	Range	Default
value	numeric	#H0000 - #H7FFF or #B0000000000000000 - #B0111111111111111 or 0 - 32767	#H0

Note: Bit 15 cannot be set.

Example :STAT:QUES:NTR 16

:STAT:QUES:NTR?

:STATus:QUEStionable:NTRansition? provides the current setting of the negative transition register.

See SCPI handbook “Command Reference”
or “WG SCPI and IEEE488 Programmer’s Introduction” for more details.

Example :STAT:QUES:NTR?
Response: 0

:STAT:QUES:PTR

:STATus:QUEStionable:PTRansition <value> specifies the value of the positive transition register.

See SCPI handbook “Command Reference”
or “WG SCPI and IEEE488 Programmer’s Introduction” for more details.

Parameter

Name	Type	Range	Default
value	numeric	#H0000 - #H7FFF or #B0000000000000000 - #B0111111111111111 or 0 - 32767	#H0

Note: Bit 15 cannot be set.

Example :STAT:QUES:PTR 16

:STAT:QUES:PTR?

:STATus:QUEStionable:PTRansition? provides the current setting of the positive transition register.

See SCPI handbook “Command Reference”
or “WG SCPI and IEEE488 Programmer’s Introduction” for more details.

Example :STAT:QUES:PTR?
Response: 0

:STAT:SEQ register

This status register indicates the states of any dynamic error/alarm/pointer sequence. This indication allows the user to get control over the state of running sequences. A bit set to “1” indicates a running sequence. A bit set to “0” indicates a finished sequence.
If bit 7 is set, then valid data are present in the FIFO of the SDH/SONET overhead capture measurement. The data can be read with the command :FETC[:ARR][:DATA][:TEL][:SDH]:OVER:CAPT? on page R-417.

Note: This status register is only accessed in the case of sequences of finite length such as single defect insertions or pointer sequences in “SINGle” mode.

:STAT:SEQ:COND?

:STATus:SEQuence:CONDition?

See SCPI handbook “Command Reference”
or “WG SCPI and IEEE488 Programmer’s Introduction” for more details.

Example

:STAT:SEQ:COND?
Response: 0

:STAT:SEQ:ENAB

:STATus:SEQuence:ENABle <value> specifies the value of the enable register.

See SCPI handbook “Command Reference”
or “WG SCPI and IEEE488 Programmer’s Introduction” for more details.

Parameter

Name	Type	Range	Default
value	numeric	#H0000 - #H7FFF or #B0000000000000000 - #B0111111111111111 or 0 - 32767	#H0

Note: Bit 15 cannot be set.

Example

:STAT:SEQ:ENAB 4

:STAT:SEQ:ENAB?

:STATus:SEQuence:ENABle? provides the current setting of the enable register.

See SCPI handbook “Command Reference”
or “WG SCPI and IEEE488 Programmer’s Introduction” for more details.

Example

:STAT:SEQ:ENAB?
Response: 0

:STAT:SEQ[:EVEN]?

:STATus:SEQuence[:EVENt]? reads the event register.

See SCPI handbook “Command Reference”
or “WG SCPI and IEEE488 Programmer’s Introduction” for more details.

Note: Reading the event register clears its content.

Example

:STAT:SEQ?
Response: 0

:STAT:SEQ:NTR

:STATus:SEQuence:NTRansition <value> specifies the value of the negative transition register.

See SCPI handbook “Command Reference”
or “WG SCPI and IEEE488 Programmer’s Introduction” for more details.

Parameter

Name	Type	Range	Default
value	numeric	#H0000 - #H7FFF or #B0000000000000000 - #B0111111111111111 or 0 - 32767	#H0

Note: Bit 15 cannot be set.

Example :STAT:SEQ:NTR 4

:STAT:SEQ:NTR?

:STATus:SEQuence:NTRansition? provides the current setting of the negative transition register.

See SCPI handbook “Command Reference”
or “WG SCPI and IEEE488 Programmer’s Introduction” for more details.

Example :STAT:SEQ:NTR?
Response: 0

:STAT:SEQ:PTR

:STATus:SEQuence:PTRansition <value> specifies the value of the positive transition register.

See SCPI handbook “Command Reference”
or “WG SCPI and IEEE488 Programmer’s Introduction” for more details.

Parameter

Name	Type	Range	Default
value	numeric	#H0000 - #H7FFF or #B0000000000000000 - #B0111111111111111 or 0 - 32767	#H0

Note: Bit 15 cannot be set.

Example :STAT:SEQ:PTR 8

:STAT:SEQ:PTR?

:STATus:SEQuence:PTRansition? provides the current setting of the positive transition register.

See SCPI handbook “Command Reference”
or “WG SCPI and IEEE488 Programmer’s Introduction” for more details.

Example

:STAT:SEQ:PTR?
Response: 0

Notes:

4 TRIGGER 1 subsystem

The Trigger subsystem is used for Start/Stop control of measurements (see also [:SENS]:SWE on page R-407)

:ABOR[1]

:ABORt[1] halts a measurement in progress or a timer sequence.

Note: A measurement in progress is halted at the end of the next full second to ensure homogeneous results.
If the results are to be read after ending a measurement with ABORt[1], it is a good idea to insert a *WAI command between the ABORt[1] command and the read command for the results.

Parameter	None
Dependencies	This command works only if a measurement has been previously activated using :INIT[1][:IMM][:ALL] on page R-23.
Example	:ABOR
Related commands	:INIT[1][:IMM][:ALL] on page R-23 :TRIG[1][:SEQ]:SOUR on page R-24 :TRIG[1][:SEQ]:STIM on page R-25

:INIT[1][:IMM][:ALL]

:INITiate[1][:IMMediate][:ALL] starts the measurement on the next trigger.

Parameter	None
Dependencies	None
Comments	The measurement is started on the next trigger. This can be when the next full second is reached, or under timer control, by reaching the time preset with :TRIG[1][:SEQ]:STIM on page R-25. The trigger condition to be fulfilled is specified using :TRIG[1][:SEQ]:SOUR on page R-24.
Example	:INIT
Related commands	:ABOR[1] on page R-23 :TRIG[1][:SEQ]:SOUR on page R-24 :TRIG[1][:SEQ]:STIM on page R-25

:TRIG[1][:SEQ]:SOUR

:TRIGger[1][:SEQuence]:SOURce <source> specifies the trigger source for the TRIGGER subsystem.

Parameter

Name	Type	Range	Default
source	discrete	AINTernal | STIMe | IMMediate	AINT

Dependencies None

Comments

AINTernal: The trigger condition is satisfied when the next complete second is reached.

STIMe: The trigger condition is satisfied when the start time set with :TRIG[1][:SEQ]:STIM on page R-25 is reached.

IMMediate: The trigger condition is satisfied in an asynchronous manner, i.e. at the next possible point in time.

Example :TRIG[1][:SEQ]:SOUR STIM for the timer as a trigger source.

Related commands
:INIT[1][:IMM][:ALL] on page R-23
:ABOR[1] on page R-23
:TRIG[1][:SEQ]:STIM on page R-25

:TRIG[1][:SEQ]:SOUR?

This query provides the current trigger source setting.

Example
:TRIG[1][:SEQuence]:SOUR?
Response: AINT
for activated internal triggering at the next complete second.

:TRIG[1][:SEQ]:STIM

:TRIGger[1][:SEQuence]:STIMe <year>,<month>,<day>,<hour>,<minute>,second> specifies the starting time of a timer-based measurement.

Parameter

Name	Type	Range	Default
year	numeric	1994 - 2037	none
month	numeric	1 - 12	none
day	numeric	1 - 31	none
hour	numeric	0 - 23	none
minute	numeric	0 - 59	none
second	numeric	0 - 59	none

Dependencies: Effective only if :TRIG[1][:SEQ]:SOUR STIM.

Comments: This command is used to set the point in time at which a timer-based measurement is to start.

Example: :TRIG:STIM 1996,6,3,18,30,00 sets the measurement start to June 3, 1996 at 18:30:00

Related commands:
:INIT[1][:IMM][:ALL] on page R-23
:ABOR[1] on page R-23
:TRIG[1][:SEQ]:SOUR on page R-24

:TRIG[1][:SEQ]:STIM?

:TRIGger[1][:SEQuence]:STIMe? This query provides the current setting of the measurement start time.

Example:
:TRIG:STIM?
Response: 1995,12,31,23,30,20
for measurement start on December, 31, 1995 at 23:30:20.

Notes:

5 TRIGGER 2 subsystem

The Trigger 2 subsystem is used for Start/Stop control of SDH/SONET overhead data capture measurements (see also [:SENS]:FUNC:EVEN[:ON] on page R-405 and :FETC[:ARR][:DATA][:TEL][:SDH]:OVER:CAPT? on page R-417 ff.
The status of a running capture measurement is indicated in the status register (see Status register structure on page R-11 ff.) as follows:

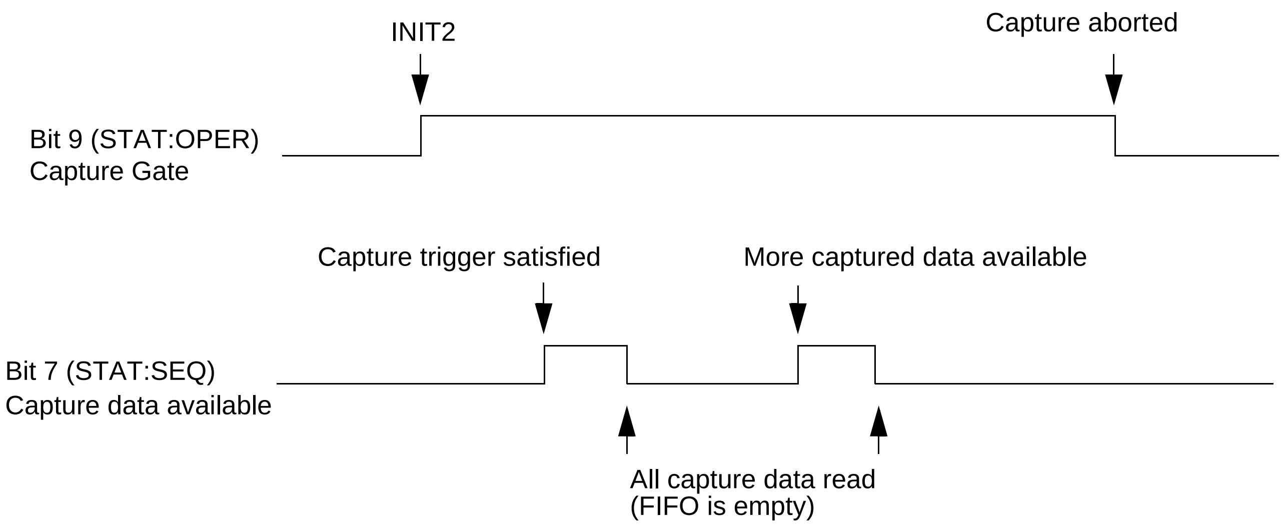


Fig. R-2 Capture measurement

Note: All commands in this group are valid only if the option BN 3035/90.15 is available.

:ABOR2

:ABORt2 halts a capture measurement in progress.

Note: A capture measurement in progress is halted at the end of the next full second to ensure homogeneous results.

If the results are to be read after ending a measurement with ABORt2, it is a good idea to insert a *WAI command between the ABORt2 command and the read command for the results.

Parameter None

Dependencies This command works only if a capture measurement was previously activated using :INIT2[:IMM][:ALL] on page R-28.

Comments A running capture measurement can be manually terminated with this command. The measurement is automatically interrupted if the capture FIFO is full so that no further data can be recorded.

Example :ABOR2

Related commands :INIT2[:IMM][:ALL] on page R-28
:TRIG2[:SEQ]:LOG:SOUR on page R-30
:TRIG2[:SEQ]:LOG:TYPE on page R-31
:TRIG2[:SEQ]:LOG:VAL on page R-32

:INIT2[:IMM][:ALL]

:INITiate2[:IMMediate][:ALL] starts the capture measurement.

Parameter None

Dependencies Option 90.15 is required for capture measurements.

Example :INIT2

Related commands :ABOR2 on page R-27
:TRIG2[:SEQ]:LOG:SOUR on page R-30
:TRIG2[:SEQ]:LOG:TYPE on page R-31
:TRIG2[:SEQ]:LOG:VAL on page R-32
:FETC[:ARR][:DATA][:TEL][:SDH]:OVER:CAPT? on page R-417

:TRIG2[:SEQ]:LOG:OBYT

:TRIGger2[:SEQuence]:LOGic:OBYTe <byte> determines the SOH/TOH byte or byte pair (K1K2) whose changes in value are to be recorded.

Parameter

Name	Type	Range	Default
byte	discrete	SOH/TOH bytes: A11 | A12 | A13 | A21 | A22 | A23 | C1 | X18 | X19 | B1 | X22 | X23 | E1 | X25 | X26 | F1 | X28 | X29 | D1 | X32 | X33 | D2| X35 | X36 | D3 | X38 | X39 | H11 | H12 | H13 | H21 | H22 | H23 | H31 | H32 | H33 | B21 | B22 | B23 | K1K2 | X55 | X56 | X58 | X59 | D4 | X62 | X63 | D5 | X65 | X66 | D6 | X68 | X69 | D7 | X72 | X73 | D8 | X75 | X76 | D9 | X78 | X79 | D10 | X82 | X83 | D11 | X85 | X86 | D12 | X88 | X89 | S1 | Z12 | Z13 | Z21 | Z22 | M1 | E2 | X98 | X99 High path POH bytes: J1,B3,C2,G1,F2,H4,Z3,K3,N1 Low path POH (C3 mapping): J1L,B3L,C2L,G1L,F2L,H4L, Z3L,K3L,N1L Low path POH bytes: V5,J2,N2,K4	K1K2

Dependencies	The set values of :TRIG2[:SEQ]:LOG:VAL and :TRIG2[:SEQ]:LOG:OBYT are evaluated for the trigger source VALue and NVALue. For STM0/STS1, only bytes in the 1st, 4th and 7th column are allowed (i.e. A11 is possible but not A12 and A13). For STM4/OC12, the A1,A2,B1 bytes are not selectable. For STM16/OC48, the A1,A2,B1 bytes are not selectable. The selectable POH bytes are depending on the selected mapping (e.g. the received signal must contain a low path to select the LP-POH bytes).

Comments

A11	Value for the 1st A1 byte of the SOH as comparison byte
A12	Value for the 2nd A1 byte of the SOH as comparison byte
A13	Value for the 3rd A1 byte of the SOH as comparison byte
A21	Value for the 1st A2 byte of the SOH as comparison byte
etc. up to	
X99	Value for the SOH byte line 9, column 9 as comparison byte

Bytes without a standardized name are indicated by their line and column numbers in the SOH/TOH with a prefixed ‘X’.
e.g. X25 indicates the byte in line 2 and column 5 (next to the E1 byte).

Example

:TRIG2:LOG:OBYT D2
selects the D2 byte for capture measurement.

Related commands

:INIT2[:IMM][:ALL] on page R-28
:ABOR2 on page R-27
:TRIG2[:SEQ]:LOG:VAL on page R-32
:TRIG2[:SEQ]:LOG:SOUR on page R-30
:TRIG2[:SEQ]:LOG:TYPE on page R-31

:TRIG2[:SEQ]:LOG:OBYT?

:TRIGger2[:SEQuence]:LOGic:OBYTe? This query provides the set value for the SOH comparison byte for the trigger condition of the capture measurement.

Example

:TRIG2:LOG:OBYTE?
K1K2 for the corresponding SOH comparison byte.

:TRIG2[:SEQ]:LOG:SOUR

:TRIGger2[:SEQuence]:LOGic:SOURce <source> determines the trigger source for the capture measurement.

Parameter

Name	Type	Range	Default
source	discrete	MANual | VALue | NVALue | AUAIS | AULOP | MSRDI | MSAIS | TCMFrame	VALue

Dependencies
For VALue/NVALue, the set values of :TRIG2[:SEQ]:LOG:VAL and :TRIG2[:SEQ]:LOG:OBYT are evaluated.

Comments

MANual:	The SOH bytes selected with :TRIG2[:SEQ]:LOG:OBYT are evaluated. If the measurement is started, recording begins immediately.
VALue:	The capture measurement is started if the comparison pattern entered with :TRIG2[:SEQ]:LOG:VAL matches the received value of the SOH byte selected with :TRIG2[:SEQ]:LOG:OBYT.
NVALue:	The capture measurement is started if the comparison pattern entered with :TRIG2[:SEQ]:LOG:VAL does not match the received value of the SOH byte selected with :TRIG2[:SEQ]:LOG:OBYT.
AUAIS:	The data recording is started if the alarm AUAIS is detected.
AULOP:	The data recording is started if the alarm AULOP is detected
MSRDI:	The data recording is started if the alarm MSRDI is detected.
MSAIS:	The data recording is started if the alarm MSAIS is detected.
TCMFrame	Tandem Connection Monitoring recording begins with the next TCM-FAS-WORD that is found.

Example
:TRIG2:LOG:SOUR MSAIS

Related commands
:INIT2[:IMM][:ALL] on page R-28
:ABOR2 on page R-27
:TRIG2[:SEQ]:LOG:VAL on page R-32
:TRIG2[:SEQ]:LOG:TYPE on page R-31

:TRIG2[:SEQ]:LOG:SOUR?

:TRIGger2[:SEQuence]:LOGic:SOURce? This query provides the set trigger source for the capture measurement.

Example
:TRIG2:LOG:SOUR?
Response: MAN for manual triggering of the capture measurement.

:TRIG2[:SEQ]:LOG:TYPE

:TRIGger2[:SEQuence]:LOGic:TYPE <value> determines the time frame for data recording, referred to the trigger time point of the capture measurement.

Parameter

Name	Type	Range	Default
value	discrete	AFTer	AFTer

Dependencies None

Comments AFTer: The recording time frame of the capture measurement begins after the trigger.

Example :TRIG2:LOG:TYPE AFT

Related commands
:INIT2[:IMM][:ALL] on page R-28
:ABOR2 on page R-27
:TRIG2[:SEQ]:LOG:SOUR on page R-30
:TRIG2[:SEQ]:LOG:VAL? on page R-32
:TRIG2[:SEQ]:LOG:OBYT on page R-28

:TRIG2[:SEQ]:LOG:TYPE?

:TRIGger2[:SEQuence]:LOGic:TYPE? This query provides the set value of the recording time frame for the capture measurement.

Example :TRIG2:LOG:TYPE?
Response: AFT for recording after the trigger event.

:TRIG2[:SEQ]:LOG:VAL

:TRIGger2[:SEQuence]:LOGic:VALue <pattern> determines the comparison pattern with which an SOH byte set with :TRIG2[:SEQ]:LOG:OBYT is compared to attain the trigger condition of the capture measurement.

Parameter

Name	Type	Range	Default
pattern	string	String with the allowable characters "0" | "1" | "X" | "x" , 16 characters long.	"XXXXXXXX XXXXXXXX"

Dependencies

The pattern set here is evaluated only for :TRIG2[:SEQ]:LOG:SOUR = VALue or NVALue.

Comments

pattern: Only the characters "0", "1", "X", "x" are allowed.
A length **of 16 characters is required**.
For 1 byte capture, only the **first** 8 characters are valid.

"X" | "x": This bit position is irrelevant for the trigger condition.

"1'' A logical 1 is necessary at this bit position to attain the trigger condition.

"0'' A logical 0 is necessary at this bit position to attain the trigger condition.

After the trigger condition is attained, the comparison value set here is no longer relevant, all subsequent byte changes are recorded regardless of the comparison value!

Example

:TRIG2:LOG:VAL "XXXXXXXXXXXXXX01"
For K1K2 capture, Bit0 is set to 1 and Bit1 to 0 as the trigger condition.

:TRIG2:LOG:VAL "XXXXXX01XXXXXXXX"
For 1 byte capture, Bit0 is set to 1 and Bit1 to 0 as the trigger condition since only the first 8 characters are relevant.

Related commands

:INIT2[:IMM][:ALL] on page R-28
:ABOR2 on page R-27
:TRIG2[:SEQ]:LOG:TYPE on page R-31
:TRIG2[:SEQ]:LOG:SOUR on page R-30
:TRIG2[:SEQ]:LOG:OBYT on page R-28

:TRIG2[:SEQ]:LOG:VAL?

:TRIGger2[:SEQuence]:LOGic:VALue? This query provides the set value of the comparison pattern for the trigger condition of the capture measurement.

Example

:TRIG2:LOG:VAL?
Response: "XXXXXXXX0011X001" for the corresponding comparison pattern.

6 TRIGGER 3 subsystem

The Trigger 3 subsystem is used to start and stop the capture process for a complete homogeneous SDH overhead fetch result.
The following are required: Signal structure STM16/OC48 and options BN 3035/91.53, BN 3035/91.54 or BN 3035/91.59 (STM16c/OC48c hardware options).

:ABOR3

:ABORt3 halts the capture process started with :INIT3.

Parameter	None
Dependencies	This command works only if the capture process has been previously activated using :INIT3[:IMM][:ALL] on page R-33.
Example	:ABOR3
Related commands	:INIT3[:IMM][:ALL] on page R-33

:INIT3[:IMM][:ALL]

:INITiate3[:IMMediate][:ALL] starts the capture process.

Parameter	None
Dependencies	None
Comments	:INIT3 starts the capture process for a complete homogeneous SDH overhead fetch result.
Example	:INIT3
Related commands	:ABOR3 on page R-33 :FETC[:ARR][:DATA][:TEL][:SDH]:OVER:CPARt[i]? on page R-416 :FETC:SCAL[:DATA][:TEL][:SDH]:OVER:CPARt[i]? on page R-426

Notes:

7 OUTPUT subsystem

:OUTP:CLOC[1]:DIV[:STAT]

:OUTPut:CLOCk[1]:DIVider[:STATe] <state> switches the clock output divider for port [24] on or off.

Parameter

Name	Type	Range	Default
state	boolean	ON | OFF | 0 | 1	OFF

Dependencies

Is only valid if [:SENS]:DATA[:TEL]:SDH:RATE = STM4.

A setting = ON is mandatory for STM-4 Wander measurements in conjunction with the Jitter Module for options BN 3035/90.67 or O.172 BN 3035/90.86 with firmware release 7.0 or later (not possible for ABT-20 devices).

A setting = ON is mandatory for STM-4 JITTER measurements in conjunction with the Jitter Module ONLY for option O.172 BN 3035/90.86 with firmware release 7.0 or later (not possible for ABT-20 devices).

A setting = OFF is mandatory for STM-4 JITTER measurements in conjunction with the Jitter Module ONLY for option BN 3035/90.67 with firmware release earlier than 7.0 (not possible for ABT-20 devices).

Comments

ON | 1: The STM4 clock divider is switched on producing a 155 Mbit/s clock signal at port [24] instead of the normal 622 Mbit/s. The setting in conjunction with the Jitter Module is explained above.

OFF | 0: Output divider off. The setting in conjunction with the Jitter Module is explained above.

Example

:OUTP:CLOC:DIV ON switches the clock output divider on.

Related commands

[:SENS]:DATA[:TEL]:SDH:RATE on page R-370

On **Jitter Module**: [:SENS]:DATA[:TEL]:RATE = **STM4**; [:SENS]:MODE.

:OUTP:CLOC[1]:DIV[:STAT]?

This query provides the status of the clock output divider.

Example

:OUTP:CLOC:DIV?
Response: 1 if the clock output divider is switched on.

:OUTP:CLOC2[:STAT]

:OUTPut:CLOCk2[:STATe] <state> switches the 2488 MHz clock output (port [42]) on or off.

Parameter

Name	Type	Range	Default
state	boolean	ON | OFF | 0 | 1	OFF

Dependencies: Is only valid if :SOUR:DATA[:TEL]:SDH:RATE = STM16. The output signal is only valid if the receiver gets a valid STM16/OC48 input signal.

Comments:
ON | 1: Output on
OFF | 0: Output off
This output is automatically switched ON if :SOUR:DATA[:TEL]:SDH:RATE = STM16 is set.

Example: :OUTP:CLOC2 ON switches the clock output on.

Related commands: :OUTP:CLOC3[:STAT] on page R-37

:OUTP:CLOC2[:STAT]?

This query provides the status of the 2488 MHz clock output.

Example:
:OUTP:CLOC2?
Response: 1 if the clock output is switched on.

:OUTP:CLOC3[:STAT]

:OUTPut:CLOCk3[:STATe] <state> switches the 77.76 MHz clock output (port [41]) on or off.

Parameter

Name	Type	Range	Default
state	boolean	ON | OFF | 0 | 1	OFF

Dependencies
Is only valid if :SOUR:DATA[:TEL]:SDH:RATE = STM16.
The output signal is only valid if a valid STM16/OC48 input signal is received.

Comments
ON | 1: Output on
OFF | 0: Output off
This output is automatically switched ON if
:SOUR:DATA[:TEL]:SDH:RATE = STM16 is set.

Example
:OUTP:CLOC3 ON switches the clock output on.

Related commands
:OUTP:CLOC2[:STAT] on page R-36

:OUTP:CLOC3[:STAT]?

This query provides the status of the 78 MHz clock output.

Example
:OUTP:CLOC3?
Response: 1 if the clock output is switched on.

:OUTP[:TEL]:AUX

Commands under this command node set the auxiliary output (AUX connector [11] or [13]) of the generator. The PDH signal unpacked from the received signal can be output from this output **(not possible for ABT-20 devices)**.

Note: Auxiliary input support depends on option BN 3035/90.20 (DROP&INSERT).

:OUTP[:TEL]:AUX[:STAT]

:OUTPut[:TELecom]:AUXiliary[:STATe] <state> switches the AUX output of the generator on or off (DROP mode).

Parameter

Name	Type	Range	Default
state	boolean	ON | OFF | 0 | 1	OFF

Dependencies

Only PDH signals can be unpacked from the received signal.
Normally the dropped signals are routed to ports [10] or [13] **(not possible for ABT-20 devices)**.

Note: If receiver and generator are set to SDH mode and the bit rate is set to STM16/OC48 an unbalanced dropped signal is routed to port [15] instead of port [11]!

Comments

ON **|** 1: Output switched on
OFF **|** 0: Output switched off

Example

:OUTP:AUX ON switches the output on.

Related commands

:OUTP[:TEL]:AUX:CODE on page R-38
:OUTP[:TEL]:AUX:TYPE on page R-39

:OUTP[:TEL]:AUX[:STAT]?

This query provides the status of the AUX output.

Example

:OUTP:AUX?
Response: 1 if the AUX output is switched on.

:OUTP[:TEL]:AUX:CODE

:OUTPut[:TELecom]:AUXiliary:CODE <code> sets the line code of the AUX output.

Parameter

Name	Type	Range	Default
code	discrete	HDB3 |B3ZS | B8ZS | CMI | AMI	HDB3

Dependencies

CMI for all bit rates, ternary codes only up to 34 Mbit/s **(not possible for ABT-20 devices)**!

Comments The line code is set in accordance with the bit rate.

CMI:	Sets CMI line code (set for M140 signals)
B3ZS:	Sets B3ZS line code (set for DS3 signals)
B8ZS:	Sets B8ZS line code (set for DS1,DS2 signals)
HDB3:	Sets HDB3 line code (set for M2, M8, M34 signals)

Example :OUTP:AUX:CODE HDB3 sets the HDB3 code.

Related commands :OUTP[:TEL]:AUX[:STAT] on page R-38
:OUTP[:TEL]:AUX:TYPE on page R-39

:OUTP[:TEL]:AUX:CODE?

This query provides the current setting for the line code of the AUX output.

Example :OUTP:AUX:CODE?
Response: HDB3 for HDB3 line code.

:OUTP[:TEL]:AUX:TYPE

:OUTPut[:TELecom]:AUXiliary:TYPE <type> sets the interface type of the AUX output.

Parameter

Name	Type	Range	Default
type	discrete	UNBalanced | BALanced	UNB

Dependencies :OUTP[:TEL]:LINE:TYPE on page R-44! Only either the LINE or the AUX output can be set to BAL.
UNB for all bit rates, BAL only up to 2 Mbit/s **(not possible for ABT-20 devices)**.

Comments UNBalanced: Unbalanced (coaxial)
BALanced: Balanced port [13]

Example :OUTP:AUX:CODE UNB sets the AUX output to unbalanced.

Related commands :OUTP[:TEL]:AUX[:STAT] on page R-38
:OUTP[:TEL]:AUX:CODE on page R-38
:OUTP[:TEL]:LINE:TYPE on page R-44

:OUTP[:TEL]:AUX:TYPE?

This query provides the current setting for the interface type of the AUX output.

Example :OUTP:AUX:TYPE?
Response: UNB if the unbalanced output is activated.

:OUTP[:TEL]:IBUS:DCC

:OUTPut[:TELecom]:IBUS:DCCcontrol <mode> sets the duty cycle control hardware of the internal local data bus.

Parameter

Name	Type	Range	Default
mode	discrete	AUTO |ON | OFF	AUTO

Dependencies
This setting is relevant only for VXI modules that are clocked with external, reduced bit rates. It should not be modified otherwise.

Comments
The internal data bus is needed to forward the signals to a neighboring NRZ module in VXI test systems. The signal transmitted there requires a duty cycle correction for bit rates ≥ 139 Mbit/s. Since the clock actually present is unknown when using an external clock, it might be necessary to fix the duty cycle correction with this command in case of reduced external clocks.

AUTO: Sets automatic setting of the duty cycle hardware.This is sufficient for normal operation of this instrument and should not be changed.

ON: Activates the duty cycle control hardware (mandatory for all bit rates ≥ 139 Mbit/s on the internal data bus).

OFF: Deactivates the duty cycle control hardware (mandatory for all bit rates <139Mbit/s on the internal data bus).

Example
:OUTP:IBUS:DCC ON sets the control ON.

Related commands
:OUTP[:TEL]:LINE:ROUT on page R-43
:INP[:TEL]:LINE:ROUT on page R-262

:OUTP[:TEL]:IBUS:DCC?

This query provides the current setting for duty cycle control of the internal local data bus.

Example
:OUTP:IBUS:DCC?
Response: AUTO for automatic mode.

:OUTP[:TEL]:LINE

Commands under this command node set the electrical LINE output (connector [15] or [13]) of the generator. The structure of the output signal is determined by the commands of the SOURCE subsystem.

:OUTP[:TEL]:LINE:CODE

:OUTPut[:TELecom]:LINE:CODE <code> sets the line code of the LINE output.

Parameter

Name	Type	Range	Default
code	discrete	HDB3 | B3ZS | B8ZS | CMI | AMI	HDB3

Dependencies
CMI for all bit rates, ternary codes only up to 51 Mbit/s!

Comments
The line code is set in accordance with the bit rate
CMI: Sets CMI line code (set for M140, STM0 or STM1 signals)
HDB3: Sets HDB3 line code (set for M2, M8, M34 signals)
B3ZS: Sets B3ZS line code (set for DS3 signal)
B8ZS: Sets B8ZS line code (set for DS1, DS2 signal)

Example
:OUTP:LINE:CODE CMI sets the CMI code.

Related commands
:OUTP[:TEL]:LINE:TYPE on page R-44
:OUTP[:TEL]:LINE:ERR:CODE | BPV on page R-42

:OUTP[:TEL]:LINE:CODE?

This query provides the current setting for the line code of the LINE output.

Example
:OUTP:LINE:CODE?
Response: CMI for the CMI line code.

:OUTP[:TEL]:LINE:ERR:CODE | BPV

:OUTPut[:TELecom]:LINE:ERRor:CODE <errmode> determines the type of code error insertion into the signal of the LINE output.

Parameter

Name	Type	Range	Default
errmode	discrete	NONE | ONCE	NONE

Dependencies None

Comments
NONE: Code error insertion not activated.
ONCE: Generates a single code error.

Example
OUTP:LINE:ERR:CODE ONCE generates a single code error.
OUTP:LINE:ERR:BPV ONCE generates a single code error.

Related commands
:OUTP[:TEL]:LINE:CODE on page R-41
:OUTP[:TEL]:LINE:TYPE on page R-44

:OUTP[:TEL]:LINE:ERR:CODE | BPV?

This query provides the current setting of the code error insertion.

Comments ONCE is a volatile state and cannot be queried!

Example
:OUTP:LINE:ERR:CODE?
Response: NONE

:OUTP[:TEL]:LINE:LEV

:OUTPut[:TELecom]:LINE:LEVel <level> sets the output signal level.

Parameter

Name	Type	Range	Default
level	discrete	HIGH | LOW | DSX	HIGH

Dependencies Can only be set for STS1, STM0 and DS3 signals.

Comments
HIGH: 0 dB
LOW: -13.8 dB
DSX: 450 ft. cable simulation (728A)

Example OUTP:LINE:LEV HIGH sets the output signal to 0 dB.

:OUTP[:TEL]:LINE:LEV?

This query delivers the current setting of the output signal level.

Example :OUTP:LINE:LEV?
Response: DSX if cable simulation is set.

:OUTP[:TEL]:LINE:ROUT

:OUTPut[:TELecom]:LINE:ROUTe <route> sets the routing of the LINE output.

Parameter

Name	Type	Range	Default
route	discrete	PORT | IBUS	PORT

Dependencies Must be set to IBUS for :SOUR:DATA[:TEL]:SDH:RATE = STM16.

Comments
PORT: Output signal is routed to the external connector [15].
IBUS: Output signal is routed to the internal local data bus connecting this module to its neighbor slot (NRZ or STM16/OC48 module).
This routing is automatically switched to IBUS if :SOUR:DATA[:TEL]:SDH:RATE = STM16 is set.

Example :OUTP:LINE:ROUT PORT

Related commands :INP[:TEL]:LINE:ROUT on page R-262

:OUTP[:TEL]:LINE:ROUT?

This query provides the current setting for the routing of the LINE output.

Example :OUTP:LINE:ROUT?
Response: PORT for routing to the external connector [15].

:OUTP[:TEL]:LINE:TYPE

:OUTPut[:TELecom]:LINE:TYPE <type> sets the interface type of the LINE output.

Parameter

Name	Type	Range	Default
route	discrete	UNB | BAL	UNB

Dependencies
UNB for all bit rates, BAL only up to 2Mbit/s.
:OUTP[:TEL]:AUX:TYPE on page R-39! Only either the LINE or the AUX output can be set to BAL.

Comments
UNBalanced: Unbalanced (coaxial)
BALanced: Balanced port [13]

Example
:OUTP:LINE:TYPE UNB sets the LINE output to unbalanced.

Related commands
:OUTP[:TEL]:LINE:CODE on page R-41
:OUTP[:TEL]:LINE:ERR:CODE | BPV on page R-42
:OUTP[:TEL]:AUX:TYPE on page R-39

:OUTP[:TEL]:LINE:TYPE?

This query provides the current setting for the interface type of the LINE output.

Example
:OUTP:LINE:TYPE?
Response: UNB if the unbalanced output is activated.

:OUTP[:TEL]:NRZ

Commands under this command node set the electrical NRZ output (port[46]) of the generator for STM16 or OC48 signals.

Note: This output support depends on options BN 3035/90.5X (electrical STM16/OC48 interfaces).

:OUTP[:TEL]:NRZ[:STAT]

:OUTPut[:TELecom]:NRZ[:STATe] <state> switches the electrical output of the STM16 or OC48 generator (port[46]) on or off.

Parameter

Name	Type	Range	Default
state	boolean	ON | OFF | 0 | 1	OFF

Dependencies

<state> = ON only valid if :SOUR:DATA[:TEL]:SOUR[:SOCK] = OPTIC.
<state> = ON only valid if :SOUR:MODE = SDH.
<state> = ON only valid if :SOUR:DATA[:TEL]:SDH:RATE = STM16.

Comments

ON | 1: Output switched on
OFF | 0: Output switched off
This output is automatically switched ON if :SOUR:DATA[:TEL]:SDH:RATE = STM16 is set.

Example

:OUTP:NRZ ON switches the output on.

Related commands

:OUTP[:TEL]:OPT2[:STAT] on page R-48

:OUTP[:TEL]:NRZ[:STAT]?

This query provides the status of the electrical STM16/OC48 output.

Example

:OUTP:NRZ?
Response: 1 if the electrical output is switched on.

:OUTP[:TEL]:OPT[1]

Commands under this command node set the optical output (port [18]) of the generator for STM0/1/4 or OC1/OC3/OC12 signals.

Note: Optical output support depends on options BN 3035/90.4X (optical interfaces).

:OUTP[:TEL]:OPT[1][:STAT]

:OUTPut[:TELecom]:OPTic[1][:STATe] <state> switches the optical output of the STM0/1/4 or OC1/OC3/OC12 generator (port [18]) on or off.

Parameter

Name	Type	Range	Default
state	boolean	ON | OFF | 0 | 1	OFF

Dependencies
<state> = ON only valid if :SOUR:DATA[:TEL]:SOUR[:SOCK] = OPTIC.
<state> = ON only valid if :SOUR:MODE = SDH.
<state> = ON only valid if :SOUR:DATA[:TEL]:SDH:RATE = STM0|STM1|STM4.

Comments
ON | 1: Output switched on (LASER ON)
OFF | 0: Output switched off (LASER OFF)

Example
:OUTP:OPT ON switches the output on.

Related commands
:OUTP[:TEL]:OPT[1]:WLEN on page R-47

:OUTP[:TEL]:OPT[1][:STAT]?

This query provides the status of the optical output.

Example
:OUTP:OPT?
Response: 1 if the optical output is switched on.

:OUTP[:TEL]:OPT[1]:WLEN

:OUTPut[:TELecom]:OPTic[1]:WLENgth <wavelength> sets the wavelength of the optical STM0/1/4 or OC1/OC3/OC12 output (port [18]).

Parameter

Name	Type	Range	Default
wavelength	discrete	W1310 | W1550	W1310

Dependencies

The corresponding option must be available.
Value is set to W1550 if option W1310 is not available when optical signal is selected.

Comments

W1310: 1310 nm generator wavelength
W1550: 1550 nm generator wavelength

Example

:OUTP:OPT:WLEN W1550 sets the wavelength to 1550 nm.

Related commands

:OUTP[:TEL]:OPT[1][:STAT] on page R-46

:OUTP[:TEL]:OPT[1]:WLEN?

This query provides the wavelength setting of the optical output.

Example

:OUTP:OPT:WLEN?
Response: W1310

:OUTP[:TEL]:OPT2

Commands under this command node set the optical output (port [47] or [48]) of the generator for STM16 or OC48 signals **(not possible for ABT-20 devices)**.

Note: Optical output support depends on options BN 3035/90.5X (optical STM16/OC48 interfaces).

:OUTP[:TEL]:OPT2[:STAT]

:OUTPut[:TELecom]:OPTic2[:STATe] <state> switches the optical output of the STM16 or OC48 generator (port [47] or [48]) on or off.

Parameter

Name	Type	Range	Default
state	boolean	ON | OFF | 0 | 1	OFF

Dependencies
<state> = ON only valid if :SOUR:DATA[:TEL]:SOUR[:SOCK] = OPTIC.
<state> = ON only valid if :SOUR:MODE = SDH.
<state> = ON only valid if :SOUR:DATA[:TEL]:SDH:RATE = STM16 **(not possible for ABT-20 devices)**.

Comments
ON | 1: Output switched on (LASER ON)
OFF | 0: Output switched off (LASER OFF)
This output is automatically switched ON if :SOUR:DATA[:TEL]:SDH:RATE = STM16 is set.

Example
:OUTP:OPT2 ON switches the output on.

Related commands
:OUTP[:TEL]:NRZ[:STAT] on page R-45

:OUTP[:TEL]:OPT2[:STAT]?

This query provides the current setting of the optical STM16/OC48 output.

Example
:OUTP:OPT2?
Response: 1 if the optical output is switched on.

:OUTP[:TEL]:OPT2:PWL?

:OUTPut[:TELecom]:OPTic2[:PWLength] <laser> provides the physical wavelength of the optical output of the STM16 or OC48 generator (port [47] or [48]) **(not possible for ABT-20 devices)**.

Parameter

Name	Type	Range
laser	discrete or numeric	W1310 | W1550| 1 | 2

Comments	W1310 | 1 : Provides the physical wavelength of built-in laser 1 in nm W1550 | 2 : Provides the physical wavelength of built-in laser 2 in nm If two lasers with other than the standard wavelengths are installed, W1310 always selects laser 1 and W1550 always selects laser 2. If only one laser is installed, W1550 is not valid. In this case W1310 selects laser 1, independent of the installed wavelength.
Example	:OUTP:OPT2:PWL? W1310 Response: 1308.51 if the physical wavelength of laser 1 is 1308.51 nm.

:OUTP[:TEL]:OPT2:WLEN

:OUTPut[:TELecom]:OPTic2:WLENgth] <laser> switches the optical output of the STM16 or OC48 generator (port [47] or [48]) to laser 1 (W1310) or laser 2 (W1550).

Parameter

Name	Type	Range	Default
state	boolean	W1310 | W1550| 0 | 1	OFF

Dependencies: To use this command, option BN 3035/90.59 or BN 3035/91.59 must be fitted **(not possible for ABT-20 devices)**.

Comments:

W1310: Laser 1 (1310 nm generator wavelength)
W1550: Laser 2 (1550 nm generator wavelength)

If two lasers with other than the standard wavelengths are installed, W1310 always selects laser 1 and W1550 always selects laser 2. If only one laser is installed, W1550 is not valid. In this case W1310 selects laser 1, independent of the installed wavelength. The precise physical wavelength can be read with the query :OUTP[:TEL]:OPT2:PWL? on page R-48.

Example: :OUTP:OPT2:WLEN W1550 sets the output to laser 2 (1550 nm).

Related commands:

:OUTP[:TEL]:OPT2[:STAT] on page R-48
:OUTP[:TEL]:OPT2:PWL? on page R-48

:OUTP[:TEL]:OPT2:WLEN?

This query provides the current setting of the optical output.

Example:

:OUTP:OPT2:WLEN?
Response: W1310 if laser 1 is selected.

:OUTP[:TEL]:OPT3[:STAT]

:OUTPut[:TELecom]:OPTic3[:STATe] <state> switches the optical output of the STM64 or OC192 generator (port [103]) on or off.

Parameter

Name	Type	Range	Default
state	boolean	ON | OFF | 0 | 1	OFF

Dependencies
<state> = ON only valid if :SOUR:DATA[:TEL]:SOUR[:SOCK] = OPTIC.
<state> = ON only valid if :SOUR:MODE = SDH.
<state> = ON only valid if :SOUR:DATA[:TEL]:SDH:RATE = STM64 **(not possible for ABT-20 devices)**.

Comments
ON | 1: Output switched on (LASER ON)
OFF | 0: Output switched off (LASER OFF)
This output is automatically switched ON if :SOUR:DATA[:TEL]:SDH:RATE = STM64 is set.

Example
:OUTP:OPT3 ON switches the output on.

Related commands
:OUTP[:TEL]:NRZ[:STAT] on page R-45

:OUTP[:TEL]:OPT3[:STAT]?

This query provides the current setting of the optical STM164/OC192 output.

Example
:OUTP:OPT3?
Response: 1 if the optical output is switched on.

:OUTP:TRIG

Commands under this command node set the trigger output (connector [26]). Several trigger signals can be output from this output.

:OUTP:TRIG:SOUR

:OUTPut:TRIGger:SOURce <source> sets the signal source for the trigger output.

Parameter

Name	Type	Range	Default
source	discrete	TSE | RCLock | TXFTrigger | TXPTrigger	TSE

Dependencies None

Comments

TSE:	Test sequence errors
RCLock:	Reference clock, 2.048 MHz
TXFTrigger:	Generator frame trigger (SDH signals only)
TXPTrigger:	Generator pattern trigger

Example :OUTP:TRIG:SOUR RCL selects reference clock.

Related commands :OUTP:TRIG[:STAT] on page R-52

:OUTP:TRIG:SOUR?

This query provides the signal source of the trigger output.

Example :OUTP:TRIG:SOUR?
Response: TXPT if the generator pattern trigger is selected

:OUTP:TRIG[:STAT]

:OUTPut:TRIGger[:STATe] <state> switches the trigger output on or off.

Parameter

Name	Type	Range	Default
state	boolean	ON | OFF | 0 | 1	OFF

Dependencies: None

Comments:
ON | 1: Output switched on
OFF | 0: Output switched off

Example: :OUTP:TRIG ON switches the output on.

Related commands: :OUTP:TRIG:SOUR on page R-51

:OUTP:TRIG[:STAT]?

This query provides the status of the trigger output.

Related commands: :OUTP:TRIG?
Response: 1 if the trigger output is switched on.

8 SOURCE subsystem

Note: For clarity, options are shown in abbreviated form in this chapter, e.g. “**90.xx**” instead of “**BN 3035/90.xx**”.

This subsystem is used to set the signal characteristics of the PDH/SDH/SONET signal generator.

:SOUR:CLOC:FOFF:OFFS

:SOURce:CLOCk:FOFFset:OFFSet <value> determines the frequency offset of the output signal in 1/1000 ppm (parts per million).

Parameter

Name	Type	Range	Default
value	numeric	-500000 to +500000 1)	0

Dependencies

Valid only if :SOUR:CLOC:FOFF[:STAT] = ON.

For **STM-16 wander** generation with firmware release **7.0** or later, the command SOUR:CLOC:FOFF:OFFS **x**; must be transmitted to the **Jitter Module** with the **same** value of **x** as set here on the **Basic Module.**

1) If the bitrate is STM-16 or STM-64: The maximum value is limited to ± 50000.

Comments

Setting is in ppb (parts per billion, i.e. 1/1000 ppm)

Example

:SOUR:CLOC:FOFF:OFFS -3000
specifies the frequency shift as -3 ppm.

Related commands

:SOUR:CLOC:FOFF[:STAT] on page R-53,
On **Jitter Module**: SOUR:CLOC:FOFF:OFFS.

:SOUR:CLOC:FOFF:OFFS?

:SOURce:CLOCk:FOFFset:OFFSet? provides the current value of the frequency offset.

Example

:SOUR:CLOC:FOFF:OFFS?
Response: -50000 for frequency offset = -50 ppm.

:SOUR:CLOC:FOFF[:STAT]

:SOURce:CLOCk:FOFFset[:STATe] <state> activates/deactivates the frequency offset of the output signal.

Parameter

Name	Type	Range	Default
state	boolean	ON | OFF | 0 | 1	OFF

Dependencies

A frequency offset is not possible if :SOUR:DATA[:TEL]:NEL = ADM.

Comments	ON | 1:	Offset switched on
	OFF | 0:	Offset switched off

The deviation from the nominal frequency is specified using :SOUR:CLOC:FOFF:OFFS on page R-53.

Example :SOUR:CLOC:FOFF ON switches the frequency offset on.

Related commands :SOUR:CLOC:FOFF:OFFS on page R-53

:SOUR:CLOC:FOFF[:STAT]?

:SOURce:CLOCk:FOFFset[:STATe]? provides the status of the frequency offset.

Example :SOUR:CLOC:FOFF:STAT?
Response: 1 if the frequency offset is activated

:SOUR:CLOC:SOUR

:SOURce:CLOCk:SOURce <source> determines the clock source of the generated PDH/SDH signals.

Parameter

Name	Type	Range	Default
source	discrete	INTernal | EDATA2M | ECLOCK2M | EDATA1M5 | ECLOCK1M5 | RX	INT

Dependencies None

Comments	INT:	Internal TX clock generation
	EDATA2M:	TX clock derived from an external data signal (2 Mbit/s)
	ECLOCK2M:	External TX clock (T3 2 MHz)
	EDATA1M5:	TX clock derived from an external data signal (1.5 Mbit/s)
	ECLOCK1M5:	External TX clock (1.5 Mbit/s)
	RX:	TX clock derived from receiver clock

Example :SOUR:CLOC:SOUR INT
switches internal TX clock generation on.

Related commands None

:SOUR:CLOC:SOUR?

:SOURce:CLOCk:SOURce? provides the current setting of the TX clock source.

Example :SOUR:CLOC:SOUR?
Response: INT for internal clock generation.

:SOUR:DATA[:TEL]:AAL1

The commands in this group specify the structure of a AAL1 signal mapped into ATM cells (not valid for ABT-20 devices).

Note: All commands in this group are valid only if AAL1 is selected as payload of the ATM cells.

:SOUR:DATA[:TEL]:AAL1:CEM

:SOURce:DATA[:TELecom]:AAL1:CEMulation <type> determines the circuit emulation system bit rate.

Parameter

Name	Type	Range	Default
type	discrete	OFF | DS1| M2 | DS2 | M8 | M34 | DS3 PCM30 | PCM30CRC	OFF

Dependencies (not valid for ABT-20 devices)

Comments

<type>=

OFF:	AAL1 cells are transmitted with load corresponding to the settings of :SOUR:DATA[:TEL]:ATM:DIST:TYPE on page R-66 and related commands
DS1:	AAL1 cells are transmitted at a system bit rate of 1544 kbit/s
M2:	AAL1 cells are transmitted at a system bit rate of 2048 kbit/s
DS2:	AAL1 cells are transmitted at a system bit rate of 6312 kbit/s
M8:	AAL1 cells are transmitted at a system bit rate of 8448 kbit/s
M34:	AAL1 cells are transmitted at a system bit rate of 34368 kbit/s
DS3:	AAL1 cells are transmitted at a system bit rate of 44736 kbit/s
PCM30:	AAL1 cells are transmitted at a system bit rate of 2048 kbit/s with PCM30 frame structure in the 47 byte payload
PCM30CRC:	AAL1 cells are transmitted at a system bit rate of 2048 kbit/s with PCM30CRC frame structure in the 47 byte payload (segmentation)

Example

:SOUR:DATA[:TEL]:AAL1:CEM M2
sets the system bit rate to 2 Mbit/s unframed.

Related commands

:SOUR:DATA[:TEL]:ATM:DIST:TYPE on page R-66
:SOUR:DATA[:TEL]:PAYL:PATT on page R-88

:SOUR:DATA[:TEL]:AAL1:CEM?

:SOURce:DATA[:TELecom]:AAL1:CEMulation? provides the current setting of the AAL1 system bit rate.

Dependencies (not valid for ABT-20 devices)

Example :SOUR:DATA[:TEL]:AAL1:CEM?
Response: OFF
if the system bit rate is disabled.

:SOUR:DATA[:TEL]:AAL1:ERR[:MODE]

:SOURce:DATA[:TELecom]:AAL1:ERR[:MODE] <error>, <mode> determines the error insertion in the AAL1 header.

Parameter

Name	Type	Range	Default
error	discrete	CRC | PERRor | CLOSs	CLOS
mode	discrete	NONE | ONCE | RATE	NONE

Dependencies (not valid for ABT-20 devices)

Comments <error>=

CRC: Insertion of bit errors in CRC field of AAL1 header
PERRor: Insertion of bit errors in parity field of AAL1 header
CLOSs: Skips one sequence number in AAL1 header to simulate a cell loss

<mode> =

NONE: No error insertion
ONCE: Insertion of single error
RATE: Error rate corresponding to :SOUR:DATA[:TEL]:AAL1:ERR:RATE on page R-57

Example :SOUR:DATA[:TEL]:AAL1:CEM CRC, ONCE
generates a single CRC error.

Related commands :SOUR:DATA[:TEL]:AAL1:ERR:RATE on page R-57

:SOUR:DATA[:TEL]:AAL1:ERR[:MODE]?

:SOURce:DATA[:TELecom]:AAL1:ERRor:MODE]? provides the current setting of the error insertion.

Dependencies (not valid for ABT-20 devices)

Comments ONCE is a volatile state and cannot be read with this query.

Example :SOUR:DATA[:TEL]:AAL1:ERR[:MODE]?
Response: PERR,RATE if an error rate for parity errors is activated.

:SOUR:DATA[:TEL]:AAL1:ERR:RATE

:SOURce:DATA[:TELecom]:AAL1:ERRorr:RATE <rate> defines the error rate for error insertion.

Parameter

Name	Type	Range	Default
rate	numeric	1E-3 | 1E-4 | 1E-5 | 1E-6	1E-6

Dependencies Error rate is active only if :SOUR:DATA[:TEL]:AAL1:CEM on page R-55 is set to <mode> = RATE (not valid for ABT-20 devices).

Comments

Error type	Range
CRC, PERR, CLOS	1E-3 | 1E-4 | 1E-5 | 1E-6

Values not equal to 1 for the mantissa are rounded to 1E-n.

Example :SOUR:DATA[:TEL]:AAL1:ERR:RATE 1E-5
sets the error rate to 1 x 10^{-5}.

Related commands :SOUR:DATA[:TEL]:AAL1:CEM on page R-55

:SOUR:DATA[:TEL]:AAL1:ERR:RATE?

:SOURce:DATA[:TELecom]:AAL1:ERRorr:RATE? provides the current error rate setting.

Dependencies (not valid for ABT-20 devices)

Example :SOUR:DATA[:TEL]:AAL1:ERR:RATE?
Response: 1E-5 Error rate = 1 x 10^{-5}

:SOUR:DATA[:TEL]:ATM

The commands in this group specify the structure of a ATM signal mapped into PDH signals or into SDH signals.

Note: All commands in this group are valid only if ATM is selected as payload of a PDH signal or as payload of a SDH signal.

:SOUR:DATA[:TEL]:ATM:ALAR:CLEN

:SOURce:DATA[:TELecom]:ATM:ALARm:CLENgth<erroredcells>,<correctcells> defines alarm sequences.

Parameter

Name	Type	Range	Default
erroredcells	numeric	7 - 31	7
correctcells	numeric	1 - 31	31

Dependencies

The sequence <erroredcells>, <correctcells> is run through only if :SOUR:DATA[:TEL]:ATM:ALAR[:MODE] = <alarm>, PER is set.

The sequence <erroredcells> is run through if :SOUR:DATA[:TEL]:ATM:ALAR[:MODE] = <alarm>, SING is set.

Comments

erroredcells: Number of cells in which an uncorrectable header error is generated
correctcells: Number of cells in which no header error is transmitted

Example

:SOUR:DATA[:TEL]:ATM:ALAR:CLEN 9, 20
sets errored cells to 9 and correct cells to 20.

Related commands

:SOUR:DATA[:TEL]:ATM:ALAR[:MODE] on page R-59

:SOUR:DATA[:TEL]:ATM:ALAR:CLEN?

:SOURce:DATA[:TELecom]:ATM:ALARm:CLENgth? provides the current alarm sequence description.

Example

:SOUR:DATA:ATM:ALAR:CLEN?
Response: 8,10
Alarm is generated for 8-6 = 2 cells, then 10 error-free cells follow.

:SOUR:DATA[:TEL]:ATM:ALAR[:MODE]

:SOURce:DATA:[TELecom]:ATM:ALARm[:MODE] <alarm>, <mode> determines the alarm insertion.

Parameter

Name	Type	Range	Default
alarm	discrete	LOCD | EVPAIS | EVPRDI | EVCAIS | EVCRDI | EV2AIS | EV2RDI	LOCD
mode	discrete	NONE | ONCE | CONTinuous | SINGle | PERiodical	NONE

Dependencies None

Comments

<alarm> =

LOCD:	Loss of cell delineation
EVPAIS:	Sends F4 OAM cell carrying AIS end to end (not possible for ABT-20 devices)
EVPRDI:	Sends F4 OAM cell carrying RDI end to end (not possible for ABT-20 devices)
EVCAIS:	Sends F5 OAM cell carrying AIS end to end (not possible for ABT-20 devices)
EVCRDI:	Sends F5 OAM cell carrying RDI end to end (not possible for ABT-20 devices)
EV2AIS:	Sends both EVPAIS and EVCAIS (not possible for ABT-20 devices)
EV2RDI:	Sends both EVPRDI and EVCRDI (not possible for ABT-20 devices)

<mode> =

NONE:	No alarm insertion
ONCE:	Insertion of single alarm for :SOUR:DATA[:TEL]:ATM:ALAR[:MODE] = LOCD 7 cells are transmitted with uncorrectable header errors
CONTinuous:	Continuous alarm insertion
SINGle:	Insertion of an alarm for the duration <erroredcells> corresponding to SOUR:DATA[:TEL]:ATM:ALAR:CLEN
PERiodical:	Periodic execution of an alarm sequence corresponding to :SOUR:DATA[:TEL]:ATM:ALAR:CLEN <erroredcells>, <correctcells>

Example

:SOUR:DATA[:TEL]:ATM:ALAR[:MODE] LOCD,CONT
activates the “LOCD” alarm in “continuous” mode.

Related commands :SOUR:DATA[:TEL]:ATM:ALAR:CLEN on page R-58

:SOUR:DATA[:TEL]:ATM:ALAR[:MODE]?

:SOURce:DATA[:TELecom]:ATM:ALARm[:MODE]? provides the current setting of the alarm insertion.

Comments
ONCE is a volatile state and cannot be read.

Example
:SOUR:DATA:ATM:ALAR? if continuous insertion of LOCD is activated.
Response: LOCD,CONT

:SOUR:DATA[:TEL]:ATM:DIST:BURS:BLO

:SOURce:DATA[:TELecom]:ATM:DISTribution:BURSt:BLOad <burstload> determines the relative load of the burst in the measurement channel (burst load).

Parameter

Name	Type	Range	Default
burstload	numeric	1 - 100	100
		0.25 - 25 (if VC4_4C (STS12C_SPE) ATM is selected)	25

Dependencies
The setting is valid only for :SOUR:DATA[:TEL]:ATM:DIST:TYPE = BURS (not valid for ABT-20 devices).

Comments
Setting is in %. The unit % is not specified.
The resolution is 1 %.
Burst load 80 % means a burst with 80 % load for a duration of :SOUR:DATA[:TEL]:ATM:DIST:BURS:BLEN <burstlength> cells.

Example
:SOUR:DATA[:TEL]:ATM:DIST:BURS:BLO 100
sets the burst load to 100 %.

Related commands
:SOUR:DATA[:TEL]:ATM:DIST:BURS:BLEN on page R-61
:SOUR:DATA[:TEL]:ATM:DIST:BURS:BPER on page R-61
:SOUR:DATA[:TEL]:ATM:DIST:CONS:LOAD on page R-62
:SOUR:DATA[:TEL]:ATM:DIST:EQU:CDIS on page R-64
:SOUR:DATA[:TEL]:ATM:DIST:TYPE on page R-66

:SOUR:DATA[:TEL]:ATM:DIST:BURS:BLO?

:SOURce:DATA[:TELecom]:ATM:DIStribution:BURSt:BLOad? provides the current setting of the relative load of the burst.

Dependencies
(not valid for ABT-20 devices)

Example
:SOUR:DATA:ATM:DIST:BURS:BLO?
Response: 100 for burst load = 100 %.

:SOUR:DATA[:TEL]:ATM:DIST:BURS:BLEN

:SOURce:DATA[:TELecom]:ATM:DIStribution:BURSt:BLENgth <burstlength> determines the length of the burst in cells.

Parameter

Name	Type	Range	Default
burstlength	numeric	1 - 255	10
		4 - 1020 (if VC4_4C (STS12C_SPE) ATM is selected)	40

Dependencies — The setting is valid only for :SOUR:DATA[:TEL]:ATM:DIST:TYPE = BURS (not valid for ABT-20 devices).

Example — :SOUR:DATA[:TEL]:ATM:DIST:BURS:BLEN 10
sets the length of the burst to 10 cells.

Related commands — :SOUR:DATA[:TEL]:ATM:DIST:BURS:BLO on page R-60
:SOUR:DATA[:TEL]:ATM:DIST:BURS:BPER on page R-61
:SOUR:DATA[:TEL]:ATM:DIST:TYPE on page R-66

:SOUR:DATA[:TEL]:ATM:DIST:BURS:BLEN?

:SOURce:DATA[:TELecom]:ATM:DIStribution:BURSt:BLENgth? provides the current setting of the burst length in cells.

Dependencies — (not valid for ABT-20 devices)

Example — :SOUR:DATA:ATM:DIST:BURS:BLEN?
Response: 10 — if the burst length is set to 10 cells.

:SOUR:DATA[:TEL]:ATM:DIST:BURS:BPER

:SOURce:DATA[:TELecom]:ATM:DIStribution:BURSt:BPERiod <burstperiod> determines the period duration of the burst in cells.

Parameter

Name	Type	Range	Default
burstperiod	numeric	1 - 1023	100
		4 - 4092 (if VC4_4C (STS12C_SPE) ATM is selected)	400

Dependencies — The setting is valid only for :SOUR:DATA[:TEL]:ATM:DIST:TYPE = BURS (not valid for ABT-20 devices).

Example — :SOUR:DATA[:TEL]:ATM:DIST:BURS:BPER 100
sets the burst period to 100 cells.

Related commands — :SOUR:DATA[:TEL]:ATM:DIST:BURS:BLO on page R-60
:SOUR:DATA[:TEL]:ATM:DIST:BURS:BLEN on page R-61
:SOUR:DATA[:TEL]:ATM:DIST:TYPE on page R-66

:SOUR:DATA[:TEL]:ATM:DIST:BURS:BPER?

:SOURce:DATA[:TELecom]:ATM:DISTribution:BURSt:BPERiod? provides the current setting of the burst period duration in cells.

Dependencies (not valid for ABT-20 devices)

Example :SOUR:DATA[:TEL]:ATM:DIST:BURS:BPER?
Response: 100 if the burst period is set to 100 cells.

:SOUR:DATA[:TEL]:ATM:DIST:CONS:LOAD

:SOURce:DATA[:TELecom]:ATM:DISTribution:CONStant:LOAD <meanload> determines the relative mean load in the measurement channel for constant distribution.

Parameter

Name	Type	Range	Default
meanload	numeric	0.01 - 100	100
		0.0025 - 25 (if VC4_4C (STS12C_SPE) ATM is selected)	25

Dependencies The setting is valid only for :SOUR:DATA[:TEL]:ATM:DIST:TYPE = CONS (not valid for ABT-20 devices).

The setting resolution is dependent on
:SOUR:DATA[:TEL]:ATM:DIST:CONS:RES on page R-63

Resolution	Setting range
0.01	0.01 % - 0.99 %
0.1	0.1 % - 9.9 %
1	1 % - 100 %

Comments Setting is in %. The unit % is not specified.
meanload 40 % means: 1 load cell, 1 empty cell, 1 load cell, 2 empty cells, …

Example :SOUR:DATA[:TEL]:ATM:DIST:CONS:LOAD 50
sets the load to 50 %.

Related commands
:SOUR:DATA[:TEL]:ATM:DIST:CONS:RES on page R-63
:SOUR:DATA[:TEL]:ATM:DIST:EQU:CDIS on page R-64
:SOUR:DATA[:TEL]:ATM:DIST:EQU:RES on page R-65
:SOUR:DATA[:TEL]:ATM:DIST:TYPE on page R-66

:SOUR:DATA[:TEL]:ATM:DIST:CONS:LOAD?

:SOURce:DATA[:TELecom]:ATM:DIStribution:CONStant:LOAD provides the current setting of the relative mean load for constant distribution in the measurement channel.

Dependencies
(not valid for ABT-20 devices)

Example
:SOUR:DATA[:TEL]:ATM:DIST:CONS:LOAD?
Response: 50 if 50 % load is set.

:SOUR:DATA[:TEL]:ATM:DIST:CONS:RES

:SOURce:DATA[:TELecom]:ATM:DIStribution:CONStant:LOAD:RESolution <resolution> determines the resolution of the load in the measurement channel for constant distribution.

Parameter

Name	Type	Range	Default
resolution	numeric	0.01 | 0.1 | 1	1
		0.0025 | 0.025 | 0.25 (if VC4_4C (STS12C_SPE) ATM is selected)	0.25

Dependencies
The setting is valid only for
:SOUR:DATA[:TEL]:ATM:DIST:BURS:BLO = CONS
(not valid for ABT-20 devices),
see :SOUR:DATA[:TEL]:ATM:DIST:BURS:BLO on page R-60.

Comments
Setting is in %.
The unit % is not specified.

Example
:SOUR:DATA[:TEL]:ATM:DIST:CONS:RES 1
sets the load range for :SOUR:DATA[:TEL]:ATM:DIST:CONS:LOAD to 1 % -100 % with resolution of 1 %.

Related commands
:SOUR:DATA[:TEL]:ATM:DIST:TYPE on page R-66
:SOUR:DATA[:TEL]:ATM:DIST:BURS:BLO on page R-60
:SOUR:DATA[:TEL]:ATM:DIST:EQU:CDIS on page R-64
:SOUR:DATA[:TEL]:ATM:DIST:EQU:RES on page R-65

:SOUR:DATA[:TEL]:ATM:DIST:CONS:RES?

:SOURce:DATA[:TELecom]:ATM:DIStribution:CONStant:RESolution provides the current setting of the resolution for constant distribution in the measurement channel.

Dependencies
(not valid for ABT-20 devices)

Example
:SOUR:DATA[:TEL]:ATM:DIST:CONS:LOAD?
Response: 1 if the resolution is set to 1 %.

:SOUR:DATA[:TEL]:ATM:DIST:EQU:CDIS

:SOURce:DATA[:TELecom]:ATM:DIStribution:EQUidistant:CDIStance <celldistance> determines the cell spacing in the measurement channel.

Parameter

Name	Type	Range	Default
celldistance	numeric	1 - 10000	1
		4 - 40000 (if VC4_4C (STS12C_SPE) ATM is selected)	4

Dependencies

The setting is valid only for :SOUR:DATA[:TEL]:ATM:DIST:TYPE = EQU (not valid for ABT-20 devices).
The setting resolution is dependent on :SOUR:DATA[:TEL]:ATM:DIST:EQU:RES on page R-65.

Resolution	Setting range
1	1 - 99
10	10 - 990
100	00 - 10000

Example

:SOUR:DATA[:TEL]:ATM:DIST:EQU:CDIS 100
sets the spacing between two consecutive test cells to 100.

Related commands

:SOUR:DATA[:TEL]:ATM:DIST:TYPE on page R-66
:SOUR:DATA[:TEL]:ATM:DIST:BURS:BLO on page R-60
:SOUR:DATA[:TEL]:ATM:DIST:CONS:RES on page R-63
:SOUR:DATA[:TEL]:ATM:DIST:EQU:RES on page R-65

:SOUR:DATA[:TEL]:ATM:DIST:EQU:CDIS?

:SOURce:DATA[:TELecom]:ATM:DIStribution:EQUidistant:CDIStance provides the current setting of the cell spacing in the measurement channel.

Dependencies

(not valid for ABT-20 devices)

Example

:SOUR:DATA[:TEL]:ATM:DIST:EQU:CDIS?
Response: 100 if the cell spacing is set to 100.

:SOUR:DATA[:TEL]:ATM:DIST:EQU:RES

:SOURce:DATA[:TELecom]:ATM:DISTribution:EQUidistant:RESolution <resolution> determines the resolution of the cell spacing in the measurement channel.

Parameter

Name	Type	Range	Default
resolution	numeric	1 | 10 | 100	1
		4 | 40 | 400 (if VC4_4C (STS12C_SPE) ATM is selected)	4

Dependencies
The setting is valid only for :SOUR:DATA[:TEL]:ATM:DIST:TYPE = EQU (not valid for ABT-20 devices),
see :SOUR:DATA[:TEL]:ATM:DIST:EQU:CDIS on page R-64.

Example
:SOUR:DATA[:TEL]:ATM:DIST:EQU:RES 10
sets the load range for :SOUR:DATA[:TEL]:ATM:DIST:EQU:CDIS to 10 - 1000 cells with a resolution of 10 cells.

Related commands
:SOUR:DATA[:TEL]:ATM:DIST:BURS:BLO on page R-60
:SOUR:DATA[:TEL]:ATM:DIST:CONS:RES on page R-63
:SOUR:DATA[:TEL]:ATM:DIST:EQU:CDIS on page R-64
:SOUR:DATA[:TEL]:ATM:DIST:TYPE on page R-66

:SOUR:DATA[:TEL]:ATM:DIST:EQU:RES?

:SOURce:DATA[:TELecom]:ATM:DISTribution:EQUidistant:RESolution provides the current setting of the resolution of the cell spacing in the measurement channel.

Dependencies
(not valid for ABT-20 devices)

Example
:SOUR:DATA[:TEL]:ATM:DIST:EQU:RES?
Response: 10 if the cell spacing resolution is set to 10.

:SOUR:DATA[:TEL]:ATM:DIST:STAT

:SOURce:DATA[:TELecom]:ATM:DISTribution:STATe <state> switches the generator on or off in the measurement channel.

Parameter

Name	Type	Range	Default
state	boolean	ON | OFF | 0 | 1	ON

Dependencies (not valid for ABT-20 devices)

Comments
OFF | 0: No ATM traffic transmitted in the measurement channel (only fill cells and background traffic is transmitted).
ON | 1: ATM traffic is transmitted in the measurement channel.
The foreground channel runs independently of the ATM background generator.

Example
:SOUR:DATA[:TEL]:ATM:DIST:STAT ON
switches on the generator in the measurement channel.

Related commands
:SOUR:DATA[:TEL]:ATM:DIST:BURS:BLO on page R-60
:SOUR:DATA[:TEL]:ATM:FILL on page R-69
:SOUR:DATA[:TEL]:ATM:TRAF:BGEN:STAT on page R-85

:SOUR:DATA[:TEL]:ATM:DIST:STAT?

:SOURce:DATA[:TELecom]:ATM:DISTribution:STATe? provides the current setting of the ATM generator in the measurement channel.

Dependencies (not valid for ABT-20 devices)

Example
:SOUR:DATA[:TEL]:ATM:DIST:STAT?
Response: 1
if the generator is switched on in the measurement channel.

:SOUR:DATA[:TEL]:ATM:DIST:TYPE

:SOURce:DATA[:TELecom]:ATM:DISTribution:TYPE <type> sets the distribution of the cells in the measurement channel.

Parameter

Name	Type	Range	Default
type	discrete	BURSt | EQUidistant | CONStant	CONS

Dependencies (not valid for ABT-20 devices)

Comments
<type> =
BURSt: Burst traffic
EQUidistant: All cells are equally spaced, i.e. relative bit rate = 100 %/n (n = 1, 2, 3, …10000)
CONStant: Cells are transmitted with a constant bit rate

Example :SOUR:DATA[:TEL]:ATM:DIST:TYPE CONS
sets the traffic in the measurement channel for a constant TX profile.

Related commands :SOUR:DATA[:TEL]:ATM:DIST:BURS:BLO on page R-60
:SOUR:DATA[:TEL]:ATM:DIST:CONS:RES on page R-63
:SOUR:DATA[:TEL]:ATM:DIST:EQU:CDIS on page R-64
:SOUR:DATA[:TEL]:ATM:DIST:EQU:RES on page R-65

:SOUR:DATA[:TEL]:ATM:DIST:TYPE?

:SOURce:DATA[:TELecom]:ATM:DISTribution:TYPE? provides the current setting of the cell distribution in the measurement channel.

Dependencies (not valid for ABT-20 devices)

Example :SOUR:DATA[:TEL]:ATM:DIST:TYPE?
Response: CONS if the TX profile is set to CONSTANT.

:SOUR:DATA[:TEL]:ATM:ERR:HEAD:CLEN

:SOURce:DATA[:TELecom]:ATM:ERRor:HEADer:CLENgth <erroredcells>, where <correctcells> defines the error sequences in the cell header.

Parameter

Name	Type	Range	Default
erroredcells	numeric	1 - 31	1
correctcells	numeric	1 - 31	31

Dependencies The sequence is run through only if
:SOUR:DATA[:TEL]:ATM:ERR:HEAD[:MODE] = <error>, PER is set.
The sequence is run through with <erroredcells> if
:SOUR:DATA[:TEL]:ATM:ERR:HEAD[:MODE] = <error>, SINGle is set.

Comments erroredcells = number of cells in which the error is generated
correctcells = number of cells in which no error is generated

Example :SOUR:DATA[:TEL]:ATM:ERR:HEAD:CLEN 10,20
sets erroredcells to 10 and correctcells to 20.

Related commands :SOUR:DATA[:TEL]:ATM:ERR:HEAD[:MODE] on page R-68

:SOUR:DATA[:TEL]:ATM:ERR:HEAD:CLEN?

:SOURce:DATA[:TELecom]:ATM:ERRor:HEADer:CLENgth? provides the current error sequence description.

Example :SOUR:DATA:ATM:ERR:HEAD:CLEN?
Response: 5,10
Error present in 5 cells followed by 10 cells with no error.

:SOUR:DATA[:TEL]:ATM:ERR:HEAD[:MODE]

:SOURce:DATA[:TELecom]:ATM:ERR:HEADer[:MODE] <error>, <mode>
determines the error insertion in the cell header.

Parameter

Name	Type	Range	Default
error	discrete	HCORrect | HUNCorrect	HCOR
mode	discrete	NONE | ONCE | CONTinuous | RATE | SINGle | PERiodical	NONE

Dependencies None

Comments <error> =

HCORrect:	Insertion of a single error (correctable) into the cell header..
HUNCorrect.	Insertion of an uncorrectable error (≥ 2 bit errors) into the cell header

<mode> =

NONE:	No error insertion..
ONCE:	Insertion of single error
CONTinuous:	Continuous error insertion
RATE:	Error rate corresponding to :SOUR:DATA[:TEL]:ATM:ERR:HEAD:RATE on page R-69
SINGle:	Insertion of an error measurement channel for the duration <erroredcells>
PERiodical:	Periodic execution of an error sequence corresponding to :SOUR:DATA[:TEL]:ATM:DIST:EQU:CDIS on page R-64

Example :SOUR:DATA:ATM:ERR:HEAD HCOR, ONCE
generates a single correctable header error.

Related commands :SOUR:DATA[:TEL]:ATM:ALAR[:MODE] on page R-59
:SOUR:DATA[:TEL]:ATM:ERR:HEAD:CLEN on page R-67
:SOUR:DATA[:TEL]:ATM:ERR:HEAD:RATE on page R-69

:SOUR:DATA[:TEL]:ATM:ERR:HEAD[:MODE]?

:SOURce:DATA[:TELecom]:ATM:ERRor:HEADer:MODE]? provides the current setting of the error insertion.

Comments ONCE is a volatile state and cannot be read with this query.

Example :SOUR:DATA:ATM:ERR:HEAD?
Response: HCOR,RATE
if an error rate for correctable header errors is activated.

:SOUR:DATA[:TEL]:ATM:ERR:HEAD:RATE

:SOURce:DATA[:TELecom]:ATM:ERRor:HEADer:RATE <rate> defines the error rate for error insertion.

Parameter

Name	Type	Range	Default
rate	numeric	1E-6 …1E-2	1E-6

Dependencies

Error rate is active only if :SOUR:DATA[:TEL]:ATM:ERR:HEAD[:MODE] on page R-68 is set to <mode> = RATE.

Comments

For HCOR, the set rate corresponds to the equivalent bit error rate!

Error type	Range
HCOR HUNC	1E-2, 1E-3, … 1E-6

Example

:SOUR:DATA:ATM:ERR:HEAD:RATE 1E-5
sets the error rate to 1×10^{-5}.

Related commands

:SOUR:DATA[:TEL]:ATM:ERR:HEAD[:MODE] on page R-68

:SOUR:DATA[:TEL]:ATM:ERR:HEAD:RATE?

:SOUR:DATA[:TEL]:ATM:ERR:HEAD:RATE? provides the current error rate setting.

Example

:SOUR:DATA:ATM:ERR:HEAD:RATE?
Response: 1E-5 Error rate = 1×10^{-5}.

:SOUR:DATA[:TEL]:ATM:FILL

:SOURce:DATA[:TELecom]:ATM:FILL <type> determines the filler cells that are transmitted when no load cells are being transmitted.

Parameter

Name	Type	Range	Default
type	discrete	IDLE | UNASsigned	UNAS

Dependencies

None

Comments

<type> =
IDLE: IDLE cells are transmitted
UNASsigned: UNASSIGNED cells are transmitted

Example

:SOUR:DATA[:TEL]:ATM:FILL IDLE sets the filler cell type to IDLE.

:SOUR:DATA[:TEL]:ATM:FILL?

:SOURce:DATA[:TELecom]:ATM:FILL? provides the current filler cell type.

Example :SOUR:DATA[:TEL]:ATM:FILL?
Response: IDLE if the IDLE filler cell type is set.

:SOUR:DATA[:TEL]:ATM:HEAD:CLP

:SOURce:DATA[:TELecom]:ATM:HEADer:CLP <value> determines the CLP field in the cell header.

Parameter

Name	Type	Range	Default
value	numeric	0 - 1	0

Dependencies (not valid for ABT-20 devices)

Example :SOUR:DATA[:TEL]:ATM:HEAD:CLP 0 sets the CLP field to 0.

Related commands :SOUR:DATA[:TEL]:ATM:HEAD:GFC on page R-71
:SOUR:DATA[:TEL]:ATM:HEAD:VPI on page R-73
:SOUR:DATA[:TEL]:ATM:HEAD:VCI on page R-72
:SOUR:DATA[:TEL]:ATM:HEAD:PT on page R-72

:SOUR:DATA[:TEL]:ATM:HEAD:CLP?

:SOURce:DATA[:TELecom]:ATM:HEADer:CLP? provides the current setting of the CLP field in the cell header of the measurement channel.

Dependencies (not valid for ABT-20 devices)

Example :SOUR:DATA[:TEL]:ATM:HEAD:CLP?
Response: 0 if CLP 0 is set.

:SOUR:DATA[:TEL]:ATM:HEAD:GFC

:SOURce:DATA[:TELecom]:ATM:HEADer:GFC <value> sets the GFC field in the cell header of the measurement channel.

Parameter

Name	Type	Range	Default
value	numeric	0 - 15	0

Dependencies: Valid only for :SOUR:DATA[:TEL]:ATM:NINT = UNI
(not valid for ABT-20 devices).

Comments: None

Example: :SOUR:DATA[:TEL]:ATM:HEAD:GFC 0 sets the GFC field to 0.

Related commands:
:SOUR:DATA[:TEL]:ATM:HEAD:VPI on page R-73
:SOUR:DATA[:TEL]:ATM:HEAD:VCI on page R-72
:SOUR:DATA[:TEL]:ATM:HEAD:PT on page R-72
:SOUR:DATA[:TEL]:ATM:HEAD:CLP on page R-70
:SOUR:DATA[:TEL]:ATM:NINT on page R-74

:SOUR:DATA[:TEL]:ATM:HEAD:GFC?

:SOURce:DATA[:TELecom]:ATM:HEADer:GFC? provides the current setting of the GFC field in the cell header of the measurement channel.

Dependencies: (not valid for ABT-20 devices)

Example: :SOUR:DATA[:TEL]:ATM:HEAD:GFC?
Response: 0 if GFC 0 is set.

:SOUR:DATA[:TEL]:ATM:HEAD:HEC?

:SOURce:DATA[:TELecom]:ATM:HEADer:HEC? provides the current setting of the HEC field in the cell header of the measurement channel.

Comments: Query only! Value is computed internally.

Dependencies: (not valid for ABT-20 devices)

Example: :SOUR:DATA[:TEL]:ATM:HEAD:HEC?
Response: 45 if HEC 45 is set.

:SOUR:DATA[:TEL]:ATM:HEAD:PT

:SOURce:DATA[:TELecom]:ATM:HEADer:PT <value> determines the PT field in the cell header of the measurement channel.

Parameter

Name	Type	Range	Default
value	numeric	0 - 7	0

Dependencies (not valid for ABT-20 devices)

Example :SOUR:DATA[:TEL]:ATM:HEAD:PT 5 sets the payload type to 5.

Related commands
:SOUR:DATA[:TEL]:ATM:HEAD:GFC on page R-71
:SOUR:DATA[:TEL]:ATM:HEAD:VPI on page R-73
:SOUR:DATA[:TEL]:ATM:HEAD:VCI on page R-72
:SOUR:DATA[:TEL]:ATM:HEAD:CLP on page R-70

:SOUR:DATA[:TEL]:ATM:HEAD:PT?

:SOURce:DATA[:TELecom]:ATM:HEADer:PT? provides the current setting of the PT field in the cell header of the measurement channel.

Dependencies (not valid for ABT-20 devices)

Example :SOUR:DATA[:TEL]:ATM:HEAD:PT?
Response: 5 if payload type 5 is set.

:SOUR:DATA[:TEL]:ATM:HEAD:VCI

:SOURce:DATA[:TELecom]:ATM:HEADer:VCI <value> determines the VCI field in the cell header of the measurement channel.

Parameter

Name	Type	Range	Default
value	numeric	0 - 65535	32

Dependencies (not valid for ABT-20 devices)

Example :SOUR:DATA[:TEL]:ATM:HEAD:VCI 15 sets the VCI to 15.

Related commands
:SOUR:DATA[:TEL]:ATM:HEAD:GFC on page R-71
:SOUR:DATA[:TEL]:ATM:HEAD:VPI on page R-73
:SOUR:DATA[:TEL]:ATM:HEAD:PT on page R-72
:SOUR:DATA[:TEL]:ATM:HEAD:CLP on page R-70

:SOUR:DATA[:TEL]:ATM:HEAD:VCI?

:SOURce:DATA[:TELecom]:ATM:HEADer:VCI? provides the current setting of the VCI field in the cell header of the measurement channel.

Dependencies (not valid for ABT-20 devices)

Example :SOUR:DATA[:TEL]:ATM:HEAD:VCI?
Response: 32 if VCI 32 is set.

:SOUR:DATA[:TEL]:ATM:HEAD:VPI

:SOURce:DATA[:TELecom]:ATM:HEADer:VPI <value> determines the VPI field in the cell header of the measurement channel.

Parameter

Name	Type	Range	Default
value	numeric	0 - 255/4095	0

Dependencies (not valid for ABT-20 devices)
Value limitation as a function of :SOUR:DATA[:TEL]:ATM:NINT =
UNI: Max. value = 255
NNI: Max. value = 4095

Example :SOUR:DATA[:TEL]:ATM:HEAD:VPI 15 sets the VPI to 15.

Related commands
:SOUR:DATA[:TEL]:ATM:HEAD:GFC on page R-71
:SOUR:DATA[:TEL]:ATM:HEAD:VCI on page R-72
:SOUR:DATA[:TEL]:ATM:HEAD:PT on page R-72
:SOUR:DATA[:TEL]:ATM:HEAD:CLP on page R-70
:SOUR:DATA[:TEL]:ATM:NINT on page R-74

:SOUR:DATA[:TEL]:ATM:HEAD:VPI?

:SOURce:DATA[:TELecom]:ATM:HEADer:VPI? provides the current setting of the VPI field in the cell header of the measurement channel.

Dependencies (not valid for ABT-20 devices)

Example :SOUR:DATA[:TEL]:ATM:HEAD:VPI?
Response: 32 if VPI 32 is set.

:SOUR:DATA[:TEL]:ATM:NINT

SOURce:DATA[:TELecom]:ATM:NINTerface <type> determines the setting of the network interface.

Parameter

Name	Type	Range	Default
type	discrete	UNI | NNI	UNI

Dependencies (not valid for ABT-20 devices)

Comments
UNI: User network interface
NNI: Network node interface

Example :SOUR:DATA[:TEL]:ATM:NINT UNI sets the network interface to UNI.

Related commands
:SOUR:DATA[:TEL]:ATM:HEAD:GFC on page R-71
:SOUR:DATA[:TEL]:ATM:HEAD:VPI on page R-73

:SOUR:DATA[:TEL]:ATM:NINT?

:SOURce:DATA[:TELecom]:ATM:NINTerface? provides the current setting of the network interface.

Dependencies (not valid for ABT-20 devices)

Example
:SOUR:DATA[:TEL]:ATM:NINT?
Response: UNI if network interface UNI is set.

:SOUR:DATA[:TEL]:ATM:PAYL:SCR

:SOURce:DATA[:TELecom]:ATM:PAYLoad:SCRambling <scramble> determines the setting of the ATM payload scrambler.

Parameter

Name	Type	Range	Default
scramble	boolean	ON | OFF | 0 | 1	ON

Dependencies None

Comments
ON | 1: Turn on scrambler
OFF | 0: Turn off scrambler

Example :SOUR:DATA[:TEL]:ATM:PAYL:SCR ON activates the scrambler.

:SOUR:DATA[:TEL]:ATM:PAYL:SCR?

:SOURce:DATA[:TELecom]:ATM:PAYLoad:SCRambling? provides the current setting of the scrambler.

Example :SOUR:DATA:ATM:PAYL:SCR?
Response: 1 if scrambling is switched on.

:SOUR:DATA[:TEL]:ATM:PAYL:TYPE

:SOURce:DATA[:TELecom]:ATM:PAYLoad:TYPE <scramble> determines the cell payload.

Parameter

Name	Type	Range	Default
type	discrete	AAL0 | AAL1 | O191	AAL0

Dependencies (not valid for ABT-20 devices)

Comments O.191: Test cells conforming to the O.191 draft are transmitted

Example :SOUR:DATA[:TEL]:ATM:PAYL:TYPE AAL1
sets the ATM payload type to AAL1.

Related commands None

:SOUR:DATA[:TEL]:ATM:PAYL:TYPE?

:SOURce:DATA[:TELecom]:ATM:PAYLoad:TYPE? provides the current setting of the cell payload type.

Dependencies (not valid for ABT-20 devices)

Example :SOUR:DATA[:TEL]:ATM:PAYL:TYPE?
Response: AAL1 if ATM payload type AAL1 is set.

:SOUR:DATA[:TEL]:ATM:SOUR

SOURce:DATA[:TELecom]:ATM:SOURce <source> determines the source of the ATM cells.

Parameter

Name	Type	Range	Default
source	discrete	INTernal | EXTernal	INT

Dependencies
:SOUR:DATA[:TEL]:ATM:SOUR = EXT requires option 90.80.
If :SOUR:DATA[:TEL]:ATM:SOUR = EXT the sensor parameter ([:SENS]:DATA[:TEL]:ATM:SENS on page R-322) must also be set to EXT.

Comments
This command determines the source of the transmitted ATM cells:
INTernal: Cells generated in the basic module (requires option 90.70)
EXTernal: Cells generated in the BAG module (requires option 90.80)

Example
:SOUR:DATA:ATM:SOUR INT

Related commands
[:SENS]:DATA[:TEL]:ATM:SENS on page R-322

:SOUR:DATA[:TEL]:ATM:SOUR?

:SOURce:DATA[:TELecom]:ATM:SOURce? provides the current setting of the ATM cell source.

Example
SOUR:DATA:ATM:SOUR?
Response: INT

:SOUR:DATA[:TEL]:ATM:TRAF:BCH:FILL:LIM

:SOURce:DATA[:TELecom]:ATM:TRAFfic:BCHannel:FILL:LIMit <value> determines the fill limit of the background channel.

Parameter

Name	Type	Range	Default
value	numeric	25 | 100	100

Dependencies
(not valid for ABT-20 devices)
The selection is effective only if VC4_4C (STS12C_SPE) ATM is selected.

Comments
Setting is in %. The unit % is not specified.

Example
:SOUR:DATA[:TEL]:ATM:TRAF:BCH:FILL:LIM 100 sets the limit to 100 %

Related commands
:SOUR:DATA[:TEL]:ATM:TRAF:BCH:TYPE on page R-83

:SOUR:DATA[:TEL]:ATM:TRAF:BCH:FILL:LIM?

:SOURce:DATA[:TELecom]:ATM:TRAFfic:BCHannel:FILL:LIMit? provides the current setting of the fill limit for the background channel.

Dependencies (not valid for ABT-20 devices)

Example :SOUR:DATA[:TEL]:ATM:TRAF:BCH:FILL:LIM?
Response: 100 if the limit is set to 100 % (599.04 Mbit/s for VC4_4C (STS12C_SPE)).

:SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:CLP

:SOURce:DATA[:TELecom]:ATM:TRAFfic:BCHannel:HEADer:CLP <value> determines the CLP field in the cell header of the background channel.

Parameter

Name	Type	Range	Default
value	numeric	0 - 1	0

Dependencies (not valid for ABT-20 devices)
The selection is effective only if VC4_4C (STS12C_SPE) ATM is selected.

Example :SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:CLP 0 sets the CLP field to 0.

Related commands :SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:GFC on page R-78
:SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:VPI on page R-81
:SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:VCI on page R-80
:SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:PT on page R-79
:SOUR:DATA[:TEL]:ATM:TRAF:BCH:PAYL on page R-82

:SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:CLP?

:SOURce:DATA[:TELecom]:ATM:TRAFfic:BCHannel:HEADer:CLP? provides the current setting of the CLP field in the cell header of the background channel.

Dependencies (not valid for ABT-20 devices)

Example :SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:CLP?
Response: 0 if CLP 0 is set.

:SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:GFC

:SOURce:DATA[:TELecom]:ATM:TRAFfic:BCHannel:HEADer:GFC <value> sets the GFC field in the cell header of the background channel.

Parameter

Name	Type	Range	Default
value	numeric	0 - 15	0

Dependencies (not valid for ABT-20 devices)
The selection is effective only if VC4_4C (STS12C_SPE) ATM is selected
Valid only for :SOUR:DATA[:TEL]:ATM:NINT = UNI .

Comments None

Example :SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:GFC 0 sets the GFC field to 0.

Related commands :SOUR:DATA[:TEL]:ATM:NINT on page R-74
:SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:VPI on page R-81
:SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:VCI on page R-80
:SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:PT on page R-79
:SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:CLP on page R-77
:SOUR:DATA[:TEL]:ATM:TRAF:BCH:PAYL on page R-82

:SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:GFC?

:SOURce:DATA[:TELecom]:ATM:TRAFfic:BCHannel:HEADer:GFC? provides the current setting of the GFC field in the cell header of the background channel.

Dependencies (not valid for ABT-20 devices)

Example :SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:GFC?
Response: 0 if GFC 0 is set.

:SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:HEC?

:SOURce:DATA[:TELecom]:ATM:TRAFfic:BCHannel:HEADer:HEC? provides the current setting of the HEC field in the cell header of the background channel.

Comments Query only! Value is computed internally.

Dependencies (not valid for ABT-20 devices)

Example :SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:HEC?
Response: 45 if HEC 45 is set.

:SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:PT

:SOURce:DATA[:TELecom]:ATM:TRAFfic:BCHannel:HEADer:PT <value> determines the PT field in the cell header of the background channel.

Parameter

Name	Type	Range	Default
value	numeric	0 - 7	0

Dependencies (not valid for ABT-20 devices)
The selection is effective only if VC4_4C (STS12C_SPE) ATM is selected.

Example :SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:PT 5
sets the payload type to 5.

Related commands :SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:CLP on page R-77
:SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:GFC on page R-78
:SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:VPI on page R-81
:SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:VCI on page R-80
:SOUR:DATA[:TEL]:ATM:TRAF:BCH:PAYL on page R-82

:SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:PT?

:SOURce:DATA[:TELecom]:ATM:TRAFfic:BCHannel:HEADer:PT? provides the current setting of the PT field in the cell header of the background channel.

Dependencies (not valid for ABT-20 devices)

Example :SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:PT?
Response: 5 if payload type 5 is set.

:SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:VCI

:SOURce:DATA[:TELecom]:ATM:TRAFfic:BCHannel:HEADer:VCI <value> determines the VCI field in the cell header of the background channel.

Parameter

Name	Type	Range	Default
value	numeric	0 - 65535	100

Dependencies (not valid for ABT-20 devices)
The selection is effective only if VC4_4C (STS12C_SPE) ATM is selected.

Example :SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:VCI 15 sets the VCI to 15.

Related commands
:SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:CLP on page R-77
:SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:GFC on page R-78
:SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:VPI on page R-81
:SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:PT on page R-79
:SOUR:DATA[:TEL]:ATM:TRAF:BCH:PAYL on page R-82

:SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:VCI?

:SOURce:DATA[:TELecom]:ATM:TRAFfic:BCHannel:HEADer:VCI? provides the current setting of the VCI field in the cell header of the background channel.

Dependencies (not valid for ABT-20 devices)

Example :SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:VCI?
Response: 32 if VCI 32 is set.

:SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:VPI

:SOURce:DATA[:TELecom]:ATM:TRAFfic:BCHannel:HEADer:VPI <value> determines the VPI field in the cell header of the background channel.

Parameter

Name	Type	Range	Default
value	numeric	0 - 255/4095	10

Dependencies
(not valid for ABT-20 devices)
The selection is effective only if VC4_4C (STS12C_SPE) ATM is selected.
Value limitation as a function of :SOUR:DATA[:TEL]:ATM:NINT =
UNI: Max. value = 255
NNI: Max. value = 4095

Example
:SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:VPI 15 sets the VPI to 15.

Related commands
:SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:CLP on page R-77
:SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:GFC on page R-78
:SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:VCI on page R-80
:SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:PT on page R-79
:SOUR:DATA[:TEL]:ATM:TRAF:BCH:PAYL on page R-82
:SOUR:DATA[:TEL]:ATM:NINT on page R-74

:SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:VPI?

:SOURce:DATA[:TELecom]:ATM:TRAFfic:BCHannel:HEADer:VPI? provides the current setting of the VPI field in the cell header of the background channel.

Dependencies
(not valid for ABT-20 devices)

Example
:SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:VPI?
Response: 32 if VPI 32 is set.

:SOUR:DATA[:TEL]:ATM:TRAF:BCH:PAYL

:SOURce:DATA[:TELecom]:ATM:TRAFfic:BCHannel:PAYLoad <value> determines the payload fill byte of the background channel.

Parameter

Name	Type	Range	Default
value	numeric	0 - 255	0

Dependencies (not valid for ABT-20 devices)
The selection is effective only if VC4_4C (STS12C_SPE) ATM is selected.

Example :SOUR:DATA[:TEL]:ATM:TRAF:BCH:PAYL 15 sets the VCI to 15.

Related commands :SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:CLP on page R-77
:SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:GFC on page R-78
:SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:VPI on page R-81
:SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:VCI on page R-80
:SOUR:DATA[:TEL]:ATM:TRAF:BCH:HEAD:PT on page R-79

:SOUR:DATA[:TEL]:ATM:TRAF:BCH:PAYL?

:SOURce:DATA[:TELecom]:ATM:TRAFfic:BCHannel:PAYLoad? provides the current setting of the payload fill byte of the background channel.

Dependencies (not valid for ABT-20 devices)

Example :SOUR:DATA[:TEL]:ATM:TRAF:BCH:PAYL?
Response: 32 if payload fill byte 32 is set.

Example :SOUR:DATA[:TEL]:ATM:TRAF:BCH:FILL:LIM?
Response: 100 if the limit is set to 100 % (599.04 Mbit/s for VC4_4C (STS12C_SPE)).

:SOUR:DATA[:TEL]:ATM:TRAF:BCH:STAT

:SOURce:DATA[:TELecom]:ATM:TRAFfic:BCHannel:STATe <state> determines the setting of the ATM background channel.

Parameter

Name	Type	Range	Default
state	boolean	ON | OFF | 1 | 0	OFF

Dependencies (not valid for ABT-20 devices)
The selection is effective only if VC4_4C (STS12C_SPE) ATM is selected.

Comments The ATM background channel runs independently of any foreground traffic.

Example :SOUR:DATA[:TEL]:ATM:TRAF:BCH:STAT ON
activates the ATM background channel.

Related commands :SOUR:DATA[:TEL]:ATM:DIST:STAT on page R-66

:SOUR:DATA[:TEL]:ATM:TRAF:BCH:STAT?

:SOURce:DATA[:TELecom]:ATM:TRAFfic:BCHannel:STATe? provides the current setting of the ATM background channel.

Dependencies (not valid for ABT-20 devices)

Example :SOUR:DATA[:TEL]:ATM:TRAF:BCH:STAT?
Response: 1 if the ATM background channel is activated.

:SOUR:DATA[:TEL]:ATM:TRAF:BCH:TYPE

:SOURce:DATA[:TELecom]:ATM:TRAFfic:BCHannel:TYPE <type> sets the distribution of the cells in the background channel.

Parameter

Name	Type	Range	Default
type	discrete	CONStant | FILL	CONS

Dependencies (not valid for ABT-20 devices)
The selection is effective only if VC4_4C (STS12C_SPE) ATM is selected.

Comments <type> =
CONStant: Cells are transmitted at a constant bit rate of 449 Mbit/s
FILL: Background channel fills bandwith up to the limit given by :SOUR:DATA[:TEL]:ATM:TRAF:BCH:FILL:LIM

Example :SOUR:DATA[:TEL]:ATM:TRAF:BCH:TYPE CONS
sets the traffic in the background channel to constant 449 Mbit/s

Related commands :SOUR:DATA[:TEL]:ATM:TRAF:BCH:FILL:LIM on page R-76

:SOUR:DATA[:TEL]:ATM:TRAF:BCH:TYPE?

:SOURce:DATA[:TELecom]:ATM:TRAFfic:BCHannel:TYPE? provides the current setting of the cell distribution in the background channel.

Dependencies (not valid for ABT-20 devices)

Example :SOUR:DATA[:TEL]:ATM:TRAF:BCH:TYPE?
Response: CONS if the TX profile is set to CONSTANT 449 Mbit/s.

:SOUR:DATA[:TEL]:ATM:TRAF:BGEN:DATA

:SOURce:DATA[:TELecom]:ATM:TRAFfic:BGENerator:DATA sets all the necessary bytes for ATM background traffic.

Parameter

Name	Type	Range	Default
all bytes for ATM background traffic	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none

Dependencies

(not valid for ABT-20 devices)
The selection is not effective if VC4_4C (STS12C_SPE) ATM is selected.

Comments

The data format is structured:

N — The first byte declares the number of lines with valid data; maximum is 200 lines.

The cell is transmitted from each line according to cellrep, idlerep and seqrep. After the last line (line N) is transmitted the traffic starts again with line 1.

Each line consists of a structure of 10 bytes:

seqrep — Byte 0 defines how often this sequence of cells and idle/unassigned cells is repeated (0 - 255)

idlerep_lsb
idlerep_msb — Bytes 1 and 2 define the number of idle/unassigned cells which are transmitted after the cellrep (0 - 32767)

cellrep — Byte 3 defines repetition of these transmitted cells (0 - 255)

hb1, hb2
hb3, hb4
HEC — Bytes 4 to 7 define the cell header including HEC of the transmitted cells

pb — Byte 9 defines the payload byte of the transmitted cells (all 48 bytes are equal)

Complete format:
<N>,
<l1_seqrep>, <l1_idlerep_lsb>, <l1_idlerep_msb>, <l1_cellrep>,
<l1_hb1>, <l1_hb2>, <l1_hb3>, <l1_hb4>, <l1_HEC>, <l1_pb>,
<l2_seqrep>, <l2_idlerep_lsb>, <l2_idlerep_msb>, <l2_cellrep>,
<l2_hb1>, <l2_hb2>, <l2_hb3>, <l2_hb4>, <l2_HEC>, <l2_pb>,
...
<lN_seqrep>, <lN_idlerep_lsb>, <lN_idlerep_msb>, <lN_cellrep>,
<lN_hb1>, <lN_hb2>, <lN_hb3>, <lN_hb4>, <lN_HEC>, <lN_pb>,

Note: The traffic is not checked to allow for maximum flexibility. For example, you can insert HEC errors.

Example

:SOUR:DATA[:TEL]:ATM:TRAF:BGEN:DATA
2,
1, 1, 0, 1, 0, 0, 0, 0, 0, 88,
1, 5, 0, 4, 0, 0, 0, 0, 0, 99,

Related commands

:SOUR:DATA[:TEL]:ATM:TRAF:BGEN:STAT on page R-85

:SOUR:DATA[:TEL]:ATM:TRAF:BGEN:DATA?

:SOURce:DATA[:TELecom]:ATM:TRAFfic:BGENerator:DATA? provides the current setting of the ATM background traffic.

Example
:SOUR:DATA[:TEL]:ATM:TRAF:BGEN:DATA?
Response:
2,
1, 1, 0, 1, 0, 0, 0, 0, 0, 88,
1, 5, 0, 4, 0, 0, 0, 0, 0, 99,
0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
... (total 200 lines)
0, 0, 0, 0, 0, 0, 0, 0, 0, 0,

Dependencies
(not valid for ABT-20 devices)
:SOURce:DATA[:TELecom]:ATM:TRAFfic:BGENerator:STATe <state> determines the setting of the ATM background generator.

:SOUR:DATA[:TEL]:ATM:TRAF:BGEN:STAT

:SOURce:DATA[:TELecom]:ATM:TRAFfic:BGENerator:STATe <state> determines the setting of the ATM background generator.

Parameter

Name	Type	Range	Default
state	boolean	ON | OFF | 1 | 0	OFF

Dependencies
(not valid for ABT-20 devices)
The selection is not effective if VC4_4C (STS12C_SPE) ATM is selected.

Comments
The ATM background generator runs independently of any foreground traffic.

Example
:SOUR:DATA[:TEL]:ATM:TRAF:BGEN:STAT ON
activates the ATM background generator.

Related commands
:SOUR:DATA[:TEL]:ATM:DIST:STAT on page R-66
:SOUR:DATA[:TEL]:ATM:TRAF:BGEN:DATA on page R-84

:SOUR:DATA[:TEL]:ATM:TRAF:BGEN:STAT?

:SOURce:DATA[:TELecom]:ATM:TRAFfic:BGENerator:STATe? provides the current setting of the ATM background generator.

Dependencies
(not valid for ABT-20 devices)

Example
:SOUR:DATA[:TEL]:ATM:TRAF:BGEN:STAT?
Response: 1 if the ATM background generator is activated.

:SOUR:DATA[:TEL]:NEL

:SOURce:DATA[:TELecom]:NELement <mode> determines the type of network element emulated by the instrument.

Parameter

Name	Type	Range	Default
mode	discrete	TERMinal | ADMux	TERM

Dependencies None

Comments
TERMinal: Signal receiver and transmitter are independent.
ADMux: The transmitter sends the received signal.
Signal receiver and transmitter are coupled to the same bit rate **(not possible for ABT-20 devices)**.

Example :SOUR:DATA:NEL ADM

Related commands :SOUR:DATA[:TEL]:SDH:REPL on page R-214

:SOUR:DATA[:TEL]:NEL?

The query :SOURce:DATA[:TELecom]:NELement? delivers the current setting for the network element.

Example :SOUR:DATA:NEL?
Response: TERM

:SOUR:DATA[:TEL]:PAYL:ERR[:MODE]

:SOURce:DATA[:TELecom]:PAYLoad:ERRor[:MODE] <mode> determines the type of error insertion into the payload.

Parameter

Name	Type	Range	Default
mode	discrete	NONE | ONCE | RATE	NONE

Dependencies None

Comments
NONE: No error insertion
ONCE: Inserts a single error into payload data
RATE: Activates error insertion according to :SOUR:DATA[:TEL]:PAYL:ERR:RATE on page R-87

Example :SOUR:DATA:PAYL:ERR ONCE
inserts a bit error in the payload data stream.

Related commands :SOUR:DATA[:TEL]:PAYL:ERR:RATE on page R-87

:SOUR:DATA[:TEL]:PAYL:ERR[:MODE]?

:SOURce:DATA[:TELecom]:PAYLoad:ERRor:BIT? provides the current setting for the error insertion into the payload.

Comments — ONCE: Is a volatile state and cannot be read.

Example — :SOUR:DATA:PAYL:ERR?
Response: RATE

:SOUR:DATA[:TEL]:PAYL:ERR:RATE

:SOURce:DATA[:TELecom]:PAYLoad:ERRor:RATE <rate> determines the bit error rate in the payload.

Parameter

Name	Type	Range	Default
rate	numeric	1E-2 | 1E-3 | 1E-4 | 1E-5 | 1E-6 | 1E-7 | 1E-8 | 1E-9	1E-6

Dependencies — Is active only if :SOUR:DATA[:TEL]:PAYL:ERR[:MODE] = RATE is set.

Comments — The bit error rate in the payload can be set in steps of whole powers of ten. Intermediate values are rounded to the next power of ten.

Example — :SOUR:DATA:PAYL:ERR:RATE 1E-3
activates a bit error ratio of $1*10^{-3}$ in the payload data stream.

Related commands — :SOUR:DATA[:TEL]:PAYL:ERR[:MODE] on page R-86

:SOUR:DATA[:TEL]:PAYL:ERR:RATE?

:SOURce:DATA[:TELecom]:PAYLoad:ERRor:RATE? provides the current setting for the error insertion into the payload.

Example — :SOUR:DATA:PAYL:ERR:RATE?
Response: 1E-2

:SOUR:DATA[:TEL]:PAYL:PATT

:SOURce:DATA[:TELecom]:PAYLoad:PATTern <pattern> determines the test pattern in the active measurement channel.

Parameter

Name	Type	Range	Default
pattern	discrete	PRBS11 | PRBS15 | PRBS20 | PRBS23 | PRBS31 | IPRBS11 | IPRBS15 | IPRBS20 | IPRBS23 | IPRBS31 | QRSS20 | IQRSS20 | UWORd	PRBS15

Dependencies

Setting is active only if :SOUR:DATA[:TEL]:PAYL:SOUR = INT is set.
Settings are automatically modified if :SOUR:DATA[:TEL]:PDH:RATE <inputrate> changes.

<inputrate>	<pattern>
M140 (E4)	PRBS23
M45 (DS3)	PRBS15
M34 (E3)	PRBS23
M8 (E2)	PRBS15
M6 (DS2)	PRBS15
M2 (E1)	PRBS15
M15 (DS1)	QRSS20
K64 (DS0)	PRBS11

Comments

PRBS11: Pseudo-random bit sequence 2^{11}-1 to O.152
PRBS15: Pseudo-random bit sequence 2^{15}-1 to O.151 (ITU-T standard)
PRBS20: Pseudo-random bit sequence 2^{20}-1 to O.151
PRBS23: Pseudo-random bit sequence 2^{23}-1 to O.151 (ITU-T standard)
PRBS31: Pseudo-random bit sequence 2^{31}-1 to O.150 (only available for :SOUR:DATA[:TEL]:SDH:MAPP:CONC[:MODE] = CONT | VIRT)
IPRBS11: Inverted pseudo-random bit sequence 2^{11}-1 to O.152
IPRBS15: Inverted pseudo-random bit sequence 2^{15}-1 to O.151
IPRBS20: Inverted pseudo-random bit sequence 2^{20}-1 to O.151
IPRBS23: Inverted pseudo-random bit sequence 2^{23}-1 to O.151
IPRBS31: Inverted pseudo-random bit sequence 2^{31}-1 to O.150 (only available for :SOUR:DATA[:TEL]:SDH:MAPP:CONC[:MODE] = CONT | VIRT)
QRSS11: Pseudo-random bit sequence 2^{11}-1 to ... with DS1 only
QRSS20: Pseudo-random bit sequence 2^{20}-1 to T1.403 with DS1 only
IQRSS11: Inverted pseudo-random bit sequence 2^{11}-1 to ... with DS1 only
IQRSS20: Inverted pseudo-random bit sequence 2^{20}-1 to T1.403 with DS1 only
UWORd: 16 bit digital word (User Word) set with :SOUR:DATA[:TEL]:PAYL:UWOR on page R-90

Example

:SOUR:DATA:PAYL:PATT PRBS15
activates the pseudo-random bit sequence 2^{15}-1 (O.151) in the active test channel.

Related commands

:SOUR:DATA[:TEL]:PAYL:UWOR on page R-90

:SOUR:DATA[:TEL]:PAYL:PATT?

:SOURce:DATA[:TELecom]:PAYLoad:PATTern? provides the current setting for the test pattern in the measurement channel.

Example

:SOUR:DATA:PAYL:PATT?
Response: PRBS23

:SOUR:DATA[:TEL]:PAYL:SOUR

:SOURce:DATA[:TELecom]:PAYLoad:SOURce <source> determines the source of the payload.

Parameter

Name	Type	Range	Default
source	discrete	INTernal | EXTernal	INT

Dependencies

EXTernal requires DROP&INSERT option (90.20).
Only PDH signals can be received from the external auxiliary interface port [10] or [12].

Comments

INTernal: Internal generation of payload
EXTernal: Inserts payload from the external auxiliary interface port [10] or [12]

Example

:SOUR:DATA:PAYL:SOUR INT
activates internal payload generation in the SOURCE subsystem.

Related commands

None

:SOUR:DATA[:TEL]:PAYL:SOUR?

:SOURce:DATA[:TELecom]:PAYLoad:SOURce? provides the current setting for the source of the payload in the test channel.

Example

:SOUR:DATA:PAYL:SOUR?
Response: INT

:SOUR:DATA[:TEL]:PAYL:UWOR

:SOURce:DATA[:TELecom]:PAYLoad:UWORd <value> determines the 16 bit digital word (User Word) in the active measurement channel.

Parameter

Name	Type	Range	Default
value	numeric	#H0000 - #HFFFF or #B0000000000000000 - #B1111111111111111 or 0 - 65535	#HAAAA

Dependencies: Setting is active only if :SOUR:DATA[:TEL]:PAYL:PATT = UWOR is set.

Example: :SOUR:DATA:PAYL:UWOR #HAA55
sets the digital word to AA55hex.

Related commands: :SOUR:DATA[:TEL]:PAYL:PATT on page R-88

:SOUR:DATA[:TEL]:PAYL:UWOR?

:SOURce:DATA[:TELecom]:PAYLoad:UWORd? provides the current setting for the 16 bit digital word in the test channel.

Example: :SOUR:DATA:PAYL:UWOR?
Response: 12398

:SOUR:DATA[:TEL]:PDH

The commands in this group specify the structure of the PDH signal to be generated or additionally the structure of a PDH signal to be mapped into SDH signals.

Note: All commands in this group are valid only if: :SOUR:MODE = PDH
(i.e. a PDH signal is being generated).
or:
:SOUR:MODE = SDH and :SOUR:DATA[:TEL]:SDH:PAYL:TYPE = PDH
(i.e. an SDH signal which contains a PDH signal is being generated).

:SOUR:DATA[:TEL]:PDH:ALAR:FLEN

:SOURce:DATA[:TELecom]:PDH:ALARm:FLENgth <activeframes>, <inactiveframes> defines the length of PDH alarm sequences.

Parameter

Name	Type	Range	Default
activeframes	numeric	1 - 8191	1
inactiveframes	numeric	1 - 8191	9

Dependencies

Some continuous alarms can also be set by intentionally setting the overhead bytes --> Alarm setting with this command is not influenced by this!

Comments

activeframes = number of frames in which the alarm is generated
inactiveframes = number of frames in which no alarm is generated

Example

:SOUR:DATA:PDH:ALAR:FLEN 5,10
specifies the following sequence: Alarm is present in 5 frames, followed by 10 frames without an alarm and so on.

Related commands

:SOUR:DATA[:TEL]:PDH:ALAR[:MODE] on page R-92

:SOUR:DATA[:TEL]:PDH:ALAR:FLEN?

:SOURce:DATA[:TELecom]:PDH:ALARm:FLENgth? provides the current setting of the alarm sequence.

Example

:SOUR:DATA:PDH:ALAR:FLEN?
Response: 10,100
Alarm is present in 10 frames, followed by 100 frames without an alarm.

:SOUR:DATA[:TEL]:PDH:ALAR[:MODE]

:SOURce:DATA[:TELecom]:PDH:ALARm[:MODE] <alarm>, <mode> determines the PDH alarm insertion.

Parameter

Name	Type	Range	Default
alarm	discrete	LOF1_5 | LOF2 | LOF8 | LOF34 | LOF45 | LOF140 | |AIS1_5 | AIS2 | AIS8 | AIS34 | AIS45 | AIS140 | RDI1_5 | RDI2 | RDI8 | RDI34 | RDI45 | RDI140 | IDLE45 | FEAC	LOF2
mode	discrete	NONE | CONTinuous PERiodical	NONE

Dependencies

<alarm> depends on the given signal structure (e.g. it is not possible to insert an AIS140 alarm into a 2M PDH signal).
Continuous alarms can also be set by intentionally setting the specific bits in the frame.
Error insertion has higher priority and overwrites static settings!

Comments

<alarm>=

LOF1_5: Loss Of Frame in DS1 signal (1.5 Mbit/s)
LOF2: Loss Of Frame in 2 Mbit/s signal
LOF8: Loss Of Frame in 8 Mbit/s signal
LOF34: Loss Of Frame in 34 Mbit/s signal
LOF45: Loss Of Frame in DS3 signal (45 Mbit/s)
LOF140: Loss Of Frame in 140 Mbit/s signal

AIS1_5: Alarm Indication Signal in DS1 signal (1.5 Mbit/s)
AIS2: Alarm Indication Signal in 2 Mbit/s signal
AIS8: Alarm Indication Signal in 8 Mbit/s signal
AIS34: Alarm Indication Signal in 34 Mbit/s signal
AIS45: Alarm Indication Signal in DS3 signal (45 Mbit/s)
AIS140: Alarm Indication Signal in 140 Mbit/s signal

RDI1_5: Remote Defect Indication (yellow1_5) in DS1 signal (1.5 Mbit/s)
RDI2: Remote Defect Indication (FERF) in 2 Mbit/s signal
RDI8: Remote Defect Indication (FERF) in 8 Mbit/s signal
RDI34: Remote Defect Indication (FERF) in 34 Mbit/s signal
RDI45: Remote Defect Indication (yellow45) in DS3 signal (45 Mbit/s)
RDI140: Remote Defect Indication (FERF) in 140Mbit/s signal
IDLE45: DS3 idle signal

UNEQ34: Unequipped signal 34 Mbit/s G832
UNEQ140: Unequipped signal 140 Mbit/s G832

PLM34: Path Signal Label Mismatch 34 Mbit/s G832
PLM140: Path Signal Label Mismatch 140 Mbit/s G832

TIM34: Trace Identifier Mismatch 34 Mbit/s G832
TIM140: Trace Identifier Mismatch 140 Mbit/s G832

FEAC: Far End Alarm and Control in DS3 signal (45 Mbit/s)

Comments	<mode> =	
	NONE:	No alarm insertion
	CONTinuous:	Continuous alarm insertion
	PERiodical:	Periodic alarm insertion according to the setting for :SOUR:DATA[:TEL]:PDH:ALAR:FLEN on page R-91 (:SOUR:DATA[:TEL]:PDH:ALAR:SEQ on page R-94 for LOF1_5 and LOF45)

Example
:SOUR:DATA:PDH:ALAR LOF2, CONT
generates LOF in a 2 Mbit/s signal.

Related commands
:SOUR:DATA[:TEL]:PDH:ALAR:FLEN on page R-91
:SOUR:DATA[:TEL]:PDH:ALAR:SEQ on page R-94

:SOUR:DATA[:TEL]:PDH:ALAR[:MODE]?

:SOURce:DATA[:TELecom]:PDH:ALARm[:MODE]? provides the current setting of the PDH alarm insertion.

Example
:SOUR:DATA:PDH:ALAR?
Response: LOF2, CONT if a continuous LOF2 alarm is activated.

:SOUR:DATA[:TEL]:PDH:ALAR:SEQ

:SOURce:DATA[:TELecom]:PDH:ALARm:SEQuence <sequence> sets frame error sequences for DS3/DS1 signals according to G.783 (T1.105.3).

Parameter

Name	Type	Range	Default
type	discrete	S2IN4 | S2IN5 | S2IN6 | S2IN2 | S2IN3 | S3IN3 | S3IN15 | S3IN16 | S3IN17	S2IN4

Dependencies

S2IN4, S2IN5, S2IN6: Only for signals containing DS1

S2IN2, S2IN3, S3IN3,S3IN15, S3IN16, S3IN17: Only for signals containing DS3

Comments

S2IN4: 1st and 4th Ft bits errored in a (E)SF DS1 frame
S2IN5: 1st and 5th Ft bits errored in a (E)SF DS1 frame
S2IN6: 1st and 5th Ft bits errored in a (E)SF DS1 frame

S2IN2: 1st and 2nd F bits errored in a DS3 multiframe
S2IN3: 1st and 3rd F bits errored in a DS3 multiframe
S3IN3: 1st, 2nd and 3rd F bits errored in a DS3 multiframe
S3IN15: 1st, 8th and 15th F bits errored in a DS3 multiframe
S3IN16: 1st, 9th and 16th F bits errored in a DS3 multiframe
S3IN17: 1st, 9th and 17th F bits errored in a DS3 multiframe

Example

:SOUR:DATA:PDH:ALAR:SEQ S2IN4 sets alarm sequence S2IN4.

Related commands

:SOUR:DATA[:TEL]:PDH:ALAR[:MODE] on page R-92

:SOUR:DATA[:TEL]:PDH:ALAR:SEQ?

:SOURce:DATA[:TELecom]:PDH:ALARm:SEQuence? provides the sequence setting as per G.783 (T1.105.3).

Example

:SOUR:DATA:PDH:ALAR:SEQ?
Response: S2IN4

:SOUR:DATA[:TEL]:PDH:DS1:CHAN

:SOURce:DATA[:TELecom]:PDH:DS1:CHANnels <channel1> [,<channel2> [,channel3>[…[,<channelN>]]]] sets the channel numbers [n] of the N x 64 kbit/s test channels in the 1.544 Mbit/s DS1 signal.

Parameter

Name	Type	Range	Default
channel1	numeric	1 - 24	1
channel2	numeric	1 - 24	not active
…	numeric	1 - 24	not active
channel24	numeric	1 - 24	not active

Dependencies

Is valid only if:
:SOUR:DATA[:TEL]:PDH:FRAM = FRAM is set.
:SOUR:DATA[:TEL]:PDH:RATE <inputrate> = DS0.
:SOUR:DATA[:TEL]:PDH:RATE <outputrate> = DS1| DS3.
Channel setting works only if the MUX option (90.32) is present.

Comments

Groups of any number of 64 kbit/s channels can be formed, ranging from a single channel at 64 kbit/s to 24 x 64 kbit/s = 1536 kbit/s. The number of parameters in this command determines the number of channels used.
At least one channel must be selected.

The default setting has 1 x 64 kbit/s channel in channel 1.
The channels should be selected in order, and no channel may be selected more than once.

Example

:SOUR:DATA:PDH:DS1:CHAN 10
corresponds to 1 x 64 kbit/s in channel 10
:SOUR:DATA:PDH:DS1:CHAN 1,2,3
corresponds to 3 x 64 kbit/s = 192 kbit/s in channels 1, 2, 3
:SOUR:DATA:PDH:DS1:CHAN 1,5,6,23,24
corresponds to 5 x 64 kbit/s = 320 kbit/s in channels 1, 5, 6, 23, 24

Related commands

:SOUR:DATA[:TEL]:PDH:FRAM on page R-104
:SOUR:DATA[:TEL]:PDH:RATE on page R-129
:SOUR:DATA[:TEL]:PDH:DS1:FRAM on page R-96

:SOUR:DATA[:TEL]:PDH:DS1:CHAN?

:SOURce:DATA[:TELecom]:PDH:DS1:CHANnels? provides the current setting of the channel numbers [n] of the N x 64 kbit/s measurement channels in the DS1 output signal.

Example

:SOUR:DATA:PDH:DS1:CHAN?
Response: 1,4,24
for 3 x 64 kbit/s = 192 kbit/s in channels 1, 4, 24

:SOUR:DATA[:TEL]:PDH:DS1:FRAM

:SOURce:DATA[:TELecom]:PDH:DS1:FRAMing <framing> determines the framing of the DS1 signal.

Parameter

Name	Type	Range	Default
framing	discrete	SF | ESF107	ESF107

Dependencies Is only valid if: :SOUR:DATA[:TEL]:PDH:FRAM = FRAM is set.

Comments <framing> =
SF: Super Frame to ANSI T1.107
ESF107: Extended Super Frame to ANSI T1.107

Example :SOUR:DATA:PDH:DS1:FRAM SF activates Super Frame.

:SOUR:DATA[:TEL]:PDH:DS1:FRAM?

The query :SOURce:DATA[:TELecom]:PDH:DS1:FRAMing? delivers the current setting of the framing of the DS1 signal.

Example :SOUR:DATA:PDH:DS1:FRAM?
Response: SF if framing = Super Frame.

:SOUR:DATA[:TEL]:PDH:DS3:CHAN

:SOURce:DATA[:TELecom]:PDH:DS3:CHANnel <channel> sets the channel number of the DS1 measurement channel in the DS3 PDH signal.

Parameter

Name	Type	Range	Default
channel	numeric	1 - 28	1

Dependencies

Is valid only if:
:SOUR:DATA[:TEL]:PDH:FRAM = FRAM is set.
:SOUR:DATA[:TEL]:PDH:RATE <inputrate> = DS1
:SOUR:DATA[:TEL]:PDH:RATE <outputrate> = DS3
Channel setting works only if the MUX option (90.32) is present.

Comments

This command sets the selection of the DS1 measurement channel within a DS3 frame.

Example

:SOUR:DATA:PDH:DS3:CHAN 2

Related commands

:SOUR:DATA[:TEL]:PDH:FRAM on page R-104
:SOUR:DATA[:TEL]:PDH:RATE on page R-129

:SOUR:DATA[:TEL]:PDH:DS3:CHAN?

:SOURce:DATA[:TELecom]:PDH:DS3:CHANnel? provides the current setting of the channel number of the DS1 measurement channel in the DS3 PDH output signal.

Example

:SOUR:DATA:PDH:DS3:CHAN?
Response: 1

:SOUR:DATA[:TEL]:PDH:DS3:FEAC[:ALAR]

:SOURce:DATA[:TELecom]:PDH:DS3:FEAC[:ALARm] <value> sets the value of the FEAC byte in the DS3 PDH signal.

Parameter

Name	Type	Range	Default
value	numeric	0 - 63	0

Dependencies

Is valid only if:
:SOUR:DATA[:TEL]:PDH:ALAR[:MODE] = CONT, FEAC is set.
:SOUR:DATA[:TEL]:PDH:RATE <outputrate> = DS3

Comments

This command sets the value of the DS3 FEAC byte. Only 6 bits are relevant.
The following table shows the binary interpretation of the FEAC byte:

14	(001110 bin)	DS3 LOS
00	(000000 bin)	DS3 OOF
22	(010110 bin)	DS3 AIS
26	(011010 bin)	DS3 IDLE
25	(011001 bin)	DS3 equipment failure, service affecting
15	(001111 bin)	DS3 equipment failure, non-service affecting
21	(010101 bin)	Multiple DS1 LOS
30	(011110 bin)	Single DS1 LOS
05	(000101 bin)	DS1 equipment failure, service affecting
03	(000011 bin)	DS1 equipment failure, non-service affecting
29	(011101 bin)	Com equipment failure, non-service affecting

Example

:SOUR:DATA:PDH:DS3:FEAC 15

Related commands

:SOUR:DATA[:TEL]:PDH:ALAR[:MODE] on page R-92

:SOUR:DATA[:TEL]:PDH:DS3:FEAC[:ALAR]?

:SOURce:DATA[:TELecom]:PDH:DS3:CHANnel? provides the current setting of the value of the FEAC byte in the DS3 PDH output signal.

Example

:SOUR:DATA:PDH:DS3:FEAC?
Response: 0

:SOUR:DATA[:TEL]:PDH:DS3:FEAC:LOOP[:TYPE]

:SOURce:DATA[:TELecom]:PDH:DS3:FEAC:LOOP[:TYPE} <type> sets the loop type in the DS3 PDH signal.

Parameter

Name	Type	Range	Default
type	discrete	NONE | ACTivated | DEACtivated	NONE

Dependencies

Is valid only if:
:SOUR:DATA[:TEL]:PDH:ALAR[:MODE] = CONT, FEAC is set.
:SOUR:DATA[:TEL]:PDH:RATE <outputrate> = DS3

Comments

NONE: Idle sequence (all ones) or alarm is transmitted if selected.
ACTivated: Sequence for setting up a loop is transmitted.
DEACtivated: Sequence for clearing down the loop is transmitted.

Example

:SOUR:DATA:PDH:DS3:FEAC:LOOP ACT

Related commands

:SOUR:DATA[:TEL]:PDH:DS3:FEAC:LOOP:CODE on page R-100
:SOUR:DATA[:TEL]:PDH:ALAR[:MODE] on page R-92

:SOUR:DATA[:TEL]:PDH:DS3:FEAC:LOOP[:TYPE]?

:SOURce:DATA[:TELecom]:PDH:DS3:LOOP[:TYPE]? provides the current setting of the loop type in the DS3 PDH signal.

Example

:SOUR:DATA:PDH:DS3:FEAC:LOOP?
Response: ACT if a sequence is currently being transmitted in order to set up a loop.

:SOUR:DATA[:TEL]:PDH:DS3:FEAC:LOOP:CODE

:SOURce:DATA[:TELecom]:PDH:DS3:FEAC:LOOP:CODE] <value> sets the value of the FEAC loop code byte in the DS3 PDH signal.

Parameter

Name	Type	Range	Default
value	numeric	0 - 63	0

Dependencies

Is valid only if::SOUR:DATA[:TEL]:PDH:ALAR[:MODE] = CONT, FEAC is set.
:SOUR:DATA[:TEL]:PDH:RATE <outputrate> = DS3

Comments

This command sets the value of the DS3 FEAC loop code byte. Only 6 bits are relevant. The following table shows the binary interpretation of the loop code byte:

27	(011011 bin)	DS3 Line
33	(100001 bin)	DS1 Line # 1
34	(100010 bin)	DS1 Line # 2
35	(100011 bin)	DS1 Line # 3
36	(100100 bin)	DS1 Line # 4
37	(100101 bin)	DS1 Line # 5
38	(100110 bin)	DS1 Line # 6
39	(100111 bin)	DS1 Line # 7
40	(101000 bin)	DS1 Line # 8
41	(101001 bin)	DS1 Line # 9
42	(101010 bin)	DS1 Line # 10
43	(101011 bin)	DS1 Line # 11
44	(101100 bin)	DS1 Line # 12
45	(101101 bin)	DS1 Line # 13
46	(101110 bin)	DS1 Line # 14
47	(101111 bin)	DS1 Line # 15
48	(110000 bin)	DS1 Line # 16
49	(110001 bin)	DS1 Line # 17
50	(110010 bin)	DS1 Line # 18
51	(110011 bin)	DS1 Line # 19
52	(110100 bin)	DS1 Line # 20
53	(110101 bin)	DS1 Line # 21
54	(110110 bin)	DS1 Line # 22
55	(110111 bin)	DS1 Line # 23
56	(111000 bin)	DS1 Line # 24
57	(111001 bin)	DS1 Line # 25
58	(111010 bin)	DS1 Line # 26
59	(111011 bin)	DS1 Line # 27
60	(111011 bin)	DS1 Line # 28
19	(010011 bin)	DS1 Line All

Example

:SOUR:DATA:PDH:DS3:FEAC:LOOP:CODE 19

Related commands

:SOUR:DATA[:TEL]:PDH:ALAR[:MODE] on page R-92
:SOUR:DATA[:TEL]:PDH:DS3:FEAC:LOOP[:TYPE] on page R-99

:SOUR:DATA[:TEL]:PDH:DS3:FEAC:LOOP:CODE?

:SOURce:DATA[:TELecom]:PDH:DS3:FEAC:LOOP:CODE? provides the current setting of the value of the FEAC loop code byte in the DS3 PDH output signal.

Example

:SOUR:DATA:PDH:DS3:FEAC:LOOP:CODE?
Response: 19

:SOUR:DATA[:TEL]:PDH:DS3:FRAM

:SOURce:DATA[:TELecom]:PDH:DS3:FRAMing <framing> determines the framing of the DS3 signal.

Parameter

Name	Type	Range	Default
framing	discrete	CPARity | M13	CPARity

Dependencies: Is only valid if: :SOUR:DATA[:TEL]:PDH:FRAM = FRAM is set.

Comments

<framing> =
CPARity: C-Parity frame
M13: M13 frame.

Example

:SOUR:DATA:PDH:DS3:FRAM CPAR activates C-Parity frame.

:SOUR:DATA[:TEL]:PDH:DS3:FRAM?

:SOURce:DATA[:TELecom]:PDH:DS3:FRAMing? provides the current setting of the framing of the DS3 signal.

Example

:SOUR:DATA:PDH:DS3:FRAM?
Response: CPAR for C-Parity framing of D3 signal.

:SOUR:DATA[:TEL]:PDH:ERR[:MODE]

:SOURce:DATA[:TELecom]:PDH:ERRor[:MODE] <error>, <mode> determines the PDH error insertion.

Parameter

Name	Type	Range	Default
error	discrete	FAS2 | CRC | EBIT | FAS8 | FAS34 | FAS45 | FAS140 | FAS1_5 | CRC6 | P45 | CP45 | EM34 | EM140 | REI34 | REI45| REI140	FAS2
mode	discrete	NONE | ONCE | RATE	NONE

Dependencies

Error insertion into the frame alignment signals is possible only if the TX signal contains a PDH signal with the relevant frame.
CRC and EBIT errors can be inserted only if:
:SOUR:DATA[:TEL]:PDH:M2:FRAM = PCM30CRC | PCM31CRC.
EM34 and REI 34 can be inserted only if:
:SOUR:DATA[:TEL]:PDH:RATE = M34,M34 and
:SOUR:DATA[:TEL]:PDH:M34:FTYP = G832 are set.
EM140 and REI140 can be inserted only if:
:SOUR:DATA[:TEL]:PDH:RATE = M140,M140 and
:SOUR:DATA[:TEL]:PDH:M140:FTYP = G832 are set.

Comments

<error> =

FAS2: Error insertion into the frame alignment signal of the 2 Mbit/s signal
CRC: Error insertion in the CRC4 of the 2 Mbit/s multiframe.
EBIT: Error insertion in the E-BITs of the 2 Mbit/s multiframe
FAS8: Error insertion in frame alignment signal of the 8 Mbit/s signal.
FAS34: Error insertion in frame alignment signal of the 34 Mbit/s signal.
FAS45: Error insertion in frame alignment signal of the 45 Mbit/s signal.
FAS140: Error insertion in frame alignment signal of the 140 Mbit/s signal.
FAS1_5: Error insertion in frame alignment signal of the DS1 signal (1.5 Mbit/s). Modes: ONCE or NONE only.
CRC6: Error insertion into the CRC6 of the DS1 ESF signal.
P45: Parity error insertion into the DS3 signal. Modes: ONCE or NONE only.
CP45: Path parity error insertion (C bits) into the DS3 signal. Modes: ONCE or NONE only.
REI45: Error insertion in FEBE bits of the DS3 CPAR signal.
EM34: Error insertion in EM byte of the 34 Mbit/s G.832 signal.
EM140: Error insertion in EM byte of the 140 Mbit/s G.832 signal.
REI34: Error insertion in REI bit of the 34 Mbit/s G.832 signal.
REI140: Error insertion in REI bit of the 140 Mbit/s G.832 signal.

<mode> =

NONE: No error insertion.
ONCE: Insertion of a single error. This is a volatile state and cannot be read with a query!
RATE: Error rate according to :SOUR:DATA[:TEL]:PDH:ERR:RATE on page R-103.

Example

:SOUR:DATA:PDH:ERR FAS2,ONCE

:SOUR:DATA[:TEL]:PDH:ERR[:MODE]?

:SOURce:DATA[:TELecom]:PDH:ERRor[:MODE]? provides the current setting of the PDH error insertion.

Comments
ONCE is a volatile state and cannot be read with a query.

Example
:SOUR:DATA:PDH:ERR?
Response: FAS2, RATE
for error rate in the frame alignment signal of the 2 Mbit/s signal.

:SOUR:DATA[:TEL]:PDH:ERR:RATE

:SOURce:DATA[:TELecom]:PDH:ERRor:RATE <rate> defines the error rate for PDH error insertion.

Parameter

Name	Type	Range	Default
rate	NR3	1E-10 … 2E-3	1E-6

Dependencies
Error rate is active only if :SOUR:DATA[:TEL]:PDH:ERR[:MODE] on page R-102 is set to <mode> = RATE.

Comments
The set rate corresponds to the equivalent bit error rate!

Error type	Range
CRC	1E-9 … 1E-3
REI-34	1E-10 … 2E-4
REI-140	1E-10 … 5E-5
others	1E-10 … 2E-3

Example
:SOUR:DATA:PDH:ERR:RATE 1E-5 Error rate = 1 x 10^{-5}

Related commands
:SOUR:DATA[:TEL]:PDH:ERR[:MODE] on page R-102

:SOUR:DATA[:TEL]:PDH:ERR:RATE?

:SOURce:DATA[:TELecom]:PDH:ERRor:RATE ? provides the current error rate setting.

Example
:SOUR:DATA:PDH:ERR:RATE?
Response: 2E-5 Error rate = 2 x 10^{-5}

:SOUR:DATA[:TEL]:PDH:FRAM

:SOURce:DATA[:TELecom]:PDH:FRAMing <framing> determines the frame structure of the PDH signal.

Parameter

Name	Type	Range	Default
framing	discrete	FRAMed | UNFRamed	FRAM

Dependencies For :SOUR:DATA[:TEL]:PDH:RATE = DS2,DS2 <framing>=UNFR is required.

Comments
FRAMed: Framed PDH signal
UNFRamed: Signal without PDH frame and filled with the test pattern set by :SOUR:DATA[:TEL]:PAYL:PATT on page R-88

Example :SOUR:DATA:PDH:FRAM FRAM

Related commands :SOUR:DATA[:TEL]:PDH:RATE on page R-129

:SOUR:DATA[:TEL]:PDH:FRAM?

:SOURce:DATA[:TELecom]:PDH:FRAMing? provides the current setting for the frame structure of the PDH signal.

Example :SOUR:DATA:PDH:FRAM?
Response: UNFR for an unframed signal.

:SOUR:DATA[:TEL]:PDH:M2:ABIT

:SOURce:DATA[:TELecom]:PDH:M2:ABIT <state> determines the status of the A bit (bit 3 in the NON FAS octet) in the 2 Mbit/s frame (see also G.704).

Parameter

Name	Type	Range	Default
state	boolean	#H0 - #H1 or #B0 - #B1 or 0 - 1	0

Dependencies Is valid only if: :SOUR:DATA[:TEL]:PDH:FRAM = FRAM is set.
Alarm insertion has higher priority and overwrites static settings!
The A bit setting works only if the MUX option (90.30) is present.

Comments The state of the A bit set here remains static until reprogrammed.

Example :SOUR:DATA:PDH:M2:ABIT 1

Related commands :SOUR:DATA[:TEL]:PDH:FRAM on page R-104
:SOUR:DATA[:TEL]:PDH:RATE on page R-129

:SOUR:DATA[:TEL]:PDH:M2:ABIT?

:SOURce:DATA[:TELecom]:PDH:M2:ABIT? provides the current setting of the state of the A bit in the 2 Mbit/s frame.

Example

:SOUR:DATA:PDH:M2:ABIT?
Response: 1

:SOUR:DATA[:TEL]:PDH:M2:BNF

:SOURce:DATA[:TELecom]:PDH:M2:BNFas <state> determines the state of bits A and Sa4 to Sa8 in the 2 Mbit/s background frame (see also G.704).

Parameter

Name	Type	Range	Default
states	numeric	#H00 - #H3F or #B000000 - #B111111 or 0 - 63	#B011111

Dependencies

Is valid only if:
:SOUR:DATA[:TEL]:PDH:FRAM = FRAM is set.
:SOUR:DATA[:TEL]:PDH:RATE <inputrate> = M34 | M8 | M2 | K64.
:SOUR:DATA[:TEL]:PDH:RATE <outputrate> = M8 | M34 | M140.
Setting of the bits in the background frames works only if the MUX option (90.30) is present.

Comments

The state of the bits set here remains static until reprogrammed.
2 Mbit/s background channels are present only with an activated MUX chain in which more than one 2 Mbit/s channel is present, i.e. the output bit rate must be at least 8 Mbit/s.

Example

:SOUR:DATA:PDH:M2:BNF OFF

Related commands

:SOUR:DATA[:TEL]:PDH:FRAM on page R-104
:SOUR:DATA[:TEL]:PDH:RATE on page R-129

:SOUR:DATA[:TEL]:PDH:M2:BNF?

:SOURce:DATA[:TELecom]:PDH:M2:BNFas? provides the current setting of bits A and Sa4 to Sa8 in the 2 Mbit/s background frame.

Example

:SOUR:DATA:PDH:M2:BNF?
Response: 1

:SOUR:DATA[:TEL]:PDH:M2:CHAN

:SOURce:DATA[:TELecom]:PDH:M2:CHANnels <channel1> [,<channel2> [,channel3>[…[,<channelN>]]]] sets the channel numbers [n] of the N x 64 kbit/s test channels in the 2 Mbit/s PDH signal.

Parameter

Name	Type	Range	Default
channel1	numeric	1 - 31 [30]	1
channel2	numeric	1 - 31 [30]	not active
…	numeric	1 - 31 [30]	not active
channel31[30]	numeric	1 - 31 [30]	not active

Dependencies

Is valid only if:
:SOUR:DATA[:TEL]:PDH:FRAM = FRAM is set.
:SOUR:DATA[:TEL]:PDH:RATE <inputrate> = K64.
:SOUR:DATA[:TEL]:PDH:RATE <outputrate> = M2 | M8 | M34 | M140.
Channel 31 can be set only for :SOUR:DATA[:TEL]:PDH:M2:FRAM = PCM31 | PCM31CRC.
Channel setting works only if the MUX option (90.30) is present.

Comments

Groups of any number of 64 kbit/s channels can be formed, ranging from a single channel at 64 kbit/s to 31 x 64 kbit/s = 1984 kbit/s. The number of parameters in this command determines the number of channels used.
At least one channel must be selected.

The default setting has 1 x 64 kbit/s channel in channel 1.
The channels should be selected in order, and no channel may be selected more than once.

Example

:SOUR:DATA:PDH:M2:CHAN 10
corresponds to 1 x 64 kbit/s in channel 10
:SOUR:DATA:PDH:M2:CHAN 1,2,3
corresponds to 3 x 64 kbit/s = 192 kbit/s in channels 1, 2, 3
:SOUR:DATA:PDH:M2:CHAN 1,5,6,25,30
corresponds to 5 x 64 kbit/s = 320 kbit/s in channels 1, 5, 6, 25, 30

Related commands

:SOUR:DATA[:TEL]:PDH:FRAM on page R-104
:SOUR:DATA[:TEL]:PDH:RATE on page R-129
:SOUR:DATA[:TEL]:PDH:M2:FRAM on page R-107

:SOUR:DATA[:TEL]:PDH:M2:CHAN?

:SOURce:DATA[:TELecom]:PDH:M2:CHANnels? provides the current setting of the channel numbers [n] of the N x 64 kbit/s measurement channels in the 2 Mbit/s PDH output signal.

Example

:SOUR:DATA:PDH:M2:CHAN?
Response: 1,4,25
for 3 x 64 kbit/s = 192 kbit/s in channels 1, 4, 25

:SOUR:DATA[:TEL]:PDH:M2:FRAM

:SOURce:DATA[:TELecom]:PDH:M2:FRAMing <framing> sets the frame type of the 2 Mbit/s PDH signal.

Parameter

Name	Type	Range	Default
framing	discrete	PCM30 | PCM30CRC | PCM31 | PCM31CRC	PCM30CRC

Dependencies
Is valid only if: :SOUR:DATA[:TEL]:PDH:FRAM = FRAM is set.

Comments

PCM30: Framed signal to O.150 with CAS signaling channel
PCM30CRC: Framed signal to O.150 with CRC-4 and CAS signaling channel (timeslot 16)
PCM31: Framed signal to O.150 without CAS signaling channel
PCM31CRC: Framed signal to O.150 with CRC-4 and without CAS signaling channel

Example
:SOUR:DATA:PDH:M2:FRAM PCM31

Related commands
:SOUR:DATA[:TEL]:PDH:FRAM on page R-104
:SOUR:DATA[:TEL]:PDH:RATE on page R-129

:SOUR:DATA[:TEL]:PDH:M2:FRAM?

:SOURce:DATA[:TELecom]:PDH:M2:FRAMing? provides the current setting of the frame type of the 2 Mbit/s signal.

Example
:SOUR:DATA:PDH:M2:FRAM?
Response: PCM30 if the frame type is set for a PCM30 signal.

:SOUR:DATA[:TEL]:PDH:M2:SBIT

:SOURce:DATA[:TELecom]:PDH:M2:SBITs<Sa4>,<Sa5>,<Sa6>,<Sa7>,<Sa8> determines sequences in the spare (Sa) bits (bits 4 - 8 of the NON FAS octet) of the 2 Mbit/s frame (see also G.704).

Parameter

Name	Type	Range	Default
Sa4	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	255 (all bits=1)
Sa5	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	255 (all bits=1)
Sa6	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	255 (all bits=1)
Sa7	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	255 (all bits=1)
Sa8	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	255 (all bits=1)

Dependencies
Is valid only if: :SOUR:DATA[:TEL]:PDH:FRAM = FRAM is set.
Sa bit sequences work only if the MUX option (90.30) is present.

Comments
An 8 bit sequence is set here for each Sa bit which is inserted into the corresponding bits of the 2 Mbit/s PDH frame. A value of e.g. <Sa4> = #B11100011 fills the Sa4 bit at the first 3 positions in the multiframe with 1, followed by 3 positions with 0 and 2 positions with 1. This procedure is repeated cyclically. If an Sa bit is to be filled statically, all 8 bits can be programmed to the same value, i.e. #B11111111 or #B00000000.

Example
:SOUR:DATA:PDH:M2:SBIT #B11001100,255,255,10,#HFF

Related commands
:SOUR:DATA[:TEL]:PDH:FRAM on page R-104
:SOUR:DATA[:TEL]:PDH:RATE on page R-129

:SOUR:DATA[:TEL]:PDH:M2:SBIT?

:SOURce:DATA[:TELecom]:PDH:M2:SBITs? provides the current setting of the sequences in the Sa bits of the 2 Mbit/s frame.

Example
:SOUR:DATA:PDH:M2:SBIT?
Response: 0,255,10,0,0

:SOUR:DATA[:TEL]:PDH:M2:TSL16

:SOURce:DATA[:TELecom]:PDH:M2:TSLot16 <frame0>,<frame1>,<otherframes> determines how the bytes in the time slot 16 signaling multiframe of the 2 Mbit/s frame are filled (see also G.704).

Parameter

Name	Type	Range	Default
frame0	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	11 corresponding to #B00001011
frame1	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	221 corresponding to #B11011101
otherframes	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	221 corresponding to #B11011101

Dependencies

Is valid only if: :SOUR:DATA[:TEL]:PDH:FRAM = FRAM and :SOUR:DATA[:TEL]:PDH:M2:FRAM = PCM30CRC | PCM30 are set.
Timeslot 16 settings work only if the MUX option (90.30) is present.

Comments

<frame0>: carries in bits 1 to 4 the signaling multiframe pattern (0000). This should not be programmed in bits 1 to 4 of the other frames (<frame1> and <otherframes>) since this would prevent synchronization to the multiframe.

Example

:SOUR:DATA:PDH:M2:TSL16 #B00001111,255,221

Related commands

:SOUR:DATA[:TEL]:PDH:FRAM on page R-104
:SOUR:DATA[:TEL]:PDH:M2:FRAM on page R-107
:SOUR:DATA[:TEL]:PDH:RATE on page R-129

:SOUR:DATA[:TEL]:PDH:M2:TSL16?

:SOURce:DATA[:TELecom]:PDH:M2:TSLot16? provides the current setting of the filling of the bytes in the timeslot 16 signaling multiframe of the 2 Mbit/s frame.

Example

:SOUR:DATA:PDH:M2:TSL16?
Response: 11,221,221

:SOUR:DATA[:TEL]:PDH:M8:BDNB

:SOURce:DATA[:TELecom]:PDH:M8:BDNBits <state> determines the state of the D&N bits (bits 11 & 12) in the 8 Mbit/s background channels (see also G.742).

Parameter

Name	Type	Range	Default
states	numeric	#H0 - #H3 or #B00 - #B11 or 0 - 3	1 (#B01 => D=0 and N=1)

Dependencies
Is valid only if:
:SOUR:DATA[:TEL]:PDH:FRAM = FRAM is set.
:SOUR:DATA[:TEL]:PDH:RATE <inputrate> = M34 | M8 | M2 | K64.
:SOUR:DATA[:TEL]:PDH:RATE <outputrate> = M34 | M140.
DN bit setting works only if the MUX option (90.30) is present.

Comments
The state of the DN bits set here remains static until reprogrammed.

Example
:SOUR:DATA:PDH:M8:BDNB 3

Related commands
:SOUR:DATA[:TEL]:PDH:FRAM on page R-104
:SOUR:DATA[:TEL]:PDH:RATE on page R-129
:SOUR:DATA[:TEL]:PDH:M8:DNB on page R-112

:SOUR:DATA[:TEL]:PDH:M8:BDNB?

:SOURce:DATA[:TELecom]:PDH:M8:BDNBits? provides the current setting of the state of the DN bits in the 8 Mbit/s background channels.

Example
:SOUR:DATA:PDH:M8:BDNB?
Response: 1

:SOUR:DATA[:TEL]:PDH:M8:CHAN

:SOURce:DATA[:TELecom]:PDH:M8:CHANnel <channel> sets the channel number of the 2 Mbit/s measurement channel in the 8 Mbit/s PDH signal.

Parameter

Name	Type	Range	Default
channel	numeric	1 - 4	1

Dependencies
Is valid only if:
:SOUR:DATA[:TEL]:PDH:FRAM = FRAM is set.
:SOUR:DATA[:TEL]:PDH:RATE <inputrate> = M2 |
K64:SOUR:DATA[:TEL]:PDH:RATE <outputrate> = M8 | M34 | M140
Channel setting works only if the MUX option (90.30) is present.

Comments
This command sets selection of the 2 Mbit/s measurement channel within an 8 Mbit/s frame.

Example
:SOUR:DATA:PDH:M8:CHAN 2

Related commands
:SOUR:DATA[:TEL]:PDH:FRAM on page R-104
:SOUR:DATA[:TEL]:PDH:RATE on page R-129

:SOUR:DATA[:TEL]:PDH:M8:CHAN?

:SOURce:DATA[:TELecom]:PDH:M8:CHANnel? provides the current setting of the channel number of the 2 Mbit/s measurement channel in the 8 Mbit/s PDH output signal.

Example
:SOUR:DATA:PDH:M8:CHAN?
Response: 1

:SOUR:DATA[:TEL]:PDH:M8:DNB

:SOURce:DATA[:TELecom]:PDH:M8:DNBits <state> determines the state of the D&N bits (bits 11 & 12) in the 8 Mbit/s frame (see also G.742).

Parameter

Name	Type	Range	Default
states	numeric	#H0 - #H3 or #B00 - #B11 or 0 - 3	1 (#B01 => D=0 and N=1)

Dependencies

Is valid only if:
:SOUR:DATA[:TEL]:PDH:FRAM = FRAM is set.
:SOUR:DATA[:TEL]:PDH:RATE <inputrate> = M8 | M2 | K64
:SOUR:DATA[:TEL]:PDH:RATE <outputrate> = M8 | M34 | M140
DN bit setting works only if the MUX option (90.30) is present.

Comments

The state of the DN bits set here remains static until reprogrammed.

Example

:SOUR:DATA:PDH:M8:DNB 3

Related commands

:SOUR:DATA[:TEL]:PDH:FRAM on page R-104
:SOUR:DATA[:TEL]:PDH:RATE on page R-129
:SOUR:DATA[:TEL]:PDH:M8:BDNB on page R-110

:SOUR:DATA[:TEL]:PDH:M8:DNB?

:SOURce:DATA[:TELecom]:PDH:M8:DNBits? provides the current setting of the state of the DN bits in the 8 Mbit/s frame.

Example

:SOUR:DATA:PDH:M8:DNB?
Response: 1

:SOUR:DATA[:TEL]:PDH:M34:BDNB

:SOURce:DATA[:TELecom]:PDH:M34:BDNBits <state> determines the state of the D&N bits (bits 11 & 12) in the 34 Mbit/s background channels (see also G.751).

Parameter

Name	Type	Range	Default
states	numeric	#H0 - #H3 or #B00 - #B11 or 0 - 3	1 (#B01 => D=0 and N=1)

Dependencies

Is valid only if:
:SOUR:DATA[:TEL]:PDH:FRAM = FRAM is set.
:SOUR:DATA[:TEL]:PDH:RATE <inputrate> = M34 | M8 | M2 | K64.
:SOUR:DATA[:TEL]:PDH:RATE <outputrate> = M140.
DN bit setting works only if the MUX option (90.30) is present.

Comments

The state of the DN bits set here remains static until reprogrammed.

Example

:SOUR:DATA:PDH:M34:BDNB 3

Related commands

:SOUR:DATA[:TEL]:PDH:FRAM on page R-104
:SOUR:DATA[:TEL]:PDH:RATE on page R-129
:SOUR:DATA[:TEL]:PDH:M34:DNB on page R-115

:SOUR:DATA[:TEL]:PDH:M34:BDNB?

:SOURce:DATA[:TELecom]:PDH:M34:BDNBits? provides the current setting of the state of the DN bits in the 34 Mbit/s background channels.

Example

:SOUR:DATA:PDH:M34:BDNB?
Response: 1

:SOUR:DATA[:TEL]:PDH:M34:CHAN

:SOURce:DATA[:TELecom]:PDH:M34:CHANnel <channel> sets the channel number of the 8 Mbit/s measurement channel in the 34 Mbit/s PDH signal.

Parameter

Name	Type	Range	Default
channel	numeric	1 - 4	1

Dependencies

Is valid only if:
:SOUR:DATA[:TEL]:PDH:FRAM = FRAM is set.
:SOUR:DATA[:TEL]:PDH:RATE <inputrate> = M8 | M2 | K64
:SOUR:DATA[:TEL]:PDH:RATE <outputrate> = M34 | M140
Channel setting works only if the MUX option (90.30) is present.

Comments

This command sets the selection of the 8 Mbit/s measurement channel within a 34 Mbit/s frame.

Example

:SOUR:DATA:PDH:M34:CHAN 4

Related commands

:SOUR:DATA[:TEL]:PDH:FRAM on page R-104
:SOUR:DATA[:TEL]:PDH:RATE on page R-129

:SOUR:DATA[:TEL]:PDH:M34:CHAN?

:SOURce:DATA[:TELecom]:PDH:M34:CHANnel? provides the current setting of the channel number of the 8 Mbit/s measurement channel in the 34 Mbit/s PDH output signal.

Example

:SOUR:DATA:PDH:M34:CHAN?
Response: 1

:SOUR:DATA[:TEL]:PDH:M34:DNB

:SOURce:DATA[:TELecom]:PDH:M34:DNBits <state> determines the state of the D&N bits (bits 11 & 12) in the 34 Mbit/s frame (see also G.751).

Parameter

Name	Type	Range	Default
states	numeric	#H0 - #H3 or #B00 - #B11 or 0 - 3	1 (#B01 => D=0 and N=1)

Dependencies

Is valid only if:
:SOUR:DATA[:TEL]:PDH:FRAM = FRAM is set.
:SOUR:DATA[:TEL]:PDH:RATE <inputrate> = M34 | M8 | M2 | K64
:SOUR:DATA[:TEL]:PDH:RATE <outputrate> = M34 | M140
DN bit setting works only if the MUX option (90.30) is present.

Comments

The state of the DN bits set here remains static until reprogrammed.

Example

:SOUR:DATA:PDH:M34:DNB 3

Related commands

:SOUR:DATA[:TEL]:PDH:FRAM on page R-104
:SOUR:DATA[:TEL]:PDH:RATE on page R-129
:SOUR:DATA[:TEL]:PDH:M34:BDNB on page R-113

:SOUR:DATA[:TEL]:PDH:M34:DNB?

:SOURce:DATA[:TELecom]:PDH:M34:DNBits? provides the current setting of the state of the DN bits in the 34 Mbit/s frame.

Example

:SOUR:DATA:PDH:M34:DNB?
Response: 1
for 3 x 64 kbit/s = 192 kbit/s in channels 1, 4, 25

:SOUR:DATA[:TEL]:PDH:M34:FTYP

:SOURce:DATA[:TELecom]:PDH:M34:FTYPe <ftyp> sets the frame type of the 34Mbit/s PDH signal.

Parameter

Name	Type	Range	Default
ftyp	discrete	G751 | G832	G751

Dependencies

Is valid only if:
:SOUR:MODE = PDH and
:SOUR:DATA[:TEL]:PDH:FRAM = FRAM and
:SOUR:DATA[:TEL]:PDH:RATE = M34, M34
are set.

Comments

G751: Frame according to G.751
G832: Frame according to G.832

Example

:SOUR:DATA[:TEL]:PDH:M34:FTYP G751

Related commands

:SOUR:DATA[:TEL]:PDH:FRAM on page R-104
:SOUR:DATA[:TEL]:PDH:RATE on page R-129

:SOUR:DATA[:TEL]:PDH:M34:FTYP?

:SOURce:DATA[:TELecom]:PDH:M34:FTYPe? provides the current setting of the frame type of the 34 Mbit/s signal.

Example

:SOUR:DATA[:TEL]:PDH:M34:FTYP?
Response: G751 if the frame type is set to G.751.

:SOUR:DATA[:TEL]:PDH:M34:G832:OVER:DATA

:SOURce:DATA[:TELecom]:PDH:M34:G832:OVERhead:DATA <byte>, <value> sets the bytes of the 34 Mbit/s G832 overhead.

Parameter

Name	Type	Range	Default
byte	discrete	FA1| FA2 | TR | MA | NR | GC	none
value	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none

Dependencies

Continuous alarms/errors can also be generated here.
Error/alarm insertion has higher priority and overwrites static settings!

Comments

This command allows individual setting of the overhead bytes.
<byte>: Byte number in the M34 G832 overhead
<value>: Value for byte designated by <byte>
This command allows individual setting of the designated OH bytes. For the default setting, see :SOUR:DATA[:TEL]:PDH:M34:G832:OVER:PRES on page R-119

Note: The EM byte is generated by parity formation and cannot be altered!

Example

:SOUR:DATA[:TEL]:PDH:M34:G832:OVER:DATA NR, #H34
sets NR byte to 34hex.

Related commands

:SOUR:DATA[:TEL]:PDH:M34:G832:OVER:DATA:BLOC on page R-118
:SOUR:DATA[:TEL]:PDH:M34:G832:OVER:TRAC on page R-120

:SOUR:DATA[:TEL]:PDH:M34:G832:OVER:DATA?

:SOURce:DATA[:TELecom]:PDH:M34:G832:OVERhead:DATA?<byte> provides current settings of individual overhead bytes in the OH.

Example

:SOUR:DATA[:TEL]:PDH:M34:G832:OVER:DATA? GC
Response: 128 GC byte is set to 80hex.

:SOUR:DATA[:TEL]:PDH:M34:G832:OVER:DATA:BLOC

:SOURce:DATA[:TELecom]:PDH:M34:G832:OVERhead:DATA:BLOCk <FA1>, <FA2>, <EM>, <TR>, <MA>, <NR>, <GC> sets all 7 bytes of the 34 Mbit/s G832 overhead.

Parameter

7 successive <numeric> values are expected, which set the complete POH.

Name	Type	Range	Default
FA1	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	#HF6
FA2	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	#H28
EM	numeric	automatically generated --> should be set to 0	0
TR	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	0
MA	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	#H10
NR	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	0
GC	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	0

Dependencies

Continuous alarms can also be generated here.
Error/alarm insertion has higher priority and overwrites static settings!

Comments

EM byte of the OH cannot be set since its value is automatically generated.

Example

:SOUR:DATA[:TEL]:PDH:M34:G832:OVER:DATA:BLOC #HF6,#H28,0,4,0,#HFF,0

Related commands

:SOUR:DATA[:TEL]:PDH:M34:G832:OVER:DATA on page R-117
:SOUR:DATA[:TEL]:PDH:M34:G832:OVER:PRES on page R-119

:SOUR:DATA[:TEL]:PDH:M34:G832:OVER:DATA:BLOC?

:SOURce:DATA[:TELecom]:PDH:M34:G832:OVERhead:DATA:BLOCk? provides the current settings of the 7 bytes of the 34 Mbit/s G832 overhead.

Example

:SOUR:DATA[:TEL]:PDH:M34:G832:OVER:DATA:BLOC?
Response: 246,40,4,16,0,255,0

:SOUR:DATA[:TEL]:PDH:M34:G832:OVER:PRES

:SOURce:DATA[:TELecom]:PDH:M34:G832:OVERhead:PRESet sets the overhead bytes to their default values.

Parameter None

Comments Standard overhead (hex)

POH bytes	Value
FA1	F6
FA2	28
EM	XX
TR	00
MA	10
NR	00
GC	00

XX: inserted via parity formation (EM)
There is no query for this command.

Example :SOUR:DATA[:TEL]:PDH:M34:G832:OVER:PRES

Related commands :SOUR:DATA[:TEL]:PDH:M34:G832:OVER:DATA on page R-117

:SOUR:DATA[:TEL]:PDH:M34:G832:OVER:TRAC

:SOURce:DATA[:TELecom]:PDH:M34:G832:OVERhead:TRACe <mode>, <trace> determines the cyclical trace string and mode in the trace (TR byte of the OH).

Parameter

Name	Type	Range	Default
mode	discrete	NONE | TRC16	NONE
trace	string	Strings with a length from 1 to 15 bytes	“WG E3-TRACE”

Dependencies None

Comments <mode>=

NONE: Trace is switched off. The byte which can be set with :SOUR:DATA[:TEL]:PDH:M34:G832:OVER:DATA on page R-117 is transmitted.

TRC16: The string of up to 15 characters is automatically completed for frame synchronization and error checking with the 16th byte using CRC-7.

<trace>: All printable characters are allowed (7 bit ASCII). If the string is shorter than the maximum length, it is padded with blanks (20hex).

Example :SOUR:DATA[:TEL]:PDH:M34:G832:OVER:TRAC TRC16, “Hello World”
“Hello World” is transmitted cyclically in the TR trace.

:SOUR:DATA[:TEL]:PDH:M34:G832:OVER:TRAC?

:SOURce:DATA[:TELecom]:PDH:M34:G832:OVERhead:TRACe? provides the current setting for the trace in the TR byte of the OH.

Example :SOUR:DATA[:TEL]:PDH:M34:G832:OVER:TRAC?
Response: TRC16,“Hello World”
for “Hello World” in the 16 byte trace.

:SOUR:DATA[:TEL]:PDH:M140:CHAN

:SOURce:DATA[:TELecom]:PDH:M140:CHANnel <channel> sets the channel number of the 34 Mbit/s measurement channel in the 140 Mbit/s PDH signal.

Parameter

Name	Type	Range	Default
channel	numeric	1 - 4	1

Dependencies

Is valid only if:
:SOUR:DATA[:TEL]:PDH:FRAM = FRAM is set.
:SOUR:DATA[:TEL]:PDH:RATE <inputrate> = M34 | M8 | M2 | K64
:SOUR:DATA[:TEL]:PDH:RATE <outputrate> = M140
Channel setting works only if the MUX option (90.30) is present.

Comments

This command sets the selection of the 34 Mbit/s measurement channel within a 140 Mbit/s frame.

Example

:SOUR:DATA:PDH:M140:CHAN 3

Related commands

:SOUR:DATA[:TEL]:PDH:FRAM on page R-104
:SOUR:DATA[:TEL]:PDH:RATE on page R-129

:SOUR:DATA[:TEL]:PDH:M140:CHAN?

:SOURce:DATA[:TELecom]:PDH:M140:CHANnel? provides the current setting of the channel number of the 34 Mbit/s measurement channel in the 140 Mbit/s PDH output signal.

Example

:SOUR:DATA:PDH:M140:CHAN?
Response: 1

:SOUR:DATA[:TEL]:PDH:M140:DNYY

:SOURce:DATA[:TELecom]:PDH:M140:DNYYbits <state> determines the state of the DNYY bits (bits 13 to 16) in the 140 Mbit/s frame (see also G.751).

Parameter

Name	Type	Range	Default
states	numeric	#H0 - #HF or #B0000 - #B1111 or 0 - 15	7 (#B0111 => D=0 and NYY=1

Dependencies

Is valid only if:
:SOUR:DATA[:TEL]:PDH:FRAM = FRAM is set.
:SOUR:DATA[:TEL]:PDH:RATE <inputrate> = M140 | M34 | M8 | M2 | K64.
:SOUR:DATA[:TEL]:PDH:RATE <outputrate> = M140
DNYY bit setting works only if the MUX option (90.30) is present.

Comments

The state of the DNYY bits set here remains static until reprogrammed.

Example

:SOUR:DATA:PDH:M140:DNYY 3

Related commands

:SOUR:DATA[:TEL]:PDH:FRAM on page R-104
:SOUR:DATA[:TEL]:PDH:RATE on page R-129

:SOUR:DATA[:TEL]:PDH:M140:DNYY?

:SOURce:DATA[:TELecom]:PDH:M140:DNYYbits? provides the current setting of the state of the DNYY bits in the 140 Mbit/s frame.

Example

:SOUR:DATA:PDH:M140:DNYY?
Response: 15

:SOUR:DATA[:TEL]:PDH:M140:FTYP

:SOURce:DATA[:TELecom]:PDH:M140:FTYPe <ftyp> sets the frame type of the 140 Mbit/s PDH signal.

Parameter

Name	Type	Range	Default
ftyp	discrete	G751 | G832	G751

Dependencies

Is valid only if:
:SOUR:MODE = PDH and
:SOUR:DATA[:TEL]:PDH:FRAM = FRAM and
:SOUR:DATA[:TEL]:PDH:RATE = M140,M140
are set.

Comments

G751: Frame according to G.751
G832: Frame according to G.832

Example

:SOUR:DATA[:TEL]:PDH:M140:FTYP G751

Related commands

:SOUR:DATA[:TEL]:PDH:FRAM on page R-104
:SOUR:DATA[:TEL]:PDH:RATE on page R-129

:SOUR:DATA[:TEL]:PDH:M140:FTYP?

:SOURce:DATA[:TELecom]:PDH:M140:FTYPe? provides the current setting of the frame type of the 140 Mbit/s signal.

Example

:SOUR:DATA[:TEL]:PDH:M140:FTYP?
Response: G751 if frame type is set to G.751.

:SOUR:DATA[:TEL]:PDH:M140:G832:OVER:DATA

:SOURce:DATA[:TELecom]:PDH:M140:G832:OVERhead:DATA <byte>, <value> sets bytes of the 140 Mbit/s G832 overhead.

Parameter

Name	Type	Range	Default
byte	discrete	FA1 | FA2 | TR | MA | NR | GC | P1| P2	none
value	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none

Dependencies

Continuous alarms/errors can also be generated here.
Error/alarm insertion has higher priority and overwrites static settings!

Comments

This command allows individual setting of the overhead bytes.

<byte>: Byte number in the M140 G832 overhead

<value>: Value for the byte designated by <byte>

This command allows individual setting of the designated OH bytes. For the default setting, see :SOUR:DATA[:TEL]:PDH:M34:G832:OVER:PRES on page R-119.

Note: The EM byte is generated through parity formation and cannot be altered!

Example

:SOUR:DATA[:TEL]:PDH:M140:G832:OVER:DATA NR, #H34
sets NR byte to 34hex.

Related commands

:SOUR:DATA[:TEL]:PDH:M140:G832:OVER:DATA:BLOC on page R-125
:SOUR:DATA[:TEL]:PDH:M140:G832:OVER:TRAC on page R-127

:SOUR:DATA[:TEL]:PDH:M140:G832:OVER:DATA?

:SOURce:DATA[:TELecom]:PDH:M140:G832:OVERhead:DATA?<byte> provides current settings of individual bytes in the OH.

Example

:SOUR:DATA[:TEL]:PDH:M140:G832:OVER:DATA? GC
Response: 128 GC byte is set to 80hex.

:SOUR:DATA[:TEL]:PDH:M140:G832:OVER:DATA:BLOC

:SOURce:DATA[:TELecom]:PDH:M140:G832:OVERhead:DATA:BLOCk <FA1>, <FA2>, <EM>, <TR>, <MA>, <NR>, <GC>, <P1>, <P2> sets all 9 bytes of the 140 Mbit/s G832 overhead.

Parameter

Nine successive <numeric> values are expected, which set the complete POH.

Name	Type	Range	Default
FA1	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	#HF6
FA2	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	#H28
EM	numeric	automatically generated --> should be set to 0	0
TR	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	0
MA	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	#H10
NR	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	0
GC	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	0
P1	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	0
P2	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	0

Dependencies

Continuous alarms can also be generated here.
Error/alarm insertion has higher priority and overwrites static settings!

Comments

EM byte of the OH cannot be set since its value is automatically generated.

Example

:SOUR:DATA[:TEL]:PDH:M140:G832:OVER:DATA:BLOC #HF6,#H28,0,4,0,#HFF,0,0,0

Related commands

:SOUR:DATA[:TEL]:PDH:M140:G832:OVER:DATA on page R-124
:SOUR:DATA[:TEL]:PDH:M140:G832:OVER:PRES on page R-126

:SOUR:DATA[:TEL]:PDH:M140:G832:OVER:DATA:BLOC?

:SOURce:DATA[:TELecom]:PDH:M140:G832:OVERhead:DATA:BLOCk? provides the current settings of the 7 bytes of the 34 Mbit/s G832 overhead.

Example :SOUR:DATA[:TEL]:PDH:M140:G832:OVER:DATA:BLOC?
Response: 246,40,4,0,0,255,0,0,0

:SOUR:DATA[:TEL]:PDH:M140:G832:OVER:PRES

:SOURce:DATA[:TELecom]:SDH:POVerhead:PRESet sets the overhead bytes to their default values.

Parameter None

Comments Standard overhead (hex)

POH bytes	Value
FA1	F6
FA1	28
EM	XX
TR	00
MA	10
NR	00
GC	00
P1	00
P2	00

XX: Inserted via parity formation (EM)
There is no query for this command.

Example :SOUR:DATA[:TEL]:PDH:M140:G832:OVER:PRES

Related commands :SOUR:DATA[:TEL]:PDH:M140:G832:OVER:DATA on page R-124

:SOUR:DATA[:TEL]:PDH:M140:G832:OVER:TRAC

:SOURce:DATA[:TELecom]:PDH:M140:G832:OVERhead:TRACe <mode>, <trace> determines the cyclical trace string and mode in the trace (TR byte of the OH).

Parameter

Name	Type	Range	Default
mode	discrete	NONE | TRC16	NONE
trace	string	Strings with a length from 1 to 15 bytes	“WG E4-TRACE”

Dependencies None

Comments <mode> =

NONE: Trace is switched off. The byte which can be set with :SOUR:DATA[:TEL]:PDH:M140:G832:OVER:DATA on page R-124 is transmitted.

TRC16: The string of up to 15 characters is automatically completed for frame synchronization and error checking with the 16th byte using CRC-7

<trace>: All printable characters are allowed (7 bit ASCII). If the string is shorter than the maximum length, it is padded with blanks (20hex).

Example :SOUR:DATA[:TEL]:PDH:M140:G832:OVER:TRAC TRC16, “Hello World”
“Hello World” is transmitted cyclically in the TR trace.

:SOUR:DATA[:TEL]:PDH:M140:G832:OVER:TRAC?

:SOURce:DATA[:TELecom]:PDH:M140:G832:OVERhead:TRACe? provides the current setting for the trace in the TR byte of the OH.

Example :SOUR:DATA[:TEL]:PDH:M140:G832:OVER:TRAC?
Response: TRC16,“Hello World”
for “Hello World” in the 16 byte trace.

:SOUR:DATA[:TEL]:PDH:PAYL:TYPE

:SOURce:DATA[:TELecom]:PDH:PAYLoad:TYPE <type> specifies the type of PDH payload transmitted.

Parameter

Name	Type	Range	Default
type	discrete	PATTern | ATM | PLCP	PATT

Dependencies None

Comments

PATTern: Pattern

ATM: ATM (Asynchronous Transfer Mode) signal
(only with ATM option 90.70 fitted
in conjunction with a PDH mapping option)

PLCP: PLCP (Physical Layer Convergence Protocol),
protocol for transporting ATM in PDH, (only with ATM option 90.70 or 90.80 fitted in conjunction with a PDH mapping option)

Example :SOUR:DATA[:TEL]:PDH:PAYL:TYPE ATM
sets the PDH payload type to ATM.

Related commands None

:SOUR:DATA[:TEL]:PDH:PAYL:TYPE?

:SOURce:DATA[:TELecom]:PDH:PAYLoad:TYPE? provides the type of the PDH payload transmitted.

Example :SOUR:DATA[:TEL]:PDH:PAYL:TYPE?
Response: ATM if PDH payload type is set to ATM.

:SOUR:DATA[:TEL]:PDH:RATE

:SOURce:DATA[:TELecom]:PDH:RATE <outputrate>, <inputrate> sets the input and output bit rates of a PDH signal hierarchy level (TX side).

Parameter

Name	Type	Range	Default
outputrate	discrete	M2 | M8 | M34 | M140 | DS1 | DS2 | DS3	M2
inputrate	discrete	K64 | M2 | M8 | M34 | M140 | DS0 | DS1 | DS2 |DS3	M2

Dependencies

For K64 … M140:
If the <inputrate> and <outputrate> are different, the MUX chain option (90.30) is required **(not possible for ABT-20 devices)**.
The input bit rate must always be less than or equal to the output bit rate <outputrate> (MUX function).

For DS0, DS1, DS3:
If the <inputrate> and <outputrate> are different, the MUX chain option (90.32) is required **(not possible for ABT-20 devices)**.

If <outputrate> is set to DS2, <inputrate> = DS2 is required.

Setting the <inputrate> will also set the payload pattern in :SOUR:DATA[:TEL]:PAYL:PATT on page R-88.

Comments

K64 | DS0:	64 kbit/s
M2:	2.048 Mbit/s
M8:	8.442 Mbit/s
M34:	34.368 Mbit/s
M140:	139.264 Mbit/s
DS1:	1.544 Mbit/s
DS2:	6.312 Mbit/s
DS3:	44.736 Mbit/s

If the <inputrate> and <outputrate> are equal, a PDH signal without a multiplex substructure has been set.

The following figures show how the MUX chains (CEPT and ANSI) can be set:

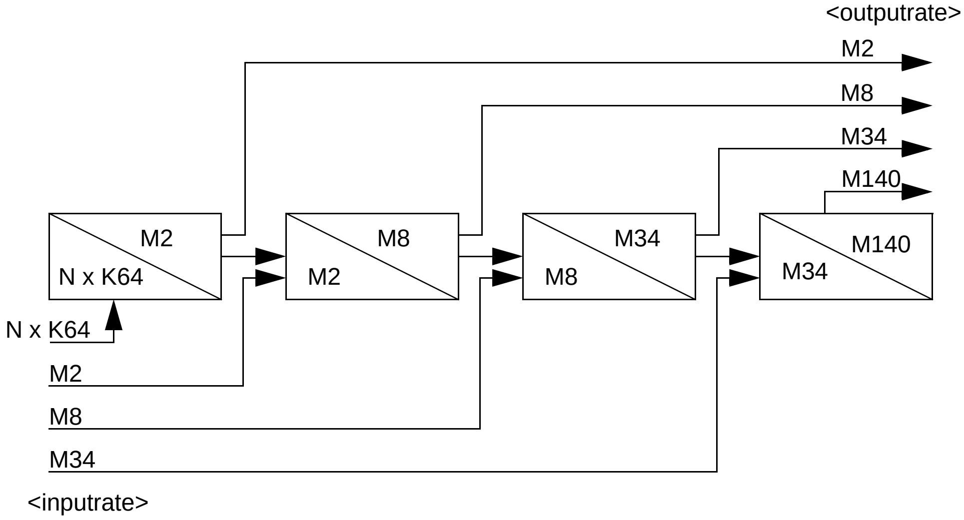


Fig. R-3 Setting the MUX chain (CEPT)

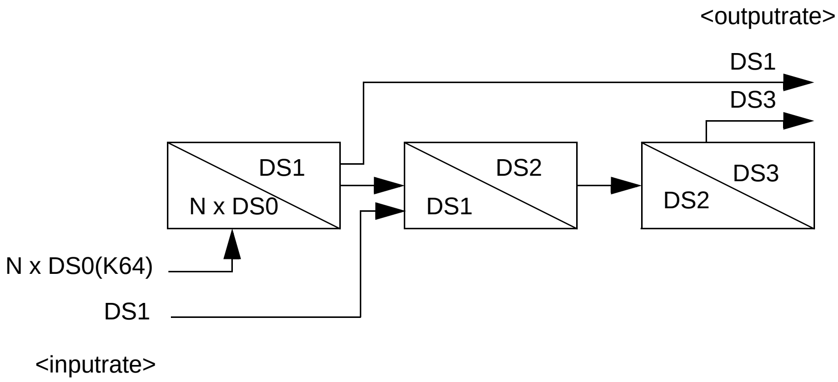


Fig. R-4 Setting the MUX chain (ANSI)

Note: The framing command :SOUR:DATA[:TEL]:PDH:FRAM on page R-104 always corresponds to the <inputrate> side of the MUX chain!

Example :SOUR:DATA:PDH:RATE M2,M2
sets the input/output bit rate to 2.048 Mbit/s.

Related commands :SOUR:DATA[:TEL]:PDH:FRAM on page R-104

:SOUR:DATA[:TEL]:PDH:RATE?

The query :SOURce:DATA[:TELecom]:PDH:RATE? delivers the current setting of the generator PDH signal hierarchy level.

Example :SOUR:DATA:PDH:RATE?
Response: M2, M2

:SOUR:DATA[:TEL]:PLCP

The commands in this group specify the structure of the PLCP signal mapped into PDH signals.

Note: All commands in this group are valid only if :SOUR:MODE = PDH and :SOUR:DATA[:TEL]:PDH:PAYL:TYPE = PLCP

:SOUR:DATA[:TEL]:PLCP:ALAR[:MODE]

:SOURce:DATA:[TELecom]:PLCP:ALARm[:MODE] <alarm>, <mode> determines the alarm insertion mode.

Parameter

Name	Type	Range	Default
alarm	discrete	LOF | RAI	LOF
mode	discrete	NONE | CONTinuous	NONE

Dependencies None

Comments

<alarm> =
LOF: Loss of frame
RAI: Remote alarm indication

<mode> =
NONE: No alarm insertion
CONTinuous: Continuous alarm insertion

Example

:SOUR:DATA[:TEL]:PLCP:ALAR[:MODE] LOF,CONT
activates the “LOF” alarm in “continuous” mode.

:SOUR:DATA[:TEL]:PLCP:ALAR[:MODE]?

The query :SOURce:DATA[:TELecom]:PLCP:ALARm[:MODE]? delivers the current alarm insertion mode setting.

Example

:SOUR:DATA[:TEL]:PLCP:ALAR[:MODE]?
Response: LOF,CONT if continuous LOF alarm insertion is activated.

:SOUR:DATA[:TEL]:PLCP:ALAR:FLEN

:SOURce:DATA[:TELecom]:PLCP:ALARm:FLENgth <activeframes>, <inactiveframes> defines alarm sequences.

Parameter

Name	Type	Range	Default
activeframes	numeric	1 - 8000	1
inactiveframes	numeric	1 - 8000	9

Dependencies — The sequence runs only if :SOUR:DATA[:TEL]:PLCP:ALAR[:MODE] = LOF, PER is set.

Comments — activeframes = number of frames in which the alarm is generated
inactiveframes = number of frames in which no alarm is generated

Example — :SOUR:DATA[:TEL]:PLCP:ALAR:FLEN 5,10
specifies the following sequence: Alarm is present in 5 frames, followed by 10 frames without an alarm.

Related commands — :SOUR:DATA[:TEL]:PLCP:ALAR[:MODE] on page R-131

:SOUR:DATA[:TEL]:PLCP:ALAR:FLEN?

:SOURce:DATA[:TELecom]:PLCP:ALARm:FLENgth? provides the current alarm sequence specification.

Example — :SOUR:DATA[:TEL]:PLCP:ALAR:FLEN?
Response: 10,100
Alarm is present in 10 frames, followed by 100 frames without an alarm.

:SOUR:DATA[:TEL]:PLCP:ERR[:MODE]

:SOURce:DATA[:TELecom]:PLCP:ERR[:MODE] <error>, <mode> determines the error insertion mode.

Parameter

Name	Type	Range	Default
error	discrete	FAS | B1 | FEBE	FAS
mode	discrete	NONE | ONCE | RATE	NONE

Dependencies None

Comments <error> =

FAS: Error inserted in frame alignment signal
B1: Uncorrectable error (> 2 bit errors) inserted in cell header
FEBE: Far-end bit error

<mode> =

NONE: No error insertion
ONCE: Insertion of single error
RATE: Error rate corresponding to :SOUR:DATA[:TEL]:PLCP:ERR:RATE on page R-134

Example :SOUR:DATA[:TEL]:PLCP:ERR[:MODE] FAS, RATE
generates a FAS error with a rate defined in :SOUR:DATA[:TEL]:PLCP:ERR:RATE on page R-134.

Related commands :SOUR:DATA[:TEL]:PLCP:ERR:RATE on page R-134

:SOUR:DATA[:TEL]:PLCP:ERR[:MODE]?

The query :SOURce:DATA[:TELecom]:PLCP:ERRor:[MODE]? delivers the current error insertion mode setting.

Comments ONCE is a volatile state and cannot be read with this query.

Example :SOUR:DATA[:TEL]:PLCP:ERR[:MODE]?
Example Response: FAS,RATE if an FAS error rate is activated.

:SOUR:DATA[:TEL]:PLCP:ERR:RATE

:SOURce:DATA[:TELecom]:PLCP:ERRor:RATE <rate> defines the error rate for PDH error insertion.

Parameter

Name	Type	Range	Default
rate	NR3	1E-8 … 1E-3	1E-6

Dependencies

Error rate is active only if :SOUR:DATA[:TEL]:PLCP:ERR[:MODE] on page R-133 is set to <mode> = RATE.

Comments

The set rate corresponds to the equivalent bit error rate!

Error type	Range
FAS	1E-7 … 1E-3
others	1E-8 … 1E-3

Example

:SOUR:DATA[:TEL]:PLCP:ERR:RATE 1E-5 Error rate = 1 x 10^{-5}

Related commands

:SOUR:DATA[:TEL]:PLCP:ERR[:MODE] on page R-133

:SOUR:DATA[:TEL]:PLCP:ERR:RATE?

The query :SOURce:DATA[:TELecom]:PLCP:ERRor:RATE? delivers the current error rate setting.

Example

:SOUR:DATA[:TEL]:PLCP:ERR:RATE?
Response: 1E-5 Error rate = 1 x 10^{-5}.

:SOUR:DATA[:TEL]:SDH

The commands in this group specify the structure of an SDH signal.

Note: All commands in this group are valid only if :SOUR:MODE = SDH.

:SOUR:DATA[:TEL]:SDH:ALAR:FLEN

:SOURce:DATA[:TELecom]:SDH:ALARm:FLENgth <activeframes>, <inactiveframes> defines the length of alarm sequences.

Parameter

Name	Type	Range	Default
activeframes	numeric	1 - 4800000 1 - 480000 1) 1 - 256000 2)	1
inactiveframes	numeric	1 - 4800000	9

Dependencies

Some continuous alarms can also be set by intentionally setting the overhead bytes --> Alarm setting with this command is not influenced by this!

1) For STM16/OC48; option 90.53, 90.54 or 90.59 only
2) For STM4/OC12; option 90.46, 90.47 or 90.48 only

Comments

activeframes = number of frames in which the alarm is generated
inactiveframes = number of frames in which no alarm is generated
1 frame = 125 µs
For alarm = LOS, PER: Only multiples of 800 frames (0.1 s) can be set for activeframes and inactiveframes.

Example

:SOUR:DATA:SDH:ALAR:FLEN 5,10
specifies the following sequence: Alarm is present in 5 frames, followed by 10 frames without an alarm and so on.

Related commands

:SOUR:DATA[:TEL]:SDH:ALAR[:MODE] on page R-136

:SOUR:DATA[:TEL]:SDH:ALAR:FLEN?

:SOURce:DATA[:TELecom]:SDH:ALARm:FLENgth? provides the current setting of the alarm sequence.

Example

:SOUR:DATA:SDH:ALAR:FLEN?
Response: 10,100
Alarm is present in 10 frames, followed by 100 frames without an alarm.

:SOUR:DATA[:TEL]:SDH:ALAR[:MODE]

:SOURce:DATA[:TELecom]:SDH:ALARm[:MODE] <alarm>, <mode> determines the alarm insertion.

Parameter

Name	Type	Range CEPT	Range ANSI	Default
alarm	discrete	LOS | LOF | RSTIM | MSAIS | MSRDI | AUAIS | AULOP | HPRDI | HPTIM | HPPLM | HPUNEQ | TULOM | TUAIS | AISC1 | AISC2 | AISC3 | AISC4 | AISC5 | AISC6 | AISC7 | AISC8 | AISC9 | AISC10 | AISC11 | AISC12 | AISC13 | AISC14 | AISC15 | AISC16 | TULOP | LOPC1 | LOPC2 | LOPC3 | LOPC4 | LOPC5 | LOPC6 | LOPC7 | LOPC8 | LOPC9 | LOPC10 | LOPC11 | LOPC12 | LOPC13 | LOPC14 | LOPC15 | LOPC16 |	LOS | LOF | TIML | AISL | RDIL | AISP | LOPP | RDIP | TIMP | PLMP | UNEQP | LOM | AISV | AISC1 | AISC2 | AISC3 | AISC4 | AISC5 | AISC6 | AISC7 | AISC8 | AISC9 | AISC10 | AISC11 | AISC12 | AISC13 | AISC14 | AISC15 | AISC16 | LOPV | LOPC1 | LOPC2 | LOPC3 | LOPC4 | LOPC5 | LOPC6 | LOPC7 | LOPC8 | LOPC9 | LOPC10 | LOPC11 | LOPC12 | LOPC13 | LOPC14 | LOPC15 | LOPC16 |	LOF

Parameter

Name	Type	Range CEPT	Range ANSI	Default
alarm	discrete	LPRFI | LPRDI | LPTIM | LPPLM | LPUNEQ | PDIP | PDIV | HPRDIEP | HPRDIES | HPRDIEC | LPRDIEP | LPRDIES | LPRDIEC	RFIV | RDIV | TIMV | PLMV | UNEQV | PDIP | PDIV | RDIEPP | RDIEPS | RDIEPC | RDIEVP | RDIEVS | RDIEVC	LOF
mode	discrete	NONE | CONTinuous | PERiodical		NONE

Dependencies

Continuous alarms can also be set by intentionally setting the overhead bytes
--> Alarm insertion has higher priority and overwrites static bytes!

Comments

Alarm descriptions, CEPT notation
<alarm> =

LOS:	Loss Of Signal
LOF:	Loss Of Frame
RSTIM:	Regenerator Section Trace Identifier Mismatch. RS-TIM (J0)
MSAIS:	Multiplex Section Alarm Indication Signal
MSRDI:	Multiplex Section Remote Defect Indication MS-RDI (MS-FERF)
AUAIS:	Administration Unit Alarm Indication Signal
AULOP:	AU Loss Of Pointer
HPRDI:	High Path Remote Defect Indication HP-RDI (HP-FERF)
HPTIM:	High Path Trace Identifier Mismatch HP-TIM (J1)
HPPLM:	High Path Signal Label Mismatch HP-PLM
HPUNEQ:	High Path Unequipped signal HP-UNEQ
TULOM:	Tributary Unit Loss of Multiframe TU-LOM
TUAIS:	Tributary Unit (Low Path) Alarm Indication Signal TU-AIS
AISC1:	Concatenation Alarm Indication Signal AU4 # 1
AISC2:	Concatenation Alarm Indication Signal AU4 # 2
AISC3:	Concatenation Alarm Indication Signal AU4 # 3
AISC4:	Concatenation Alarm Indication Signal AU4 # 4
AISC5:	Concatenation Alarm Indication Signal AU4 # 5
AISC6:	Concatenation Alarm Indication Signal AU4 # 6
AISC7:	Concatenation Alarm Indication Signal AU4 # 7
AISC8:	Concatenation Alarm Indication Signal AU4 # 8
AISC9:	Concatenation Alarm Indication Signal AU4 # 9
AISC10:	Concatenation Alarm Indication Signal AU4 # 10
AISC11:	Concatenation Alarm Indication Signal AU4 # 11
AISC12:	Concatenation Alarm Indication Signal AU4 # 12
AISC13:	Concatenation Alarm Indication Signal AU4 # 13
AISC14:	Concatenation Alarm Indication Signal AU4 # 14
AISC15:	Concatenation Alarm Indication Signal AU4 # 15
AISC16:	Concatenation Alarm Indication Signal AU4 # 16
TULOP:	Tributary Unit Loss Of Pointer TU-LOP
LOPC1:	Concatenation Loss Of Pointer AU-Pointer # 1

LOPC2:	Concatenation Loss Of Pointer AU-Pointer # 2
LOPC3:	Concatenation Loss Of Pointer AU-Pointer # 3
LOPC4:	Concatenation Loss Of Pointer AU-Pointer # 4
LOPC5:	Concatenation Loss Of Pointer AU-Pointer # 5
LOPC6:	Concatenation Loss Of Pointer AU-Pointer # 6
LOPC7:	Concatenation Loss Of Pointer AU-Pointer # 7
LOPC8:	Concatenation Loss Of Pointer AU-Pointer # 8
LOPC9:	Concatenation Loss Of Pointer AU-Pointer # 9
LOPC10:	Concatenation Loss Of Pointer AU-Pointer # 10
LOPC11:	Concatenation Loss Of Pointer AU-Pointer # 11
LOPC12:	Concatenation Loss Of Pointer AU-Pointer # 12
LOPC13:	Concatenation Loss Of Pointer AU-Pointer # 13
LOPC14:	Concatenation Loss Of Pointer AU-Pointer # 14
LOPC15:	Concatenation Loss Of Pointer AU-Pointer # 15
LOPC16:	Concatenation Loss Of Pointer AU-Pointer # 16
LPRDI:	Low Path Remote Defect Indication LP-RDI (LP-FERF)
LPRFI:	Low Path Remote Failure Indication
LPUNEQ:	Low Path Unequipped signal
LPTIM:	Low Path Trace Identifier Mismatch LP-TIM
LPPLM:	Low Path Signal Label Mismatch LP-PLM
PDIP:	Payload Defect Indication STS-Path
PDIV:	Payload Defect Indication VT-Path
HPRDIEP:	High Path Remote Defect Indication Enhanced Payload
HPRDIES:	High Path Remote Defect Indication Enhanced Server
HPRDIEC:	High Path Remote Defect Indication Enhanced Connectivity
LPRDIEP:	Low Path Remote Defect Indication Enhanced Payload
LPRDIES:	Low Path Remote Defect Indication Enhanced Server
LPRDIEC:	Low Path Remote Defect Indication Enhanced Connectivity

Alarm descriptions, ANSI notation
<alarm> =

LOS:	Loss Of Signal
LOF:	Loss Of Frame
TIML:	Trace Identifier Mismatch Line (J0)
AISL:	Alarm Indication Signal Line
RDIL:	Remote Defect Indication Line
AISP:	Alarm Indication Signal STS-Path
LOPP:	Loss Of Pointer STS-Path
RDIP:	Remote Defect Indication STS-Path
TIMP:	Trace Identifier Mismatch STS-Path (J1)
PLMP:	Signal Label Mismatch STS-Path
UNEQ:	Unequipped signal STS-Path
LOM:	Loss of Multiframe VT-Path
AISV:	Alarm Indication Signal VT-Path
AISC1:	Concatenation Alarm Indication Signal STS-Path # 1
AISC2:	Concatenation Alarm Indication Signal STS-Path # 2
AISC3:	Concatenation Alarm Indication Signal STS-Path # 3
AISC4:	Concatenation Alarm Indication Signal STS-Path # 4
AISC5:	Concatenation Alarm Indication Signal STS-Path # 5
AISC6:	Concatenation Alarm Indication Signal STS-Path # 6
AISC7:	Concatenation Alarm Indication Signal STS-Path # 7
AISC8:	Concatenation Alarm Indication Signal STS-Path # 8
AISC9:	Concatenation Alarm Indication Signal STS-Path # 9
AISC10:	Concatenation Alarm Indication Signal STS-Path # 10

AISC11:	Concatenation Alarm Indication Signal STS-Path # 11
AISC12:	Concatenation Alarm Indication Signal STS-Path # 12
AISC13:	Concatenation Alarm Indication Signal STS-Path # 13
AISC14:	Concatenation Alarm Indication Signal STS-Path # 14
AISC15:	Concatenation Alarm Indication Signal STS-Path # 15
AISC16:	Concatenation Alarm Indication Signal STS-Path # 16
LOPV:	Loss Of Pointer VT-Path
LOPC1:	Concatenation Loss Of Pointer STS-Path # 1
LOPC2:	Concatenation Loss Of Pointer STS-Path # 2
LOPC3:	Concatenation Loss Of Pointer STS-Path # 3
LOPC4:	Concatenation Loss Of Pointer STS-Path # 4
LOPC5:	Concatenation Loss Of Pointer STS-Path # 5
LOPC6:	Concatenation Loss Of Pointer STS-Path # 6
LOPC7:	Concatenation Loss Of Pointer STS-Path # 7
LOPC8:	Concatenation Loss Of Pointer STS-Path # 8
LOPC9:	Concatenation Loss Of Pointer STS-Path # 9
LOPC10:	Concatenation Loss Of Pointer STS-Path # 10
LOPC11:	Concatenation Loss Of Pointer STS-Path # 11
LOPC12:	Concatenation Loss Of Pointer STS-Path # 12
LOPC13:	Concatenation Loss Of Pointer STS-Path # 13
LOPC14:	Concatenation Loss Of Pointer STS-Path # 14
LOPC15:	Concatenation Loss Of Pointer STS-Path # 15
LOPC16:	Concatenation Loss Of Pointer STS-Path # 16
RDIV:	Remote Defect Indication VT-Path
RFIV:	Remote Failure Indication VT-Path
UNEQV:	Unequipped signal VT-Path
TIMV:	Trace Identifier Mismatch VT-Path
PLMV:	Path Signal Label Mismatch VT-Path
PDIP:	Payload Defect Indication STS-Path
PDIV:	Payload Defect Indication VT-Path
RDIEPP:	Remote Defect Indication Enhanced Payload STS-Path
RDIEPS:	Remote Defect Indication Enhanced Server STS-Path
RDIEPC:	Remote Defect Indication Enhanced Connectivity STS-Path
RDIEVP:	Remote Defect Indication Enhanced Payload VT-Path
RDIEVS:	Remote Defect Indication Enhanced Server VT-Path
RDIEVC:	Remote Defect Indication Enhanced Connectivity VT-Path

<mode> =

NONE:	No alarm insertion
CONTinuous:	Continuous alarm insertion
PERiodical:	Periodic execution of the alarm sequence as defined by :SOUR:DATA[:TEL]:SDH:ALAR:FLEN on page R-135 See alarm generation tables in the Options Manual file for periodic alarms that are allowed for the various mapping options.

Example

:SOUR:DATA:SDH:ALAR MSAIS, CONT
generates a continuous MSAIS.

Related commands

:SOUR:DATA[:TEL]:SDH:ALAR:FLEN on page R-135

:SOUR:DATA[:TEL]:SDH:ALAR[:MODE]?

:SOURce:DATA[:TELecom]:SDH:ALARm[:MODE]? provides the current setting of the alarm insertion.

Dependencies

Some continuous alarms can also be set by intentionally setting the overhead bytes --> The response to this query may be NONE in such cases!

Note: The corresponding command accepts the ITU-T and ANSI notation. The query however always returns the ITU-T notation.

Example

:SOUR:DATA:SDH:ALAR?
Response: LOF,PER if a LOF alarm sequence is activated.

:SOUR:DATA[:TEL]:SDH:BPOV:DATA

:SOURce:DATA[:TELecom]:SDH:BPOVerhead:DATA <byte>, <value> sets bytes of the VC4 (STS3CSPE) / VC3 (STS1SPE) high order POH (path overhead) of the background channels.

Parameter

Name	Type	Range	Default
byte	discrete	J1 | C2 | G1 | F2 | F3| K3(Z4) | N1	none
value	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none

Dependencies

None

Comments

This command allows individual setting of the designated POH bytes in all background channels simultaneously. For the default setting, see :SOUR:DATA[:TEL]:SDH:BPOV:PRES on page R-143.

Example

:SOUR:DATA:SDH:BPOV:DATA C2, #H34 sets C2 byte to 34hex.

Related commands

:SOUR:DATA[:TEL]:SDH:BPOV:HPTR on page R-142
:SOUR:DATA[:TEL]:SDH:BPOV:PRES on page R-143

:SOUR:DATA[:TEL]:SDH:BPOV:DATA?

:SOURce:DATA[:TELecom]:SDH:BPOVerhead:DATA? <byte> provides the current settings of the high order POH (path overhead) of the background channels.

Example

:SOUR:DATA:SDH:BPOV:DATA? C2
Response: 128 C2 byte is set to 80hex.

:SOUR:DATA[:TEL]:SDH:BPOV:DATA:BLOC

:SOURce:DATA[:TELecom]:SDH:BPOVerhead:DATA:BLOCk <J1>, <B3>, <C2>, <G1>, <F2>, <H4>, <F3>, <K3>, <N1> sets all 9 bytes of the VC4 (STS3CSPE)/VC3 (STS1SPE) high order POH (path overhead) of the background channels.

Parameter

Nine successive <numeric> values are expected, which set the complete POH.

Name	Type	Range	Default
J1	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
B3	numeric	Automatically generated --> should be set to 0	0
C2	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
G1	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
F2	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
H4	numeric	Automatically generated --> should be set to #HFF	#HFF
F3	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
K3(Z4)	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
N1	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none

Dependencies

Continuous alarms can also be generated here.
Error/alarm insertion has higher priority and overwrites static settings!

Comments

B3 and the H4 byte of the POH cannot be set since their values are automatically generated.

Example

:SOUR:DATA:SDH:BPOV:DATA:BLOC 0,0,4,0,0,#HFF,0,0,0

Related commands

:SOUR:DATA[:TEL]:SDH:BPOV:DATA on page R-140

:SOUR:DATA[:TEL]:SDH:BPOV:DATA:BLOC?

:SOURce:DATA[:TELecom]:SDH:BPOVerhead:DATA:BLOCk? provides the current settings of the 9 bytes of the VC4 (STS3CSPE)/VC3 (STS1SPE) high oder POH (path overhead) of the background channels.

Example
:SOUR:DATA:SDH:BPOV:DATA:BLOC?
Response: 0,0,4,0,0,255,0,0,0

:SOUR:DATA[:TEL]:SDH:BPOV:HPTR

:SOURce:DATA[:TELecom]:SDH:BPOVerhead:HPTRace <mode>, <trace> determines the cyclical path trace string and mode in the J1 high path trace (J1 byte of the VC4 (STS3CSPE)/VC3 (STS1SPE)) of all background channels.

Parameter

Name	Type	Range	Default
mode	discrete	NONE | TRC16	TRC16
trace	string	Strings with a length from 1 to 15 bytes	“WG HP-TRACE”

Dependencies None

Comments <mode>

NONE: Path trace is switched off. The byte J1, which is set by :SOUR:DATA[:TEL]:SDH:BPOV:DATA on page R-140, is transmitted statically.

TRC16: The string of up to 15 characters is automatically completed for frame synchronization and error checking with the 16th byte using CRC-7.

<trace>: All printable characters are allowed (7 bit ASCII). If the string is shorter than the maximum length, it is padded with blanks (20hex). Non-printing characters can be set using the UNIX shell conventions:

\n --> new line character
\r --> CR character
\b --> back space character
\t --> TAB character
\0 --> 0 HEX character
\\ --> \ character
\001 --> 01 HEX character in octal notation

Example
:SOUR:DATA:SDH:BPOV:HPTR TRC16, “Hello World”
“Hello World” is cyclically transmitted in the J1 trace.

Related commands :SOUR:DATA[:TEL]:SDH:BPOV:DATA on page R-140

:SOUR:DATA[:TEL]:SDH:BPOV:HPTR?

:SOURce:DATA[:TELecom]:SDH:BPOVerhead:HPTRace? provides the current setting for the J1 high path trace in the J1 byte of the VC3 (STS1SPE)/VC4 (STS3CSPE) POH.

Example

:SOUR:DATA:SDH:BPOV:HPTR?
Response: TRC16,"Hello World"
for "Hello World" in the 16 byte trace.

:SOUR:DATA[:TEL]:SDH:BPOV:PRES

:SOURce:DATA[:TELecom]:SDH:BPOVerhead:PRESet sets the VC4 (STS3CSPE)/ VC3 (STS1SPE) POH overhead bytes of the background channel to their default values.

Parameter

None

Comments

Standard overhead (hex)

POH bytes	Value
J1	00
B3	XX
C2	02
G1	00
F2	00
H4	FF
F3	00
K3(Z4)	00
N1	00

XX: Inserted by parity formation (B3)
YY: Automatically filled through H4 sequence (H4)
There is no query for this command.

Example

:SOUR:DATA:SDH:BPOV:PRES

Related commands

:SOUR:DATA[:TEL]:SDH:TRIB:BPOV:PRES on page R-231

:SOUR:DATA[:TEL]:SDH:CHAN

:SOURce:DATA[:TELecom]:SDH:CHANnel <grp1_no>[, <grp2_no>, <trib_no>]
determines the active SDH measurement channel within the active STM-1 of an STM-N signal.

Parameter

Name	Type	Range	Default
grp1_no	numeric	1 - 3	1
grp2_no	numeric	1 - 7	1
trib_no	numeric	1 - 3 (3 x TU12/VT2) 1 - 4 (4 x TU11/VT1.5)	1

Dependencies

Valid only if a mapping was selected which contains **multiple** containers as a payload with the command :SOUR:DATA[:TEL]:SDH:MAPP on page R-168 (if only one container is present, e.g. with the C4 or STS3CSPE mapping, then it automatically becomes the measurement channel, and this CHANnel command is meaningless).

Comments

This command applies to the selection of the measurement channel if more than 1 channel (container) is contained in the SDH output signal.
The <grp1_no> parameter determines the TUG3 or AU3 number of the SDH signal or the STS1 number within the STS3 of the SONET signal.
The <grp2_no> parameter determines the TUG2 number of the SDH signal or the VT-group number of the SONET signal.
The <trib_no> parameter determines the TU number within the TUG2 of the SDH signal or the VT-number within the VT-group of the SONET signal.
The first parameter <grp1_no> is sufficient for C3 mappings.

The channel setting 1 to 12/48/192 for OC12/OC48/OC192 can be made in two stages:
:SOUR:DATA[:TEL]:SDH:STMN:CHAN = <stmn-channel>
:SOUR:DATA[:TEL]:SDH:CHAN = <grp1_no>
where the channel number is:
oc 3/12/48/192_no = 3 x stmn_no + grp1_no -3

OC	1	2	3	4	5	6	7	8	9	10	11	12	13	…	192
STMN	1	1	1	2	2	2	3	3	3	4	4	4	5	…	64
grp1	1	2	3	1	2	3	1	2	3	1	2	3	1	…	3

Alternatively, the channels of the ANSI structures for OC3/12/48/192 can be set with the commands
:SOUR:DATA[:TEL]:SDH:STSN:CHAN on page R-218
:SOUR:DATA[:TEL]:SDH:STSV:CHAN on page R-219.

Example

:SOUR:DATA:SDH:CHAN 1,2,3
sets the active measurement channel to the 3rd tributary of the 2nd TUG2 in the 1st TUG3 (assumes mapping = STM1 with 63xVC12).
:SOUR:DATA:SDH:CHAN 3
sets the active measurement channel to the 3rd VC3 (STS1SPE) (assumes mapping = STM1(STS3) with 3 VC3 (STS1SPE).

Related commands
:SOUR:DATA[:TEL]:SDH:RATE on page R-213
:SOUR:DATA[:TEL]:SDH:MAPP on page R-168
:SOUR:DATA[:TEL]:SDH:STMN:CHAN on page R-217
:SOUR:DATA[:TEL]:SDH:STSN:CHAN on page R-218
:SOUR:DATA[:TEL]:SDH:STSV:CHAN on page R-219

:SOUR:DATA[:TEL]:SDH:CHAN?

:SOURce:DATA[:TELecom]:SDH:CHANnel? provides the current channel selection of the SDH output signal.

Example
:SOUR:DATA:SDH:CHAN?
Response: 1,2,3
SDH: Measurement channel is in the 3rd tributary of the 2nd TUG2 in the 1st TUG3. SONET: Measurement channel is in the 3rd tributary of the 2nd VT group in the 1st STS1SPE.

:SOUR:DATA[:TEL]:SDH:CONC:DPO2

:SOURce:DATA[:TELecom]:SDH:CONCatenate:DPOinter <value> determines the virtual concatenated delta pointer value of POH #2.

Parameter

Name	Type	Range	Default
value	numeric	-40 to 40	0

Dependencies :SOUR:DATA[:TEL]:SDH:MAPP:CONC[:MODE] on page R-170 must be set to VIRTual.

Comments In the case of “virtual concatenation”, this command can be used to set the pointer offset of the 2nd POH relative to the pointer of the 1st POH. The pointer of the 1st POH represents the “guide pointer”. If the guide pointer changes, e.g. due to pointer actions (see also :SOUR:DATA[:TEL]:SDH:POIN[:ACT] on page R-198), the pointer for POH #2 also always changes simultaneously. However, the difference between the guide pointer and the pointer of the 2nd POH always conforms to the value set with this command.

Example:

Pointer for 1st POH = 100 and delta pointer for 2nd POH = -10, so the absolute pointer value of the 2nd POH is 90. If the value of the guide pointer now changes to 101, then the value of the 2nd pointer will be 91.

Example :SOUR:DATA:SDH:CONC:DPO2 10 sets the delta pointer value to 10.

Related commands :SOUR:DATA[:TEL]:SDH:CONC:POIN[:ACT] on page R-149

:SOUR:DATA[:TEL]:SDH:CONC:DPO2?

:SOURce:DATA[:TELecom]:SDH:CONCatenate:DPOinter2? provides the virtual concatenated delta pointer value of POH #2.

Example :SOUR:DATA:SDH:CONC:DPO2?
Response: 10

:SOUR:DATA[:TEL]:SDH:CONC:DPO3

:SOURce:DATA[:TELecom]:SDH:CONCatenate:DPOinter <value> determines the virtual concatenated delta pointer value of POH #3.

Parameter

Name	Type	Range	Default
value	numeric	-40 to 40	0

Dependencies: :SOUR:DATA[:TEL]:SDH:MAPP:CONC[:MODE] on page R-170 must be set to VIRTual.

Comments: In the case of “virtual concatenation”, this command can be used to set the pointer offset of the 3rd POH relative to the pointer of the 1st POH. The pointer of the 1st POH represents the “guide pointer”. If the guide pointer changes, e.g. due to pointer actions (see also :SOUR:DATA[:TEL]:SDH:POIN[:ACT] on page R-198), the pointer for POH #3 also always changes simultaneously. However, the difference between the guide pointer and the pointer of the 3rd POH always conforms to the value set with this command.

Example:

Pointer for 1st POH = 100 and delta pointer for 3rd POH = -10, so the absolute pointer value of the 3rd POH is 90. If the value of the guide pointer now changes to 101, then the value of the 3rd pointer will be 91.

Example: :SOUR:DATA:SDH:CONC:DPO3 10 sets the delta pointer value to 10.

Related commands: :SOUR:DATA[:TEL]:SDH:CONC:POIN[:ACT] on page R-149

:SOUR:DATA[:TEL]:SDH:CONC:DPO3?

:SOURce:DATA[:TELecom]:SDH:CONCatenate:DPOinter3? provides the virtual concatenated delta pointer value of POH #3.

Example: :SOUR:DATA:SDH:CONC:DPO3?
Response: 10

:SOUR:DATA[:TEL]:SDH:CONC:DPO4

:SOURce:DATA[:TELecom]:SDH:CONCatenate:DPOinter <value> determines the virtual concatenated delta pointer value of POH #4.

Parameter

Name	Type	Range	Default
value	numeric	-40 to 40	0

Dependencies :SOUR:DATA[:TEL]:SDH:MAPP:CONC[:MODE] on page R-170 must be set to VIRTual.

Comments In the case of “virtual concatenation”, this command can be used to set the pointer offset of the 4th POH relative to the pointer of the 1st POH. The pointer of the 1st POH represents the “guide pointer”. If the guide pointer changes, e.g. due to pointer actions (see also :SOUR:DATA[:TEL]:SDH:POIN[:ACT] on page R-198), the pointer for POH #4 also always changes simultaneously. However, the difference between the guide pointer and the pointer of the 4th POH always conforms to the value set with this command.

Example:

Pointer for 1st POH = 100 and delta pointer for 4th POH = -10, so the absolute pointer value of the 4th POH is 90. If the value of the guide pointer now changes to 101, then the value of the 4th pointer will be 91.

Example :SOUR:DATA:SDH:CONC:DPO4 10 sets the delta pointer value to 10.

Related commands :SOUR:DATA[:TEL]:SDH:CONC:POIN[:ACT] on page R-149

:SOUR:DATA[:TEL]:SDH:CONC:DPO4?

:SOURce:DATA[:TELecom]:SDH:CONCatenate:DPOinter4? provides the virtual concatenated delta pointer value of POH #4.

Example :SOUR:DATA:SDH:CONC:DPO4?
Response: 10

:SOUR:DATA[:TEL]:SDH:CONC:POIN[:ACT]

:SOURce:DATA[:TELecom]:SDH:CONCatenate:POINter[:ACTion] <action> sets the AU/STS (administrative unit) pointer actions in the case of virtual concatenation of multiple containers.

Parameter

Name	Type	Range	Default
action	discrete	NONE | NPOinter	NONE

Dependencies

:SOUR:DATA[:TEL]:SDH:MAPP:CONC[:MODE] on page R-170 must be set to VIRTual.

:SOUR:DATA[:TEL]:SDH:POIN[:ACT] on page R-198 must be set to NONE, as AU/STS pointer actions are not allowed at the same time.

Comments

NONE: No pointer actions
NPOinter: New virtual concatenation delta pointer values as set by :SOUR:DATA[:TEL]:SDH:CONC:DPO2, :SOUR:DATA[:TEL]:SDH:CONC:DPO3, :SOUR:DATA[:TEL]:SDH:CONC:DPO4 are activated.

Note: The run-time of this pointer setting command depends on the difference between old and new pointer values and may take up to 0.7 s. Use bit 0 of the :STAT:SEQ register to synchronize your controller.

Example

:SOUR:DATA:SDH:CONC:POIN NPO sets new delta pointer values.

Related commands

:SOUR:DATA[:TEL]:SDH:CONC:DPO2 on page R-146
:SOUR:DATA[:TEL]:SDH:CONC:DPO3 on page R-147
:SOUR:DATA[:TEL]:SDH:CONC:DPO4 on page R-148

:SOUR:DATA[:TEL]:SDH:CONC:POIN[:ACT]?

:SOURce:DATA[:TELecom]:SDH:CONCatenate:POINter[:ACTion]? provides the current setting of the concatenated delta pointer action.

Comments

<NPO> is a volatile state and cannot be read with the query.

Example

:SOUR:DATA:SDH:CONC:POIN?
Response: NONE

:SOUR:DATA[:TEL]:SDH:CONC:POV2:DATA

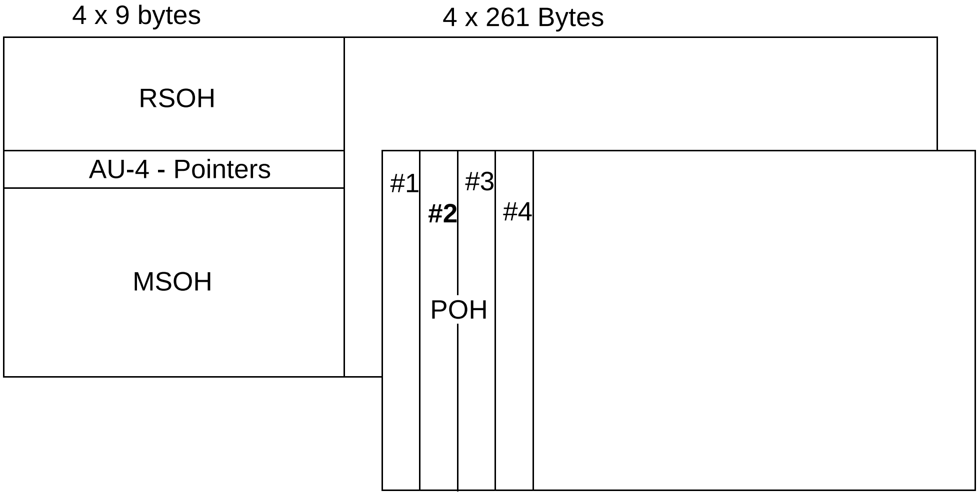
:SOURce:DATA[:TELecom]:SDH:CONCatenate:POVerhead2:DATA <byte>, <value> sets bytes of the virtual concatenated POH # 2(path overhead).

Parameter

Name	Type	Range	Default
byte	discrete	J1 | C2 | G1 | F2 | F3| K3(Z4) | N1	none
value	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none

Dependencies: :SOUR:DATA[:TEL]:SDH:MAPP:CONC[:MODE] on page R-170 must be set to VIRTual.

Comments: This command allows individual setting of the designated POH bytes. For the default setting, see :SOUR:DATA[:TEL]:SDH:CONC:POV2:PRES on page R-153.
POH # 1 can be set with the command :SOUR:DATA[:TEL]:SDH:POV:DATA on page R-208.



Example: :SOUR:DATA:SDH:CONC:POV2:DATA C2, #H34 sets C2 byte to 34hex.

Related commands:
:SOUR:DATA[:TEL]:SDH:CONC:POV2:DATA:BLOC on page R-151
:SOUR:DATA[:TEL]:SDH:CONC:POV2:PRES on page R-153
:SOUR:DATA[:TEL]:SDH:CONC:POV2:MODE on page R-152

:SOUR:DATA[:TEL]:SDH:CONC:POV2:DATA?

:SOURce:DATA[:TELecom]:SDH:CONCatenate:POVerhead2:DATA? <byte> provides the current settings of individual virtual concatenated POH # 2 bytes.

Example: :SOUR:DATA:SDH:CONC:POV2:DATA? C2
Response: 128 C2 byte is set to 80hex.

:SOUR:DATA[:TEL]:SDH:CONC:POV2:DATA:BLOC

:SOURce:DATA[:TELecom]:SDH:CONCatenate:POVerhead2:DATA:BLOCk <J1>, <B3>,<C2>, <G1>, <F2>, <H4>, <F3>, <K3>, <N1> sets all 9 bytes of the virtual concatenated POH #2 (path overhead).

Parameter

Nine successive numeric values are expected, which set the complete POH.

Name	Type	Range	Default
J1	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
B3	numeric	automatically generated --> should be set to 0	0
C2	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
G1	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
F2	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
H4	numeric	automatically generated --> should be set to #HFF	#HFF
F3	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
K3(Z4)	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
N1	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none

Dependencies

Continuous alarms can also be generated here.
Error/alarm insertion has higher priority and overwrites static settings!
:SOUR:DATA[:TEL]:SDH:MAPP:CONC[:MODE] on page R-170 must be set to VIRTual.

Comments

The B3 and H4 bytes of the POH cannot be set since their values are automatically generated.POH # 1 can be set with the command :SOUR:DATA[:TEL]:SDH:POV:DATA:BLOC on page R-209.

Example

:SOUR:DATA:SDH:CONC:POV2:DATA:BLOC 0,0,4,0,0,#HFF,0,0,0

Related commands

:SOUR:DATA[:TEL]:SDH:CONC:POV2:DATA on page R-150

:SOUR:DATA[:TEL]:SDH:CONC:POV2:DATA:BLOC?

:SOURce:DATA[:TELecom]:SDH:CONCatenate:POVerhead2:DATA:BLOCk? provides the current settings of the 9 bytes of the virtual concatenated POH #2 (path overhead).

Example

:SOUR:DATA:SDH:CONC:POV2:DATA:BLOC?
Response: 0,0,4,0,0,255,0,0,0

:SOUR:DATA[:TEL]:SDH:CONC:POV2:MODE

:SOURce:DATA[:TELecom]:SDH:CONCatenate:POVerhead2:MODE <mode> sets the mode of POH # 2 (path overhead) in the case of virtual concatenation.

Parameter

Name	Type	Range	Default
mode	discrete	FIX | DUPLicate	DUPL

Dependencies :SOUR:DATA[:TEL]:SDH:MAPP:CONC[:MODE] on page R-170 must be set to VIRTual.

Comments

FIX: Individual POH bytes as set by the command :SOUR:DATA[:TEL]:SDH:CONC:POV2:DATA on page R-150 are inserted into the POH #2.

DUPLicate: The 9 byte path overhead as in POH # 1 is duplicated into POH #2. Note: Any path trace that is possibly activated will also be copied.

Example :SOUR:DATA:SDH:CONC:POV2:MODE DUPL

Related commands :SOUR:DATA[:TEL]:SDH:CONC:POV2:DATA on page R-150.

:SOUR:DATA[:TEL]:SDH:CONC:POV2:MODE?

:SOURceDATA[:TELecom]:SDH:CONCatenate:POVerhead2:MODE? provides the current mode of the POH # 2 (path overhead) in the case of virtual concatenation.

Example :SOUR:DATA:SDH:CONC:POV2:MODE?
Response: FIX

:SOUR:DATA[:TEL]:SDH:CONC:POV2:PRES

:SOURce:DATA[:TELecom]:SDH:CONCatenate:POVerhead:PRESet sets the virtual concatenated overhead bytes in POH # 2 to their default values.

Dependencies
:SOUR:DATA[:TEL]:SDH:MAPP:CONC[:MODE] on page R-170 must be set to VIRTual.

Parameter
None

Comments
Standard overhead (hex):

POH bytes of POH # 1 - 4	Value
J1	00
B3	XX
C2	02
G1	00
F2	00
H4	YY
F3	00
K3(Z4)	00
N1	00

XX: Inserted by parity formation (B3)
YY: Automatically filled through H4 sequence (H4).
There is no query for this command.

Example
:SOUR:DATA:SDH:CONC:POV2:PRES

Related commands
None

:SOUR:DATA[:TEL]:SDH:CONC:POV3:DATA

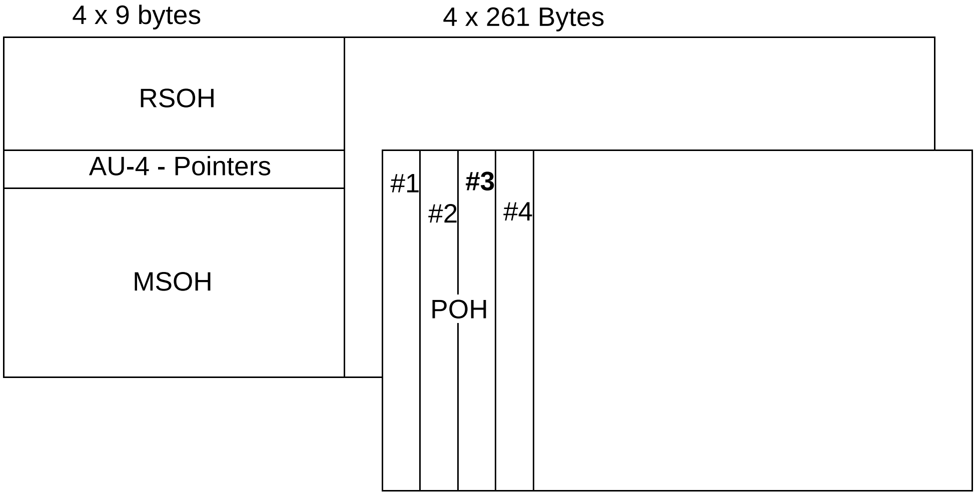
:SOURce:DATA[:TELecom]:SDH:CONCatenate:POVerhead3:DATA <byte>, <value> sets bytes of the virtual concatenated POH # 3 (path overhead).

Parameter

Name	Type	Range	Default
byte	discrete	J1 | C2 | G1 | F2 | F3| K3(Z4) | N1	none
value	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none

Dependencies — :SOUR:DATA[:TEL]:SDH:MAPP:CONC[:MODE] on page R-170 must be set to VIRTual.

Comments — This command allows individual setting of the designated POH bytes. For the default setting, see :SOUR:DATA[:TEL]:SDH:CONC:POV3:PRES on page R-157.
POH # 1 can be set with the command :SOUR:DATA[:TEL]:SDH:POV:DATA on page R-208.



Example — :SOUR:DATA:SDH:CONC:POV3:DATA C2, #H34 — sets C2 byte to 34hex.

Related commands
:SOUR:DATA[:TEL]:SDH:CONC:POV3:DATA:BLOC on page R-155
:SOUR:DATA[:TEL]:SDH:CONC:POV3:PRES on page R-157
:SOUR:DATA[:TEL]:SDH:CONC:POV3:MODE on page R-156

:SOUR:DATA[:TEL]:SDH:CONC:POV3:DATA?

:SOURce:DATA[:TELecom]:SDH:CONCatenate:POVerhead3:DATA? <byte> provides the current settings of individual virtual concatenated POH # 3 bytes.

Example — :SOUR:DATA:SDH:CONC:POV3:DATA? C2
Response: 128 — C2 byte is set to 80hex.

:SOUR:DATA[:TEL]:SDH:CONC:POV3:DATA:BLOC

:SOURce:DATA[:TELecom]:SDH:CONCatenate:POVerhead3:DATA:BLOCk <J1>, <B3>,<C2>, <G1>, <F2>, <H4>, <F3>, <K3>, <N1> sets all 9 bytes of the virtual concatenated POH # 3 (path overhead).

Parameter

Nine successive numeric values are expected, which set the complete POH.

Name	Type	Range	Default
J1	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
B3	numeric	automatically generated --> should be set to 0	0
C2	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
G1	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
F2	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
H4	numeric	automatically generated --> should be set to #HFF	#HFF
F3	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
K3(Z4)	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
N1	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none

Dependencies

Continuous alarms can also be generated here.
Error/alarm insertion has higher priority and overwrites static settings!
:SOUR:DATA[:TEL]:SDH:MAPP:CONC[:MODE] on page R-170 must be set to VIRTual.

Comments

The B3 and H4 bytes of the POH cannot be set since their values are automatically generated. POH # 1 can be set with the command :SOUR:DATA[:TEL]:SDH:POV:DATA:BLOC on page R-209.

Example

:SOUR:DATA:SDH:CONC:POV3:DATA:BLOC 0,0,4,0,0,#HFF,0,0,0

Related commands

:SOUR:DATA[:TEL]:SDH:CONC:POV3:DATA on page R-154

:SOUR:DATA[:TEL]:SDH:CONC:POV3:DATA:BLOC?

:SOURce:DATA[:TELecom]:SDH:CONCatenate:POVerhead3:DATA:BLOCk? provides the current settings of the 9 bytes of the virtual concatenated POH # 3 (path overhead).

Example

:SOUR:DATA:SDH:CONC:POV3:DATA:BLOC?
Response: 0,0,4,0,0,255,0,0,0

:SOUR:DATA[:TEL]:SDH:CONC:POV3:MODE

:SOURce:DATA[:TELecom]:SDH:CONCatenate:POVerhead3:MODE <mode> sets the mode of POH # 3 (path overhead) in the case of virtual concatenation.

Parameter

Name	Type	Range	Default
mode	discrete	FIX | DUPLicate	DUPL

Dependencies :SOUR:DATA[:TEL]:SDH:MAPP:CONC[:MODE] on page R-170 must be set to VIRTual.

Comments

FIX: Individual POH bytes as set by the command :SOUR:DATA[:TEL]:SDH:CONC:POV3:DATA on page R-154 are inserted into the POH #3.

DUPLicate: The 9 byte path overhead as in POH # 1 is duplicated into POH #3. Note: Any path trace that is possibly activated will also be copied.

Example :SOUR:DATA:SDH:CONC:POV3:MODE DUPL

Related commands :SOUR:DATA[:TEL]:SDH:CONC:POV3:DATA on page R-154.

:SOUR:DATA[:TEL]:SDH:CONC:POV3:MODE?

:SOURceDATA[:TELecom]:SDH:CONCatenate:POVerhead3:MODE? provides the current mode of the POH # 3 (path overhead) in the case of virtual concatenation.

Example :SOUR:DATA:SDH:CONC:POV3:MODE?
Response: FIX

:SOUR:DATA[:TEL]:SDH:CONC:POV3:PRES

:SOURce:DATA[:TELecom]:SDH:CONCatenate:POVerhead:PRESet sets the virtual concatenated overhead bytes in POH # 3 to their default values.

Dependencies :SOUR:DATA[:TEL]:SDH:MAPP:CONC[:MODE] on page R-170 must be set to VIRTual.

Parameter None

Comments Standard overhead (hex):

POH bytes of POH # 1 - 4	Value
J1	00
B3	XX
C2	02
G1	00
F2	00
H4	YY
F3	00
K3(Z4)	00
N1	00

XX: Inserted via parity formation (B3)
YY: Automatically filled through H4 sequence (H4).
There is no query for this command.

Example :SOUR:DATA:SDH:CONC:POV3:PRES

Related commands None

:SOUR:DATA[:TEL]:SDH:CONC:POV4:DATA

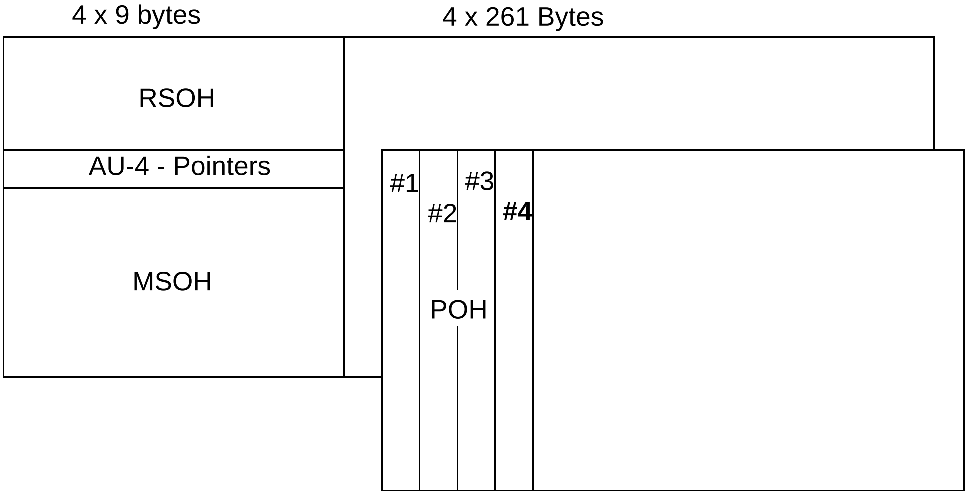
:SOURce:DATA[:TELecom]:SDH:CONCatenate:POVerhead4:DATA <byte>, <value> sets bytes of the virtual concatenated POH # 4 (path overhead).

Parameter

Name	Type	Range	Default
byte	discrete	J1 | C2 | G1 | F2 | F3| K3(Z4) | N1	none
value	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none

Dependencies :SOUR:DATA[:TEL]:SDH:MAPP:CONC[:MODE] on page R-170 must be set to VIRTual.

Comments This command allows individual setting of the designated POH bytes. For the default setting, see :SOUR:DATA[:TEL]:SDH:CONC:POV4:PRES on page R-161. POH # 1 can be set with the command :SOUR:DATA[:TEL]:SDH:POV:DATA on page R-208.



Example :SOUR:DATA:SDH:CONC:POV4:DATA C2, #H34 sets C2 byte to 34hex.

Related commands :SOUR:DATA[:TEL]:SDH:CONC:POV4:DATA:BLOC on page R-159
:SOUR:DATA[:TEL]:SDH:CONC:POV4:PRES on page R-161
:SOUR:DATA[:TEL]:SDH:CONC:POV4:MODE on page R-160

:SOUR:DATA[:TEL]:SDH:CONC:POV4:DATA?

:SOURce:DATA[:TELecom]:SDH:CONCatenate:POVerhead4:DATA? <byte> provides the current settings of individual virtual concatenated POH # 4 bytes.

Example :SOUR:DATA:SDH:CONC:POV4:DATA? C2
Response: 128 C2 byte is set to 80hex.

:SOUR:DATA[:TEL]:SDH:CONC:POV4:DATA:BLOC

:SOURce:DATA[:TELecom]:SDH:CONCatenate:POVerhead4:DATA:BLOCk <J1>, <B3>,<C2>, <G1>, <F2>, <H4>, <F3>, <K3>, <N1> sets all 9 bytes of the virtual concatenated POH # 4 (path overhead).

Parameter

Nine successive numeric values are expected, which set the complete POH.

Name	Type	Range	Default
J1	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
B3	numeric	automatically generated --> should be set to 0	0
C2	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
G1	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
F2	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
H4	numeric	automatically generated --> should be set to #HFF	#HFF
F3	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
K3(Z4)	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
N1	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none

Dependencies

Continuous alarms can also be generated here.
Error/alarm insertion has higher priority and overwrites static settings!
:SOUR:DATA[:TEL]:SDH:MAPP:CONC[:MODE] on page R-170 must be set to VIRTual.

Comments

The B3 and H4 bytes of the POH cannot be set since their values are automatically generated. POH # 1 can be set with the command :SOUR:DATA[:TEL]:SDH:POV:DATA:BLOC on page R-209.

Example

:SOUR:DATA:SDH:CONC:POV4:DATA:BLOC 0,0,4,0,0,#HFF,0,0,0

Related commands

:SOUR:DATA[:TEL]:SDH:CONC:POV4:DATA on page R-158

:SOUR:DATA[:TEL]:SDH:CONC:POV4:DATA:BLOC?

:SOURce:DATA[:TELecom]:SDH:CONCatenate:POVerhead4:DATA:BLOCk? provides the current settings of the 9 bytes of the virtual concatenated POH # 4 (path overhead).

Example

:SOUR:DATA:SDH:CONC:POV4:DATA:BLOC?
Response: 0,0,4,0,0,255,0,0,0

:SOUR:DATA[:TEL]:SDH:CONC:POV4:MODE

:SOURce:DATA[:TELecom]:SDH:CONCatenate:POVerhead4:MODE <mode> sets the mode of POH # 4 (path overhead) in the case of virtual concatenation.

Parameter

Name	Type	Range	Default
mode	discrete	FIX | DUPLicate	DUPL

Dependencies: :SOUR:DATA[:TEL]:SDH:MAPP:CONC[:MODE] on page R-170 must be set to VIRTual.

Comments

FIX: Individual byte POH bytes as set by the command :SOUR:DATA[:TEL]:SDH:CONC:POV2:DATA on page R-150 are inserted into the POH #4.

DUPLicate: The 9 byte path overhead as in POH # 1 is duplicated into POH #4. Note: Any path trace that is possibly activated will also be copied.

Example: :SOUR:DATA:SDH:CONC:POV4:MODE DUPL

Related commands: :SOUR:DATA[:TEL]:SDH:CONC:POV4:DATA on page R-158.

:SOUR:DATA[:TEL]:SDH:CONC:POV4:MODE?

:SOURceDATA[:TELecom]:SDH:CONCatenate:POVerhead4:MODE? provides the current mode of the POH # 4 (path overhead) in the case of virtual concatenation.

Example: :SOUR:DATA:SDH:CONC:POV4:MODE?
Response: FIX

:SOUR:DATA[:TEL]:SDH:CONC:POV4:PRES

:SOURce:DATA[:TELecom]:SDH:CONCatenate:POVerhead4:PRESet sets the virtual concatenated overhead bytes in POH # 4 to their default values.

Dependencies :SOUR:DATA[:TEL]:SDH:MAPP:CONC[:MODE] on page R-170 must be set to VIRTual.

Parameter None

Comments Standard overhead (hex):

POH bytes of POH # 1 - 4	Value
J1	00
B3	XX
C2	02
G1	00
F2	00
H4	YY
F3	00
K3(Z4)	00
N1	00

XX: Inserted via parity formation (B3)
YY: Automatically filled through H4 sequence (H4).
There is no query for this command.

Example :SOUR:DATA:SDH:CONC:POV4:PRES

Related commands None

:SOUR:DATA[:TEL]:SDH:ERR:FLEN

:SOURce:DATA[:TELecom]:SDH:ERRor:FLENgth <activeframes>, <inactiveframes> defines the length of error sequences.

Parameter

Name	Type	Range	Default
activeframes	numeric	1 - 4800000 1 - 480000 1) 1 - 256000 2)	1
inactiveframes	numeric	1 - 4800000	9

Dependencies

Continuous errors can also be set by intentionally setting the overhead bytes. Error insertion has higher priority and overwrites static bytes!

1) For STM16/OC48; option 90.53, 90.54 or 90.59 only
2) For STM4/OC12; option 90.46, 90.47 or 90.48 only

Comments

activeframes = number of frames in which the error is generated
inactiveframes = number of frames in which no error is generated
1 frame = 125 µs

Example

:SOUR:DATA:SDH:ERR:FLEN 5,10
specifies the following sequence: Error is present in 5 frames, followed by 10 frames without an error and so on.

Related commands

:SOUR:DATA[:TEL]:SDH:ERR[:MODE] on page R-165

:SOUR:DATA[:TEL]:SDH:ERR:FLEN?

:SOURce:DATA[:TELecom]:SDH:ERRor:FLENgth? provides the current setting of the error sequence.

Example

:SOUR:DATA:SDH:ERR:FLEN?
Response: 10,100
Error is present in 10 frames, followed by 100 frames without an error.

:SOUR:DATA[:TEL]:SDH:ERR:MASK:HBIP

:SOURce:DATA[:TELecom]:SDH:ERRor:MASK:HBIP <mask> inserts an errored bit into the B3 byte of every SDH frame at the position defined by the bit(s) set to 1 in <mask>.

Parameter

Name	Type	Range	Default
mask	numeric	#H00 - #HFF or #B00000000 - #B 11111111 or 0 - 255	0

Dependencies — Only valid if :SOUR:DATA[:TEL]:SDH:ERR[:MODE] <mode> = STATic

Comments — Used e.g. in Tandem Connection Monitoring for insertion of B3 error in every frame.

Example — :SOUR:DATA:SDH:ERR:MASK:HBIP 129

Related commands — :SOUR:DATA[:TEL]:SDH:ERR:MASK:LBIP on page R-164
:SOUR:DATA[:TEL]:SDH:ERR[:MODE] on page R-165

:SOUR:DATA[:TEL]:SDH:ERR:MASK:HBIP?

:SOURce:DATA[:TELecom]:SDH:ERRor:MASK:HBIP? provides the current setting of <mask>.

Example — :SOUR:DATA:SDH:ERR:MASK:HBIP?
Response: 128

:SOUR:DATA[:TEL]:SDH:ERR:MASK:LBIP

:SOURce:DATA[:TELecom]:SDH:ERRor:MASK:LBIP <mask> inserts an errored bit into the V5 byte of every 4th SDH frame at the position defined by the bit(s) set to 1 in <mask>.

Parameter

Name	Type	Range	Default
mask	numeric	#H00 - #H03 or #B00000000 - #B 00000011 or 0 - 3	0

Dependencies: Only valid if :SOUR:DATA[:TEL]:SDH:ERR[:MODE] <mode> = STATic

Comments: Used e.g. in Tandem Connection Monitoring for insertion of B3 error in every frame.

Example: :SOUR:DATA:SDH:ERR:MASK:LBIP 129

Related commands: :SOUR:DATA[:TEL]:SDH:ERR:MASK:HBIP on page R-163
:SOUR:DATA[:TEL]:SDH:ERR[:MODE] on page R-165

:SOUR:DATA[:TEL]:SDH:ERR:MASK:LBIP?

:SOURce:DATA[:TELecom]:SDH:ERRor:MASK:LBIP? provides the current setting of <mask>.

Example: :SOUR:DATA:SDH:ERR:MASK:LBIP?
Response: 129

:SOUR:DATA[:TEL]:SDH:ERR[:MODE]

:SOURce:DATA[:TELecom]:SDH:ERRor[:MODE] <error>, <mode> determines the error insertion into the SDH signal.

Parameter

Name	Type	Range CEPT	Range ANSI	Default
error	discrete	FAS | RSBIP | MSBIP | MSREI | HPREI | HPBIP | LPREI | LPBIP	FAS | B1 | B2 | REIL | REIP | B3 | REIV | BIP2 | BIPV	FAS
mode	discrete	NONE | ONCE | RATE | PER | STAT		NONE

Dependencies

Continuous errors can also be set by intentionally setting the overhead bytes. Error insertion has higher priority and overwrites static bytes!

Comments

Description: CEPT notation

<err> =

FAS: Error insertion into frame alignment bytes A1 and A2 (not possible in STM-4/STM-16 signals).

RSBIP: Error insertion into regenerator section BIP.

MSBIP: Error insertion in multiplex section BIP.

MSREI: Error insertion into section REI (FEBE) (Remote Error Indication in M1 byte of the STM1 signal). This M1 byte contains the B2 error value as reported back.

HPREI: Error insertion into High Path REI (FEBE).

HPBIP: Error insertion into High Path BIP (B3).

LPREI: Error insertion into Low Path REI (FEBE) (Remote Error Indication in bit 3 of the V5 byte).

LPBIP: Error insertion into Low Path BIP (bits 1-2 in the V5 byte)

Description: ANSI notation

<err> =

FAS: Error insertion into frame alignment bytes (A1 & A2).

B1: Error insertion into regenerator section BIP.

B2: Error insertion in multiplex section BIP.

REIL: Error insertion into section REI Line (FEBE) (Remote Error) Indication in Z2 byte of the STS1 signal. This Z2 byte contains the B2 error value as reported back.

REIP: Error insertion into REI STS Path (FEBE) (Remote Error Indication).

B3: Error insertion into High Path BIP.

REIV: Error insertion into REI VT-Path (FEBE) (Remote Error Indication in bit 3 of the V5 byte).

BIPV: Error insertion into BIP2 VT-Path (bits 1-2 in the V5 byte).

<mode> =

NONE:	No error insertion.
ONCE:	Insertion of a single error.
RATE:	Error rate as set by :SOUR:DATA[:TEL]:SDH:ERR:RATE on page R-167.
PERiodical:	Periodic execution of the error sequence as set by :SOUR:DATA[:TEL]:SDH:ERR:FLEN on page R-162
STATic:	Static error insertion into B3, V5 byte at bit position determined by :SOUR:DATA[:TEL]:SDH:ERR:MASK:HBIP on page R-163, :SOUR:DATA[:TEL]:SDH:ERR:MASK:LBIP on page R-164 Only available in container types AU-4/AU-3

Example
:SOUR:DATA:SDH:ERR FAS, ONCE
generates a single frame alignment signal error.

Related commands
:SOUR:DATA[:TEL]:SDH:ERR:RATE on page R-167

:SOUR:DATA[:TEL]:SDH:ERR[:MODE]?

:SOURce:DATA[:TELecom]:SDH:ERRor[:MODE]? provides the current setting of the error insertion.

Comments
ONCE is a volatile state and cannot be read with this query.

Note: The corresponding command accepts the ITU-T and ANSI notation. The query however always returns the ITU-T notation.

Example
:SOUR:DATA:SDH:ERR?
Response: FAS,RATE
if a frame alignment byte error rate is activated.

:SOUR:DATA[:TEL]:SDH:ERR:RATE

:SOURce:DATA[:TELecom]:SDH:ERRor:RATE <rate> defines the error rate for error insertion.

Parameter

Name	Type	Range	Default
rate	NR3	2E-3 to 1E-10 depends on error type and bit rate	1E-6

Dependencies

Error rate is active only if :SOUR:DATA[:TEL]:ATM:ERR:HEAD[:MODE] on page R-68 is set to <mode> = RATE.

Comments

The set rate corresponds to the equivalent bit error rate!

Error type	Range
FAS	2E-3 to 1E-10
RSBIP (B1)	2E-4 to 1E-10 2E-5 to 1E-8 (for STM16/OC48)
MSBIP (B2)	2E-3 to 1E-10 1E-3 to 1E-8 (for STM16/OC48)
MSREI (REI-L)	2E-3 to 1E-10 1E-3 to 1E-8 (for STM16/OC48)
HPBIP (B3)	2E-4 to 1E-10
HPREI (REI-L)	2E-4 to 1E-10
LPBIP (BIP-V)	2E-4 to 1E-10
LPREI (REI-V)	2E-4 to1E-10

Example

:SOUR:DATA:SDH:ERR:RATE 1E-5 Error rate = 1×10^{-5}

Related commands

:SOUR:DATA[:TEL]:SDH:ERR[:MODE] on page R-165

:SOUR:DATA[:TEL]:SDH:ERR:RATE?

:SOURce:DATA[:TELecom]:SDH:ERRor:RATE? provides the current error rate setting.

Example

:SOUR:DATA:SDH:ERR:RATE?
Response: 2E-5 Error rate = 2×10^{-5}

:SOUR:DATA[:TEL]:SDH:MAPP

:SOURce:DATA[:TELecom]:SDH:MAPPing <mapping> determines the mapping of the SDH signal.

Parameter

Name	Type	Range CEPT	Range ANSI	Default
mapping	discrete	C4 | C3 | C2 | C12 | C11 | C11TU12	STS3CSPE | STS1SPE | VT6 | VT2 | VT1_5	C12 (VT2)

Dependencies

CEPT mapping: :SOUR:DATA[:TEL]:STAN = ITUT, BELL
ANSI mapping: :SOUR:DATA[:TEL]:STAN = ANSI, <version>

Setting the <mapping> will also set the following parameters:
:SOUR:DATA[:TEL]:SDH:CHAN
all channels are set to 1.
:SOUR:DATA[:TEL]:SDH:TRIB:MAPP
set to ASYN if <mapping> not C12 or VT2.
:SOUR:DATA[:TEL]:PDH:RATE
<outputrate> set according to <mapping>.
:SOUR:DATA[:TEL]:SDH:POV:HSEQ
set to SFRM if mapping = C12 or VT2.
:SOUR:DATA[:TEL]:SDH:TRIB:POV:LPTR
set to NONE if <mapping> = C4 or STS3CSPE.
All overheads and path overheads are set to default.

Example

:SOUR:DATA:SDH:MAPP C12

Related commands

:SOUR:DATA[:TEL]:SDH:RATE on page R-213
:SOUR:DATA[:TEL]:SDH:MAPP:TUFL on page R-172
:SOUR:DATA[:TEL]:SDH:PAYL:TYPE on page R-195

:SOUR:DATA[:TEL]:SDH:MAPP?

:SOURce:DATA[:TELecom]:SDH:MAPPing? provides the current setting of the SDH signal mapping.

Note: The corresponding command accepts the ITU-T and ANSI notation. The query however always returns the ITU-T notation.

Example

:SOUR:DATA:SDH:MAPP?
Response: C12
for homogeneous mapping of 63 C12 containers in the STM-1.

:SOUR:DATA[:TEL]:SDH:MAPP:OFFS

:SOURce:DATA[:TELecom]:SDH:MAPPing:OFFSet <value> determines the mapping offset of the SDH signal.

Parameter

Name	Type	Range	Default
value	numeric	-100 to +100	0

Dependencies
Valid only if :SOUR:DATA[:TEL]:SDH:PAYL:TYPE = PDH,
:SOUR:DATA[:TEL]:SDH:TRIB:MAPP = ASYNcron and
:SOUR:DATA[:TEL]:PAYL:SOUR = INTernal

Comments
This parameter controls the settings of the VC stuff bits, used for adapting the frequency deviation of the PDH signal while mapped into the container.
Setting is in ppm (parts per million)

Example
:SOUR:DATA:SDH:MAPP:OFFS -50
specifies the offset of the mapping as -50 ppm.

Related commands
:SOUR:DATA[:TEL]:SDH:MAPP on page R-168
:SOUR:DATA[:TEL]:SDH:PAYL:TYPE on page R-195
:SOUR:DATA[:TEL]:SDH:TRIB:MAPP on page R-235

:SOUR:DATA[:TEL]:SDH:MAPP:OFFS?

:SOURce:DATA[:TELecom]:SDH:MAPPing:OFFSet? provides the current setting of the SDH signal mapping offset.

Example
:SOUR:DATA:SDH:MAPP:OFFS?
Response: -50 for mapping offset = -50 ppm.

:SOUR:DATA[:TEL]:SDH:MAPP:CONC[:MODE]

:SOURce:DATA[:TELecom]:SDH:MAPPing:CONCatenate <mode> determines mapping of the concatenation mode emulated by the STM-4 transmit signal.

Parameter

Name	Type	Range	Default
mode	discrete	NONE | CONTiguous | VIRTual	NONE

Dependencies

Only valid if :SOUR:DATA[:TEL]:SDH:RATE = STM4 /STS12 or
:SOUR:DATA[:TEL]:SDH:RATE = STM16 /STS-48.
Requires option 90.90 or 90.91 and 90.92.
VIRT not valid for STM-16/OC-48.
:SOUR:DATA[:TEL]:SDH:MAPP = C4 is required for CONT or VIRT.

Comments

NONE: The transmitter is in no concatenation mode.
CONTiguous: The transmitter is in contiguous concatenation mode (only possible if option 90.90 or 90.91 is installed).
VIRTual: The transmitter is in virtual concatenation mode (only possible if option 90.90 or 90.91 and additional option 90.92 is installed).

Example

:SOUR:DATA:SDH:MAPP:CONC CONT

Related commands

:SOUR:DATA[:TEL]:SDH:MAPP:CONC:CSIZ on page R-171
:SOUR:DATA[:TEL]:SDH:MAPP:CONC:CSIZ on page R-171
:SOUR:DATA[:TEL]:SDH:CONC:DPO2 on page R-146
:SOUR:DATA[:TEL]:SDH:CONC:DPO2? on page R-146
:SOUR:DATA[:TEL]:SDH:CONC:DPO3 on page R-147
:SOUR:DATA[:TEL]:SDH:CONC:DPO3? on page R-147
:SOUR:DATA[:TEL]:SDH:CONC:DPO4 on page R-148
:SOUR:DATA[:TEL]:SDH:CONC:DPO4? on page R-148

:SOUR:DATA[:TEL]:SDH:MAPP:CONC[:MODE]?

The query :SOURce:DATA[:TELecom]:SDH:MAPPing:CONCatenate? delivers the current setting for the concatenation mode of the transmit signal.

Example

:SOUR:DATA:SDH:MAPP:CONC?
Response: VIRT

:SOUR:DATA[:TEL]:SDH:MAPP:CONC:CSIZ

:SOURce:DATA[:TELecom]:SDH:MAPPing:CONCatenate:CSIZe <size> determines the mapping of VC4_16C (STS48C_SPE) or VC4_4C (STS12C_SPE) into STM-16 (OC-48) or STM-64 (OC-192).

Parameter

Name	Type	Range CEPT	Range ANSI	Default
size	discrete	VC4_16C | VC4_4C	STS48C_SPE | STS12C_SPE	VC4_16C (STS48C_SPE)

Dependencies
VC_4C requires option 90.90 or 90.91
VC_16C requires option 90.93

Comments
STM16:
See part 10 “Concatenated Mappings” in the “Option File Manual”.
VC4_16C Container filled with 1 x VC4_16C (1 x STS48C_SPE).
VC4_4C Container filled with 4 x VC4-4C (4 x STS12C_SPE).
STM64:
See part 10 “Concatenated Mappings” in the “Option File Manual”.
VC4_16C Container filled with 4 x VC4_16C (4 x STS48C_SPE).
VC4_4C Container filled with 16 x VC4-4C (16 x STS12C_SPE).

Example
:SOUR:DATA:SDH:MAPP:CONC:CSIZE VC4_4C

Related commands
:SOUR:DATA[:TEL]:SDH:MAPP:CONC[:MODE] on page R-170

:SOUR:DATA[:TEL]:SDH:MAPP:CONC:CSIZ?

The query :SOURce:DATA[:TELecom]:SDH:MAPPing:CONCatenate:CSIZe? delivers the current setting of the transmit signal concatenation size.

Example
:SOUR:DATA:SDH:MAPP:CONC:CSIZ?
Response: VC4_4C

:SOUR:DATA[:TEL]:SDH:MAPP:TUFL

:SOURce:DATA[:TELecom]:SDH:MAPPing:TUFLoating <mapping> determines the mapping of the TU (Tributary Unit) of the STM-1/4 signal.

Parameter

Name	Type	Range	Default
mapping	discrete	AU4 | AU3	AU4

Dependencies Use only if :SOUR:DATA[:TEL]:STAN = ITUT.

Comments
AU4: Mapping via AU4 (Administrative Unit) in the STM1/4 signal.
AU3: Mapping via AU3 (Administrative Unit) in the STM1/4 signal.

Example :SOUR:DATA:SDH:MAPP:TUFL AU4

Related commands
:SOUR:DATA[:TEL]:SDH:RATE on page R-213
:SOUR:DATA[:TEL]:SDH:MAPP on page R-168

:SOUR:DATA[:TEL]:SDH:MAPP:TUFL?

:SOURce:DATA[:TELecom]:SDH:MAPPing:TUFLoating? provides the current setting of the TU mapping in the STM-1/4 signal.

Example :SOUR:DATA:SDH:MAPP:TUFL?
Response: AU3

Overview :SOUR:DATA[:TEL]:SDH:OVER[i]: ... commands

The following figure gives an overview of the different commands needed to modify the SOH/TOH of the SDH/SONET signal.

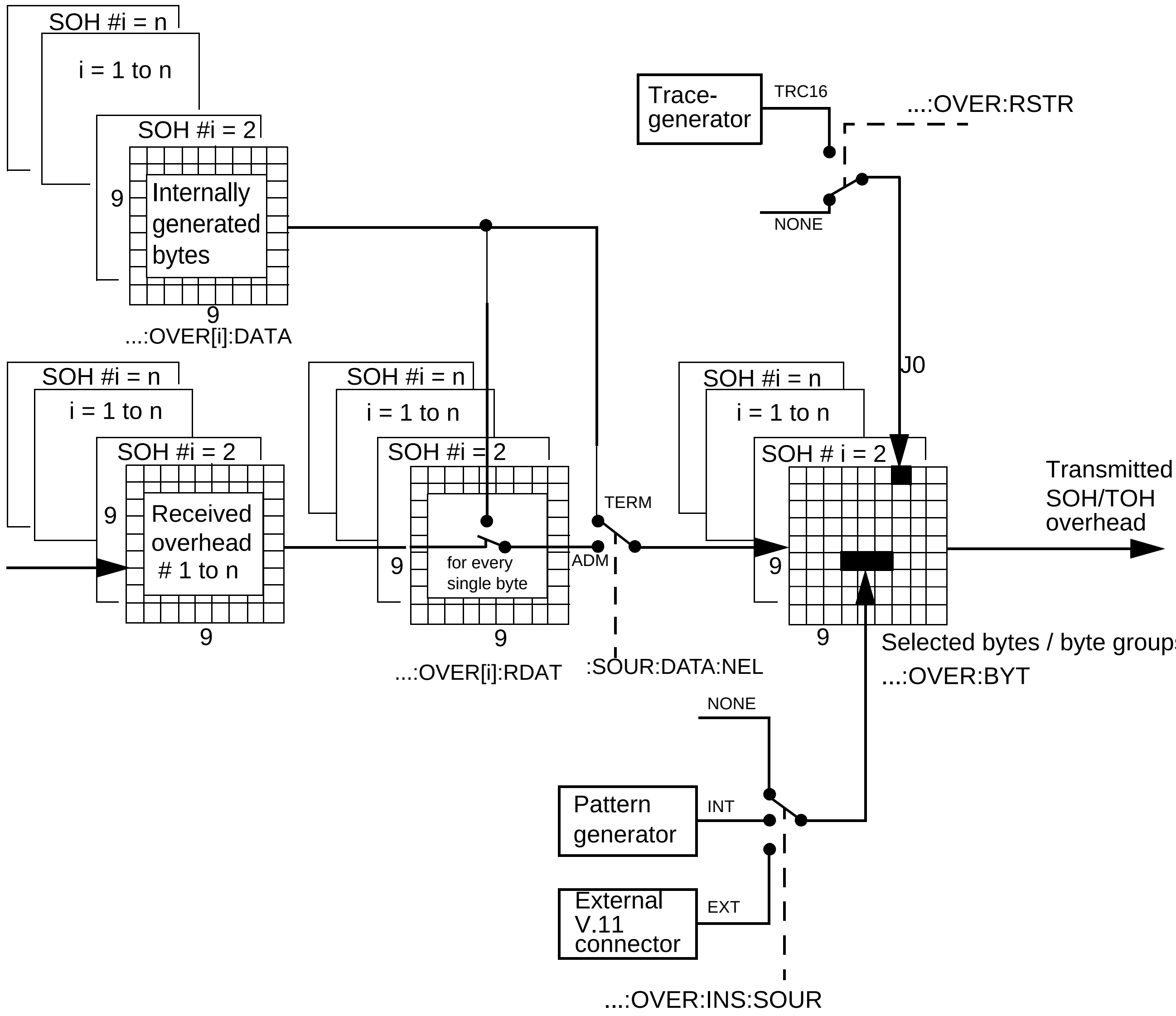


Fig. R-5 Overview :SOUR:DATA[:TEL]:SDH:OVER[i]:... commands

Note: The 9 x 9 overhead array SOH/TOH # 1 in the above figure is used for STM1/STS3 and STM16/OC48 using options 90.50, 90.51, 90.53, 90.54 or 90.59 (older STM16/ OC48 hardware options).
For STM16/OC48 using options 91.53, 91.54 or 91.59, the numerical suffix i is used to select SOH/ TOH array # i, where i = 1 to 16 (STM16c/OC48c hardware options) or STM64/OC192, where i = 1 to 64 when using options 91.40, 91.41 (STM64/OC192 Tx hardware options).
For STM4/OC12, the arrays are set with the commands under node ... :STMN:OVER: ... (only one 9 x 36 SOH/TOH array).

:SOUR:DATA[:TEL]:SDH:OVER:BYT

:SOURce:DATA[:TELecom]:SDH:OVERhead:BYTes <bytes> determines the bytes or byte groups in which data insertion is to take place.

Parameter

Name	Type	Range	Default
bytes	discrete	SDCC | LDCC | J0(C1) | J1 | J1L | J2 | E1 | E2 | F1 | F2 | F2L | K1K2 | K3(Z4) | K3L(Z4L) | K4(Z6) | N1 | N1L | N2 | C2 | C2L	SDCC

Dependencies :SOUR:DATA[:TEL]:SDH:OVER:INS[:SOUR] = INT is not allowed for the K1, K2, K3, K3L, K4 bytes.

Comments

SDCC:	Data insertion into section DCC (D1 - D3 bytes).
LDCC:	Data insertion into line DCC (D4 - D12 bytes).
J0(C1):	Data extraction from J0 byte (Path Trace)
J1:	Data extraction from J1 byte (Path Trace) of the High Path POH
J1L:	Data extraction from J1L byte (Path Trace) of the Low Path POH
J2:	Data extraction from J2 byte (Path Trace) of the Low Path POH
E1:	Data insertion into E1 byte (Section Orderwire).
E2:	Data insertion into E2 byte (Line Orderwire).
F1:	Data insertion into F1 byte (User Channel).
F2:	Data insertion into F2 byte (Path User Channel) of the High Path POH.
F2L:	Data insertion into F2 byte (Path User Channel) of the Low Path POH.
K1K2:	Data insertion into K1K2 bytes.
K3(Z4):	Data insertion into K3 (Z4) byte of the High Path POH.
K3L(Z4L):	Data insertion into K3 (Z4) byte of the Low Path POH.
K4(Z6):	Data insertion into K4 (Z6) byte.
N1:	Data insertion into N1 (Z5) byte (Path User Channel) of the High Path POH.
N1L:	Data insertion into N1 (Z5) byte (Path User Channel) of the Low Path POH.
N2:	Data insertion into N2 (Z6) byte.
C2:	Data extraction from C2 (Signal Label) of the High Path POH
C2L:	Data extraction from C2 (Signal Label) of the Low Path POH

Example :SOUR:DATA:SDH:OVER:BYT E1 for data insertion into E1 byte.

Related commands :SOUR:DATA[:TEL]:SDH:OVER:INS[:SOUR] on page R-178

:SOUR:DATA[:TEL]:SDH:OVER:BYT?

:SOURce:DATA[:TELecom]:SDH:OVERhead:BYTes? provides the current setting of the byte selection.

Example :SOUR:DATA:SDH:OVER:BYT?
Response: LDCC
for insertion into line DCC channel (D4 to D12 bytes of the SOH).

:SOUR:DATA[:TEL]:SDH:OVER[i]:DATA

:SOURce:DATA[:TELecom]:SDH:OVERhead[i]:DATA <line>, <col>, <value> sets bytes of the STM0/1/16 (STS1/3/48) SOH/TOH (Section/Transport Overhead). The numerical suffix i selects SOH/TOH # i for STM16/OC48 when using options 91.53, 91.54 or 91.59 (STM16c/OC48c hardware options) or STM64/OC192 when using options 91.40, 91.41 (STM64/OC192 Tx hardware options).

Parameter

Name	Type	Range	Default
line	numeric	1 - 9	none
col	numeric	1 - 9	none
value	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none

Dependencies

Continuous alarms/errors can also be generated here.
Error/alarm insertion has higher priority and overwrites static settings.
The numerical suffix i is only valid when STM16c/OC48c or STM64/OC192 hardware options are fitted (see above).

Comments

This command allows individual setting of the SOH/TOH overhead bytes.

<line>: Line number in 9 x 9 array of the STM0/1/16/STS1/3/48 overhead.

<col>: Column (see table) number in 9 x 9 array of STM0/1/16/STS1/3/48 overhead.

<value>: Value for byte designated by <line>,<col>.

For STS1/OC1 or OC48 signals, only columns 1, 4, 7 should be used.
The valid range of values for the numerical suffix i is 1 to 16 for STM16/OC48 or 1 to 64 for STM64/OC192.

Byte table:

	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7	Col. 8	Col. 9
Line 1	A1	A1	A1	A2	A2	A2	C1	—	—
Line 2	B1	—	—	E1	—	—	F1	—	—
Line 3	D1	—	—	D2	—	—	D3	—	—
Line 4	H1	Y	Y	H2	—	—	H3	H3	H3
Line 5	B2	B2	B2	K1	—	—	K2	—	—
Line 6	D4	—	—	D5	—	—	D6	—	—
Line 7	D7	—	—	D8	—	—	D9	—	—
Line 8	D10	—	—	D11	—	—	D12	—	—
Line 9	S1	Z1	Z1	Z2	Z2	M1	E2	—	—

Note: The B1, B2 bytes are generated through parity formation and cannot be altered.

For STM-16/OC48 signals when using option 90.50, 90.51, 90.53, 90.54 or 90.59 the overhead can only be set for the first of the 16/48 overhead channels. The A1, A2, B1, B2 bytes and all bytes in line 4 cannot be altered.

Example

:SOUR:DATA:SDH:OVER:DATA 1,7,#h34	sets C1 byte in SOH/TOH # 1 to 34hex.
SOUR:DATA:SDH:OVER[16]:DATA 1,6,#h55	sets the last A2 byte in SOH/TOH # 16 to 55hex (only valid with STM16c/OC48c hardware options).

Related commands :SOUR:DATA[:TEL]:SDH:OVER[i]:DATA:BLOC on page R-177

:SOUR:DATA[:TEL]:SDH:OVER[i]:DATA?

:SOURce:DATA[:TELecom]:SDH:OVERhead[i]:DATA?<line>,<col> provides the current settings of individual overhead bytes in the SOH/TOH. The numerical suffix i selects SOH/TOH # i for STM16/OC48 when using options 91.53, 91.54 or 91.59 (STM16c/OC48c hardware options) or STM64/OC192 when using options 91.40, 91.41 (STM64/OC192 Tx hardware options).

Example

:SOUR:DATA:SDH:OVER:DATA? 1,8
Response: 128 D10 byte is set to 80hex.

:SOUR:DATA[:TEL]:SDH:OVER[i]:DATA:BLOC

:SOURce:DATA[:TELecom]:SDH:OVERhead:DATA:BLOCk <line1col1>, <line1col2>, …, <line9col9> sets all 81 bytes of the SOH/TOH (Section Overhead/ Transport Overhead). The numerical suffix i selects SOH/TOH # i for STM16/OC48 when using options 91.53, 91.54 or 91.59 (STM16c/OC48c hardware options) or STM64/OC192 when using options 91.40, 91.41 (STM64/OC192 Tx hardware options).

Parameter

81 successive <numeric> values are expected which set the complete SOH/TOH. The 9 bytes of the 1st line are to be entered first, then the 2nd through 9th lines.

Name	Type	Range	Default
all 81 bytes of the SOH/TOH	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none

Dependencies

Continuous alarms can also be generated here.
Error/alarm insertion has higher priority and overwrites static settings!
The numerical suffix i is only valid when STM16c/OC48c or STM64/OC192 hardware options are fitted (see above).

Comments

The B1, B2 bytes are automatically generated through parity formation and cannot be altered. These bytes should be set to 0.
The valid range of values for the numerical suffix i is 1 to 16 for STM16/OC48 or 1 to 64 for STM64/OC192.

Example

```
:SOUR:DATA:SDH:OVER:DATA:BLOC
#hf6,#hf6,#hf6,#h28,#h28,#h28,0,#haa,#haa,   <1st line>
0,0,0,0,0,0,0,0,0,                           <2nd line>
0,0,0,0,0,0,0,0,0,                           <3rd line>
#h6a,#h9b,#h9b,10,0,0,0,0,0,                 <4th line>
0,0,0,0,0,0,0,0,0,                           <5th line>
0,0,0,0,0,0,0,0,0,                           <6th line>
0,0,0,0,0,0,0,0,0,                           <7th line>
0,0,0,0,0,0,0,0,0,                           <8th line>
0,0,0,0,0,0,0,0,0                            <9th line>
```

Related commands

:SOUR:DATA[:TEL]:SDH:OVER[i]:DATA on page R-175

:SOUR:DATA[:TEL]:SDH:OVER[i]:DATA:BLOC?

:SOURce:DATA[:TELecom]:SDH:OVERhead[i]:DATA:BLOCk? provides the current settings of all overhead bytes in the SOH/TOH. The numerical suffix i selects SOH/TOH # i for STM16/OC48 when using options 91.53, 91.54 or 91.59 (STM16c/OC48c hardware options) or STM64/OC192 when using options 91.40, 91.41 (STM64/OC192 Tx hardware options).

Example :SOUR:DATA:SDH:OVER:DATA:BLOC?

246,246,246,40,40,40,0,170,170,	<1st line>
0,0,0,0,0,0,0,0,0,	<2nd line>
0,0,0,0,0,0,0,0,0,	<3rd line>
106,155,155,10,0,0,0,0,0,	<4th line>
0,0,0,0,0,0,0,0,0,	<5th line>
0,0,0,0,0,0,0,0,0,	<6th line>
0,0,0,0,0,0,0,0,0,	<7th line>
0,0,0,0,0,0,0,0,0,	<8th line>
0,0,0,0,0,0,0,0,0	<9th line>

:SOUR:DATA[:TEL]:SDH:OVER:INS[:SOUR]

:SOURce:DATA[:TELecom]:SDH:OVERhead:INSert[:SOURce] <source> sets data insertion into the bytes or byte groups specified using :SOUR:DATA[:TEL]:SDH:OVER:BYT on page R-174.

Parameter

Name	Type	Range	Default
source	discrete	NONE | INTernal | EXTernal	NONE

Dependencies
<source> = INT | EXT overwrites the static overhead bytes.
For <source> = INT and :SOUR:DATA[:TEL]:SDH:RATE = STM16 :SOUR:DATA[:TEL]:SDH:STMN:CHAN on page R-217 must be set to 1.

Comments
NONE: No data insertion
INTernal: Internal pseudo-random bit sequence PRBS11 is inserted
EXTernal: Data from the external V.11 interface are inserted

Example
:SOUR:DATA:SDH:OVER:INS EXT
inserts data from external V.11 interface.

Related commands :SOUR:DATA[:TEL]:SDH:OVER:BYT on page R-174

:SOUR:DATA[:TEL]:SDH:OVER:INS[:SOUR]?

:SOURce:DATA[:TELecom]:SDH:OVERhead:INSert[:SOURce]? provides the current setting of the data insertion.

Example
:SOUR:DATA:SDH:OVER:INS?
Response: INT for insertion of an internal PRBS11 signal.

:SOUR:DATA[:TEL]:SDH:OVER[i]:PRES

:SOURce:DATA[:TELecom]:SDH:OVERhead[i]:PRESet sets all overhead bytes to their default values. The numerical suffix i selects SOH/TOH # i for STM16/OC48 when using options 91.53, 91.54 or 91.59 (STM16c/OC48c hardware options) or STM64/OC192 when using options 91.40, 91.41 (STM64/OC192 Tx hardware options).

Parameter None

Comments Standard overhead (hex) ITU-T STM1-AU4, STM16-AU4 or STM64-AU4:

SOH									
	1	2	3	4	5	6	7	8	9
1	A1 F6	A1 F6	A1 F6	A2 28	A2 28	A2 28	J0 01	— AA	— AA
2	B1 XX	— 00	— 00	E1 00	— 00	— 00	F1 00	— 00	— 00
3	D1 00	— 00	— 00	D2 00	— 00	— 00	D3 00	— 00	— 00
4	H1 68	Y 9B	Y 9B	H2 00	— FF	— FF	H3 00	H3 00	H3 00
5	B2 XX	B2 XX	B2 XX	K1 00	— 00	— 00	K2 00	— 00	— 00
6	D4 00	— 00	— 00	D5 00	— 00	— 00	D6 00	— 00	— 00
7	D7 00	— 00	— 00	D8 00	— 00	— 00	D9 00	— 00	— 00
8	D10 00	— 00	— 00	D11 00	— 00	— 00	D12 00	— 00	— 00
9	S1 00	Z1 00	Z1 00	Z2 00	Z2 00	M1 00	E2 00	— 00	— 00

Comments Standard overhead (hex) ANSI STS3C, STS48/OC48 or STS192/OC192 with STS3C:

TOH									
	1	2	3	4	5	6	7	8	9
1	A1 F6	A1 F6	A1 F6	A2 28	A2 28	A2 28	C1 01	— 02	— 03
2	B1 XX	— 00	— 00	E1 00	— 00	— 00	F1 00	— 00	— 00
3	D1 00	— 00	— 00	D2 00	— 00	— 00	D3 00	— 00	— 00
4	H1 60	Y 93	Y 93	H2 00	— FF	— FF	H3 00	H3 00	H3 00
5	B2 XX	B2 XX	B2 XX	K1 00	— 00	— 00	K2 00	— 00	— 00
6	D4 00	— 00	— 00	D5 00	— 00	— 00	D6 00	— 00	— 00
7	D7 00	— 00	— 00	D8 00	— 00	— 00	D9 00	— 00	— 00
8	D10 00	— 00	— 00	D11 00	— 00	— 00	D12 00	— 00	— 00
9	S1 00	Z1 00	Z1 00	Z2 00	Z2 00	M1 00	E2 00	— 00	— 00

Comments

Standard overhead (hex) ITU-T STM1-AU3, STM16-AU3 or STM64-AU3:

S O H									
	1	2	3	4	5	6	7	8	9
1	A1 F6	A1 F6	A1 F6	A2 28	A2 28	A2 28	J0 01	— AA	— AA
2	B1 XX	— 00	— 00	E1 00	— 00	— 00	F1 00	— 00	— 00
3	D1 00	— 00	— 00	D2 00	— 00	— 00	D3 00	— 00	— 00
4	H1 68	H1 68	H1 68	H2 00	H2 00	H2 00	H3 00	H3 00	H3 00
5	B2 XX	B2 XX	B2 XX	K1 00	— 00	— 00	K2 00	— 00	— 00
6	D4 00	— 00	— 00	D5 00	— 00	— 00	D6 00	— 00	— 00
7	D7 00	— 00	— 00	D8 00	— 00	— 00	D9 00	— 00	— 00
8	D10 00	— 00	— 00	D11 00	— 00	— 00	D12 00	— 00	— 00
9	S1 00	Z1 00	Z1 00	Z2 00	Z2 00	M1 00	E2 00	— 00	— 00

Comments

Standard overhead (hex) ANSI STS3, STS48/OC48 or STS192/OC192:

T O H									
	1	2	3	4	5	6	7	8	9
1	A1 F6	A1 F6	A1 F6	A2 28	A2 28	A2 28	C1 01	— 02	— 03
2	B1 XX	— 00	— 00	E1 00	— 00	— 00	F1 00	— 00	— 00
3	D1 00	— 00	— 00	D2 00	— 00	— 00	D3 00	— 00	— 00
4	H1 60	H1 60	H1 60	H2 00	H2 00	H2 00	H3 00	H3 00	H3 00
5	B2 XX	B2 XX	B2 XX	K1 00	— 00	— 00	K2 00	— 00	— 00
6	D4 00	— 00	— 00	D5 00	— 00	— 00	D6 00	— 00	— 00
7	D7 00	— 00	— 00	D8 00	— 00	— 00	D9 00	— 00	— 00
8	D10 00	— 00	— 00	D11 00	— 00	— 00	D12 00	— 00	— 00
9	S1 00	Z1 00	Z1 00	Z2 00	Z2 00	M1 00	E2 00	— 00	— 00

Comments

Standard overhead (hex) ITU-T STM0:

S O H			
	1	4	7
1	A1 F6	A2 28	J0 01
2	B1 XX	E1 00	F1 00
3	D1 00	D2 00	D3 00
4	H1 68	H2 00	H3 00
5	B2 XX	K1 00	K2 00
6	D4 00	D5 00	D6 00
7	D7 00	D8 00	D9 00
8	D10 00	D11 00	D12 00
9	S1 00	Z2 00	E2 00

Comments

Standard overhead (hex) ANSI STS1:

T O H			
	1	4	7
1	A1 F6	A2 28	C1 01
2	B1 XX	E1 00	F1 00
3	D1 00	D2 00	D3 00
4	H1 60	H2 00	H3 00
5	B2 XX	K1 00	K2 00
6	D4 00	D5 00	D6 00
7	D7 00	D8 00	D9 00
8	D10 00	D11 00	D12 00
9	S1 00	Z2 00	E2 00

XX: Inserted via parity formation (B1, B2)

There is no query for this command.

Example

:SOUR:DATA:SDH:OVER:PRES

Related commands

:SOUR:DATA[:TEL]:SDH:OVER[i]:DATA on page R-175

:SOUR:DATA[:TEL]:SDH:OVER[i]:RDAT

:SOURce:DATA[:TELecom]:SDH:OVERhead[i]:RDATa <line>, <col>, <value>
selects the replaced overhead bytes of the STM0/1/16 (STS1/3/48) SOH/TOH (Section/Transport Overhead). The numerical suffix i selects SOH/TOH # i for STM16/OC48 when using options 91.53, 91.54 or 91.59 (STM16c/OC48c hardware options) or STM64/OC192 when using options 91.40, 91.41 (STM64/OC192 Tx hardware options).

Parameter

Name	Type	Range	Default
line	numeric	1 - 9	none
col	numeric	1 - 9	none
value	numeric	0 - 1	none

Dependencies

Only valid if :SOUR:DATA[:TEL]:NEL = ADM.
The B1, B2, M1 bytes are always terminated and reconstructed by this instrument and cannot be replaced in the way described here.
The A1, A2 bytes of the STM16 (OC48) signal are always terminated and reconstructed by this instrument and cannot be replaced in the way described here.
The numerical suffix i is only valid when STM16c/OC48c or STM64/OC192 hardware options are fitted (see above).

Comments

In “Through” mode, this command determines the bytes being switched through transparently by the receiver or the bytes being overwritten by the transmitter.

<line>: Line number in 9 x 9 array of the STM-1/STS3 overhead
<col>: Column (see table) number in 9 x 9 array of STM-1/STS-3 overhead
<value>: 0: Byte is taken from RX
1: Byte is replaced by the TX byte value set by :SOUR:DATA[:TEL]:SDH:OVER[i]:DATA on page R-175

For STM0/STS1/OC1 or OC48 signals only columns 1, 4, 7 should be used.
The valid range of values for the numerical suffix i is 1 to 16 for STM16/OC48 or 1 to 64 for STM64/OC192.

Byte table:

	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7	Col. 8	Col. 9
Line 1	A1	A1	A1	A2	A2	A2	C1	—	—
Line 2	B1	—	—	E1	—	—	F1	—	—
Line 3	D1	—	—	D2	—	—	D3	—	—
Line 4	H1	Y	Y	H2	—	—	H3	H3	H3
Line 5	B2	B2	B2	K1	—	—	K2	—	—
Line 6	D4	—	—	D5	—	—	D6	—	—
Line 7	D7	—	—	D8	—	—	D9	—	—
Line 8	D10	—	—	D11	—	—	D12	—	—
Line 9	S1	Z1	Z1	Z2	Z2	M1	E2	—	—

Note: For STM-16/OC48 signals the overhead can only be set for the first of the 16/48 overhead channels!

Example :SOUR:DATA:SDH:OVER:RDAT 1,7,1 C1 byte not from RX.

Related commands
:SOUR:DATA[:TEL]:SDH:OVER[i]:DATA on page R-175
:SOUR:DATA[:TEL]:SDH:OVER[i]:DATA:BLOC on page R-177
:SOUR:DATA[:TEL]:NEL on page R-86
:SOUR:DATA[:TEL]:SDH:OVER[i]:RDAT:BLOC on page R-183
:SOUR:DATA[:TEL]:SDH:STMN:OVER:RDAT on page R-226

:SOUR:DATA[:TEL]:SDH:OVER[i]:RDAT?

:SOURce:DATA[:TELecom]:SDH:OVERhead[i]:RDATa?<line>,<col> provides the current setting of the replaced overhead bytes of the STM0/1/16 (STS1/3/48) SOH/TOH (Section/Transport Overhead). The numerical suffix i selects SOH/TOH # i for STM16/OC48 when using options 91.53, 91.54 or 91.59 (STM16c/OC48c hardware options) or STM64/OC192 when using options 91.40, 91.41 (STM64/OC192 Tx hardware options).

Example :SOUR:DATA:SDH:OVER:RDAT? 1,8
Response: 1 D10 is replaced.

:SOUR:DATA[:TEL]:SDH:OVER[i]:RDAT:BLOC

:SOURce:DATA[:TELecom]:SDH:OVERhead[i]:RDATa:BLOCk <line1col1>, <line1col2>, …, <line9col9> selects the replaced overhead bytes of the complete STM0/1/16 (STS1/3/48) SOH/TOH (Section/Transport Overhead). The numerical suffix i selects SOH/TOH # i for STM16/OC48 when using options 91.53, 91.54 or 91.59 (STM16c/OC48c hardware options) or STM64/OC192 when using options 91.40, 91.41 (STM64/OC192 Tx hardware options).

Parameter 81 successive <numeric> values are expected which set the complete SOH/TOH. The 9 bytes of the 1st line are to be entered first, then the 2nd through 9th lines.

Name	Type	Range	Default
all 81 bytes of the SOH/TOH	numeric	0 - 1	none

Dependencies Only valid if :SOUR:DATA[:TEL]:NEL = ADM.
The B1, B2, M1 bytes are always terminated and reconstructed by this instrument and cannot be replaced in the way described here. They must be set to 1.
The A1, A2 bytes of the STM16 (OC48) signal are always terminated and reconstructed by this instrument and cannot be replaced in the way described here. They must be set to 1.
The numerical suffix i is only valid when STM16c/OC48c or STM64/OC192 hardware options are fitted (see above).

Comments

In “Through” mode, this command determines the bytes being switched through transparently by the receiver or the bytes being overwritten by the transmitter.

<values>: 0: byte is taken from RX
1: byte is replaced by the TX byte value set by :SOUR:DATA[:TEL]:SDH:OVER[i]:DATA on page R-175.

Even for STM0/OC1 all 81 bytes must be set, but only columns 1,4,7 are significant. The valid range of values for the numerical suffix i is 1 to 16 for STM16/OC48 or 1 to 64 for STM64/OC192.

Example

:SOUR:DATA:SDH:OVER:RDAT:BLOC
1,1,1,1,1,1,0,1,1, <1st line>
0,0,0,0,0,0,0,0,0, <2nd line>
0,0,0,0,0,0,0,0,0, <3rd line>
1,1,1,1,0,0,0,0,0, <4th line>
0,0,0,0,0,0,0,0,0, <5th line>
0,0,0,0,0,0,0,0,0, <6th line>
0,0,0,0,0,0,0,0,0, <7th line>
0,0,0,0,0,0,0,0,0, <8th line>
0,0,0,0,0,0,0,0,0 <9th line>

Related commands

:SOUR:DATA[:TEL]:SDH:OVER[i]:DATA on page R-175
:SOUR:DATA[:TEL]:SDH:OVER[i]:DATA:BLOC on page R-177
:SOUR:DATA[:TEL]:NEL on page R-86
:SOUR:DATA[:TEL]:SDH:OVER[i]:RDAT on page R-182

:SOUR:DATA[:TEL]:SDH:OVER[i]:RDAT:BLOC?

:SOURce:DATA[:TELecom]:SDH:OVERhead[i]:RDATa:BLOCk? provides the current setting of the replaced overhead bytes of the complete STM0/1/16 (STS1/3/48) SOH/TOH (Section/Transport Overhead). The numerical suffix i selects SOH/TOH # i for STM16/OC48 when using options 91.53, 91.54 or 91.59 (STM16c/OC48c hardware options) or STM64/OC192 when using options 91.40, 91.41 (STM64/OC192 Tx hardware options).

Example

:SOUR:DATA:SDH:OVER:RDAT:BLOC?
Response:
1,1,1,1,1,1,0,1,1, <1st line>
0,0,0,0,0,0,0,0,0, <2nd line>
0,0,0,0,0,0,0,0,0, <3rd line>
1,1,1,1,0,0,0,0,0, <4th line>
0,0,0,0,0,0,0,0,0, <5th line>
0,0,0,0,0,0,0,0,0, <6th line>
0,0,0,0,0,0,0,0,0, <7th line>
0,0,0,0,0,0,0,0,0, <8th line>
0,0,0,0,0,0,0,0,0 <9th line>

:SOUR:DATA[:TEL]:SDH:OVER:RSTR

:SOURce:DATA[:TELecom]:SDH:OVERhead:RSTRace <mode>, <trace> determines the cyclical trace string and mode in the J0 regenerator section trace (C1 byte of the SOH/TOH).

Parameter

Name	Type	Range	Default
mode	discrete	NONE | TRC16	NONE
trace	string	Strings with a length from 1 to 15 bytes	“WG RS-TRACE”

Dependencies None

Comments <mode> =

NONE: Path Trace is switched off. The byte which can be set with :SOUR:DATA[:TEL]:SDH:OVER[i]:DATA on page R-175 is sent.

TRC16: The string of up to 15 characters is automatically completed for frame synchronization and error checking with the 16th byte using CRC-7.

<trace>: All printable characters are allowed (7 bit ASCII). If the string is shorter than the maximum length, it is padded with blanks (20hex).
Non-printing characters can be set using the UNIX shell conventions:

\n --> new line character
\r --> CR character
\b --> back space character
\t --> TAB character
\0 --> 0 HEX character
\\ --> \ character
\001 --> 01 HEX character in octal notation

Example :SOUR:DATA:SDH:OVER:RSTR TRC16, “Hello World”
“Hello World” is transmitted cyclically in the J0 trace.

Related commands :SOUR:DATA[:TEL]:SDH:POV:HPTR on page R-210
:SOUR:DATA[:TEL]:SDH:TRIB:POV:LPTR on page R-247

:SOUR:DATA[:TEL]:SDH:OVER:RSTR?

:SOURce:DATA[:TELecom]:SDH:OVERhead:RSTRace? provides the current setting for the J0 regenerator section trace in the C1 byte of the SOH/TOH.

Example :SOUR:DATA:SDH:OVER:RSTR?
Response: TRC16,“Hello World”
for “Hello World” in the 16 byte trace.

:SOUR:DATA[:TEL]:SDH:OVER:SEQ[:ACT]

:SOURce:DATA[:TELecom]:SDH:OVERhead:SEQuence:[ACTion] <mode>
determines the setting of overhead sequence insertion.

Parameter

Name	Type	Range	Default
mode	discrete	NONE | MNP | TCM	NONE

Dependencies

MNP available for
:SOUR:DATA[:TEL]:SDH:RATE = STM16/STS48(OC48) with Option 91.59.
MNP and TCM only available if
:SOUR:DATA[:TEL]:SDH:ALAR[:MODE] = NONE
:SOUR:DATA[:TEL]:SDH:ERR[:MODE] = NONE.

Comments

NONE: No overhead sequence insertion

MNP: Activates overhead sequence insertion in the overhead selected with :SOUR:DATA[:TEL]:SDH:OVER:SEQ:TYPE on page R-192 at the position defined in :SOUR:DATA[:TEL]:SDH:OVER:SEQ:POS:POH on page R-189 or :SOUR:DATA[:TEL]:SDH:OVER:SEQ:POS:SOH | TOH on page R-190 and for value 1 in interval m and value 2 in interval n with period p defined in :SOUR:DATA[:TEL]:SDH:OVER:SEQ:MNP:DATA on page R-187

Overhead sequence insertion is only possible with STM16/STS48(OC48) module, option 91.53, 91.54, or 91.59.
Error insertion and alarm insertion excludes overhead sequence insertion.
The state of overhead sequence insertion can be read in the status register structure at position 6 of the command :STAT:SEQ register on page R-18.
At the end of the sequence the command is set to NONE automatically.

TCM: Activates the frame sequence for Tandem Connection Monitoring. This generates frame signals with a fixed length of 76 bytes for bytes N1 or N2/Z6. The content of the sequence is set using the command :SOUR:DATA[:TEL]:SDH:OVER:SEQ:TCM:DATA on page R-191.

Example

:SOUR:DATA:SDH:OVER:SEQ MNP
inserts a defined overhead sequence in the SOH or POH data stream.

Related commands

:SOUR:DATA[:TEL]:SDH:OVER:SEQ:TYPE on page R-192
:SOUR:DATA[:TEL]:SDH:OVER:SEQ:POS:POH on page R-189
:SOUR:DATA[:TEL]:SDH:OVER:SEQ:POS:SOH | TOH on page R-190
:SOUR:DATA[:TEL]:SDH:OVER:SEQ:MNP:DATA on page R-187
:SOUR:DATA[:TEL]:SDH:OVER:SEQ:TCM:DATA on page R-191
:SOUR:DATA[:TEL]:SDH:OVER:SEQ:TCM:DATA:BLOC on page R-193

:SOUR:DATA[:TEL]:SDH:OVER:SEQ[:ACT]?

:SOURce:DATA[:TELecom]:SDH:OVERhead:SEQuence:[ACTion]? provides the current setting of overhead sequence insertion in the SOH or POH data stream

Comments

MNP: Overhead sequence insertion in the SOH or POH data stream is activated

Example

:SOUR:DATA:SDH:OVER:SEQ?
Response: MNP

:SOUR:DATA[:TEL]:SDH:OVER:SEQ:MNP:DATA

:SOURce:DATA[:TELecom]:SDH:OVERhead:SEQuence:MNP:DATA <value1>, <frames1>, <value2>, <frames2>, <repetition> defines the values, counts and repetitions for overhead sequence insertion.

Parameter

Name	Type	Range	Default
value1	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	#H01
frames1	numeric	1 - 2000000000	1
value2	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	#H02
frames2	numeric	1 - 2000000000	1
repetition	numeric	1 - 65535	1

Dependencies

None

Comments

Selects the contents of the selected SOH (TOH) or POH overhead byte and the number of frames sending each byte as well as the repetition rate of the sequence.
The total overhead sequence has the format (M + N) x P
1 frame = 125 µs
The sequence is started with the command
:SOUR:DATA[:TEL]:SDH:OVER:SEQ[:ACT] on page R-186

value1 Content of the selected overhead byte while M is active
frames1 Number of frames M in which the selected overhead byte has the value1
value2 Content of the selected overhead byte while N is active
frames2 Number of frames N in which the selected overhead byte has the value2
repetition Number of repetitions P

Example	:SOUR:DATA:SDH:OVER:SEQ:MNP:DATA 0, 8000, #HC2, 32000, 100 specifies the following sequence: The selected SOH (TOH) or POH overhead byte is present with the value 0 for 8000 frames, followed by 32000 frames with the value C2 Hex (194), followed by 8000 frames with the value 0 and 32000 frames with the value C2 Hex and so on for 100 cycles. Then the overhead byte returns to its original value.
Related commands	:SOUR:DATA[:TEL]:SDH:OVER:SEQ[:ACT] on page R-186 :SOUR:DATA[:TEL]:SDH:OVER:SEQ:TYPE on page R-192 :SOUR:DATA[:TEL]:SDH:OVER:SEQ:POS:POH on page R-189 :SOUR:DATA[:TEL]:SDH:OVER:SEQ:POS:SOH | TOH on page R-190

:SOUR:DATA[:TEL]:SDH:OVER:SEQ:MNP:DATA?

:SOURce:DATA[:TELecom]:SDH:OVERhead:SEQuence:MNP:DATA? provides the current settings of the overhead sequence insertion counts, values and repetitions in the SOH (TOH) or POH data stream:

Example	:SOUR:DATA:SDH:OVER:SEQ:MNP:DATA?	
	Response: 12, 8000, 24, 32000,100	The selected overhead byte is inserted with the value 12 for 8000 frames, followed by 32000 frames with the value 24. This sequence is repeated 100 times.

:SOUR:DATA[:TEL]:SDH:OVER:SEQ:POS:POH

:SOURce:DATA[:TELecom]:SDH:OVERhead:SEQuence:POSition:POH <position> determines the overhead byte position for POH overhead sequence insertion.

Parameter

Name	Type	Range	Default
position	numeric	1 - 9	5

Dependencies

Only available if :SOUR:DATA[:TEL]:SDH:OVER:SEQ[:ACT] = MNP and overhead insertion :SOUR:DATA[:TEL]:SDH:OVER:SEQ:TYPE = HPOH | LPOH

Comments

Position:	VC-3/4 STS 1/3C SPE POH byte:	VC- 2/11/12 VT 1.5/2/6 POH byte:
1	J1	-
2	B3	J2
3	C2	N2
4	G1	K4
5	F2	
6	-	
7	F3	
8	K3	
9	N1	

Example

:SOUR:DATA:SDH:OVER:SEQ:POS:POH 5
inserts a defined overhead sequence in the POH F2 byte.

Related commands

:SOUR:DATA[:TEL]:SDH:OVER:SEQ[:ACT] on page R-186
:SOUR:DATA[:TEL]:SDH:OVER:SEQ:MNP:DATA on page R-187
:SOUR:DATA[:TEL]:SDH:OVER:SEQ:POS:SOH | TOH on page R-190
:SOUR:DATA[:TEL]:SDH:OVER:SEQ:TYPE on page R-192

:SOUR:DATA[:TEL]:SDH:OVER:SEQ:POS:POH?

:SOURce:DATA[:TELecom]:SDH:OVERhead:SEQuence:POSition:POH? provides the current setting of POH byte overhead sequence insertion.

Example

:SOUR:DATA:SDH:OVER:SEQ:POS:POH?

Response: 5 — Overhead sequence insertion in POH byte F2.

:SOUR:DATA[:TEL]:SDH:OVER:SEQ:POS:SOH | TOH

:SOURce:DATA[:TELecom]:SDH:OVERhead:SEQuence:POSition:SOH <line>, <col> determines the overhead byte line and column for SOH (TOH) overhead sequence insertion.

Parameter

Name	Type	Range	Default
line	numeric	1 - 9	2
col	numeric	1 - 144	6

Dependencies: Only available if :SOUR:DATA[:TEL]:SDH:OVER:SEQ[:ACT] = MNP and overhead insertion :SOUR:DATA[:TEL]:SDH:OVER:SEQ:TYPE = SOH

Comments:

<line>: Horizontal index (line number) of the overhead in 9 x 3 array of the STM-0/STS-0 (OC1) overhead or the 9 x 9 array of the STM-1/STS-3 (OC3) overhead or the 9 x 36 array of the STM-4/STS-12 (OC12) overhead or the 9 x 144 array of the STM-16/STS-16 (OC48) overhead.

<col>: Vertical index (column number) of the overhead. The number of columns depends on the signal structure.

Signal structure:	Number of columns:
STM0/STS1 (OC1)	9 (columns 1, 4 and 7 only are relevant)
STM1/STS3 (OC3)	9
STM4/STS12 (OC12)	36
STM16/STS48(OC48)	144
STM64/OC192	144

Example: :SOUR:DATA:SDH:OVER:SEQ:POS:SOH 3, 1
inserts a defined overhead sequence in the SOH D1 byte.

Related commands:
:SOUR:DATA[:TEL]:SDH:OVER:SEQ[:ACT] on page R-186
:SOUR:DATA[:TEL]:SDH:OVER:SEQ:MNP:DATA on page R-187
:SOUR:DATA[:TEL]:SDH:OVER:SEQ:POS:POH on page R-189
:SOUR:DATA[:TEL]:SDH:OVER:SEQ:TYPE on page R-192

:SOUR:DATA[:TEL]:SDH:OVER:SEQ:POS:SOH?

:SOURce:DATA[:TELecom]:SDH:OVERhead:SEQuence:POSition:SOH? provides the current setting of SOH/TOH byte overhead sequence insertion.

Example: :SOUR:DATA:SDH:OVER:SEQ:POS:SOH?
Response: 3, 1 — Overhead sequence insertion in SOH byte D1

:SOUR:DATA[:TEL]:SDH:OVER:SEQ:TCM:DATA

:SOURce:DATA[:TELecom]:SDH:OVERhead:SEQuence:TCMonitoring:DATA <position>, <value> sets the byte in the frame sequence for Tandem Connection Monitoring at the specified position to the specified value.

Parameter

Name	Type	Range	Default
position	numeric	1 - 76	none
value	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none

Dependencies None

Comments This command allows individual setting of the bytes in the frame sequence for Tandem Connection Monitoring.
<position>: Position in the 76 byte array of the frame sequence.
<value>: Value of the byte designated by <position>.

Example :SOUR:DATA:SDH:OVER:SEQ:TCM:DATA,73,#H01
sets byte 73 in frame sequence to 01hex (RDI).

Related commands :SOUR:DATA[:TEL]:SDH:OVER:SEQ:TCM:DATA:BLOC on page R-193

:SOUR:DATA[:TEL]:SDH:OVER:SEQ:TCM:DATA?

:SOURce:DATA[:TELecom]:SDH:OVERhead:SEQuence:TCMonitoring:DATA?, <position> provides the current settings of individual overhead bytes in the frame sequence.

Example :SOUR:DATA:SDH:OVER:SEQ:TCM:DATA? 8
Response: 128 byte # 8 is actually set to 80hex.

:SOUR:DATA[:TEL]:SDH:OVER:SEQ:TYPE

:SOURce:DATA[:TELecom]:SDH:OVERhead:SEQuence:TYPE <type> determines the overhead type for overhead sequence insertion.

Parameter

Name	Type	Range	Default
type	discrete	SOH | HPOH | LPOH	SOH

Dependencies: Only available if :SOUR:DATA[:TEL]:SDH:OVER:SEQ[:ACT] = MNP

Comments: Selects the overhead used for overhead sequence insertion

SOH: Sequence inserted in a section overhead (SOH) or transport overhead (TOH) byte

HPOH: Sequence inserted in a higher order path overhead (HPOH) byte

LPOH: Sequence inserted in a lower order path overhead (LPOH) byte

Example: :SOUR:DATA:SDH:OVER:SEQ:TYP SOH
inserts a defined overhead sequence in the SOH data stream.

Related commands:
:SOUR:DATA[:TEL]:SDH:OVER:SEQ[:ACT] on page R-186
:SOUR:DATA[:TEL]:SDH:OVER:SEQ:MNP:DATA on page R-187
:SOUR:DATA[:TEL]:SDH:OVER:SEQ:POS:POH on page R-189
:SOUR:DATA[:TEL]:SDH:OVER:SEQ:POS:SOH | TOH on page R-190

:SOUR:DATA[:TEL]:SDH:OVER:SEQ:TYPE?

:SOURce:DATA[:TELecom]:SDH:OVERhead:SEQuence:TYPE <type> provides the current overhead type for overhead sequence insertion.

Example: :SOUR:DATA:SDH:OVER:SEQ:TYPE?

Response: SOH — The current overhead sequence insertion byte is a SOH (TOH) byte.

:SOUR:DATA[:TEL]:SDH:OVER:SEQ:TCM:DATA:BLOC

:SOURce:DATA[:TELecom]:SDH:OVERhead:SEQuence:TCMonitoring:DATA :BLOCk <value 1>, <value 2>, …, <value 76> sets all 76 bytes of the frame sequence for Tandem Connection Monitoring (TCM).

A TCM sequence consists of 76 bytes (frames) with the following coding for N1 and N2 (Z6):

	bit 1	bit 2	bit 3	bit 4	bit 5	bit 6	bit 7	bit 8[1]
N1 coding	TC-IEC		TC-IEC	TC-IEC	TC-REI	TC-OEI	TC-FAS, TC-APId, TC-RDI, TC-ODI	
N2 (Z6) coding	BIP-2		1	Inc. AIS	TC-REI	TC-OEI	TC-FAS, TC-APId, TC-RDI, TC-ODI	

1 Bit 8 is the least significant bit

Table R-1 N1, N2 (Z6) byte structure

The coding for bits 7 and 8 (bit 7-bit 8 multiframe structure) is explained in more detail in the following table:

Frame #	bit 1 to bit 6	bit 7	bit 8	Meaning
1 - 7 (FAS)	...	1	1	TC-FAS
8 (FAS)	...	1	0	TC-FAS
9 (Trace 1)	...	1	C1	TC-APId byte #1
10 (Trace 1)	...	C2	C3	TC-APId byte #1
11 (Trace 1)	...	C4	C5	TC-APId byte #1
12 (Trace 1)	...	C6	C7	TC-APId byte #1
13 (Trace 2)	...	0	X	TC-APId byte #2
14 (Trace 2)	...	X	X	TC-APId byte #2
15 (Trace 2)	...	X	X	TC-APId byte #2
16 (Trace 2)	...	X	X	TC-APId byte #2
...	...	...	...	...
69 (Trace 16)	...	0	X	TC-APId byte #16
70 (Trace 16)	...	X	X	TC-APId byte #16
71 (Trace 16)	...	X	X	TC-APId byte #16
72 (Trace 16)	...	X	X	TC-APId byte #16
73 (Alarm)	...	Res. (0)	TC-RDI	TC-RDI
74 (Alarm)	...	TC-ODI	Res. (0)	TC-ODI
75 (Reserved)	...	Res. (0)	Res. (0)	Reserved (Default: 0)
76 (Reserved)	...	Res. (0)	Res. (0)	Reserved (Default: 0)

Table R-2 Coding for bits 7 and 8

Parameter

Name	Type	Range	Default
all 76 bytes of the frame sequence	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none

Dependencies None

Example :SOUR:DATA:SDH:OVER:SEQ:TCM:DATA:BLOC
147,147,147,147,147,147,147,146,145,145,147,147,145,145,145,144,
145,144,144,147,145,144,147,145,144,146,147,145,145,145,145,144,
145,145,144,146,145,144,144,145,145,144,144,147,145,144,145,145,
144,146,147,145,145,144,146,145,145,144,145,144,145,144,145,145,
145,144,147,146,145,145,145,144,144,145, 146,147

Related commands :SOUR:DATA[:TEL]:SDH:OVER:SEQ:TCM:DATA on page R-191

:SOUR:DATA[:TEL]:SDH:OVER:SEQ:TCM:DATA:BLOC?

:SOURce:DATA[:TELecom]:SDH:OVERhead:SEQuence:TCMonitoring:DATA
:BLOCk? provides the current settings of all bytes in the frame sequence.

Example :SOUR:DATA:SDH:OVER:SEQ:TCM:DATA:BLOC?
147,147,147,147,147,147,147,146,145,145,147,147,145,145,145,144,
145,144,144,147,145,144,147,145,144,146,147,145,145,145,145,144,
145,145,144,146,145,144,144,145,145,144,144,147,145,144,145,145,
144,146,147,145,145,144,146,145,145,144,145,144,145,144,145,145,
145,144,147,146,145,145,145,144,144,145, 146,147

:SOUR:DATA[:TEL]:SDH:PAYL:TYPE

:SOURce:DATA[:TELecom]:SDH:PAYLoad:TYPE <type> specifies the type of payload transmitted in the SDH measurement channel.

Parameter

Name	Type	Range	Default
type	discrete	PDH | PATTern | ATM	PDH

Dependencies None

Comments

PDH: PDH signal corresponding to :SOUR:DATA[:TEL]:PDH on page R-91 ff.

PATTern: Pattern corresponding to :SOUR:DATA[:TEL]:PAYL:PATT on page R-88 in the entire container (bulk signal).

ATM: ATM (Asynchronous Transfer Mode) signal corresponding to :SOUR:DATA[:TEL]:ATM on page R-58 ff. (only with ATM option 90.70 or 90.80 installed).

Example :SOUR:DATA:SDH:PAYL:TYPE PDH sets a PDH signal as test payload.

Related commands
:SOUR:DATA[:TEL]:SDH:MAPP on page R-168
:SOUR:DATA[:TEL]:PDH on page R-91 ff.

:SOUR:DATA[:TEL]:SDH:PAYL:TYPE?

:SOURce:DATA[:TELecom]:SDH:PAYLoad:TYPE? provides the current SDH payload type.

Example :SOUR:DATA:SDH:PAYL:TYPE?
Response: PDH if the SDH payload is a PDH signal.

Overview of pointer sequences

Note: The parameters for the above sequences are strongly interdependent. The instrument will attempt to eliminate any setting conflicts. This may lead to internal parameter changes depending on the order in which settings were made, which may be undesirable. It is a good idea to transmit all settings for the pointer sequences in a single setting command. The feasibility check of the entire setting will then be made only after all the individual values have been set.

The following pointer sequences are possible:

Periodic (single/multiple) pointers with identical polarity (possible as pointer increment and decrement):

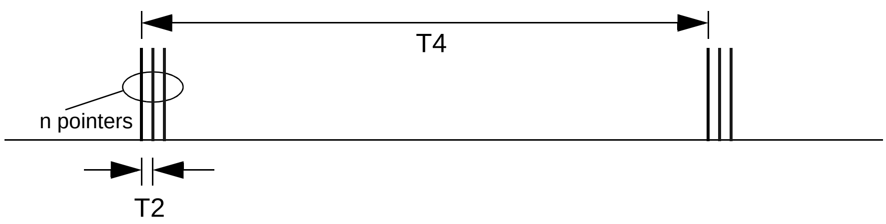


Fig. R-6 Periodic (single/multiple) pointers with identical polarity

Periodic (single/multiple) pointers with differing polarity:

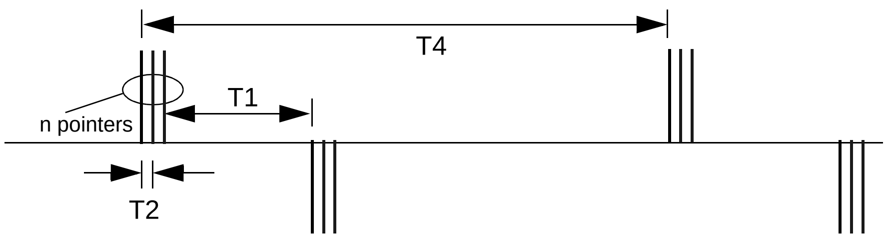


Fig. R-7 Periodic (single/multiple) pointers with differing polarity

Periodic pointers with one double pointer:

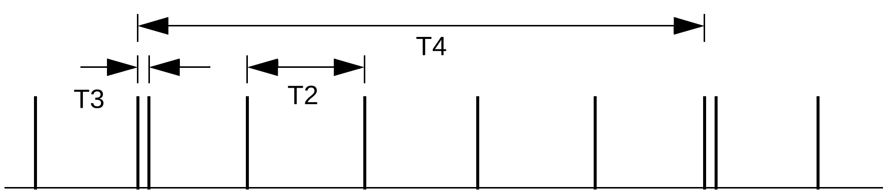


Fig. R-8 Periodic pointers with one double pointer

Periodic pointers with one missing pointer:

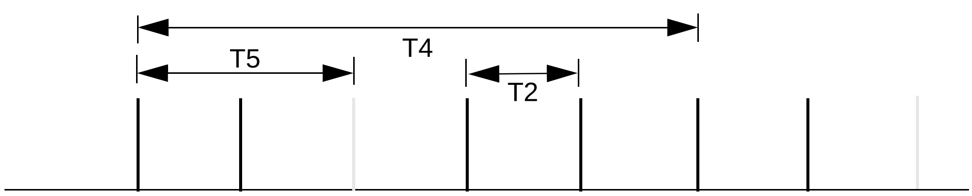


Fig. R-9 Periodic pointers with one missing pointer

Moreover, the following pointer sequences from G.783 (T1.105.3) are also possible:

Periodic “87-3” sequence (increment and decrement):

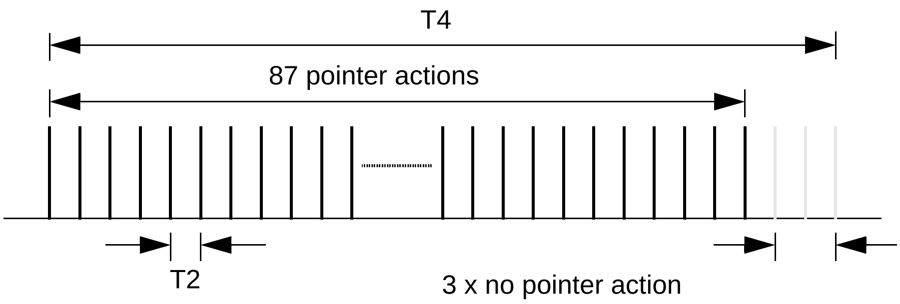


Fig. R-10 “87-3” sequence

Periodic “43/44” sequence with double pointer (increment and decrement):

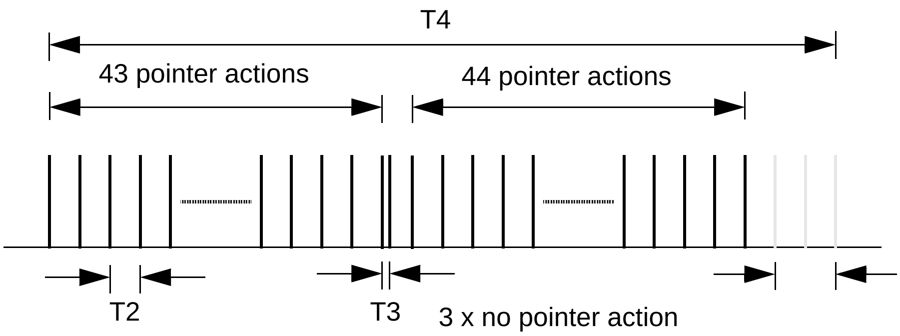


Fig. R-11 Periodic “43/44” sequence with double pointer

Periodic “86-4” sequence with missing pointer (increment and decrement):

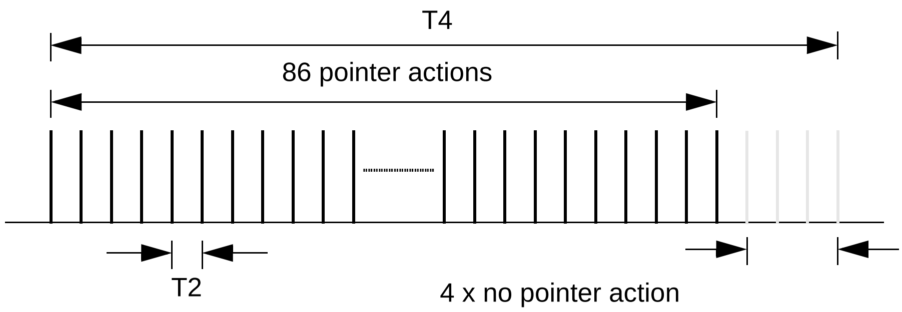


Fig. R-12 “86-4” sequence with missing pointer

Key to figures

n: Number of pointer actions
T1: Spacing between the last pointer decrement and the next pointer increment (only for periodic pointers of different polarity)
T2: Spacing between individual pointer actions (Adjust Period)
T3: Pointer period (T4)
T4: Period for periodic pointer actions
T5: Spacing between a missing pointer and the start of the pointer period (T4)

:SOUR:DATA[:TEL]:SDH:POIN[:ACT]

:SOURce:DATA[:TELecom]:SDH:POINter[:ACTion] <action> sets the AU/STS (administrative unit) pointer actions.

Parameter

Name	Type	Range	Default
action	discrete	NONE | NPOinter | INCRement | DECRement | ALTernate | SEQuence	NONE

Dependencies None

Comments

NONE: No pointer actions
NPOinter: New pointer value
INCRement: Pointer increment sequences
DECrement: Pointer decrement sequences
ALTernate: Pointer alternating sequences
SEQuence: Pointer sequences as per G.783 (T1.105.3)

Example :SOUR:DATA:SDH:POIN NPO sets a new pointer value.

Related commands

:SOUR:DATA[:TEL]:SDH:TRIB:POIN[:ACT] on page R-236
:SOUR:DATA[:TEL]:SDH:POIN:VAL on page R-207
:SOUR:DATA[:TEL]:SDH:POIN:MODE on page R-203
:SOUR:DATA[:TEL]:SDH:POIN:PER on page R-205
:SOUR:DATA[:TEL]:SDH:POIN:IPER on page R-202
:SOUR:DATA[:TEL]:SDH:POIN:ADD[:STAT] on page R-199
:SOUR:DATA[:TEL]:SDH:POIN:SEQ:TYPE on page R-206
:SOUR:DATA[:TEL]:SDH:POIN:NDFL on page R-203
:SOUR:DATA[:TEL]:SDH:POIN:CANC[:STAT] on page R-201
:SOUR:DATA[:TEL]:SDH:POIN:NUMB on page R-204

:SOUR:DATA[:TEL]:SDH:POIN[:ACT]?

:SOURce:DATA[:TELecom]:SDH:POINter[:ACTion]? provides the current setting of the pointer action.

Comments <NPO> is a volatile state and cannot be read with this query.

Example :SOUR:DATA:SDH:POIN?
Response: SEQ

:SOUR:DATA[:TEL]:SDH:POIN:ADD:PER

:SOURce:DATA[:TELecom]:SDH:POINter:ADD:PERiod <interval> sets the AU/STS double pointer interval (see also “T3” in Overview of pointer sequences on page R-196).

Parameter

Name	Type	Range	Default
interval	numeric	2 - 80000	4

Dependencies :SOUR:DATA[:TEL]:SDH:POIN:ADD[:STAT] = ON

Comments Double pointer interval expressed as a number of frames (1 frame = 125 µs).

Example :SOUR:DATA:SDH:POIN:ADD:PER 4 sets an interval of 0.5 ms.

Related commands :SOUR:DATA[:TEL]:SDH:POIN:ADD[:STAT] on page R-199

:SOUR:DATA[:TEL]:SDH:POIN:ADD:PER?

:SOURce:DATA[:TELecom]:SDH:POINter:ADD:PERiod? provides the current double pointer interval.

Example :SOUR:DATA:SDH:POIN:ADD:PER?
Response: 4 for an interval of 4 frames.

:SOUR:DATA[:TEL]:SDH:POIN:ADD[:STAT]

:SOURce:DATA[:TELecom]:SDH:POINter:ADD[:STATe] <state> controls the generation of AU/STS double pointers.

Parameter

Name	Type	Range	Default
state	boolean	ON | OFF | 1 | 0	OFF

Dependencies :SOUR:DATA[:TEL]:SDH:POIN[:ACT] = INCR | DECR

Comments
ON | 1: Activates double pointer generation
OFF | 0: Deactivates double pointer generation

Example :SOUR:DATA:SDH:POIN:ADD ON activates double pointer generation.

Related commands
:SOUR:DATA[:TEL]:SDH:POIN[:ACT] on page R-198
:SOUR:DATA[:TEL]:SDH:POIN:ADD:PER on page R-199

:SOUR:DATA[:TEL]:SDH:POIN:ADD[:STAT]?

:SOURce:DATA[:TELecom]:SDH:POINter:ADD[:STATe]? provides the current setting of AU/STS double pointer generation.

Example :SOUR:DATA:SDH:POIN:ADD?
Response: 0 if double pointer generation is switched off.

:SOUR:DATA[:TEL]:SDH:POIN:APER

:SOURce:DATA[:TELecom]:SDH:POINter:APERiod <period> sets the adjust period (see also “T2” in Overview of pointer sequences on page R-196).

Parameter

Name	Type	Range	Default
period	numeric	2 - 80000	4

Parameter None

Comments <frames>: Pointer adjust period expressed as a number of frames (1 frame = 125 µs).

Example :SOUR:DATA:SDH:POIN:APER 10000 sets the adjust period to 10000 frames.

Related commands :SOUR:DATA[:TEL]:SDH:POIN[:ACT] on page R-198
:SOUR:DATA[:TEL]:SDH:POIN:IPER on page R-202
:SOUR:DATA[:TEL]:SDH:POIN:PER on page R-205

:SOUR:DATA[:TEL]:SDH:POIN:APER?

:SOURce:DATA[:TELecom]:SDH:POINter:APERiod? provides the adjust period.

Example :SOUR:DATA:SDH:POIN:APER?
Response: 10000

:SOUR:DATA[:TEL]:SDH:POIN:CANC:PER

:SOURce:DATA[:TELecom]:SDH:POINter:CANCel:PERiod <interval> sets the interval for cancellation of AU/STS pointer actions (see also “T5” in Overview of pointer sequences on page R-196).

Parameter

Name	Type	Range	Default
interval	numeric	0 - 4800000	16000

Dependencies :SOUR:DATA[:TEL]:SDH:POIN:CANC[:STAT] = ON

Comments Interval for cancellation of pointer actions expressed as a number of frames (1 frame = 125 µs).

Example :SOUR:DATA:SDH:POIN:CANC:PER 4 sets an interval of 0.5 ms.

Related commands :SOUR:DATA[:TEL]:SDH:POIN:CANC[:STAT] on page R-201

:SOUR:DATA[:TEL]:SDH:POIN:CANC:PER?

:SOURce:DATA[:TELecom]:SDH:POINter:CANCel:PERiod? provides the interval for cancellation of pointer actions.

Example :SOUR:DATA:SDH:POIN:CANC:PER?
Response: 4 for an interval of 4 frames.

:SOUR:DATA[:TEL]:SDH:POIN:CANC[:STAT]

:SOURce:DATA[:TELecom]:SDH:POINter:CANCel[:STATe] <state> controls the cancellation of AU/STS pointer actions.

Parameter

Name	Type	Range	Default
state	boolean	ON | OFF | 1 | 0	OFF

Dependencies :SOUR:DATA[:TEL]:SDH:POIN[:ACT] = INCR | DECR

Comments
ON | 1: Activates cancellation of pointer actions
OFF | 0: Deactivates cancellation of pointer actions

Example :SOUR:DATA:SDH:POIN:CANC ON activates cancellation of pointer actions.

Related commands :SOUR:DATA[:TEL]:SDH:POIN[:ACT] on page R-198
:SOUR:DATA[:TEL]:SDH:POIN:CANC:PER on page R-201

:SOUR:DATA[:TEL]:SDH:POIN:CANC[:STAT]?

:SOURce:DATA[:TELecom]:SDH:POINter:CANCel[:STATe]? provides the current setting of the cancellation of AU/STS pointer actions.

Example
:SOUR:DATA:SDH:POIN:CANC?
Response: 0 if cancellation of pointer actions is switched off.

:SOUR:DATA[:TEL]:SDH:POIN:IPER

:SOURce:DATA[:TELecom]:SDH:POINter:IPERiod <period> sets the inversion period (see also “T1” in Overview of pointer sequences on page R-196).

Parameter

Name	Type	Range	Default
period	numeric	2 - 4800000	8000

Dependencies
:SOUR:DATA[:TEL]:SDH:POIN[:ACT] = ALT

Comments
<frames>: AU/STS pointer inversion period expressed as a number of frames (1 frame = 125 µs).

Example
:SOUR:DATA:SDH:POIN:IPER 10000
sets the inversion period to 10000 frames.

Related commands
:SOUR:DATA[:TEL]:SDH:POIN[:ACT] on page R-198
:SOUR:DATA[:TEL]:SDH:POIN:ADD[:STAT] on page R-199
:SOUR:DATA[:TEL]:SDH:POIN:PER on page R-205

:SOUR:DATA[:TEL]:SDH:POIN:IPER?

:SOURce:DATA[:TELecom]:SDH:POINter:IPERiod? provides the inversion period.

Example
:SOUR:DATA:SDH:POIN:IPER?
Response: 10000

:SOUR:DATA[:TEL]:SDH:POIN:MODE

:SOURce:DATA[:TELecom]:SDH:POINter:MODE <mode> sets the execution mode of the pointer sequence.

Parameter

Name	Type	Range	Default
mode	discrete	SINGle | PERiodical	PER

Dependencies None

Comments

SINGle: Single execution of sequence
PERiodical: Periodic execution of sequence

Example :SOUR:DATA:SDH:POIN:MODE SING sets a single run.

Related commands :SOUR:DATA[:TEL]:SDH:POIN[:ACT] on page R-198
:SOUR:DATA[:TEL]:SDH:POIN:SEQ:TYPE on page R-206

:SOUR:DATA[:TEL]:SDH:POIN:MODE?

:SOURce:DATA[:TELecom]:SDH:POINter:MODE? provides the execution mode for the pointer sequence.

Comments SING is a volatile state and cannot be read.

Example :SOUR:DATA:SDH:POIN:MODE?
Response: PER

:SOUR:DATA[:TEL]:SDH:POIN:NDFL

:SOURce:DATA[:TELecom]:SDH:POINter:NDFLag <state> controls NDF generation when a new AU/STS pointer is set.

Parameter

Name	Type	Range	Default
state	boolean	ON | OFF | 1 | 0	ON

Dependencies :SOUR:DATA[:TEL]:SDH:POIN[:ACT] = NPO

Comments

ON | 1: Activates NDF (New Data Flag) generation
OFF | 0: Deactivates NDF generation

Example :SOUR:DATA:SDH:POIN:NDFL ON when a pointer appears, NDF is set.

Related commands :SOUR:DATA[:TEL]:SDH:POIN[:ACT] on page R-198

:SOUR:DATA[:TEL]:SDH:POIN:NDFL?

:SOURce:DATA[:TELecom]:SDH:POINter:NDFLag? provides the NDF initial value when setting new pointers.

Example :SOUR:DATA:SDH:POIN:NDFL?
Response: 1 if NDF is set.

:SOUR:DATA[:TEL]:SDH:POIN:NUMB

:SOURce:DATA[:TELecom]:SDH:POINter:NUMBer <number> sets the number of multiple pointers (see also “n” in Overview of pointer sequences on page R-196).

Parameter

Name	Type	Range	Default
number	numeric	1 - 2000	1

Dependencies :SOUR:DATA[:TEL]:SDH:POIN[:ACT] = INCR | DECR | ALT.

Example :SOUR:DATA:SDH:POIN:NUMB 3 sets pointer actions.

Related commands :SOUR:DATA[:TEL]:SDH:POIN[:ACT] on page R-198
:SOUR:DATA[:TEL]:SDH:POIN:IPER on page R-202
:SOUR:DATA[:TEL]:SDH:POIN:ADD[:STAT] on page R-199
:SOUR:DATA[:TEL]:SDH:POIN:PER on page R-205

:SOUR:DATA[:TEL]:SDH:POIN:NUMB?

:SOURce:DATA[:TELecom]:SDH:POINter:NUMBer? provides the number of multiple pointers.

Example :SOUR:DATA:SDH:POIN:NUMB?
Response: 1

:SOUR:DATA[:TEL]:SDH:POIN:PER

:SOURce:DATA[:TELecom]:SDH:POINter:PERiod <period> sets the AU/STS pointer period (see also “T4” in Overview of pointer sequences on page R-196).

Parameter

Name	Type	Range	Default
period	numeric	2 - 4800000	16000

Dependencies None

Comments <period>: Pointer period expressed as a number of frames (1 frame = 125 µs).

Example :SOUR:DATA:SDH:POIN:PER 1000 sets the pointer period to 1000 frames.

Related commands :SOUR:DATA[:TEL]:SDH:POIN[:ACT] on page R-198
:SOUR:DATA[:TEL]:SDH:POIN:IPER on page R-202
:SOUR:DATA[:TEL]:SDH:POIN:ADD[:STAT] on page R-199

:SOUR:DATA[:TEL]:SDH:POIN:PER?

:SOURce:DATA[:TELecom]:SDH:POINter:PER? provides the pointer period.

Example :SOUR:DATA:SDH:POIN:PER?
Response: 1000

:SOUR:DATA[:TEL]:SDH:POIN:SEQ:DIR

:SOURce:DATA[:TELecom]:SDH:POINter:SEQuence:DIRection <direction> sets the direction of AU/STS pointer sequences as per G.783 (T1.105.3).

Parameter

Name	Type	Range	Default
direction	discrete	UP | DOWN	UP

Dependencies :SOUR:DATA[:TEL]:SDH:POIN[:ACT] = SEQ

Comments UP: Executes sequence with pointer increments
DOWN: Executes sequence with pointer decrements

Example :SOUR:DATA:SDH:POIN:SEQ:DIR UP
sets sequences with increasing pointers.

Related commands :SOUR:DATA[:TEL]:SDH:POIN:SEQ:TYPE on page R-206

:SOUR:DATA[:TEL]:SDH:POIN:SEQ:DIR?

:SOURce:DATA[:TELecom]:SDH:POINter:SEQuence:DIRection? provides the direction of pointer sequences as per G.783 (T1.105.3).

Example :SOUR:DATA:SDH:POIN:SEQ:DIR?
Response: DOWN

:SOUR:DATA[:TEL]:SDH:POIN:SEQ:TYPE

:SOURce:DATA[:TELecom]:SDH:POINter:SEQuence:TYPE <type> sets the AU/STS pointer sequences as per G.783 (T1.105.3).

Parameter

Name	Type	Range	Default
type	discrete	S873 | S4344 | S864	S873

Dependencies :SOUR:DATA[:TEL]:SDH:POIN[:ACT] = SEQ

Comments
S873: Sequence: 87-3 pattern
S4344: Sequence: 43-44 pattern with double pointer
S864: Sequence: 86-4 pattern with missing pointer

Example :SOUR:DATA:SDH:POIN:SEQ:TYPE S873 sets the 87-3 pattern.

Related commands
:SOUR:DATA[:TEL]:SDH:POIN[:ACT] on page R-198
:SOUR:DATA[:TEL]:SDH:POIN:SEQ:DIR on page R-205

:SOUR:DATA[:TEL]:SDH:POIN:SEQ:TYPE?

:SOURce:DATA[:TELecom]:SDH:POINter:SEQuence:TYPE? provides the sequence setting as per G.783 (T1.105.3).

Example :SOUR:DATA:SDH:POIN:SEQ:TYPE?
Response: S873

:SOUR:DATA[:TEL]:SDH:POIN:SSB

:SOURce:DATA[:TELecom]:SDH:POINter:SSBits <value> sets the value of the SS bits in the H1 byte.

Parameter

Name	Type	Range	Default
value	numeric	0 - 3	2

Dependencies None

Comments When the system is switched between ITU-T and ANSI, the value is reset as follows:
If :SOUR:DATA[:TEL]:STAN = ITUT reset to 2,
if :SOUR:DATA[:TEL]:STAN = ANSI reset to 0.

Example :SOUR:DATA:SDH:POIN:SSB 0; sets the SS bits to binary 00.

:SOUR:DATA[:TEL]:SDH:POIN:SSB?

:SOURce:DATA[:TELecom]:SDH:POINter:SSBits? provides the value of the SS bits.

Example :SOUR:DATA:SDH:POIN:SSB?
Response: 0

:SOUR:DATA[:TEL]:SDH:POIN:VAL

:SOURce:DATA[:TELecom]:SDH:POINter:VALue <value> sets the value of the AU/STS pointer activated by :SOUR:DATA[:TEL]:SDH:POIN[:ACT] = NPO.

Parameter

Name	Type	Range	Default
value	numeric	0 - 782	0

Dependencies :SOUR:DATA[:TEL]:SDH:POIN[:ACT] = NPO must be transmitted to activate the new pointer value set by this command.

Comments AU-4, AU-3: 0-782

Example :SOUR:DATA:SDH:POIN:VAL 10;
:SOUR:DATA:SDH:POIN NPO sets the pointer value to 10.

Related commands :SOUR:DATA[:TEL]:SDH:POIN[:ACT] on page R-198

:SOUR:DATA[:TEL]:SDH:POIN:VAL?

:SOURce:DATA[:TELecom]:SDH:POINter:VALue? provides the pointer value.

Example :SOUR:DATA:SDH:POIN:VAL?
Response: 10

:SOUR:DATA[:TEL]:SDH:POV:DATA

:SOURce:DATA[:TELecom]:SDH:POVerhead:DATA <byte>, <value> sets bytes of the VC4 (STS3CSPE) / VC3 (STS1SPE) high order POH (path overhead).

Parameter

Name	Type	Range	Default
byte	discrete	J1 | C2 | G1 | F2 | F3| K3(Z4) | N1	none
value	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none

Dependencies None

Comments This command allows individual setting of the designated high oder POH bytes. For the default setting, see :SOUR:DATA[:TEL]:SDH:POV:PRES on page R-212.

Example :SOUR:DATA:SDH:POV:DATA C2, #H34 sets C2 byte to 34hex.

Related commands :SOUR:DATA[:TEL]:SDH:POV:PRES on page R-212
:SOUR:DATA[:TEL]:SDH:POV:DATA:BLOC on page R-209
:SOUR:DATA[:TEL]:SDH:POV:HPTR on page R-210

:SOUR:DATA[:TEL]:SDH:POV:DATA?

:SOURce:DATA[:TELecom]:SDH:POVerhead:DATA? <byte> provides the current settings of individual VC4 (STS3CSPE) / VC3 (STS1SPE) high order POH bytes.

Example :SOUR:DATA:SDH:POV:DATA? C2
Response: 128 C2 byte is set to 80hex.

:SOUR:DATA[:TEL]:SDH:POV:DATA:BLOC

:SOURce:DATA[:TELecom]:SDH:POVerhead:DATA:BLOCk <J1>, <B3>, <C2>, <G1>, <F2>, <H4>, <F3>, <K3>, <N1> sets all 9 bytes of the VC4 (STS3CSPE) / VC3 (STS1SPE) high order POH (path overhead).

Parameter

Nine successive numeric values are expected, which set the complete POH.

Name	Type	Range	Default
J1	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
B3	numeric	automatically generated --> should be set to 0	0
C2	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
G1	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
F2	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
H4	numeric	automatically generated --> should be set to #HFF	#HFF
F3	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
K3(Z4)	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
N1	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none

Dependencies

Continuous alarms can also be generated here.
Error/alarm insertion has higher priority and overwrites static settings!

Comments

The B3 and H4 bytes of the POH cannot be set since their values are automatically generated.

Example

:SOUR:DATA:SDH:POV:DATA:BLOC 0,0,4,0,0,#HFF,0,0,0

Related commands

:SOUR:DATA[:TEL]:SDH:POV:DATA on page R-208

:SOUR:DATA[:TEL]:SDH:POV:DATA:BLOC?

:SOURce:DATA[:TELecom]:SDH:POVerhead:DATA:BLOCk? provides the current settings of the 9 bytes of the VC4 (STS3CSPE) / VC3 (STS1SPE) high order POH (path overhead).

Example

:SOUR:DATA:SDH:POV:DATA:BLOC?
Response: 0,0,4,0,0,255,0,0,0

:SOUR:DATA[:TEL]:SDH:POV:HPTR

:SOURce:DATA[:TELecom]:SDH:POVerhead:HPTRace <mode>, <trace>
determines the cyclical path trace string and mode in the J1 high path trace (J1 byte of the VC4 (STS3CSPE)/VC3 (STS1SPE)).

Parameter

Name	Type	Range	Default
mode	discrete	NONE | TRC16 | TRC64	TRC16
trace	string	Strings with a length from 1 to 15 bytes or 1 to 64 bytes	"WG HP-TRACE"

Dependencies None

Comments <mode> =

NONE: Path trace is switched off. The byte J1, which is set by :SOUR:DATA[:TEL]:SDH:POV:DATA on page R-208 is transmitted statically.

TRC16: The string of up to 15 characters is automatically completed for frame synchronization and error checking with the 16th byte using CRC-7.

TRC64: The trace contains 64 characters.

<trace>: All printable characters are allowed (7 bit ASCII). If the string is shorter than the maximum length, it is padded with blanks (20hex) in the case of TRC16 or with 0 (00hex) in the case of TRC64.
A CR/LF sequence is automatically added to the TRC64 string to complete the 64 byte sequence if the programmed string is shorter than 63 characters. **A CR/LF sequence is required for the ANT-20 receiver to synchronize to the received signal.**
Non-printing characters can be set using the UNIX shell conventions:

\n --> new line character
\r --> CR character
\b --> back space character
\t --> TAB character
\0 --> 0 HEX character
\\ --> \ character
\001 --> 01 HEX character in octal notation

Example :SOUR:DATA:SDH:POV:HPTR TRC16, "Hello World"
"Hello World" is cyclically transmitted in the J1 trace.

Related commands :SOUR:DATA[:TEL]:SDH:POV:DATA on page R-208

:SOUR:DATA[:TEL]:SDH:POV:HPTR?

:SOURce:DATA[:TELecom]:SDH:POVerhead:HPTRace? provides the current setting for the J1 high path trace in the J1 byte of the VC3 (STS1SPE)/VC4 (STS3CSPE) POH.

Example :SOUR:DATA:SDH:POV:HPTR?
Response: TRC16,"Hello World"
for "Hello World" in the 16 byte trace.

:SOUR:DATA[:TEL]:SDH:POV:HSEQ

:SOURce:DATA[:TELecom]:SDH:POVerhead:HSEQuence <type> determines the type of H4 sequence.

Parameter

Name	Type	Range	Default
type	discrete	OFF | SFRM | LFRM	SFRM

Dependencies None

Comments
OFF: No sequence
SFRM: Short frame (4 frame sequence from CCITT G.709 Fig. 3.16)
LFRM: Long frame (48 frame sequence from CCITT G.709 Fig. 3.15)

Example :SOUR:DATA:SDH:POV:HSEQ SFRM sets the 4 frame sequence.

Related commands None

:SOUR:DATA[:TEL]:SDH:POV:HSEQ?

:SOURce:DATA[:TELecom]:SDH:POVerhead:HSEQuence? provides the current setting for the type of H4 sequence.

Example :SOUR:DATA:SDH:POV:HSEQ?
Response: SFRM if the 4 frame sequence is activated.

:SOUR:DATA[:TEL]:SDH:POV:PRES

:SOURce:DATA[:TELecom]:SDH:POVerhead:PRESet sets the VC4 (STS3CSPE) / VC3 (STS1SPE) high order POH overhead bytes in the measurement channel to their default values.

Parameter None

Comments Standard overhead (hex)

POH bytes	Value
J1	00
B3	XX
C2	02
G1	00
F2	00
H4	FF
F3	00
K3(Z4)	00
N1	00

XX: Inserted via parity formation (B3)
YY: Automatically filled through H4 sequence (H4).
There is no query for this command.

Example :SOUR:DATA:SDH:POV:PRES

Related commands :SOUR:DATA[:TEL]:SDH:OVER[i]:PRES on page R-179

:SOUR:DATA[:TEL]:SDH:RATE

:SOURce:DATA[:TELecom]:SDH:RATE <rate> sets the output bit rate of the generator for SDH signal generation.

Parameter

Name	Type	Range CEPT	Range ANSI	Default
rate	discrete	STM64 | STM16 | STM4 | STM1 | STM0	STS192 | STS48 | STS12 | STS3 | STS1	STM1

Dependencies

CEPT-Rate: :SOUR:DATA[:TEL]:STAN = ITUT, BELL;
ANSI-Rate: :SOUR:DATA[:TEL]:STAN = ANSI, <version>;
STM4 or STS12 (OC12) signal only via the optical output (:SOUR:DATA[:TEL]:SOUR[:SOCK] = OPT).
STM16, STM64 or STS48, STS192 (OC48, OC192) signal only via the optical or NRZ output.
STM4 or STS12 requires option 90.46 or 90.47 or 90.48.
STM16 or STS48 requires option 90.5X or 91.5X.
STM64 or STS192 requires option 90.40 or 90.41 **(not possible for ABT-20 devices)**.

Comments

Description: CEPT notation:

STM64:	9953.28 Mbit/s
STM16:	2488.32 Mbit/s
STM4:	622.08 Mbit/s
STM1:	155.52 Mbit/s
STM0:	51.84 Mbit/s

Description: ANSI notation:

STS192:	9953.28 Mbit/s
STS48:	2488.32 Mbit/s
STS12:	622.08 Mbit/s
STS3:	155.52 Mbit/s
STS0:	51.84 Mbit/s

Example

:SOUR:DATA:SDH:RATE STM1 sets the output bit rate to 155.52 Mbit/s.

Related commands

:SOUR:DATA[:TEL]:SDH:MAPP on page R-168
:SOUR:DATA[:TEL]:SDH:PAYL:TYPE on page R-195

:SOUR:DATA[:TEL]:SDH:RATE?

:SOURce:DATA[:TELecom]:SDH:RATE? provides the current output bit rate of the generator (SOURce).

Note: The corresponding command accepts ITU-T or ANSI notation. The query however always returns the ITU-T notation.

Example

:SOUR:DATA:RATE?
Response: STM1

:SOUR:DATA[:TEL]:SDH:REPL

:SOURce:DATA[:TELecom]:SDH:REPLace <mode> switches between “Block & Replace” and “Through” mode of the instrument.

Parameter

Name	Type	Range	Default
mode	discrete	SOH | AU	SOH

Dependencies :SOUR:DATA[:TEL]:NEL = ADM; connects receiver to transmitter (“Through” mode)

Comments
SOH: Normal “Through” mode is selected.
AU: “Block & Replace” mode is selected.
This is similar to “Through” mode. The receiver signal is looped to the transmitter, which terminates the selected AU-3 or AU-4 only and replaces it with a new one. The AU is selected by the channel command. The TX and RX channels must be the same.

Example
:SOUR:NEL ADM;
:SOUR:DATA:SDH:REPL AU activates “Block & Replace” mode.

Related commands :SOUR:DATA[:TEL]:NEL on page R-86

:SOUR:DATA[:TEL]:SDH:REPL?

:SOURce:DATA[:TELecom]:SDH:REPLace? provides the current mode of the instrument, i.e. “Block & Replace” or “Through” mode.

Example
:SOUR:DATA:SDH:REPL?
Response: AU if “Block & Replace” mode is selected.

:SOUR:DATA[:TEL]:SDH:SCR

:SOURce:DATA[:TELecom]:SDH:SCRambling <scramble> determines the setting of the scrambler.

Parameter

Name	Type	Range CEPT	Range ANSI	Default
scramble	boolean	ON | OFF | 0 | 1	ON	scramble

Dependencies ON is required if :SOUR:DATA[:TEL]:SDH:RATE = STM16|STS48.

Comments
ON | 1: Switch on scrambler
OFF | 0: Switch off scrambler

Example :SOUR:DATA:SDH:SCR ON activates the scrambler.

Related commands None

:SOUR:DATA[:TEL]:SDH:SCR?

:SOURce:DATA[:TELecom]:SDH:SCRambling? provides the current setting of the scrambler.

Example :SOUR:DATA:SDH:SCR?
Response: 1 if scrambling is switched on.

:SOUR:DATA[:TEL]:SDH:STMN

The commands under this node are used to set the optical interface. They are valid only if :SOUR:DATA[:TEL]:SOUR[:SOCK] = OPT.

:SOUR:DATA[:TEL]:SDH:STMN:BCH

:SOURce:DATA[:TELecom]:SDH:STMN:BCHannel <mode> sets the filling of the background channels on the optical output.

Parameter

Name	Type	Range	Default
mode	discrete	UNEQuipped | MEASurement	UNEQ

Dependencies: This command has no effect if the output signal has only a single measurement channel and no background channels.
Only valid if :SOUR:DATA[:TEL]:SDH:RATE = STM4|STM16

Dependencies:
UNEQuipped: Fills background channels with “UNEQUIPPED”.
MEASurement: Fills background channels in the same way as the measurement channel.

Example: :SOUR:DATA:SDH:STMN:BCH UNEQ
sets background channels to “UNEQUIPPED”.

Related commands: None

:SOUR:DATA[:TEL]:SDH:STMN:BCH?

:SOURce:DATA[:TELecom]:SDH:STMN:BCHannel? indicates the current filling of the background channels on the optical output.

Example: :SOUR:DATA:SDH:STMN:BCH?
Response: MEAS

:SOUR:DATA[:TEL]:SDH:STMN:CHAN

:SOURce:DATA[:TELecom]:SDH:STMN:CHANnel <channel> sets the active measurement channel n of an STM-N signal.

Parameter

Name	Type	Range	Default
channel	numeric	1 - 4 (for STM4 | STS12) 1 - 16 (for STM16 | OC48 1 - 64 (for STM64 | OC192)	1

Dependencies
This command has no effect if the output signal has no substructure.
Only valid if :SOUR:DATA[:TEL]:SDH:RATE = STM4|STM16|STM64.

Comments
The command :SOUR:DATA[:TEL]:SDH:CHAN on page R-144 is available for further substructuring of the STM-1 measurement channel.

The channel setting 1 to 12/48/192 for OC12/OC48/OC192 can be made in two stages:
:SOUR:DATA[:TEL]:SDH:STMN:CHAN = <stmn-channel>
:SOUR:DATA[:TEL]:SDH:CHAN = <grp1_no>
where the channel number is: oc12/48_no = 3 x stmn_no + grp1_no -3

OC	1	2	3	4	5	6	7	8	9	10	11	12	13	…	48
STMN	1	1	1	2	2	2	3	3	3	4	4	4	5	…	16
grp1	1	2	3	1	2	3	1	2	3	1	2	3	1	…	3

Alternatively, the channels of the ANSI structures for OC3/12/48/192 can be set with the commands
:SOUR:DATA[:TEL]:SDH:STSN:CHAN on page R-218
:SOUR:DATA[:TEL]:SDH:STSV:CHAN on page R-219

Example
:SOUR:DATA:SDH:STMN:CHAN 2
activates 2nd channel as measurement channel.

Related commands
:SOUR:DATA[:TEL]:SDH:CHAN on page R-144
:SOUR:DATA[:TEL]:SDH:STSN:CHAN on page R-218
:SOUR:DATA[:TEL]:SDH:STSV:CHAN on page R-219

:SOUR:DATA[:TEL]:SDH:STMN:CHAN?

:SOURce:DATA[:TELecom]:SDH:STMN:CHANnel? provides the current setting of the measurement channel on the optical output.

Example
:SOUR:DATA:SDH:STMN:CHAN?
Response: 3

:SOUR:DATA[:TEL]:SDH:STSN:CHAN

:SOURce:DATA[:TELecom]:SDH:STSN:CHANnel <channel> sets the active measurement channel n of an STS-N signal.

Parameter

<table>
<tr><th>Name</th><th>Type</th><th>Range</th><th>Default</th></tr>
<tr><td>channel</td><td>numeric</td><td>1 - 3 (for STM1-AU3 | STS3-STS1 SPE)
1 - 12 (for STM4-AU3 | STS12-STS1 SPE)
1 - 48 (for STM16-AU3 |OC48-STS1 SPE
1 -192 (for STM64-AU3 | OC192-STS1 SPE)
1 - 4 (for STM4-AU4 | OC12-STS3c SPE
1 -16 (for STM16-AU4 | OC48-STS3c SPE)
1 -64 (for STM64-AU4 | OC192-STS3c SPE)
1 - 4 (for STM16-AU4-4c | OC48-STS3c SPE)
1 -16 (for STM64-AU4-4c | OC192-STS3c SPE)
1 -4 (for STM64-AU4-16c | OC192-STS48-c SPE)</td><td>1</td></tr>
</table>

Dependencies

This command together with the command :SOUR:DATA[:TEL]:SDH:STSV:CHAN on page R-219 serves for setting the channel structure for ANSI-structured mappings.
Only valid if :SOUR:DATA[:TEL]:SDH:RATE = STM1 | STS3 | STM4 | OC12 | STM16 | OC48 | STM64 | OC192.

Comments

The command :SOUR:DATA[:TEL]:SDH:STSV:CHAN on page R-219 is available for further structuring of the measurement channel output signal.
This command has no effect if the output signal has only a single measurement channel and no background channels.
Remote control programs may set the channels using either the SONET commands
SOUR:DATA:SDH:STSN:CHAN
SOUR:DATA:SDH:STSV:CHAN
or the SDH commands
SOUR:DATA:SDH:STMN:CHAN
SOUR:DATA:SDH:CHAN
Mixing the two types of command is not permitted.

Example

:SOUR:DATA:SDH:STSN:CHAN 2
activates 2nd channel as measurement channel.

Related commands

:SOUR:DATA[:TEL]:SDH:STSV:CHAN on page R-219
:SOUR:DATA[:TEL]:SDH:CHAN on page R-144
:SOUR:DATA[:TEL]:SDH:STMN:CHAN on page R-217

:SOUR:DATA[:TEL]:SDH:STSN:CHAN?

:SOURce:DATA[:TELecom]:SDH:STSN:CHANnel? provides the current setting of the measurement channel on the optical output.

Example

:SOUR:DATA:SDH:STSN:CHAN?
Response: 3

:SOUR:DATA[:TEL]:SDH:STSV:CHAN

:SOURce:DATA[:TELecom]:SDH:STSVt:CHANnel <timeslot> sets the active measurement timeslot inside the active STS-1 of an STS-N signal.

Parameter

Name	Type	Range	Default
channel	numeric	1 - 7 (for C2/VT6 SPE) 1 - 21 (for C12/VT2 SPE or C11TU12) 1 - 28 (for C11/VT1,5 SPE)	1

Dependencies

This command together with the command :SOUR:DATA[:TEL]:SDH:STSN:CHAN on page R-218 serves for setting the channel structure for ANSI-structured mappings.
Only valid if :SOUR:DATA[:TEL]:SDH:RATE = STM1 | STS3 | STM4 | STS12 | STM16 | OC48 | STM64 | OC192.

Comments

The command :SOUR:DATA[:TEL]:SDH:STSN:CHAN on page R-218 is available for further structuring of the measurement channel output signal.
This command has no effect if the STS-1 has no substructure.
Remote control programs may set the channels using either the SONET commands
SOUR:DATA:SDH:STSN:CHAN
SOUR:DATA:SDH:STSV:CHAN
or the SDH commands
SOUR:DATA:SDH:STMN:CHAN
SOUR:DATA:SDH:CHAN
Mixing the two types of command is not permitted.

Example

:SOUR:DATA:SDH:STSV:CHAN 2
activates 2nd channel as measurement channel.

Related commands

:SOUR:DATA[:TEL]:SDH:STSN:CHAN on page R-218
:SOUR:DATA[:TEL]:SDH:CHAN on page R-144
:SOUR:DATA[:TEL]:SDH:STMN:CHAN on page R-217

:SOUR:DATA[:TEL]:SDH:STSV:CHAN?

:SOURce:DATA[:TELecom]:SDH:STSVt:CHANnel? provides the current setting of the measurement channel on the optical output.

Example

:SOUR:DATA:SDH:STSV:CHAN?
Response: 3

:SOUR:DATA[:TEL]:SDH:STMN:OVER:DATA

:SOURce:DATA[:TELecom]:SDH:STMN:OVERhead:DATA <line>, <col>, <value> sets bytes of the STM4/OC12 SOH (Section Overhead).

Parameter

Name	Type	Range	Default
line	numeric	1 - 9	none
col	numeric	1 - 36	none
value	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none

Dependencies

Continuous alarms can also be generated here.
Error/alarm insertion has higher priority and overwrites static settings!

Comments

This command allows individual setting of the STM4/OC12 SOH overhead byte.

<line>: Line number in the 9 x 36 array of the STM-4 overhead

<col>: Column number (see table) in the 9 x 36 array of the STM-4 overhead

<value>: Value for the byte designated by <line>,<col>

For byte filling and default settings, see
:SOUR:DATA[:TEL]:SDH:STMN:OVER:PRES on page R-222.

The B1, B2 bytes are formed through parity generation and cannot be altered!

Example

:SOUR:DATA:SDH:STMN:OVER:DATA 1,25, #H34
sets 1st C1 byte to 34hex.

Related commands

:SOUR:DATA[:TEL]:SDH:STMN:OVER:DATA:BLOC on page R-221
:SOUR:DATA[:TEL]:SDH:STMN:OVER:PRES on page R-222

:SOUR:DATA[:TEL]:SDH:STMN:OVER:DATA?

:SOURce:DATA[:TELecom]:SDH:STMN:OVERhead:DATA?<line>,<col> provides the current settings of individual overhead bytes of the STM4/OC12 SOH.

Example

:SOUR:DATA:SDH:STMN:OVER:DATA? 1,8
Response: 128 D10 byte is set to 80hex.

:SOUR:DATA[:TEL]:SDH:STMN:OVER:DATA:BLOC

:SOURce:DATA[:TELecom]:SDH:STMN:OVERhead:DATA:BLOCk <line1col1>, <line1col2>, …, <line9col36> sets all 324 bytes of the STM4/OC12 SOH (Section Overhead).

Parameter

324 successive numeric values are expected, which set the complete STM4/OC12 SOH. The 36 bytes of the 1st line are to be entered first, then the 2nd through 9th lines.

Name	Type	Range	Default
all 324 bytes of the SOH	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none

Dependencies

Continuous alarms can be also generated here.
Error/alarm insertion has higher priority and overwrites static settings!

Comments

For byte filling and default settings, see
:SOUR:DATA[:TEL]:SDH:STMN:OVER:PRES on page R-222.
The B1, B2 bytes are formed through parity generation and cannot be altered! These bytes should be set to 0.

Example

:SOUR:DATA:SDH:STMN:OVER:DATA:BLOC
#HF6,#HF6,#HF6,#HF6,#HF6,#HF6,#HF6,#HF6,#HF6,#HF6,#HF6,#HF6,

#H28,#H28,#H28,#H28,#H28,#H28,#H28,#H28,#H28,#H28,#H28,#H28,

0,#HAA,#HAA,#HAA,#HAA,#HAA,#HAA,#HAA,#HAA,#HAA,#HAA,#HAA,
#HAA,
and so on for columns 2 to 9

Related commands

:SOUR:DATA[:TEL]:SDH:STMN:OVER:DATA on page R-220
:SOUR:DATA[:TEL]:SDH:STMN:OVER:PRES on page R-222

:SOUR:DATA[:TEL]:SDH:STMN:OVER:DATA:BLOC?

:SOURce:DATA[:TELecom]:SDH:STMN:OVERhead:DATA:BLOCk? provides the current settings of all overhead bytes of the STM4/OC12 SOH.

Example

:SOUR:DATA:SDH:STMN:OVER:DATA:BLOC?
Response: 324 numerical values in the range 0 to 255

:SOUR:DATA[:TEL]:SDH:STMN:OVER:PRES

:SOURce:DATA[:TELecom]:SDH:STMN:OVERhead:PRESet sets all STM4/OC12 SOH overhead bytes to their default values.

Parameter None

Comments Standard overhead for ITU-T STM4-AU4 (hex):

	line 1	line 2	line 3	line 4	line 5	line 6	line 7	line 8	line 9
col 1	A1 F6	B1 XX	D1 00	H1 68	B2 XX	D4 00	D7 00	D10 00	S1 00
col 2	A1 F6	| 00	| 00	H1 68	B2 XX	| 00	| 00	| 00	Z1 00
col 3	A1 F6	| 00	| 00	H1 68	B2 XX	| 00	| 00	| 00	Z1 00
col 4	A1 F6	| 00	| 00	H1 68	B2 XX	| 00	| 00	| 00	Z1 00
col 5	A1 F6	| 00	| 00	Y 9B	B2 XX	| 00	| 00	| 00	Z1 00
col 6	A1 F6	| 00	| 00	Y 9B	B2 XX	| 00	| 00	| 00	Z1 00
col 7	A1 F6	| 00	| 00	Y 9B	B2 XX	| 00	| 00	| 00	Z1 00
col 8	A1 F6	| 00	| 00	Y 9B	B2 XX	| 00	| 00	| 00	Z1 00
col 9	A1 F6	| 00	| 00	Y 9B	B2 XX	| 00	| 00	| 00	Z1 00
col 10	A1 F6	| 00	| 00	Y 9B	B2 XX	| 00	| 00	| 00	Z1 00
col 11	A1 F6	| 00	| 00	Y 9B	B2 XX	| 00	| 00	| 00	Z1 00
col 12	A1 F6	| 00	| 00	Y 9B	B2 XX	| 00	| 00	| 00	Z1 00
col 13	A2 28	E1 00	D2 00	H2 00	K1 00	D5 00	D8 00	D11 00	Z2 00
col 14	A2 28	| 00	| 00	H2 00	| 00	| 00	| 00	| 00	Z2 00
col 15	A2 28	| 00	| 00	H2 00	| 00	| 00	| 00	| 00	M1 00
col 16	A2 28	| 00	| 00	H2 00	| 00	| 00	| 00	| 00	Z2 00
col 17	A2 28	| 00	| 00	| FF	| 00	| 00	| 00	| 00	Z2 00
col 18	A2 28	| 00	| 00	| FF	| 00	| 00	| 00	| 00	Z2 00
col 19	A2 28	| 00	| 00	| FF	| 00	| 00	| 00	| 00	Z2 00
col 20	A2 28	| 00	| 00	| FF	| 00	| 00	| 00	| 00	Z2 00
col 21	A2 28	| 00	| 00	| FF	| 00	| 00	| 00	| 00	Z2 00
col 22	A2 28	| 00	| 00	| FF	| 00	| 00	| 00	| 00	Z2 00
col 23	A2 28	| 00	| 00	| FF	| 00	| 00	| 00	| 00	Z2 00
col 24	A2 28	| 00	| 00	| FF	| 00	| 00	| 00	| 00	Z2 00
col 25	J0 C1 01	F1 00	D3 00	H3 00	K2 00	D6 00	D9 00	D12 00	E2 00
col 26	Z0 C1 AA	| 00	| 00	H3 00	| 00	| 00	| 00	| 00	| 00
col 27	Z0 C1 AA	| 00	| 00	H3 00	| 00	| 00	| 00	| 00	| 00
col 28	Z0 C1 AA	| 00	| 00	H3 00	| 00	| 00	| 00	| 00	| 00
col 29	| AA	| 00	| 00	H3 00	| 00	| 00	| 00	| 00	| 00
col 30	| AA	| 00	| 00	H3 00	| 00	| 00	| 00	| 00	| 00
col 31	| AA	| 00	| 00	H3 00	| 00	| 00	| 00	| 00	| 00
col 32	| AA	| 00	| 00	H3 00	| 00	| 00	| 00	| 00	| 00
col 33	| AA	| 00	| 00	H3 00	| 00	| 00	| 00	| 00	| 00
col 34	| AA	| 00	| 00	H3 00	| 00	| 00	| 00	| 00	| 00
col 35	| AA	| 00	| 00	H3 00	| 00	| 00	| 00	| 00	| 00
col 36	| AA	| 00	| 00	H3 00	| 00	| 00	| 00	| 00	| 00

Comments

Standard overhead for ITU-T STM4-AU3 (hex):

	col 1	col 2	col 3	col 4	col 5	col 6	col 7	col 8	col 9	col 10	col 11	col 12
line 1	A1 F6	A1 F6	A1 F6	A1 F6	A1 F6	A1 F6	A1 F6	A1 F6	A1 F6	A1 F6	A1 F6	A1 F6
line 2	B1 XX	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 3	D1 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 4	H1 68	H1 68	H1 68	H1 68	H1 68	H1 68	H1 68	H1 68	H1 68	H1 68	H1 68	H1 68
line 5	B2 XX	B2 XX	B2 XX	B2 XX	B2 XX	B2 XX	B2 XX	B2 XX	B2 XX	B2 XX	B2 XX	B2 XX
line 6	D4 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 7	D7 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 8	D10 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 9	S1 00	Z1 00	Z1 00	Z1 00	Z1 00	Z1 00	Z1 00	Z1 00	Z1 00	Z1 00	Z1 00	Z1 00

	col 13	col 14	col 15	col 16	col 17	col 18	col 19	col 20	col 21	col 22	col 23	col 24
line 1	A2 28	A2 28	A2 28	A2 28	A2 28	A2 28	A2 28	A2 28	A2 28	A2 28	A2 28	A2 28
line 2	E1 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 3	D2 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 4	H2 00	H2 00	H2 00	H2 00	H2 00	H2 00	H2 00	H2 00	H2 00	H2 00	H2 00	H2 00
line 5	K1 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 6	D5 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 7	D8 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 8	D11 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 9	Z2 00	Z2 00	M1 00	Z2 00	Z2 00	Z2 00	Z2 00	Z2 00	Z2 00	Z2 00	Z2 00	Z2 00

	col 25	col 26	col 27	col 28	col 29	col 30	col 31	col 32	col 33	col 34	col 35	col 36
line 1	J0 C1 01	Z0 C1 AA	Z0 C1 AA	Z0 C1 AA	– AA	– AA	– AA	– AA	– AA	– AA	– AA	– AA
line 2	F1 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 3	D3 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 4	H3 00	H3 00	H3 00	H3 00	H3 00	H3 00	H3 00	H3 00	H3 00	H3 00	H3 00	H3 00
line 5	K2 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 6	D6 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 7	D9 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 8	D12 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 9	E2 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00

Comments

Standard overhead for ANSI STM4-STS3C (OC12-STS3C) (hex):

	col 1	col 2	col 3	col 4	col 5	col 6	col 7	col 8	col 9	col 10	col 11	col 12
line 1	A1 F6	A1 F6	A1 F6	A1 F6	A1 F6	A1 F6	A1 F6	A1 F6	A1 F6	A1 F6	A1 F6	A1 F6
line 2	B1 XX	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 3	D1 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 4	H1 60	H1 60	H1 60	H1 60	Y 93	Y 93	Y 93	Y 93	Y 93	Y 93	Y 93	Y 93
line 5	B2 XX	B2 XX	B2 XX	B2 XX	B2 XX	B2 XX	B2 XX	B2 XX	B2 XX	B2 XX	B2 XX	B2 XX
line 6	D4 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 7	D7 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 8	D10 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 9	S1 00	Z1 00	Z1 00	Z1 00	Z1 00	Z1 00	Z1 00	Z1 00	Z1 00	Z1 00	Z1 00	Z1 00

	col 13	col 14	col 15	col 16	col 17	col 18	col 19	col 20	col 21	col 22	col 23	col 24
line 1	A2 28	A2 28	A2 28	A2 28	A2 28	A2 28	A2 28	A2 28	A2 28	A2 28	A2 28	A2 28
line 2	E1 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 3	D2 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 4	H2 00	H2 00	H2 00	H2 00	– FF	– FF	– FF	– FF	– FF	– FF	– FF	– FF
line 5	K1 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 6	D5 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 7	D8 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 8	D11 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 9	Z2 00	Z2 00	M1 00	Z2 00	Z2 00	Z2 00	Z2 00	Z2 00	Z2 00	Z2 00	Z2 00	Z2 00

	col 25	col 26	col 27	col 28	col 29	col 30	col 31	col 32	col 33	col 34	col 35	col 36
line 1	J0 C1 01	Z0 C1	Z0 C1	Z0 C1	–	–	–	–	–	–	–	–
line 2	F1 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 3	D3 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 4	H3 00	H3 00	H3 00	H3 00	H3 00	H3 00	H3 00	H3 00	H3 00	H3 00	H3 00	H3 00
line 5	K2 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 6	D6 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 7	D9 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 8	D12 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 9	E2 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00

Comments

Standard overhead for ANSI STM4-STS3 (OC12-STS3) (hex):

	col 1	col 2	col 3	col 4	col 5	col 6	col 7	col 8	col 9	col 10	col 11	col 12
line 1	A1 F6	A1 F6	A1 F6	A1 F6	A1 F6	A1 F6	A1 F6	A1 F6	A1 F6	A1 F6	A1 F6	A1 F6
line 2	B1 XX	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 3	D1 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 4	H1 60	H1 60	H1 60	H1 60	H1 60	H1 60	H1 60	H1 60	H1 60	H1 60	H1 60	H1 60
line 5	B2 XX	B2 XX	B2 XX	B2 XX	B2 XX	B2 XX	B2 XX	B2 XX	B2 XX	B2 XX	B2 XX	B2 XX
line 6	D4 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 7	D7 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 8	D10 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 9	S1 00	Z1 00	Z1 00	Z1 00	Z1 00	Z1 00	Z1 00	Z1 00	Z1 00	Z1 00	Z1 00	Z1 00

	col 13	col 14	col 15	col 16	col 17	col 18	col 19	col 20	col 21	col 22	col 23	col 24
line 1	A2 28	A2 28	A2 28	A2 28	A2 28	A2 28	A2 28	A2 28	A2 28	A2 28	A2 28	A2 28
line 2	E1 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 3	D2 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 4	H2 00	H2 00	H2 00	H2 00	H2 00	H2 00	H2 00	H2 00	H2 00	H2 00	H2 00	H2 00
line 5	K1 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 6	D5 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 7	D8 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 8	D11 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 9	Z2 00	Z2 00	M1 00	Z2 00	Z2 00	Z2 00	Z2 00	Z2 00	Z2 00	Z2 00	Z2 00	Z2 00

	col 25	col 26	col 27	col 28	col 29	col 30	col 31	col 32	col 33	col 34	col 35	col 36
line 1	J0 C1 01	Z0 C1	Z0 C1	Z0 C1	–	–	–	–	–	–	–	–
line 2	F1 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 3	D3 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 4	H3 00	H3 00	H3 00	H3 00	H3 00	H3 00	H3 00	H3 00	H3 00	H3 00	H3 00	H3 00
line 5	K2 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 6	D6 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 7	D9 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 8	D12 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00
line 9	E2 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00	– 00

XX: Inserted via parity formation (B1, B2)
There is no query for this command.

Example

:SOUR:DATA:SDH:OVER:STMN:PRES

Related commands

:SOUR:DATA[:TEL]:SDH:STMN:OVER:DATA on page R-220
:SOUR:DATA[:TEL]:SDH:STMN:OVER:DATA:BLOC on page R-221

:SOUR:DATA[:TEL]:SDH:STMN:OVER:RDAT

:SOURce:DATA[:TELecom]:SDH:STMN:OVERhead:RDATa <line>, <col>, <value> selects the overhead bytes of the STM4 (OC12) SOH/TOH (Section/Transport Overhead) to be replaced.

Parameter

Name	Type	Range	Default
line	numeric	1 - 9	none
col	numeric	1 - 36	none
value	numeric	0 - 1	none

Dependencies
Only valid if :SOUR:DATA[:TEL]:NEL = ADM.
The B1, B2, M1 bytes are always terminated and reconstructed by this instrument and cannot be replaced in the way described here.

Comments
In “Through” mode this command determines the bytes being switched through transparently by the receiver or the bytes being overwritten by the transmitter.

<line>: Line number in the 9 x 36 array of the STM-4 (OC-12) overhead

<col>: Column number (see table) in the 9 x 36 array of the STM-4 (OC12) overhead

<value>: 0: Byte is taken from RX
1: Byte is replaced by the TX byte value set by :SOUR:DATA[:TEL]:SDH:STMN:OVER:DATA on page R-220

Example
:SOUR:DATA:SDH:STMN:OVER:RDAT 1,25, 1
C1 byte not from TX

Related commands
:SOUR:DATA[:TEL]:SDH:STMN:OVER:DATA on page R-220
:SOUR:DATA[:TEL]:SDH:STMN:OVER:DATA:BLOC on page R-221
:SOUR:DATA[:TEL]:NEL on page R-86
:SOUR:DATA[:TEL]:SDH:STMN:OVER:RDAT:BLOC on page R-227
:SOUR:DATA[:TEL]:SDH:OVER[i]:RDAT on page R-182

:SOUR:DATA[:TEL]:SDH:STMN:OVER:RDAT?

:SOURce:DATA[:TELecom]:SDH:STMN:OVERhead:RDATa?<line>,<col> provides the current setting of the replaced overhead bytes of the STM4 (OC12) SOH/TOH (Section/Transport Overhead).

Example
:SOUR:DATA:SDH:STMN:OVER:RDAT? 13,8
Response: 1 D11 is replaced.

:SOUR:DATA[:TEL]:SDH:STMN:OVER:RDAT:BLOC

:SOURce:DATA[:TELecom]:SDH:STMN:OVERhead:RDATa:BLOCk <line1col1>, <line1col2>, …, <line9col36> selects the overhead bytes of the complete STM4 (OC12) SOH/TOH (Section/Transport Overhead) that are to be replaced.

Parameter

324 successive numeric values are expected, which set the complete STM4/OC12 SOH. The 36 bytes of the 1st line are to be entered first, then the 2nd through 9th lines.

Name	Type	Range	Default
all 324 bytes of the SOH	numeric	0 - 1	none

Dependencies

Only valid if :SOUR:DATA[:TEL]:NEL = ADM.
The B1, B2, M1 bytes are always terminated and reconstructed by this instrument and cannot be replaced in the way described here. They must be set to 1.

Comments

In “Through” mode this command determines the bytes being switched through transparently by the receiver or the bytes being overwritten by the transmitter.

<values> 0: Byte is taken from RX
1: Byte is replaced by the TX byte value set by :SOUR:DATA[:TEL]:SDH:STMN:OVER:DATA on page R-220

Example

:SOUR:DATA:SDH:STMN:OVER:RDAT:BLOC
1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,
1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,
0,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,
1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,
1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,
1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,
1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,
1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,
1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1
replaces only the D1 byte.

Related commands

:SOUR:DATA[:TEL]:SDH:STMN:OVER:DATA on page R-220
:SOUR:DATA[:TEL]:SDH:STMN:OVER:DATA:BLOC on page R-221
:SOUR:DATA[:TEL]:SDH:STMN:OVER:RDAT on page R-226
:SOUR:DATA[:TEL]:NEL on page R-86
:SOUR:DATA[:TEL]:SDH:OVER[i]:RDAT on page R-182

:SOUR:DATA[:TEL]:SDH:STMN:OVER:RDAT:BLOC?

:SOURce:DATA[:TELecom]:SDH:STMN:OVERhead:RDATa:BLOCk? provides the current setting of the replaced overhead bytes of the complete STM4 (OC12) SOH/TOH (Section/Transport Overhead).

Example

:SOUR:DATA:SDH:STMN:OVER:RDAT:BLOC?

Response: 324 numerical values in the range 0 to 1

1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,
1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,
0,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,
1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,
1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,
1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,
1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,
1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,
1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1
if only the D1 byte is replaced.

:SOUR:DATA[:TEL]:SDH:TRIB

The commands in this command group determine the settings of all low path tributary units (TU-11, TU-12, TU-2, TU-3).

:SOUR:DATA[:TEL]:SDH:TRIB:BPOV:DATA

:SOURce:DATA[:TELecom]:SDH:TRIButary:BPOVerhead:DATA <byte>, <value> sets bytes of the VC12 POH (path overhead) of the background channels.

Parameter

Name	Type	Range	Default
byte	discrete	V5 | J2 | N2 | K4(Z6)	none
value	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255 For V5, only values from 0 - 63 are allowed	none

Dependencies None

Comments This command allows individual setting of the designated POH bytes in all background channels simultaneously.
For <byte> = V5 only values for the bits 3 to 8 are allowed.

Example :SOUR:DATA:SDH:TRIB:BPOV:DATA N2, #H34 sets N2 byte to 34hex.

Related commands
:SOUR:DATA[:TEL]:SDH:TRIB:BPOV:LPTR on page R-230
:SOUR:DATA[:TEL]:SDH:TRIB:BPOV:DATA on page R-229
:SOUR:DATA[:TEL]:SDH:TRIB:POV:DATA on page R-246

:SOUR:DATA[:TEL]:SDH:TRIB:BPOV:DATA?

:SOURce:DATA[:TELecom]:SDH:TRIButary:BPOVerhead:DATA? <byte> provides the current settings of individual VC12 POH (path overhead) bytes in the common background channels.

Example :SOUR:DATA:SDH:TRIB:BPOV:DATA? N2
Response: 128 N2 byte is set to 80hex.

:SOUR:DATA[:TEL]:SDH:TRIB:BPOV:LPTR

:SOURce:DATA[:TELecom]:SDH:

:BPOVerhead:LPTRace <mode>, <trace> determines the cyclical path trace string and mode in the J2 low path trace (J2 byte of the VC12 POH (path overhead)) of all background channels.

Parameter

Name	Type	Range	Default
mode	discrete	NONE | TRC16	TRC16
trace	string	Strings with a length from 1 to 15 bytes	“WG IDLE”

Dependencies None

Comments <mode> =

NONE: Path trace is switched off. The J2 byte as set by :SOUR:DATA[:TEL]:SDH:TRIB:BPOV:DATA on page R-229 is transmitted statically.

TRC16: The string of up to 15 characters is automatically completed for frame synchronization and error checking with the 16th byte using CRC-7.

<trace>: All printable characters are allowed (7 bit ASCII). If the string is shorter than the maximum length, it is padded with blanks (20hex). Non-printing characters can be set using the UNIX shell conventions:

\n --> new line character
\r --> CR character
\b --> back space character
\t --> TAB character
\0 --> 0 HEX character
\\ --> \ character
\001 --> 01 HEX character in octal notation

Example :SOUR:DATA:SDH:TRIB:BPOV:LPTR TRC16,“Hello World”
“Hello World” is transmitted cyclically in the J2 trace.

Related commands :SOUR:DATA[:TEL]:SDH:TRIB:POV:LPTR on page R-247
:SOUR:DATA[:TEL]:SDH:TRIB:BPOV:DATA on page R-229

:SOUR:DATA[:TEL]:SDH:TRIB:BPOV:LPTR?

:SOURce:DATA[:TELecom]:SDH:TRIButary:BPOVerhead:LPTRace? provides the current setting of the J2 low path trace in the J2 byte of the VC12 POH (path overhead) of all background channels.

Example :SOUR:DATA:SDH:TRIB:BPOV:LPTR?
Response: TRC16,“Hello World”
for “Hello World” in the 16 byte trace.

:SOUR:DATA[:TEL]:SDH:TRIB:BPOV:PRES

:SOURce:DATA[:TELecom]:SDH:TRIButary:BPOVerhead:PRESet sets all tributary overhead bytes (V5,J2,N2,K4(Z6)) of the background channels to their default values.

Parameter None

Comments Standard overhead (binary):

POH bytes	Pattern
V5	XX00YYY0
J2	00
N2	00
K4(Z6)	00

YYY = 010 (VC-12 A = for asynchronous operation)

YYY = 011 (VC-12 S = for bit-synchronous operation)

XX = LP-BIP error, generated internally	Bits 1-2
Other bit patterns:	
LP-REI (FEBE) fixed at “0”	Bit 3
RFI	Bit 4
Signal label (L1, L2, L3)	Bits 5-7
LP-RDI (FERF)	Bit 8

There is no query for this command.

Example :SOUR:DATA:SDH:TRIB:BPOV:PRES

Related commands :SOUR:DATA[:TEL]:SDH:TRIB:BPOV:DATA on page R-229
:SOUR:DATA[:TEL]:SDH:TRIB:BPOV:LPTR on page R-230

:SOUR:DATA[:TEL]:SDH:TRIB:BPOV:VC3:DATA

:SOURce:DATA[:TELecom]:SDH:TRIButary:BPOVerhead:VC3:DATA <byte>, <value> sets bytes of the low path VC3 POH (path overhead) of all background channels.

Parameter

Name	Type	Range	Default
byte	discrete	J1 | C2 | G1 | F2 | F3| K3(Z4) | N1	none
value	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none

Dependencies
Only applicable for SDH mappings.
Coupled with :SOUR:DATA[:TEL]:SDH:TRIB:POV:LPTR
A low path VC3 POH only exists for VC3 mapping via AU4. In this case, one high path VC4 POH and three low path VC3 POHs are present.

Comments
This command allows the individual setting of the designated POH bytes in the 2 background channels for C3 mapping via AU4. The POH bytes of the one measurement channel are set using
:SOUR:DATA[:TEL]:SDH:TRIB:POV:VC3:DATA on page R-249.
For defaults see :SOUR:DATA[:TEL]:SDH:TRIB:BPOV:VC3:PRES on page R-234.

Example
:SOUR:DATA:SDH:TRIB:BPOV:VC3:DATA C2, #H34
sets the C2 byte to 34hex.

Related commands
:SOUR:DATA[:TEL]:SDH:TRIB:BPOV:VC3:PRES on page R-234
:SOUR:DATA[:TEL]:SDH:TRIB:BPOV:VC3:DATA:BLOC on page R-233
:SOUR:DATA[:TEL]:SDH:TRIB:POV:VC3:DATA on page R-249

:SOUR:DATA[:TEL]:SDH:TRIB:BPOV:VC3:DATA?

:SOURce:DATA[:TELecom]:SDH:TRIButary:BPOVerhead:VC3:DATA? <byte> provides current settings of individual low path VC3 POH bytes of all background channels.

Example
:SOUR:DATA:SDH:TRIB:BPOV:VC3:DATA? C2
Response: 128 C2 byte is set to 80hex.

:SOUR:DATA[:TEL]:SDH:TRIB:BPOV:VC3:DATA:BLOC

:SOURce:DATA[:TELecom]:SDH:TRIButary:BPOVerhead:VC3:DATA:BLOCk <J1>, <B3>, <C2>, <G1>, <F2>, <H4>, <F3>, <K3>, <N1> sets bytes of the low path VC3 POH (path overhead) of all background channels.

Parameter

Nine successive <numeric> values are expected, which set the complete POH.

Name	Type	Range	Default
J1	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
B3	numeric	automatically generated --> should be set to 0	0
C2	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
G1	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
F2	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
H4	numeric	automatically generated --> should be set to #HFF	#HFF
F3	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
K3(Z4)	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
N1	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none

Dependencies

Only applicable for SDH mappings.
Continuous alarms can also be generated here.
Error/alarm insertion has higher priority and overwrites static settings!
A low path VC3 POH only exists for VC3 mapping via AU4. In this case, one high path VC4 POH and three low path VC3 POHs are present.

Comments

The B3 byte is automatically generated through parity formation and cannot be altered!
This byte should be set to 0.

Example

:SOUR:DATA:SDH:TRIB:BPOV:VC3:DATA:BLOC 0,0,4,0,0,#HFF,0,0,0

Related commands

:SOUR:DATA[:TEL]:SDH:TRIB:BPOV:VC3:PRES on page R-234
:SOUR:DATA[:TEL]:SDH:TRIB:BPOV:VC3:DATA on page R-232
:SOUR:DATA[:TEL]:SDH:TRIB:POV:VC3:DATA on page R-249

:SOUR:DATA[:TEL]:SDH:TRIB:BPOV:VC3:DATA:BLOC?

:SOURce:DATA[:TELecom]:SDH:TRIButary:BPOVerhead:VC3:DATA:BLOCk? provides the current settings of the 9 bytes of the low path VC3 POH (path overhead) of all background channels.

Example :SOUR:DATA:SDH:TRIB:BPOV:VC3:DATA:BLOC?
Response: 0,0,4,0,0,255,0,0,0

:SOUR:DATA[:TEL]:SDH:TRIB:BPOV:VC3:PRES

:SOURce:DATA[:TELecom]:SDH:TRIButary:BPOVerhead:VC3:PRESet sets the low path VC3 POH overhead bytes of all background channels to their default values.

Parameter None

Comments Standard overhead (hex)

POH bytes	Pattern
J1	00
B3	XX
C2	02
G1	00
F2	00
H4	YY
F3	00
K3(Z4)	00
N1	00

XX: Inserted via parity formation (B3)
YY: Automatically filled through H4 sequence (H4).

A low path VC3 POH only exists for VC3 mapping via AU4. In this case, one high path VC4 POH and three low path VC3 POHs are present.

There is no query for this command.

Example :SOUR:DATA:SDH:TRIB:BPOV:VC3:PRES

Related commands :SOUR:DATA[:TEL]:SDH:POV:PRES on page R-212

:SOUR:DATA[:TEL]:SDH:TRIB:MAPP

:SOURce:DATA[:TELecom]:SDH:TRIButary:MAPPing <mapping> determines the mapping of the TU11/TU12 or VT1.5/VT2 tributary units.

Parameter

Name	Type	Range	Default
mapping	discrete	ASYNchronous | FBYTe	ASYN

Dependencies Coupled with :SOUR:DATA[:TEL]:SDH:MAPP

Comments

ASYNchronous: Asynchronous mapping
FBYTe: Floating byte mapping

Example

:SOUR:DATA:SDH:TRIB:MAPP ASYN
activates asynchronous mapping for the tributary units.

Related commands

:SOUR:DATA[:TEL]:SDH:MAPP on page R-168
:SOUR:DATA[:TEL]:SDH:PAYL:TYPE on page R-195

:SOUR:DATA[:TEL]:SDH:TRIB:MAPP?

:SOURce:DATA[:TELecom]:SDH:TRIButary:MAPPing? provides the current setting of the mapping of the TU11/TU12 or VT1.5/VT2 tributary units.

Example

:SOUR:DATA:SDH:TRIB:MAPP?
Response: FBYT for floating byte mapping.

:SOUR:DATA[:TEL]:SDH:TRIB:POIN[:ACT]

:SOURce:DATA[:TELecom]:SDH:TRIBUtary:POINter[:ACTion] <action> sets the TU/VT pointer actions.

Parameter

Name	Type	Range	Default
action	discrete	NONE | NPOinter | INCRement | DECRement | ALTernate | SEQuence	NONE

Dependencies None

Comments
NONE: No pointer actions
NPOinter: New pointer value
INCRement: Pointer increment sequences
DECrement: Pointer decrement sequences
ALTernate: Pointer alternating sequences
SEQuence: Pointer sequences to G.783 (T1.105.3)

Example :SOUR:DATA:SDH:TRIB:POIN NPO sets a new pointer value.

Related commands
:SOUR:DATA[:TEL]:SDH:POIN[:ACT] on page R-198
:SOUR:DATA[:TEL]:SDH:TRIB:POIN:VAL on page R-245
:SOUR:DATA[:TEL]:SDH:TRIB:POIN:MODE on page R-241
:SOUR:DATA[:TEL]:SDH:TRIB:POIN:PER on page R-243
:SOUR:DATA[:TEL]:SDH:TRIB:POIN:IPER on page R-240
:SOUR:DATA[:TEL]:SDH:TRIB:POIN:APER on page R-238
:SOUR:DATA[:TEL]:SDH:TRIB:POIN:SEQ:TYPE on page R-244
:SOUR:DATA[:TEL]:SDH:TRIB:POIN:NDFL on page R-241
:SOUR:DATA[:TEL]:SDH:TRIB:POIN:ADD[:STAT] on page R-237
:SOUR:DATA[:TEL]:SDH:TRIB:POIN:CANC:PER on page R-239
:SOUR:DATA[:TEL]:SDH:TRIB:POIN:NUMB on page R-242

:SOUR:DATA[:TEL]:SDH:TRIB:POIN[:ACT]?

:SOURce:DATA[:TELecom]:SDH:TRIButary:POINter[:ACTion]? provides the current setting of the pointer action.

Comments <NPO> is a volatile state and cannot be read with this query.

Example :SOUR:DATA:SDH:TRIB:POIN?
Response: None

:SOUR:DATA[:TEL]:SDH:TRIB:POIN:ADD:PER

:SOURce:DATA[:TELecom]:SDH:TRIButary:POINter:ADD:PERiod <interval> sets the TU/VT double pointer interval (see also “T3” in Overview of pointer sequences on page R-196).

Parameter

Name	Type	Range	Default
interval	numeric	2 - 80000	16

Dependencies :SOUR:DATA[:TEL]:SDH:TRIB:POIN:ADD[:STAT] = ON

Comments Double pointer interval expressed as a number of frames (1 frame = 125 µs for C3 mapping or = 500 µs for the other mappings).

Example :SOUR:DATA:SDH:TRIB:POIN:ADD:PER 4 sets an interval of 0.5 ms.

Related commands :SOUR:DATA[:TEL]:SDH:TRIB:POIN:ADD[:STAT] on page R-237

:SOUR:DATA[:TEL]:SDH:TRIB:POIN:ADD:PER?

:SOURce:DATA[:TELecom]:SDH:TRIButary:POINter:ADD:PERiod? provides the current setting of the double pointer interval.

Example :SOUR:DATA:SDH:TRIB:POIN:ADD:PER?
Response: 4 for an interval of 4 frames.

:SOUR:DATA[:TEL]:SDH:TRIB:POIN:ADD[:STAT]

:SOURce:DATA[:TELecom]:SDH:TRIButary:POINter:ADD[:STATe] <state> controls the generation of TU/VT double pointers.

Parameter

Name	Type	Range	Default
state	boolean	ON | OFF | 1 | 0	OFF

Dependencies :SOUR:DATA[:TEL]:SDH:TRIB:POIN[:ACT] = INCR | DECR

Comments
ON | 1: Activates double pointer generation
OFF | 0: Deactivates double pointer generation

Example :SOUR:DATA:SDH:TRIB:POIN:ADD ON activates double pointer generation.

Related commands
:SOUR:DATA[:TEL]:SDH:TRIB:POIN[:ACT] on page R-236
:SOUR:DATA[:TEL]:SDH:TRIB:POIN:ADD:PER on page R-237

:SOUR:DATA[:TEL]:SDH:TRIB:POIN:ADD[:STAT]?

:SOURce:DATA[:TELecom]:SDH:TRIButary:POINter:ADD[:STATe]? provides the current setting of TU/VT double pointer generation.

Example :SOUR:DATA:SDH:TRIB:POIN:ADD?
Response: 0 if double pointer generation is switched off.

:SOUR:DATA[:TEL]:SDH:TRIB:POIN:APER

:SOURce:DATA[:TELecom]:SDH:TRIButary:POINter:APERiod <period> sets the TU/VT pointer adjustment period (see also “T2” in Overview of pointer sequences on page R-196).

Parameter

Name	Type	Range	Default
period	numeric	2 - 80000	8000

Dependencies None

Comments <frames>: Pointer adjustment period expressed as a number of frames (1 frame = 125 µs for C3 mapping or = 500 µs for the other mappings).

Example :SOUR:DATA:SDH:TRIB:POIN:APER 10000
sets the adjustment period to 10000 frames.

Related commands :SOUR:DATA[:TEL]:SDH:TRIB:POIN[:ACT] on page R-236
:SOUR:DATA[:TEL]:SDH:TRIB:POIN:IPER on page R-240
:SOUR:DATA[:TEL]:SDH:TRIB:POIN:PER on page R-243

:SOUR:DATA[:TEL]:SDH:TRIB:POIN:APER?

:SOURce:DATA[:TELecom]:SDH:TRIButary:POINter:APERiod? provides the current adjustment period.

Example :SOUR:DATA:SDH:TRIB:POIN:APER?
Response: 10000

:SOUR:DATA[:TEL]:SDH:TRIB:POIN:CANC:PER

:SOURce:DATA[:TELecom]:SDH:TRIButary:POINter:CANCel:PERiod <interval> sets the interval for cancellation of TU/VT pointer actions (see also "T5" in Overview of pointer sequences on page R-196).

Parameter

Name	Type	Range	Default
interval	numeric	0 - 4800000	16000

Dependencies :SOUR:DATA[:TEL]:SDH:TRIB:POIN:CANC[:STAT] = ON

Comments Interval for cancellation of pointer actions expressed as a number of frames (1 frame = 125 µs for C3 mapping or = 500 µs for the other mappings).

Example :SOUR:DATA:SDH:TRIB:POIN:CANC:PER 4
sets an interval of 0.5 ms.

Related commands :SOUR:DATA[:TEL]:SDH:TRIB:POIN:CANC[:STAT] on page R-239

:SOUR:DATA[:TEL]:SDH:TRIB:POIN:CANC:PER?

:SOURce:DATA[:TELecom]:SDH:TRIButary:POINter:CANCel:PERiod? provides the current interval for cancellation of pointer actions.

Example :SOUR:DATA:SDH:TRIB:POIN:CANC:PER?
Response: 4 for an interval of 4 frames.

:SOUR:DATA[:TEL]:SDH:TRIB:POIN:CANC[:STAT]

:SOURce:DATA[:TELecom]:SDH:TRIButary:POINter:CANCel[:STATe] <state> controls the cancellation of TU/VT pointer actions.

Parameter

Name	Type	Range	Default
state	boolean	ON | OFF | 1 | 0	OFF

Dependencies :SOUR:DATA[:TEL]:SDH:TRIB:POIN[:ACT] = INCR | DECR

Comments
ON | 1: Activates cancellation of pointer actions
OFF | 0: Deactivates cancellation of pointer actions

Example :SOUR:DATA:SDH:TRIB:POIN:CANC ON
activates cancellation of pointer actions.

Related commands :SOUR:DATA[:TEL]:SDH:TRIB:POIN[:ACT] on page R-236
:SOUR:DATA[:TEL]:SDH:TRIB:POIN:CANC:PER on page R-239

:SOUR:DATA[:TEL]:SDH:TRIB:POIN:CANC[:STAT]?

:SOURce:DATA[:TELecom]:SDH:TRIButary:POINter:CANCel[:STATe]? provides the current setting of the cancellation of TU/VT pointer actions.

Example

:SOUR:DATA:SDH:TRIB:POIN:CANC?
Response: 0
if cancellation of pointer actions is switched off.

:SOUR:DATA[:TEL]:SDH:TRIB:POIN:IPER

:SOURce:DATA[:TELecom]:SDH:TRIButary:POINter:IPERiod <period> sets the TU/VT pointer inversion period (see also “T1” in Overview of pointer sequences on page R-196).

Parameter

Name	Type	Range	Default
period	numeric	2 - 4800000	8000

Dependencies :SOUR:DATA[:TEL]:SDH:TRIB:POIN[:ACT] = ALT

Comments <frames>: Pointer inversion period expressed as a number of frames (1 frame = 125 µs for C3 mapping or = 500 µs for the other mappings).

Example

:SOUR:DATA:SDH:TRIB:POIN:IPER 10000
sets the inversion period to 10000 frames.

Related commands

:SOUR:DATA[:TEL]:SDH:TRIB:POIN[:ACT] on page R-236
:SOUR:DATA[:TEL]:SDH:TRIB:POIN:APER on page R-238
:SOUR:DATA[:TEL]:SDH:TRIB:POIN:PER on page R-243

:SOUR:DATA[:TEL]:SDH:TRIB:POIN:IPER?

:SOURce:DATA[:TELecom]:SDH:TRIButary:POINter:IPERiod? provides the current inversion period.

Example

:SOUR:DATA:SDH:TRIB:POIN:IPER?
Response: 10000

:SOUR:DATA[:TEL]:SDH:TRIB:POIN:MODE

:SOURce:DATA[:TELecom]:SDH:TRIButary:POINter:MODE <mode> sets the execution mode of the TU/VT pointer sequence.

Parameter

Name	Type	Range	Default
mode	discrete	SINGle | PERiodical	PER

Dependencies None

Comments
SINGle: Single execution of sequence
PERiodical: Periodic execution of sequence

Example :SOUR:DATA:SDH:TRIB:POIN:MODE SING sets a single pass.

Related commands :SOUR:DATA[:TEL]:SDH:TRIB:POIN[:ACT] on page R-236
:SOUR:DATA[:TEL]:SDH:TRIB:POIN:SEQ:TYPE on page R-244

:SOUR:DATA[:TEL]:SDH:TRIB:POIN:MODE?

:SOURce:DATA[:TELecom]:SDH:TRIButary:POINter:MODE? provides the current setting of the execution mode of the pointer sequence.

Example :SOUR:DATA:SDH:TRIB:POIN:MODE?
Response: PER
(SING is a volatile state and cannot be read with the query)

:SOUR:DATA[:TEL]:SDH:TRIB:POIN:NDFL

:SOURce:DATA[:TELecom]:SDH:TRIButary:POINter:NDFLag <state> controls NDF generation when a new TU/VT pointer is set.

Parameter

Name	Type	Range	Default
state	boolean	ON | OFF | 1 | 0	ON

Dependencies :SOUR:DATA[:TEL]:SDH:TRIB:POIN[:ACT] = NPO

Comments
ON | 1: Activates NDF (New Data Flag) generation
OFF | 0: Deactivates NDF generation

Example :SOUR:DATA:SDH:TRIB:POIN:NDFL ON
if a pointer appears, NDF is set.

Related commands :SOUR:DATA[:TEL]:SDH:TRIB:POIN[:ACT] on page R-236

:SOUR:DATA[:TEL]:SDH:TRIB:POIN:NDFL?

:SOURce:DATA[:TELecom]:SDH:TRIButary:POINter:NDFLag? provides the initial NDF value when setting new pointers.

Example
:SOUR:DATA:SDH:TRIB:POIN:NDFL?
Response: 1 if NDF is set.

:SOUR:DATA[:TEL]:SDH:TRIB:POIN:NUMB

:SOURce:DATA[:TELecom]:SDH:TRIButary:POINter:NUMBer <number> sets the number of TU/VT multiple pointers (see also "n" in Overview of pointer sequences on page R-196).

Parameter

Name	Type	Range	Default
number	numeric	1 - 2000	1

Dependencies :SOUR:DATA[:TEL]:SDH:TRIB:POIN[:ACT] = INCR | DECR | ALT.

Example :SOUR:DATA:SDH:TRIB:POIN:NUMB 3 sets pointer actions.

Related commands
:SOUR:DATA[:TEL]:SDH:TRIB:POIN[:ACT] on page R-236
:SOUR:DATA[:TEL]:SDH:TRIB:POIN:IPER on page R-240
:SOUR:DATA[:TEL]:SDH:TRIB:POIN:APER on page R-238
:SOUR:DATA[:TEL]:SDH:TRIB:POIN:PER on page R-243

:SOUR:DATA[:TEL]:SDH:TRIB:POIN:NUMB?

:SOURce:DATA[:TELecom]:SDH:TRIButary:POINter:NUMBer? provides the number of multiple pointers.

Example
:SOUR:DATA:SDH:TRIB:POIN:NUMB?
Response: 1

:SOUR:DATA[:TEL]:SDH:TRIB:POIN:PER

:SOURce:DATA[:TELecom]:SDH:TRIButary:POINter:PERiod <period> sets the TU/VT pointer period (see also “T4” in Overview of pointer sequences on page R-196).

Parameter

Name	Type	Range	Default
period	numeric	2 - 4800000	16000

Dependencies None

Comments <period>: Pointer period expressed as a number of frames (1 frame = 125 µs for C3 mapping or = 500 µs for the other mappings).

Example :SOUR:DATA:SDH:TRIB:POIN:PER 1000 sets pointer period to 1000 frames.

Related commands :SOUR:DATA[:TEL]:SDH:TRIB:POIN[:ACT] on page R-236
:SOUR:DATA[:TEL]:SDH:TRIB:POIN:IPER on page R-240
:SOUR:DATA[:TEL]:SDH:TRIB:POIN:APER on page R-238

:SOUR:DATA[:TEL]:SDH:TRIB:POIN:PER?

:SOURce:DATA[:TELecom]:SDH:TRIButary:POINter:PER? provides the pointer period.

Example :SOUR:DATA:SDH:TRIB:POIN:PER?
Response: 1000

:SOUR:DATA[:TEL]:SDH:TRIB:POIN:SEQ:DIR

:SOURce:DATA[:TELecom]:SDH:TRIButary:POINter:SEQuence:DIRection <direction> sets the direction of the TU/VT pointer sequences as per G.783 (T1.105.3).

Parameter

Name	Type	Range	Default
direction	discrete	UP | DOWN	UP

Dependencies :SOUR:DATA[:TEL]:SDH:TRIB:POIN[:ACT] = SEQ

Comments UP: Executes sequence with pointer increments
DOWN Executes sequence with pointer decrements

Example :SOUR:DATA:SDH:TRIB:POIN:SEQ:DIR UP
sets sequences with increasing pointers.

Related commands :SOUR:DATA[:TEL]:SDH:TRIB:POIN:SEQ:TYPE on page R-244

:SOUR:DATA[:TEL]:SDH:TRIB:POIN:SEQ:DIR?

:SOURce:DATA[:TELecom]:SDH:TRIButary:POINter:SEQuence:DIRection? provides the direction of the pointer sequences as per G.783 (T1.105.3).

Example :SOUR:DATA:SDH:TRIB:POIN:SEQ:DIR?
Response: DOWN

:SOUR:DATA[:TEL]:SDH:TRIB:POIN:SEQ:TYPE

:SOURce:DATA[:TELecom]:SDH:TRIButary:POINter:SEQuence:TYPE <type> sets the TU/VT pointer sequences as per G.783 (T1.105.3).

Parameter

Name	Type	Range	Default
type	discrete	S873 | S4344 | S864	S873

Dependencies :SOUR:DATA[:TEL]:SDH:TRIB:POIN[:ACT] = SEQ

Comments
S873: Sequence: 87-3 pattern
S4344: Sequence: 43-44 pattern with double pointer
S864: Sequence: 86-4 pattern with missing pointer

Example :SOUR:DATA:SDH:TRIB:POIN:SEQ:TYPE S873 sets the 87-3 pattern.

Related commands :SOUR:DATA[:TEL]:SDH:TRIB:POIN[:ACT] on page R-236
:SOUR:DATA[:TEL]:SDH:TRIB:POIN:SEQ:DIR on page R-243

:SOUR:DATA[:TEL]:SDH:TRIB:POIN:SEQ:TYPE?

:SOURce:DATA[:TELecom]:SDH:TRIButary:POINter:SEQuence:TYPE? provides the sequence setting as per G.783 (T1.105.3).

Example :SOUR:DATA:SDH:TRIB:POIN:SEQ:TYPE?
Response: S873

:SOUR:DATA[:TEL]:SDH:TRIB:POIN:VAL

:SOURce:DATA[:TELecom]:SDH:TRIButary:POINter:VALue <value> sets the TU/VT pointer value which is activated by :SOUR:DATA[:TEL]:SDH:TRIB:POIN[:ACT] = NPO.

Parameter

Name	Type	Range	Default
value	numeric	0 - 764	0

Dependencies

:SOUR:DATA[:TEL]:SDH:TRIB:POIN[:ACT] = NPO must be transmitted to activate the new pointer value set by this command.
The maximum allowable pointer values depend on the mapping that is selected; see also :SOUR:DATA[:TEL]:SDH:MAPP on page R-168.

Comments

Pointer ranges for mapping types:

C11:	0 - 103
C12:	0 - 139
C2:	0 - 427
C3:	0 - 764

Example

:SOUR:DATA:SDH:TRIB:POIN:VAL 10;
:SOUR:DATA:SDH:TRIB:POIN NPO sets the pointer value to 10.

Related commands

:SOUR:DATA[:TEL]:SDH:TRIB:POIN[:ACT] on page R-236

:SOUR:DATA[:TEL]:SDH:TRIB:POIN:VAL?

:SOURce:DATA[:TELecom]:SDH:TRIButary:POINter:VALue? provides the pointer value.

Example

:SOUR:DATA:SDH:TRIB:POIN:VAL?
Response: 10

:SOUR:DATA[:TEL]:SDH:TRIB:POV:DATA

:SOURce:DATA[:TELecom]:SDH:TRIButary:POVerhead:DATA <byte>, <value> sets bytes of the VC12 POH in the measurement channel (path overhead).

Parameter

Name	Type	Range	Default
byte	discrete	V5 | J2 | N2 | K4(Z6)	none
value	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255 For V5, values from 0 - 63 only are allowed.	none

Dependencies None

Comments This command allows individual setting of the designated POH bytes in the tributary measurement channel.
For <byte> = V5 only values for the bits 3 to 8 are allowed.

Example :SOUR:DATA:SDH:TRIB:POV:DATA N2, #H34 sets N2 byte to 34hex.

Related commands :SOUR:DATA[:TEL]:SDH:TRIB:POV:LPTR on page R-247
:SOUR:DATA[:TEL]:SDH:TRIB:POV:PRES on page R-248
:SOUR:DATA[:TEL]:SDH:TRIB:POV:VC3:DATA on page R-249

:SOUR:DATA[:TEL]:SDH:TRIB:POV:DATA?

:SOURce:DATA[:TELecom]:SDH:TRIButary:POVerhead:DATA? <byte> provides current settings of individual VC12 POH (path overhead) bytes in the measurement channel.

Example :SOUR:DATA:SDH:TRIB:POV:DATA? N2
Response: 128 N2 byte is set to 80hex.

:SOUR:DATA[:TEL]:SDH:TRIB:POV:LPTR

:SOURce:DATA[:TELecom]:SDH:TRIButary:POVerhead:LPTRace <mode>, <trace> determines the cyclical path trace string and mode in the J1/J2 low path trace (J2 byte of the VC11/VC12/VC2 POH (path overhead) or J1 byte of the low path VC3 in the case of C3 mapping via AU-4) in the measurement channel.

Parameter

Name	Type	Range	Default
mode	discrete	NONE | TRC16 | TRC64	TRC16
trace	string	Strings with a length from 1 to 15 bytes or 1 to 64 bytes	“WG LP-TRACE”

Dependencies None

Comments <mode> =

NONE: Path trace is switched off. Byte J2 as set by :SOUR:DATA[:TEL]:SDH:TRIB:POV:DATA on page R-246 is transmitted statically.

TRC16: The string of up to 15 characters is automatically completed for frame synchronization and error checking with the 16th byte using CRC-7.

TRC64: The trace contains up to 64 characters.

<trace>: All printable characters are allowed (7 bit ASCII). If the string is shorter than the maximum length, it is padded with blanks (20hex) in the case of TRC16 or with 0 (00hex) in the case of TRC64. A CR/LF sequence is automatically added to the TRC64 string to complete the 64 byte sequence if the programmed string is shorter than 63 characters. **A CR/LF sequence is required for the ANT-20 receiver to synchronize to the received signal.** Non-printing characters can be set using the UNIX shell conventions:

\n --> new line character
\r --> CR character
\b --> back space character
\t --> TAB character
\0 --> 0 HEX character
\\ --> \ character
\001 --> 01 HEX character in octal notation

Example :SOUR:DATA:SDH:TRIB:POV:LPTR TRC16,“Hello World”
“Hello World” is transmitted cyclically in the J2 trace.

Related commands :SOUR:DATA[:TEL]:SDH:TRIB:POV:DATA on page R-246

:SOUR:DATA[:TEL]:SDH:TRIB:POV:LPTR?

:SOURce:DATA[:TELecom]:SDH:TRIButary:POVerhead:LPTRace? provides the current setting of the J2 low path trace in the J2 byte of the VC12 POH (path overhead) in the measurement channel.

Example :SOUR:DATA:SDH:TRIB:POV:LPTR?
Response: TRC16,“Hello World”
for “Hello World” in the 16 byte trace.

:SOUR:DATA[:TEL]:SDH:TRIB:POV:PRES

:SOURce:DATA[:TELecom]:SDH:TRIButary:POVerhead:PRESet sets all tributary overhead bytes (V5, J2, N2, K4 (Z6)) of the measurement channel to their default values.

Parameter None

Comments Standard overhead (binary):

POH bytes	Pattern
V5	XX00YYY0
J2	00
N2	00
K4(Z6)	00

YYY = 010 (VC-12 A = for asynchronous operation)

YYY = 011 (VC-12 S = for bit-synchronous operation)

XX = LP-BIP error, generated internally, bits 1-2

Other bit patterns:

LP-REI (FEBE) fixed to “0”	Bit 3
RFI	Bit 4
Signal label (L1, L2, L3)	Bits 5-7
LP-RDI (FERF)	Bit 8

There is no query for this command.

Example :SOUR:DATA:SDH:TRIB:POV:PRES

Related commands :SOUR:DATA[:TEL]:SDH:TRIB:POV:DATA on page R-246
:SOUR:DATA[:TEL]:SDH:TRIB:POV:LPTR on page R-247

:SOUR:DATA[:TEL]:SDH:TRIB:POV:VC3:DATA

:SOURce:DATA[:TELecom]:SDH:TRIButary:POVerhead:VC3:DATA <byte>, <value> sets bytes of the low path VC3 POH (path overhead) in the measurement channel.

Parameter

Name	Type	Range	Default
byte	discrete	J1 | C2 | G1 | F2 | F3| K3(Z4) | N1	none
value	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none

Dependencies

Only applicable for SDH mappings.
A low path VC3 POH only exists for VC3 mapping via AU4. In this case, one high path VC4 POH and three low path VC3 POHs are present.

Comments

This command allows the individual setting of the designated POH bytes in the measurement channel for C3 mapping via AU4. The POH bytes of the two background channels are set using
:SOUR:DATA[:TEL]:SDH:TRIB:BPOV:VC3:DATA on page R-232.
This command allows the individual setting of the designated POH bytes. For default values, see :SOUR:DATA[:TEL]:SDH:TRIB:POV:VC3:PRES on page R-251

Example

:SOUR:DATA:SDH:TRIB:POV:VC3:DATA C2, #H34
sets the C2 byte to 34hex.

Related commands

:SOUR:DATA[:TEL]:SDH:TRIB:POV:VC3:PRES on page R-251
:SOUR:DATA[:TEL]:SDH:TRIB:POV:VC3:DATA:BLOC on page R-250
:SOUR:DATA[:TEL]:SDH:TRIB:POV:LPTR on page R-247

:SOUR:DATA[:TEL]:SDH:TRIB:POV:VC3:DATA?

:SOURce:DATA[:TELecom]:SDH:TRIButary:POVerhead:VC3:DATA? <byte> provides current settings of individual low path VC3 POH bytes.

Example

:SOUR:DATA:SDH:TRIB:POV:VC3:DATA? C2
Response: 128 C2 byte is set to 80hex.

:SOUR:DATA[:TEL]:SDH:TRIB:POV:VC3:DATA:BLOC

:SOURce:DATA[:TELecom]:SDH:TRIButary:POVerhead:VC3:DATA:BLOCk <J1>, <B3>, <C2>, <G1>, <F2>, <H4>, <F3>, <K3>, <N1> sets bytes of the low path VC3 POH (path overhead) in the measurement channel.

Parameter

Nine successive <numeric> values are expected, which set the complete POH; see next page.

Dependencies

Only applicable for SDH mappings.
Continuous alarms can also be generated here.
A low path VC3 POH only exists for VC3 mapping via AU4. In this case, one high path VC4 POH and three low path VC3 POHs are present.

Parameter

Name	Type	Range	Default
J1	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
B3	numeric	automatically generated --> should be set to 0	0
C2	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
G1	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
F2	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
H4	numeric	automatically generated --> should be set to #HFF	#HFF
F3	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
K3(Z4)	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none
N1	numeric	#H00 - #HFF or #B00000000 - #B11111111 or 0 - 255	none

Comments

The B3 and H4 bytes of the POH cannot be set since their values are generated automatically.

Example

:SOUR:DATA:SDH:TRIB:POV:VC3:DATA:BLOC 0,0,4,0,0,#HFF,0,0,0

Related commands

:SOUR:DATA[:TEL]:SDH:TRIB:POV:VC3:DATA on page R-249

:SOUR:DATA[:TEL]:SDH:TRIB:POV:VC3:DATA:BLOC?

:SOURce:DATA[:TELecom]:SDH:TRIButary:POVerhead:VC3:DATA:BLOCk? provides the current settings of the 9 bytes of the low path VC3 POH (path overhead).

Example :SOUR:DATA:SDH:TRIB:POV:VC3:DATA:BLOC?
Response: 0,0,4,0,0,255,0,0,0

:SOUR:DATA[:TEL]:SDH:TRIB:POV:VC3:PRES

:SOURce:DATA[:TELecom]:SDH:TRIButary:POVerhead:VC3:PRESet sets low path VC3 POH overhead bytes of the measurement channel to their default values.

Parameter None

Dependencies Only applicable for SDH mappings.
A low path VC3 POH only exists for VC3 mapping via AU4. In this case, one high path VC4 POH and three low path VC3 POHs are present.

Comments Standard overhead (hex)

POH bytes	Pattern
J1	00
B3	XX
C2	02
G1	00
F2	00
H4	YY
F3	00
K3(Z4)	00
N1	00

XX: Inserted via parity formation (B3).
YY: Automatically filled through H4 sequence (H4).

There is no query for this command.

Example :SOUR:DATA:SDH:TRIB:POV:VC3:PRES

Related commands :SOUR:DATA[:TEL]:SDH:POV:PRES on page R-212

:SOUR:DATA[:TEL]:SOUR:DIV

:SOURce:DATA[:TELecom]:SOURce:DIVide <state> controls the generation of divided generator signals. Simultaneous generation of an optical and an electrical signal is set by this command.

Parameter

Name	Type	Range	Default
state	boolean	ON | OFF | 1 | 0	OFF

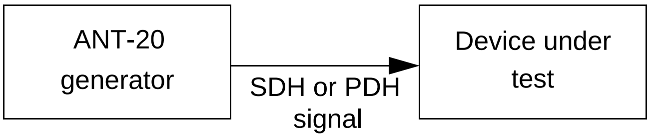
Dependencies

<state> = ON is not possible while :SOUR:DATA[:TEL]:NEL = ADM.
:SOUR:MODE on page R-255 must be set to PDH.

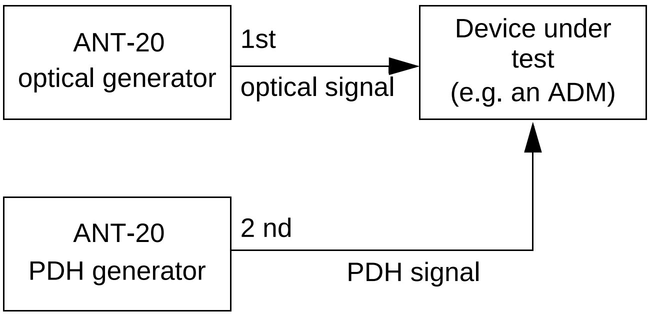
Comments

<state>:
ON | 1: Activates ADM test mode
OFF | 0: Deactivates ADM test mode

If <state> = OFF a single generator signal is generated by this device:



If <state> = ON a split generator signal is generated by this device:



The 2 signals are generated simultaneously.

1st: An optical SDH/SONET signal as specified by :SOUR:DATA[:TEL]:SDH:RATE on page R-213 with HP unequipped in all subchannels.
2nd: :SOUR:DATA[:TEL]:PDH:RATE on page R-129 with all the features available in “normal” mode.

Example

SOUR:DATA:SOUR:DIV ON activates ADM test mode.

Related commands

:SOUR:DATA[:TEL]:SDH:RATE on page R-213
:SOUR:DATA[:TEL]:SDH:MAPP:TUFL on page R-172
:SOUR:MODE on page R-255
All commands in node :SOUR:DATA[:TEL]:PDH on page R-91 ff.

:SOUR:DATA[:TEL]:SOUR:DIV?

:SOURce:DATA[:TELecom]:SOURce:DIVide? provides the current setting of the generation of divided generator signals.

Example :SOUR:DATA:SOUR:DIV?
Response: 0 if ADM test mode is switched off.

:SOUR:DATA[:TEL]:SOUR[:SOCK]

:SOURce:DATA[:TELecom]:SOURce[:SOCKet] <sourceport> determines the output port to which the signal generated in the SOURCE subsystem is output.

Parameter

Name	Type	Range	Default
sourceport	discrete	LINE | OPTic	LINE

Dependencies :SOUR:DATA[:TEL]:SOUR[:SOCK] = OPT only with the optical interface fitted and :SOUR:MODE = SDH.

Comments LINE: Output to LINE interface
OPTic: Output to optical interface

Example :SOUR:DATA:SOUR LINE activates output to LINE interface.

Related commands :SOUR:MODE on page R-255

:SOUR:DATA[:TEL]:SOUR[:SOCK]?

:SOURce:DATA[:TELecom]:SOURce[:SOCKet]? provides the current setting for the output port.

Example :SOUR:DATA:SOUR?
Response: LINE

:SOUR:DATA[:TEL]:STAN

:SOURce:DATA[:TELecom]:STANdard <standard>[,<version>] distinguishes between SDH or SONET operation of ANT20. In SONET operation <version> handles differences between T1X1 and Bellcore.

Parameter

Name	Type	Range	Default
standard	discrete	ITUT | ANSI	ITUT
version	discrete	BELL | T1X1	BELL

Dependencies None

Comments <standard> =

ITUT: SDH operation
The following settings are performed if switched to ITU-T:
:SOUR:DATA[:TEL]:SDH:POV:HPTR TRC16,“WG HP-TRACE”
:SOUR:DATA[:TEL]:SDH:TRIB:POV:LPTR TRC16,
“WG LP-TRACE” all channels are set to 1.

ANSI: SONET operation
The following settings are performed if switched to ANSI:
:SOUR:DATA[:TEL]:SDH:POV:HPTR TRC64, “WG STS-TRACE”
:SOUR:DATA[:TEL]:SDH:TRIB:POV:LPTR TRC64,
”WG VT-TRACE” all channels are set to 1.

<version> = optional parameter:

BELL: Anomaly and defect processing (enhanced alarms) according to Bellcore GR-253.

T1X1: Anomaly and defect processing (enhanced alarms) according to ANSI T1X1.

Example :SOUR:DATA:STAN ANSI,T1X1 activates system to SONET operation (T1X1).

Related commands
:SOUR:DATA[:TEL]:SDH:POV:HPTR on page R-210
:SOUR:DATA[:TEL]:SDH:TRIB:POV:LPTR on page R-247

:SOUR:DATA[:TEL]:STAN?

:SOURce:DATA[:TELecom]:STANdard? provides the current setting for the standard and the ANSI version.

Example :SOUR:DATA:STAN?
Response: ANSI,BELL

:SOUR:MODE

:SOURce:MODE <mode> sets the mode of the generator (SOURce).

Parameter

Name	Type	Range	Default
mode	discrete	SDH | PDH	PDH

Dependencies None

Comments

SDH: The source generates an SDH or **SONET** signal based on the settings from :SOUR:DATA[:TEL]:SDH on page R-135 ff.

PDH: The source generates a PDH signal based on the settings from :SOUR:DATA[:TEL]:PDH on page R-91 ff.
(e.g. a 2 Mbit/s or a DS1 signal).

Example :SOUR:MODE PDH activates PDH signal generation.

Related commands :SOUR:DATA[:TEL]:SDH on page R-135 ff.
:SOUR:DATA[:TEL]:PDH on page R-91 ff.

:SOUR:MODE?

:SOURce:MODE? provides the current mode of the generator (SOURce).

Example :SOUR:MODE?
Response: SDH if SDH signal generation is activated.

9 INPUT Subsystem

:INP:CLOC:JITT[:STAT]

:INPut:CLOCk:JITTer[:STATe] <state> sets the clock source of the signal generator.

Parameter

Name	Type	Range	Default
state	boolean	ON | OFF | 0 | 1	OFF

Dependencies

When an STM16 signal is generated, the generator clock (port [45]) must be synchronized to the STM1 signal multiplexed into the STM16 signal being generated.
(not possible for ABT-20 devices).

For jitter generation up to STM-16 or for wander generation, the command :INP:CLOC:JITT[:STAT] ON; must be transmitted to the Basic Module (Mainframe) after the related commands are transmitted to the Jitter Module or Jitter STM-16 Module.

Comments

ON **|** 1: Takes generator clock from jitter module or from port [23] (VXI modules only) for signals up to STM4.
Takes generator clock from port [45] for STM16 signals.
Enables jitter capabilities.

OFF **|** 0: Sets internal clock generation.
Disables jitter capabilities.

Example

:INP:CLOC:JITT 1

Related commands

:INP:CLOC:WAND[:STAT] on page R-257

For **Jitter Module**:
:SOUR:MODE
:SOUR:JITT:AMPL
:SOUR:JITT:FREQ
:SOUR:JITT[:STAT]

and for firmware release **7.0** or later:
:JITTSOUR:WAND:AFAC
:SOUR:WAND:AMPL
:SOUR:WAND:FREQ
:SOUR:WAND[:STAT]

For **Jitter STM-16 Module**:
:SOUR:JITT:AMPL, :SOUR:JITT:FREQ, :SOUR:JITT[:STAT]

and for firmware release **7.0** or later:
:SOUR:MODE.

:INP:CLOC:JITT[:STAT]?

This query supplies the current jitter clock source setting.

Example

:INP:CLOC:JITT?
Response: 0 for deactivated jitter.

:INP:CLOC:WAND[:STAT]

:INPut:CLOCk:WANDer[:STATe] <state> sets the clock source of the signal generator.

Parameter

Name	Type	Range	Default
state	boolean	ON | OFF | 0 | 1	OFF

Dependencies

This command requires firmware release **7.0** or later.
(not possible for ABT-20 devices).

For STM-16 wander generation only, the command :INP:CLOC:WAND[:STAT] ON; must be transmitted to the Basic Module (Mainframe) after the related commands are sent to the Jitter Module or Jitter STM-16 Module.
For STM-16 jitter generation, the command :INP:CLOC:WAND[:STAT] OFF; (default) must be transmitted to the Basic Module.

For jitter generation up to STM-4 jitter or wander generation, the command :INP:CLOC:WAND[:STAT] is not relevant.

Comments

ON | 1:
OFF | 0: Disables wander capabilities.

Example

:INP:CLOC:WAND 1

Related commands

:INP:CLOC:JITT[:STAT] on page R-256

On **Jitter Module**:
:SOUR:MODE

and for firmware release **7.0** or later:
:JITTSOUR:WAND:AFAC
:SOUR:WAND:AMPL
:SOUR:WAND:FREQ
:SOUR:WAND[:STAT]

On **Jitter STM-16 Module**
and for firmware release **7.0** or later:
:SOUR:MODE

:INP:CLOC:WAND[:STAT]?

This query supplies the current wander clock source setting.

Example

:INP:CLOC:WAND?
Response: 0 for deactivated wander.

:INP[:TEL]:AUX

Commands under this command node set the auxiliary input
(AUX connector [10] or [12]) used for insertion of PDH signals into the generated output signal (not possible for ABT-20 devices).

Note: Auxiliary input support depends on option BN 3035/90.20 (DROP&INSERT) (not possible for ABT-20 devices).

:INP[:TEL]:AUX:CODE

:INPut[:TELecom]:AUX:CODE <code> sets the line code of the auxiliary input.

Parameter

Name	Type	Range	Default
code	discrete	CMI | HDB3 | B3ZS | B8ZS | AMI	HDB3

Dependencies: CMI for all bit rates, ternary codes (HDB3, B3ZS, B8ZS) only up to 34 Mbit/s (not possible for ABT-20 devices)!

Comments:

CMI:	Sets CMI line code
HDB3:	Sets HDB3 line code
B3ZS:	Sets B3ZS line code
B8ZS:	Sets B8ZS line code
AMI:	Sets AMI line code

Example: :INP:AUX:CODE CMI   sets CMI line code.

Related commands: :INP[:TEL]:AUX:TYPE on page R-259

:INP[:TEL]:AUX:CODE?

This query supplies the current line code setting.

Example: :INP:AUX:CODE?
Response: CMI   if CMI line code is activated.

:INP[:TEL]:AUX:TYPE

:INPut[:TELecom]:AUX:TYPE <type> sets the auxiliary input interface type.

Parameter

Name	Type	Range	Default
type	discrete	UNBalanced | BALanced	UNB

Dependencies: UNB for all bit rates, BAL only up to 2 Mbit/s (not possible for ABT-20 devices).

Comments:
UNBalanced: Unbalanced (coaxial) port [10]
BALanced: Balanced port [12]

Example: :INP:AUX:CODE UNB sets the unbalanced input.

Related commands: :INP[:TEL]:AUX:CODE on page R-258

:INP[:TEL]:AUX:TYPE?

This query supplies the current setting of the interface type.

Example: :INP:AUX:TYPE?
Response: UNB if the unbalanced input is activated.

:INP[:TEL]:LINE

Commands under this command node set the electrical LINE input [14] or [12] of the receiver. The structure of the input signal is determined by the commands of the SENSE subsystem.

:INP[:TEL]:LINE:CODE

:INPut[:TELecom]:LINE:CODE <code> sets the line code of the input.

Parameter

Name	Type	Range	Default
code	discrete	CMI | HDB3 | B3ZS | B8ZS | AMI	HDB3

Dependencies: CMI for all bit rates, ternary codes (HDB3, B3ZS, B8ZS, AMI) only up to 34 Mbit/s!

Comments

CMI:	Sets CMI line code
HDB3:	Sets HDB3 line code
B3ZS:	Sets B3ZS line code
B8ZS:	Sets B8ZS line code
AMI:	Sets AMI line code

Example: :INP:LINE:CODE CMI sets CMI line code.

Related commands
:INP[:TEL]:LINE:TYPE on page R-263
:INP[:TEL]:LINE:LEV on page R-262
:INP[:TEL]:LINE:EQU on page R-261

:INP[:TEL]:LINE:CODE?

This query supplies the current line code setting.

Example
:INP:LINE:CODE?
Response: CMI if CMI line code is activated.

:INP[:TEL]:LINE:EQU

:INPut[:TELecom]:LINE:EQUalizer <state> sets the equalizer.

Parameter

Name	Type	Range	Default
state	boolean	ON | OFF | 0 | 1	OFF

Dependencies None

Comments
OFF | 0: Equalizer switched off
ON | 1: Equalizer switched on

Example :INP:LINE:EQU ON activates the equalizer.

Related commands
:INP[:TEL]:LINE:TYPE on page R-263
:INP[:TEL]:LINE:CODE on page R-260
:INP[:TEL]:LINE:EREF on page R-261
:INP[:TEL]:LINE:LEV on page R-262

:INP[:TEL]:LINE:EQU?

This query supplies the current equalizer setting.

Example :INP:LINE:EQU?
Response: 1 if the equalizer is switched on.

:INP[:TEL]:LINE:EREF

:INPut[:TELecom]:LINE:EREFerence <level> sets the equalizer reference level.

Parameter

Name	Type	Range	Default
level	numeric	-15 -> -26	-20

Dependencies Valid only if :INP[:TEL]:LINE:LEV = PMP and :INP[:TEL]:LINE:EQU = ON.

Comments All values in dB.

Example :INP:LINE:EREF -20 sets an equalizer reference level of -20 dB.

Related commands
:INP[:TEL]:LINE:EQU on page R-261
:INP[:TEL]:LINE:LEV on page R-262

:INP[:TEL]:LINE:EREF?

This query supplies the current equalizer reference level setting.

Example :INP:LINE:EREF?
Response: -15

:INP[:TEL]:LINE:LEV

:INPut[:TELecom]:LINE:LEVel <level> sets the input sensitivity.

Parameter

Name	Type	Range	Default
level	discrete	ITUT | PMP | HIGH | LOW | DSX	ITUT

Dependencies
DSX only with DS3, STS1, STM0.
The equalizer must be switched ON during DSX operation.

Comments
ITUT (HIGH): Level to ITU-T (nominal level)
PMP (LOW): Level for PMP (protected monitor point) interfaces
DSX: Nominal level and up to 450 ft/728A cable loss

Example
:INP:LINE:LEV ITUT sets the input to ITU-T sensitivity.

Related commands
:INP[:TEL]:LINE:TYPE on page R-263
:INP[:TEL]:LINE:CODE on page R-260
:INP[:TEL]:LINE:EREF on page R-261
:INP[:TEL]:LINE:EQU on page R-261

:INP[:TEL]:LINE:LEV?

This query supplies the current setting of the input sensitivity.

Example
:INP:LINE:LEV?
Response: ITUT if ITU-T level sensitivity is activated.

:INP[:TEL]:LINE:ROUT

:INPut[:TELecom]:LINE:ROUTe <route> sets the routing of the LINE input [14].

Parameter

Name	Type	Range	Default
route	discrete	PORT | IBUS	PORT

Dependencies
Must be set to IBUS for [:SENS]:DATA[:TEL]:SDH:RATE = STM16.

Comments
PORT: Input signal is routed from the external connector [14].
IBUS: Input signal is routed from the internal local data bus connecting this module to its neighbour slot (NRZ or STM16/OC48 module).
This routing is automatically switched to IBUS if [:SENS]:DATA[:TEL]:SDH:RATE = STM16 is set.

Example
:INP:LINE:PORT ROUT

Related commands
:OUTP[:TEL]:LINE:ROUT on page R-43

:INP[:TEL]:LINE:ROUT?

This query provides the current setting for the routing of the LINE input.

Example
:INP:LINE:ROUT?
Response: PORT for routing to the external connector [14].

:INP[:TEL]:LINE:TYPE

:INPut[:TELecom]:LINE:TYPE <type> sets the interface type of the input.

Parameter

Name	Type	Range	Default
type	discrete	UNBalanced | BALanced	UNB

Dependencies
UNB for all bit rates, BAL only up to 2 Mbit/s.

Comments
UNBalanced: Unbalanced (coaxial) port [14]
BALanced: Balanced port [12]

Example
:INP:LINE:CODE UNB sets the unbalanced input.

Related commands
:INP[:TEL]:LINE:CODE on page R-260
:INP[:TEL]:LINE:LEV on page R-262
:INP[:TEL]:LINE:EQU on page R-261

:INP[:TEL]:LINE:TYPE?

This query supplies the current setting of the interface type.

Example
:INP:LINE:TYPE?
Response: UNB if the unbalanced input is activated.

10 SENSE subsystem

Note: For clarity, options are shown in abbreviated form in this chapter, e.g. “**90.xx**” instead of “**BN 3035/90.xx**”.

This subsystem is used to set the SDH/PDH receiver, configure measurements and query results.

[:SENS]:DATA:FIN?

[:SENSe]:DATA:FINal? {<id>} reads **final measurement results.**

Parameter

Name	Type	Range	Default
id	string	e.g. “ECO:SDH:RSB” for counter value for SDH-B1 errors	none

Dependencies

Coupled with [:SENS]:FUNC[:ON]
Valid final results are only available if a measurement was previously initiated and has finished.
Valid final results are not available for results taken continuously.

Comments

The result(s) designated with <id> are read out, or (if there is no <id> parameter) all results which were previously selected with [:SENS]:FUNC[:ON] on page R-381.
The list of available results is found under Result IDs for :SENS:DATA and :SENS:FUNC commands on page R-382.

Response

The table below shows the response if multiple results are selected

Response name	Response type
response code (1st result)	numeric response code ID
result value (1st result)	response type as described in Result IDs for :SENS:DATA and :SENS:FUNC commands on page R-382
response code (2nd result)	numeric response code ID
result value (2nd result)	response type 2nd result
…	…
response code (last result)	numeric response code ID
result value (last result)	response type 2nd result

Note: If a result is invalid for any reason the corresponding response code is negative and the result value is set to NAN (not a number = 9.91E37).

Example

If CODE and B2 error measurement was previously selected using [:SENS]:FUNC[:ON] “ECO:CODE”,“ECO:SDH:MSB:SUM”, a result given by :DATA:FIN? might be: 130,50,260,0
Meaning:

130	Response code “ECO:CODE”
50	50 code errors found.
260	Response code “ECO:MSB:SUM”
0	0 B2 errors found.

or:
130,50,-260,9.91E37

130	Response code “ECO:CODE”
50	50 code errors found
-260	Response code “ECO:MSB:SUM” invalid
9.91E37	B2 errors not valid; NAN (not a number) is returned

Related commands

Result IDs for :SENS:DATA and :SENS:FUNC commands on page R-382
[:SENS]:FUNC[:ON] on page R-381
[:SENS]:SWE:TIME on page R-408
[:SENS]:DATA:ACT? on page R-265
:INIT[1][:IMM][:ALL] on page R-23
:ABOR[1] on page R-23

[:SENS]:DATA:ACT?

[:SENSe]:DATA:ACTual? {<id>} reads **current results**.

Parameter

Name	Type	Range	Default
id	string	e.g. “ECO:SDH:RSB” for counter value for SDH-B1 errors	none

Dependencies

Coupled with: [:SENS]:FUNC[:ON].
Valid results are only available if a measurement was previously initiated (except status results (“CST: …”) or other results which are taken continuously).

Comments

The result(s) designated with <id>s are read out, or (if there is no <id> parameter) all results which were previously selected with [:SENS]:FUNC[:ON] on page R-381. The list of available results is found under Result IDs for :SENS:DATA and :SENS:FUNC commands on page R-382.

Note: Current and final results are identical once the measurement has finished. If a result is invalid for any reason the corresponding response code is negative and the result value is set to NAN (not a number = 9.91E37).

Example

see [:SENS]:DATA:FIN? on page R-264.
DATA:ACT? “CST:SIGN”
Response: 50,4
Meaning:

50:	Response code “CST:SIGN”
4:	Value of the bit field: Alarm field “CSTatus:SIGNal” indicates a LOS alarm

Related commands Result IDs for :SENS:DATA and :SENS:FUNC commands on page R-382
[:SENS]:FUNC[:ON] on page R-381
[:SENS]:DATA:FIN? on page R-264
:INIT[1][:IMM][:ALL] on page R-23

[:SENS]:DATA:EVEN?

[:SENSe]:DATA:EVENt? <number> reads the “number” of accumulated events from the event FIFO.

Parameter

Name	Type	Range	Default
number	numeric	1 - 200	1

Dependencies FIFO entries are only available if a measurement was previously initiated.

Comments All measurements activated with [:SENS]:FUNC[:ON] on page R-381 automatically generate an event in case of anomalies (i.e. when errors or alarm state changes occur).
These events are stored in an event FIFO (First In First Out), where they can be extracted with this command.
The data are extracted as in a normal FIFO structure, i.e. the oldest entry first, then the second oldest, etc.
You can determine whether an event has occurred by monitoring the status register (Status register structure on page R-11).
The FIFO content is cleared by initiating a new measurement or by a *RST command.

Each event (error or alarm) causes at least 2 entries in the FIFO:
1st entry: the time stamp (response code = 10).
2nd entry: the event.
If more than one event occurs between 2 time stamps, the first entry contains the time stamp and following entries contain the events belonging to the same time stamp.

If at least one event entry is available, bit0 of the status byte is set (see also STATUS subsystem on page R-11 ff.)

Response Each entry in the FIFO has the following structure:

Namen	Type
response code	numeric (the response code)
value	numerical value

Example

:DATA:EVEN? 2	supplies 2 events out of the FIFO
Response: 10,0.1930400E7,101,123	
10	ID 1st event (the time stamp)
0.1930400E7	ms since 1970/1/1
1054	ID 2nd event (code error)
123	123 code errors found

Related commands [:SENS]:FUNC[:ON] on page R-381
[:SENS]:DATA:EVEN:NUMB? on page R-267

[:SENS]:DATA:EVEN:NUMB?

[:SENSe]:DATA:EVENt:NUMBer? supplies the number of events available in the event FIFO.

Parameter	None
Example	:DATA:EVEN:NUMB? Response: 88 for 88 available events.
Related commands	[:SENS]:DATA:EVEN? on page R-266

Codes for the event memory

Name	Response code	Response type	Event description
CEVent:SDH:TCMonitoring:IEC	1030	count	Tandem Connection: Event Result Incoming Error
CEVent:SDH:TCMonitoring:DIFF	1032	count	Tandem Connection: Event Result Difference Error
CEVent:SDH:TCMonitoring:REI	1034	count	Tandem Connection: Event Result Remote Error Indication
CEVent:SDH:TCMonitoring:OEI	1036	count	Tandem Connection: Event Result Outgoing Error Indication
CEVent:TSE	1052	count	Payload test sequence error(s)
CEVent:CODE	1054	count	Code error(s)
CEVent:SDH:FAS	1100	count	SDH/SONET frame error(s) (Frame Alignment Signal)
CEVent:SDH:RSBip	1102	count	B1 BIP error(s) (Regenerator Section)
CEVent:SDH:MSBip	1104	count	B2 BIP error(s) (Multiplex Section)
CEVent:SDH:MSBip:SUM	1106	count	Summary B2 BIP error(s) (Multiplex Section) for signals containing multiple channels with independent B2 generation (STM4/OC12)
CEVent:SDH:PBIP	1108	count	B3 Path BIP error(s)
CEVent:SDH:PREI	1110	count	High Path REI (REI-P)
CEVent:SDH:MSRei	1112	count	Multiplex Section REI (FEBE, M1, REI-L)
CEVent:SDH:PACT:PCO	1114	count	AU/STS pointer increment
CEVent:SDH:PACT:NCO	1115	count	AU/STS pointer decrement
CEVent:SDH:PACT:PVAL	1116	count	New AU/STS pointer value
CEVent:SDH:PACT:NDF	1117	count	AU/STS NDF (New Data Flag)
CEVent:SDH:PACT2:DPO:MIN	1119	count	Minimum AU/STS delta pointer value of C4/STS3C #2 related to C4/STS3C #1. (Note: for STM4C/OC12C virtual concatenation only)
CEVent:SDH:PACT2:DPO:MAX	1120	count	Maximum AU/STS delta pointer value of C4/STS3C #2 related to C4/STS3C #1. (Note: for STM4C/OC12C virtual concatenation only)
CEVent:SDH:PACT3:DPO:MIN	1121	count	Minimum AU/STS delta pointer value of C4/STS3C #3 related to C4/STS3C #1. (Note: for STM4C/OC12C virtual concatenation only)

Table R-3 Event IDs for the event memory (error events)

Name	Response code	Response type	Event description
CEVent:SDH:PACT3:DPO:MAX	1122	count	Maximum AU/STS delta pointer value of C4/STS3C #3 related to C4/STS3C #1. (Note: for STM4C/OC12C virtual concatenation only)
CEVent:SDH:PACT4:DPO:MIN	1123	count	Minimum AU/STS delta pointer value of C4/STS3C #4 related to C4/STS3C #1. (Note: for STM4C/OC12C virtual concatenation only)
CEVent:SDH:PACT4:DPO:MAX	1124	count	Maximum AU/STS delta pointer value of C4/STS3C #4 related to C4/STS3C #1. (Note: for STM4C/OC12C virtual concatenation only)
CEVent:SDH:TRIButary:PREI	1150	count	Low Path REI (REI-V)
CEVent:SDH:TRIButary:PBIP	1152	count	Low Path BIP-2 error(s) (BIP-V)
CEVent:SDH:TRIButary:PACT:PCO	1154	count	TU/VT pointer increment
CEVent:SDH:TRIButary:PACT:NCO	1155	count	TU/VT pointer decrement
CEVent:SDH:TRIButary:PACT:PVAL	1156	count	New TU/VT pointer value
CEVent:SDH:TRIButary:PACT:NDF	1157	count	TU/VT-NDF (New Data Flag)
CEVent:PDH:M2:FAS	1200	count	PDH 2 Mbit/s frame error(s)
CEVent:PDH:M2:CRC	1202	count	PDH 2 Mbit/s CRC error(s)
CEVent:PDH:M2:EBIT	1204	count	PDH 2 Mbit/s EBIT error(s)
CEVent:PDH:M8:FAS	1206	count	PDH 8 Mbit/s frame error(s)
CEVent:PDH:M34:FAS	1208	count	PDH 34 Mbit/s frame error(s)
CEVent:PDH:M140:FAS	1210	count	PDH 140 Mbit/s frame error(s)
CEVent:PDH:DS1:FAS	1250	count	PDH 1.544 Mbit/s DS1 frame error(s)
CEVent:PDH:DS1:CRC	1252	count	PDH 1.544 Mbit/s DS1 CRC error(s)
CEVent:PDH:DS3:FAS	1270	count	PDH 44.736 Mbit/s DS3 frame error(s)
CEVent:PDH:DS3:MFAS	1272	count	PDH 44.736 Mbit/s DS3 multiframe error(s)
CEVent:PDH:DS3:REI	1274	count	PDH 44.736 Mbit/s DS3 REI error(s)
CEVent:PDH:DS3:PAR	1276	count	PDH 44.736 Mbit/s DS3 parity error(s)
CEVent:PDH:DS3:CPAR	1278	count	PDH 44.736 Mbit/s DS3 C-parity error(s)
CEVent:ATM:CELLs	1301	count	All cells (not possible for ABT-20 devices)

Table R-3 Event IDs for the event memory (error events) *(continued)*

Name	Response code	Response type	Event description
CEVent:ATM:CLPCells	1303	count	Cells of test channel marked with CLP=1 (not possible for ABT-20 devices)
CEVent:ATM:FCELls	1305	count	Filtered cells (all cells in test channel) (not possible for ABT-20 devices)
CEVent:ATM:F4Cells	1307	count	F4 OAM cells of test path (not possible for ABT-20 devices)
CEVent:ATM:F5Cells	1309	count	F5 OAM cells of test channel (not possible for ABT-20 devices)
CEVent:ATM:HCORrect	1311	count	Correctable header errors
CEVent:ATM:HUNCorrect	1313	count	Uncorrectable header errors
CEVent:ATM:LCELls	1315	count	Loaded cells (non idle and non unassigned) (not possible for ABT-20 devices)
CEVent:ATM:RPCR	1317	count	Reverse peak cell rate (min. cell distance) (not possible for ABT-20 devices)
CEVent:ATM:ERRCells	1319	count	Errored cells (not possible for ABT-20 devices)
CEVent:ATM:LOSCells	1321	count	Lost cells (not possible for ABT-20 devices)
CEVent:ATM:MISCells	1323	count	Misinserted cells (not possible for ABT-20 devices)
CEVent:AAL1:CRCerrors	1402	count	AAL1 CRC errors (not possible for ABT-20 devices)
CEVent:AAL1:PERRors	1400	count	AAL1 parity errors (not possible for ABT-20 devices)
CEVent:AAL1:CLR	1404	count	AAL1 lost cells (not possible for ABT-20 devices)
CEVent:AAL1:CMR	1406	count	AAL1 misinserted cells (not possible for ABT-20 devices)
CEVent:PLCP:FAS	1450	count	PLCP frame error(s)
CEVent:PLCP:B1	1452	count	PLCP B1-BIP error(s)
CEVent:PLCP:FEBE	1454	count	PLCP far end bit error(s)
CEVent:PDH:M34:G832:EM	1500	count	PDH 34 Mbit/s according to G832: EM (BIP) error(s)
CEVent:PDH:M34:G832:REI	1502	count	PDH 34 Mbit/s according to G832: REI

Table R-3 Event IDs for the event memory (error events) *(continued)*

Name	Response code	Response type	Event description
CEVent:PDH:M140:G832:EM	1504	count	PDH 140 Mbit/s according to G832: EM (BIP) error(s)
CEVent:PDH:M140:G832:REI	1506	count	PDH 140 Mbit/s according to G832: REI
CEVent: COUNT Event (Errors occurred)			

Table R-3 Event IDs for the event memory (error events) *(continued)*

Name	Response code	Response type	Event description
AEVent:SIGNal	1000	boolean (compressed)	Event in the signal alarm bit field (see also Alarm field “CSTatus:SIGNal” on page R-272)
AEVent:SDH	1001	boolean (compressed)	Event in the SDH alarm bit field (see also Alarm field “CSTatus:SDH”/ “HSTatus:SDH” on page R-272)
AEVent:SDH2	1002	boolean (compressed)	Event in the SDH alarm bit field (see also Alarm field “CSTatus:SDH2”/ “HSTatus:SDH2” on page R-274)
AEVent:PDH	1010	boolean (compressed)	Event in the PDH alarm bit field (see also Alarm field “CSTatus:PDH”/ “HSTatus:PDH” on page R-278)
AEVent:PDH2	1011	boolean (compressed)	Event in the PDH alarm bit field (see also Alarm field “CSTatus:PDH2”/ “HSTatus:PDH2” on page R-279 (DS1, DS3)
AEVent:ATM	1300	boolean	Alarm change for ATM measurements

Table R-4 Other event IDs for the event memory (alarm alternation events)

Note: The alarm alternation events are combined into groups of bit fields (32 bits) in which each individual alarm can be found in a specified bit position. These groups are composed of alarms which logically belong together. A logical “1” at the respective bit position indicates an active alarm, and a logical “0” an inactive alarm. For a description of these groups, see: Alarm bit fields on page R-272 ff.

Name	Response code	Response type	Event description
NOEVent	0	count = 0	No event available
OVERflow	1	count = 0	Overflow of internal event memory
Time stamp	10	count	Time stamp of events in milliseconds since 1/1/1970

Table R-5 General event IDs for the event memory

Alarm bit fields

Alarm field "CSTatus:SIGNal"/"HSTatus:SIGNal"

Bit position	Alarm name
0 (LSB)	Power Fail
1	reserved
2	LOS: Loss of Signal
3	LTI: Loss of Timing Information
4	reserved
5	reserved
6	reserved
7	LSS: Loss of Sequence Synchronization
8	internal FIFO overflow (OC-12c ATM only)
9 … 31	reserved

Table R-6 Alarm field "CSTatus:SIGNal"

Alarm field "CSTatus:SDH"/"HSTatus:SDH"

Bit position	Alarm name
0 (LSB)	LOF: Loss of Frame
1	OOF: Out of Frame
2	AU-AIS: Administrative Unit Alarm Indication Signal. AIS-P Path AIS
3	MS-AIS: Multiplex Section Alarm Indication Signal. AIS-L Line AIS
4	TU-AIS: Tributary Unit Alarm Indication Signal AIS-V VT Path AIS
5	AU-LOP: Administrative Unit Loss of Pointer. LOP-P Path LOP
6	TU-LOP: Tributary Unit Loss of Pointer. LOP-V VT Path LOP
7	AU-NDF: Administrative Unit New Data Flag. NDF-P Path NDF
8	TU-NDF: Tributary Unit New Data Flag. NDF-V VT NDF.

Table R-7 Alarm field "CSTatus:SDH"

Bit position	Alarm name
9	MS-RDI: Multiplex Section Remote Defect Indication. RDI-L: line RDI
10	HP-RDI: High Path Remote Defect Indication. RDI-P: Path RDI
11	LP-RDI: Low Path Remote Defect Indication. RDI-V: VT Path RDI
12	HP-PLM: High Path Label Mismatch. PLM-P: Path PLM. Note: This alarm is only detected if the corresponding alarm detection is previously activated using the command [:SENS]:FUNC:EVEN[:ON] on page R-405.
13	LP-PLM: Low Path Label Mismatch. PLM-V: VT Path PLM. Note: This alarm is only detected if the corresponding alarm detection is previously activated using the command [:SENS]:FUNC:EVEN[:ON] on page R-405.
14	HP-UNEQ: High Path Unequipped. UNEQ-P: Path UNEQ
15	LP-UNEQ: Low Path Unequipped. UNEQ-V: VT Path UNEQ
16	reserved
17	RS-TIM: Regenerator Section Trace Identifier Mismatch. TIM-:L Line TIM. Note: This alarm is only detected if the corresponding alarm detection is previously activated using the command [:SENS]:FUNC:EVEN[:ON] on page R-405.
18	HP-TIM: High Path Trace Identifier Mismatch. TIM-P: Path TIM. Note: This alarm is only detected if the corresponding alarm detection is previously activated using the command [:SENS]:FUNC:EVEN[:ON] on page R-405.
19	LP-TIM: Low Path Trace Identifier Mismatch. TIM-V: VT Path TIM. Note: This alarm is only detected if the corresponding alarm detection is previously activated using the command [:SENS]:FUNC:EVEN[:ON] on page R-405.
20	TU-LOM: Tributary Unit Loss of Multiframe
21	reserved
22	reserved
23	reserved
24	LP-RFI: Low Path Remote Failure Indication. RFI-V: VT Path RFI

Table R-7 Alarm field “CSTatus:SDH” *(continued)*

Bit position	Alarm name
25	HP-RDI P: (payload). RDI P: Path RDI P Note: [:SENS]:DATA[:TEL]:SDH:ALAR:RDIE:AMOD = ON is required for this alarm to be detected.
26	HP-RDI S: (server). RDI S: Path RDI S Note: [:SENS]:DATA[:TEL]:SDH:ALAR:RDIE:AMOD = ON is required for this alarm to be detected.
27	HP-RDI C: (connectivity). RDI C: Path RDI C Note: [:SENS]:DATA[:TEL]:SDH:ALAR:RDIE:AMOD = ON is required for this alarm to be detected.
28	LP-RDI P: (payload). RDI P: VT Path RDI P Note: [:SENS]:DATA[:TEL]:SDH:ALAR:RDIE:AMOD = ON is required for this alarm to be detected.
29	LP-RDI S: (server). RDI S: VT Path RDI S Note: [:SENS]:DATA[:TEL]:SDH:ALAR:RDIE:AMOD = ON is required for this alarm to be detected.
30	LP-RDI C: (connectivity) RDI C: VT Path RDI C Note: [:SENS]:DATA[:TEL]:SDH:ALAR:RDIE:AMOD = ON is required for this alarm to be detected.
31 (MSB)	reserved

Table R-7 Alarm field “CSTatus:SDH” *(continued)*

Alarm field “CSTatus:SDH2”/“HSTatus:SDH2”

Bit position	Alarm name
0 (LSB)	HP-PDI: High Path Payload Defect Indication PDI-P: Path PDI
1	LP-PDI: Low Path Payload Defect Indication PDI-V: VT Path PDI
2	reserved
3	reserved
4	reserved
5	reserved
6	reserved
7	reserved

Table R-8 Alarm field “CSTatus:SDH2”

Bit position	Alarm name
8	N1-TCM-UNEQ: High Path TCM Unequipped Note: This alarm is only detected if the corresponding TCM measurement is previously activated using the command [:SENS]:FUNC:EVEN[:ON] on page R-405 and TCM evaluation is switched to HPOH using the command :[SENS]:DATA[:TEL]:SDH:OVER:TCM:TYPE on page R-364.
9	N1-TCM-LTC: High Path Loss of Tandem Connection Note: This alarm is only detected if the corresponding TCM measurement is previously activated using the command [:SENS]:FUNC:EVEN[:ON] on page R-405 and TCM evaluation is switched to HPOH using the command :[SENS]:DATA[:TEL]:SDH:OVER:TCM:TYPE on page R-364.
10	N1-TCM-AIS: High Path TCM Incoming AIS Note: This alarm is only detected if the corresponding TCM measurement is previously activated using the command [:SENS]:FUNC:EVEN[:ON] on page R-405 and TCM evaluation is switched to HPOH using the command :[SENS]:DATA[:TEL]:SDH:OVER:TCM:TYPE on page R-364.
11	N1-TCM-RDI: High Path TCM Remote Defect Indication Note: This alarm is only detected if the corresponding TCM measurement is previously activated using the command [:SENS]:FUNC:EVEN[:ON] on page R-405 and TCM evaluation is switched to HPOH using the command :[SENS]:DATA[:TEL]:SDH:OVER:TCM:TYPE on page R-364.
12	N1-TCM-ODI: High Path TCM Outgoing Defect Indication Note: This alarm is only detected if the corresponding TCM measurement is previously activated using the command [:SENS]:FUNC:EVEN[:ON] on page R-405 and TCM evaluation is switched to HPOH using the command :[SENS]:DATA[:TEL]:SDH:OVER:TCM:TYPE on page R-364.
13	reserved
14	reserved
15	reserved
16	N2-TCM-UNEQ: Low Path TCM Unequipped Note: This alarm is only detected if the corresponding TCM measurement is previously activated using the command [:SENS]:FUNC:EVEN[:ON] on page R-405 and TCM evaluation is switched to LPOH using the command :[SENS]:DATA[:TEL]:SDH:OVER:TCM:TYPE on page R-364.
17	N2-TCM-LTC: Low Path Loss of Tandem Connection Note: This alarm is only detected if the corresponding TCM measurement is previously activated using the command [:SENS]:FUNC:EVEN[:ON] on page R-405 and TCM evaluation is switched to LPOH using the command :[SENS]:DATA[:TEL]:SDH:OVER:TCM:TYPE on page R-364.

Table R-8 Alarm field “CStatus:SDH2”

Bit position	Alarm name
18	N2-TCM-AIS: Low Path TCM Incoming AIS Note: This alarm is only detected if the corresponding TCM measurement is previously activated using the command [:SENS]:FUNC:EVEN[:ON] on page R-405 and TCM evaluation is switched to LPOH using the command :[SENS]:DATA[:TEL]:SDH:OVER:TCM:TYPE on page R-364.
19	N2-TCM-RDI: Low Path TCM Remote Defect Indication Note: This alarm is only detected if the corresponding TCM measurement is previously activated using the command [:SENS]:FUNC:EVEN[:ON] on page R-405 and TCM evaluation is switched to LPOH using the command :[SENS]:DATA[:TEL]:SDH:OVER:TCM:TYPE on page R-364.
20	N2-TCM-ODI: Low Path TCM Outgoing Defect Indication Note: This alarm is only detected if the corresponding TCM measurement is previously activated using the command [:SENS]:FUNC:EVEN[:ON] on page R-405 and TCM evaluation is switched to LPOH using the command :[SENS]:DATA[:TEL]:SDH:OVER:TCM:TYPE on page R-364.
21 ... 31 (MSB)	reserved

Table R-8 Alarm field “CStatus:SDH2”

Alarm field "CSTatus:ATM"/"HSTatus:ATM"

Bit position	Alarm name
0 (LSB)	LCD Loss of Cell Delineation
1	EVPAIS: End to End Virtual Path AIS (not possible for ABT-20 devices)
2	EVPRDI: End to End Virtual Path RDI (not possible for ABT-20 devices)
3	EVCAIS: End to End Virtual Channel AIS (not possible for ABT-20 devices)
4	EVCRDI: End to End Virtual Channel RDI (not possible for ABT-20 devices)
5 … 8	reserved
9	OCLR: Overflow of Cell loss ratio measurement (not possible for ABT-20 devices)
10	OCMR: Overflow of cell misinserted rate measurement (not possible for ABT-20 devices)
11	AAL1_OOSYNC (not possible for ABT-20 devices)
12	reserved
13	No user cells in test channel named as LPAC (loss of performance access capability) when analyzing test cells otherwise LTC (loss of test channel load)
14	reserved
15	OCR (overflow cell rate) internal ATM cell FIFO overflow (VC4_4C (STS12C_SPE) ATM only)
16 … 27	reserved
28	PLCP LOF: Loss of Frame
29	PLCP OOF: Out of Frame
30	PLCP RAI: Remote Alarm Indication
31 (MSB)	reserved

Table R-9 Alarm field "CSTatus:ATM"

Alarm field “CSTatus:PDH”/“HSTatus:PDH”

Bit position	Alarm name
0 (LSB)	AIS-2: Alarm Indication Signal 2 Mbit/s frame
1	LOF-2: Loss of Frame 2 Mbit/s frame
2	RDI-2: Remote Defect Indication 2 Mbit/s frame
3	AIS-8: Alarm Indication Signal 8 Mbit/s frame
4	LOF-8: Loss of Frame 8 Mbit/s frame
5	RDI-8: Remote Defect Indication 8 Mbit/s frame
6	AIS-34: Alarm Indication Signal 34 Mbit/s frame
7	LOF-34: Loss of Frame 34 Mbit/s frame
8	RDI-34: Remote Defect Indication 34 Mbit/s frame
9	AIS-140: Alarm Indication Signal 140 Mbit/s frame
10	LOF-140: Loss of Frame 140 Mbit/s frame
11	RDI-140: Remote Defect Indication 140 Mbit/s frame
12	AIS-64k: Alarm Indication Signal 64 kbit/s channel
13	PLM-34: Path Label Mismatch 34 Mbit/s frame
14	UNEQ-34: Unequipped 34 Mbit/s frame
15	TIM-34: Trace Identifier Mismatch 34 Mbit/s frame
16	PLM-140: Path Label Mismatch 140 Mbit/s frame
17	UNEQ-140: Unequipped 140 Mbit/s frame
18	TIM-140: Trace Identifier Mismatch 140 Mbit/s frame
19	OOF-34: Out of Frame 34 Mbit/s G.832 frame
20	OOF-140: Out of Frame 140 Mbit/s G.832 frame
21 … 31	reserved

Table R-10 Alarm field “CSTatus:PDH”

Alarm field “CSTatus:PDH2”/“HSTatus:PDH2”

Bit position	Alarm name
0 (LSB)	AIS-DS1: Alarm Indication Signal 1.5 Mbit/s frame
1	OOF-DS1: Out of Frame 1.5 Mbit/s frame
2	LOF-DS1: Loss of Frame 1.5 Mbit/s frame
3	YELLOW-DS1
4	reserved
5	reserved
6	reserved
7	reserved
8	reserved
9	reserved
10	reserved
11	reserved
12	reserved
13	AIS-DS3: Alarm Indication Signal 45 Mbit/s frame
14	OOF-DS3: Out of Frame 45 Mbit/s frame
15	LOF-DS3: Loss of Frame 45 Mbit/s frame
16	YELLOW-DS3: 45 Mbit/s
17	IDLE-A-DS3: Idle A-Bit of Frame 45 Mbit/s
18	AIC-DS3: Application Identification Channel 45 Mbit/s
19	FEAC-DS3-LOS: Far End Alarm and Control DS3 LOS
20	FEAC-DS3-OOF: Far End Alarm and Control DS3 OOF
21	FEAC-DS3-AIS: Far End Alarm and Control DS3 AIS
22	FEAC-DS3-IDLE: Far End Alarm and Control DS3 IDLE
23	FEAC-DS3-EQFS: Far End Alarm and Control DS3 Equipment Failure Service Affecting
24	FEAC-DS3-EQFN: Far End Alarm and Control DS3 Equipment Failure Non Service Affecting
25	FEAC-DS1-MLOS: Far End Alarm and Control DS1 Multiplexer LOS
26	FEAC-DS1-SLOS: Far End Alarm and Control DS1 Single LOS
27	FEAC-DS1-EQFS: Far End Alarm and Control DS1 Equipment Failure Service Affecting

Table R-11 Alarm field “CSTatus:PDH2”

Bit position	Alarm name
28	FEAC-DS1-EQFN: Far End Alarm and Control DS1 Equipment Failure Non Service Affecting
29	FEAC-DS1-CEFN: Far End Alarm and Control DS1 Common Equipment Failure Non Service Affecting
30, 31(MSB)	reserved

Table R-11 Alarm field “CSTatus:PDH2” *(continued)*

Result field “CSTatus:FEAC:LOOP:ON”/“CSTatus:FEAC:LOOP:OFF”/ “HSTatus:FEAC:LOOP:ON”/“HSTatus:FEAC:LOOP:OFF”

Bit position	FEAC Loop Code
0 (LSB)	DS3 Line
1	DS1 Line # 1
2	DS1 Line # 2
3	DS1 Line # 3
4	DS1 Line # 4
5	DS1 Line # 5
6	DS1 Line # 6
7	DS1 Line # 7
8	DS1 Line # 8
9	DS1 Line # 9
10	DS1 Line # 10
11	DS1 Line # 11
12	DS1 Line # 12
13	DS1 Line # 13
14	DS1 Line # 14
15	DS1 Line # 15
16	DS1 Line # 16
17	DS1 Line # 17
18	DS1 Line # 18
19	DS1 Line # 19
20	DS1 Line # 20
21	DS1 Line # 21
22	DS1 Line # 22
23	DS1 Line # 23

Table R-12 Result field “CSTatus:FEAC:LOOP:ON”

Bit position	FEAC Loop Code
24	DS1 Line # 24
25	DS1 Line # 25
26	DS1 Line # 26
27	DS1 Line # 27
28	DS1 Line # 28
29	DS1 Line All
30, 31(MSB)	reserved

Table R-12 Result field “CSTatus:FEAC:LOOP:ON” *(continued)*

Result field “CSTatus:TCMonitoring”/“HSTatus:TCMonitoring”

Bit position	Alarm name
0 (LSB)	TCM-UNEQ: TCM Alarm “Unequipped”
1	TCM-LTC: TCM Alarm “Loss of Tandem Connection”
2	TCM-AIS: TCM Alarm “Incoming AIS”
3	TCM-RDI: TCM Alarm “Remote Defect Indication”
4	TCM-ODI: TCM Alarm “Outgoing Defect Indication”
5	reserved
6	reserved
7	reserved
8	TCM-REI: TCM Error “Remote Error Indication”
9	TCM-OEI: TCM Error “Outgoing Error Indication”
10 … 15(MSB)	reserved

Table R-13 Result field “CSTatus:TCMonitoring”

[:SENS]:DATA[:TEL]:AAL1

The commands in this group specify the structure of a AAL1 signal mapped into ATM cells.

Note: All commands in this group are valid only if AAL1 is selected as payload of the ATM cells (not valid for ABT-20 devices).

[:SENS]:DATA[:TEL]:AAL1:CEM

[:SENSe]:DATA[:TELecom]:AAL1:CEMulation <type> determines the circuit emulation system bit rate.

Parameter

Name	Type	Range	Default
type	discrete	OFF | PCM30 | PCM30CRC	OFF

Dependencies (not valid for ABT-20 devices)

Comments <type> =

OFF: Sets AAL1 cell payload unframed

PCM30: AAL1 cells are expected with a PCM30 frame structure in the payload (reassembly)

PCM30CRC: AAL1 cells are expected with a PCM30 CRC frame structure in the payload (reassembly)

Example [:SENS]:DATA[:TEL]:AAL1:CEM OFF sets the system bit rate to OFF.

[:SENS]:DATA[:TEL]:AAL1:CEM?

[:SENSe]:DATA[:TELecom]:AAL1:CEMulation? provides the current setting of the AAL1 system bit rate.

Dependencies (not valid for ABT-20 devices)

Example [:SENS]:DATA[:TEL]:AAL1:CEM?
Response: OFF
if the AAL1 system bit rate is disabled.

[:SENS]:DATA[:TEL]:ANAL:G821:ALL

[:SENSe]:DATA[:TELecom]:ANALysis:G821:ALLocation <value> determines HRP allocation for G.821 analysis evaluations.

Parameter

Name	Type	Range	Default
value	numeric	0.1 - 100	100

Dependencies None

Comments Determines the allocation of the 27500 km HRP (Hypothetical Reference Path). All values in %.

Example :DATA:ANAL:G821:ALL 10 sets allocation to 10%.

Related commands [:SENS]:DATA[:TEL]:ANAL[:TYPE] on page R-314

[:SENS]:DATA[:TEL]:ANAL:G821:ALL?

[:SENSe]:DATA[:TELecom]:ANALysis:G821:ALLocation? provides the current setting of the HRP allocation for analysis evaluations.

Example :DATA:ANAL:G821:ALL?
Response: 10.0 for 10.0% allocation.

[:SENS]:DATA[:TEL]:ANAL:G821:DM:THR

[:SENSe]:DATA[:TELecom]:ANALysis:G821:DM:THReshold <value> determines the DM (degraded minute) threshold for G.821 analysis evaluations.

Parameter

Name	Type	Range	Default
value	numeric	1.0E-7 - 1.0E-4	1.0E-6

Dependencies None

Comments Determines the DM threshold.

Example :DATA:ANAL:G821:DM:THR 1.0E-4 sets threshold to 1.0 x 10^{-4}.

Related commands [:SENS]:DATA[:TEL]:ANAL[:TYPE] on page R-314

[:SENS]:DATA[:TEL]:ANAL:G821:DM:THR?

[:SENSe]:DATA[:TELecom]:ANALysis:G821:DM:THReshold? provides the current setting of the DM (degraded minute) threshold for analysis evaluations.

Example :DATA:ANAL:G821:DM:THR?
Response: 1.0E-6

[:SENS]:DATA[:TEL]:ANAL:G821:EVAL

[:SENSe]:DATA[:TELecom]:ANALysis:G821:EVALuation <evaluation> determines the current setting for the type of evaluation anomaly used in G.821 analysis.

Parameter

Name	Type	Range	Default
evaluation	discrete	TSE | M2CRC | M2EBIT | M2FAS | M8FAS | M34FAS | M140FAS	TSE

Dependencies

If not set to TSE, a matching setting of the receiver signal is required to allow the selected analysis evaluation.

Comments

<evaluation>:

TSE: Perform analysis for TSE (test sequence errors)
M2CRC: Perform analysis for CRC (cyclic redundancy check) errors in the 2 Mbit/s multiframe
M2EBIT: Perform analysis for E-BIT errors in the 2 Mbit/s multiframe
M2FAS: Perform analysis for FAS (frame alignment signal) errors in the 2 Mbit/s multiframe
M8FAS: Perform analysis for FAS (frame alignment signal) errors in the 8 Mbit/s frame
M34FAS: Perform analysis for FAS (frame alignment signal) errors in the 34 Mbit/s frame
M140FAS: Perform analysis for FAS (frame alignment signal) errors in the 140 Mbit/s frame

If set to M2CRC or M2EBIT all threshold parameters concerning G.821 evaluation (DM and SES) are interpreted as equivalent TSE rates.

Example

:DATA:ANAL:G821:EVAL M140FAS sets FAS 140 Mbit/s evaluation.

Related commands

[:SENS]:DATA[:TEL]:ANAL[:TYPE] on page R-314

[:SENS]:DATA[:TEL]:ANAL:G821:EVAL?

[:SENSe]:DATA[:TELecom]:ANALysis:G821:EVALuation? provides the current setting for the type of evaluation anomaly used in G.821 analysis.

Example

:DATA:ANAL:G821:EVAL?
Response: TSE
if G.821 TSE measurement is activated.

[:SENS]:DATA[:TEL]:ANAL:G821:MODE

[:SENSe]:DATA[:TELecom]:ANALysis:G821:MODE <mode> determines the current setting for the evaluation mode used in G.821 analysis.

Parameter

Name	Type	Range	Default
mode	discrete	NORMal | MULTiplex	NORM

Dependencies None

Comments
<mode> =
NORMal: Perform analysis without G.821 annex D support
MULTiplex: Perform analysis with G.821 annex D support. Normalization to 64 kbit/s at primary bit rate and above

Example :DATA:ANAL:G821:MODE MULT sets annex D evaluation.

Related commands [:SENS]:DATA[:TEL]:ANAL[:TYPE] on page R-314

[:SENS]:DATA[:TEL]:ANAL:G821:SES:THR

[:SENSe]:DATA[:TELecom]:ANALysis:G821:SES:THReshold <value> determines the SES (severely errored second) threshold for G.821 analysis evaluations.

Parameter

Name	Type	Range	Default
value	numeric	1.0E-5 - 1.0E-2	1.0E-3

Dependencies None

Comments Determines the SES threshold.

Example :DATA:ANAL:G821:SES:THR 1.0E-4 sets threshold to 1.0 x 10^{-4}.

Related commands [:SENS]:DATA[:TEL]:ANAL[:TYPE] on page R-314

[:SENS]:DATA[:TEL]:ANAL:G821:SES:THR?

[:SENSe]:DATA[:TELecom]:ANALysis:G821:SES:THReshold? provides the current setting of the SES (severely errored second) threshold for analysis evaluations.

Example
:DATA:ANAL:G821:SES:THR?
Response: 1.0E-4

[:SENS]:DATA[:TEL]:ANAL:G826:ALL

[:SENSe]:DATA[:TELecom]:ANALysis:G826:ALLocation <value> determines HRP allocation for G.826 analysis evaluations.

Parameter

Name	Type	Range	Default
value	numeric	0.1 - 100	18.5

Dependencies None

Comments Determines the allocation of the 27500 km HRP (Hypothetical Reference Path). All values in %.

Example :DATA:ANAL:G826:ALL 10 sets allocation to 10%.

Related commands [:SENS]:DATA[:TEL]:ANAL[:TYPE] on page R-314

[:SENS]:DATA[:TEL]:ANAL:G826:ALL?

[:SENSe]:DATA[:TELecom]:ANALysis:G826:ALLocation? provides the current setting of the HRP allocation for analysis evaluations.

Example :DATA:ANAL:G826:ALL?
Response: 18.5 for 18.5 % allocation.

[:SENS]:DATA[:TEL]:ANAL:G826:EVAL

[:SENSe]:DATA[:TELecom]:ANALysis:G826:EVALuation <evaluation> determines the current setting for the evaluation type used in G.826ISM analysis.

Parameter

Name	Type	Range	Default
evaluation	discrete	NONE | RSB1 | MSB2 | HPB3 | LPBIP | M140PDH | M34PDH | M8PDH | M2PDHFAS | M2PDHCRC | M140G832FAS | M140G832EM | M34G832FAS | M34G832EM | DS3FAS | DS3PPAR | DS3CPAR | DS1FAS | DS1CRC	M2PDHCRC

Dependencies A matching setting of the receiver signal is required to allow the selected analysis evaluation.

Comments	<evaluation> =	
	RSB1:	Perform analysis for B1 errors in SDH signals
	MSB2:	Perform analysis for B2 errors in SDH signals
	HPB3:	Perform analysis for B3 errors in SDH signals
	LPBIP:	Perform analysis for LPBIP errors in SDH signals
	M140PDH:	Perform analysis for FAS (frame alignment signal) errors in the 140 Mbit/s frame
	M34PDH:	Perform analysis for FAS (frame alignment signal) errors in the 34 Mbit/s frame
	M8PDH:	Perform analysis for FAS (frame alignment signal) errors in the 8 Mbit/s frame
	M2PDHFAS:	Perform analysis for FAS (frame alignment signal) errors in the 2 Mbit/s frame
	M2PDHCRC:	Perform analysis for CRC (cyclic redundancy check) errors in the 2 Mbit/s multiframe
	M140G832FAS:	Perform analysis for FAS (frame alignment signal) errors in the 140 Mbit/s G.832 frame
	M140G832EM:	Perform analysis for EM (error monitoring) errors in the 140 Mbit/s G.832 frame
	M34G832FAS:	Perform analysis for FAS (frame alignment signal) errors in the 34 Mbit/s G.832 frame
	M34G832EM:	Perform analysis for EM (error monitoring) errors in the 34 Mbit/s G.832 frame
	DS3FAS:	Perform analysis for FAS (frame alignment signal) errors in the 45 Mbit/s frame
	DS3PPAR:	Perform analysis for PPAR (P-parity) errors in the 45 Mbit/s frame
	DS3CPAR:	Perform analysis for CPAR (C-parity) errors in the 45 Mbit/s frame
	DS1FAS:	Perform analysis for FAS (frame alignment signal) errors in the 1.5 Mbit/s frame
	DS1CRC:	Perform analysis for CRC (cyclic redundancy check) errors in the 1.5 Mbit/s frame

Example :DATA:ANAL:G826:EVAL M140PDH sets FAS 140 Mbit/s evaluation.

Related commands [:SENS]:DATA[:TEL]:ANAL[:TYPE] on page R-314

[:SENS]:DATA[:TEL]:ANAL:G826:EVAL?

[:SENSe]:DATA[:TELecom]:ANALysis:G826:EVAL? provides the current setting of the evaluation type used in G.826ISM analysis.

Example :DATA:ANAL:G826:EVAL?
Response: M2PDHCRC for CRC in service analysis at 2 Mbit/s.

[:SENS]:DATA[:TEL]:ANAL:G826:SES:THR

[:SENSe]:DATA[:TELecom]:ANALysis:G826:SES:THReshold <value> determines the SES (severely errored second) threshold for G.826 analysis evaluations.

Parameter

Name	Type	Range	Default
value	numeric	1 - 47563	2400

Dependencies — Setting this value will switch off the automatic setting made by [:SENS]:DATA[:TEL]:ANAL:G826:SES:THR:AUTO on page R-288.

Comments — Determines the SES threshold expressed as a number of errored blocks.

Example — :DATA:ANAL:G826:SES:THR 10 sets threshold to 10.

Related commands — [:SENS]:DATA[:TEL]:ANAL:G826:SES:THR:AUTO on page R-288
[:SENS]:DATA[:TEL]:ANAL[:TYPE] on page R-314

[:SENS]:DATA[:TEL]:ANAL:G826:SES:THR?

[:SENSe]:DATA[:TELecom]:ANALysis:G826:SES:THReshold? provides the current setting of the SES (severely errored second) threshold for analysis evaluations.

Example — :DATA:ANAL:G826:SES:THR?
Response: 5000

[:SENS]:DATA[:TEL]:ANAL:G826:SES:THR:AUTO

[:SENSe]:DATA[:TELecom]:ANALysis:G826:SES:THReshold:AUTO <state> determines the state of the automatic SES (severely errored second) threshold setting for G.826 analysis evaluations.

Parameter

Name	Type	Range	Default
state	auto	0 | OFF | 1 | ON | ONCE	1

Dependencies — None

Comments — <state> =
ON | 1: Turns on the SES value automatic setting.
OFF | 0: Turns off the SES value automatic setting.
ONCE: The SES value set by [:SENS]:DATA[:TEL]:ANAL:G826:SES:THR on page R-287 is calculated once. The <state> is then set to 0.

Example — :DATA:ANAL:G826:SES:THR:AUTO 0 deactivates the automatic SES threshold setting.

Related commands — [:SENS]:DATA[:TEL]:ANAL:G826:SES:THR on page R-287
[:SENS]:DATA[:TEL]:ANAL[:TYPE] on page R-314

[:SENS]:DATA[:TEL]:ANAL:G826:SES:THR:AUTO?

[:SENSe]:DATA[:TELecom]:ANALysis:G826:SES:THReshold:AUTO? provides the current setting of the automatic SES (severely errored second) threshold value setting.

Comments — ONCE: is a volatile state and cannot be read.

Example :DATA:ANAL:G826:SES:THR:AUTO?
Response: 0 if the automatic setting is deactivated.

[:SENS]:DATA[:TEL]:ANAL:G826:UAS:LIM[:STAT]

[:SENSe]:DATA[:TELecom]:ANALysis:G826:UAS:LIM[:STATe] <state> activates/ deactivates the UAS (unavailable second) limit for analysis evaluations.

Parameter

Name	Type	Range	Default
value	boolean	ON | OFF | 0 | 1	OFF

Dependencies None

Comments ON | 1: Limit switched on
OFF | 0: Limit switched off

Example :DATA:ANAL:G826:UAS:LIM ON switches the limit on.

Related commands [:SENS]:DATA[:TEL]:ANAL:G826:UAS:LIM:UPP on page R-289
[:SENS]:DATA[:TEL]:ANAL[:TYPE] on page R-314

[:SENS]:DATA[:TEL]:ANAL:G826:UAS:LIM[:STAT]?

[:SENSe]:DATA[:TELecom]:ANALysis:G826:UAS:LIM[:STATe]? provides the status of the UAS (unavailable second) limit.

Example :DATA:ANAL:G826:UAS:LIM?
Response: 1 if the limit is activated.

[:SENS]:DATA[:TEL]:ANAL:G826:UAS:LIM:UPP

[:SENSe]:DATA[:TELecom]:ANALysis:G826:UAS:LIMit:UPPer <value> determines the UAS (unavailable second) limit for analysis evaluations.

Parameter

Name	Type	Range	Default
value	numeric	0 - 100000	0

Dependencies Is valid only if:
[:SENS]:DATA[:TEL]:ANAL:G826:UAS:LIM[:STAT] = 1

Comments If the measured UAS exceeds the UAS limit the verdict for the path is: Rejected.

Example :DATA:ANAL:G826:UAS:LIM:UPP 10 sets the limit to 10.

Related commands [:SENS]:DATA[:TEL]:ANAL:G826:UAS:LIM[:STAT] on page R-289
[:SENS]:DATA[:TEL]:ANAL[:TYPE] on page R-314

[:SENS]:DATA[:TEL]:ANAL:G826:UAS:LIM:UPP?

[:SENSe]:DATA[:TELecom]:ANALysis:G826:UAS:LIMit:UPPer? provides the current setting of the UAS (unavailable second) limit for analysis evaluations.

Example :DATA:ANAL:G826:UAS:LIM:UPP?
Response: 5000

[:SENS]:DATA[:TEL]:ANAL:G826:UAS:MODE

[:SENSe]:DATA[:TELecom]:ANALysis:G826:UAS:MODE <mode> determines the current setting for the UAS (unavailable seconds) evaluation mode used in G.826ISM analysis.

Parameter

Name	Type	Range	Default
mode	discrete	INDividual | GLOBal	INDividual

Dependencies Only selectable if near end and far end are evaluated.

Comments <mode> =
INDividual: Individual evaluation of UAS for near end and far end
GLOBal: Global evaluation of UAS for near end and far end

Example :DATA:ANAL:G826:UAS:MODE GLOB sets the UAS evaluation to global.

Related commands [:SENS]:DATA[:TEL]:ANAL[:TYPE] on page R-314

[:SENS]:DATA[:TEL]:ANAL:G826:UAS:MODE?

[:SENSe]:DATA[:TELecom]:ANALysis:G826:UAS:MODE? provides the status of the UAS (unavailable seconds) evaluation mode used in G.826ISM analysis.

Example :DATA:ANAL:G826:UAS:MODE?
Response: INDI for individual UAS evaluation mode.

[:SENS]:DATA[:TEL]:ANAL:G828:ALL

[:SENSe]:DATA[:TELecom]:ANALysis:G828:ALLocation <value> determines the allocation for G.828 analysis evaluations.

Parameter

Name	Type	Range	Default
value	numeric	0.1 - 100	18.5

Dependencies None

Comments Determines the allocation of the 27500 km HRP (Hypothetical Reference Path). All values in %.

Example :DATA:ANAL:G828:ALL 10 sets the allocation to 10%.

Related commands [:SENS]:DATA[:TEL]:ANAL[:TYPE] on page R-314

[:SENS]:DATA[:TEL]:ANAL:G828:ALL?

[:SENSe]:DATA[:TELecom]:ANALysis:G828:ALLocation? provides the current setting of the allocation for analysis evaluations.

Example :DATA:ANAL:G828:ALL?
Response: 10.0 for 10.0 % allocation.

[:SENS]:DATA[:TEL]:ANAL:G828:EVAL

[:SENSe]:DATA[:TELecom]:ANALysis:G828:EVALuation <evaluation> determines the current setting of the anomaly evaluation type used in G.828 analysis.

Parameter

Name	Type	Range	Default
evaluation	discrete	NONE | RSB1 | MSB2 | HPB3 | LPBIP | TCM | TSE	HPB3

Dependencies If not set to TSE, a matching setting of the receiver signal is required to allow the selected analysis evaluation.

Comments <evaluation> =

NONE: No G.828 analysis
RSB1: Perform analysis for B1 errors in SDH signals
MSB2: Perform analysis for B2 errors in SDH signals
HPB3: Perform analysis for B3 errors in SDH signals
LPBIP: Perform analysis for LPBIP errors in SDH signals
TCM: Perform analysis for TCM (Tandem Connection Monitoring) Bytes N1/N2 (Z6)
Not yet available!
TSE: Perform analysis for TSE (test sequence errors)

Example :DATA:ANAL:G828:EVAL HPB3 sets high path B3 error evaluation.

Related commands [:SENS]:DATA[:TEL]:ANAL[:TYPE] on page R-314

[:SENS]:DATA[:TEL]:ANAL:G828:EVAL?

[:SENSe]:DATA[:TELecom]:ANALysis:G828:EVALuation? provides the current setting of the anomaly evaluation type used in G.828 analysis.

Example :DATA:ANAL:G828:EVAL?
Response: HPB3 if G.828 HPB3 measurement is activated.

[:SENS]:DATA[:TEL]:ANAL:G828:SEPI[:STAT]

[:SENSe]:DATA[:TELecom]:ANALysis:G828:SEPIntensity[:STATe] <state> activates/deactivates the consideration of SEPI (Severely Errored Period Intensity) in the calculation of the verdict.

Parameter

Name	Type	Range	Default
state	boolean	ON | OFF | 0 | 1	OFF

Dependencies None

Comments ON **|** 1: Consideration switched on
OFF **|** 0: Consideration switched off

Example :DATA:ANAL:G828:SEPI ON switches the consideration on.

[:SENS]:DATA[:TEL]:ANAL:G828:SEPI[:STAT]?

[:SENSe]:DATA[:TELecom]:ANALysis:G828:SEPIntensity[:STATe]? provides the status of the consideration of SEPI (Severely Errored Period Intensity) in the calculation of the verdict.

Example :DATA:ANAL:G828:SEPI?
Response: 1 if the consideration is activated.

[:SENS]:DATA[:TEL]:ANAL:G828:SES:THR

[:SENSe]:DATA[:TELecom]:ANALysis:G828:SES:THReshold <value> determines the SES (severely errored second) threshold for G.828 analysis evaluations.

Parameter

Name	Type	Range	Default
value	numeric	1 - 8000	2400

Dependencies Setting this value will switch off the automatic setting made by [:SENS]:DATA[:TEL]:ANAL:G828:SES:THR:AUTO on page R-293

Comments Determines the SES threshold expressed as a number of errored blocks.

Example :DATA:ANAL:G828:SES:THR 10 sets threshold to 10.

Related commands [:SENS]:DATA[:TEL]:ANAL:G828:SES:THR:AUTO on page R-293
[:SENS]:DATA[:TEL]:ANAL[:TYPE] on page R-314

[:SENS]:DATA[:TEL]:ANAL:G828:SES:THR?

[:SENSe]:DATA[:TELecom]:ANALysis:G828:SES:THReshold? provides the current setting of the SES (severely errored second) threshold for analysis evaluations.

Example :DATA:ANAL:G828:SES:THR?
Response: 5000

[:SENS]:DATA[:TEL]:ANAL:G828:SES:THR:AUTO

[:SENSe]:DATA[:TELecom]:ANALysis:G828:SES:THReshold:AUTO <state> determines the state of the automatic SES (severely errored second) threshold setting for G.828 analysis evaluations.

Parameter

Name	Type	Range	Default
state	auto	0 | OFF | 1 | ON | ONCE	1

Dependencies None

Comments <state> =
ON | 1: Turns on the SES value automatic setting.
OFF | 0: Turns off the SES value automatic setting.
ONCE: The SES value set by [:SENS]:DATA[:TEL]:ANAL:G828:SES:THR on page R-292 is calculated once. The <state> is then set to 0.

Example :DATA:ANAL:G828:SES:THR:AUTO 0 deactivates the automatic SES threshold setting.

Related commands [:SENS]:DATA[:TEL]:ANAL:G828:SES:THR on page R-292
[:SENS]:DATA[:TEL]:ANAL[:TYPE] on page R-314

[:SENS]:DATA[:TEL]:ANAL:G828:SES:THR:AUTO?

[:SENSe]:DATA[:TELecom]:ANALysis:G828:SES:THReshold:AUTO? provides the current setting of the automatic SES (severely errored second) threshold value setting.

Comments ONCE: is a volatile state and cannot be read.

Example :DATA:ANAL:G828:SES:THR:AUTO?
Response: 0 if the automatic setting is deactivated.

[:SENS]:DATA[:TEL]:ANAL:G828:UAS:LIM[:STAT]

[:SENSe]:DATA[:TELecom]:ANALysis:G828:UAS:LIM[:STATe] <state> activates/ deactivates the UAS (unavailable second) limit for analysis evaluations.

Parameter

Name	Type	Range	Default
value	boolean	ON | OFF | 0 | 1	OFF

Dependencies None

Comments
ON | 1: Limit switched on
OFF | 0: Limit switched off

Example :DATA:ANAL:G828:UAS:LIM ON switches the limit on.

Related commands
[:SENS]:DATA[:TEL]:ANAL:G828:UAS:LIM:UPP on page R-294
[:SENS]:DATA[:TEL]:ANAL[:TYPE] on page R-314

[:SENS]:DATA[:TEL]:ANAL:G828:UAS:LIM[:STAT]?

[:SENSe]:DATA[:TELecom]:ANALysis:G828:UAS:LIM[:STATe]? provides the status of the UAS (unavailable second) limit.

Example
:DATA:ANAL:G828:UAS:LIM?
Response: 1 if the limit is activated.

[:SENS]:DATA[:TEL]:ANAL:G828:UAS:LIM:UPP

[:SENSe]:DATA[:TELecom]:ANALysis:G828:UAS:LIMit:UPPer <value> determines the UAS (unavailable second) limit for analysis evaluations.

Parameter

Name	Type	Range	Default
value	numeric	0 - 100000	0

Dependencies
Is valid only if:
[:SENS]:DATA[:TEL]:ANAL:G828:UAS:LIM[:STAT] = 1

Comments If the measured UAS exceeds the UAS limit the verdict for the path is: Rejected.

Example :DATA:ANAL:G828:UAS:LIM:UPP 10 sets the limit to 10.

Related commands
[:SENS]:DATA[:TEL]:ANAL:G828:UAS:LIM[:STAT] on page R-294
[:SENS]:DATA[:TEL]:ANAL[:TYPE] on page R-314

[:SENS]:DATA[:TEL]:ANAL:G828:UAS:LIM:UPP?

[:SENSe]:DATA[:TELecom]:ANALysis:G828:UAS:LIMit:UPPer? provides the current setting of the UAS (unavailable second) limit for analysis evaluations.

Example :DATA:ANAL:G828:UAS:LIM:UPP?
Response: 5000

[:SENS]:DATA[:TEL]:ANAL:G828:UAS:MODE

[:SENSe]:DATA[:TELecom]:ANALysis:G828:UAS:MODE <mode> determines the current setting for the UAS (unavailable seconds) evaluation mode used in G.828ISM analysis.

Parameter

Name	Type	Range	Default
mode	discrete	INDividual | GLOBal	INDividual

Dependencies Only selectable if near end and far end are evaluated.

Comments <mode> =
INDividual: Individual evaluation of UAS for near end and far end
GLOBal: Global evaluation of UAS for near end and far end

Example :DATA:ANAL:G828:UAS:MODE GLOB sets the UAS evaluation to global.

Related commands [:SENS]:DATA[:TEL]:ANAL[:TYPE] on page R-314

[:SENS]:DATA[:TEL]:ANAL:G828:UAS:MODE?

[:SENSe]:DATA[:TELecom]:ANALysis:G828:UAS:MODE? provides the status of the UAS (unavailable seconds) evaluation mode used in G.828ISM analysis.

Example :DATA:ANAL:G828:UAS:MODE?
Response: INDI for individual UAS evaluation mode.

[:SENS]:DATA[:TEL]:ANAL:G829:EVAL

[:SENSe]:DATA[:TELecom]:ANALysis:G829:EVALuation <evaluation> determines the current setting of the anomaly evaluation type used in G.829 analysis.

Parameter

Name	Type	Range	Default
evaluation	discrete	NONE | RSB1 | MSB2 | TSE	MSB2

Dependencies If not set to TSE, a matching setting of the receiver signal is required to allow the selected analysis evaluation.

Comments <evaluation> =
NONE: No G.829 analysis
RSB1: Perform analysis for B1 errors in SDH signals
MSB2: Perform analysis for B2 errors in SDH signals
TSE: Perform analysis for TSE (test sequence errors)

Example :DATA:ANAL:G829:EVAL MSB2 sets multiplexer section B2 error evaluation.

Related commands [:SENS]:DATA[:TEL]:ANAL[:TYPE] on page R-314

[:SENS]:DATA[:TEL]:ANAL:G829:EVAL?

[:SENSe]:DATA[:TELecom]:ANALysis:G829:EVALuation? provides the current setting of the anomaly evaluation type used in G.829 analysis.

Example :DATA:ANAL:G829:EVAL?
Response: MSB2 if G.829 MSB2 measurement is activated.

[:SENS]:DATA[:TEL]:ANAL:G829:SES:THR

[:SENSe]:DATA[:TELecom]:ANALysis:G829:SES:THReshold <value> determines the SES (severely errored second) threshold for G.829 analysis evaluations.

Parameter

Name	Type	Range	Default
value	numeric	1 - 2147483647	19200

Dependencies Setting this value will switch off the automatic setting made by [:SENS]:DATA[:TEL]:ANAL:G829:SES:THR:AUTO on page R-297

Comments Determines the SES threshold expressed as a number of errored blocks.

Example :DATA:ANAL:G829:SES:THR 10 sets threshold to 10.

Related commands [:SENS]:DATA[:TEL]:ANAL:G829:SES:THR:AUTO on page R-297
[:SENS]:DATA[:TEL]:ANAL[:TYPE] on page R-314

[:SENS]:DATA[:TEL]:ANAL:G829:SES:THR?

[:SENSe]:DATA[:TELecom]:ANALysis:G829:SES:THReshold? provides the current setting of the SES (severely errored second) threshold for analysis evaluations.

Example :DATA:ANAL:G829:SES:THR?
Response: 19200

[:SENS]:DATA[:TEL]:ANAL:G829:SES:THR:AUTO

[:SENSe]:DATA[:TELecom]:ANALysis:G829:SES:THReshold:AUTO <state> determines the state of the automatic SES (severely errored second) threshold setting for G.829 analysis evaluations.

Parameter

Name	Type	Range	Default
state	auto	0 | OFF | 1 | ON | ONCE	1

Dependencies None

Comments <state> =

ON | 1: Turns on the SES value automatic setting.

OFF | 0: Turns off the SES value automatic setting.

ONCE: The SES value set by [:SENS]:DATA[:TEL]:ANAL:G829:SES:THR on page R-296 is calculated once. The <state> is then set to 0.

Example :DATA:ANAL:G829:SES:THR:AUTO 0 deactivates the automatic SES threshold setting.

Related commands [:SENS]:DATA[:TEL]:ANAL:G829:SES:THR on page R-296
[:SENS]:DATA[:TEL]:ANAL[:TYPE] on page R-314

[:SENS]:DATA[:TEL]:ANAL:G829:SES:THR:AUTO?

[:SENSe]:DATA[:TELecom]:ANALysis:G829:SES:THReshold:AUTO? provides the current setting of the automatic SES (severely errored second) threshold value setting.

Comments ONCE: is a volatile state and cannot be read.

Example :DATA:ANAL:G829:SES:THR:AUTO?
Response: 0 if the automatic setting is deactivated.

[:SENS]:DATA[:TEL]:ANAL:M2100:ALL

[:SENSe]:DATA[:TELecom]:ANALysis:M2100:ALLocation <value> determines The allocation for M.2100 analysis evaluations.

Parameter

Name	Type	Range	Default
value	numeric	0.1 - 100	100

Dependencies None

Comments The BISO value (Bringing Into Service Objective) and hence the S1 and S2 thresholds can be influenced with this parameter. The following formula according to M.2100 is used:
BISO = (Allocation x EERPO x Test Period x BISO Multiplier) / 2
EERPO = End to End Reference Performance Objective

Example :DATA:ANAL:M2100:ALL 10 sets the allocation to 10%.

Related commands [:SENS]:DATA[:TEL]:ANAL:M2100:BISO:MULT on page R-298
[:SENS]:DATA[:TEL]:ANAL[:TYPE] on page R-314

[:SENS]:DATA[:TEL]:ANAL:M2100:ALL?

[:SENSe]:DATA[:TELecom]:ANALysis:M2100:ALLocation? provides the current setting of the allocation for analysis evaluations.

Example :DATA:ANAL:M2100:ALL?
Response: 10.0 for 10.0 % allocation.

[:SENS]:DATA[:TEL]:ANAL:M2100:BISO:ES?

[:SENSe]:DATA[:TELecom]:ANALysis:M2100:BISObjective:ESeconds? provides the current setting of the BISO (Bringing Into Service Objectives) ES (Errored Second) threshold for analysis evaluations.

Comments This setting is calculated internally according to M.2100 and can therefore only be queried. The value can range from 0 to 1E7.

Example :DATA:ANAL:M2100:BISO:ES?
Response: 2039

[:SENS]:DATA[:TEL]:ANAL:M2100:BISO:MULT

[:SENSe]:DATA[:TELecom]:ANALysis:M2100:BISObjective:MULTiplier <value> determines the multiplier value for M.2100 analysis evaluations.

Parameter

Name	Type	Range	Default
value	numeric	0.1 - 100	1

Dependencies None

Comments The BISO value (Bringing Into Service Objective) and hence the S1 and S2 thresholds can be influenced with this parameter. The following formula according to M.2100 is used:
BISO = (Allocation x EERPO x Test Period x BISO Multiplier) / 2
EERPO = End to End Reference Performance Objective

Example :DATA:ANAL:M2100:BISO:MULT 10 sets the multiplier to 10.

Related commands [:SENS]:DATA[:TEL]:ANAL:G828:SEPI[:STAT] on page R-292
[:SENS]:DATA[:TEL]:ANAL[:TYPE] on page R-314

[:SENS]:DATA[:TEL]:ANAL:M2100:BISO:MULT?

[:SENSe]:DATA[:TELecom]:ANALysis:M2100:BISObjective:MULTiplier? provides the current setting of the BISO multiplier for analysis evaluations.

Example :DATA:ANAL:M2100:BISO:MULT?
Response: 5

[:SENS]:DATA[:TEL]:ANAL:M2100:BISO:SES?

[:SENSe]:DATA[:TELecom]:ANALysis:M2100:BISObjective:SESeconds? provides the current setting of the BISO SES (Severely Errored Second) threshold for analysis evaluations.

Comments This setting is calculated internally according to M.2100 and can therefore only be queried. The value can range from 0 to 1E6.

Example :DATA:ANAL:M2100:BISO:SES?
Response: 51

[:SENS]:DATA[:TEL]:ANAL:M2100:EVAL

[:SENSe]:DATA[:TELecom]:ANALysis:M2100:EVALuation <evaluation> determines the current setting of the anomaly evaluation type used in M.2100 analysis.

Parameter

Name	Type	Range	Default
evaluation	discrete	NONE | TSE | M2CRC | M2FAS | M8FAS | M34FAS | M140FAS | DS1CRC | DS1FAS | DS3PBIT | DS3FAS	M2CRC

Dependencies If not set to TSE, a matching setting of the receiver signal is required to allow the selected analysis evaluation.

Comments <evaluation> =

NONE:	No M.2100 analysis
TSE:	Perform analysis for TSE (test sequence errors)
M2CRC:	Perform analysis for CRC (cyclic redundancy check) errors in the 2 Mbit/s multiframe
M2FAS:	Perform analysis for FAS (frame alignment signal) errors in the 2 Mbit/s multiframe
M8FAS:	Perform analysis for FAS (frame alignment signal) errors in the 8 Mbit/s frame
M34FAS:	Perform analysis for FAS (frames alignment signal) errors in the 34 MBit/s frame
M140FAS:	Perform analysis for FAS (frame alignment signal) errors in the 140 Mbit/s frame
DS1CRC:	Perform analysis for CRC (cyclic redundancy check) errors in the DS1 signal
DS1FAS:	Perform analysis for FAS (frame alignment signal) errors in the DS1 signal
DS3PBIT:	Perform analysis for PARITY bit errors in the DS3 signal
DS3FAS:	Perform analysis for FAS (frame alignment signal) errors in the DS3 signal

Example :DATA:ANAL:M2100:EVAL M140FAS sets FAS 140 Mbit/s evaluation.

Related commands [:SENS]:DATA[:TEL]:ANAL[:TYPE] on page R-314

[:SENS]:DATA[:TEL]:ANAL:M2100:EVAL?

[:SENSe]:DATA[:TELecom]:ANALysis:M2100:EVALuation? provides the current setting of the anomaly evaluation type used in M.2100 analysis.

Example :DATA:ANAL:M2100:EVAL?
Response: TSE if M.2100 TSE measurement is activated.

[:SENS]:DATA[:TEL]:ANAL:M2100:S1:ES?

[:SENSe]:DATA[:TELecom]:ANALysis:M2100:S1:ESeconds? provides the current setting of the S1 ES (Errored Second) threshold for analysis evaluations.

Comments This setting is calculated internally according to M.2100 and can therefore only be queried. The value can range from 0 to 1E7.

Example :DATA:ANAL:M2100:S1:ES?
Response: 1949

[:SENS]:DATA[:TEL]:ANAL:M2100:S1:SES?

[:SENSe]:DATA[:TELecom]:ANALysis:M2100:S1:SESeconds? provides the current setting of the S1 SES (Severely Errored Second) threshold for analysis evaluations.

Comments This setting is calculated internally according to M.2100 and can therefore only be queried. The value can range from 0 to 1E6.

Example :DATA:ANAL:M2100:S1:SES?
Response: 15

[:SENS]:DATA[:TEL]:ANAL:M2100:S2:ES?

[:SENSe]:DATA[:TELecom]:ANALysis:M2100:S2:ESeconds? provides the current setting of the S2 ES (Errored Second) threshold for analysis evaluations.

Comments This setting is calculated internally according to M.2100 and can therefore only be queried. The value can range from 0 to 1E7.

Example :DATA:ANAL:M2100:S2:ES?
Response: 2129

[:SENS]:DATA[:TEL]:ANAL:M2100:S2:SES?

[:SENSe]:DATA[:TELecom]:ANALysis:M2100:S2:SESeconds? provides the current setting of the S2 SES (Severely Errored Second) threshold for analysis evaluations.

Comments This setting is calculated internally according to M.2100 and can therefore only be queried. The value can range from 0 to 1E6.

Example :DATA:ANAL:M2100:S2:SES?
Response: 36

[:SENS]:DATA[:TEL]:ANAL:M2100:UAS:LIM[:STAT]

[:SENSe]:DATA[:TELecom]:ANALysis:M2100:UAS:LIMit[:STATe] <state> activates/deactivates the UAS (Unavailable Second) limit for analysis evaluations.

Parameter

Name	Type	Range	Default
state	boolean	ON | OFF | 0 | 1	OFF

Dependencies None

Comments ON | 1: Limit switched on
OFF | 0: Limit switched off

Example :DATA:ANAL:M2100:UAS:LIM ON switches the limit on.

Related commands [:SENS]:DATA[:TEL]:ANAL:M2100:UAS:LIM:UPP on page R-302
[:SENS]:DATA[:TEL]:ANAL[:TYPE] on page R-314

[:SENS]:DATA[:TEL]:ANAL:M2100:UAS:LIM[:STAT]?

[:SENSe]:DATA[:TELecom]:ANALysis:M2100:UAS:LIMit[:STATe]? provides the status of the UAS (Unavailable Second) limit.

Example :DATA:ANAL:M2100:UAS:LIM?
Response: 1 if the limit is activated.

[:SENS]:DATA[:TEL]:ANAL:M2100:UAS:LIM:UPP

[:SENSe]:DATA[:TELecom]:ANALysis:M2100:UAS:LIMit:UPPer <value> determines the UAS (Unavailable Second) limit for analysis evaluations.

Parameter

Name	Type	Range	Default
value	numeric	0 - 100000	0

Dependencies Is valid only if:
[:SENS]:DATA[:TEL]:ANAL:M2100:UAS:LIM[:STAT] = 1

Comments If the measured UAS exceeds the UAS limit the verdict for the path is: Rejected.

Example :DATA:ANAL:M2100:UAS:LIM:UPP 10 sets the limit to 10.

Related commands [:SENS]:DATA[:TEL]:ANAL:M2100:UAS:LIM[:STAT] on page R-301
[:SENS]:DATA[:TEL]:ANAL[:TYPE] on page R-314

[:SENS]:DATA[:TEL]:ANAL:M2100:UAS:LIM:UPP?

[:SENSe]:DATA[:TELecom]:ANALysis:M2100:UAS:LIMit:UPPer? provides the current setting of the UAS (Unavailable Second) limit for analysis evaluations.

Example :DATA:ANAL:M2100:UAS:LIM:UPP?
Response: 5000

[:SENS]:DATA[:TEL]:ANAL:M2100:UAS:MODE

[:SENSe]:DATA[:TELecom]:ANALysis:M2100:UAS:MODE <mode> determines the current setting of the UAS (Unavailable Seconds) evaluation mode used in M.2100 analysis.

Parameter

Name	Type	Range	Default
mode	discrete	INDividual | GLOBal	INDividual

Dependencies Only selectable if M.2100 evaluation is set to M2CRC.

Comments <mode> =
INDividual: Individual evaluation of UAS for near end and far end
GLOBal: Global evaluation of UAS for near end and far end

Example :DATA:ANAL:M2100:UAS:MODE GLOB sets the UAS evaluation to global.

Related commands [:SENS]:DATA[:TEL]:ANAL[:TYPE] on page R-314

[:SENS]:DATA[:TEL]:ANAL:M2100:UAS:MODE?

[:SENSe]:DATA[:TELecom]:ANALysis:M2100:UAS:MODE? provides the status of the UAS (Unavailable Seconds) evaluation mode used in M.2100 analysis.

Example	:DATA:ANAL:M2100:UAS:MODE?	
	Response: INDI	for individual UAS evaluation mode.

[:SENS]:DATA[:TEL]:ANAL:M2101:ALL

[:SENSe]:DATA[:TELecom]:ANALysis:M2101:ALLocation <value> determines the allocation for M.2101 analysis evaluations.

Parameter

Name	Type	Range	Default
value	numeric	0.1 - 100	100

Dependencies None

Comments The BISO value (Bringing Into Service Objective) and hence the S1 and S2 thresholds can be influenced with this parameter. The following formulas according to M.2101 are used for paths respectively sections:

$BISO_{es/bbe}$ for paths and regenerator sections:
$BISO_{es}$ = (Allocation x EERPO x Test Period x BISO Multiplier) / 2
$BISO_{bbe}$ = (Allocation x EERPO x Test Period x Blocks/s x BISO Multiplier) / 2

$BISO_{es/bbe}$ for multiplex sections:
$BISO_{es}$ = (Allocation x EERPO x Test Period x BISO Multiplier) / 10
$BISO_{bbe}$ = (Allocation x EERPO x Test Period x Blocks/s x BISO Multiplier) / 10

$BISO_{ses}$ for paths and sections:
$BISO_{ses}$ = (Allocation x EERPO x Test Period x BISO Multiplier) / 2

EERPO = End to End Reference Performance Objective

Example :DATA:ANAL:M2101:ALL 10 sets the allocation to 10%.

Related commands [:SENS]:DATA[:TEL]:ANAL:M2101:BISO:MULT on page R-305
[:SENS]:DATA[:TEL]:ANAL[:TYPE] on page R-314

[:SENS]:DATA[:TEL]:ANAL:M2101:ALL?

[:SENSe]:DATA[:TELecom]:ANALysis:M2101:ALLocation? provides the current setting of the allocation for analysis evaluations.

Example :DATA:ANAL:M2101:ALL?
Response: 10.0 for 10.0 % allocation.

[:SENS]:DATA[:TEL]:ANAL:M2101:BISO:BBE?

[:SENSe]:DATA[:TELecom]:ANALysis:M2101:BISObjective:BBErrors? provides the current setting of the BISO (Bringing Into Service Objectives) BBE (Background Block Error) threshold for analysis evaluations.

Dependencies Is available only if:
[:SENS]:DATA[:TEL]:ANAL:M2101:VERSion = M2101

Comments This setting is calculated internally according to M.2101 and can therefore only be queried. The value can range from 0 to 1E12.

Example :DATA:ANAL:M2101:BISO:BBE?
Response: 9677

[:SENS]:DATA[:TEL]:ANAL:M2101:BISO:ES?

[:SENSe]:DATA[:TELecom]:ANALysis:M2101:BISObjective:ESeconds? provides the current setting of the BISO (Bringing Into Service Objectives) ES (Errored Second) threshold for analysis evaluations.

Comments This setting is calculated internally according to M.2101 and can therefore only be queried. The value can range from 0 to 1E7.

Example :DATA:ANAL:M2101:BISO:ES?
Response: 2039

[:SENS]:DATA[:TEL]:ANAL:M2101:BISO:MULT

[:SENSe]:DATA[:TELecom]:ANALysis:M2101:BISObjective:MULTiplier <value> determines the multiplier value for M.2101 analysis evaluations.

Parameter

Name	Type	Range	Default
value	numeric	0.1 - 100	1

Dependencies None

Comments The BISO value (Bringing Into Service Objective) and hence the S1 and S2 thresholds can be influenced with this parameter. The following formulas according to M.2101 are used for paths respectively sections:

$BISO_{es/bbe}$ for paths and regenerator sections:
$BISO_{es}$ = (Allocation x EERPO x Test Period x BISO Multiplier) / 2
$BISO_{bbe}$ = (Allocation x EERPO x Test Period x Blocks/s x BISO Multiplier) / 2

$BISO_{es/bbe}$ for multiplex sections:
$BISO_{es}$ = (Allocation x EERPO x Test Period x BISO Multiplier) / 10
$BISO_{bbe}$ = (Allocation x EERPO x Test Period x Blocks/s x BISO Multiplier) / 10

$BISO_{ses}$ for paths and sections:
$BISO_{ses}$ = (Allocation x EERPO x Test Period x BISO Multiplier) / 2

EERPO = End to End Reference Performance Objective

Example :DATA:ANAL:M2101:BISO:MULT 10 sets the multiplier to 10.

Related commands [:SENS]:DATA[:TEL]:ANAL:M2101:ALL on page R-304
[:SENS]:DATA[:TEL]:ANAL[:TYPE] on page R-314

[:SENS]:DATA[:TEL]:ANAL:M2101:BISO:MULT?

[:SENSe]:DATA[:TELecom]:ANALysis:M2101:BISObjective:MULTiplier? provides the current setting of the BISO multiplier for analysis evaluations.

Example :DATA:ANAL:M2101:BISO:MULT?
Response: 5

[:SENS]:DATA[:TEL]:ANAL:M2101:BISO:SEP?

[:SENSe]:DATA[:TELecom]:ANALysis:M2101:BISObjective:SEPeriod? provides the current setting of the BISO SEP (Severely Errored Period) threshold for analysis evaluations.

Dependencies Is available only if:
[:SENS]:DATA[:TEL]:ANAL:M2101:VERSion = M2101

Comments This setting is calculated internally according to M.2101 and can therefore only be queried. The value can range from 0 to 1E6.

Example :DATA:ANAL:M2101:BISO:SEP?
Response: 16

[:SENS]:DATA[:TEL]:ANAL:M2101:BISO:SES?

[:SENSe]:DATA[:TELecom]:ANALysis:M2101:BISObjective:SESeconds? provides the current setting of the BISO SES (Severely Errored Second) threshold for analysis evaluations.

Comments This setting is calculated internally according to M.2101 and can therefore only be queried. The value can range from 0 to 1E6.

Example :DATA:ANAL:M2101:BISO:SES?
Response: 51

[:SENS]:DATA[:TEL]:ANAL:M2101:EVAL

[:SENSe]:DATA[:TELecom]:ANALysis:M2101:EVALuation <evaluation> determines the current setting of the anomaly evaluation type used in M.2101 analysis.

Parameter

Name	Type	Range	Default
evaluation	discrete	NONE | RSB1 | MSB2 | HPB3 | LPBIP | TCM | TSE	HPB3

Dependencies If not set to TSE, a matching setting of the receiver signal is required to allow the selected analysis evaluation.

Comments	<evaluation> =	
	NONE:	No M.2101 analysis
	RSB1:	Perform analysis for B1 errors in SDH signals
	MSB2:	Perform analysis for B2 errors in SDH signals
	HPB3:	Perform analysis for B3 errors in SDH signals
	LPBIP:	Perform analysis for LPBIP errors in SDH signals
	TCM:	Perform analysis for TCM (Tandem Connection Monitoring) Bytes N1/N2 (Z6) Not yet available!
	TSE:	Perform analysis for TSE (test sequence errors)

Example :DATA:ANAL:M2101:EVAL HPB3 sets high path B3 error evaluation.

Related commands [:SENS]:DATA[:TEL]:ANAL[:TYPE] on page R-314

[:SENS]:DATA[:TEL]:ANAL:M2101:EVAL?

[:SENSe]:DATA[:TELecom]:ANALysis:M2101:EVALuation? provides the current setting of the anomaly evaluation type used in M.2101 analysis.

Example :DATA:ANAL:M2101:EVAL?
Response: TSE if M.2101 TSE measurement is activated.

[:SENS]:DATA[:TEL]:ANAL:M2101:S1:BBE?

[:SENSe]:DATA[:TELecom]:ANALysis:M2101:S1:BBErrors? provides the current setting of the S1 BBE (Background Block Error) threshold for analysis evaluations.

Dependencies Is available only if:
[:SENS]:DATA[:TEL]:ANAL:M2101:VERSion = M2101

Comments This setting is calculated internally according to M.2101 and can therefore only be queried. The value can range from 0 to 1E12.

Example :DATA:ANAL:M2101:S1:BBE?
Response: 9480

[:SENS]:DATA[:TEL]:ANAL:M2101:S1:ES?

[:SENSe]:DATA[:TELecom]:ANALysis:M2101:S1:ESeconds? provides the current setting of the S1 ES (Errored Second) threshold for analysis evaluations.

Comments This setting is calculated internally according to M.2101 and can therefore only be queried. The value can range from 0 to 1E7.

Example :DATA:ANAL:M2101:S1:ES?
Response: 1847

[:SENS]:DATA[:TEL]:ANAL:M2101:S1:SEP?

[:SENSe]:DATA[:TELecom]:ANALysis:M2101:S1:SEPeriod? provides the current setting of the S1 SEP (Severely Errored Period) threshold for analysis evaluations.

Dependencies
Is available only if:
[:SENS]:DATA[:TEL]:ANAL:M2101:VERSion = M2101

Comments
This setting is calculated internally according to M.2101 and can therefore only be queried. The value can range from 0 to 1E6.

Example
:DATA:ANAL:M2101:S1:SEP?
Response: 4

[:SENS]:DATA[:TEL]:ANAL:M2101:S1:SES?

[:SENSe]:DATA[:TELecom]:ANALysis:M2101:S1:SESeconds? provides the current setting of the S1 SES (Severely Errored Second) threshold for analysis evaluations.

Comments
This setting is calculated internally according to M.2101 and can therefore only be queried. The value can range from 0 to 1E6.

Example
:DATA:ANAL:M2101:S1:SES?
Response: 166

[:SENS]:DATA[:TEL]:ANAL:M2101:S2:BBE?

[:SENSe]:DATA[:TELecom]:ANALysis:M2101:S2:BBErrors? provides the current setting of the S2 BBE (Background Block Error) threshold for analysis evaluations.

Dependencies
Is available only if:
[:SENS]:DATA[:TEL]:ANAL:M2101:VERSion = M2101

Comments
This setting is calculated internally according to M.2101 and can therefore only be queried. The value can range from 0 to 1E12.

Example
:DATA:ANAL:M2101:S2:BBE?
Response: 9874

[:SENS]:DATA[:TEL]:ANAL:M2101:S2:ES?

[:SENSe]:DATA[:TELecom]:ANALysis:M2101:S2:ESeconds? provides the current setting of the S2 ES (Errored Second) threshold for analysis evaluations.

Comments
This setting is calculated internally according to M.2101 and can therefore only be queried. The value can range from 0 to 1E7.

Example
:DATA:ANAL:M2101:S2:ES?
Response: 2023

[:SENS]:DATA[:TEL]:ANAL:M2101:S2:SEP?

[:SENSe]:DATA[:TELecom]:ANALysis:M2101:S2:SEPeriod? provides the current setting of the S2 SEP (Severely Errored Period) threshold for analysis evaluations.

Dependencies: Is available only if:
[:SENS]:DATA[:TEL]:ANAL:M2101:VERSion = M2101

Comments: This setting is calculated internally according to M.2101 and can therefore only be queried. The value can range from 0 to 1E6.

Example: :DATA:ANAL:M2101:S2:SEP?
Response: 16

[:SENS]:DATA[:TEL]:ANAL:M2101:S2:SES?

[:SENSe]:DATA[:TELecom]:ANALysis:M2101:S2:SESeconds? provides the current setting of the S2 SES (Severely Errored Second) threshold for analysis evaluations.

Comments: This setting is calculated internally according to M.2101 and can therefore only be queried. The value can range from 0 to 1E6.

Example: :DATA:ANAL:M2101:S2:SES?
Response: 222

[:SENS]:DATA[:TEL]:ANAL:M2101:SEPI[:STAT]

[:SENSe]:DATA[:TELecom]:ANALysis:M2101:SEPIntensity[:STATe] <state> activates/deactivates the consideration of SEPI (Severely Errored Period Intensity) in the calculation of the verdict.

Parameter

Name	Type	Range	Default
state	boolean	ON | OFF | 0 | 1	ON

Dependencies: Is available only if:
[:SENS]:DATA[:TEL]:ANAL:M2101:VERSion = M2101

Comments:
ON | 1: Consideration switched on
OFF | 0: Consideration switched off

Example: :DATA:ANAL:M2101:SEPI ON switches the consideration on.

Related commands: [:SENS]:DATA[:TEL]:ANAL:M2101:VERSion on page R-311

[:SENS]:DATA[:TEL]:ANAL:M2101:SEPI[:STAT]?

[:SENSe]:DATA[:TELecom]:ANALysis:M2101:SEPIntensity[:STATe]? provides the status of the consideration of SEPI (Severely Errored Period Intensity) in the calculation of the verdict.

Example :DATA:ANAL:M2101:SEPI?
Response: 1 if the consideration is activated.

[:SENS]:DATA[:TEL]:ANAL:M2101:UAS:LIM[:STAT]

[:SENSe]:DATA[:TELecom]:ANALysis:M2101:UAS:LIMit[:STATe] <state> activates/deactivates the UAS (Unavailable Second) limit for analysis evaluations.

Parameter

Name	Type	Range	Default
state	boolean	ON | OFF | 0 | 1	OFF

Dependencies None

Comments ON | 1: Limit switched on
OFF | 0: Limit switched off

Example :DATA:ANAL:M2101:UAS:LIM ON switches the limit on.

Related commands [:SENS]:DATA[:TEL]:ANAL:M2101:UAS:LIM:UPP on page R-310
[:SENS]:DATA[:TEL]:ANAL[:TYPE] on page R-314

[:SENS]:DATA[:TEL]:ANAL:M2101:UAS:LIM[:STAT]?

[:SENSe]:DATA[:TELecom]:ANALysis:M2101:UAS:LIMit[:STATe]? provides the status of the UAS (Unavailable Second) limit.

Example :DATA:ANAL:M2101:UAS:LIM?
Response: 1 if the limit is activated.

[:SENS]:DATA[:TEL]:ANAL:M2101:UAS:LIM:UPP

[:SENSe]:DATA[:TELecom]:ANALysis:M2101:UAS:LIMit:UPPer <value> determines the UAS (unavailable second) limit for analysis evaluations.

Parameter

Name	Type	Range	Default
value	numeric	0 - 100000	0

Dependencies Is valid only if:
[:SENS]:DATA[:TEL]:ANAL:M2101:UAS:LIM[:STAT] = 1

Comments If the measured UAS exceeds the UAS limit the verdict for the path is: Rejected.

Example :DATA:ANAL:M2101:UAS:LIM:UPP 10 sets the limit to 10.

Related commands [:SENS]:DATA[:TEL]:ANAL:M2101:UAS:LIM[:STAT] on page R-310
[:SENS]:DATA[:TEL]:ANAL[:TYPE] on page R-314

[:SENS]:DATA[:TEL]:ANAL:M2101:UAS:LIM:UPP?

[:SENSe]:DATA[:TELecom]:ANALysis:M2101:UAS:LIMit:UPPer? provides the current setting of the UAS (Unavailable Second) limit for analysis evaluations.

Example :DATA:ANAL:M2101:UAS:LIM:UPP?
Response: 5000

[:SENS]:DATA[:TEL]:ANAL:M2101:UAS:MODE

[:SENSe]:DATA[:TELecom]:ANALysis:M2101:UAS:MODE <mode> determines the current setting of the UAS (Unavailable Seconds) evaluation mode used in M.2101 analysis.

Parameter

Name	Type	Range	Default
mode	discrete	INDividual | GLOBal	INDividual

Dependencies Only selectable if M.2101 evaluation is set to MSB2, HPB3 or LPBIP.

Comments <mode> =
INDividual: Individual evaluation of UAS for near end and far end
GLOBal: Global evaluation of UAS for near end and far end

Example :DATA:ANAL:M2101:UAS:MODE GLOB sets the UAS evaluation to global.

[:SENS]:DATA[:TEL]:ANAL:M2101:UAS:MODE?

[:SENSe]:DATA[:TELecom]:ANALysis:M2101:UAS:MODE? provides the status of the UAS (Unavailable Seconds) evaluation mode used in M.2101 analysis.

Example :DATA:ANAL:M2101:UAS:MODE?
Response: INDI for individual UAS evaluation mode.

[:SENS]:DATA[:TEL]:ANAL:M2101:VERSion

[:SENSe]:DATA[:TELecom]:ANALysis:M2101:VERSion <vers> determines the version of the M.2101 analysis.

Parameter

Name	Type	Range	Default
vers	discrete	M2101 | M2101_1	M2101

Dependencies None

Comments <vers> =
M2101: Analysis corresponding to M.2101 recommendation 06/2000.
M2101_1: Analysis corresponding to M.2101.1 recommendation 04/1997.

Example :DATA:ANAL:M2101:VERS M2101_1 sets the analysis to M.2101.1.

Related commands [:SENS]:DATA[:TEL]:ANAL:M2101:SEPI[:STAT] on page R-309

[:SENS]:DATA[:TEL]:ANAL:M2101:VERSion?

[:SENSe]:DATA[:TELecom]:ANALysis:M2101:VERSion? provides the version of the M.2101 analysis.

Example	:DATA:ANAL:M2101:VERS? Response: M2101_1	for analysis corresponding to M.2101.1 recommendation 04/1997.

[:SENS]:DATA[:TEL]:ANAL:PERF:EVAL

[:SENSe]:DATA[:TELecom]:ANALysis:PERFormance:EVALuation <evaluation> determines the current setting for the anomaly evaluation type used in ANSI performance analysis.

Parameter

Name	Type	Range	Default
evaluation	discrete	NONE | TSE | CODE (BPV)| RSBIP (SECTion) | MSBIP (LINE) | PBIP (STSPATH) | LPBIP (VTPATH) | DS3FAS | DS3PAR | DS3CPAR | DS1FAS | DS1CRC	TSE

Dependencies

A matching setting of the receiver signal is required to allow the selected analysis evaluation.

Comments

<evaluation> =

NONE:	No ANSI performance analysis
TSE:	Perform analysis for TSE (test sequence errors)
CODE | BPV:	Perform analysis for code (BPV) errors
RSBIP | SECTion:	Perform analysis for B1-BIP error(s) (Regenerator Section)
MSBIP | LINE:	Perform analysis for B2-BIP error(s) (Multiplex Section)
PBIP | STSPATH:	Perform analysis for B3-BIP error(s) (High path/STS path)
LPBIP | VTPATH:	Perform analysis for LP-BIP error(s) (Low path/VT path)
DS3FAS:	Perform analysis for FAS (frame alignment signal) errors in the DS3 signal
DS3PAR:	Perform analysis for parity errors in the DS3 signal
DS1FAS:	Perform analysis for FAS (frame alignment signal) errors in the DS1 signal
DS1CRC:	Perform analysis for CRC (cyclic redundancy check) errors in the DS1 signal

This parameter is automatically set according to the current signal structure. If no analysis is possible it is set to NONE.

Example

:DATA:ANAL:PERF:EVAL TSE sets TSE evaluation.

Related commands

[:SENS]:DATA[:TEL]:ANAL[:TYPE] on page R-314

[:SENS]:DATA[:TEL]:ANAL:PERF:EVAL?

[:SENSe]:DATA[:TELecom]:ANALysis:PERFormance:EVALuation? provides the current setting of the anomaly evaluation type used in ANSI performance analysis.

Example :DATA:ANAL:PERF:EVAL?
Response: TSE if ANSI TSE measurement is activated.

[:SENS]:DATA[:TEL]:ANAL[:TYPE]

[:SENSe]:DATA[:TELecom]:ANALysis[:TYPE] <type> determines the type of analysis evaluation.

Parameter

Name	Type	Range	Default
type	discrete	NONE | G826ISM | G826OOS | G821 | M2100 | PERFormance | M2101 | G828 | G829	NONE

Dependencies None

Comments

NONE:	No analysis evaluation activated
G826ISM:	G.826 in service measurement activated
G826OOS:	G.826 out of service measurement activated
G821:	G.821 evaluation activated
M2100:	M.2100 evaluation activated
PERFormance:	ANSI evaluation activated
M2101:	M.2100 evaluation activated
G828:	G.828 evaluation activated
G829:	G.829 evaluation activated

Example :DATA:ANAL G826OOS selects G.826 OOS analysis.

Related commands All commands in the corresponding subnodes of the selected type of analysis.

[:SENS]:DATA[:TEL]:ANAL[:TYPE]?

[:SENSe]:DATA[:TELecom]:ANALysis[:TYPE]? provides the current setting of the type of analysis evaluation.

Example :DATA:ANAL?
Response: G826ISM if G.826 in service measurement is activated.

[:SENS]:DATA[:TEL]:APS

The commands in this group specify the commands for automatic protection switching (APS) measurement.

Note: All commands in this group are valid only if the option 90.15 is available.

[:SENS]:DATA[:TEL]:APS:GATE

[:SENSe]:DATA[:TELecom]:APS:GATE <value> sets the gate time for APS measurement.

Parameter

Name	Type	Range	Default
value	numeric	100 - 5000	100

Dependencies None

Comments A signal path interruption causes various alarms / bit errors. APS time recording begins when the first alarm / error corresponding to the setting of [:SENS]:DATA[:TEL]:APS:SENS on page R-315 occurs. This command determines the maximum duration of the recording. Subsequent alarms / errors (e.g. due to a further line disruption) do not affect the measured value.
The gate time is set in steps of one millisecond.

Example [:SENS]:DATA[:TEL]:APS:GATE 100
sets the APS gate time to 100 milliseconds.

Related commands [:SENS]:DATA[:TEL]:APS:SENS on page R-315
Result IDs for :SENS:DATA and :SENS:FUNC commands on page R-382 (APSTime)

[:SENS]:DATA[:TEL]:APS:GATE?

[:SENSe]:DATA[:TELecom]:APS:GATE? provides the current setting of the gate time for APS measurement.

Example :DATA:APS:GATE?
Response: 500 for a gate time of 500 ms.

[:SENS]:DATA[:TEL]:APS:SENS

[:SENSe]:DATA[:TELecom]:APS:SENSor] <type> determines the type of APS (Automatic Protection Switching) sensor.

Parameter

Name	Type	Range CEPT	Range ANSI	Default
type	discrete	TSE | MSAIS | AUAIS | TUAIS	TSE | AISL | AISP | AISV	TSE

Dependencies The signal structure that is set must enable the selected sensor.

Comments	TSE:	Test sequence error (bit errors) activated as APS sensor.
	MSAIS | AISL:	SDH alarm MSAIS/AIS-Line activated as APS sensor.
	AUAIS | AISP:	SDH alarm AUAIS/AIS-STS-Path activated as APS sensor.
	TUAIS | AISV:	SDH alarm TUAIS/AIS-VT-Path activated as APS sensor.

Alarms or test sequence errors occur for every signal path switch-over due to a line defect. The sensor set here is used as an indicator for the duration of the APS signal path switch-over. For example: If MSAIS is activated, the duration of an existing MSAIS alarm is measured.

Example :DATA:APS:SENS MSAIS switches to MSAIS.

Related commands [:SENS]:DATA[:TEL]:APS:GATE on page R-315

[:SENS]:DATA[:TEL]:APS:SENS?

[:SENSe]:DATA[:TELecom]:APS:SENSor? provides the current setting of the sensor type for APS measurement.

Example :DATA:APS:SENS?
Response: TSE If TSE is activated as the sensor for APS measurement.

[:SENS]:DATA[:TEL]:ATM

The commands in this group specify the structure of the ATM signal demapped from PDH signals or from SDH signals.

Note: All commands in this group are valid only if ATM is selected as the payload of a PDH signal or SDH signal.

[:SENS]:DATA[:TEL]:ATM:ANAL:CTD:OFFS

[:SENSe]:DATA[:TELecom]:ATM:ANALysis:CTD:OFFSet <value> sets the offset for Cell Transfer Delay measurement.

Parameter

Name	Type	Range	Default
value	numeric	0 - 65535	0

Dependencies The selection is effective only if [:SENS]:DATA[:TEL]:ATM:ANAL:TYPE = CTD is set (not valid for ABT-20 devices).

Comments The offset is set in steps of 2.56 microseconds.

Example [:SENS]:DATA[:TEL]:ATM:ANAL:CTD:OFFS 100
sets the offset to 100 x 2.56 = 256 microseconds.

Related commands [:SENS]:DATA[:TEL]:ATM:ANAL:CTD:RES on page R-317
[:SENS]:DATA[:TEL]:ATM:ANAL:TYPE on page R-318

[:SENS]:DATA[:TEL]:ATM:ANAL:CTD:OFFS?

[:SENSe]:DATA[:TELecom]:ATM:ANALysis:CTD:OFFSet? provides the current setting of the offset for CTD measurement.

Dependencies (not valid for ABT-20 devices)

Example [:SENS]:DATA[:TEL]:ATM:ANAL:CTD:OFFS?
Response: 10
The offset is set to 10 x 2.56 us = 25.6 microseconds.

(not possible for ABT-20 devices)

[:SENS]:DATA[:TEL]:ATM:ANAL:CTD:RES

[:SENSe]:DATA[:TELecom]:ATM:ANALysis:CTD:RESolution <value> sets the resolution for Cell Transfer Delay measurement.

Parameter

Name	Type	Range	Default
value	numeric	0 - 7	3

Dependencies The selection is effective only if [:SENS]:DATA[:TEL]:ATM:ANAL:TYPE = CTD is set (not valid for ABT-20 devices).

Comments The resolution and the class width are set as follows:

Resolution	Class width
0	160 ns
1	1.28 µs
2	10.24 µs
3	81.92 µs
4	655.36 µs
5	5.242 ms
6	41.94 ms
7	335.5 ms

Example [:SENS]:DATA[:TEL]:ATM:ANAL:CTD:RES 0
sets the class width to 160 ns.

Related commands [:SENS]:DATA[:TEL]:ATM:ANAL:CTD:OFFS on page R-316
[:SENS]:DATA[:TEL]:ATM:ANAL:TYPE on page R-318

[:SENS]:DATA[:TEL]:ATM:ANAL:CTD:RES?

[:SENSe]:DATA[:TELecom]:ATM:ANALysis:CTD:RESolution? provides the current setting of the resolution for CTD measurement.

Dependencies (not valid for ABT-20 devices)

Example [:SENS]:DATA[:TEL]:ATM:ANAL:CTD:RES?
Response: 2
The resolution is set to 2, i.e. a class width of 10.24 microseconds.

[:SENS]:DATA[:TEL]:ATM:ANAL:TYPE

[:SENSe]:DATA[:TELecom]:ATM:ANALysis:TYPE <type> selects the measurement type.

Parameter

Name	Type	Range	Default
type	discrete	ERP | CTD	ERP

Dependencies
The selection is effective only if [:SENS]:DATA[:TEL]:ATM:PAYL:TYPE = O191 is set (not valid for ABT-20 devices).

Comments
ERP: Measurement of error-related performance parameters (errored cells, lost cells, misinserted cells).
CTD: Measurement of cell transfer delay distribution

Example
[:SENS]:DATA[:TEL]:ATM:ANAL:TYPE ERP
selects measurement of error-related performance parameters.

Related commands
[:SENS]:DATA[:TEL]:ATM:ANAL:CTD:OFFS on page R-316
[:SENS]:DATA[:TEL]:ATM:ANAL:CTD:RES on page R-317

[:SENS]:DATA[:TEL]:ATM:ANAL:TYPE?

[:SENSe]:DATA[:TELecom]:ATM:ANALysis:TYPE? provides the setting of the selected measurement type.

Dependencies
(not valid for ABT-20 devices)

Example
[:SENS]:DATA[:TEL]:ATM:ANAL:TYPE?
Response: ERP
if measurement of error-related performance parameters is set.

[:SENS]:DATA[:TEL]:ATM:CLP

[:SENSe]:DATA[:TELecom]:ATM:CLP <value> determines the CLP field in the measurement channel that is filtered out.

Parameter

Name	Type	Range	Default
value	numeric	0 - 1	0

Dependencies (not valid for ABT-20 devices)
The selection is only effective if VC4_4C (STS12C_SPE) ATM is selected.

Example [:SENS]:DATA[:TEL]:ATM:CLP 0 sets the CLP receive filter to the value 0.

Related commands
[:SENS]:DATA[:TEL]:ATM:CLP:FILT on page R-319
[:SENS]:DATA[:TEL]:ATM:VCI on page R-323
[:SENS]:DATA[:TEL]:ATM:VPI on page R-324

[:SENS]:DATA[:TEL]:ATM:CLP?

[:SENSe]:DATA[:TELecom]:ATM:CLP?
provides the current setting of the CLP filter.

Dependencies (not valid for ABT-20 devices)

Example [:SENS]:DATA[:TEL]:ATM:CLP?
Response: 0 if the CLP receive filter is set to 0.

[:SENS]:DATA[:TEL]:ATM:CLP:FILT

[:SENSe]:DATA[:TELecom]:ATM:CLP:FILTer <filter> determines the setting of the CLP filter.

Parameter

Name	Type	Range	Default
filter	boolean	ON | OFF | 0 | 1	ON

Dependencies (not valid for ABT-20 devices)
The selection is only effective if VC4_4C (STS12C_SPE) ATM is selected.

Example [:SENS]:DATA[:TEL]:ATM:CLP:FILT ON activates the CLP filter.

Related commands
[:SENS]:DATA[:TEL]:ATM:CLP on page R-319

[:SENS]:DATA[:TEL]:ATM:CLP:FILT?

[:SENSe]:DATA[:TELecom]:ATM:CLP:FILTer? provides the current setting of the CLP filter.

Dependencies (not valid for ABT-20 devices)

Example [:SENS]:DATA[:TEL]:ATM:CLP:FILT?
Response: 1 if the CLP filter is activated.

[:SENS]:DATA[:TEL]:ATM:NINT

[:SENSe]:DATA[:TELecom]:ATM:NINTerface <type> determines the setting of the network interface.

Parameter

Name	Type	Range	Default
type	discrete	UNI | NNI	UNI

Dependencies See :SOUR:DATA[:TEL]:ATM:NINT on page R-74
(not valid for ABT-20 devices).
UNI: User-network interface
NNI: Network node interface

Example [:SENS]:DATA[:TEL]:ATM:NINT UNI sets the network interface to UNI.

Related commands [:SENS]:DATA[:TEL]:ATM:VPI on page R-324

[:SENS]:DATA[:TEL]:ATM:NINT?

[:SENSe]:DATA[:TELecom]:ATM:NINTerface? provides the setting of the network interface.

Dependencies (not valid for ABT-20 devices)

Example [:SENS]:DATA[:TEL]:ATM:NINT?
Response: UNI if the interface is set to UNI.

[:SENS]:DATA[:TEL]:ATM:PAYL:SCR

[:SENSe]:DATA[:TELecom]:ATM:PAYLoad:SCRambling <scramble> determines the setting of the scrambler.

Parameter

Name	Type	Range	Default
scramble	boolean	ON | OFF | 0 | 1	ON

Dependencies None

Comments
ON | 1: Turn on scrambler
OFF | 0: Turn off scrambler

Example [:SENS]:DATA[:TEL]:ATM:PAYL:SCR ON activates the scrambler.

[:SENS]:DATA[:TEL]:ATM:PAYL:SCR?

[:SENSe]:DATA[:TELecom]:ATM:PAYLoad:SCRambling? provides the current setting of the scrambler.

Example
[:SENS]:DATA:ATM:PAYL:SCR?
Response: 1 if scrambling is switched on.

[:SENS]:DATA[:TEL]:ATM:PAYL:TYPE

[:SENSe]:DATA[:TELecom]:ATM:PAYLoad:TYPE <type> determines the cell payload.

Parameter

Name	Type	Range	Default
type	discrete	AAL0 | AAL1 | O191	AAL0

Dependencies (not valid for ABT-20 devices)

Comments O191: Test cells according to O.191 draft are analyzed.

Example
[:SENS]:DATA[:TEL]:ATM:PAYL:TYPE AAL1
sets the ATM payload type to AAL1.

[:SENS]:DATA[:TEL]:ATM:PAYL:TYPE?

[:SENSe]:DATA[:TELecom]:ATM:PAYLoad:TYPE? provides the current setting of the cell payload type.

Dependencies (not valid for ABT-20 devices)

Example
[:SENS]:DATA[:TEL]:ATM:PAYL:TYPE?
Response: AAL0 if ATM payload type AAL0 is set.

[:SENS]:DATA[:TEL]:ATM:SENS

[:SENSe]:DATA[:TELecom]:ATM:SENSe <sense> determines the sensor for the ATM cells.

Parameter

Name	Type	Range	Default
sense	discrete	INTernal | EXTernal	INT

Dependencies
[:SENS]:DATA[:TEL]:ATM:SENS = EXT requires option 90.80.
If [:SENS]:DATA[:TEL]:ATM:SENS = EXT the source parameter (:SOUR:DATA[:TEL]:ATM:SOUR on page R-76) must also be set to EXT.

Comments
This command determines where the received ATM cells are analyzed:

INTernal: Cell analysis in basic module (requires option 90.70)

EXTernal: Received cells are forwarded to the BAG module for analysis (requires option 90.80)

Example
DATA:ATM:SENS INT

Related commands
:SOUR:DATA[:TEL]:ATM:SOUR on page R-76

[:SENS]:DATA[:TEL]:ATM:SENS?

[:SENSe]:DATA[:TELecom]:ATM:SENSe? provides the current setting of the sensor for the ATM cells.

Example
DATA:ATM:SENS?
Response: INT

[:SENS]:DATA[:TEL]:ATM:VCI

[:SENSe]:DATA[:TELecom]:ATM:VCI <value> determines the VCI field in the measurement channel that is filtered out.

Parameter

Name	Type	Range	Default
value	numeric	0 - 65535	32

Dependencies (not valid for ABT-20 devices)

Example [:SENS]:DATA[:TEL]:ATM:VCI 32
sets the VCI receive filter to the value 32.

Related commands [:SENS]:DATA[:TEL]:ATM:CLP on page R-319
[:SENS]:DATA[:TEL]:ATM:VCI:FILT on page R-323
[:SENS]:DATA[:TEL]:ATM:VPI on page R-324

[:SENS]:DATA[:TEL]:ATM:VCI?

[:SENSe]:DATA[:TELecom]:ATM:VCI? provides the current setting of the VCI filter.

Dependencies (not valid for ABT-20 devices)

Example [:SENS]:DATA[:TEL]:ATM:VCI?
Response: 32 if the VCI receive filter is set to 32.

[:SENS]:DATA[:TEL]:ATM:VCI:FILT

[:SENSe]:DATA[:TELecom]:ATM:VCI:FILTEr <filter> determines the setting of the VCI filter.

Parameter

Name	Type	Range	Default
filter	boolean	ON | OFF | 0 | 1	ON

Dependencies (not valid for ABT-20 devices)

Example [:SENS]:DATA[:TEL]:ATM:VCI:FILT ON activates the VCI filter.

Related commands [:SENS]:DATA[:TEL]:ATM:VCI on page R-323

[:SENS]:DATA[:TEL]:ATM:VCI:FILT?

[:SENSe]:DATA[:TELecom]:ATM:VCI:FILTer? provides the current setting of the VCI filter.

Dependencies (not valid for ABT-20 devices)

Example [:SENS]:DATA[:TEL]:ATM:VCI:FILT?
Response: 1 if the VCI filter is activated.

[:SENS]:DATA[:TEL]:ATM:VPI

[:SENSe]:DATA[:TELecom]:ATM:VPI <value> determines the VPI field in the measurement channel that is filtered out.

Parameter

Name	Type	Range	Default
value	numeric	0 - 255/4095	0

Dependencies
Value limitation is a function of [:SENS]:DATA[:TEL]:ATM:NINT (not valid for ABT-20 devices).
UNI: Maximum value = 255
NNI: Maximum value = 4095

Example
[:SENS]:DATA[:TEL]:ATM:VPI 32
sets the VPI receive filter to the value 32.

Related commands
[:SENS]:DATA[:TEL]:ATM:CLP on page R-319
[:SENS]:DATA[:TEL]:ATM:NINT on page R-320
[:SENS]:DATA[:TEL]:ATM:VCI on page R-323

[:SENS]:DATA[:TEL]:ATM:VPI?

[:SENSe]:DATA[:TELecom]:ATM:VPI?
provides the current setting of the VPI filter.

Dependencies
(not valid for ABT-20 devices)

Example
[:SENS]:DATA[:TEL]:ATM:VPI?
Response: 32 if the VPI receive filter is set to 32.

[:SENS]:DATA[:TEL]:ERR:FAS:AMOD

[:SENSe]:DATA[:TELecom]:ERRor:FAS:AMODe <mode> determines the bit / word error setting for FAS (Frame Alignment Signal) errors in the signal.

Parameter

Name	Type	Range	Default
mode	discrete	BIT | WORD	BIT

Dependencies
None

Comments
BIT: FAS bit errors are counted
WORD: FAS word errors are counted

Example
:DATA:ERR:FAS:AMOD BIT activates FAS bit error counting.

[:SENS]:DATA[:TEL]:ERR:FAS:AMOD?

[:SENSe]:DATA[:TELecom]:ERRor:FAS:AMODe? provides the current setting of the bit / word error setting for FAS errors.

Example
:DATA:ERR:FAS:AMOD?
Response: WORD if counting of FAS WORD errors is activated.

[:SENS]:DATA[:TEL]:ERR:TSE:AMOD

[:SENSe]:DATA[:TELecom]:ERRor:TSE:AMODe <mode> determines the bit / word error setting for TSE (Test Sequence Error) errors in the signal.

Parameter

Name	Type	Range	Default
mode	discrete	BIT | WORD	BIT

Dependencies None

Comments
BIT: TSE bit errors are counted
WORD: TSE word errors are counted

Example :DATA:ERR:TSE:AMOD BIT activates TSE bit error counting.

[:SENS]:DATA[:TEL]:ERR:TSE:AMOD?

[:SENSe]:DATA[:TELecom]:ERRor:TSE:AMODe? provides the current setting of the bit/word error setting for TSE errors.

Example
:DATA:ERR:TSE:AMOD?
Response: WORD if counting of TSE WORD errors is activated.

[:SENS]:DATA[:TEL]:LED:AUL[:STAT]

[:SENSe]:DATA[:TELecom]:LEDevent:AULop[:STATe] <switch> activates/ deactivates display of AU-NDF/NDF-P events in addition to AU-LOP/LOP-P events on the AU-LOP/LOP-P LED.

Parameter

Name	Type	Range	Default
switch	boolean	ON | OFF | 0 | 1	OFF

Dependencies None

Comments
ON | 1: Display AU-NDF/NDF-P and AU-LOP/LOP-P
OFF | 0: Display only AU-LOP/LOP-P

Example :DATA:SDH:LED:AUL ON activates display of AU-NDF/NDF-P.

Related commands [:SENS]:DATA[:TEL]:LED:TUL[:STAT] on page R-326

[:SENS]:DATA[:TEL]:LED:AUL[:STAT]?

The query [:SENSe]:DATA[:TELecom]:LEDevent:AULop[:STATe]? indicates if the AU-LOP/LOP-P LED is to be used to display AU-NDF/NDF-P events in addition to AU-LOP/LOP-P.

[:SENS]:DATA[:TEL]:LED:TUL[:STAT]

[:SENSe]:DATA[:TELecom]:LEDevent:TULop[:STATe] <switch> activates/ deactivates display of TU-NDF/NDF-V events in addition to TU-LOP/LOP-V events on the TU-LOP/LOP-V LED.

Parameter

Name	Type	Range	Default
switch	boolean	ON | OFF | 0 | 1	OFF

Dependencies None

Comments
ON | 1: Display TU-NDF/NDF-V and TU-LOP/LOP-V
OFF | 0: Display only TU-LOP/LOP-V

Example :DATA:SDH:LED:TUL ON activates display of TU-NDF/NDF-V.

Related commands [:SENS]:DATA[:TEL]:LED:AUL[:STAT] on page R-325

[:SENS]:DATA[:TEL]:LED:TUL[:STAT]?

The query [:SENSe]:DATA[:TELecom]:LEDevent:TULop[:STATe]? indicates if the TU-LOP/LOP-V LED is to be used to display TU-NDF/NDF-V events in addition to TU-LOP/LOP-V

[:SENS]:DATA[:TEL]:FLEX:RES:SEL

[:SENSe]:DATA[:TELecom]:FLEX:RESult:SELect <type> selects the measurement.

Parameter

Name	Type	Range	Default
type	discrete	ATM | DS3PLCP | STANdard	STAN

Dependencies

The selection is effective only if
[:SENS]:DATA[:TEL]:PDH:RATE = DS3 and
[:SENS]:DATA[:TEL]:PDH:PAYL:TYPE = PLCP or ATM are set
(not valid for ABT-20 devices).

Comments

The measurements that are performed simultaneously are limited in this combination and must be selected from the following list:

- ATM total load
- ATM load in test channel
- ATM correctable header errors
- ATM uncorrectable header errors

All other ATM measurements

- DS3 FAS errors
- DS3 MFAS errors
- DS3 C parity errors
- DS3 P parity errors
- DS3 FEBE

- PLCP FAS errors
- PLCP B1 Errors
- PLCP FEBE

Note: Measurements not mentioned here are not influenced by this selection

ATM:	Measurement of all ATM Parameters
DS3PLCP:	Measurement of all DS3 errors and all PLCP errors
STANdard:	Measurement of the most important events For DS3-PLCP-ATM: DS3 FAS, DS3 MFAS, PLCP FAS, PLCP B1, ATM total load, ATM load in test channel and ATM errored cells For DS3-ATM: DS3 FAS, DS3 MFAS, ATM HCOR, ATM HUNC, ATM total load, ATM load in test channel and ATM errored cells

Example

[:SENS]:DATA[:TEL]:FLEX:RES:SEL ATM
selects measurement of all ATM parameters.

[:SENS]:DATA[:TEL]:FLEX:RES:SEL?

[:SENSe]:DATA[:TELecom]:FLEX:RESult:SELect? provides the measurements that have been selected.

Dependencies

(not valid for ABT-20 devices)

Example

[:SENS]:DATA[:TEL]:FLEX:RES:SEL?
Response: ATM if ATM measurements are selected.

[:SENS]:DATA[:TEL]:PAYL:PATT

[:SENSe]:DATA[:TELecom]:PAYLoad:PATTern <pattern> determines the test pattern in the active measurement channel.

Parameter

Name	Type	Range	Default
pattern	discrete	PRBS11 | PRBS15 | PRBS20 | PRBS23 | IPRBS11 | IPRBS15 | IPRBS20 | IPRBS23 | PRBS31 | IPRBS31 | QRSS20 | IQRSS20 | UWORd | TRAFfic	PRBS15

Dependencies

Settings are automatically modified if [:SENS]:DATA[:TEL]:PDH:RATE <outputrate> changes.

<outputrate>	<pattern>
M140 (E4)	PRBS23
M45 (DS3)	PRBS15
M34 (E3)	PRBS23
M8 (E2)	PRBS15
M6 (DS2)	PRBS15
M2 (E1)	PRBS15
M15 (DS1)	QRSS20
K64 (DS0)	PRBS11

Comments

PRBS11: Pseudo-random bit sequence 2^{11}-1 to O.152.
PRBS15: Pseudo-random bit sequence 2^{15}-1 to O.151 (ITU-T standard).
PRBS20: Pseudo-random bit sequence 2^{20}-1 to O.151.
PRBS23: Pseudo-random bit sequence 2^{23}-1 to O.151 (ITU-T standard).
PRBS31: Pseudo-random bit sequence 2^{31}-1 to O.150 (ITU-T standard; with [:SENS]:DATA[:TEL]:SDH:MAPP:CONC[:MODE] = CONT | VIRT only).
IPRBS11: Inverted pseudo-random bit sequence 2^{11}-1 to O.152.
IPRBS15: Inverted pseudo-random bit sequence 2^{15}-1 to O.151.
IPRBS20: Inverted pseudo-random bit sequence 2^{20}-1 to O.151.
IPRBS23: Inverted pseudo-random bit sequence 2^{23}-1 to O.151.
IPRBS31: Inverted pseudo-random bit sequence 2^{31}-1 to O.150. (with [:SENS]:DATA[:TEL]:SDH:MAPP:CONC[:MODE] = CONT | VIRT only)
QRSS20: Pseudo-random bit sequence 2^{20}-1 according to T1.403 (with DS1 only).
UWOR: 16 bit digital word set using [:SENS]:DATA[:TEL]:PAYL:UWOR on page R-329.
TRAFfic: Deactivates test pattern comparison (real traffic mode). No TSE anomaly (test sequence error) or LSS defect (loss of sequence synchronization) will be detected.

Example	:DATA:PAYL:PATT PRBS15	activates the pseudo-random bit sequence 2^{15}-1 (O.151) in the active measurement channel.

Related commands [:SENS]:DATA[:TEL]:PAYL:UWOR on page R-329

[:SENS]:DATA[:TEL]:PAYL:PATT?

[:SENSe]:DATA[:TELecom]:PAYLoad:PATTern? provides the current setting of the test pattern in the measurement channel.

Example :DATA:PAYL:PATT?
Response: PRBS23

[:SENS]:DATA[:TEL]:PAYL:UWOR

[:SENSe]:DATA[:TELecom]:PAYLoad:UWORd <value> determines the 16 bit digital word in the active measurement channel.

Parameter

Name	Type	Range	Default
value	numeric	#H0000 - #HFFFF or #B0000000000000000 - #B1111111111111111 or 0 - 65535	#HAAAA

Dependencies Setting is active only if [:SENS]:DATA[:TEL]:PAYL:PATT = UWOR is set.

Example :DATA:PAYL:UWOR #HAA55 sets the digital word to AA55 hex.

Related commands [:SENS]:DATA[:TEL]:PAYL:PATT on page R-328

[:SENS]:DATA[:TEL]:PAYL:UWOR?

[:SENSe]:DATA[:TELecom]:PAYLoad:UWORd? provides the current setting of the 16 bit digital word in the measurement channel.

Example :DATA:PAYL:UWOR?
Response: 12398

[:SENS]:DATA[:TEL]:PDH

The commands in this group specify the structure of a received PDH signal as well as the structure of a PDH signal mapped into SDH signals.

Note: All commands in this group are valid only if: [:SENS]:MODE = PDH
(i.e. a PDH signal is being received).
or:
[:SENS]:MODE = SDH and [:SENS]:DATA[:TEL]:SDH:PAYL:TYPE = PDH.
(i.e. an SDH signal is being received which contains a PDH signal).

[:SENS]:DATA[:TEL]:PDH:DS1:CHAN

[:SENSe]:DATA[:TELecom]:PDH:DS1:CHANnels <channel1> [,<channel2> [,channel3>[…[,<channelN>]]]] sets the channel numbers [n] of the N x 64 kbit/s measurement channels in the 1.544 Mbit/s DS1 receive signal.

Parameter

Name	Type	Range	Default
channel1	numeric	1 - 24	1
channel2	numeric	1 - 24	not active
…	numeric	1 - 24	not active
channel24	numeric	1 - 24	not active

Dependencies

Is valid only if:
[:SENS]:DATA[:TEL]:PDH:FRAM = FRAM is set.
[:SENS]:DATA[:TEL]:PDH:RATE <outputrate> = K64 (DS0).
Channel setting works only if the DEMUX option (90.32) is available.

Comments

Groups of any number of 64 kbit/s channels can be formed, ranging from a single channel at 64 kbit/s to 24 x 64 kbit/s = 1536 kbit/s. The number of parameters in this command determines the number of channels used.
At least one channel must be selected.
The default setting is 1 x 64 kbit/s channel in channel 1.
The channels should be selected in order and no channel may be selected more than once.

Example

:DATA:PDH:DS1:CHAN 10	corresponds to 1 x 64 kbit/s in channel 10
:DATA:PDH:DS1:CHAN 1,2,3	corresponds to 3 x 64 kbit/s = 192 kbit/s in channels 1, 2, 3
:DATA:PDH:DS1:CHAN 1,5,6,23,24	corresponds to 5 x 64 kbit/s = 320 kbit/s in channels 1, 5, 6, 23, 24

Related commands

[:SENS]:DATA[:TEL]:PDH:FRAM on page R-334
[:SENS]:DATA[:TEL]:PDH:RATE on page R-350
[:SENS]:DATA[:TEL]:PDH:DS1:FRAM on page R-331

[:SENS]:DATA[:TEL]:PDH:DS1:CHAN?

[:SENSe]:DATA[:TELecom]:PDH:DS1:CHANnels? provides the current setting of the channel numbers [n] of the N x 64 kbit/s measurement channels in the 1.544 Mbit/s DS1 receive signal.

Example :DATA:PDH:DS1:CHAN?
Response: 1,4,24 for 3 x 64 kbit/s = 192 kbit/s in channels 1, 4, 24.

[:SENS]:DATA[:TEL]:PDH:DS1:FRAM

[:SENSe]:DATA[:TELecom]:PDH:DS1:FRAMing <framing> determines the framing of the DS1 signal.

Parameter

Name	Type	Range	Default
framing	discrete	SF | ESF107	ESF107

Dependencies Is valid only if: [:SENS]:DATA[:TEL]:PDH:FRAM = FRAM is set.

Comments <framing> =
SF: Super Frame (ANSI T1.107)
ESF107: Extended Super Frame (ANSI T1.107)

Example :DATA:PDH:DS1:FRAM SF activates Super Frame.

[:SENS]:DATA[:TEL]:PDH:DS1:FRAM?

[:SENSe]:DATA[:TELecom]:PDH:DS1:FRAMing? provides the current setting of the framing of the DS1 signal.

Example :DATA:PDH:DS1:FRAM?
Response: SF if Super Frame framing is set.

[:SENS]:DATA[:TEL]:PDH:DS3:CHAN

[:SENSe]:DATA[:TELecom]:PDH:DS3:CHANnel <channel> sets the channel number of the DS1 measurement channel in the 44.736 Mbit/s PDH receive signal.

Parameter

Name	Type	Range	Default
channel	numeric	1 - 28	1

Dependencies

Is valid only if:
[:SENS]:DATA[:TEL]:PDH:FRAM = FRAM is set.
[:SENS]:DATA[:TEL]:PDH:RATE <outputrate> = DS1 | K64.
[:SENS]:DATA[:TEL]:PDH:RATE <inputrate> = DS3.
Channel setting works only if the DEMUX option (90.32) is available.

Comments

This command sets the selection of the DS1 measurement channel within a DS3 frame.

Example

:DATA:PDH:DS3:CHAN 1

Related commands

[:SENS]:DATA[:TEL]:PDH:FRAM on page R-334
[:SENS]:DATA[:TEL]:PDH:RATE on page R-350

[:SENS]:DATA[:TEL]:PDH:DS3:CHAN?

[:SENSe]:DATA[:TELecom]:PDH:DS3:CHANnel? provides the current setting of the channel number of the DS1 measurement channel in the DS3 PDH receive signal.

Example

:DATA:PDH:DS3:CHAN?
Response: 1

[:SENS]:DATA[:TEL]:PDH:DS3:FEAC:LOOP:RES

[:SENSe]:DATA[:TELecom]:PDH:DS3:FEAC:LOOP:RESet.
This command clears the history status of received FEAC loop activate / deactivate requests.

[:SENS]:DATA[:TEL]:PDH:DS3:FRAM

[:SENSe]:DATA[:TELecom]:PDH:DS3:FRAMing <framing> determines the framing of the DS3 signal.

Parameter

Name	Type	Range	Default
framing	discrete	CPARity | M13	CPARity

Dependencies: Is valid only if: [:SENS]:DATA[:TEL]:PDH:FRAM = FRAM is set.

Comments: <framing> =
CPARity: C parity frame
M13: M13 frame

Example: :DATA:PDH:DS3:FRAM CPAR activates C parity frame.

[:SENS]:DATA[:TEL]:PDH:DS3:FRAM?

[:SENSe]:DATA[:TELecom]:PDH:DS3:FRAMing? provides the current setting of the framing of the DS3 signal.

Example: :DATA:PDH:DS3:FRAM?
Response: CPAR if C parity framing of the DS3 signal is set.

[:SENS]:DATA[:TEL]:PDH:FRAM

[:SENSe]:DATA[:TELecom]:PDH:FRAMing <framing> determines the frame structure of the PDH signal.

Parameter

Name	Type	Range	Default
framing	discrete	FRAMed | UNFRamed	FRAMed

Dependencies None

Comments
FRAMed: Framed PDH signal
UNFRamed: Signal without PDH frames and filled with test pattern as selected by [:SENS]:DATA[:TEL]:PAYL:PATT on page R-328.

Example :DATA:PDH:FRAM FRAM activates framed pattern.

Related commands [:SENS]:DATA[:TEL]:PDH:RATE on page R-350

[:SENS]:DATA[:TEL]:PDH:FRAM?

[SENSe]:DATA[:TELecom]:PDH:FRAMing? provides the current setting of the frame structure of the PDH signal.

Example :DATA:PDH:FRAM?
Response: UNFR for an unframed signal.

[:SENS]:DATA[:TEL]:PDH:M2:CHAN

[:SENSe]:DATA[:TELecom]:PDH:M2:CHANnels <channel1> [,<channel2> [,channel3>[…[,<channelN>]]]] sets the channel numbers [n] of the N x 64 kbit/s measurement channels in the 2 Mbit/s PDH receive signal.

Parameter

Name	Type	Range	Default
channel1	numeric	1 - 31 [30]	1
channel2	numeric	1 - 31 [30]	not active
…	numeric	1 - 31 [30]	not active
channel31[30]	numeric	1 - 31 [30]	not active

Dependencies

Is valid only if:
[:SENS]:DATA[:TEL]:PDH:FRAM = FRAM is set.
[:SENS]:DATA[:TEL]:PDH:RATE <outputrate> = K64.
Channel 31 can be set only if [:SENS]:DATA[:TEL]:PDH:M2:FRAM = PCM31 | PCM31CRC is selected.
Channel setting works only if the DEMUX option (90.30 or 90.31) is available.

Comments

Groups of any number of 64 kbit/s channels can be formed, ranging from a single channel at 64 kbit/s to 31 x 64 kbit/s = 1984 kbit/s. The number of parameters in this command determines the number of channels used.
At least one channel must be selected.
The default setting is 1 x 64 kbit/s channel in channel 1.
The channels should be selected in order and no channel may be selected more than once.

Example

:DATA:PDH:M2:CHAN 10	corresponds to 1 x 64 kbit/s in channel 10
:DATA:PDH:M2:CHAN 1,2,3	corresponds to 3 x 64 kbit/s = 192 kbit/s in channels 1, 2, 3
:DATA:PDH:M2:CHAN 1,5,6,25,30	corresponds to 5 x 64 kbit/s = 320 kbit/s in channels 1, 5, 6, 25, 30

Related commands

[:SENS]:DATA[:TEL]:PDH:FRAM on page R-334
[:SENS]:DATA[:TEL]:PDH:RATE on page R-350
[:SENS]:DATA[:TEL]:PDH:M2:FRAM on page R-336

[:SENS]:DATA[:TEL]:PDH:M2:CHAN?

[:SENSe]:DATA[:TELecom]:PDH:M2:CHANnels? provides the current setting of the channel numbers [n] of the N x 64 kbit/s measurement channels in the 2 Mbit/s PDH receive signal.

Example

:DATA:PDH:M2:CHAN?
Response: 1,4,25 for 3 x 64 kbit/s = 192 kbit/s in channels 1, 4, 25.

[:SENS]:DATA[:TEL]:PDH:M2:FRAM

[:SENSe]:DATA[:TELecom]:PDH:M2:FRAMing <framing> sets the frame type for the 2 Mbit/s PDH receive signal.

Parameter

Name	Type	Range	Default
framing	discrete	PCM30 | PCM30CRC | PCM31 | PCM31CRC	PCM30CRC

Dependencies: Is valid only if: [:SENS]:DATA[:TEL]:PDH:FRAM = FRAM is set.

Comments:

PCM30: Framed signal to O.150 with CAS signaling channel
PCM30CRC: Framed signal to O.150 with CRC-4 and CAS signaling channel (timeslot 16)
PCM31: Framed signal to O.150 without CAS signaling channel
PCM31CRC: Framed signal to O.150 with CRC-4 and without CAS signaling channel

Example: :DATA:PDH:M2:FRAM PCM31

Related commands: [:SENS]:DATA[:TEL]:PDH:FRAM on page R-334
[:SENS]:DATA[:TEL]:PDH:RATE on page R-350

[:SENS]:DATA[:TEL]:PDH:M2:FRAM?

[:SENSe]:DATA[:TELecom]:PDH:M2:FRAMing? provides the current setting of the frame type for the 2 Mbit/s signal.

Example: :DATA:PDH:M2:FRAM?
Response: PCM31CRC

[:SENS]:DATA[:TEL]:PDH:M2:SEQ

[:SENSe]:DATA[:TELecom]:PDH:M2:SEQuence <sequence> sets the Sa bit for which the Sa sequence in the 2 Mbit/s PDH receive signal is to be determined.

Parameter

Name	Type	Range	Default
sequence	discrete	SA4 | SA5 | SA6 | SA7 | SA8	SA4

Dependencies: Is valid only if: [:SENS]:DATA[:TEL]:PDH:FRAM = FRAM is set.

Comments: Bit sequences can be received and determined in the 5 Sa bits of the 2 Mbit/s PDH signal. This is only possible in a single Sa bit at a given point in time. This command determines the Sa bit for which the sequence is to be determined. The result can be queried using the command:
:FETC:SCAL[:DATA][:TEL]:PDH:M2:SBIT? on page R-423.

Example: :DATA:PDH:M2:SEQ SA5

Related commands: [:SENS]:DATA[:TEL]:PDH:FRAM on page R-334
:FETC:SCAL[:DATA][:TEL]:PDH:M2:SBIT? on page R-423

[:SENS]:DATA[:TEL]:PDH:M2:SEQ?

[:SENSe]:DATA[:TELecom]:PDH:M2:SEQuence? provides the current setting of the Sa bit for which the Sa sequence of the 2 Mbit/s PDH receive signal is to be determined.

Example: :DATA:PDH:M2:SEQ?
Response: SA4

[:SENS]:DATA[:TEL]:PDH:M8:CHAN

[:SENSe]:DATA[:TELecom]:PDH:M8:CHANnel <channel> sets the channel number of the 2 Mbit/s measurement channel in the 8 Mbit/s PDH receive signal.

Parameter

Name	Type	Range	Default
channel	numeric	1 - 4	1

Dependencies

Is valid only if:
[:SENS]:DATA[:TEL]:PDH:FRAM = FRAM is set.
[:SENS]:DATA[:TEL]:PDH:RATE <outputrate> = M2 | K64.
[:SENS]:DATA[:TEL]:PDH:RATE <inputrate> = M140 | M34 | M8.
Channel setting works only if the DEMUX option (90.30 or 90.31) is available.

Comments

This command sets the selection of the 2 Mbit/s measurement channel within an 8 Mbit/s frame.

Example

:DATA:PDH:M8:CHAN 1

Related commands

[:SENS]:DATA[:TEL]:PDH:FRAM on page R-334
[:SENS]:DATA[:TEL]:PDH:RATE on page R-350

[:SENS]:DATA[:TEL]:PDH:M8:CHAN?

[:SENSe]:DATA[:TELecom]:PDH:M8:CHANnel? provides the current setting of the channel number of the 2 Mbit/s measurement channel in the 8 Mbit/s PDH receive signal.

Example

:DATA:PDH:M8:CHAN?
Response: 1

[:SENS]:DATA[:TEL]:PDH:M34:CHAN

[:SENSe]:DATA[:TELecom]:PDH:M34:CHANnel <channel> sets the channel number of the 8 Mbit/s measurement channel in the 34 Mbit/s PDH receive signal.

Parameter

Name	Type	Range	Default
channel	numeric	1 - 4	1

Dependencies

Is valid only if:
[:SENS]:DATA[:TEL]:PDH:FRAM = FRAM is set.
[:SENS]:DATA[:TEL]:PDH:RATE <outputrate> = M8 | M2 | K64
[:SENS]:DATA[:TEL]:PDH:RATE <inputrate> = M140 | M34.
Channel setting works only if the DEMUX option (90.30 or 90.31) is available.

Comments

This command sets the selection of the 8 Mbit/s measurement channel within a 34 Mbit/s frame.

Example

:DATA:PDH:M34:CHAN 4

Related commands

[:SENS]:DATA[:TEL]:PDH:FRAM on page R-334
[:SENS]:DATA[:TEL]:PDH:RATE on page R-350

[:SENS]:DATA[:TEL]:PDH:M34:CHAN?

[:SENSe]:DATA[:TELecom]:PDH:M34:FRAMing? provides the current setting of the channel number of the 8 Mbit/s measurement channel in the 34 Mbit/s PDH receive signal.

Example

:DATA:PDH:M34:CHAN?
Response: 1

[:SENS]:DATA[:TEL]:PDH:M34:FTYP

[:SENSe]:DATA[:TELecom]:PDH:M34:FTYPe <ftyp> sets the frame type for the 34 Mbit/s PDH signal.

Parameter

Name	Type	Range	Default
ftyp	discrete	G751 | G832	G751

Dependencies

Is valid only if:
[:SENS]:MODE = PDH and
[:SENS]:DATA[:TEL]:PDH:FRAM = FRAM and
[:SENS]:DATA[:TEL]:PDH:RATE = M34,M34
are set.

Comments

G751: Frame according to G.751
G832: Frame according to G.832

Example

[:SENS]:DATA[:TEL]:PDH:M34:FTYP G751

Related commands

[:SENS]:DATA[:TEL]:PDH:FRAM on page R-334
[:SENS]:DATA[:TEL]:PDH:RATE on page R-350

[:SENS]:DATA[:TEL]:PDH:M34:FTYP?

[:SENSe]:DATA[:TELecom]:PDH:M34:FTYPe? provides the current setting of the frame type for the 34 Mbit/s signal.

Example

[:SENS]:DATA[:TEL]:PDH:M34:FTYP?
Response: G751 if the frame type is set to G.751.

[:SENS]:DATA[:TEL]:PDH:M34:G832:OVER:PLAB

[:SENSe]:DATA[:TELecom]:PDH:M34:G832:OVERhead:PLABel <label> determines the comparison value for PLM-34 alarm detection (Path Label Mismatch). The payload type received in byte MA of the OH is compared with the value set here.

Parameter

Name	Type	Range	Default
label	numeric	#H0 - #H7 or #B000 - #B111 or 0 - 255	2

Dependencies None

Comments The following values are defined for the payload type bits in the MA byte of the M34 G832 overhead:

0: Unequipped
1: Equipped non specific
2: ATM
3: SDH TU-12s

All other values are as yet undefined.

Example [:SENS]:DATA[:TEL]:PDH:M34:G832:OVER:PLAB
sets the value “equipped non specific”.

[:SENS]:DATA[:TEL]:PDH:M34:G832:OVER:PLAB?

[:SENSe]:DATA[:TELecom]:PDH:M34:G832:OVERhead:PLABel? provides the current setting for the path label comparison value.

Example [:SENS]:DATA[:TEL]:PDH:M34:G832:OVER:PLAB?
Response: 1 for “unequipped non specific”.

[:SENS]:DATA[:TEL]:PDH:M34:G832:OVER:TRAC:FREF

[:SENSe]:DATA[:TELecom]:PDH:M34:G832:OVERhead:TRACe:FREFerence <value> sets the value to which the bytes in the TR channel are compared.

Parameter

Name	Type	Range	Default
value	byte	0 - 255	1

Dependencies None

Comments <value>:
Setting for the fixed byte received in TR if the command [:SENS]:DATA[:TEL]:PDH:M34:G832:OVER:TRAC:REF was switch to FIXed.

Example [:SENS]:DATA[:TEL]:PDH:M34:G832:OVER:TRAC:FREF 15
comparison pattern = 15.

Related commands [:SENS]:DATA[:TEL]:PDH:M34:G832:OVER:TRAC:REF on page R-343

[:SENS]:DATA[:TEL]:PDH:M34:G832:OVER:TRAC:FREF?

[:SENSe]:DATA[:TELecom]:PDH:M34:G832:OVERhead:TRACe:FREFerence? delivers the current byte for TR comparison.

Example [:SENS]:DATA[:TEL]:PDH:M34:G832:OVER:TRAC:FREF?
Response: 15 if 15 is set as the fixed value in TR.

[:SENS]:DATA[:TEL]:PDH:M34:G832:OVER:TRAC:REF

[:SENSe]:DATA[:TELecom]:PDH:M34:G832:OVERhead:TRACe:REFerence <mode>, <trace> determines the mode and the comparison pattern for the trace if the mode is TRC16 (TR byte of the OH).

Parameter

Name	Type	Range	Default
mode	discrete	FIXed | TRC16	FIXed
trace	string	Strings with a length from 1 to 15 bytes	“WG E3-TRACE”

Dependencies None

Comments <mode> =

FIXed: Receiving fixed bytes in channel TR.

TRC16: Receiving a string of up to 15 characters completed for frame synchronization and error checking with the 16th byte using CRC-7.

<trace>:

This string is needed as a comparison pattern for detecting the TIM-34 alarm (Trace Identifier Mismatch).
All printable characters are allowed (7 bit ASCII). If the string is shorter than the maximum length, it is padded with blanks (20hex).
Non-printing characters can be set using the UNIX shell conventions:

\n --> new line character
\r --> CR character
\b --> back space character
\t --> TAB character
\0 --> 0 HEX character
\\ --> \ character
\001 --> 01 HEX character in octal notation.

Comments [:SENS]:DATA[:TEL]:PDH:M34:G832:OVER:TRAC:REF TRC16,“Hello World”
trace mode = TRC16
comparison pattern = “Hello World”.

Related commands [:SENS]:DATA[:TEL]:PDH:M34:G832:OVER:TRAC:FREF on page R-342

[:SENS]:DATA[:TEL]:PDH:M34:G832:OVER:TRAC:REF?

[:SENSe]:DATA[:TELecom]:PDH:M34:G832:OVERhead:TRACe:REFerence?
provides the current trace mode and setting for the TR comparison string.

Example [:SENS]:DATA[:TEL]:PDH:M34:G832:OVER:TRAC:REF?
Response: TRC16,“Hello World” for “Hello World” in the 16 byte trace.

[:SENS]:DATA[:TEL]:PDH:M140:CHAN

[:SENSe]:DATA[:TELecom]:PDH:M140:CHANnel <channel> sets the channel number of the 34 Mbit/s measurement channel in the 140 Mbit/s PDH receive signal.

Parameter

Name	Type	Range	Default
channel	numeric	1 - 4	1

Dependencies

Is valid only if:
[:SENS]:DATA[:TEL]:PDH:FRAM = FRAM is set.
[:SENS]:DATA[:TEL]:PDH:RATE <outputrate> = M34 | M8 | M2 | K64
[:SENS]:DATA[:TEL]:PDH:RATE <inputrate> = M140.
Channel setting works only if the DEMUX option (90.30 or 90.31) is available.

Comments

This command sets the selection of the 34 Mbit/s measurement channel within a 140 Mbit/s frame.

Example

:DATA:PDH:M140:CHAN 2

Related commands

[:SENS]:DATA[:TEL]:PDH:FRAM on page R-334
[:SENS]:DATA[:TEL]:PDH:RATE on page R-350

[:SENS]:DATA[:TEL]:PDH:M140:CHAN?

[:SENSe]:DATA[:TELecom]:PDH:M140:FRAMing? provides the current setting of the channel number of the 34 Mbit/s measurement channel in the 140 Mbit/s PDH receive signal.

Example

:DATA:PDH:M140:CHAN?
Response: 1

[:SENS]:DATA[:TEL]:PDH:M140:FTYP

[:SENSe]:DATA[:TELecom]:PDH:M140:FTYPe <ftyp> sets the frame type for the 140 Mbit/s PDH signal.

Parameter

Name	Type	Range	Default
ftyp	discrete	G751 | G832	G751

Dependencies

Is valid only if:
[:SENS]:MODE = PDH and
[:SENS]:DATA[:TEL]:PDH:FRAM = FRAM and
[:SENS]:DATA[:TEL]:PDH:RATE = M140,M140
are set.

Comments

G751: Frame according to G.751
G832: Frame according to G.832

Example

[:SENS]:DATA[:TEL]:PDH:M140:FTYP G751

Related commands

[:SENS]:DATA[:TEL]:PDH:FRAM on page R-334
[:SENS]:DATA[:TEL]:PDH:RATE on page R-350

[:SENS]:DATA[:TEL]:PDH:M140:FTYP?

[:SENSe]:DATA[:TELecom]:PDH:M34:FTYPe? provides the current setting of the frame type for the 140 Mbit/s signal.

Example

[:SENS]:DATA[:TEL]:PDH:M140:FTYP?
Response: G751 if the frame type is set to G.751.

[:SENS]:DATA[:TEL]:PDH:M140:G832:OVER:PLAB

[:SENSe]:DATA[:TELecom]:PDH:M140:G832:OVERhead:PLABel <label> determines the comparison value for PLM-140 alarm detection (Path Label Mismatch). The payload type bits received in byte MA of the OH are compared with the value set here.

Parameter

Name	Type	Range	Default
label	numeric	#H0 - #H7 or #B000 - #B111 or 0 - 7	2

Dependencies None

Comments The following values are defined for the payload type in the MA byte of the M140 G832 overhead:

0: Unequipped
1: Equipped non specific
2: ATM
3: SDH TU-12s

All other values are as yet undefined.

Example [:SENS]:DATA[:TEL]:PDH:M140:G832:OVER:PLAB 1
sets the value “equipped non specific”.

[:SENS]:DATA[:TEL]:PDH:M140:G832:OVER:PLAB?

[:SENSe]:DATA[:TELecom]:PDH:M140:G832:OVERhead:PLABel? provides the current setting for the path label comparison value.

Example [:SENS]:DATA[:TEL]:PDH:M140:G832:OVER:PLAB?
Response: 1 for “unequipped non specific”.

[:SENS]:DATA[:TEL]:PDH:M140:G832:OVER:TRAC:FREF

[:SENSe]:DATA[:TELecom]:PDH:M140:G832:OVERhead:TRACe:FREFerence <value> sets the value to which the bytes in the TR channel are compared.

Parameter

Name	Type	Range	Default
value	byte	0 - 255	1

Dependencies None

Comments <value>:
Setting for the fixed byte received in TR if the command [:SENS]:DATA[:TEL]:PDH:M140:G832:OVER:TRAC:REF was switched to FIXed.

Example [:SENS]:DATA[:TEL]:PDH:M140:G832:OVER:TRAC:FREF 15
comparison pattern = 15.

Related commands [:SENS]:DATA[:TEL]:PDH:M140:G832:OVER:TRAC:REF on page R-348

[:SENS]:DATA[:TEL]:PDH:M140:G832:OVER:TRAC:FREF?

[:SENSe]:DATA[:TELecom]:PDH:M140:G832:OVERhead:
TRACe:FREFerence? delivers the current byte for TR comparison.

Example [:SENS]:DATA[:TEL]:PDH:M140:G832:OVER:TRAC:FREF?
Response: 15 if 15 is set as the fixed value in TR.

[:SENS]:DATA[:TEL]:PDH:M140:G832:OVER:TRAC:REF

[:SENSe]:DATA[:TELecom]:PDH:M140:G832:OVERhead:TRACe:REFerence <mode>, <trace> determines the mode and the comparison pattern for the trace if the mode is TRC16 (TR byte of the OH).

Parameter

Name	Type	Range	Default
mode	discrete	FIXed | TRC16	FIXed
trace	string	Strings with a length from 1 to 15 bytes	“WG E4-TRACE”

Dependencies None

Comments <mode> =

FIXed: Receiving fixed bytes in channel TR.

TRC16: Receiving a string of up to 15 characters completed for frame synchronization and error checking with the 16th byte using CRC-7.

<trace>: This string is needed as a comparison pattern for detecting the TIM-34 alarm (Trace Identifier Mismatch).
All printable characters are allowed (7 bit ASCII). If the string is shorter than the maximum length, it is padded with blanks (20hex).
Non-printing characters can be set using the UNIX shell conventions:

\n --> new line character
\r --> CR character
\b --> back space character
\t --> TAB character
\0 --> 0 HEX character
\\ --> \ character
\001 --> 01 HEX character in octal notation.

Comments [:SENS]:DATA[:TEL]:PDH:M140:G832:OVER:TRAC:REF TRC16,“Hello World”
trace mode = TRC16
comparison pattern = “Hello World”.

Related commands [:SENS]:DATA[:TEL]:PDH:M140:G832:OVER:TRAC:REF on page R-348

[:SENS]:DATA[:TEL]:PDH:M140:G832:OVER:TRAC:REF?

[:SENSe]:DATA[:TELecom]:PDH:M140:G832:OVERhead:TRACe:REFerence? provides the current trace mode and setting for the TR comparison string.

Example [:SENS]:DATA[:TEL]:PDH:M140:G832:OVER:TRAC:REF?
Response: TRC16,“Hello World” for “Hello World” in the 16 byte trace.

[:SENS]:DATA[:TEL]:PDH:PAYL:TYPE

[:SENSe]:DATA[:TELecom]:PDH:PAYLoad:TYPE <type> specifies the type of PDH payload received.

Parameter

Name	Type	Range	Default
type	discrete	PATTern | ATM | PLCP	PATT

Dependencies None

Comments

PATTern: Framed pattern corresponding to [:SENS]:DATA[:TEL]:PAYL:PATT on page R-328.

ATM: ATM (Asynchronous Transfer Mode), (only with ATM option 90.70 or 90.80 fitted in conjunction with a PDH mapping option).

PLCP: PLCP (Physical Layer Convergence Protocol), protocol for transporting ATM in PDH, (only with ATM option 90.70 or 90.80 fitted in conjunction with a PDH mapping option).

Example

[:SENS]:DATA[:TEL]:SDH:PAYL:TYPE ATM
sets the PDH payload type to ATM.

[:SENS]:DATA[:TEL]:PDH:PAYL:TYPE?

[:SENSe]:DATA[:TELecom]:PDH:PAYLoad:TYPE? provides the type of received PDH payload.

Example

[:SENS]:DATA[:TEL]:PDH:PAYL:TYPE?
Response: ATM if PDH payload type ATM is set.

[:SENS]:DATA[:TEL]:PDH:RATE

[:SENSe]:DATA[:TELecom]:PDH:RATE <inputrate>, <outputrate> sets the input and output bit rates of a PDH signal hierarchy level (receiving end).

Parameter

Name	Type	Range	Default
inputrate	discrete	M2 | M8 | M34 | M140 | DS1 | DS2 | DS3	M2
outputrate	discrete	K64 | M2 | M8 | M34 | M140 | DS0 | DS1 | DS2 | DS3	M2

Dependencies

For K64 … M140:
If the <inputrate> and <outputrate> are different, then the DEMUX chain option (90.30 or 90.31) is required (not possible for ABT-20 devices).
The input bit rate must always be greater than or equal to the output bit rate <outputrate> (DEMUX function).

For DS0, DS1, DS3:
If the <inputrate> and <outputrate> are different, then the DEMUX chain option (90.32) is required (not possible for ABT-20 devices).

If <inputrate> is set to DS2, then <outputrate> = DS2 is required.

Setting the <outputrate> will also set the payload pattern in [:SENS]:DATA[:TEL]:PAYL:PATT on page R-328.

Comments

K64 | DS0: 64 kbit/s
M2: 2.048 Mbit/s
M8: 8.442 Mbit/s
M34: 34.368 Mbit/s
M140: 139.264 Mbit/s
DS1: 1.544 Mbit/s
DS2: 6.312 Mbit/s
DS3: 44.738 Mbit/s

If the <inputrate> and <outputrate> are equal, then a PDH signal without a multiplex substructure has been set.

The following figures show how the DEMUX chains (CEPT and ANSI) can be set:

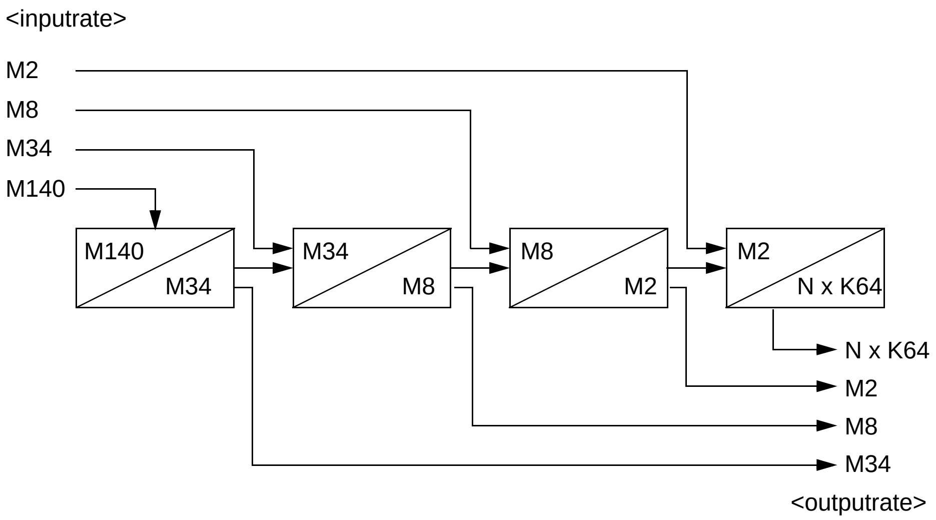


Fig. R-13 Settings of the DEMUX chain (CEPT)

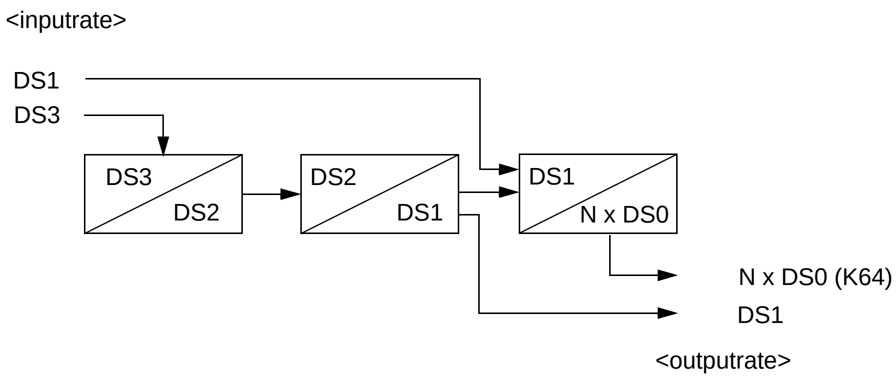


Fig. R-14 Settings of the DEMUX chain (ANSI)

Note: The framing command [:SENS]:DATA[:TEL]:PDH:FRAM on page R-334 always corresponds to the <outputrate> side of the DEMUX chain!

Example :DATA:PDH:RATE M2, M2 sets the input / output bit rates to 2.048 Mbit/s.

Related commands [:SENS]:DATA[:TEL]:PDH:FRAM on page R-334

[:SENS]:DATA[:TEL]:PDH:RATE?

[:SENSe]:DATA[:TELecom]:PDH:RATE? provides the current setting of the PDH signal hierarchy level of the receiver.

Example :DATA:PDH:RATE?
Response: M2,M2

[:SENS]:DATA[:TEL]:SDH

The commands in this group specify the structure of a received SDH/SONET signal.

Note: All commands in this group are valid only if [:SENS]:MODE = SDH.

[:SENS]:DATA[:TEL]:SDH:ALAR:RDIE:AMOD

[:SENSe]:DATA[:TELecom]:SDH:ALARm:RDIEnhanced:AMODe <state>
activates / deactivates enhanced RDI evaluation of SDH alarms.

Parameter

Name	Type	Range	Default
state	boolean	ON | OFF | 0 | 1	OFF

Dependencies This switch is only relevant if [:SENS]:DATA[:TEL]:STAN = ANSI,BELL

Comments ON | 1: Enhanced RDI evaluation on
OFF | 0: Enhanced RDI evaluation off

Example :DATA:SDH:ALAR:RDIE:AMOD ON activates enhanced RDI evaluation.

Related commands [:SENS]:DATA[:TEL]:STAN on page R-378

[:SENS]:DATA[:TEL]:SDH:ALAR:RDIE:AMOD?

The query [:SENSe]:DATA[:TELecom]:SDH:ALAR:RDIE:AMOD? delivers the enhanced RDI evaluation status.

Example :DATA:SDH:ALAR:RDIE:AMOD?
Response: 1 if enhanced RDI evaluation is active.

[:SENS]:DATA[:TEL]:SDH:CHAN

[:SENSe]:DATA[:TELecom]:SDH:CHANnel <grp1_no>[, <grp2_no>, <trib_no>]
determines the active SDH / SONET measurement channel if multiple channels are present in the input data stream that is currently set.

Parameter

Name	Type	Range	Default
grp1_no	numeric	1 - 3	1
grp2_no	numeric	1 - 7	1
trib_no	numeric	1 - 3 (3xTU12/VT2) 1 - 4 (4xTU11/VT1.5)	1

Dependencies

Valid only if a mapping was selected which contains **multiple** containers as a payload with the command [:SENS]:DATA[:TEL]:SDH:MAPP on page R-357 (if only one container is present, e.g. with the C4 or STS3CSPE mapping, then it automatically becomes the measurement channel, and this CHANnel command is meaningless).

Comments

This command applies to the selection of the measurement channel if more than 1 channel (container) is present in the SDH input signal.
The <grp1_no> parameter determines the TUG3 or AU3 number of the SDH signal or the STS1 number within the STS3 of the SONET signal.
The <grp2_no> parameter determines the TUG2 number of the SDH signal or the VT-group number of the SONET signal.
The <trib_no> parameter determines the TU number within the TUG2 of the SDH signal or the VT-number within the VT-group of the SONET signal.
The first parameter <grp1_no> is sufficient for C3 mapping.

The channel setting 1 to 12/48/192 for OC12/OC48/OC192 can be made in two stages:
[:SENS]:DATA[:TEL]:SDH:STMN:CHAN = <stmn-channel>
[:SENS]:DATA[:TEL]:SDH:CHAN = <grp1_no>
where the channel number is: oc12/48_no = 3 x stmn_no + grp1_no -3

OC	1	2	3	4	5	6	7	8	9	10	11	12	13	…	48
STMN	1	1	1	2	2	2	3	3	3	4	4	4	5	…	16
grp1	1	2	3	1	2	3	1	2	3	1	2	3	1	…	3

Alternatively, the channels of the ANSI structures for OC3/12/48/192 can be set with the commands
[:SENS]:DATA[:TEL]:SDH:STSN:CHAN on page R-373
[:SENS]:DATA[:TEL]:SDH:STSV:CHAN on page R-374.

Example

:DATA:SDH:CHAN 1, 2, 3
sets the active measurement channel to the 3rd tributary of the 2nd TUG2 in the 1st TUG3 (assumed mapping: STM1 with 63 x VC12).

:DATA:SDH:CHAN 3
sets the active measurement channel to the 3rd VC3 (STS3SPE) (assumed mapping: STM1(STS3) with 3 VC3 (STS3SPE)).

Related commands
[:SENS]:DATA[:TEL]:SDH:MAPP on page R-357
[:SENS]:DATA[:TEL]:SDH:RATE on page R-370
[:SENS]:DATA[:TEL]:SDH:PAYL:TYPE on page R-365
[:SENS]:DATA[:TEL]:SDH:STMN:CHAN on page R-372
[:SENS]:DATA[:TEL]:SDH:STSN:CHAN on page R-373
[:SENS]:DATA[:TEL]:SDH:STSV:CHAN on page R-374

[:SENS]:DATA[:TEL]:SDH:CHAN?

[:SENSe]:DATA[:TELecom]:SDH:CHANnel? provides the current channel selection for the SDH measurement signal.

Response name	Response type	Range	Default
grp1_no	numeric	1 - 3 (STM1:AU4 with 3 x TUG3 or STS3)	none
grp2_no	numeric	1 - 7	none
trib_no	numeric	1 - 3 (3 x TU12/VT2) 1 - 4 (4 x TU11/VT1.5)	none

Example
:DATA:SDH:CHAN?
Response: 1,2,3
SDH: Measurement channel is in the 3rd tributary of the 2nd TUG2 in the 1st TUG3.
SONET: Measurement channel is in the 3rd tributary of the 2nd VT group in the 1st STS1SPE.

[:SENS]:DATA[:TEL]:SDH:ERR:BIP:AMOD

[:SENSe]:DATA[:TELecom]:SDH:ERRor:BIP:AMODe <mode> determines the bit / word error setting (analysis mode) for BIP (Bit Interleaved Parity) errors in the SDH or SONET signal.

Parameter

Name	Type	Range	Default
mode	discrete	BIT | WORD	BIT

Dependencies None

Comments
BIT: B1, B2, B3, BIP-2 bit errors are counted
WORD: B1, B2, B3, BIP-2 word errors are counted

Example :DATA:SDH:ERR:BIP:AMOD BIT activates bit error counting.

[:SENS]:DATA[:TEL]:SDH:ERR:BIP:AMOD?

[:SENSe]:DATA[:TELecom]:SDH:ERRor:BIP:AMODe? provides the current setting of bit / word error counting for SDH B1, B2, B3, BIP-2 errors.

Example :DATA:SDH:ERR:BIP:AMOD?
Response: WORD if WORD error counting is switched on.

[:SENS]:DATA[:TEL]:SDH:ERR:TSE:SOUR

[:SENSe]:DATA[:TELecom]:SDH:ERRor:TSE:SOURce <mode> determines the bit error measurement source in the SDH/SONET signal.

Parameter

Name	Type	Range	Default
mode	discrete	PAYLoad | OVERhead	PAYL

Dependencies

For <mode> = OVER and [:SENS]:DATA[:TEL]:SDH:RATE = STM16 [:SENS]:DATA[:TEL]:SDH:STMN:CHAN on page R-372 must be set to 1.

Comments

PAYLload: The test pattern in the payload is measured.

OVERhead: The test pattern in the overhead is measured.
Note: A PRBS11 pattern is requested.

Example

:DATA:SDH:ERR:TSE:SOUR PAYL
activates bit error measurement in the payload.

Related commands

[:SENS]:DATA[:TEL]:SDH:OVER:BYT on page R-361

[:SENS]:DATA[:TEL]:SDH:ERR:TSE:SOUR?

[:SENSe]:DATA[:TELecom]:SDH:ERRor:TSE:SOUR? provides the current setting of the bit error measurement source in the SDH signal.

Example

:DATA:SDH:ERR:TSE:SOUR?
Response: OVER if measurement in the overhead is activated.

[:SENS]:DATA[:TEL]:SDH:MAPP

[:SENSe]:DATA[:TELecom]:SDH:MAPPing <mapping> determines the mapping of the SDH signal.

Parameter

Name	Type	Range CEPT	Range ANSI	Default
mapping	discrete	C4 | C3 | C2 | C12 | C11 | C11TU12	STS3CSPE | STS1SPE | VT6 | VT2 | VT1_5	C12 (VT2)

Dependencies

CEPT mapping: [:SENS]:DATA[:TEL]:STAN = ITUT, BELL;
ANSI mapping: [:SENS]:DATA[:TEL]:STAN = ANSI, <version>;
Setting the <mapping> will also set the following parameters:
[:SENS]:DATA[:TEL]:SDH:CHAN
all channels are set to 1.
[:SENS]:DATA[:TEL]:SDH:TRIB:MAPP
set to ASYN if <mapping> not C12 or VT2.
[:SENS]:DATA[:TEL]:PDH:RATE
<outputrate> set according to <mapping>.
[:SENS]:DATA[:TEL]:SDH:POV:HSEQ
set to SFRM if mapping = C12 or VT2.
[:SENS]:DATA[:TEL]:SDH:TRIB:POV:LPTR:REF
set to NONE if <mapping> = C4 or STS3CSPE.
All overheads and path overheads are set to default.

Example

:DATA:SDH:MAPP C12 — activates homogeneous C12 mapping in the STM1 signal (i.e. 63 VC12s are contained in the STM-1 frame)

Related commands

[:SENS]:DATA[:TEL]:SDH:RATE on page R-370
[:SENS]:DATA[:TEL]:SDH:MAPP:TUFL on page R-360
[:SENS]:DATA[:TEL]:SDH:PAYL:TYPE on page R-365

[:SENS]:DATA[:TEL]:SDH:MAPP?

[:SENSe]:DATA[:TELecom]:SDH:MAPPing? provides the current setting of SDH signal mapping.

Example

:DATA:SDH:MAPP?
Response: C12
for homogeneous mapping of 63 C12 containers in the STM1 signal.

[:SENS]:DATA[:TEL]:SDH:MAPP:CONC[:MODE]

:SENSe:DATA[:TELecom]:SDH:MAPPing:CONCatenate <mode> determines the mapping of the concatenation mode emulated by the STM-4 receive signal.

Parameter

Name	Type	Range	Default
mode	discrete	NONE | CONTiguous | VIRTual	NONE

Dependencies

Only valid if [:SENS]:DATA[:TEL]:SDH:RATE = STM4 /STS12.
Requires option 90.90 or 90.91 and, for virtual concatenation, option 90.92 additionally.
[:SENS]:DATA[:TEL]:SDH:MAPP = C4 is required for CONT or VIRT.

Comments

NONE: The receiver is not in concatenation mode.
CONTiguous: The receiver is in contiguous concatenation mode (only with option 90.90 or 90.91 installed).
VIRTual: The receiver is in virtual concatenation mode (only with option 90.90 or 90.91 and option 90.92 installed).

Example

:DATA:SDH:MAPP:CONC CONT

Related commands

[:SENS]:DATA[:TEL]:SDH:MAPP:CONC:CSIZ on page R-359

[:SENS]:DATA[:TEL]:SDH:MAPP:CONC[:MODE]?

The query :DATA[:TELecom]:SDH:MAPPing:CONCatenate? delivers the current setting of the concatenation mode for the receive signal.

Example

:DATA:SDH:MAPP:CONC?
Response: VIRT

[:SENS]:DATA[:TEL]:SDH:MAPP:CONC:CSIZ

:SENSe:DATA[:TELecom]:SDH:MAPPing:CONCatenate:CSIZe <size> determines mapping of VC4_16C (STS48C_SPE) or VC4_4C (STS12C_SPE) in the STM-16 (OC-48) or STM-16 (OC-192) receive signal.

Parameter

Name	Type	Range CEPT	Range ANSI	Default
size	discrete	VC4_16C | VC4_4C	STS48C_SPE | STS12C_SPE	VC4_16C (STS48C_SPE)

Dependencies
VC_4C requires option 90.90 or 90.91
VC_16C requires option 90.93

Comments
STM16:

VC4_16C	Container with 1 x VC4_16C (STS48C_SPE)
VC4_4C	Container with 4 x VC4_4C (STS12C_SPE)

STM64:

VC4_16C	Container with 4 x VC4_16C (STS48C_SPE)
VC4_4C	Container with 64 x VC4_4C (STS12C_SPE)

Example
:DATA:SDH:MAPP:CONC:CSIZE VC4_4C

Related commands
[:SENS]:DATA[:TEL]:SDH:MAPP:CONC[:MODE] on page R-358

:[SENS]:DATA[:TEL]:SDH:MAPP:CONC:CSIZ?

The query :[SENSe]:DATA[:TELecom]:SDH:MAPPing:CONCatenate:CSIZe? delivers the current setting for the concatenation size of the receive signal.

Example
:DATA:SDH:MAPP:CONC:CSIZ?
Response: VC4_4C

[:SENS]:DATA[:TEL]:SDH:MAPP:TUFL

[:SENSe]:DATA[:TELecom]:SDH:MAPPing:TUFLoating <mapping> determines the TU (Tributary Unit) mapping in the STM-1/4 receive signal.

Parameter

Name	Type	Range	Default
mapping	discrete	AU4 | AU3	AU4

Dependencies Use only if [:SENS]:DATA[:TEL]:STAN = ITUT (SDH mode).

Comments
AU4: Mapping via AU4 (Administrative Unit) in the STM1/4 signal.
AU3: Mapping via AU3 (Administrative Unit) in the STM1/4 signal.

Example :DATA:SDH:MAPP:TUFL AU4

Related commands
[:SENS]:DATA[:TEL]:SDH:RATE on page R-370
[:SENS]:DATA[:TEL]:SDH:MAPP on page R-357

[:SENS]:DATA[:TEL]:SDH:MAPP:TUFL?

[:SENSe]:DATA[:TELecom]:SDH:MAPPing:TUFLoating? provides the current setting of the TU mapping in the STM-1/4 receive signal.

Example :DATA:SDH:MAPP:TUFL?
Response: AU3

[:SENS]:DATA[:TEL]:SDH:OVER:BYT

[:SENSe]:DATA[:TELecom]:SDH:OVERhead:BYTes <bytes> determines the bytes or byte groups from which data extraction for overhead output via the V.11 interface or bit error measurements (TSE) in the overhead should take place.

Parameter

Name	Type	Range	Default
bytes	discrete	SDCC | LDCC | J0(C1) | J1 | J1L | J2 | E1 | E2 | F1 | F2 | F2L | K1K2 | K3(Z4) | K3L(Z4L) | K4(Z6) | N1 | N1L | N2 | C2 | C2L	SDCC

Dependencies TSE measurements are not possible for K1K2|K3|K3L|K4|N1|N1L|N2.

Comments

SDCC:	Data extraction from section DCC (D1 - D3 bytes).
LDCC:	Data extraction from line DCC (D4 - D12 bytes).
J0(C1):	Data extraction from J0 byte (Path Trace)
J1:	Data extraction from J1 byte (Path Trace) of the High Path POH
J1L:	Data extraction from J1L byte (Path Trace) of the Low Path POH
J2:	Data extraction from J2 byte (Path Trace) of the Low Path POH
E1:	Data extraction from E1 byte (Section Orderwire).
E2:	Data extraction from E2 byte (Line Orderwire).
F1:	Data extraction from F1 byte (User Channel).
F2:	Data extraction from F2 byte (Path User Channel) of the High Path POH.
F2L:	Data extraction from F2 byte (Path User Channel) of the Low Path POH.
K1K2:	Data extraction from K1, K2 bytes.
K3(Z4):	Data extraction from K3 byte of the High Path POH.
K3L(Z4L):	Data extraction from K3 byte of the Low Path POH.
K4(Z6):	Data extraction from K4 byte.
N1:	Data extraction from N1 (Z5) byte (Path User Channel) of the High Path POH.
N1L:	Data extraction from N1 (Z5) byte (Path User Channel) of the Low Path POH.
N2:	Data extraction from N2 (Z6) byte.
C2:	Data extraction from C2 (Signal Label) of the High Path POH
C2L:	Data extraction from C2 (Signal Label) of the Low Path POH

Example :DATA:SDH:OVER:BYT E1 for data extraction from E1 byte.

Related commands [:SENS]:DATA[:TEL]:SDH:OVER:DROP[:MODE] on page R-362

[:SENS]:DATA[:TEL]:SDH:OVER:BYT?

[:SENSe]:DATA[:TELecom]:SDH:OVERhead:BYTes? provides the current setting of the byte selection.

Example :DATA:SDH:OVER:BYT?
Response: LDCC
for extraction from line DCC channel (D4 to D12 bytes of the SOH).

[:SENS]:DATA[:TEL]:SDH:OVER:DROP[:MODE]

[:SENSe]:DATA[:TELecom]:SDH:OVERhead:DROP[:MODE] <mode> sets data extraction from the bytes or byte groups determined using [:SENS]:DATA[:TEL]:SDH:OVER:BYT on page R-361.

Parameter

Name	Type	Range	Default
mode	discrete	NONE | EXTernal	NONE

Dependencies None

Comments
NONE: No data extraction.
EXTernal: for output data to the external V.11 interface.

Example :DATA:SDH:OVER:DROP EXT Output to external V.11 interface.

Related commands [:SENS]:DATA[:TEL]:SDH:OVER:BYT on page R-361

[:SENS]:DATA[:TEL]:SDH:OVER:DROP[:MODE]?

[:SENSe]:DATA[:TELecom]:SDH:OVERhead:DROP[:MODE]? provides the current setting of the data extraction.

Example :DATA:SDH:OVER:DROP?
Response: EXT for output to the external V.11 interface.

[:SENS]:DATA[:TEL]:SDH:OVER:RSTR:FREF

[:SENSe]:DATA[:TELecom]:SDH:OVERhead:RSTRace:FREFerence <value> sets the value with which the bytes in the J0 channel are compared.

Parameter

Name	Type	Range	Default
value	byte	0 - 255	1

Dependencies None

Comments
<value>:
Setting for the fixed byte received in J0 if the command [:SENS]:DATA[:TEL]:SDH:OVER:RSTR:REF was switched to FIXed.

Example :DATA:SDH:OVER:RSTR:FREF 15 comparison pattern = 15.

Related commands
[:SENS]:DATA[:TEL]:SDH:OVER:RSTR:REF on page R-363
[:SENS]:DATA[:TEL]:SDH:TRIB:POV:LPTR:REF on page R-376

[:SENS]:DATA[:TEL]:SDH:OVER:RSTR:FREF?

[:SENSe]:DATA[:TELecom]:SDH:OVERhead:RSTRace:FREFerence? delivers the current byte for J0 comparison.

Example :DATA:SDH:OVER:RSTR:FREF?
Response: 15 if 15 is set as the fixed value in J0.

[:SENS]:DATA[:TEL]:SDH:OVER:RSTR:REF

[:SENSe]:DATA[:TELecom]:SDH:OVERhead:RSTRace:REFerence <mode>, <trace> determines the mode and the comparison pattern for the regenerator section J0 trace if the mode is TRC16 (C1 byte of the SOH).

Parameter

Name	Type	Range	Default
mode	discrete	FIXed | TRC16	FIXed
trace	string	Strings with a length from 1 to 15 bytes	“WG RS-TRACE”

Dependencies None

Comments <mode> =
FIXed: Receiving fixed bytes in channel J0.
TRC16: Receiving a string of 15 characters completed for frame synchronization and error checking with the 16th byte using CRC-7.
<trace>: This string is needed as a comparison pattern for detecting the RS-TIM (TIM-L) alarm (Regenerator Section Trace Identifier Mismatch).
All printable characters are allowed (7 bit ASCII). If the string is shorter than the maximum length, it is padded with blanks (20hex). Non-printing characters can be set using the UNIX shell conventions:
\n --> new line character
\r --> CR character
\b --> back space character
\t --> TAB character
\0 --> 0 HEX character
\\ --> \ character
\001 --> 01 HEX character in octal notation.

Example :DATA:SDH:OVER:RSTR:REF TRC16,“Hello World”
trace mode = TRC16
comparison pattern = “Hello World”.

Related commands [:SENS]:DATA[:TEL]:SDH:OVER:RSTR:FREF on page R-362

[:SENS]:DATA[:TEL]:SDH:OVER:RSTR:REF?

[:SENSe]:DATA[:TELecom]:SDH:OVERhead:RSTRace:REFerence? provides the current trace mode and setting for the J0 comparison string.

Example
:DATA:SDH:OVER:RSTR:REF?
Response: TRC16,“Hello World” for “Hello World” in the 16 byte trace.

[:SENS]:DATA[:TEL]:SDH:OVER:TCM:RES

[:SENSe]:DATA[:TELecom]:SDH:OVERhead:TCMonitoring:RESet.
This command clears the event history on the TCM monitor window.

:[SENS]:DATA[:TEL]:SDH:OVER:TCM:TYPE

[:SENSe]:DATA[:TELecom]:SDH:OVERhead:TCMonitoring:TYPE <type> determines the expected overhead type for tandem connection monitoring.

Parameter

Name	Type	Range	Default
type	discrete	HPOH | LPOH	HPOH

Dependencies None

Comments
Selects the expected N1/N2 (Z6) byte in POH, used for tandem connection monitoring

HPOH: TCM sequence expected in a higher order path overhead (HPOH) in N1 byte
LPOH: TCM sequence expected in a lower order path overhead (LPOH) in N1/N2 (Z6) byte

Example
[:SENS]:DATA:SDH:OVER:TCM:TYP HPOH
expects TCM in N1 byte of the higher order POH data stream.

:[SENS]:DATA[:TEL]:SDH:OVER:TCM:TYPE?

:[SENSe]:DATA[:TELecom]:SDH:OVERhead:TCMonitoring:TYPE? provides the current expected overhead type for tandem connection monitoring.

Example
[:SENS]:DATA:SDH:OVER:TCM:TYPE?
Response: HPOH The expected overhead byte for tandem connection monitoring is the N1 higher order POH byte.

[:SENS]:DATA[:TEL]:SDH:PAYL:TYPE

[:SENSe]:DATA[:TELecom]:SDH:PAYLoad:TYPE <type> specifies the type of payload received in the SDH measurement channel.

Parameter

Name	Type	Range	Default
type	discrete	PDH | PATTern | ATM	PDH

Dependencies

The structures of all PDH signals which can be set here as test signals are specified using the commands in the group [:SENS]:DATA[:TEL]:PDH on page R-330 ff.

Comments

PDH: A PDH signal is used as SDH payload.

PATTern: Pattern corresponding to [:SENS]:DATA[:TEL]:PAYL:PATT on page R-328 in the entire container (= bulk signal).

ATM: ATM (Asynchronous Transfer Mode) signal corresponding to [:SENS]:DATA[:TEL]:ATM on page R-316 ff. (only with the ATM option 90.70 or 90.80 installed).

Example

:DATA:PAYL:TYPE PDH sets a PDH signal as test payload.

Related commands

[:SENS]:DATA[:TEL]:SDH:RATE on page R-370
[:SENS]:DATA[:TEL]:SDH:MAPP on page R-357
[:SENS]:DATA[:TEL]:PDH on page R-330 ff.
[:SENS]:DATA[:TEL]:ATM on page R-316 ff.

[:SENS]:DATA[:TEL]:SDH:PAYL:TYPE?

[:SENSe]:DATA[:TELecom]:SDH:PAYLoad:TYPE? provides the current SDH payload in the measurement channel.

Example

:DATA:SDH:PAYL:TYPE?
Response: PDH for a PDH signal as the SDH payload.

[:SENS]:DATA[:TEL]:SDH:POIN:SSR

[:SENSe]:DATA[:TELecom]:SDH:POINter:SSReference <value> sets the expected value for the SS bits in the H1 byte.

Parameter

Name	Type	Range	Default
value	numeric	0 - 4	4

Dependencies None

Comments The value 0 to 3 sets the reference to the expected binary value.
The value 4 sets the SS bit reference to XX (don’t care).

Example :DATA:SDH:POIN:SSR 2 SS bit comparison binary value = 10

[:SENS]:DATA[:TEL]:SDH:POIN:SSR?

[:SENSe]:DATA[:TELecom]:SDH:POINter:SSReference? determines the expected value of the SS bits.

Example :DATA:SDH:POIN:SSR?
Response: 2 if the SS bit value is set to binary 10.

[:SENS]:DATA[:TEL]:SDH:POV:HPTR:FREF

[:SENSe]:DATA[:TELecom]:SDH:POVerhead:HPTRace:FREFerence <value> determines the value of the fixed bytes received in channel J1.

Parameter

Name	Type	Range	Default
value	byte	0 - 255	1

Dependencies None

Comments <value>:
Sets the fixed byte received in J1 if the command
[:SENS]:DATA[:TEL]:SDH:POV:HPTR:REF was switched to FIXed.

Example :DATA:SDH:POV:HPTR:FREF 114 comparison pattern = 114.

Related commands [:SENS]:DATA[:TEL]:SDH:POV:HPTR:REF on page R-367

[:SENS]:DATA[:TEL]:SDH:POV:HPTR:FREF?

[:SENSe]:DATA[:TELecom]:SDH:POVerhead:HPTRace:FREFerence? provides the current byte for the J1 comparison.

Example

:DATA:SDH:POV:HPTR:FREF?
Response: 114 if 114 is set as the fixed value in J1.

[:SENS]:DATA[:TEL]:SDH:POV:HPTR:REF

[:SENSe]:DATA[:TELecom]:SDH:POVerhead:HPTRace:REFerence <mode>, <trace> determines the mode and the comparison pattern for the J1 high path trace.

Parameter

Name	Type	Range	Default
mode	discrete	FIXed **|** TRC16 **|** TRC64	TRC16
trace	string	Strings with a length from 1 to 15 bytes or 1 to 64 bytes	“WG HP-TRACE”

Dependencies

None

Comments

<mode>=

FIXed: Receiving fixed bytes in channel J1

TRC16: Receiving a string of 15 characters completed for frame synchronization and error checking with the 16th byte using CRC-7.

TRC64: Receiving a string of 64 characters.

<trace>: This string is needed as a comparison pattern for detecting the HP-TIM (TIM-P) alarm (High Path Trace Identifier Mismatch).
All printable characters are allowed (7 bit ASCII). If the string is shorter than the maximum length, it is padded with blanks (20hex) in case of TRC16 or with 0 (00hex) in case of TRC64.
A CR/LF sequence is automatically added to the TRC64 string to complete the 64 byte sequence if the programmed string is shorter than 63 characters. **A CR/LF sequence is required for the ANT-20 receiver to synchronize to the received signal.**
Non-printing characters can be set using the UNIX shell conventions:

\n --> new line character
\r --> CR character
\b --> back space character
\t --> TAB character
\0 --> 0 HEX character
\\ --> \ character
\001 --> 01 HEX character in octal notation.

Example

:DATA:SDH:POV:HPTR:REF TRC16,“Hello World”
Trace mode = TRC16
Comparison pattern = “Hello World”.

Related commands

[:SENS]:DATA[:TEL]:SDH:POV:HPTR:FREF on page R-366

[:SENS]:DATA[:TEL]:SDH:POV:HPTR:REF?

[:SENSe]:DATA[:TELecom]:SDH:POVerhead:HPTRace:REFerence? provides the current trace mode and setting for the J1 comparison string.

Example
:DATA:SDH:POV:HPTR:REF?
Response: TRC16,“Hello World” for “Hello World” in the 16 byte trace.

[:SENS]:DATA[:TEL]:SDH:POV:HSEQ

[:SENSe]:DATA[:TELecom]:SDH:POVerhead:HSEQuence <type> determines the type of the H4 sequence.

Parameter

Name	Type	Range	Default
type	discrete	OFF | SFRM	SFRM

Dependencies None

Comments
OFF: No frame
SFRM: Short frame (4 frame sequence from CCITT G.709 Fig. 3.16 or GR-253)

Example :DATA:SDH:POV:HSEQ SFRM sets the 4 frame sequence.

[:SENS]:DATA[:TEL]:SDH:POV:HSEQ?

[:SENSe]:DATA[:TELecom]:SDH:POVerhead:HSEQuence? provides the current setting of the H4 sequence type.

Example
:DATA:SDH:POV:HSEQ?
Response: SFRM for an activated 4 frame sequence.

[:SENS]:DATA[:TEL]:SDH:POV:PLAB

[:SENSe]:DATA[:TELecom]:SDH:POVerhead:PLABel <label> determines the comparison value for the HP-PLM (PLM-P) alarm detection (High Path Label Mismatch). The received high path (C2 byte of the HP-POH) is compared with the value set here.

Parameter

Name	Type	Range	Default
label	numeric	#H0 - #HFF or #B00000000 - #B11111111 or 0 - 255	2

Dependencies None

Comments The following values are defined for the C2 byte of the VC-3/4:

0: UIS: Unequipped Indication Signal
1: Equipped non specific
2: TUG structure.
3: Locked TU
4: Asynchronous mapping of 34M and 45M into C-3
18: Asynchronous mapping of 140M into C-4
19: ATM
20: MAN
21: FDDI

All other values are as yet undefined.

Example :DATA:SDH:POV:PLAB 1 sets the value “unequipped non specific”.

[:SENS]:DATA[:TEL]:SDH:POV:PLAB?

[:SENSe]:DATA[:TELecom]:SDH:POVerhead:PLABel? provides the current setting for the high path label comparison value.

Example :DATA:SDH:POV:PLAB?
Response: 1 for “unequipped non specific”.

[:SENS]:DATA[:TEL]:SDH:RATE

[:SENSe]:DATA[:TELecom]:SDH:RATE <rate> sets the SDH receive bit rate for the receiver.

Parameter

Name	Type	Range CEPT	Range ANSI	Default
rate	discrete	STM64 | STM16 | STM4 | STM1 | STM0	STS192 | STS48 | STS12 | STS3 | STS1	STM1

Dependencies
STM4/16/48/64 and STS12/48/192 signals via the optical or NRZ inputs only (i.e. [:SENS]:DATA[:TEL]:SENS = OPT | NRZ).
STM4 or STS12 requires option 90.46 or 90.47 or 90.48.
STM16 or STS48 requires option 91.5X
STM64 or STS192 requires option 91.40 or 91.42.

Comments
Description: CEPT notation
STM64: 9953.28 Mbits/s
STM16: 2488.32 Mbit/s
STM4: 622.08 Mbit/s
STM1: 155.52 Mbit/s
STM0: 51.84 Mbit/s

Description: ANSI notation
STS192: 9953.28 Mbit/s
STS48: 2488.32 Mbit/s
STS12: 622.08 Mbit/s
STS3: 155.52 Mbit/s
STS1: 51.84 Mbit/s

Example
:DATA:SDH:RATE STM1 sets the receive bit rate to 155.52 Mbit/s.

Related commands
[:SENS]:DATA[:TEL]:SDH:MAPP on page R-357
[:SENS]:DATA[:TEL]:SDH:PAYL:TYPE on page R-365
[:SENS]:DATA[:TEL]:SENS on page R-378

[:SENS]:DATA[:TEL]:SDH:RATE?

[:SENSe]:DATA[:TELecom]:SDH:RATE? provides the current receive bit rate of the receiver.

Note: The corresponding command accepts ITU-T and ANSI notations. The query however always returns the ITU-T notation.

Example
:DATA:SDH:RATE?
Response: STM1

[:SENS]:DATA[:TEL]:SDH:SCR

[:SENSe]:DATA[:TELecom]:SDH:SCRambling <scramble> determines the setting of the scrambler.

Parameter

Name	Type	Range	Default
scramble	boolean	ON | OFF | 0 | 1	ON

Dependencies ON is required if [:SENS]:DATA[:TEL]:SDH:RATE = STM16 | STS48.

Comments
ON | 1: Turns on the scrambler
OFF | 0: Turns off the scrambler

Example :DATA:SDH:SCR ON activates the scrambler.

[:SENS]:DATA[:TEL]:SDH:SCR?

[:SENSe]:DATA[:TELecom]:SDH:SCRambling? provides the current setting of the scrambler.

Example :DATA:SDH:SCR?
Response: 1 if scrambling is switched on.

[:SENS]:DATA[:TEL]:SDH:STMN:CHAN

[:SENSe]:DATA[:TELecom]:SDH:STMN:CHANnel <channel> sets the active measurement channel for the optical input.

Parameter

Name	Type	Range	Default
channel	numeric	1 - 4 (for STM4 | STS12) 1 - 16 (for STM16 | STS12) 1 - 64 (for STM64 | STS 192)	1

Dependencies

Command has no effect if the receive signal has only one measurement channel and no background channels.
Only valid if
[:SENS]:DATA[:TEL]:SDH:RATE = STM4|STS12|STM16|STS48|STM64|STS192.

Comments

Further structuring of the receive signal in the measurement channel is by way of the other commands in the group
[:SENS]:DATA[:TEL]:SDH on page R-352 ff.

The channel setting 1 to 12/48/192 for OC12/OC48/OC192 can be made in two stages:
[:SENS]:DATA[:TEL]:SDH:STMN:CHAN = <stmn-channel>
[:SENS]:DATA[:TEL]:SDH:CHAN = <grp1_no>
where the channel number is: oc12/48_no = 3 x stmn_no + grp1_no -3

OC	1	2	3	4	5	6	7	8	9	10	11	12	13	…	48
STMN	1	1	1	2	2	2	3	3	3	4	4	4	5	…	16
grp1	1	2	3	1	2	3	1	2	3	1	2	3	1	…	3

Alternatively, the channels of the ANSI structures for OC3/12/48/192 can be set with the commands
[:SENS]:DATA[:TEL]:SDH:STMN:CHAN on page R-372
[:SENS]:DATA[:TEL]:SDH:STSV:CHAN on page R-374.

Example

:DATA:SDH:STMN:CHAN 2
activates the 2nd channel as the measurement channel.

Related commands

[:SENS]:DATA[:TEL]:SDH:CHAN on page R-353
[:SENS]:DATA[:TEL]:SDH:STSN:CHAN on page R-373
[:SENS]:DATA[:TEL]:SDH:STSV:CHAN on page R-374

[:SENS]:DATA[:TEL]:SDH:STMN:CHAN?

[:SENSe]:DATA[:TELecom]:SDH:STMN:CHANnel? provides the current setting of the measurement channel for the optical input.

Example

:DATA:SDH:STMN:CHAN?
Response: 3

[:SENS]:DATA[:TEL]:SDH:STSN:CHAN

[:SENSe]:DATA[:TELecom]:SDH:STSN:CHANnel <channel> sets the active measurement channel for the optical input.

Parameter

Name	Type	Range	Default
channel	numeric	1 - 3 (for STM1-AU3 | STS3-STS1 SPE) 1 - 12 (for STM4-AU3 | STS12-STS1 SPE) 1 - 48 (for STM16-AU3 | OC48-STS1 SPE) 1 -192 (for STM64-AU3 | OC192-STS1 SPE) 1 - 4 (for STM4-AU4 | OC12-STS3c SPE) 1 - 16 (for STM16-AU4 | OC48-STS3c SPE) 1 - 64 (for STM64-AU4 | OC192-STS3c SPE) 1 - 4 (for STM16-AU4-4c | OC48-STS3c SPE) 1 - 16 (for STM64-AU4-4c | OC192-STS3c SPE) 1 - 4 (for STM64-AU4-16c | OC192-STS48c SPE)	1

Dependencies

This command together with the command [:SENS]:DATA[:TEL]:SDH:STSV:CHAN on page R-374 serves for setting the channel structure for ANSI-structured mappings.
Only valid if [:SENS]:DATA[:TEL]:SDH:RATE = STM1 | STS3 | STM4 | STS12 | STM16 | OC48 | STM64 | OC192.

Comments

The command [:SENS]:DATA[:TEL]:SDH:STSV:CHAN on page R-374 is available for further structuring of the measurement channel output signal.
This command has no effect if the output signal has only a single measurement channel and no background channels.
Remote control programs may set the channels using either the SONET commands
SENS:DATA:SDH:STSN:CHAN
SENS:DATA:SDH:STSV:CHAN
or the SDH commands
SENS:DATA:SDH:STMN:CHAN
SENS:DATA:SDH:CHAN
Mixing the two types of command is not permitted.

Example

:DATA:SDH:STSN:CHAN 2
activates the 2nd channel as the measurement channel.

Related commands

[:SENS]:DATA[:TEL]:SDH:CHAN on page R-353
[:SENS]:DATA[:TEL]:SDH:STMN:CHAN? on page R-372
[:SENS]:DATA[:TEL]:SDH:STSV:CHAN on page R-374

[:SENS]:DATA[:TEL]:SDH:STSN:CHAN?

[:SENSe]:DATA[:TELecom]:SDH:STSN:CHANnel? provides the current setting of the measurement channel for the optical input.

Example

:DATA:SDH:STSN:CHAN?
Response: 3

[:SENS]:DATA[:TEL]:SDH:STSV:CHAN

[:SENSe]:DATA[:TELecom]:SDH:STSVt:CHANnel <channel> sets the active measurement channel for the optical input.

Parameter

Name	Type	Range	Default
channel	numeric	1 - 7 (for C2/VT6 SPE) 1 - 21 (for C12/VT2 SPE or C11TU12) 1 - 28 (for C11/VT1.5 SPE)	1

Dependencies

This command together with the command [:SENS]:DATA[:TEL]:SDH:STSV:CHAN on page R-374 serves for setting the channel structure for ANSI-structured mappings.
Only valid if
[:SENS]:DATA[:TEL]:SDH:RATE = STM4|STS12|STM16|STS48|STM64|STS192.

Comments

The command [:SENS]:DATA[:TEL]:SDH:STSV:CHAN on page R-374 is available for further structuring of the measurement channel output signal.
This command has no effect if the output signal has only a single measurement channel and no background channels.
Remote control programs may set the channels using either the SONET commands
SENS:DATA:SDH:STSN:CHAN
SENS:DATA:SDH:STSV:CHAN
or the SDH commands
SENS:DATA:SDH:STMN:CHAN
SENS:DATA:SDH:CHAN
Mixing the two types of command is not permitted.

Example

:DATA:SDH:STMN:CHAN 2
activates the 2nd channel as the measurement channel.

Related commands

[:SENS]:DATA[:TEL]:SDH:CHAN on page R-353
[:SENS]:DATA[:TEL]:SDH:STMN:CHAN? on page R-372
[:SENS]:DATA[:TEL]:SDH:STSN:CHAN on page R-373

[:SENS]:DATA[:TEL]:SDH:STSV:CHAN?

[:SENSe]:DATA[:TELecom]:SDH:STSVt:CHANnel? provides the current setting of the measurement channel for the optical input.

Example

:DATA:SDH:STSV:CHAN?
Response: 3

[:SENS]:DATA[:TEL]:SDH:TRIB:MAPP

[:SENSe]:DATA[:TELecom]:SDH:TRIButary:MAPPing <mapping> determines the mapping for the TU11/TU12 or VT1.5/VT2 Tributary Units.

Parameter

Name	Type	Range	Default
mapping	discrete	ASYNchronous **|** FBYTe	ASYN

Dependencies None

Comments
ASYNchronous: Asynchronous mapping
FBYTe: Floating byte mapping

Example
:DATA:SDH:TRIB:MAPP ASYN
activates asynchronous mapping for the Tributary Units (TUs).

Related commands
[:SENS]:DATA[:TEL]:SDH:MAPP on page R-357
[:SENS]:DATA[:TEL]:SDH:RATE on page R-370
[:SENS]:DATA[:TEL]:SDH:PAYL:TYPE on page R-365

[:SENS]:DATA[:TEL]:SDH:TRIB:MAPP?

[:SENSe]:DATA[:TELecom]:SDH:TRIButary:MAPPing? provides the current setting of the mapping for the TU11/TU12 or VT1.5/VT2 Tributary Units.

Example
:DATA:SDH:TRIB:MAPP?
Response: FBYT for floating byte mapping.

[:SENS]:DATA[:TEL]:SDH:TRIB:POV:LPTR:FREF

[:SENSe]:DATA[:TELecom]:SDH:TRIButary:POVerhead:LPTRace:
FREFerence <value> determines the value of the fixed bytes received in channel J2.

Parameter

Name	Type	Range	Default
value	byte	0 - 255	1

Dependencies None

Comments
<value>:
Sets the fixed byte received in J2 if the command [:SENS]:DATA[:TEL]:SDH:TRIB:POV:LPTR:REF was switched to FIXed.

Example
:DATA:SDH:TRIB:POV:LPTR:FREF 114 comparison pattern = 114.

Related commands
[:SENS]:DATA[:TEL]:SDH:TRIB:POV:LPTR:REF on page R-376

[:SENS]:DATA[:TEL]:SDH:TRIB:POV:LPTR:FREF?

[:SENSe]:DATA[:TELecom]:SDH:TRIButary:POVerhead:HPTRace:FREFerence? provides the current byte for the J2 comparison.

Example

:DATA:SDH:TRIB:POV:HPTR:FREF?
Response: 114 if set as fixed value 114 in J2.

[:SENS]:DATA[:TEL]:SDH:TRIB:POV:LPTR:REF

[:SENSe]:DATA[:TELecom]:SDH:TRIButary:POVerhead:LPTRace:REFerence <mode>,<trace> determines the mode and the comparison pattern for the J2 low path trace.

Parameter

Name	Type	Range	Default
mode	discrete	FIXed | TRC16 | TRC64	TRC16
trace	string	Strings with a length from 1 to 15 bytes or 1 to 64 bytes	“WG LP-TRACE”

Dependencies None

Comments

<mode> =

FIXed: Receiving fixed bytes in J2.

TRC16: Receiving a string of 15 characters completed for frame synchronization and error checking with the 16th byte using CRC-7.

TRC64: Receiving a string of 64 characters.

<trace>: This string is needed as a comparison pattern for detecting the LP-TIM (TIM-V) alarm (Low Path Trace Identifier Mismatch). All printable characters are allowed (7 bit ASCII). If the string is shorter than the maximum length, it is padded with blanks (20hex) in case of TRC16 or with 0 (00hex) in case of TRC64. A CR/LF sequence is automatically added to the TRC64 string to complete the 64 byte sequence if the programmed string is shorter than 63 characters. **A CR/LF sequence is required for the ANT-20 receiver to synchronize to the received signal.** Non-printing characters can be set using the UNIX shell conventions:

\n --> new line character
\r --> CR character
\b --> back space character
\t --> TAB character
\0 --> 0 HEX character
\\ --> \ character
\001 --> 01 HEX character in octal notation.

Example

:DATA:SDH:TRIB:POV:LPTR:REF TRC16,“Hello World”
Trace mode = TRC16
Comparison pattern = “Hello World”.

Related commands [:SENS]:DATA[:TEL]:SDH:TRIB:POV:LPTR:FREF on page R-375

[:SENS]:DATA[:TEL]:SDH:TRIB:POV:LPTR:REF?

[:SENSe]:DATA[:TELecom]:SDH:TRIButary:POVerhead:LPTRaceREFerence? provides the current trace mode and setting for the J2 comparison string.

Example
:DATA:SDH:TRIB:POV:LPTR:REF?
Response: TRC16,“Hello World” for “Hello World” in the 16 byte trace.

[:SENS]:DATA[:TEL]:SDH:TRIB:POV:PLAB

[:SENSe]:DATA[:TELecom]:SDH:TRIButaryPOVerhead:PLABel <label> determines the comparison value for LP-PLM (PLM-V) alarm detection (Low Path Label Mismatch). The received low path (bits 5 to 7 of the V5 bytes for VC-11, 12, 2 as tributary or C2 byte of the VC-3) is compared with the value set here.

Parameter

Name	Type	Range	Default
label	numeric	#H0 - #H7 or #B000 - #B111 or 0 - 7 for V5 byte (VC-11/12/2) #H0 - #HFF or #B00000000 - #B11111111 or 0 - 255 for C2 byte (VC-3)	2

Dependencies None

Comments
The following values are defined for the V5 byte of the VC-11/12/2:
0: Signal label path unequipped (UIS)
1: Equipped (non specific payload)
2: Asynchronous floating
3: Bit synchronous, floating
4: Byte synchronous, floating
5: Equipped - unused
6: Equipped - unused
7: Equipped - unused

The following values are defined for the C2 byte of the VC-3/STS1SPE:
0: UIS: Unequipped Indication Signal
1: Equipped non specific
2: TUG structure/floating VT mode
3: Locked TU/locked VT mode
4: Asynchronous mapping of 34M or DS3 into C-3/STS1SPE
18: Asynchronous mapping of 140M into C-4
19: ATM
20: MAN
21: FDDI
All other values of the C2 byte are undefined.

Example
:DATA:SDH:TRIB:POV:PLAB 1 sets “unequipped non specific”.

[:SENS]:DATA[:TEL]:SDH:TRIB:POV:PLAB?

[:SENSe]:DATA[:TELecom]:SDH:TRIButary:POVerhead:PLABel? provides the current setting of the low path label (VT path) comparison value.

Example :DATA:SDH:TRIB:POV:PLAB?
Response: 1 for “unequipped non specific”.

[:SENS]:DATA[:TEL]:SENS

[:SENSe]:DATA[:TELecom]:SENSe <senseport> determines the source of the receive signal.

Parameter

Name	Type	Range	Default
senseport	discrete	LINE | OPTic | NRZ	LINE

Dependencies LINE is not possible if
[:SENS]:DATA[:TEL]:SDH:RATE = STM4|STS12|STM16|STS48|STM64|STS192.

Comments
LINE: Receive data from the LINE input
OPTic: Receive data from the optical input
NRZ: Receive data from the NRZ (Non-Return to Zero) input

Example :DATA:SENS LINE activates the receiver for the LINE input.

[:SENS]:DATA[:TEL]:SENS?

[:SENSe]:DATA[:TELecom]:SENSe? provides the current setting of the receive signal source.

Example :DATA:SENS?
Response: LINE

[:SENS]:DATA[:TEL]:STAN

[SENSe]:DATA[:TELecom]:STANdard <standard>[,<version>] distinguishes between SDH or SONET operation of ANT20. In SONET operation <version> distinguishes between T1X1 and Bellcore.

Parameter

Name	Type	Range	Default
standard	discrete	ITUT | ANSI	ITUT
version	discrete	BELL | T1X1	BELL

Dependencies None

Comments	<standard> =	
	ITUT:	SDH operation The following settings are made automatically: [:SENS]:DATA[:TEL]:SDH:POV:HPTR:REF TRC16, ”WG HP-TRACE” [:SENS]:DATA[:TEL]:SDH:TRIB:POV:LPTR:REF TRC16, ”WG LP-TRACE”
	ANSI:	SONET operation The following settings are made automatically: [:SENS]:DATA[:TEL]:SDH:POV:HPTR:REF TRC64, ”WG STS-TRACE” [:SENS]:DATA[:TEL]:SDH:TRIB:POV:LPTR:REF TRC64, ”WG VT-TRACE”
	<version> = optional:	
	BELL:	Anomaly and defect processing (enhanced alarms) according to GR253
	T1X1:	Anomaly and defect processing (enhanced alarms) according to T1X1
Example	:DATA:STAN ANSI,T1X1	activates system for SONET operation (T1X1).
Related commands	[:SENS]:DATA[:TEL]:SDH:POV:HPTR:REF on page R-367 [:SENS]:DATA[:TEL]:SDH:TRIB:POV:LPTR:REF on page R-376	

[:SENS]:DATA[:TEL]:STAN?

[:SENSe]:DATA[:TELecom]:STANdard? provides the current setting of the standard and the ANSI versions.

Example

[:SENS]:DATA:STAN?
Response: ANSI,T1X1

[:SENS]:FUNC:OFF

[:SENSe]:FUNCtion:OFF <id>{, <id>} deletes one or more result elements from the list of results to be determined.

For the entire list of results, see Result IDs for :SENS:DATA and :SENS:FUNC commands on page R-382.

Parameter

Name	Type	Range	Default
id	string	e.g. “ECO:SDH:RSB” for counter value for SDH-B1 errors	none

Dependencies None

Example :FUNC:OFF “ECO:SDH:RSB”, “ECO:SDH:MSB”
B1 & B2 error states are not to be determined.

Related commands [:SENS]:DATA:FIN? on page R-264
[:SENS]:FUNC[:ON] on page R-381
[:SENS]:FUNC:OFF:ALL on page R-380

[:SENS]:FUNC:OFF:ALL

[:SENSe]:FUNCtion:OFF:ALL deletes all result elements from the list of results to be determined.

Parameter None

Dependencies None

Comments There is no query for this command.

Example :FUNC:OFF:ALL deletes the entire list.

Related commands [:SENS]:DATA:FIN? on page R-264
[:SENS]:FUNC[:ON] on page R-381
[:SENS]:FUNC:OFF on page R-380

[:SENS]:FUNC[:ON]

[:SENSe]:FUNCtion[:ON] <id>{, <id>} specifies the list of results to be determined.

For the entire list of results, see Result IDs for :SENS:DATA and :SENS:FUNC commands on page R-382.

Parameter

Name	Type	Range	Default
id	string	e.g. “ECO:SDH:RSB” for counter value for SDH-B1 errors	no result selected

Dependencies

Only results previously activated with this command can be read by [:SENS]:DATA:FIN? or [:SENS]:DATA:ACT?
(except results continuously taken).
Only results previously activated with this command produce entries in the event memory (see also: [:SENS]:DATA:EVEN? on page R-266).

Comments

The list of results to be determined can be very long (parameters separated by a blank). However, it does not have to be specified in a single command; several successive commands can be used.
The results can then be read with [:SENS]:DATA:FIN? on page R-264 or [:SENS]:DATA:ACT? on page R-265.

Example

:FUNC “ECO:SDH:RSB”, “ECO:SDH:MSB”
B1 & B2 error states are to be determined.

Related commands

[:SENS]:DATA:FIN? on page R-264
[:SENS]:DATA:ACT? on page R-265
[:SENS]:FUNC:OFF on page R-380
[:SENS]:FUNC:OFF:ALL on page R-380

[:SENS]:FUNC[:ON]?

[:SENSe]:FUNCtion[:ON]? provides the list of all interval end results that are currently selected.

Example

:FUNC?
Response: “ECO:SDH:RSB”, “ECO:SDH:MSB”

Result IDs for :SENS:DATA and :SENS:FUNC commands

The result IDs listed below are used to identify results requested for the following commands:
[:SENS]:FUNC[:ON] on page R-381
[:SENS]:FUNC:OFF on page R-380
[:SENS]:DATA:FIN? on page R-264
[:SENS]:DATA:ACT? on page R-265

Note: The ID strings listed below show the ID names in a long form. This simplifies understanding of the command syntax.
The device only accepts SCPI **short form upper case (capital letter)** commands to speed up the response time of the device (e.g. "CSTATUS:SIGNAL" is not accepted, use "CST:SIGN" instead).
The SCPI short form is indicated by the capital letters in the commands below.

ID string	Response code	Response type	Response description	Unit
ATIMe	20	count[1]	Actual time of day in milliseconds since 1/1/1970	ms
ETIMe	21	count	Milliseconds since measurement start	ms
STIMe	22	count	Starting time of measurement in milliseconds since 1/1/1970	ms
APSTime	35	count	Switching time of an APS cycle (Automatic Protection Switching) in milliseconds. (See: [:SENS]:DATA[:TEL]:APS on page R-314 ff.). Note: This result requires option 90.15	ms
FOFFset:LINE	40	count[1]	Frequency shift of the measured signal at the LINE input from the nominal bit rate in ppm (parts per million). Note: result cannot be read if :SOUR:DATA[:TEL]:NEL = ADM.	ppm
LEVel:OPTical	45	count[1]	Input level at the optical interface. (if the STM16 optical input is overloaded, +100 is delivered)	dbm
CSTatus:SIGNal	50	bit field[1]	Current status of the signal as a bit field (Alarm field "CSTatus:SIGNal"/ "HSTatus:SIGNal" on page R-272)	none

1 These results are taken continuously and are not available using the [:SENS]:DATA:FIN? command.

Table R-14 Result IDs for general results

ID string	Response code	Response type	Response description	Unit
HSTatus:SIGNal	60	bit field	History status of signal as a bit field (Alarm field “CSTatus:SIGNal”/ “HSTatus:SIGNal” on page R-272). This result provides all the alarms which were detected since the start of the last measurement	none
ECOunt:TSE	100	count	Payload TSE test sequence error(s) (bit / word errors as set by [:SENS]:DATA[:TEL]:ERR:TSE:AMOD on page R-325)	none
ERATio:TSE	101	ratio	TSE rate	none
COUNt:TSE	102	count	Number of TSE events evaluated	none
ACOunt:TSE	103	count	TSE measurement alarm time	ms
ARATio:TSE	104	count	TSE measurement alarm ratio	1/1000%
ECOunt:CODE	130	count	Code error(s)	none
ERATio:CODE	131	ratio	Code error rate	none
COUNt:CODE	132	count	Number of code error events evaluated	none
ACOunt:CODE	133	count	Code error measurement alarm time	ms
ARATio:CODE	134	count	Code error measurement alarm ratio	1/1000%

Table R-14 Result IDs for general results *(continued)*

ID string	Response code	Response type	Response description	Unit
CSTatus:SDH	51	bit field[1]	Current status of SDH/SONET signal as a bit field (Alarm field “CSTatus:SDH”/ “HSTatus:SDH” on page R-272)	none
CSTatus:SDH2	54	bit field[1]	Current status of SDH/SONET signal as a bit field (Alarm field “CSTatus:SDH2”/ “HSTatus:SDH2” on page R-274)	none
HSTatus:SDH	61	bit field[1]	History status of SDH/SONET signal as a bit field (Alarm field “CSTatus:SDH”/ “HSTatus:SDH” on page R-272). This result provides all the alarms that were detected since the start of the last measurement.	none
HSTatus:SDH2	64	bit field[1]	History status of SDH/SONET signal as a bit field (Alarm field “CSTatus:SDH2”/ “HSTatus:SDH2” on page R-274) This result provides all the alarms that were detected since the start of the last measurement.	none
ECOunt:SDH:FAS	200	count	SDH/SONET FAS error(s) (Frame Alignment Signal) Note: FAS results cannot be taken if [:SENS]:DATA[:TEL]:SDH:RATE = STM4|STM16.	none
ERATio:SDH:FAS	201	ratio	SDH/SONET FAS error ratio	none
COUNt:SDH:FAS	202	count	Number of FAS error events evaluated	none
ACOunt:SDH:FAS	203	count	FAS error measurement alarm time	ms
ARATio:SDH:FAS	204	count	FAS error measurement alarm ratio	1/1000%
ECOunt:SDH:RSBip	210	count	B1-BIP error(s) (Regenerator Section)	none
ERATio:SDH:RSBip	211	ratio	B1-BIP error rate	none
COUNt:SDH:RSBip	212	count	Number of B1-BIP error events evaluated	none

1 These results are taken continuously and are not available using the [:SENS]:DATA:FIN? command.

Table R-15 Result IDs for SDH/SONET results

ID string	Response code	Response type	Response description	Unit
ACOunt:SDH:RSBip	213	count	B1-BIP error measurement alarm time	ms
ARATio:SDH:RSBip	214	count	B1-BIP error measurement alarm ratio	1/1000%
ECOunt:SDH:PBIP	230	count	High Path B3-BIP error(s)	none
ERATio:SDH:PBIP	231	ratio	High Path B3-BIP error rate	none
COUNt:SDH:PBIP	232	count	Number of B3-BIP error events evaluated	none
ACOunt:SDH:PBIP	233	count	B3-BIP error measurement alarm time	ms
ARATio:SDH:PBIP	234	count	B3-BIP error measurement alarm ratio	1/1000%
ECOunt:SDH:PREI	240	count	REI-P High Path (HP-FEBE) error(s)	none
ERATio:SDH:PREI	241	ratio	REI-P error rate	none
COUNt:SDH:PREI	242	count	Number of REI-P error events evaluated	none
ACOunt:SDH:PREI	243	count	REI-P error measurement alarm time	ms
ARATio:SDH:PREI	244	count	REI-P error measurement alarm ratio	1/1000%
ECOunt:SDH:MSRei	250	count	REI-L Multiplex Section (MS-FEBE) (M1) error(s)	none
ERATio:SDH:MSRei	251	ratio	REI-L error rate	none
COUNt:SDH:MSRei	252	count	Number of REI-L error events evaluated	none
ACOunt:SDH:MSRei	253	count	REI-L error measurement alarm time	ms
ARATio:SDH:MSRei	254	count	REI-L error measurement alarm ratio	1/1000%
ECOunt:SDH:MSBip:SUMmary	260	count	B2-BIP summary error(s) (Multiplex Section) for signals containing multiple channels with independent B2 generation (e.g. STM4/OC12)	none
ERATio:SDH:MSBip:SUMmary	261	ratio	B2-BIP summary error rate	none
COUNt:SDH:MSBip:SUMmary	262	count	Number of B2-BIP summary error events evaluated	none
ACOunt:SDH:MSBip:SUMmary	263	count	B2-BIP summary error measurement alarm time	ms

Table R-15 Result IDs for SDH/SONET results *(continued)*

ID string	Response code	Response type	Response description	Unit
ARATio:SDH:MSBip:SUMmary	264	count	B2-BIP summary error measurement alarm ratio	1/1000%
ECOunt:SDH:TRIButary:PREI	300	count	REI-V Low Path (LP-FEBE) error(s)	none
ERATio:SDH:TRIButary:PREI	301	ratio	REI-V error rate	none
COUNt:SDH:TRIButary:PREI	302	count	Number of REI-V error events evaluated	none
ACOunt:SDH:TRIButary:PREI	303	count	REI-V error measurement alarm time	ms
ARATio:SDH:TRIButary:PREI	304	count	REI-V error measurement alarm ratio	1/1000%
ECOunt:SDH:TRIButary:PBIP	310	count	Low Path BIP-2 error(s)	none
ERATio:SDH:TRIButary:PBIP	311	ratio	Low Path BIP-2 error rate	none
COUNt:SDH:TRIButary:PBIP	312	count	Number of BIP-2 error events evaluated	none
ACOunt:SDH:TRIButary:PBIP	313	count	BIP-2 error measurement alarm time	ms
ARATio:SDH:TRIButary:PBIP	314	count	BIP-2 error measurement alarm ratio	1/1000%

Table R-15 Result IDs for SDH/SONET results *(continued)*

ID string	Response code	Response type	Response description	Unit
CSTatus: TCMonitoring	55	bit field[1]	Current status of Tandem Connection Monitoring results as a bit field (Result field “CSTatus:TCMonitoring”/ “HSTatus:TCMonitoring” on page R-281)	none
HSTatus: TCMonitoring	65	bit field[1]	History status of Tandem Connection Monitoring results as a bit field (Result field “CSTatus:TCMonitoring”/ “HSTatus:TCMonitoring” on page R-281)	none
ECOunt:SDH:TC Monitoring:IEC	400	count	Tandem Connection: Incoming Error Count	none
ERATio:SDH:TC Monitoring:IEC	401	ratio	Tandem Connection: Incoming Error Ratio	none
COUNt:SDH:TC Monitoring:IEC	402	count	Tandem Connection: Number of IEC events evaluated	none
ACOunt:SDH:TC Monitoring:IEC	403	count	Tandem Connection: Incoming Error Alarm Count	ms
ARATio:SDH:TC Monitoring:IEC	404	count	Tandem Connection: Incoming Error Alarm Ratio	1/1000%
ECOunt:SDH:TC Monitoring:DIFF	410	count	Tandem Connection: Difference Error Count	none
ERATio:SDH:TC Monitoring:DIFF	411	ratio	Tandem Connection: Difference Error Ratio	none
COUNt:SDH:TC Monitoring:DIFF	412	count	Tandem Connection: Number of DIFF events evaluated	none
ACOunt:SDH:TC Monitoring:DIFF	413	count	Tandem Connection: Difference Error Alarm Count	ms
ARATio:SDH:TC Monitoring:DIFF	414	count	Tandem Connection: Difference Error Alarm Ratio	1/1000%
ECOunt:SDH:TC Monitoring:REI	420	count	Tandem Connection: Remote Error Indication Count	none
ACOunt:SDH:TC Monitoring:REI	421	count	Tandem Connection: Remote Error Indication Alarm Count	ms
ARATio:SDH:TC Monitoring:REI	422	count	Tandem Connection: Remote Error Indication Alarm Ratio	1/1000%
ECOunt:SDH:TC Monitoring:OEI	430	count	Tandem Connection: Outgoing Error Indication Count	none
ACOunt:SDH:TC Monitoring:OEI	431	count	Tandem Connection: Outgoing Error Indication Alarm Count	ms
ARATio:SDH:TC Monitoring:OEI	432	count	Tandem Connection: Outgoing Error Indication Alarm Ratio	1/1000%

1 These results are taken continuously and are not available using the [:SENS]:DATA:FIN? command.

Table R-16 Result IDs for SDH/SONET Tandem Connection Monitoring (TCM) results

ID string	Response code	Response type	Response description	Unit
CSTatus:PDH	52	bit field[1]	Current status of PDH signal as a bit field (Alarm field “CSTatus:PDH”/ “HSTatus:PDH” on page R-278)	none
CSTatus:PDH2	53	bit field[1]	Current status of PDH signal as a bit field (Alarm field “CSTatus:PDH2”/ “HSTatus:PDH2” on page R-279)	none
HSTatus:PDH	62	bit field[1]	History status of PDH signal as a bit field (Alarm field “CSTatus:PDH”/ “HSTatus:PDH” on page R-278). This result provides all the alarms which were detected since the start of the last measurement	none
HSTatus:PDH2	63	bit field[1]	History status of PDH signal as a bit field (Alarm field “CSTatus:PDH2”/ “HSTatus:PDH2” on page R-279). This result provides all the alarms which were detected since the start of the last measurement	none
CST:FEAC:LOOP:ON	70	bit field	Current status of requests for activated DS3 FEAC Loops as a bit field (Result field “CSTatus:FEAC:LOOP:ON”/ “CSTatus:FEAC:LOOP:OFF”/ “HSTatus:FEAC:LOOP:ON”/ “HSTatus:FEAC:LOOP:OFF” on page R-280)	none
CST:FEAC:LOOP:OFF	71	bit field	Current status of requests for deactivated DS3 FEAC Loops as a bit field (Result field “CSTatus:FEAC:LOOP:ON”/ “CSTatus:FEAC:LOOP:OFF”/ “HSTatus:FEAC:LOOP:ON”/ “HSTatus:FEAC:LOOP:OFF” on page R-280)	none
HST:FEAC:LOOP:ON	75	bit field	History status of requests for activated DS3 FEAC Loops as a bit field (Result field “CSTatus:FEAC:LOOP:ON”/ “CSTatus:FEAC:LOOP:OFF”/ “HSTatus:FEAC:LOOP:ON”/ “HSTatus:FEAC:LOOP:OFF” on page R-280)	none
HST:FEAC:LOOP:OFF	76	bit field	History status of requests for deactivated DS3 FEAC Loops as a bit field (Result field “CSTatus:FEAC:LOOP:ON”/ “CSTatus:FEAC:LOOP:OFF”/ “HSTatus:FEAC:LOOP:ON”/ “HSTatus:FEAC:LOOP:OFF” on page R-280)	none

1 These results are taken continuously and are not available using the [:SENS]:DATA:FIN? command.

Table R-17 Result IDs for PDH results

ID string	Response code	Response type	Response description	Unit
ECOunt:PDH:M2:FAS	600	count	PDH 2 Mbit/s FAS error(s)	none
ERATio:PDH:M2:FAS	601	ratio	PDH 2 Mbit/s FAS error rate	none
COUNt:PDH:M2:FAS	602	count	Number of PDH 2 Mbit/s FAS error events evaluated	none
ACOunt:PDH:M2:FAS	603	count	PDH 2 Mbit/s FAS error measurement alarm time	ms
ARATio:PDH:M2:FAS	604	count	PDH 2 Mbit/s FAS error measurement alarm ratio	1/1000%
ECOunt:PDH:M2:CRC	640	count	PDH 2 Mbit/s CRC-4 block error(s). Note: CRC measurement requires option 90.30 or 90.31	none
ERATio:PDH:M2:CRC	641	ratio	PDH 2 Mbit/s CRC-4 block error rate	none
COUNt:PDH:M2:CRC	642	count	Number of PDH 2 Mbit/s CRC-4 block error events evaluated	none
ACOunt:PDH:M2:CRC	643	count	PDH 2 Mbit/s CRC-4 block error measurement alarm time	ms
ARATio:PDH:M2:CRC	644	count	PDH 2 Mbit/s CRC-4 block error measurement alarm ratio	1/1000%
ECOunt:PDH:M2:EBIT	650	count	PDH 2 Mbit/s E bit block error(s) Note: E bit measurement requires option 90.30 or 90.31	none
ERATio:PDH:M2:EBIT	651	ratio	PDH 2 Mbit/s E bit block error rate	none
COUNt:PDH:M2:EBIT	652	count	Number of PDH 2 Mbit/s E bit block error events evaluated	none
ACOunt:PDH:M2:EBIT	653	count	PDH 2 Mbit/s E bit block error measurement alarm time	ms
ARATio:PDH:M2:EBIT	654	count	PDH 2 Mbit/s E bit block error measurement alarm ratio	1/1000%
ECOunt:PDH:M8:FAS	610	count	PDH 8 Mbit/s FAS error(s)	none
ERATio:PDH:M8:FAS	611	ratio	PDH 8 Mbit/s FAS error rate	none
COUNt:PDH:M8:FAS	612	count	Number of PDH 8 Mbit/s FAS error events evaluated	none
ACOunt:PDH:M8:FAS	613	count	PDH 8 Mbit/s FAS error measurement alarm time	ms
ARATio:PDH:M8:FAS	614	count	PDH 8 Mbit/s FAS error measurement alarm ratio	1/1000%
ECOunt:PDH:M34:FAS	620	count	PDH 34 Mbit/s FAS error(s)	none
ERATio:PDH:M34:FAS	621	ratio	PDH 34 Mbit/s FAS error rate	none

Table R-17 Result IDs for PDH results *(continued)*

ID string	Response code	Response type	Response description	Unit
COUNt:PDH:M34:FAS	622	count	Number of PDH 34 Mbit/s FAS error events evaluated	none
ACOunt:PDH:M34:FAS	623	count	PDH 34 Mbit/s FAS error measurement alarm time	ms
ARATio:PDH:M34:FAS	624	count	PDH 34 Mbit/s FAS error measurement alarm ratio	1/1000%
ECOunt:PDH:M140:FAS	630	count	PDH 140 Mbit/s FAS error(s)	none
ERATio:PDH:M140:FAS	631	ratio	PDH 140 Mbit/s FAS error rate	none
COUNt:PDH:M140:FAS	632	count	Number of PDH 140 Mbit/s FAS error events evaluated	none
ACOunt:PDH:M140:FAS	633	count	PDH 140 Mbit/s FAS error measurement alarm time	ms
ARATio:PDH:M140:FAS	634	count	PDH 140 Mbit/s FAS error measurement alarm ratio	1/1000%
:FOFFset:PDH:M140	690	count[1]	Frequency shift of PDH 140 Mbit/s signal from the nominal bit rate in ppm (parts per million). This result requires DEMUX option (90.30 or 90.31).	ppm
:FOFFset:PDH:M34	691	count[1]	Frequency shift of PDH 34 Mbit/s signal from the nominal bit rate in ppm (parts per million). This result requires DEMUX option (90.30 or 90.31).	ppm
:FOFFset:PDH:M8	692	count[1]	Frequency shift of PDH 8 Mbit/s signal from the nominal bit rate in ppm (parts per million). This result requires DEMUX option (90.30 or 90.31).	ppm
:FOFFset:PDH:M2	693	count[1]	Frequency shift of PDH 2 Mbit/s signal from the nominal bit rate in ppm (parts per million). This result requires DEMUX option (90.30 or 90.31).	ppm
:FOFFset:PDH:DS1	790	count[1]	Frequency shift of PDH 1.544 Mbit/s (DS1) signal from the nominal bit rate in ppm (parts per million). This result requires MUX/DEMUX M13 option (90.32).	ppm
:FOFFset:PDH:DS3	791	count[1]	Frequency shift of PDH 44.736 Mbit/s (DS3) signal from the nominal bit rate in ppm (parts per million). This result requires MUX/DEMUX M13 option (90.32).	ppm

1 These results are taken continuously and are not available using the [:SENS]:DATA:FIN? command.

Table R-17 Result IDs for PDH results *(continued)*

ID string	Response code	Response type	Response description	Unit
ECOunt:PDH:M34:G832:EM	2110	count	G832: PDH 34 Mbit/s EM-BIP error(s)	none
ERATio:PDH:M34:G832:EM	2111	ratio	G832: PDH 34 Mbit/s EM-BIP error rate	none
COUNt:PDH:M34:G832:EM	2112	count	G832: Number of PDH 34 Mbit/s EM-BIP error events evaluated	none
ACOunt:PDH:M34:G832:EM	2113	count	G832: PDH 34 Mbit/s EM-BIP error measurement alarm time	ms
ARATio:PDH:M34:G832:EM	2114	count	G832: PDH 34 Mbit/s EM-BIP error measurement alarm ratio	1/1000%
ECOunt:PDH:M140:G832:EM	2100	count	G832: PDH 140 Mbit/s EM-BIP error(s)	none
ERATio:PDH:M140:G832:EM	2101	ratio	G832: PDH 140 Mbit/s EM-BIP error rate	none
COUNt:PDH:M140:G832:EM	2102	count	G832: Number of PDH 140 Mbit/s EM-BIP error events evaluated	none
ACOunt:PDH:M140:G832:EM	2103	count	G832: PDH 140 Mbit/s EM-BIP error measurement alarm time	ms
ARATio:PDH:M140:G832:EM	2104	count	G832: PDH 140 Mbit/s EM-BIP error measurement alarm ratio	1/1000%
ECOunt:PDH:M34:G832:REI	2130	count	G832: PDH 34 Mbit/s REI error(s)	none
ERATio:PDH:M34:G832:REI	2131	ratio	G832: PDH 34 Mbit/s REI error rate	none
COUNt:PDH:M34:G832:REI	2132	count	G832: Number of PDH 34 Mbit/s REI error events evaluated	none
ACOunt:PDH:M34:G832:REI	2133	count	G832: PDH 34 Mbit/s REI error measurement alarm time	ms
ARATio:PDH:M34:G832:REI	2134	count	G832: PDH 34 Mbit/s REI error measurement alarm ratio	1/1000%
ECOunt:PDH:M140:G832:REI	2120	count	G832: PDH 140 Mbit/s REI error(s)	none
ERATio:PDH:M140:G832:REI	2121	ratio	G832: PDH 140 Mbit/s REI error rate	none
COUNt:PDH:M140:G832:REI	2122	count	G832: Number of PDH 140 Mbit/s REI error events evaluated	none
ACOunt:PDH:M140:G832:REI	2123	count	G832: PDH 140 Mbit/s REI error measurement alarm time	ms
ARATio:PDH:M140:G832:REI	2124	count	G832: PDH 140 Mbit/s REI error measurement alarm ratio	1/1000%

Table R-18 Result IDs for PDH G.823 frame results

ID string	Response code	Response type	Response description	Unit
ECOunt:PDH:DS1:FAS	750	count	PDH 1.544 Mbit/s DS1 FAS error(s)	none
ERATio:PDH:DS1:FAS	751	ratio	PDH 1.544 Mbit/s DS1 FAS error rate	none
COUNt:PDH:DS1:FAS	752	count	Number of PDH 1.544 Mbit/s DS1 FAS error events evaluated	none
ACOunt:PDH:DS1:FAS	753	count	PDH 1.544 Mbit/s DS1 FAS error measurement alarm time	ms
ARATio:PDH:DS1:FAS	754	count	PDH 1.544 Mbit/s DS1 FAS error measurement alarm ratio	1/1000%
ECOunt:PDH:DS1:CRC	760	count	PDH 1.544 Mbit/s DS1 CRC error(s)	none
ERATio:PDH:DS1:CRC	761	ratio	PDH 1.544 Mbit/s DS1 CRC error rate	none
COUNt:PDH:DS1:CRC	762	count	Number of PDH 1.544 Mbit/s DS1 CRC error events evaluated	none
ACOunt:PDH:DS1:CRC	763	count	PDH 1.544 Mbit/s DS1 CRC error measurement alarm time	ms
ARATio:PDH:DS1:CRC	764	count	PDH 1.544 Mbit/s DS1 CRC error measurement alarm ratio	1/1000%
ECOunt:PDH:DS3:FAS	700	count	PDH 44.736 Mbit/s DS3 FAS error(s)	none
ERATio:PDH:DS3:FAS	701	ratio	PDH 44.736 Mbit/s DS3 FAS error rate	none
COUNt:PDH:DS3:FAS	702	count	Number of PDH 44.736 Mbit/s DS3 FAS error events evaluated	none
ACOunt:PDH:DS3:FAS	703	count	PDH 44.736 Mbit/s DS3 FAS error measurement alarm time	ms
ARATio:PDH:DS3:FAS	704	count	PDH 44.736 Mbit/s DS3 FAS error measurement alarm ratio	1/1000%
ECOunt:PDH:DS3:MFAS	710	count	PDH 44.736 Mbit/s DS3 MFAS error(s)	none
ERATio:PDH:DS3:MFAS	711	ratio	PDH 44.736 Mbit/s DS3 MFAS error rate	none
COUNt:PDH:DS3:MFAS	712	count	Number of PDH 44.736 Mbit/s DS3 MFAS error events evaluated	none
ACOunt:PDH:DS3:MFAS	713	count	PDH 44.736 Mbit/s DS3 MFAS error measurement alarm time	ms
ARATio:PDH:DS3:MFAS	714	count	PDH 44.736 Mbit/s DS3 MFAS error measurement alarm ratio	1/1000%

Table R-19 Result IDs for ANSI PDH DS1/3 results

ID string	Response code	Response type	Response description	Unit
ECOunt:PDH:DS3:REI	720	count	PDH 44.736 Mbit/s DS3 REI (FEBE) error(s)	none
ERATio:PDH:DS3:REI	721	ratio	PDH 44.736 Mbit/s DS3 REI error rate	none
COUNt:PDH:DS3:REI	722	count	Number of PDH 44.736 Mbit/s DS3 REI error events evaluated	none
ACOunt:PDH:DS3:REI	723	count	PDH 44.736 Mbit/s DS3 REI error measurement alarm time	ms
ARATio:PDH:DS3:REI	724	count	PDH 44.736 Mbit/s DS3 REI error measurement alarm ratio	1/1000%
ECOunt:PDH:DS3:PAR	730	count	PDH 44.736 Mbit/s DS3 parity error(s)	none
ERATio:PDH:DS3:PAR	731	ratio	PDH 44.736 Mbit/s DS3 parity error rate	none
COUNt:PDH:DS3:PAR	732	count	Number of PDH 44.736 Mbit/s DS3 parity error events evaluated	none
ACOunt:PDH:DS3:PAR	733	count	PDH 44.736 Mbit/s DS3 parity error measurement alarm time	ms
ARATio:PDH:DS3:PAR	734	count	PDH 44.736 Mbit/s DS3 parity error measurement alarm ratio	1/1000%
ECOunt:PDH:DS3:CPAR	740	count	PDH 44.736 Mbit/s DS3 C parity error(s)	none
ERATio:PDH:DS3:CPAR	741	ratio	PDH 44.736 Mbit/s DS3 C parity error rate	none
COUNt:PDH:DS3:CPAR	742	count	Number of PDH 44.736 Mbit/s DS3 C parity error events evaluated	none
ACOunt:PDH:DS3:CPAR	743	count	PDH 44.736 Mbit/s DS3 C parity error measurement alarm time	ms
ARATio:PDH:DS3:CPAR	744	count	PDH 44.736 Mbit/s DS3 C parity error measurement alarm ratio	1/1000%

Table R-19 Result IDs for ANSI PDH DS1/3 results *(continued)*

ID string	Response code	Response type	Response description	Unit
PACTivity:PVALue	500	count	AU/STS absolute pointer value	none
PACTivity:PCOunt	501	count	Number of AU/STS pointer increments	none
PACTivity:NCOunt	503	count	Number of AU/STS pointer decrements	none
PACTivity:NDFCount	505	count	Number of occurrences of AU/ STS NDF (New Data Flag)	none
ACOunt:PACTivity	507	count	AU/STS pointer measurement alarm time	ms
ARATio:PACTivity	508	count	AU/STS pointer measurement alarm ratio	1/1000%
PACTivity2:PVALue	520	count	AU/STS absolute pointer value for C4/STS3C channel #2. (Note: for STM4C/OC-12C virtual concatenation only)	none
PACTivity3:PVALue	521	count	AU/STS absolute pointer value for C4/STS3C channel #3. (Note: for STM4C/OC-12C virtual concatenation only)	none
PACTivity4:PVALue	522	count	AU/STS absolute pointer value for C4/STS3C channel #4. (Note: for STM4C/OC-12C virtual concatenation only)	none
PACTivity:TRIButary:PVALue	550	count	TU/VT absolute pointer value	none
PACTivity:TRIButary:PCOunt	551	count	Number of TU/VT pointer increments	none
PACTivity:TRIButary:NCOunt	553	count	Number of TU/VT pointer decrements	none
PACTivity:TRIButary:NDFCount	555	count	Number of occurrences of TU/ VT NDF (New Data Flag)	none
PACTivity:TRIButary:NDFCount :INTermediate	556	count	Number of occurrences of TU/ VT NDF (New Data Flag) in intermediate interval	none
ACOunt:TRIButary:PACTivity	557	count	TU/VT pointer measurement alarm time	ms
ARATio:TRIButary:PACTivity	558	count	TU/VT pointer measurement alarm ratio	1/1000%

Table R-20 Result IDs for SDH/SONET pointer results

ID string	Response code	Response type	Response description	Unit
STATe:ANALysis:NEND	800	int	State of quality analysis - near end analysis 0: Rejected 1: Accepted 2: M.2100/M.2101 uncertain Note: This result is not available for G.829 and ANSI performance measurements.	none
EFSCount:ANALysis:NEND	801	count	Number of EFS (error free seconds) - near end analysis	none
EFSRatio:ANALysis:NEND	802	ratio	EFS ratio - near end analysis	%
EBCount:ANALysis:NEND	803	count	Number of EB (errored blocks) - near end analysis Note: This result is only available for G.826 measurements.	none
ESCount:ANALysis:NEND	804	count	Number of ES (errored seconds) (Near end analysis)	none
ESRatio:ANALysis:NEND	805	ratio	ES ratio - near end analysis	%
SESCount:ANALysis:NEND	806	count	Number of SES (severely errored seconds) - near end analysis	none
SESRatio:ANALysis:NEND	807	ratio	SES ratio - near end analysis	%
BBECount:ANALysis:NEND	808	count	Number of BBE (background block errors) - near end analysis Note: This result is only available for G.826/G.828/G.829 and M.2101 measurements.	none
BBERatio:ANALysis:NEND	809	ratio	BBE ratio - near end analysis Note: This result is only available for G.826/G.828/G.829 and M.2101 measurements.	%
UASCount:ANALysis:NEND	810	count	Number of US (unavailable seconds) - near end analysis	none
UASRatio:ANALysis:NEND	811	ratio	US ratio - near end analysis	none
DMCount:ANALysis:NEND	812	count	Number of DM (degraded minute) - near end analysis Note: This result is only available for G.821 measurements.	none
DMRatio:ANALysis:NEND	813	ratio	DM ratio - near end analysis Note: This result is only available for G.821 measurements.	none

Table R-21 Result IDs for results of quality analysis (G.826, G.821, M21.00)

ID string	Response code	Response type	Response description	Unit
SEFSCount:ANALysis:NEND	814	count	Number of SEFS (severely errored framed seconds) - near end analysis Note: This result is only available for ANSI performance measurements.	none
SEFSRatio:ANALysis:NEND	815	ratio	SEFS ratio - near end analysis Note: This result is only available for ANSI performance measurements.	none
SEPCount:ANALysis:NEND	816	count	Number of SEP (severely errored period) - near end analysis Note: This result is only available for G.828 and M.2101 performance measurements.	none
SEPRatio:ANALysis:NEND	817	ratio	SEP ratio - near end analysis Note: This result is only available for G.828 and M.2101 performance measurements.	none
STATe:ANALysis:FEND	830	int	State of quality analysis - far end analysis 0: Rejected 1: Accepted 2: M.2100/M.2101 uncertain Note: This result is not available for G.829 and ANSI performance measurements.	none
EFSCount:ANALysis:FEND	831	count	Number of EFS (error free seconds) - far end analysis Note: This result is not available for G.821 measurements.	none
EFSRatio:ANALysis:FEND	832	ratio	EFS ratio - far end analysis Note: This result is not available for G.821 measurements.	%
EBCount:ANALysis:FEND	833	count	Number of EB (errored blocks) - far end analysis Note: This result is only available for G.826 measurements.	none
ESCount:ANALysis:FEND	834	count	Number of ES (errored seconds) - far end analysis Note: This result is not available for G.821 measurements.	none
ESRatio:ANALysis:FEND	835	ratio	ES ratio - far end analysis Note: This result is not available for G.821 measurements.	%

Table R-21 Result IDs for results of quality analysis (G.826, G.821, M21.00) *(continued)*

ID string	Response code	Response type	Response description	Unit
SESCount:ANALysis:FEND	836	count	Number of SES (severely errored seconds) - far end analysis Note: This result is not available for G.821 measurements.	none
SESRatio:ANALysis:FEND	837	ratio	SES ratio - far end analysis Note: This result is not available for G.821 measurements.	%
BBECount:ANALysis:FEND	838	count	Number of BBE (background block errors) - far end analysis Note: This result is only available for G.826/G.828/G.829 and M.2101 measurements.	none
BBERatio:ANALysis:FEND	839	ratio	BBE ratio - far end analysis Note: This result is only available for G.826/G.828/G.829 and M.2101 measurements.	%
UASCount:ANALysis:FEND	840	count	Number of US (unavailable seconds) - far end analysis Note: This result is not available for G.821 measurements.	none
UASRatio:ANALysis:FEND	841	ratio	US ratio - far end analysis	none
SEPCount:ANALysis:FEND	842	count	Number of SEP (severely errored period) - far end analysis Note: This result is not available for G.828 and M.2101 measurements.	none
SEPRatio:ANALysis:FEND	843	ratio	SEP ratio - far end analysis Note: This result is only available for G.828 and M.2101 measurements.	none
UASCount:ANALysis:PATH	860	count	Number of unavailable seconds - summary of far and near end analysis Note: This result is only available for G.826 measurements.	none

Table R-21 Result IDs for results of quality analysis (G.826, G.821, M21.00) *(continued)*

ID string	Response code	Response type	Response description	Unit
CSTatus:ATM	900	bit field[1]	Current status of ATM signal as a bit field (Alarm field “CSTatus:ATM”/ “HSTatus:ATM” on page R-277)	none
HSTatus:ATM	999	bit field	History status of ATM signal as a bit field (Alarm field “CSTatus:ATM”/ “HSTatus:ATM” on page R-277). This result provides all the alarms which were detected since the start of the last measurement	none
ECOunt:ATM:HCORrect	901	count	Correctable header error(s)	none
ERATio:ATM:HCORrect	902	ratio	Correctable header error rate = ECO:ATM:HCOR/ COUN:ATM:CELL	none
ACOunt:ATM:HCORrect	903	count	Correctable header error measurement alarm time	ms
ARATio:ATM:HCORrect	904	count	Correctable header error measurement alarm ratio	1/1000%
ECOunt:ATM:HUNCorrected	907	count	Uncorrectable header error(s)	none
1 These results are taken continuously and are not available using the [:SENS]:DATA:FIN? command.				
ERATio:ATM:HUNCorrected	908	ratio	Uncorrectable header error rate = ECO:ATM:HUNC/ COUN:ATM:CELL	none
ACOunt:ATM:HUNCorrected	909	count	Uncorrectable header error measurement alarm time	ms
ARATio:ATM:HUNCorrected	910	count	Uncorrectable header error measurement alarm ratio	1/1000%
COUNt:ATM:CELLs	921	count	All cells (not possible for ABT-20 devices)	none
COUNt:ATM:CLPCells	923	count	Cells marked with CLP=1 in test channel (not possible for ABT-20 devices)	none
CRATioATM:CLPCells	924	ratio	Ratio of cells marked with CLP=1 in test channel = COUN:ATM:CLPC/ COUN:ATM:FCEL (not possible for ABT-20 devices)	%
COUNt:ATM:FCELls	927	count	Filtered cells (test channel) (not possible for ABT-20 devices)	none
CRATioATM:FCELls	928	ratio	Filtered cells ratio (test channel) = COUN:ATM:FCEL/ COUN:ATM:FCELL (not possible for ABT-20 devices)	1/100%
COUNt:ATM:F4Cells	931	count	F4 OAM cells in test path (not possible for ABT-20 devices)	none

Table R-22 Result IDs for general ATM results

ID string	Response code	Response type	Response description	Unit
CRATioATM:F4Cells	932	ratio	F4 OAM cell ratio (test path) = COUN:ATM:F4C/ COUN:ATM:FCEL (not possible for ABT-20 devices)	%
COUNt:ATM:F5Cells	935	count	F5 OAM cells in test channel (not possible for ABT-20 devices)	none
CRATioATM:F5Cells	936	ratio	F5 OAM cell ratio (test channel) = COUN:ATM:F5C/ COUN:ATM:FCEL (not possible for ABT-20 devices)	%
COUNt:ATM:LCELls	939	count	Load cells (not possible for ABT-20 devices)	none
CRATio:ATM:LCELls	940	ratio	Load cell ratio = COUN:ATM:LCEL/ COUN:ATM:CELL (not possible for ABT-20 devices)	1/100%
COUNt:ATM:RPCR	943	count	Shortest cell distance (not possible for ABT-20 devices)	none

Table R-22 Result IDs for general ATM results *(continued)*

ID string	Response code	Response type	Response description	Unit
ECOunt:ATM:ERRCells	945	count	Errored cells (not possible for ABT-20 devices)	none
ERATio:ATM:ERRCells	946	ratio	Errored cell ratio = ECO:ATM:ERRC/ COUN:ATM:FCEL (not possible for ABT-20 devices)	none
ACOunt:ATM:ERRCells	947	count	Errored cell measurement alarm time (not possible for ABT-20 devices)	ms
ARATio:ATM:ERRCells	948	count	Errored cell measurement alarm ratio (not possible for ABT-20 devices)	1/1000%
ECOunt:ATM:LOSCells	951	count	Lost cells (not possible for ABT-20 devices)	none
ERATio:ATM:LOSCells	952	ratio	Cell loss ratio = ECO:ATM:LOSC/ COUN:ATM:FCEL (not possible for ABT-20 devices)	none
ACOunt:ATM:LOSCells	953	count	Lost cell measurement alarm time (not possible for ABT-20 devices)	ms
ARATio:ATM:LOSCells	954	count	Lost cell measurement alarm ratio (not possible for ABT-20 devices)	1/1000%
ECOunt:ATM:MISCells	957	count	Misinserted cells (not possible for ABT-20 devices)	none
ERATe:ATM:MISCells	958	ratio	Cell misinsertion rate = ECO:ATM:MISC/ measuring time (not possible for ABT-20 devices)	none
ACOunt:ATM:MISCells	959	count	Misinserted cell measurement alarm time (not possible for ABT-20 devices)	ms
ARATio:ATM:MISCells	960	count	Misinserted cell measurement alarm ratio (not possible for ABT-20 devices)	1/1000%
COUN:ATM:MCD	919	count	Mean cell transfer delay (not possible for ABT-20 devices)	ns
COUN:ATM:MNCD	988	count	Minimum cell transfer delay (not possible for ABT-20 devices)	ns
COUN:ATM:MxCD	990	count	Maximum cell transfer delay (not possible for ABT-20 devices)	ns
COUN:ATM:PCDV	992	count	Peak-to-peak 2 point CDV (cell delay variation) (not possible for ABT-20 devices)	ns

Table R-23 Result IDs for ATM performance analysis results

ID string	Response code	Response type	Response description	Unit
ECOunt:AAL1:CRCerror	976	count	AAL1 CRC error(s) (not possible for ABT-20 devices)	none
ERATio:AAL1:CRCerror	977	ratio	AAL1 CRC error rate = ECO:AAL1:CRC/ COUN:ATM:FCEL (not possible for ABT-20 devices)	none
ACOunt:AAL1:CRCerror	978	count	AAL1 CRC error measurement alarm time (not possible for ABT-20 devices)	ms
ARATio:AAL1:CRCerror	979	count	AAL1 CRC error measurement alarm ratio (not possible for ABT-20 devices)	1/1000%
ECOunt:AAL1:PERRor	982	count	AAL1 parity error(s) (not possible for ABT-20 devices)	none
ERATio:AAL1:PERRor	983	ratio	AAL1 parity error ratio = ECO:AAL1:PERR/ COUN:ATM:FCEL (not possible for ABT-20 devices)	none
ACOunt:AAL1:PERRor	984	count	AAL1 parity error measurement alarm time (not possible for ABT-20 devices)	ms
ARATio:AAL1:PERRor	985	count	AAL1 parity error measurement alarm ratio (not possible for ABT-20 devices)	1/1000%
ECOunt:AAL1:CLR	2200	count	AAL1 CRC lost cells (not possible for ABT-20 devices)	none
ERATio:AAL1:CLR	2201	ratio	AAL1 CRC cell loss ratio = ECO:AAL1:CLR/ COUN:ATM:FCEL (not possible for ABT-20 devices)	none
ACOunt:AAL1:CLR	2202	count	Alarm time (not possible for ABT-20 devices)	ms
ARATio:AAL1:CLR	2203	count	Alarm ratio (not possible for ABT-20 devices)	1/1000%
ECOunt:AAL1:CMR	2210	count	AAL1 misinserted cells (not possible for ABT-20 devices)	none

Table R-24 Result IDs for AAL1 results

ID string	Response code	Response type	Response description	Unit
ERATio:AAL1:CMR	2211	ratio	AAL1 cell misinsertion rate = ECO:AAL1:CMR/ COUN:ATM:FCEL (not possible for ABT-20 devices)	none
ACOunt:AAL1:CMR	2212	count	AAL1 misinserted cell measurement alarm time (not possible for ABT-20 devices)	ms
ARATio:AAL1:CMR	2213	count	AAL1 misinserted cell measurement alarm ratio (not possible for ABT-20 devices)	1/1000%

Table R-24 Result IDs for AAL1 results *(continued)*

ID string	Response code	Response type	Response description	Unit
ECOunt:PLCP:FAS	2000	count	PLCP FAS error(s)	none
ERATio:PLCP:FAS	2001	ratio	PLCP FAS error rate	none
COUNt:PLCP:FAS	2002	count	Number of PLCP FAS error events evaluated	none
ACOunt:PLCP:FAS	2003	count	PLCP FAS error measurement alarm time	ms
ARATio:PLCP:FAS	2004	count	PLCP FAS error measurement alarm ratio	1/1000%
ECOunt:PLCP:B1	2010	count	PLCP B1 bit error(s)	none
ERATio:PLCP:B1	2011	ratio	PLCP B1 bit error rate	none
COUNt:PLCP:B1	2012	count	Number of PLCP B1 bit error events evaluated	none
ACOunt:PLCP:B1	2013	count	PLCP B1 bit error measurement alarm time	ms
ARATio:PLCP:B1	2014	count	PLCP B1 bit error measurement alarm ratio	1/1000%
ECOunt:PLCP:FEBE	2020	count	PLCP FEBE (far end bit error(s))	none
ERATio:PLCP:FEBE	2021	ratio	PLCP FEBE error rate	none
COUNt:PLCP:FEBE	2022	count	Number of PLCP FEBE error events evaluated	none
ACOunt:PLCP:FEBE	2023	count	PLCP FEBE error measurement alarm time	ms
ARATio:PLCP:FEBE	2024	count	PLCP FEBE error measurement alarm ratio	1/1000%

Table R-25 Result IDs for PLCP results

ID string	Response code	Response type	Response description	Unit
COUNt:ATM:LCDS	2300	count	Number of seconds with LOCD (Loss of Cell Delineation) alarm. Note: This result requires option 90.80 and [:SENS]:DATA[:TEL]:ATM:SENS on page R-322 and :SOUR:DATA[:TEL]:ATM:SOUR on page R-76 set to EXTernal	s
COUNt:ATM:TRANsition: BANDwith	2301	count	Transition bandwith. Note: This result requires option 90.80 and [:SENS]:DATA[:TEL]:ATM:SENS on page R-322 and :SOUR:DATA[:TEL]:ATM:SOUR on page R-76 set to EXTernal	Bps

Table R-26 Result IDs for special ATM results (requiring option 90.80)

[:SENS]:FUNC:EVEN[:OFF]

[:SENSe]:FUNCtion:EVENt:OFF <id>{[, <id>]}* deletes one or more event elements from the list of additional events to be determined.

Parameter
For the entire list of events, see [:SENS]:FUNC:EVEN[:ON] on page R-405.

Name	Type	Range	Default
id	string	e.g. “AEV:SDH:RST”	none

Dependencies
None

Example
:FUNC:EVEN:OFF “AEV:SDH:RST” RS-TIM events are not to be determined.

Related commands
[:SENS]:FUNC:EVEN:OFF:ALL on page R-404
[:SENS]:FUNC:EVEN[:ON] on page R-405
[:SENS]:DATA:EVEN? on page R-266

[:SENS]:FUNC:EVEN:OFF:ALL

[:SENSe]:FUNCtion:EVENt:OFF:ALL deletes all event elements from the list of events to be entered into event memory.

Parameter
None

Dependencies
None

Comments
There is no query for this command.

Example
:FUNC:EVEN:OFF:ALL deletes the entire list.

Related commands
[:SENS]:DATA:EVEN? on page R-266
[:SENS]:FUNC[:ON] on page R-381
[:SENS]:FUNC:EVEN[:OFF] on page R-404

[:SENS]:FUNC:EVEN[:ON]

[:SENSe]:FUNCtion:EVENt[:ON] <id>{[, <id>]}* determines the selection of additional alarms to be detected or of special evaluations (e.g. overhead capture). Additional alarms / evaluations that need a lot of computing power can be selected by configuration using this command so that the desired alarms are recognized.

For the entire list of events see Codes for the event memory on page R-268

Note: The ID strings listed below show the ID names in a long form. This simplifies understanding of the command syntax.
The device only accepts SCPI **short form upper case (capital letter)** commands to speed up the response time of the device (e.g. “CSTATUS:SIGNAL” is not accepted, use “CST:SIGN” instead).
The SCPI short form is indicated by the capital letters in the commands below.

ID string	Event name
AEVent:SDH:RSTim	SDH Regenerator Section Trace Identifier Mismatch. Activating this event also enables RS-Trace data capture :FETC:STR[:DATA][:TEL][:SDH]:RSTR? on page R-431
AEVent:SDH:HPTim	SDH High Path Trace Identifier Mismatch (STS Path). Activating this event also enables HP-Trace data capture :FETC:STR[:DATA][:TEL][:SDH]:HPTR? on page R-429
AEVent:SDH:HPPLm	SDH High Path Path Label Mismatch (STS Path)
AEVent:SDH :TRIButary:LPTim	SDH TU Low Path Trace Identifier Mismatch. (VT Path) Activating this event also enables LP-Trace data capture :FETC:STR[:DATA][:TEL][:SDH]:LPTR? on page R-430
AEVent:SDH :TRIButary:LPPLm	SDH TU Low Path Path Label Mismatch SONET VT Path Path Label Mismatch
AEVent:PDH:G832: TRACe	G.832 Trace Identifier Mismatch (TR byte). Activating this event also enables trace data capture :FETC:STR[:DATA][:TEL]:PDH:TRAC? on page R-428
MEASurement:SDH :OVERhead:CAPTure	Enables extended overhead analysis controlled by the TRIGGER 2 subsystem on page R-27 ff.
MEASurement:SDH :OVERhead :TCMonitoring	Enables Tandem Connection Monitoring.

Dependencies None

Comments The events are stored in the event memory in each case with a time-stamp documenting their occurrence. Where alarms alternate, the beginning and the end of an alarm are two distinct events.

Example :FUNC:EVEN “AEV:SDH:TRIB:LPPL”,“AEV:SDH:TRIB:LPT”
activates evaluation of low path TIM and PLM alarms.

Related commands [:SENS]:DATA:EVEN? on page R-266

[:SENS]:FUNC:EVEN[:ON]?

[:SENSe]:FUNCtion:EVENt[:ON]? provides the list of all the (additional) events currently selected.

Example
:FUNC:EVEN?
Response: “AEV:SDH:RST”,“AEV:SDH:HPT”

[:SENS]:MODE

[:SENSe]:MODE <mode> sets the mode of the receiver.

Parameter

Name	Type	Range	Default
mode	discrete	SDH | PDH	PDH

Dependencies None

Comments
SDH: The receiver receives an SDH or **SONET** signal as set by [:SENS]:DATA[:TEL]:SDH on page R-352 ff.
PDH: The receiver receives a PDH signal as set by [:SENS]:DATA[:TEL]:PDH on page R-330 ff. (e.g. a 2 Mbit/s or a DS1 signal).

Example
:MODE PDH activates receiver PDH mode.

Related commands
[:SENS]:DATA[:TEL]:SDH on page R-352 ff.
[:SENS]:DATA[:TEL]:PDH on page R-330 ff.

[:SENS]:MODE?

[:SENSe]:MODE? provides the current mode of the receiver.

Example
:MODE?
Response: SDH if receiver SDH or SONET mode is activated.

[:SENS]:SWE

[:SENSe]:SWEep commands determine the type and duration of the measurement to be performed. Measurements are started using the TRIGGER 1 subsystem on page R-23 ff.

[:SENS]:SWE:ITIM

[:SENSe]:SWEep:ITIMe <duration><suffix> determines the duration of the intermediate measurement intervals (all results ending in ":INTermediate" --> see Result IDs for :SENS:DATA and :SENS:FUNC commands on page R-382).

Parameter

Name	Type	Range	Default
duration	numeric	1 - 60	10
suffix	discrete	[s] | min	s

Dependencies
The intermediate interval duration must be less than or equal to the measurement interval (see also [:SENS]:SWE:TIME on page R-408).

Comments
<suffix> = s Seconds (default)
<suffix> = min Minutes
Intermediate intervals can range from 1 second to 60 minutes.

Example
:SWE:ITIM 1 min
Intermediate measurement interval of 1 minute.
:SWE:ITIM 30
Intermediate measurement interval of 30 seconds.

Related commands
[:SENS]:SWE:TIME on page R-408

[:SENS]:SWE:ITIM?

[:SENSe]:SWEep:ITIMe? provides the current setting of the interval duration for intermediate results in seconds.

Example
:SWE:ITIM?
Response: 180 180 seconds measurement interval duration (= 3 minutes).

[:SENS]:SWE:TIME

[:SENSe]:SWEep:TIME <duration><suffix> determines the duration of a measurement.

Parameter

Name	Type	Range	Default
duration	numeric	1 - 99	1
suffix	discrete	[s] | min | hr | d	hr

Dependencies None

Comments
<suffix> = s Seconds (default)
<suffix> = min Minutes
<suffix> = hr Hours
<suffix> = d Days
Measurement intervals can range from 1 second to 99 days.

Example :SWE:TIME 1 d measurement interval of 1 day

Related commands
[:SENS]:SWE:ITIM on page R-407
TRIGGER 1 subsystem on page R-23 ff.

[:SENS]:SWE:TIME?

[:SENSe]:SWEep:TIME? provides the current setting of the measurement duration in seconds.

Example
:SWE:TIME?
Response: 180 180 seconds measurement interval duration (= 3 minutes).

11 FETCH subsystem

Note: For clarity, options are shown in abbreviated form in this chapter, e.g. “**90.xx**” instead of “**BN 3035/90.xx**”.

This subsystem is used in querying results from “snapshot” data which were extracted from the measurement data stream. The results are refreshed every 100 ms.

:FETC[:ARR][:DATA][:TEL]:HIST:ATM:CTD?

:FETCh[:ARRay][:DATA][:TELecom]:HISTogramm:ATM:CTD? provides the histogram for the cell transfer delay of the filtered cells.(No snapshot, but cumulated values since :INIT[1][:IMM][:ALL] on page R-23)

Parameter

None

Dependencies

Valid results are only available if a measurement was previously initiated (:INIT[1][:IMM][:ALL] on page R-23)
(not valid for ABT-20 devices).

Comments

Offset is set by [:SENS]:DATA[:TEL]:ATM:ANAL:CTD:OFFS on page R-316
Class width is set by [:SENS]:DATA[:TEL]:ATM:ANAL:CTD:RES on page R-317
Number of classes: 128
Class resolution:
class0: # of cells with transfer delay < offset + class width
class1: # of cells with
offset +class width < transfer delay < offset + 2* class width
class2: # of cells with
offset + 2*class width < transfer delay < offset + 3* class width
...
class100: # of cells with transfer delay > offset + 127* class width
Each class provides a long value (32 bit).

Example

:FETC[:ARR][:DATA][:TEL]:HIST:ATM:CTD?
Response: List of 128 NR1 values structured as described below.

Response

Name	Type	Range	Unit
<class0>	numeric	0 - 4.29 E9	none
<class1>	numeric	0 - 4.29 E9	none
…	numeric	0 - 4.29 E9	none
<class127>	numeric	0 - 4.29 E9	none

:FETC[:ARR][:DATA][:TEL]:HIST:ATM:FCEL[:BITRate]?

:FETCh[:ARRay][:DATA][:TELecom]:HISTogramm:ATM:FCELls[:BITRate]? provides the histogram for the bit rate of the filtered cells (no snapshot, but cumulated values since :INIT[1][:IMM][:ALL] on page R-23).

Parameter None

Dependencies Valid results are only available if a measurement was previously initiated (:INIT[1][:IMM][:ALL] on page R-23)
(not valid for ABT-20 devices).

Comments
Number of classes: 101
Class resolution: 1%
class0: # of 100 ms intervals with no load
class1: # of 100 ms intervals with load ≤ 1%
class2: # of 100 ms intervals with 1% < load ≤ 2%
...
class100: # of 100 ms intervals with 99% < load ≤ 100%

Each class provides a long value (32 bit).
Class 0 contains the areas without load.

Example :FETC[:ARR][:DATA][:TEL]:HIST:ATM:FCEL[:BITRate]?
Response: List of 101 NR1 values structured as described below.

Response

Name	Type	Range	Unit
<class0>	numeric	0 - 4.29 E9	none
<class1>	numeric	0 - 4.29 E9	none
…	numeric	0 - 4.29 E9	none
<class100>	numeric	0 - 4.29 E9	none

:FETC[:ARR][:DATA][:TEL]:HIST:ATM:LCEL[:BITRate]?

:FETCh[:ARRay][:DATA][:TELecom]:HISTogramm:ATM:FCELls[:BITRate]? provides the histogram for the bit rate of the user cells. (No snapshot, but cumulated values since :INIT[1][:IMM][:ALL] on page R-23)

Dependencies

Valid results are only available if a measurement was previously initiated (:INIT[1][:IMM][:ALL] on page R-23)
(not valid for ABT-20 devices).

Comments

Number of classes: 101
Class resolution:
class0: # of 100 ms intervals with no load
class1: # of 100 ms intervals with load ≤ 1%
class2: # of 100 ms intervals with 1% < load ≤ 2%
…
class100: # of 100 ms intervals with 99% < load ≤ 100%.
Each class provides a long value (32 bit).
Class 0 contains the areas without load.

Example

:FETC[:ARR][:DATA][:TEL]:HIST:ATM:LCEL[:BITRate]?
Response: List of 101 NR1 values structured as described below.

Response

Name	Type	Range	Unit
<class0>	numeric	0 - 4.29 E9	none
<class1>	numeric	0 - 4.29 E9	none
…	numeric	0 - 4.29 E9	none
<class100>	numeric	0 - 4.29 E9	none

:FETC[:ARR][:DATA][:TEL]:PDH:BITS?

:FETCh[:ARRay][:DATA][:TELecom]:PDH:BITS? supplies an array with the PDH signaling and alarm bits.

Parameter None

Response

Name	Type	Range	Unit
<DNYY>	numeric	0 - 15	none
<DN>	numeric	0 - 3	none
<DN>	numeric	0 - 3	none
<ASSSSS>	numeric	0 - 63	none

Dependencies Works only if the DEMUX option (90.31 or 90.32) is available.

Comments Response name:
<DNYY>: DNYY bits of the PDH 140 Mbit/s signal
<DN>: DN bits of the PDH 34 Mbit/s signal
<DN>: DN bits of the PDH 8 Mbit/s signal
<ASSSSS>: A,Sa4,Sa5,Sa6,Sa7,Sa8 bits of the PDH 2 Mbit/s signal
The values supplied for the PDH bits are taken as a “snapshot” from the received signal and refreshed every 100ms.
If some or all values cannot be provided, e.g. because there is no PDH 140 Mbit/s in the received signal, the respective result is set to invalid (NAN).

Example :FETC:PDH:BITS?
Response: 7,1,1,31

Related commands :FETC:SCAL[:DATA][:TEL]:PDH:M2:SBIT? on page R-423

:FETC[:ARR][:DATA][:TEL]:PDH:OVER?

:FETCh[:ARRay][:DATA][:TELecom]:PDH:OVERhead? supplies the G.832 overhead.

Parameter None

Response For the bit rate 34 Mbit/s:

Name	Type	Range	Unit
<FA1>	numeric	0 - 255	none
<FA2>	numeric	0 - 255	none
<EM>	numeric	0 - 255	none
<TR>	numeric	0 - 255	none
<MA>	numeric	0 - 255	none
<NR>	numeric	0 - 255	none
<GC>	numeric	0 - 255	none

Response For the bit rate 140 Mbit/s:

Name	Type	Range	Unit
<FA1>	numeric	0 - 255	none
<FA2>	numeric	0 - 255	none
<EM>	numeric	0 - 255	none
<TR>	numeric	0 - 255	none
<MA>	numeric	0 - 255	none
<NR>	numeric	0 - 255	none
<GC>	numeric	0 - 255	none
<P1>	numeric	0 - 255	none
<P2>	numeric	0 - 255	none

Comments The content of the bytes in the active measurement channel is taken as a “snapshot” from the received signal and refreshed every 100 ms.
If the overhead data is not available for any reason, a single NAN (9,91E37) is returned.

Example :FETC:PDH:OVER?
Response: 246,40,138,69,16,0,0 at 34 Mbit/s

Related commands :FETC[:ARR][:DATA][:TEL][:SDH]:OVER? on page R-414
:FETC[:ARR][:DATA][:TEL][:SDH]:POV? on page R-421

:FETC[:ARR][:DATA][:TEL][:SDH]:OVER?

:FETCh[:ARRay][:DATA][:TELecom][:SDH]:OVERhead? supplies the SDH section or transport overhead (SOH/TOH).

Parameter None

Response

Name	Type	Range	Unit
<byte>	numeric	0 - 255	none
<nextbyte>	numeric	0 - 255	none
…	numeric	0 - 255	none
<lastbyte>	numeric	0 - 255	none

Dependencies None

Comments

Number of supplied bytes as a function of the received signal:

STM-64/OC192 signal: 81 bytes SOH/TOH number 1 (output line-by-line)
A1,A1,A1,A2,A2,A2,C1, …

STM-16/OC48 signal: 81 bytes SOH/TOH number 1 (output line-by-line)
A1,A1,A1,A2,A2,A2,C1, …

STM-4/OC12 signal: 324 bytes SOH/TOH (output line-by-line)
A1,A1,A1,A1,A1,A1,A1,A1,A1,A1,A1,A1,A2,A2,A2,A2, …

STM-1/OC3 signal: 81 bytes SOH/TOH (output line-by-line)
A1,A1,A1,A2,A2,A2,C1, …

STM-0/OC1 signal: 27 bytes SOH (output line-by-line)
A1,A2,C1, …

The content of the bytes in the active measurement channel is taken as a “snapshot” from the received signal and refreshed every 100 ms.
If the overhead data is not available for any reason, a single NAN (9,91E37) is returned.

Note: For STM64/OC192 signals:
Only the first (SOH/TOH #1) can be taken. SOH/TOH #2-#64 are not available.
For STM16/OC48 signals:
Only the first (SOH/TOH #1) can be taken. SOH/TOH #2-#16 are not available.
Bytes A1, A2, B1, B2, H1, H2, H3, Y are not sampled and are always set to 0.

Example

:FETC:OVER?
Response: List of 81 bytes in the form 246, 246, 246, 40, 40, 40, 0, 128, … up to the 81st byte of the SOH (for STM-1 signal).

Related commands

:FETC[:ARR][:DATA][:TEL][:SDH]:POV? on page R-421
:FETC[:ARR][:DATA][:TEL][:SDH]:TRIB:POV? on page R-422
:FETC[:ARR][:DATA][:TEL][:SDH]:OVER:PART[i]? on page R-415
:FETC[:ARR][:DATA][:TEL][:SDH]:OVER:CPARt[i]? on page R-416
:FETC:SCAL[:DATA][:TEL][:SDH]:OVER? on page R-423
:FETC:SCAL[:DATA][:TEL][:SDH]:OVER:PART[i]? on page R-425
:FETC:SCAL[:DATA][:TEL][:SDH]:OVER:CPARt[i]? on page R-426

:FETC[:ARR][:DATA][:TEL][:SDH]:OVER:PART[i]?

:FETCh[:ARRay][:DATA][:TELecom][:SDH]:OVERhead:PART[i]? supplies the SDH section or transport overhead (SOH/TOH) of STM-16/OC48 or STM64/OC192 signals. The numerical suffix i selects SOH/TOH # i. Options 91.53, 91.54 or 91.59 are required for STM16c/OC48c. Options 91.40 or 91.42 are required for STM64/OC192.

Parameter

None

Response

Name	Type	Range	Unit
<byte>	numeric	0 - 255	none
<nextbyte>	numeric	0 - 255	none
…	numeric	0 - 255	none
<lastbyte>	numeric	0 - 255	none

Dependencies

None

Comments

Number of supplied bytes as a function of the received signal:

STM-64/OC192 signal: SOH/TOH #1 - #64 (64 x 81 byte = 5184 byte).
81 bytes for each SOH/TOH (output line-by-line).
A1,A1,A1,A2,A2,A2,C1, …

STM-16/OC48 signal: SOH/TOH #1 - #16 (16 x 81 byte = 1296 byte).
81 bytes for each SOH/TOH (output line-by-line).
A1,A1,A1,A2,A2,A2,C1, …

The content of the bytes in each SOH/TOH is taken as a “snapshot” from the received signal and refreshed every 100 ms.
If the overhead data is not available for any reason, a single NAN (9.91E37) is returned.

Example

:FETC:OVER:PART?
Response: List of 81 bytes in the form 246, 246, 246, 40, 40, 40, 0, 128, … up to the 81st byte of the SOH/TOH #1.
:FETC:OVER:PART5?
Response: List of 81 bytes in the form 246, 246, 246, 40, 40, 40, 0, 128, … up to the 81st byte of the SOH/TOH #5.

Related commands

:FETC[:ARR][:DATA][:TEL][:SDH]:OVER? on page R-414
:FETC[:ARR][:DATA][:TEL][:SDH]:OVER:CPARt[i]? on page R-416
:FETC[:ARR][:DATA][:TEL][:SDH]:POV? on page R-421
:FETC[:ARR][:DATA][:TEL][:SDH]:TRIB:POV? on page R-422
:FETC:SCAL[:DATA][:TEL][:SDH]:OVER? on page R-423
:FETC:SCAL[:DATA][:TEL][:SDH]:OVER:PART[i]? on page R-425
:FETC:SCAL[:DATA][:TEL][:SDH]:OVER:CPARt[i]? on page R-426

:FETC[:ARR][:DATA][:TEL][:SDH]:OVER:CPARt[i]?

:FETCh[:ARRay][:DATA][:TELecom][:SDH]:OVERhead:CapturedPARt[i]? supplies a complete homogeneous SDH section or transport overhead (SOH/TOH) from STM-16/OC48 or STM-64/OC192 signals. The numerical suffix i selects SOH/TOH # i. Options 91.53, 91.54 or 91.59 are required for STM16c/OC48c. Options 91.40 or 91.42 are r equired for STM64/OC192.

Parameter None

Response

Name	Type	Range	Unit
<byte>	numeric	0 - 255	none
<nextbyte>	numeric	0 - 255	none
…	numeric	0 - 255	none
<lastbyte>	numeric	0 - 255	none

Dependencies None

Comments

Number of supplied bytes as a function of the received signal:

STM-64/OC192 signal: SOH/TOH #1 - #64 (64 x 81 byte = 5184 byte).
81 bytes for each SOH/TOH (output line-by-line).
A1,A1,A1,A2,A2,A2,C1, …
All SOH/TOH #1 - #64 bytes are part of the same frame.

STM-16/OC48 signal: SOH/TOH #1 - #16 (16 x 81 byte = 1296 byte).
81 bytes for each SOH/TOH (output line-by-line).
A1,A1,A1,A2,A2,A2,C1, …
All SOH/TOH #1 - #16 bytes are part of the same frame.

The content of the bytes in each SOH/TOH is taken as a “snapshot” from the received signal. The content is refreshed with :INIT3[:IMM][:ALL] on page R-33. If the overhead data is not available for any reason, a single NAN (9.91E37) is returned.

Note: Use :INIT3[:IMM][:ALL] on page R-33 to start the capture process.

Example

:FETC:OVER:CPAR?
Response: List of 81 bytes in the form 246, 246, 246, 40, 40, 40, 0, 128, … up to the 81st byte of the SOH/TOH #1.
:FETC:OVER:CPAR12?
Response: List of 81 bytes in the form 246, 246, 246, 40, 40, 40, 0, 128, … up to the 81st byte of the SOH/TOH #12.

Related commands

:INIT3[:IMM][:ALL] on page R-33
:ABOR3 on page R-33
:FETC[:ARR][:DATA][:TEL][:SDH]:OVER? on page R-414
:FETC[:ARR][:DATA][:TEL][:SDH]:OVER:PART[i]? on page R-415
:FETC[:ARR][:DATA][:TEL][:SDH]:POV? on page R-421
:FETC[:ARR][:DATA][:TEL][:SDH]:TRIB:POV? on page R-422
:FETC:SCAL[:DATA][:TEL][:SDH]:OVER? on page R-423
:FETC:SCAL[:DATA][:TEL][:SDH]:OVER:PART[i]? on page R-425
:FETC:SCAL[:DATA][:TEL][:SDH]:OVER:CPARt[i]? on page R-426

:FETC[:ARR][:DATA][:TEL][:SDH]:OVER:CAPT?

:FETCh[:ARRay][:DATA][:TELecom][:SDH]:OVERhead:CAPTure? <number> reads the “number” of accumulated events from the SDH/SONET SOH/TOH overhead capture FIFO buffer.

Parameter

Name	Type	Range	Default
number	numeric	1 - 200	1

Dependencies

FIFO entries are only available if a capture measurement was previously initiated (see also TRIGGER 2 subsystem on page R-27 ff.).
The FIFO can contain more entries (>200) than it is possible to read with a single query. If so, multiple queries are needed to read the entire FIFO contents.

Comments

After a capture measurement is initiated, all events and state transitions for the selected byte detected in the measurement are stored in the capture FIFO.
These events are stored in an event FIFO (First In First Out), where they can be extracted with this command.
The data are extracted as in a normal FIFO structure, i.e. the oldest entry first, then the second oldest, etc.
The FIFO content is cleared by initiating a new capture measurement or by a *RST command.

If at least one event entry is available, bit 7 of the :STAT:SEQ register is set (see also :STAT:SEQ register on page R-18 ff.)

Response

Each entry in the FIFO has the following structure:

Response name	Response type
response code	numeric (the response code)
value	numerical value

The following response codes are defined:

Name	**Response code**	**Response type**	**Event description**
NOEVent	0	count = 0	No event available
Time stamp	10	count	Time stamp of events in milliseconds since 1/1/1970
Capture gate	1020	count	State indication for the capture gate. 1: gate opened (capture running) 0: gate closed (capture stopped)
Capture alarm event	1021	bit field	Identification of the alarms that occurred according to the table below
Frame count	1022	count	Frame count (e.g. for STM-1 8000 frames/second) since the last event.
Byte value	1023	count	New value of captured byte(s)

Table R-27 Event IDs for the capture FIFO

The bit field for the capture alarm event indicates any alarms that occurred during the capture measurement. The alarms are binary encoded in a bit field according to the following table:

Bit position	**Alarm name**
0 (LSB)	LOS: Loss of Signal
1	LOF: Loss of Frame
2	OOF: Out of Frame
3	AU-LOP: Administrative Unit Loss of Pointer. LOP-P Path LOP
4	TU-LOP: Tributary Unit Loss of Pointer. LOP-V VT Path LOP
5 to 31 (MSB)	reserved

Table R-28 Capture alarm bit field

FIFO data structure

The following overview gives a typical FIFO content for a capture measurement:

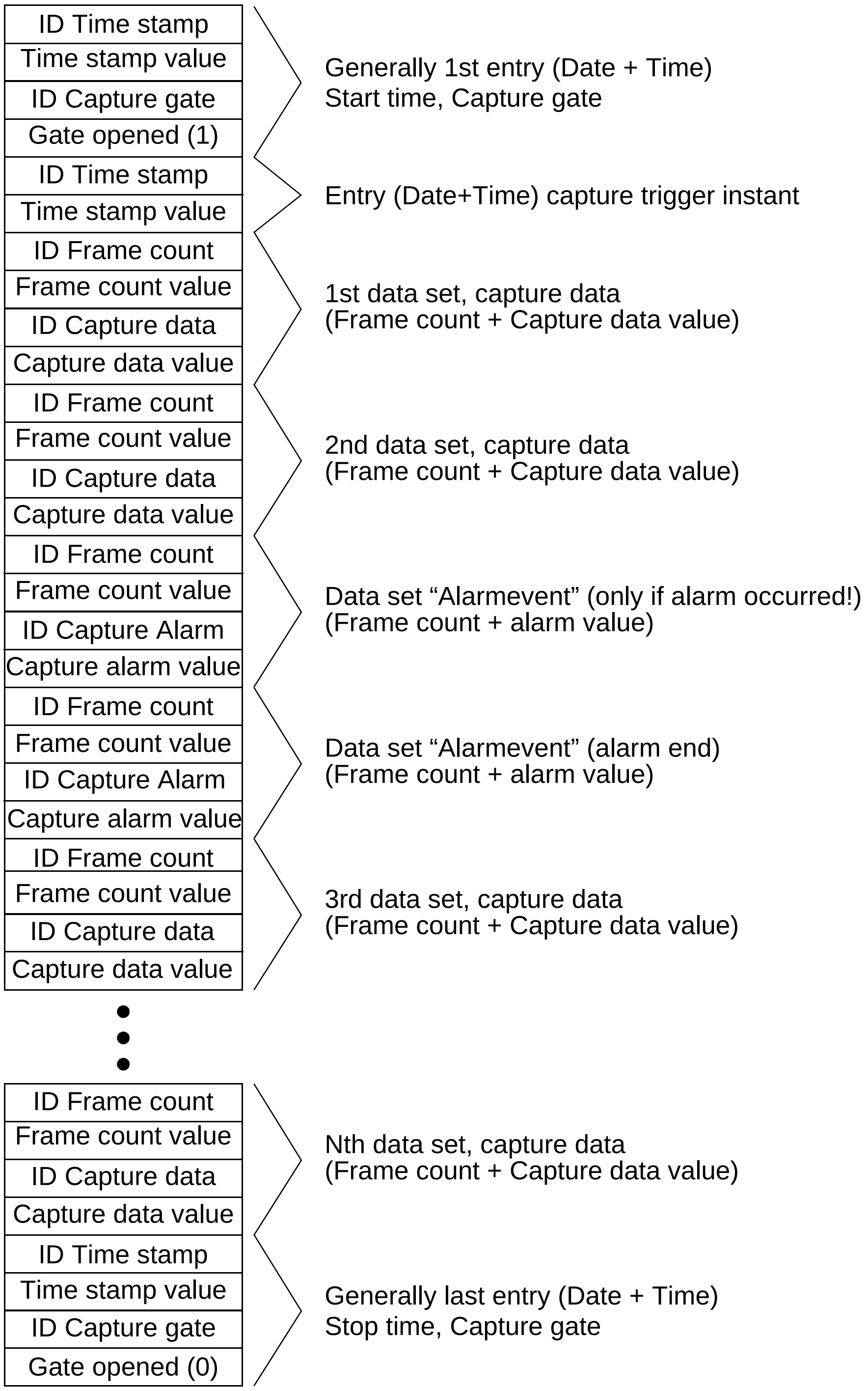


Fig. R-15 FIFO data structure

Example	:FETC:OVER:CAPT? 20	supplies up to 20 events out of the capture FIFO.

Response:
10,0.5268700E7,1020,1,10,0.5272700E7,1022,0,1023,255,1022,8000,1023,254,10,0.5272700E7,1020,0,0,0

meaning:

10	ID Time stamp (measurement start time)
0.5268700E7	ms since 1970/1/1
1020	ID Capture gate
1	gate opened (trigger reached)
10	ID Time stamp (trigger time)
0.5272700E7	ms since 1970/1/1
1022	ID Frame count
0	frame count since trigger time (0 frames)
1023	ID Byte value
255	1 st. captured byte value (255 = FF HEX)
1022	ID Frame count
8000	frame count since trigger time (8000 frames)
1023	ID Byte value
254	2 nd. captured byte value (254 = FE HEX)
10	ID Time stamp (measurement stop time)
0.5282700E7	ms since 1970/1/1
1020	ID Capture gate
0	gate closed (measurement aborted)
0	ID NOEVent (no more data available)
0	No data flag

Related commands
:FETC[:ARR][:DATA][:TEL][:SDH]:OVER:CAPT:NUMB? on page R-420
TRIGGER 2 subsystem on page R-27 ff.

:FETC[:ARR][:DATA][:TEL][:SDH]:OVER:CAPT:NUMB?

:FETCh[:ARRay][:DATA][:TELecom][:SDH]:OVERhead:CAPTure:NUMBer?
supplies the number of events available in the SDH/SONET SOH/TOH overhead capture FIFO buffer.

Parameter None

Example :FETC:OVER:CAPT:NUMB?
Response: 88 for 88 available events.

Related commands
:FETC[:ARR][:DATA][:TEL][:SDH]:OVER:CAPT:NUMB? on page R-420
TRIGGER 2 subsystem on page R-27 ff.

:FETC[:ARR][:DATA][:TEL][:SDH]:POV?

:FETCh[:ARRay][:DATA][:TELecom][:SDH]:POVerhead? supplies the VC-4/VC-3 high path overhead (POH) (STS1SPE POH).

Parameter

None

Response

Name	Type	Range	Unit
<J1>	numeric	0 - 255	none
<B3>	numeric	0 - 255	none
<C2>	numeric	0 - 255	none
<G1>	numeric	0 - 255	none
<F2>	numeric	0 - 255	none
<H4>	numeric	0 - 255	none
<F3>	numeric	0 - 255	none
<K3>	numeric	0 - 255	none
<N1>	numeric	0 - 255	none

Dependencies

The POH is always taken from the current measurement channel!

Comments

The complete high path POH is output.
The VC-4 POH is supplied for SDH mapping with VC-4 in the high order path.
The VC-3 POH is supplied for SDH mapping with VC-3 in the high order path.
The STS1SPE POH is supplied for SONET signals with STS1 mapping.
The STS3C POH is supplied for SONET signals with STS3C mapping.
With STM4C/OC12C virtual concatenation, there are 4 POHs that belong together. In this case, all 4 POHs (4 x 9 = 36 bytes) taken from the same SDH/SONET frame are supplied, i.e. the 9 bytes from the 1st. POH first, followed by the 2nd. 9 bytes and so on.

The content of the bytes in the active measurement channel is taken as a “snapshot” from the received signal and refreshed every 100 ms.
If the overhead data is not available for any reason, a single NAN (9,91E37) is returned.

Example

:FETC:POV?
Response:
00,15,254,0,0,255,0,0,0

For virtual concatenation:
FETC:POV?
Response:

0,15,2,0,0,255,0,0,0,	POH #1
0,7,2,0,0,255,0,0,0,	POH #2
0,127,2,0,0,255,0,0,0,	POH #3
0,235,2,0,0,255,0,0,0	POH #4

Related commands

:FETC[:ARR][:DATA][:TEL][:SDH]:OVER? on page R-414
:FETC[:ARR][:DATA][:TEL][:SDH]:TRIB:POV? on page R-422

:FETC[:ARR][:DATA][:TEL][:SDH]:TRIB:POV?

:FETCh[:ARRay][:DATA][:TELecom][:SDH]:TRIButary:POVerhead? supplies the tributary low order path overhead (POH). In VC-12/11 and VT1.5/VT2 mapping, these are the V5/J2/Z6/K4 bytes.

Parameter None

Response For the VC-12/11/2 mapping:

Name	Type	Range	Unit
<V5>	numeric	0 - 255	none
<J2>	numeric	0 - 255	none
<N2>	numeric	0 - 255	none
<K4>	numeric	0 - 255	none

Response For VC-3 mapping:

Name	Type	Range	Unit
<J1>	numeric	0 - 255	none
<B3>	numeric	0 - 255	none
<C2>	numeric	0 - 255	none
<G1>	numeric	0 - 255	none
<F2>	numeric	0 - 255	none
<H4>	numeric	0 - 255	none
<F3>	numeric	0 - 255	none
<K3>	numeric	0 - 255	none
<N1>	numeric	0 - 255	none

Dependencies The POH is always taken from the current measurement channel!

Comments The content of the bytes in the active measurement channel is taken as a “snapshot” from the received signal and refreshed every 100 ms.
If the overhead data is not available for any reason, a single NAN (9,91E37) is returned.

Example :FETC:TRIB:POV?
Response: 2,0,0,0

Related commands :FETC[:ARR][:DATA][:TEL][:SDH]:OVER? on page R-414
:FETC[:ARR][:DATA][:TEL][:SDH]:POV? on page R-421

:FETC:SCAL[:DATA][:TEL]:PDH:M2:SBIT?

:FETCh:SCALar[:DATA][:TELecom]:PDH:M2:SBIT? supplies a signaling sequence in one of the Sa4 to Sa8 bits of the 2 Mbit/s PDH signal.

Parameter None

Response

Name	Type	Range	Unit
<sequence>	numeric	0 - 255	none

Dependencies
Only valid if [:SENS]:DATA[:TEL]:PDH:FRAM = FRAM
and if [:SENS]:DATA[:TEL]:PDH:RATE <output rate> = M2 | K64.
Works only if the DEMUX option 90.31 or 90.32 is available.

Comments
The result is supplied as a numeric 8 bit value which contains the sequence determined. For example, a result of 130 (= #B10000010) corresponds to a sequence of 10000010 determined in the Sa bit selected with [:SENS]:DATA[:TEL]:PDH:M2:SEQ on page R-337.
The supplied Sa sequence is taken as a “snapshot” from the received signal and refreshed every 100 ms.
If the result cannot be determined, e.g. because there is no PDH 2 Mbit/s in the received signal, the result is set to invalid (NAN).

Example
:FETC:SCAL:PDH:M2:SBIT?
Response: 255

Related commands
:FETC[:ARR][:DATA][:TEL]:PDH:BITS? on page R-412
[:SENS]:DATA[:TEL]:PDH:M2:SEQ on page R-337

:FETC:SCAL[:DATA][:TEL][:SDH]:OVER?

:FETCh:SCALar[:DATA][:TELecom][:SDH]:OVERhead? <position1> [, <position2> [<position3>, ... <position16>]] supplies the current values of the SOH bytes selected by <position>.

Parameter

Name	Type	Range	Default
position1	numeric	1 - 324 (see comments)	none
[position2]	numeric	1 - 324 (see comments)	none
...		1 - 324 (see comments)	none
[position16]	numeric	1 - 324 (see comments)	none

Response

Name	Type	Range	Unit
<byte>	numeric	0 - 255	none
<nextbyte>	numeric	0 - 255	none
…	numeric	0 - 255	none
<lastbyte>	numeric	0 - 255	none

Dependencies None

Comments

Signal Structure	Position Range	Overhead byte order in the received signal
STM-64/OC192 signal	1 - 81	81 bytes SOH/TOH number 1 (output line-by-line) A1,A1,A1,A2,A2,A2,C1, …
STM-16/OC48 signal	1 - 81	81 bytes SOH/TOH number 1 (output line-by-line) A1,A1,A1,A2,A2,A2,C1, …
STM-4/OC12 signal	1 - 324	324 bytes SOH/TOH (output line-by-line) A1,A1,A1,A1,A1,A1,A1,A1,A1,A1,A1,A1,A2, A2,A2,A2, …
STM-1/OC3 signal	1 - 81	81 bytes SOH/TOH (output line-by-line) A1,A1,A1,A2,A2,A2,C1, …
STM-0/OC1 signal	1 - 27	27 bytes TOH (output line-by-line) A1,A2,C1, …

The content of the bytes in the active measurement channel is taken as a “snapshot” from the received signal and refreshed every 100 ms.
If the overhead data is not available for any reason, a NAN (9,91E37) is returned.

Note: For STM64/OC192 signals:
Only the first (SOH/TOH #1) can be taken. SOH/TOH #2-#64 are not available.
For STM16/OC48 signals:
Only the first (SOH/TOH #1) can be taken. SOH/TOH #2-#16 are not available.
Bytes A1, A2, B1, B2, H1, H2, H3, Y are not sampled and are always set to 0.

Example

:FETC:SCAL:OVER? 19, 22, 25
Response: 0, 0, 0

Supplies the values of the 3 bytes selected (D1, D2, D3) in the SOH set (for STM-1/OC3 signals).

Related commands

:FETC[:ARR][:DATA][:TEL][:SDH]:OVER? on page R-414
:FETC[:ARR][:DATA][:TEL][:SDH]:OVER:PART[i]? on page R-415
:FETC[:ARR][:DATA][:TEL][:SDH]:OVER:CPARt[i]? on page R-416
:FETC:SCAL[:DATA][:TEL][:SDH]:OVER:PART[i]? on page R-425
:FETC:SCAL[:DATA][:TEL][:SDH]:OVER:CPARt[i]? on page R-426

:FETC:SCAL[:DATA][:TEL][:SDH]:OVER:PART[i]?

:FETCh:SCALar[:DATA][:TELecom][:SDH]:OVERhead:PART[i]? <position1> [, <position2> [<position3>, ... <position16>]] supplies the current values of the SOH/TOH bytes selected by <position>. The numerical suffix i selects SOH/TOH # i. Options 91.53, 91.54 or 91.59 are required for STM16c/OC48c. Options 91.40 or 91.42 are required for STM64/OC192.

Parameter

Name	Type	Range	Default
position1	numeric	1 - 81 (see comments)	none
[position2]	numeric	1 - 81 (see comments)	none
...		1 - 81 (see comments)	none
[position16]	numeric	1 - 81 (see comments)	none

Response

Name	Type	Range	Unit
<byte>	numeric	0 - 255	none
<nextbyte>	numeric	0 - 255	none
…	numeric	0 - 255	none
<lastbyte>	numeric	0 - 255	none

Dependencies None

Comments

Signal Structure	Position Range	Overhead byte order in the received signal
STM-64/OC192 signal	1 - 81	81 bytes SOH/TOH # i (output line-by-line) A1,A1,A1,A2,A2,A2,C1, …
STM-16/OC48 signal	1 - 81	81 bytes SOH/TOH # i (output line-by-line) A1,A1,A1,A2,A2,A2,C1, …

The content of the bytes in each SOH/TOH is taken as a “snapshot” from the received signal and refreshed every 100 ms.
If the overhead data is not available for any reason, a NAN (9.91E37) is returned.

Example

:FETC:SCAL:OVER:PART? 19, 22, 25
Response: 0, 0, 0

Supplies the values of the 3 bytes selected (D1, D2, D3) in the SOH #1.

:FETC:SCAL:OVER:PART15? 19, 22, 25
Response: 0, 0, 0

Supplies the values of the 3 bytes selected (D1, D2, D3) in the SOH #15.

Related commands

:FETC[:ARR][:DATA][:TEL][:SDH]:OVER? on page R-414
:FETC[:ARR][:DATA][:TEL][:SDH]:OVER:PART[i]? on page R-415
:FETC[:ARR][:DATA][:TEL][:SDH]:OVER:CPARt[i]? on page R-416
:FETC:SCAL[:DATA][:TEL][:SDH]:OVER? on page R-423
:FETC:SCAL[:DATA][:TEL][:SDH]:OVER:CPARt[i]? on page R-426

:FETC:SCAL[:DATA][:TEL][:SDH]:OVER:CPARt[i]?

:FETCh:SCALar[:DATA][:TELecom][:SDH]:OVERhead:CPARt[i]? <position1> [, <position2> [<position3>, ... <position16>]] supplies the values of SOH/TOH bytes selected by <position>. These bytes are read from a complete homogeneous SOH/TOH. The numerical suffix i selects SOH/TOH # i. Options 91.53, 91.54 or 91.59 are required for STM16c/OC48c. Options 91.40 or 91.42 are required for STM64/OC192.

Parameter

Name	Type	Range	Default
position1	numeric	1 - 81 (see comments)	none
[position2]	numeric	1 - 81 (see comments)	none
...		1 - 81 (see comments)	none
[position16]	numeric	1 - 81 (see comments)	none

Response

Name	Type	Range	Unit
<byte>	numeric	0 - 255	none
<nextbyte>	numeric	0 - 255	none
…	numeric	0 - 255	none
<lastbyte>	numeric	0 - 255	none

Dependencies None

Comments

Signal Structure	Position Range	Overhead byte order in the received signal
STM-64/OC192 signal	1 - 81	81 bytes SOH/TOH # i (output line-by-line) A1,A1,A1,A2,A2,A2,C1, …
STM-16/OC48 signal	1 - 81	81 bytes SOH/TOH # i (output line-by-line) A1,A1,A1,A2,A2,A2,C1, …

The content of the bytes in each SOH/TOH is taken as a “snapshot” from the received signal. The content is refreshed with :INIT3[:IMM][:ALL] on page R-33.
All SOH/TOH #1 - #16/64 bytes are part of the same frame.
If the overhead data is not available for any reason, a NAN (9.91E37) is returned.

Note: Use :INIT3[:IMM][:ALL] on page R-33 to start the capture process.

Example

:FETC:SCAL:OVER:CPAR? 19, 22, 25
Response: 0, 0, 0

Supplies the values of the 3 bytes (D1, D2, D3) selected in the SOH #1.

:FETC:SCAL:OVER:CPAR16? 19, 22, 25
Response: 0, 0, 0

Supplies the values of the 3 bytes (D1, D2, D3) selected in the SOH #16.

Related commands

:INIT3[:IMM][:ALL] on page R-33
:ABOR3 on page R-33
:FETC[:ARR][:DATA][:TEL][:SDH]:OVER? on page R-414
:FETC[:ARR][:DATA][:TEL][:SDH]:OVER:PART[i]? on page R-415
:FETC[:ARR][:DATA][:TEL][:SDH]:OVER:CPARt[i]? on page R-416
:FETC:SCAL[:DATA][:TEL][:SDH]:OVER? on page R-423
:FETC:SCAL[:DATA][:TEL][:SDH]:OVER:PART[i]? on page R-425

:FETC:SCAL[:DATA][:TEL][:SDH]:TRIB:SSBits?

:FETCh:SCALar[:DATA][:TELecom][:SDH]:TRIButary:SSBits? supplies the 2 SS bits (bits 5 and 6) within the V1 Byte of the TU/VT pointer.

Parameter

None

Response

Name	Type	Range	Unit
<bits>	numeric	0 - 3	none

Dependencies

None

Comments

The supplied value is taken as a “snapshot” from the received signal and refreshed every 100 ms.
If the result cannot be determined, e.g. because there is no SDH signal containing a TU in the received signal, the result is set to invalid (NAN).
The following values are defined:

Bit values	Designation
00	TU-2
01	undefined
10	TU-12/VT2
11	TU-11/VT1.5

Example

:FETC:SCAL:TRIB:SSB?
Response: 2

:FETC:STR[:DATA][:TEL]:PDH:TRAC?

:FETCh:STRing[:DATA][:TELecom]:PDH:TRACe? supplies the G.832 path trace (TR byte of the G.832 overhead) as a ASCII string.

Parameter — None

Dependencies — This path trace can be determined only if the receive signal contains one.
G.832 trace data capture must be activated (see [:SENS]:FUNC:EVEN[:ON] on page R-405) for this command to return data.
The content of the trace is taken as a “snapshot” from the received signal and refreshed every second. It can take up to one second until the first valid result is available.

Comments — The path trace (up to 15 characters long) is supplied (the 16th character is used for synchronization and contains the CRC-7 code).
Unprintable characters are substituted using the UNIX shell conventions:

```
\n --> new line character
\r --> CR character
\b --> back space character
\t --> TAB character
\0 --> 0 HEX character
\\ --> \ character
\001 --> 01 HEX character in octal notation
```

If the data is not available for any reason, an empty string is returned.

Example — :FETC:STR:PDH:TRAC?
Response: “Hello World1234”.

Related commands — [:SENS]:FUNC:EVEN[:ON] on page R-405

:FETC:STR[:DATA][:TEL][:SDH]:HPTR?

:FETCh:STRing[:DATA][:TELecom][:SDH]:HPTRace? supplies the J1 high order path trace (J1 byte of the VC-3/4 or STS1 POH) as a ASCII string.

Parameter

None

Dependencies

A high order path trace can be determined only if the receive signal contains one.
High path trace data capture must be activated (see
[:SENS]:FUNC:EVEN[:ON] on page R-405) for this command to return data.
The content of the trace is taken as a “snapshot” from the received signal and refreshed every second. It can take up to one second until the first valid result is available.

Comments

The path trace (up to 15 characters long) is supplied (the 16th character is used for synchronization and contains the CRC-7 code).
Unprintable characters are substituted using the UNIX shell conventions:

\n --> new line character
\r --> CR character
\b --> back space character
\t --> TAB character
\0 --> 0 HEX character
\\ --> \ character
\001 --> 01 HEX character in octal notation

If the data is not available for any reason, an empty string is returned.

Example

:FETC:STR:HPTR?
Response: “Hello World”.

Related commands

:FETC:STR[:DATA][:TEL][:SDH]:RSTR? on page R-431
:FETC:STR[:DATA][:TEL][:SDH]:LPTR? on page R-430

:FETC:STR[:DATA][:TEL][:SDH]:LPTR?

:FETCh:STRing[:DATA][:TELecom][:SDH]:LPTRace? supplies the J2 low order path trace (J2 byte of the VC-12/11 or Vt1.5/VT2 POH) as a ASCII string.

Parameter
None

Dependencies
A low order path trace can be determined only if the receive signal contains one.
Low path trace data capture must be activated (see [:SENS]:FUNC:EVEN[:ON] on page R-405) for this command to return data.
The content of the trace is taken as a “snapshot” from the received signal and refreshed every second. It can take up to one second until the first valid result is available.

Comments
The path trace (up to 15 characters long) is supplied (the 16th character is used for synchronization and contains the CRC-7 code).
Unprintable characters are substituted using the UNIX shell conventions:

\n --> new line character
\r --> CR character
\b --> back space character
\t --> TAB character
\0 --> 0 HEX character
\\ --> \ character
\001 --> 01 HEX character in octal notation

If the data is not available for any reason, an empty string is returned.

Example
:FETC:STR:LPTR?
Response: “Hello World”.

Related commands
:FETC:STR[:DATA][:TEL][:SDH]:RSTR? on page R-431
:FETC:STR[:DATA][:TEL][:SDH]:HPTR? on page R-429

:FETC:STR[:DATA][:TEL][:SDH]:RSTR?

:FETCh:STRing[:DATA][:TELecom][:SDH]:RSTRace? supplies the J0 regenerator section path trace (C1 byte of the SOH) as a ASCII string.

Parameter — None

Dependencies — A regenerator section path trace can be determined only if the receive signal contains one.
Regenerator section trace data capture must be activated (see [:SENS]:FUNC:EVEN[:ON] on page R-405) for this command to return data.
The content of the trace is taken as a “snapshot” from the received signal and refreshed every second. It can take up to one second until the first valid result is available.

Comments — The path trace (up to 15 characters long) is supplied (the 16th character is used for synchronization and contains the CRC-7 code).
Unprintable characters are substituted using the UNIX shell conventions:

\n --> new line character
\r --> CR character
\b --> back space character
\t --> TAB character
\0 --> 0 HEX character
\\ --> \ character
\001 --> 01 HEX character in octal notation

If the data is not available for any reason, an empty string is returned.

Example — :FETC:STR:RSTR?
Response: “Hello World”.

Related commands — :FETC:STR[:DATA][:TEL][:SDH]:HPTR? on page R-429
:FETC:STR[:DATA][:TEL][:SDH]:LPTR? on page R-430

:FETC:STR[:DATA][:TEL][:SDH]:TCMonitoring:TRACe?

:FETCh:STRing[:DATA][:TELecom][:SDH]:TCMonitoring:TRace? supplies the tandem connection monitoring N1/N2 trace identifier as an ASCII string.

Parameter

None

Dependencies

A tandem connection monitoring trace identifier can be determined only if the receive signal contains one.
TCM trace identifier data capture must be activated (see [:SENS]:FUNC:EVEN[:ON] on page R-405) for this command to return data.
The content of the trace is taken as a “snapshot” from the received signal and refreshed every second. It can take up to one second until the first valid result is available.

Comments

The TCM trace (up to 15 characters long) is supplied (the 16th character is used for synchronization and contains the CRC-7 code).
Unprintable characters are substituted using the UNIX shell conventions:

\n --> new line character
\r --> CR character
\b --> back space character
\t --> TAB character
\0 --> 0 HEX character
\\ --> \ character
\001 --> 01 HEX character in octal notation

If the data is not available for any reason, an empty string is returned.

Example

:FETC:STR:TCM:TRAC?
Response: “TCM-TRACE-IDENT”.

Related commands

:FETC:STR[:DATA][:TEL][:SDH]:HPTR? on page R-429
:FETC:STR[:DATA][:TEL][:SDH]:LPTR? on page R-430

Appendix: Theory / Standards

1 Recommendations / Standards

1.1 ITU-T recommendations

Recommendations	Title
E.164	Numbering plan for the ISDN era
E.191	B-ISDN numbering and addressing
G.702	Digital hierarchy bit rates
G.703	Physical/electrical characteristics of hierarchical digital interfaces
G.704	Synchronous frame structures used at primary and secondary hierarchical levels
G.706	Frame alignment and cyclic redundancy check (CRC) procedures relating to basic frame structures defined in recommendation G.704
G.707	Network node interface for the synchronous digital hierarchy (SDH) (replaces G.707, G.708 and G.709 version of 03/93)
G.742	Second order digital multiplex equipment operating at 8448 kbit/s and using positive justification
G.751	Digital multiplex equipments operating at third order bit rate of 34368 kbit/s and fourth order bit rate of 139264 bit/s and using positive justification
G.755	Digital multiplex equipment operating at 139264 kbit/s and multiplexing three tributaries at 44736 kbit/s
G.772	Protected monitoring points provided on digital transmission systems
G.773	Protocol suites for Q interfaces for management of transmission systems
G.774	SDH information model for the network element view
G.774.01	SDH performance monitoring for the network element view
G.774.02	SDH configuration of the payload structure for the network element view
G.774.03	SDH management of multiplex section protection for the network element view
G.774.04	SDH management of sub network connection protection from the network element view
G.774.05	SDH management of the connection supervision functionality (HCS/LCS) for the network element view
G.774.06	SDH unidirectional performance monitoring for the network element view
G.774.07	SDH G.774 implementors guide
G.774.08	SDH management of radio-relay systems network element view
G.775	Loss of signal (LOS) and alarm indication signal (AIS) detection and clearance criteria
G.780	Vocabulary of terms for SDH networks and equipment

Table A-1 Overview of important ITU-T recommendations

Recommendations	Title
G.783	Characteristics of synchronous digital hierarchy (SDH) equipment functional blocks (G.783 (April 97) replaces G.781, G.782 and G.783 version of 01/94)
G.784	Synchronous digital hierarchy (SDH) management
G.803	Architectures of transport networks based on the synchronous digital hierarchy (SDH)
G.804	ATM cell mapping into plesiochronous digital hierarchy (PDH)
G.810	Definitions and terminology for synchronisation networks
G.811	Timing requirements at the output of primary reference clocks suitable for plesiochronous operation of international digital links
G.812	Timing requirements at the output of slave clocks suitable for plesiochronous operation of international digital links
G.813	Timing characteristics of SDH equipment slave clocks (SEC)
G.821	Error performance of an international digital connection operating below the primary rate and forming a part of an ISDN
G.823	The control of jitter and wander within digital networks which are based on the 2048 kbit/s hierarchy
G.824	The control of jitter and wander within digital networks which are based on the 1544 kbit/s hierarchy
G.825	The control of jitter and wander in digital networks based on the SDH
G.826	Error performance parameters and objectives for international, constant bit rate digital paths at or above the primary rate
G.828	Error performance parameters and objectives for international, constant bit rate synchronous digital paths
G.829	Error performance events for SDH multiplex and regenerator section
G.831	Management capabilities of transport network based on the SDH
G.832	Transport of SDH elements on PDH networks
G.841	Types and characteristics of SDH network protection architectures
G.842	Interworking of SDH network protection architectures
G.911	Parameters and calculation methodologies for reliability of fibre optic systems
G.957	Optical interfaces for equipments and systems relating to the synchronous digital hierarchy
G.958	Digital line systems based on the synchronous digital hierarchy for use on optical fibre cables
I.356	B-ISDN ATM layer cell transfer performance
I.363	B-ISDN ATM Adaptation Layer (AAL) Specification
I.371	B-ISDN Traffic control and congestion
I.432	B-ISDN User-Network Interface Physical Layer Specification
I.610	B-ISDN Operation and Maintenance Principles and Functions
M.60	Maintenance terminology and definitions

Table A-1 Overview of important ITU-T recommendations *(continued)*

Recommendations	Title
M.2100	Performance limit for bringing into service and maintenance of international PDH paths, sections and transmission systems
M.2101	Performance limit for bringing into service and maintenance of international SDH paths, and multiplex sections
M.2110	Bringing into service international digital paths, sections and transmission systems
M.2120	Digital path, section and transmission fault detection and localization
M.3010	Principles of telecommunications management networks
M.3020	TMN interface specification methodology
M.3100	Generic network information model
M.3200	TMN management services: overview
M.3300	TMN management capabilities presented in the F interface
M.3400	TMN management functions
O.150	General requirements for instrumentation for performance measurements on digital transmission equipment
O.151	Error performance measuring equipment operating at the primary rate and above
O.171	Timing jitter and wander measuring equipment for digital systems which are based on the PDH
O.172	Jitter and Wander measuring equipment for digital systems which are based on the SDH
O.181	Equipment to assess error performance on STM-N SDH interfaces
O.191	Equipment to assess ATM layer cell transfer performance
Q.2010	B-ISDN Overview signaling Capability Set 1, Release 1
Q.2100	B-ISDN signaling ATM Adaption Layer (SAAL) Overview Description
Q.2110	B-ISDN ATM Adaptation Layer - Service Specific Connection Oriented Protocol (SSCOP)
Q.2130	B-ISDN signaling ATM Adaptation Layer - Service Specific Coordination Function for Support of signaling at the User Network Interface (SSCF at UNI)
Q.2931	B-ISDN - Digital Subscriber signaling No. 2 (DSS 2) - User Network Interface Layer 3 Specification for Basic Call / Connection Control
Q.2932.1	B-ISDN - Digital Subscriber signaling System No. 2 (DSS 2) - Generic Functional Protocol - Core Functions
Q.2961	B-ISDN - Digital Subscriber signaling System No. 2 (DSS 2) - Additional Traffic Parameters
V.11	Electrical characteristics for balanced double-current interchange circuits for general use with integrated circuit equipment in the field of data communications
X.21	Interface between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) for synchronous operation on public networks

Table A-1 Overview of important ITU-T recommendations *(continued)*

1.2 ANSI standards

Standard	Title
T1.101-1994	Synchronization interface standards for the digital networks
T1.102-1993	Digital hierarchy - electrical interfaces
T1.102.01-1996	Digital hierarchy - VT 1.5 electrical interface
T1.105-1995	SONET - basic description including multiplex structure, rates and formats
T1.105.01-1995	SONET - automatic protection
T1.105.02-1995	SONET - payload mappings
T1.105.03-1994	SONET - jitter at network interfaces
T1.105.04-1995	SONET - data communication channel (DCC) protocol and architectures
T1.105.05-1994	SONET - tandem connection maintenance
T1.105.06-1996	SONET - physical layer specifications
T1.105.07-1996	SONET - sub STS-1 interface rates and formats specifications
T1.105.09-1996	SONET - network element timing and synchronisation
T1.106-1988	Digital hierarchy - optical interface specification (replaced by T1.105.06)
T1.107-1995	Digital hierarchy - formats specification (PDH)
T1.119-1994	SONET - operations administrations, maintenance and provisioning (OAM&P) communications
T1.119.01-1995	SONET - OAM&P communications protection switching fragment
T1.204-1993	OAM&P - lower layer protocol for interfaces between operation systems and network elements
T1.208-1993	OAM&P - upper layer protocol for interfaces between operation systems and network elements
T1.210-1993	OAM&P - principles of functions, architectures and protocols for TMN interfaces
T1.231-1993	Digital hierarchy - Layer 1 in-service digital transmission performance monitoring

Table A-2 Overview of important ANSI standards

1.3 Bellcore standards

Standard	Title
GR-253-CORE	SONET Transport System: Common Generic Criteria
GR-499-CORE	Transport Systems Generic Requirements (TSGR): Common Requirements

Table A-3 Overview of important Bellcore standards

1.4 ETSI standards

Standard	Title
ETS 300 147 R3	Synchronous digital hierarchy (SDH); Multiplexing structure (based on ITU-T Recommendation G.707)
ETS 300 166	Physical and electrical characteristics of hierarchical digital interfaces for equipment using the 2048 kbit/s-based plesiochronous or synchronous digital hierarchies (based on ITU-T Recommendation G.703)
ETS 300 167	Functional characteristics of 2 048 Mbit/s interfaces (based on ITU-T Recommendations G.704 and G.706)
ETS 300 417-1-1	Generic requirements of transport functionality of equipment - Part 1-1: Generic processes and performances
ETS 300 417-2-1	Generic requirements of transport functionality of equipment - Part 2-1: SDH and PDH physical section layer functions
ETS 300 417-3-1	Generic requirements of transport functionality of equipment - Part 3-1: STM-N regenerator and multiplex section layer functions
ETS 300 417-4-1	Generic requirements of transport functionality of equipment - Part 4-1: SDH path layer functions
ETS 300 417-5-1	Generic requirements of transport functionality of equipment - Part 5-1: PDH path layer functions
ETS 300 417-6-1	Generic requirements of transport functionality of equipment - Part 6-1: Synchronization layer functions
ETS 300 462-1	Generic requirements for synchronization networks - Part 1: Definitions and terminology for synchronization networks
ETS 300 462-2	Generic requirement for synchronization networks - Part 2: Synchronization network architecture
ETS 300 462-3	Generic requirement for synchronization networks - Part 3: The control of jitter and wander within synchronization networks
ETS 300 462-4	Generic requirements for synchronization networks; Part 4: Timing characteristics of slave clocks suitable for synchronization supply to SDH and PDH equipment
ETS 300 462-5	Generic requirements for synchronization networks; Part 5: Timing characteristics of slave clocks suitable for operation in synchronous Digital Hierarchy (SDH) equipment
ETS 300 462-6	Generic requirements for synchronization networks; Part 6: Timing characteristics of primary reference clocks

Table A-4 Overview of important ETSI standards

1.5 ATM Forum recommendations

Approved Items as of May 1997

Below is a listing of all specifications completed and approved by the ATM Forum since its inception in 1991.

These documents may be found on the ftp server in several different formats. The document numbers listed here link to the .pdf version of the document where available.

Technical Working Group	Approved Specifications	Specification	Approved Date
B-ICI	B-ICI 1.0	af-bici-0013.000	Sep, 1993
	B-ICI 1.1	af-bici-0013.001	-
	B-ICI 2.0 (delta spec to B-ICI 1.1)	af-bici-0013.002	Dec, 1995
	B-ICI 2.0 (integrated specification)	af-bici-0013.003	Dec, 1995 B-
	B-ICI 2.0 Addendum or 2.1	af-bici-0068.000	Nov, 1996
Data Exchange Interface	Data Exchange Interface version 1.0	af-dxi-0014.000	Aug, 1993
ILMI (Integrated Layer Mgmt. Interface)	ILMI 4.0	af-ilmi-0065.000	Sep, 1996
LAN Emulation	LAN Emulation over ATM 1.0	af-lane-0021.000	Jan, 1995
	LAN Emulation Client Management Specification	af-lane-0038.000	Sep, 1995
	LANE 1.0 Addendum	af-lane-0050.000	Dec, 1995
	LANE Servers Management Spec v1.0	af-lane-0057.000	Mar, 1996
Network Management	Customer Network Management (CNM) for ATM Public Network Service	af-nm-0019.000	Oct, 1994
	M4 Interface Requirements and Logical MIB	af-nm-0020.000	Oct, 1994
	CMIP Specification for the M4 Interface	af-nm-0027.000	Sep, 1995
	M4 Public Network view	af-nm-0058.000	Mar, 1996
	M4 "NE View"	af-nm-0071.000	Jan, 1997
	Circuit Emulation Service Interworking Requirements, Logical and CMIP MIB	af-nm-0072.000	Jan, 1997
	M4 Network View CMIP MIB Spec v1.0	af-nm-0073.000	Jan, 1997
	M4 Network View Requirements & Logical MIB Addendum	af-nm-0074.000	Jan, 1997
Physical Layer	Issued as part of UNI 3.1: 44.736 DS3 Mbps Physical Layer 100 Mbps Multimode Fiber Interface Physical Layer 155.52 Mbps SONET STS-3c Physical Layer 155.52 Mbps Physical Layer	af-uni-0010.002	-

Table A-5 Overview of important ATM forum recommendations

Technical Working Group	Approved Specifications	Specification	Approved Date
Physical Layer	ATM Physical Medium Dependent Interface Specification for 155 Mb/s over Twisted Pair Cable	af-phy-0015.000	Sep, 1994
	Utopia	af-phy-0017.000	Mar, 1994
	Mid-range Physical Layer Specification for Category 3 UTP	af-phy-0018.000	Sep, 1994
	6.312 Kbps UNI Specification	af-phy-0029.000	June, 1995
	Utopia Level 2	af-phy-0039.000	June, 1995
	Physical Interface Specification for 25.6 Mb/s over Twisted Pair	af-phy-0040.000	Nov, 1995
	A Cell-based Transmission Convergence Sublayer for Clear Channel Interfaces	af-phy-0043.000	Jan, 1996
	622.08 Mbps Physical Layer	af-phy-0046.000	Jan, 1996
	155.52 Mbps Physical Layer Specification for Category 3 UTP (See also UNI 3.1, af-uni-0010.002)	af-phy-0047.000	-
	120 Ohm Addendum to ATM PMD Interface Spec for 155 Mbps over TP	af-phy-0053.000	Jan, 1996
	155 Mbps over MMF Short Wave Length Lasers, Addendum to UNI 3.1	af-phy-0062.000	July, 1996
	WIRE (PMD to TC layers)	af-phy-0063.000	July, 1996
P-NNI	Interim Inter-Switch Signaling Protocol	af-pnni-0026.000	Dec, 1994
	P-NNI V1.0	af-pnni-0055.000	Mar, 1996
	PNNI 1.0 Addendum (soft PVC MIB)	af-pnni-0066.000	Sep, 1996
	PNNI ABR Addendum	af-pnni-0075.000	Jan, 1997
Service Aspects and Applications	Frame UNI	af-saa-0031.000	Sep, 1995
	Native ATM Services: Semantic Description	af-saa-0048.000	Feb, 1996
	Audio/Visual Multimedia Services: Video on Demand v1.0	af-saa-0049.000	Jan, 1996
	Audio/Visual Multimedia Services: Video on Demand v1.1	af-saa-0049.001	Mar, 1997
	ATM Names Service	af-saa-0069.000	Nov, 1996
Signaling	(See UNI 3.1, af-uni-0010.002)		
	UNI Signaling 4.0	af-sig-0061.000	July, 1996
	Signaling ABR Addendum	af-sig-0076.000	Jan, 1997
Testing	Introduction to ATM Forum Test Specifications	af-test-0022.000	Dec, 1994
	PICS Proforma for the DS3 Physical Layer Interface	af-test-0023.000	Sep, 1994
	PICS Proforma for the SONET STS-3c Physical Layer Interface	af-test-0024.000	Sep, 1994

Table A-5 Overview of important ATM forum recommendations *(continued)*

Technical Working Group	Approved Specifications	Specification	Approved Date
Testing	PICS Proforma for the 100 Mbps Multimode Fibre Physical Layer Interface	af-test-0025.000	Sep, 1994
	PICS Proforma for the ATM Layer (UNI 3.0)	af-test-0028.000	Apr, 1995
	Conformance Abstract Test Suite for the ATM Layer for Intermediate Systems (UNI 3.0)	af-test-0030.000	Sep, 1995
	Interoperability Test Suite for the ATM Layer (UNI 3.0)	af-test-0035.000	Apr, 1995
	Interoperability Test Suites for Physical Layer: DS-3, STS-3c, 100 Mbps MMF (TAXI)	af-test-0036.000	Apr, 1995
	PICS Proforma for the DS1 Physical Layer	af-test-0037.000	Apr, 1995
	Conformance Abstract Test Suite for the ATM Layer (End Systems) UNI 3.0	af-test-0041.000	Jan, 1996
	PICS for AAL5 (ITU spec)	af-test-0042.000	Jan, 1996
	PICS Proforma for the 51.84 Mbps Mid-Range PHY Layer Interface	af-test-0044.000	Jan, 1996
	Conformance Abstract Test Suite for the ATM Layer of Intermediate Systems (UNI 3.1)	af-test-0045.000	Jan, 1996
	PICS for the 25.6 Mbps over Twisted Pair Cable (UTP-3) Physical Layer	af-test-0051.000	Mar, 1996
	PICS for ATM Layer (UNI 3.1)	af-test-0059.000	July, 1996
	Conformance Abstract Test Suite for the UNI 3.1 ATM Layer of End Systems	af-test-0060.000	June, 1996
	Conformance Abstract Test Suite for the SSCOP Sub-layer (UNI 3.1)	af-test-0067.000	Sep, 1996
	PICS for the 155 Mbps over Twisted Pair Cable (UTP-5/STP-5) Physical Layer	af-test-0070.000	Nov, 1996
Traffic Management	(See UNI 3.1, af-uni-0010.002)		
	Traffic Management 4.0	af-tm-0056.000	Apr, 1996
	Traffic Management ABR Addendum	af-tm-0077.000	Jan, 1997
User-Network Interface (UNI)	ATM User-Network Interface Specification V2.0	af-uni-0010.000	June, 1992
	ILMI MIB for UNI 3.0	af-uni-0011.000	-
	ILMI MIB for UNI 3.1	af-uni-0011.001	-

Table A-5 Overview of important ATM forum recommendations *(continued)*

Recommendation	Title
UNI 3.1	ATM User-Network Interface Specification 3.1, 4.0
CES V2.0	Circuit Emulation Services V2.0 Baseline

Table A-6 Overview of important ATM forum recommendations

2 Alarm messages

2.1 SDH/SONET

Abbreviation SDH	Old Expression	Meaning	Abbreviation SONET	Old Expression	Meaning
ITU-T G.707 (new), G.783			**ANSI T1.105, BELLCORE GR-253**		
LOS	NO-SIG	Loss of Signal	LOS	-	Loss of Signal
TSE	BER	Test Sequence Error (Bit error)	TSE	-	Test Sequence Error (Bit error)
LSS	NO-PATT	Loss of Sequence Synchronization	LSS	-	Loss of Sequence Synchronization
LTI	NO-CLOCK	Loss of incoming Timing Intervals	LTI	-	Loss of incoming Timing Intervals
Regenerator Section			**Section**		
OOF	-	Out Of Frame	OOF	-	Out Of Frame
LOF	-	Loss Of Frame	LOF	-	Loss Of Frame
B1 (8 bits)	-	Regenerator section error monitoring	B1 (8 bits)	-	Section error monitoring
Multiplex Section			**Line (L)**		
B2 (n x 24 bits)	-	Multiplex section error monitoring	B2 (n x 8 bits)	-	Line error monitoring
MS-AIS	S-AIS	Multiplex Section AIS	AIS-L	-	Line AIS
MS-RDI	MS-FERF	Multiplex Section Remote Defect Indication	RDI-L	LINE FERF	Line Remote Defect Indication
MS-REI	-	Multiplex Section Remote Error Indication	REI-L	LINE FEBE	Line Remote Error Indication
Administrative Unit			**STS Path (SP)**		
AU-LOP	-	Loss Of AU Pointer	LOP-P	-	SP Loss of Pointer
AU-NDF	-	AU Pointer New Data Flag	NDF-P	-	SP New Data Flag
AU-AIS	P-AIS	AU AIS	AIS-P	-	SP AIS
AU-PJE	-	AU Pointer Justification Event	-		
HO Path			-		
B3 (8 bits)	-	HO Path error monitoring (VC-3/4)	B3 (8 bits)	-	SP error monitoring
HP-UNEQ	-	HO Path UNEQuipped	UNEQ-P	-	SP UNEQuipped

Table A-7 Alarm messages SDH/SONET

Abbreviation SDH	**Old Expression**	**Meaning**	**Abbreviation SONET**	**Old Expression**	**Meaning**
ITU-T G.707 (new), G.783			**ANSI T1.105, BELLCORE GR-253**		
HP-RDI	HP-FERF	HO Path Remote Defect Indication	RDI-P	STS Path YELLOW	SP Remote Defect Indication
HPRDIEP	-	HO Path RDI Payload Defect	RDIEPP	-	SP RDI Payload Defect
HPRDIES	-	HO Path RDI Server Defect	RDIEPS	-	SP RDI Server Defect
HPRDIEC	-	HO Path RDI Connectivity Defect	RDIEPC	-	SP RDI Connectivity Defect
HP-REI	HP-FEBE	HO Path Remote Error Indication	REI-P	STS Path FEBE	SP Remote Error Indication
-			PDI-P	-	SP Payload Defect Indication
HP-TIM	-	HO Path Trace Identifier Mismatch	TIM-P	-	SP Trace Identifier Mismatch
HP-PLM	HP-SLM	HO Path Payload Label Mismatch	PLM-P	-	SP Path Label Mismatch
Tributary Unit			**VT Path (VP)**		
TU-LOP	-	Loss of TU Pointer	LOP-V	-	VP Loss of Pointer
TU-NDF	-	TU pointer New Data Flag	NDF-V	-	VP New Data Flag
TU-AIS	-	TU AIS	AIS-V	-	VP AIS
TU-LOM	-	Loss Of Multiframe (H4)	LOM	-	Loss of Multiframe
LO Path			-		
BIP-2	-	LO Path error monitoring (VC-11/12)	BIP-V	-	VP error monitoring
B3 (8 bits)	-	LO Path error monitoring (VC-3)	-		
LP-UNEQ	-	LO Path UNEQuipped	UNEQ-V	VT Uneq.	VP UNEQuipped
LP-RDI	LP-FERF	LO Path Remote Defect Indication	RDI-V	VT Path YELLOW	VP Remote Defect Indication
LPRDIEP	-	LO Path RDI Payload Defect	RDIEVP	-	VP RDI Payload Defect
LPRDIES	-	LO Path RDI Server Defect	RDIEVS	-	VP RDI Server Defect
LPRDIEC	-	LO Path RDI Connectivity Defect	RDIEVC	-	VP RDI Connectivity Defect
LP-REI	LP-FEBE	LO Path Remote Error Indication	REI-V	VT Path FEBE	VP Remote Error Indication

Table A-7 Alarm messages SDH/SONET *(continued)*

Abbreviation SDH	Old Expression	Meaning	Abbreviation SONET	Old Expression	Meaning
ITU-T G.707 (new), G.783			**ANSI T1.105, BELLCORE GR-253**		
LP-RFI	-	LO Path Remote Failure Indication	RFI-V	-	VP Remote Failure Indication
-			PDI-V	-	VP Payload Defect Indication
LP-TIM	-	LO Path Trace Identifier Mismatch	TIM-V	-	VP Trace Identifier Mismatch
LP-PLM	LP-SLM	LO Path Payload Mismatch	PLM-V	-	VP Path Label Mismatch

Table A-7 Alarm messages SDH/SONET *(continued)*

2.2 ATM Path

Abbreviation	Meaning	ITU-T Rec.
AAL-1 OOS	AAL-1 Out Of Sync	I.363
LCD	Loss of Cell Delineation (Cell Synchronization)	I.610
OCLR	Overflow Cell Loss Ratio Measurement	-
OCMR	Overflow Cell Misinsertion	-
OCR	Overflow Cell Rate	-
VP-AIS	Virtual Path Alarm Indication Signal	I.610
VP-RDI	Virtual Path Remote Defect Indication	I.610
VC-AIS	Virtual Channel Alarm Indication Signal	I.610
VC-RDI	Virtual Channel Remote Defect Indication	I.610
Vx-AIS	Virtual Channel AIS and Virtual Path AIS simultaneously	-
Vx-RDI	Virtual Channel RDI and Virtual Path RDI simultaneously	-

Table A-8 Alarm messages ATM Path

2.3 Virtual Concatenation

Abbreviation	Meaning	ITU-T Rec.
DPOVC	Delta Pointer Overflow Virtual Concatenation	-

Table A-9 Alarm message Virtual Concatenation

3 Multiplexing structures

3.1 SDH Multiplexing Structure ITU-T G.707

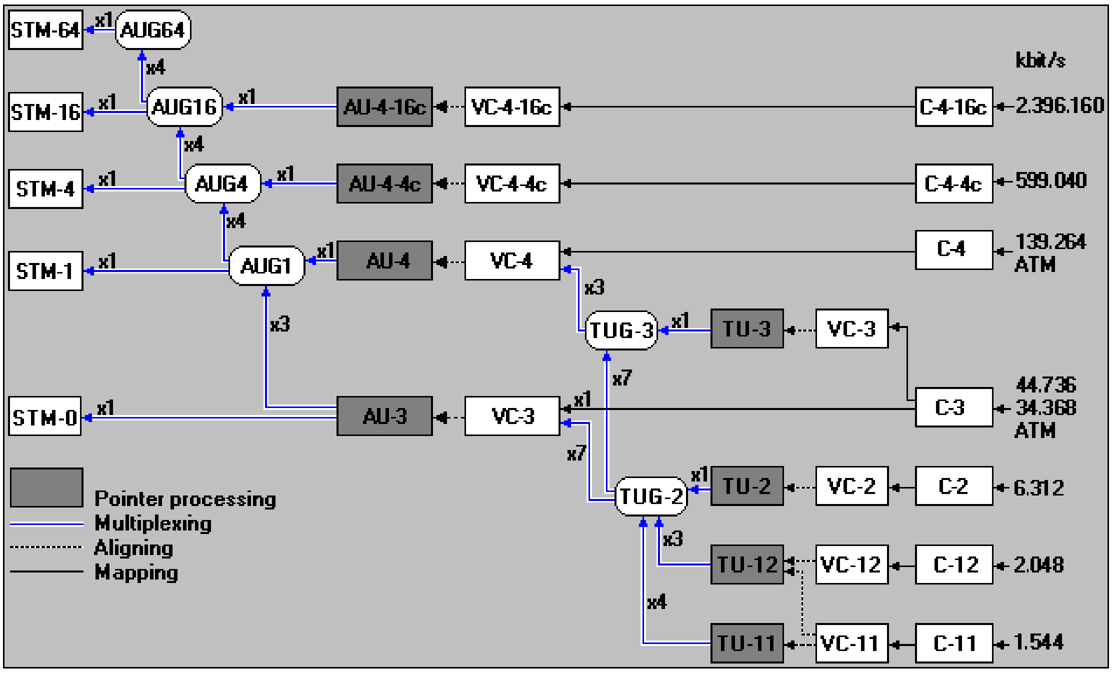


Fig. A-1 SDH Multiplexing Structure ITU-T G.707

3.2 SONET Multiplexing Structure ANSI T1.105-1995

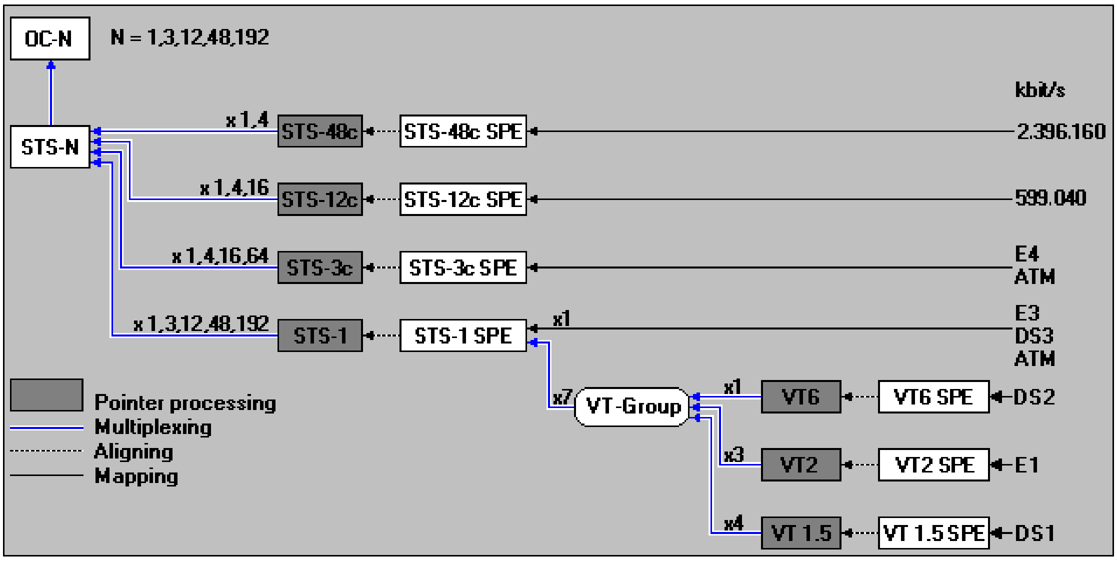


Fig. A-2 SONET Multiplexing Structure ANSI T1.105-1995

4 Abbreviations

Abbreviation	Meaning
A	
A1	SOH Framing Byte 1111 0110
	TOH Framing Byte 1111 0110
	Framing Byte 1111 0110 (PLCP)
A2	SOH Framing Byte 0010 1000
	TOH Framing Byte 0010 1000
	Framing Byte 0010 1000 (PLCP)
AAL	ATM Adaptation Layer
AAL-1 CRC	AAL1 CRC error
AAL-1 OOS	AAL1 Out Of Sync
AAL-1 PE	AAL1 Parity Error
ADEV	Allan Deviation
ADM	Add Drop Multiplexer
AFI	Authority and Format Identifier
AGE	Aging
AIS	Alarm Indication Signal
AIS-L	Alarm Indication Signal - Line
AIS-P	Alarm Indication Signal - Path
AIS-V	Alarm Indication Signal - VT
AMI	Alternated Mark Inversion
APS	Automatic Protection Switching (K1, K2)
ATM	Asynchronous Transfer Mode
AU	Administrative Unit
AU-AIS	AU Alarm Indication Signal
AU-LOP	AU Loss of Pointer
AU-n	Administrative Unit, Level n = 3; 4
AUG	Administrative Unit Group
AvBW	Average Bandwidth

Table SA-10 Standard abbreviations used in this manual

Abbreviation	Meaning
B	
B1	Parity Word BIP-8 for Regenerator Section (RSOH)
	Parity Word BIP-8 for Section
	Path Error Monitoring (BIP-8) Byte (PLCP)
B2	Parity Word BIP-Nx8 for Line
	Parity Word BIP-Nx24 for Multiplex Section (MSOH)
B3	Parity Word BIP-8 for VC-3, 4 Path (POH)
	Parity Word BIP-8 for Path Overhead (POH)
B3ZS	Bipolar with three-zero substitution
B8ZS	Bipolar with eight-zero substitution
BBE	Background Block Error
BBER	Background Block Error Ratio
BER	Bit Error Ratio
BIP-2	Parity Word BIP-8 for VC-1, 2 Path (POH)
BIP-n	Bit Interleaved Parity n Bit
BIP-V	Parity Word BIP-8 for Tributary POH
BIS[P]O	Bringing into service [performance] objectives
BPV	Bipolar Violation
BT	Burst Tolerance
BW	Bandwidth
C	
C-n	Container, n = 1 to 4 (STM-16 n = 1 to 16)
C1	STM-N Identifier
	Cycle Stuff Counter (PCLP)
C2	Signal Label (VC-3, 4 POH)
	Signal Label
CAS	Channel Associated Signaling
CBR	Constant Bit Rate
CDV	Cell Delay Variation
CDVT	Cell Delay Variation Tolerance
CER	Cell Error Ratio
CI	Concatenation Indication
	Congestion Indicator
CI-BW	Congestion Indicator Bandwidth
CK	Clock

Table SA-10 Standard abbreviations used in this manual *(continued)*

Abbreviation	Meaning
CLP	Cell Loss Priority
CLP1-BW	Cell Loss Priority 1 Bandwidth
CLR	Cell Loss Ratio
CMI	Coded Mark Inversion (Signal code)
CMR	Cell Misinsertion Rate
CPS	Cells per Second
CRC-N	Cyclic Redundancy Check, width N
CTD	Cell Transfer Delay
CuBW	Current Bandwidth
D	
D	Pointer: Decrement Bit
D1 to D3	(RSOH) 196 kbit/s DCC for Regenerator Section
D4 to D12	(MSOH) 576 kbit/s DCC for Multiplex Section
DBR	Deterministic Bit Rate
DC	Dropped Cells
DCC	Data Communication Channel
	Data Country code (ATM)
DCN	Data Communication Network
DPOVC	Delta Pointer Overflow Virtual Concatenation
DS1	Electrical Interface Signal 1544 kbit/s
DS3	Electrical Interface Signal 44736 kbit/s
DUT	Device Under Test
DXC	Digital Cross Connect System
E	
E1	Electrical Interface Signal 2048 kbit/s
	(RSOH) Orderwire Channel (voice) for Regenerator Section
	(TOH) Orderwire Channel (voice)
E2	Electrical Interface Signal 8448 kbit/s
	(MSOH) Orderwire Channel (voice) for Multiplex Section
	(TOH) Orderwire Channel (voice)
E3	Electrical Interface Signal 34368 kbit/s
E4	Electrical Interface Signal 139264 kbit/s
EBC	Errored Block Count
ECC	Embedded Communication Channel
EDC	Error Detection Code

Table SA-10 Standard abbreviations used in this manual *(continued)*

Abbreviation	Meaning
EEPO	End to End Performance Objectives
EF	Equipment Failure
EFS	Error Free Second
EM	Error Monitoring Byte (BIP-8) (G.832)
ES	Errored Second (G.826)
ESF	Extended Super Frame (DS1)
ESI	End System Identifier
ESR	Errored Second Ratio (G.826)
F	
f	Frequency
F1	(RSOH) User Channel e.g. for maintenance purposes
	(TOH) User Channel e.g. for maintenance purposes
F2, F3	(POH) Path User Channels
F4	OAM flow ATM Path
F5	OAM flow ATM Channel
FA1	Framing byte 1111 0110 (G.832)
FA2	Framing byte 0010 1000 (G.832)
FAS	Frame Alignment Signal
FE	Frame Error
FEAC	Far End Alarm and Control Signal
FEBE	Far End Block Error
FMTJ	Fast Maximum Tolerable Jitter
G	
G1	(POH) Path Status
	PLCP Path Status (PLCP)
GC	General Purpose Communication Channel (G.832)
GCRA	Generic Cell Rate Algorithm
GFC	Generic Flow Control
H	
H1	Pointer Byte 1: Bit No. 1 to 4: New Data Flag (01101001), Bit No. 5 and 6: ss bits, Bit No. 7 and 8: Pointer value (MSB bits)
H2	Pointer Byte 2: Pointer value (LSB bits)
H3	Pointer Byte 3: Negative Justification Opportunity
H4	(POH) Position Indicator e.g. for quadframe
HBER	High Bit Error Ratio

Table SA-10 Standard abbreviations used in this manual *(continued)*

Abbreviation	Meaning
HCOR	Correctable Header Error
HDB3	High Density Bipolar of order 3
HEC	Header Error Check (ATM)
HO-DSP	High Order Domain Specific Part
HP	Higher Order Path
	High-pass Filter (Jitter VI)
HPRDIEC	Higher Order Path RDI Connectivity Defect
HPRDIEP	Higher Order Path RDI Payload Defect
HPRDIES	Higher Order Path RDI Server Defect
HUNC	Uncorrectable Header Error
I	
I	Pointer: Increment Bit
ICD	International Code Designator
IEC	Incoming Error Count
IDI	Initial Domain Identifier
IDLE	Idle Cells
INC	Increment
ISDN	Integrated Services Digital Network
ISM	In Service Measurement
J	
J0	Regenerator Section Trace (RSOH)
	Section Trace (TOH)
J1	Path Trace (POH in VC-3, 4)
	STS-Path Trace (POH)
J2	Path Trace (POH in VC-1, 2)
	VT-Path Trace (POH)
JTF	Jitter Transfer Function
K	
K1, K2	Automatic Protection Switching (APS) signalling channel (MSOH)
	Automatic Protection Switching (APS) signalling channel (TOH)
K3, K4	Automatic Protection Switching (APS) signalling channel (POH)
L	
LCD	Loss of Cell Delineation

Table SA-10 Standard abbreviations used in this manual *(continued)*

Abbreviation	Meaning
LOF	Loss of Frame
LOM	Loss Of Multiframe
LOP	Loss Of Pointer
LOP-P	Loss Of Pointer - Path
LOP-V	Loss Of Pointer - VT
LOS	Loss Of Signal
LP	Lower Order Path
	Low-pass Filter (Jitter VI)
LPAC	Loss of Performance Access Capability
LPRDIEC	Lower Order Path RDI Connectivity Defect
LPRDIEP	Lower Order Path RDI Payload Defect
LPRDIES	Lower Order Path RDI Server Defect
LSS	Loss of Sequence Synchronisation (Pattern Loss)
LTC	Loss of Test Channel
	for Tandem Connection: Loss of Tandem Connection
LTI	Loss of all Incoming Timing references
M	
M1	MS-REI byte (MSOH)
	MS-REI byte (TOH)
MA	Maintenance Adaption byte (G.832)
MBS	Maximum Burst Size
MDEV	Modified Allan Deviation
MFE	Multiframe Error
MS	Multiplexer Section
MS-AIS	Multiplexer Section AIS
MSB	Most Significant Bit
MSOH	Multiplexer Section Overhead
MTBF	Mean Time Between Failures
MTIE	Maximum Time Interval Error
MTJ	Maximum Tolerable Jitter
MUX	Multiplexer
N	
N1, 2	Network operator bytes (POH) for Tandem Connection Monitoring (TCM)
NCC	Non-Conforming Cells

Table SA-10 Standard abbreviations used in this manual *(continued)*

Abbreviation	Meaning
NCS	Not Connected Seconds
NDF	New Data Flag
NE	Network Element
NNI	Network Node Interface
NPI	Null Pointer Indication
NR	Network Operator Channel (G.832)
NRZ	Non-Return to Zero
NSA	Non-Service Affecting Failure
NSAP	Network Service Access Point
NU	National Use
O	
OAM	Operation, Administration and Management
OC-N	Optical Carrier, N = 1; 3; 12; 48
OCLR	Overflow of Cell Loss Ratio
OCMR	Overflow of Cell Misinsertion Rate
OCR	Overflow Cell Rate
OH	Overhead
OOF	Out Of Frame
OOS	Out of Service Measurement
P	
P1, P2	Automatic Protection Switching (G.832)
PCR	Peak Cell Rate
PDH	Plesiochronous Digital Hierarchy
PDI	Payload Defect Indication
PJE	Pointer Justification Event
PLCP	Physical Layer Convergence Protocol
PLL	Phase Locked Loop
PLM	Payload Mismatch
PLM-P	Payload Mismatch - Path
PLM-V	Payload Mismatch - VT
PMP	Protected Monitoring Point
POH	Path Overhead
POI	Path Overhead Identifier (PLCP)
PRBS	Pseudo Random Binary Sequence
PT	Payload Type

Table SA-10 Standard abbreviations used in this manual *(continued)*

Abbreviation	Meaning
PTR	Pointer
PVC	Permanent Virtual Channel
Q	
QOS	Quality Of Service
R	
RAI	Remote Alarm Indication
RDI	Remote Defect Indication
RDIEPC	STS Path RDI Connectivity Defect
RDIEPP	STS Path RDI Server Defect
RDIEPS	STS Path RDI Payload Defect
RDIEVC	VT Path RDI Connectivity Defect
RDIEVP	VT Path RDI Server Defect
RDIEVS	VT Path RDI Payload Defect
RDI-L	Remote Defect Indication - Line
RDI-P	Remote Defect Indication - Path
RDI-V	Remote Defect Indication - VT
REI	Remote Error Indication
RFI	Remote Failure Indication
RS	Regenerator Section
RSOH	Regenerator Section Overhead
RX	Receiver
S	
S1	Synchronization Status Byte (MSOH)
	Synchronization Status Byte (TOH)
SA	Service Affecting Failure
SAAL	Signaling ATM Adaptation Layer
SBR	Statistical Bit Rate
SBW	Signaling Bandwidth
SCR	Sustainable Cell Rate
SDH	Synchronous Digital Hierarchy
SECB	Severely Errored Cell Block
SEL	Selector
SEP	Severely Errored Period
SES	Severely Errored Second
SESR	Severely Errored Second Ratio

Table SA-10 Standard abbreviations used in this manual *(continued)*

Abbreviation	Meaning
SF	Super Frame (DS1)
SIG	Signaling
SLX	Synchronous Line System
SOH	Section Overhead
SONET	Synchronous Optical Network
SPE	Synchronous Payload Envelope
SSCOP	Service Specific Convergence Protocol
STM	Synchronous Transfer Module
STM-N	Synchronous Transport Module, level N = 0, 1, 4, 16, 64
STS	Synchronous Transport Signal
STS-N	Synchronous Transport Signal, level N = 1, 3, 12, 48, 192
SVC	Switched Virtual Channel
T	
TC	Tandem Connection
TC-APId	TC Access Point Identifier (Trace Identifier)
TC-IEC	TC Incoming Error Count
TCM	Tandem Connection Monitoring
TC-ODI	TC Outgoing Defect Indication
TC-OEI	TC Outgoing Error Indication
TC-REI	TC Remote Error Indication
TC-RDI	TC Remote Defect Indication
TC-UNEQ	TC Unequipped
TDEV	Time Deviation
TI	Trace Identifier
TIE	Time Interval Error
TIM	Trace Identifier Mismatch
TMN	Telecommunications Management Network
TOH	Transport Overhead
TR	Trail trace (G.832)
TS	Timeslot
TSE	Test Sequence Error (bit errors)
TU	Tributary Unit
TU-m	Tributary Unit, level m = 1 to 3
TUG-m	Tributary Unit Group, level m = 1, 2
TX	Transmitter

Table SA-10 Standard abbreviations used in this manual *(continued)*

Abbreviation	Meaning
U	
UAS	Unavailable Second
UBR	Unspecified Bit Rate
UBW	User Traffic Bandwidth
UNAS	Unassigned Cell
UNEQ	Unequipped
UNEQ-P	Unequipped - Path
UNEQ-V	Unequipped - VT
UNI	User Network Interface
UI	Unit Interval
V	
V5	POH byte (VC-1, 2)
VBR	Variable Bit Rate
VBR-nRT	Variable Bit Rate - non Real Time
VBR-RT	Variable Bit Rage - Real Time
VC	Virtual Container (SDH)
	Virtual Channel (ATM)
VC-AIS	Virtual Channel Alarm Indication
VC-n	Virtual Container, level n = 1, 2, 3, 4
VC-n-Xc	Concatenated Virtual Container, level n, X concatenated VCs
VC-RDI	Virtual Channel Remote Defect Indication
VCI	Virtual Channel Identifier
VI	Virtual Instrument
VP	Virtual Path
VP-AIS	Virtual Path Alarm Indication
VP-RDI	Virtual Path Remote Defect Indication
VPI	Virtual Path Identifier
VT	Virtual Tributary
W	
WTR	Wait to Restore
Z	
Z0	Spare byte (RSOH)
Z6	Network operator byte (POB) for Tandem Connection Monitoring (TCM)

Table SA-10 Standard abbreviations used in this manual *(continued)*

5 SONET and SDH equivalent terms

This instrument is designed for use with SONET and SDH communications systems. The terminology used in this document is, however, mainly based on the terminology and abbreviations used for SDH communications systems. The following list indicates the more important equivalent terms for both systems.

Note:

SDH term	SONET term
AU (administrative unit) AU-AIS AU-LOP	STS (synchronous transport signal) AIS-P LOP-P
HP (high path) HP-PLM HP-RDI HP-REI	P (path) PLM-P RDI-P REI-P
HP-TIM HP-UNEQ	TIM-P UNEQ-P
LP (low path) LP-BIP LP-PLM LP-RDI LP-REI LP-RFI LP-TIM LP-UNEQ	V (VT path) BIP-V PLM-V RDI-V REI-V RFI-V TIM-V UNEQ-V
MS (multiplexer section) MS-AIS MS-DCC MS-RDI (MS-FERF) MS-REI (MS-FEBE)	L (line) AIS-L DCC-L RDI-L (FERF-L) REI-L (FEBE-L)
PDH frames	DS N frames
RS (regenerator section) RS-TIM	 TIM-L
SOH (section overhead)	TOH (transport overhead)
STM-0 STM-1 STM-4 STM-16	STS-1 / OC1 (optical) STS-3 / OC3 (optical) STS-12 / OC12 (optical) STS-48 / OC48 (optical)
TU (tributary unit) TU-11 TU-12 TU-2 TU-LOM TU-AIS TU-LOP	VT (virtual tributary) VT1.5 VT2 VT6 LOM AIS-V LOP-V
VC (virtual container) VC-11 VC-12 VC-2 VC-3 VC-4	SPE (synchronous payload envelope) VT1.5 SPE VT2 SPE VT6 SPE STS1 SPE STS3C SPE

Table A-11 SDH and SONET systems: Equivalent terms and abbreviations

Notes: