Spirent Communications
TAS Gemini *Warp*
Dual Terminal Emulator
Operations Manual

SAFETY SUMMARY

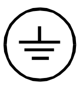
If the equipment is used in a manner not specified by the manufacturer the protection provided by the equipment may be impaired.

> **Warning**
> This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

SAFETY SYMBOLS

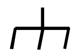
The following safety symbols are used throughout this manual and may be found on the instrument. Familiarize yourself with each symbol and its meaning before operating this instrument.

Instruction manual symbol. The product is marked with this symbol when it is necessary for the user to refer to the instruction manual to protect against damage to the instrument.



Protective ground (earth) terminal. Used to identify any terminal which is intended for connection to an external protective conductor for protection against electrical shock in case of a fault, or to the terminal of a protective ground (earth) electrode.

Indicates dangerous voltage (terminals fed from the interior by voltage exceeding 1000 volts must be so marked).



Frame terminal. A connection to the frame (chassis) of the equipment which normally includes all exposed metal structures.

The caution sign denotes a hazard. It calls attention to an operating procedure, practice, condition or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product or the user's data.

Alternating current (power line).

Spirent Communications of Eatontown, L.P.
541 Industrial Way West
Eatontown, NJ 07724

Phone: (732) 544-8700
FAX: (732) 544-8347

This manual applies to Gemini *Warp* version 5.12 and higher

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ABOUT THIS MANUAL......

This manual contains all the information you need to install and operate the TAS Gemini *Warp* Dual Terminal Emulator. This manual is structured as follows:

Section 1, *Introduction* provides and overview of Gemini features and functions, details the Gemini installation procedure, and contains upgrade information on previous releases. Be sure to read this section before operating the Gemini.

Section 2, *Local Operation* describes the Gemini front panel and menus in detail, and provides procedures for setting up and executing Gemini's tests. Examples are provided for each test procedure.

Section 3, *Gemini Menu Reference* provides an overview of Gemini's menu structure. Each Gemini menu and submenu is graphically displayed and described.

Section 4, *Gemini Parameter Reference* contains detailed information about each Gemini test parameter.

Section 5, *Remote Operation* describes the Gemini GPIB and RS-232 remote control interfaces. This section provides an overview of the Gemini command set and command syntax, and contains sample remote control procedures. 'Remote control examples for setting up a BERT test and a Data Compression test are also provided.

Section 6, *Gemini Commands Quick Reference* contains a quick reference for the entire Gemini commands set.

Section 7, *Gemini Error Codes* documents the error codes that you may encounter while using the Gemini.

Section 8, *Technical Specifications* contains detailed specifications and connector pin assignments.

The *Appendix* section provides additional information on Gemini's ROM files.

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1.0. INTRODUCTION

The TAS Gemini *Warp* Dual Terminal Emulator is a dual data analyzer that is especially suited for testing and evaluating modems and modem communication links. Gemini effectively tests and evaluates the performance of analog modems, limited-distance modems (LDMs), Digital Dataphone Service (DDS) sets, ISDN terminal adaptors, data multiplexers, and more. Gemini combines the features required for thorough testing into one compact unit. By combining these features, Gemini dramatically reduces the cost and complexity of data communications equipment test arrangements.

The Gemini *Warp* is the newest member of the Gemini family of Dual Terminal Emulators. The following subsections describe the many features of the Gemini *Warp*, and compare those features with earlier Gemini models.

1.1. Gemini *Warp* Features

Two Data Analyzers In One - Gemini contains two complete data communications analyzers in one compact package. This makes it easy to perform end-to-end tests on modems, DDS sets, limited distance modems, ISDN terminals, multiplexers, and other data communications equipment. Gemini's terminal emulation, data monitor, and performance testing features operate at rates from 45 to 2.048 Mbps.

Advanced Performance Tests - Gemini provides built-in performance testing capabilities, including Bit Error Rate/Throughput (BERT) tests, Block Acknowledge Delay tests, Call Connect Reliability tests, Character Echo Delay tests, Data Compression/File Transfer Performance tests, Multi-Point Polling tests, and Polling tests.

High Speed BERT Testing - Gemini *Warp* performs BERT tests at rates up to 2.048 Mbps with internal clock generation. Other Gemini test applications operate at rates up to 256 Kbps.

Built-In Call Setup - Gemini can store and execute call setup instructions for virtually any modem. Call setup data formats include asynchronous, synchronous, and HDLC protocol. Characters can be coded in ASCII or EBCDIC. Gemini can also monitor and display the data flow to and from each modem. Gemini provides complete testing capability, and eliminates the additional terminals, protocol analyzers, and switching equipment previously required for modem test setups.

EIA/TIA-530-A Interfaces - Gemini *Warp* supports the EIA/TIA 530-A Alt A interface as well as the RS-232 interface at either station A or B. The EIA/TIA 530-A interface standard is currently being implemented on many high speed modems and other data communications equipment. The Gemini *Warp* supports use of the same interface at both stations, or mixed interfaces (i.e., RS-232 at station A and 530-A at station B).

High Speed RS-232 Interfaces - The electrical interface for RS-232 provides V.10 compatible signal levels and templates for higher speed operation using the standard 25-pin RS-232 connector (as per the TIA Subcommittee TR-30.2 document SP-3058, dated November, 1993). For details refer to section 8.3. This interface is still fully compatible with other RS-232 standard implementations.

NOTE: The RS-232 to V.35 adapter cables which were used with the Gemini 1022 and 1022HS models will not work with the reduced voltage levels of the Gemini *Warp*. The Gemini *Warp*'s EIA/TIA 530A interfaces may be connected directly to V.35 interfaces using an appropriate adapter cable. V.35 adapter cables may be ordered from TAS.

Programmable RS-232 Interfaces - Gemini *Warp* supports multiple configurations of the RS-232 interfaces. To provide support for the various domestic and international standards, two pins on the standard 25 pin RS-232 interface are programmable. Pins 21 (Signal Quality Detect or Remote Loopback) and 23 (Data Rate Select) may be configured to be output signals, or input signals.

Signal Lead Timing Measurements - Gemini *Warp* supports timing measurements of signals at either interface. Timing measurements may be performed in parallel with any other test without degrading the performance of that test. Timing measurements may be either continuous (self triggering), or one-shot. Measurements may be performed between signals on the same station, or between stations. Timing measurements are available at either RS-232 or 530-A interfaces on the following signals:

Transmit Data	Receive Data
Transmit Clock	Receive Clock
External Transmit Clock	Request to Send
Clear to Send	Data Carrier Detect
Data Terminal Ready	Data Set Ready
Ring Indicator	Sec. Transmit Data (RS-232 only)
Sec. Receive Data (RS-232 only)	Sec. Request to Send (RS-232 only)
Sec. Clear to Send (RS-232 only)	Sec. Data Carrier Detect (RS-232 only)

Remote Control - RS-232 and IEEE-488 (GPIB) control are standard with Gemini. Remote control commands are simple and easy to use, and are the same regardless of the remote control method. This makes it easy to include Gemini in automatic modem test systems.

RS-232/GPIB Command Translator - Gemini can act as the GPIB controller in an automatic test system. Commands are sent to Gemini via the RS-232 remote control port, and Gemini controls the rest of the test station via GPIB. This allows any standard PC to act as a GPIB controller without additional GPIB control hardware.

Optional Interface Modules - As new interface standards are adopted, your Gemini *Warp* can be upgraded with optional interface modules from TAS. Contact your TAS sales representative for more information.

Software Upgrades - The Gemini *Warp* software is stored on EPROMs located inside the unit. You can easily upgrade your software by replacing the EPROMs.

1.2. Gemini Feature Comparison

The following table provides a quick reference to the major functional differences between the Gemini 1022HS, 1022VS, and *Warp* models.

FEATURE	**1022HS**	**1022VS**	*Warp*
BERT Test	Yes	Yes	Yes
2.048 Mbps BERT Test	No	No	Yes
Polls Test	Yes	Yes	Yes
Multi-point Polls Test	Yes	Yes	Yes
Built-in Call Setup	Yes	Yes	Yes
Data Compression Test	Async only	Sync/Async	Sync/Async
Character Echo Delay Test	No	Yes	Yes
Block Acknowledge Delay Test	No	Yes	Yes
RS-232 and GPIB remote control	No	Yes	Yes
RS-232/GPIB command translator	Yes	Yes	Yes
Timing measurements	No	Yes	Yes
EIA/TIA 530-A interface	No	Yes	Yes
Maximum internal clock rate	128 Kbps	256 Kbps	2.048 Mbps
High Speed RS-232 Interfaces	No	Yes	Yes
User programmable interface signals	No	Yes	Yes
External software cartridge	Yes	Yes	No
Software upgrades available	Yes	Yes	Yes
Optional interface modules	No	No	Yes

Table 1-1. Feature Comparison

1.3. Gemini Applications

1.3.1. Transmission Performance Testing

Figure 1-1 shows the TAS 182GT Modem Test System. In this setup, the TAS 182 Telephone Network Emulator simulates telephone network conditions, and Gemini measures modem performance parameters such as bit error rate and throughput. Gemini also sends and monitors modem call setup commands. Since Gemini contains two data analyzers, it performs call setup at both modems without switching the data connections, and it measures modem performance simultaneously at both test interfaces. The PC executes the test control program (in this case, TASKIT/100). The PC controls Gemini directly, and controls the TAS 100 Series Telephone Network Emulator via Gemini's built-in RS-232/GPIB protocol converter.

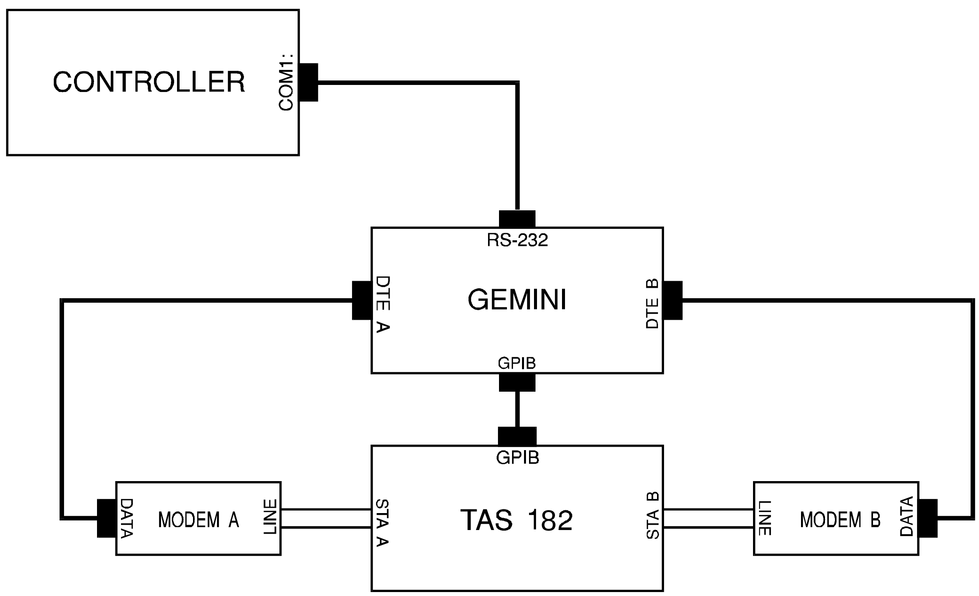

Figure 1-1. TAS 182GT Modem Test System

The Gemini *Warp* also performs testing for modems with data compression and error control protocols. The Gemini Data Compression/File Transfer test measures the effective transfer rate of these modems and evaluates their performance.

Gemini *Warp* can simulate a multi-point configuration network, in which a central control point (master) maintains contact and communication with several sites (slaves).

Gemini can verify modem functionality by transmitting command strings to the modem and comparing the modem's response to a preset expected response, including time limit specifications.

1.3.2. Testing ISDN Transceivers, DDS Sets, or LDMs

Figure 1-2 shows a test setup for ISDN U-interface transceivers. In this setup, the TAS 2200A Loop Emulator simulates subscriber loop conditions, and Gemini measures transceiver performance parameters such as bit error rate. A similar setup can be used to test limited distance modems, DDS sets, and other wideband data transceivers.

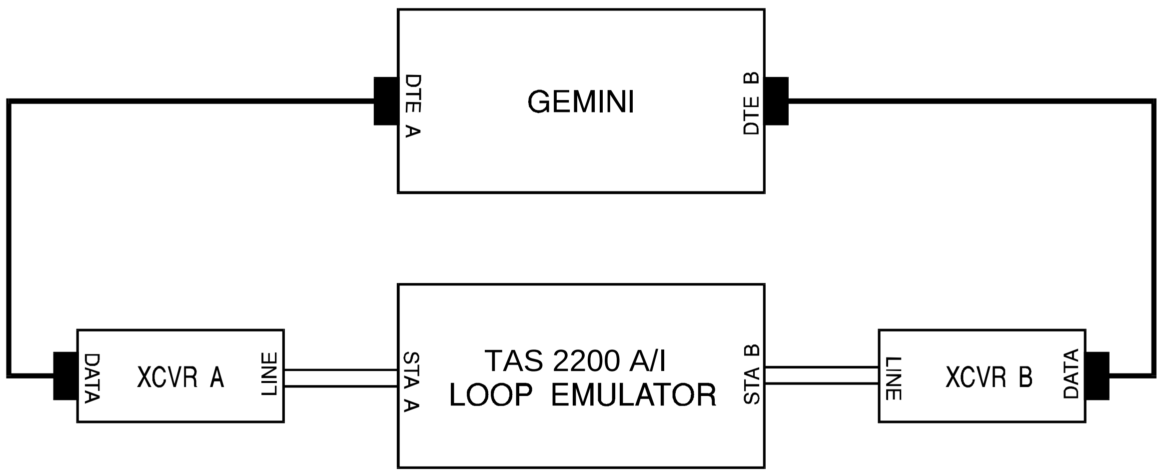

Figure 1-2. Testing ISDN U-Interface Transceivers

1.3.3. Communications Link Testing

Figure 1-3 shows Gemini testing an end-to-end data communications link. Gemini contains two independent data analyzers, so it can simultaneously test more than one port on a multi-port modem or multiplexer. Since Gemini uses industry-standard data test patterns, it can work with a variety of other data analyzers.

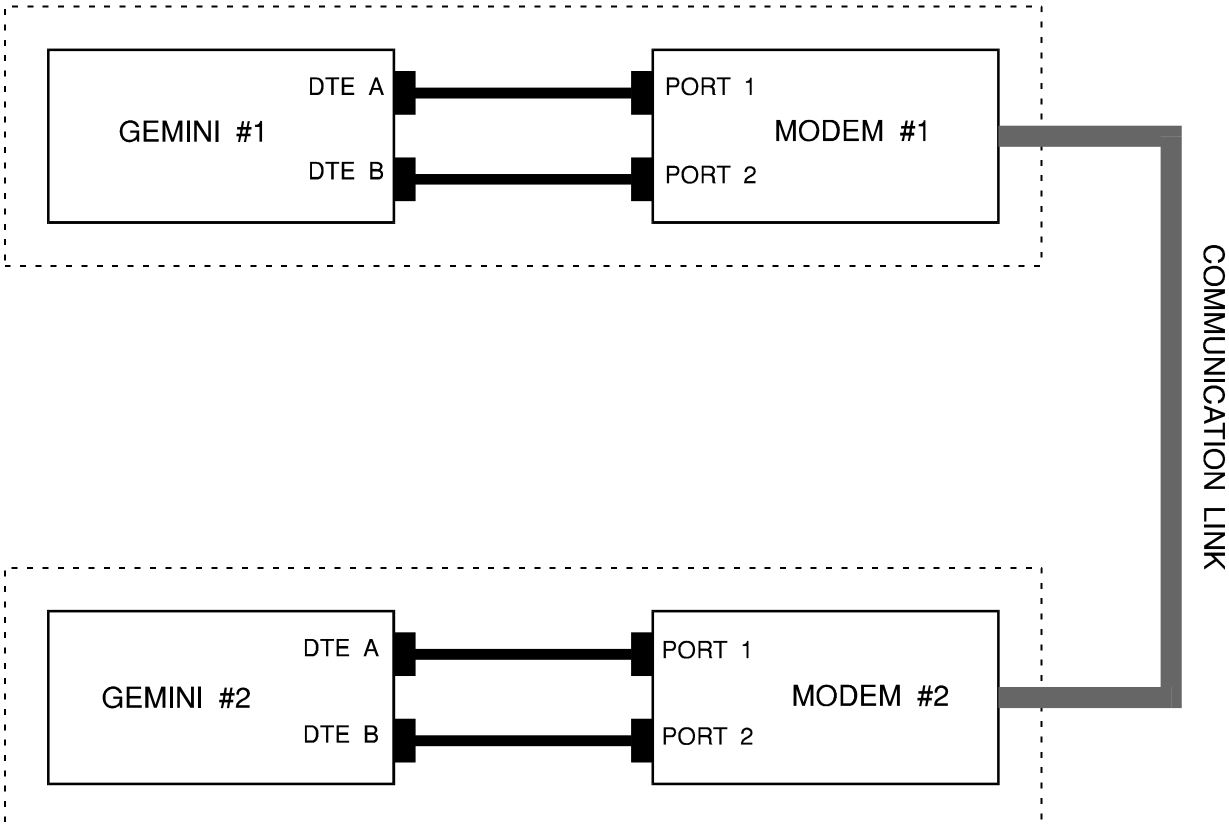

Figure 1-3. Communications Link Test Configuration

1.4. Guided Tour

1.4.1. Front Panel Description

Figure 1-4 shows the Gemini front panel. The following sections describe each front panel feature.

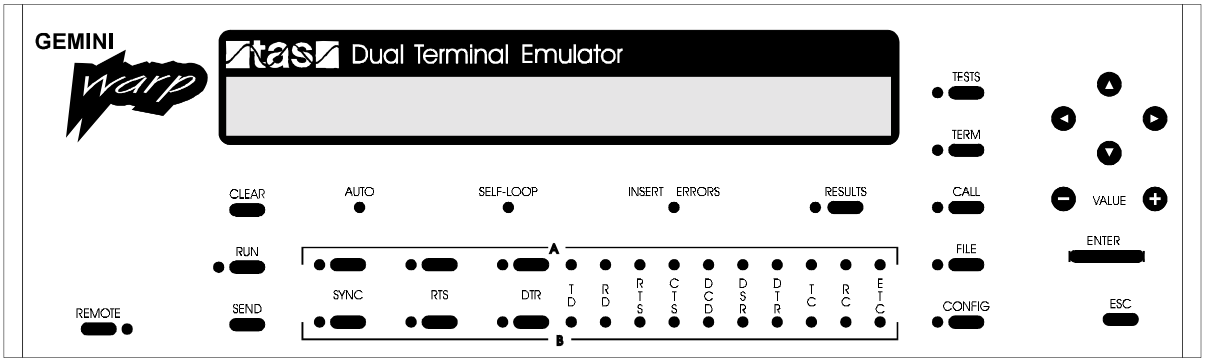

Figure 1-4. Gemini Front Panel

Front Panel Buttons

The TESTS key selects the TESTS menu. This menu allows selection of the test mode and all parameters for performance tests such as Bit Error Rate Throughput (BERT) test, Call Connect Reliability test, Data Compression/File Transfer test, Multi-Point Polling test, and Polling test.

The TERM key selects the TERM menu. This menu permits selection of separate terminal parameters for call setup data and test data. Terminal parameters include protocol (sync, async, etc.), bit rate, flow control, etc. This menu also allows selection of the currently active interface (either RS-232 or EIA/TIA 530-A) at both stations A and B. This menu also lets you set and/or read the status of interface leads that do not appear on the interface status monitor.

The CALL key selects the CALL menu. This menu allows you to enter, edit, and transmit call setup strings to autodial modems.

The FILE key selects the FILE menu. Here you are allowed to load predefined tests, configured by TAS. You may also save all test and terminal parameters in nonvolatile RAM for recalling at a later time.
The CONFIG key selects the CONFIG menu. This menu displays Gemini software version, status, and installed options, and allows selection of Gemini operating modes and bus control modes.

The menu navigation keys, located at the far right side of the panel, allow you to scroll between lines (↑, ↓) or fields (←, →) of a menu.

The value keys (+ and -) allow you to edit parameter values.

The ENTER key accesses a submenu. A carriage return symbol (↵) appears at the right side of each menu item that has a submenu.

The ESC key allows you to exit a submenu.

The RESULTS key displays test results in the LCD display when the results indicator is on, and displays menu information when the indicator is off.

The CLEAR key clears the test results display.

The RUN key starts or stops the analysis of test data. The RUN indicator is on when analysis is active.

The SEND key performs two different functions.

- In Call Setup mode, the SEND key transmits the currently selected call setup string.
- In BERT or Polling test mode, you can insert one error in the transmit data stream each time you press the SEND key.

The REMOTE key enables/disables remote control operation. When remote operation is enabled, menu parameters cannot be changed from the front panel. However, the menu navigation keys can still be used to view parameter values.

Front Panel Indicators

The MAIN DISPLAY shows all control menus and test results.

The A/B TEST INTERFACE contains the interface status monitors, and provides buttons for control of RTS and DTR functions.

When the INSERT ERRORS indicator is on, Gemini is inserting errors into the transmit data stream for both the A and B test interfaces.

When the SELF-LOOP indicator is on, Gemini is looping transmit data to receive data at both the A and B test interfaces.
The AUTO indicator is reserved for future use.

The front panel keys and displays provide access to most of Gemini's features. Using the front panel, you can set up and execute tests, perform modem call setup, and save and recall test configuration files.

Gemini's front panel has a two line LCD display which is used to navigate through the menu structure and to provide information to the user such as test results. In this manual, illustrations of this display appear as shown here:

```
GEMINI
DUAL TERMINAL EMULATOR
```

Gemini can not display an entire menu at one time. For your convenience, this manual will list an entire menu, as shown here:

```
Menu item #1
Menu item #2
Menu item #3
Menu item #4
```

Gemini's functionality is organized into a menu structure consisting of five main menus and several submenus. The five main menus correspond to five buttons on the front panel. To designate where a menu entry is found, a menu path will be specified in the following format:

MAIN MENU (BUTTON) NAME \ SUBMENU NAME \ SUBMENU NAME \ ...

1.4.2. Rear Panel Description

Figure 1-5 shows the rear panel of the Gemini. The following sections describe the rear panel features.

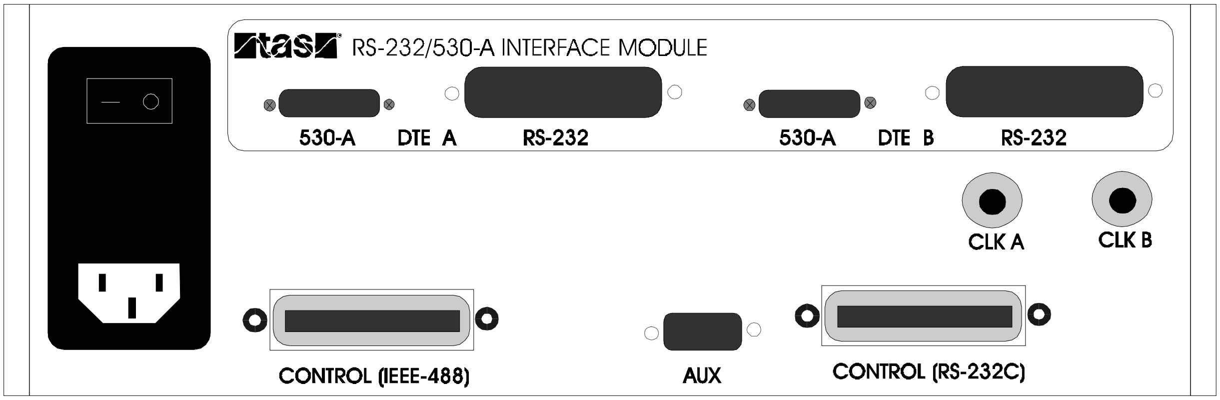

Figure 1-5. Gemini Rear Panel

The 530-A and RS-232 DTE A and DTE B ports each provide the interface to one of Gemini's two independent data analyzers.

The CLK A, CLK B connectors receive the external clock signals for station A and station B analyzers.

The CONTROL (IEEE 488) port allows an external GPIB controller to control Gemini. Gemini's RS-232/GPIB Translator also uses this port to control other GPIB instruments.

The CONTROL (RS-232C) port allows an external computer to provide control of Gemini via RS-232 Carriage Return/Line Feed or RS-232 ACK/NAK protocol.

The AUX port is reserved for future use.

The AC SWITCH/RECEPTACLE ASSEMBLY contains the AC on/off switch and the AC power connector.

1.5. Getting Started

To prepare the Gemini *Warp* for initial operation, perform the following steps:

1. Unpack the Gemini *Warp* shipping carton. The carton should contain the following items:
   - Gemini *Warp* Dual Terminal Emulator
   - Operations Manual
   - AC power cord
   - GPIB cable
   - Two RS-232 test cables
   - 3.5” disk containing TASKIT/Gemini for Windows and TASKIT/Gemini Operations Manual

NOTE: Verify that all parts listed above are contained in your Gemini *Warp* shipping carton. Save the shipping carton and packing materials until you have completed the system installation and initial check. If you must return equipment, please use the original box and packing material.

2. Check each item for physical damage. If any part appears damaged, contact the TAS Customer Service department immediately.
3. Verify that the power switch at the upper left side of the rear panel is in the off (0) position. Plug one end of the AC power cord into the Gemini, then plug the other end into the AC source.
4. Set the AC power switch to the on (1) position. Gemini now executes its power-up diagnostic sequence, and briefly displays the following message on the MAIN DISPLAY:

```
Gemini Warp
Dual Terminal Emulator
```

If Gemini detects an error, it shows the appropriate status code on the main display. If Gemini loses the contents of its battery-backed memory, it displays the following message:

```
Gemini Warp
Memory lost, restore from default
```

Press the ESC key to clear the message and restore Gemini's default settings.

Consult Section 2, "Local Operation", for further information. If you intend to use a computer or data terminal to control Gemini, also consult Section 5, "Remote Operation".

NOTE: If the Gemini *Warp* encounters a failure during its initial diagnostic operation, note the error code displayed on the front panel, and refer to the Error Code section of this manual. If necessary, obtain troubleshooting advice from the TAS Customer Service department.

1.6. Feature Release History

Version 5.11

Firmware Version 5.11 fixed several software bugs, all associated with the synchronous call setup modes of the Gemini WARP. Prior to Version 5.11 the character format for sync call setup was incorrect (i.e. character length and parity). In addition when HDLC call setup protocol was selected, the framing of HDLC frames was incorrect.

Version 5.12

Firmware Version 5.12 fixed two software bugs. RTS control during Multi-point Polls test now functions correctly. Error reporting in the call connect reliability test has been fixed; previous versions report a no carrier error and a bad response error if either error condition was detected.

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2.0. LOCAL OPERATION

This section describes how to operate Gemini from the front panel. Before attempting to use Gemini from the remote link, you should read this section to understand the basic operation of Gemini. This section contains information that you will need if you are using Gemini from the front panel or from the remote link.

Gemini provides two control options: Local and Remote. For local control, you use Gemini's front panel keys and display to set up and execute tests. For remote control, you must attach a computer or terminal to one of Gemini's control interfaces (RS-232 or GPIB), and use the computer or terminal to set up and execute tests. This section of the manual describes the Gemini local operations. Section 5, "Remote Operation", describes the Gemini remote control protocols and commands.

For local operation, the REMOTE indicator must be off. This indicator and the REMOTE key are located at the lower left of the Gemini front panel. If the REMOTE indicator is on, press the REMOTE key to turn it off.

2.1. Menus Overview

Gemini provides a convenient and easy-to-use menu structure that gives easy access to all of its functions. This section will give you instructions on navigating through Gemini's menu structure using the keys on the right side of Gemini's front panel. You will also find specific information about the different menus which appear in Gemini's main display.

There are five main menus in the Gemini: CALL, CONFIG, FILE, TERM, and TESTS. Each of these menus is represented by a key on the Gemini panel. To access one of these menus, simply press the associated key. For example, to access the CONFIG main menu, press CONFIG. The indicator next to the key will light to indicate the current menu. These menus organize Gemini's functionality so that you can find the features you need easily. Once you become familiar with Gemini's menu structure, you will find it easy to use. In Section 3, "Menu Reference", you will find a complete listing of all of Gemini's menus.

Use the ↑ and ↓ keys to scroll through each line of the menu. Gemini will beep if ↓ is pressed at the last line of the menu or if ↑ is pressed at the first line of the menu.

Some of Gemini's menus have more than one field or entry on the same line. The ← and → keys provide access to entries on the same line. If ← is pressed when the cursor is positioned at the leftmost entry, Gemini will beep. Similarly, if → is pressed when the cursor is positioned at the rightmost entry, Gemini will beep. ← and → also allow you to navigate the cursor within numbers and strings.

If a menu entry has a submenu associated with it, Gemini will display ↵ after the entry. To enter the submenu, navigate the cursor to the ↵ using ← and → as necessary, and press ENTER. Gemini will display the name of the submenu in the upper left corner. As you enter more submenus, the submenu names are appended to the upper left corner. This menu path is useful when navigating through Gemini's menu structure. To return from a submenu, press ESC.

When a menu key is pressed, Gemini recalls its place in that menu and returns there. To jump to the top of the menu, press the associated main menu key twice.

Each menu entry has a parameter value associated with it. The parameter value associated with a menu entry can be changed by using + and -. For example, if a menu entry is "clock rate", you can adjust the value with the + and - until the clock rate you want appears. In summary, the guidelines for operating the Gemini menus are as follows:

- Press TESTS, TERM, CALL, FILE, or CONFIG to select a main menu.
- Press ENTER to enter a submenu.
- Press ESC to exit a submenu.
- Press ↑ or ↓ to scroll up or down within a menu.
- Press ← or → key to position the cursor within a menu line.
- Press the + or - key to change the value of the current menu parameter.
- Gemini displays ↵ at the right side of a menu parameter to indicate that a submenu is present.
- When you return to a main menu, Gemini displays the same menu or submenu line that it displayed when you exited the menu.
- If you press the menu key for the currently selected menu, Gemini positions the cursor at the top level and first line of the menu.

2.1.1. TESTS Menu

The TESTS menu is where you select the test mode and specify the parameters for the selected test. The TESTS menu also allows you to setup lead timing measurements and select the self-loop and insert errors options. To enter the TESTS menu, press the TESTS key.

Test Modes

Since Gemini is a multifunctional data analyzer, it has multiple modes of operation. The test mode must be explicitly selected by the user in the TESTS menu. Gemini displays the selected test mode in the upper right side of the LCD display. The following test modes are available:

`bert`	Bit Error Rate/Throughput
`hs_bert`	High-Speed Bit Error Rate / Throughput
`calls`	Connect Reliability
`data_comp`	Data Compression/File Transfer
`multi_pt`	Multipoint Polling
`polls`	Polling
`echo`	Character Echo and Block Acknowledge Delay

A brief description of each test is contained in the introduction. The operation of each test is covered individually in this section. To select a particular test, perform the following steps:

1. Press the TESTS key twice to display the top menu line of the TESTS menu. Gemini will display the following:

```
>                                                   [bert]
TEST MODE: bert↵
```

2. Press the + or - key to scroll through the test modes until the desired test mode appears. As a you scroll through the test modes, Gemini requires a few seconds to reprogram its data analyzers. During this time, Gemini will make a ticking sound to remind you to wait until it is finished.

All test parameters associated with any particular test mode are contained in its submenu, as indicated by the ↵ after the test name. To access the test parameters, press ENTER. All of these parameters are discussed individually in Section 4, "Gemini Parameters Reference".

To select Character Echo or Block Acknowledgment Delay test, select the test mode echo. Enter the submenu by pressing enter. Gemini will display the following.

```
>                                                   [echo]
ECHO TYPE: char_echo↵
```

Press the + or - key to select the desired echo type.

Lead Timing Measurement

The second line of the TESTS menu allows you to setup the lead timing measurement options. To access the timing measurement parameters, press ENTER.

Self-Loop and Insert Errors

The next line of the TESTS menu allows you to select the self-loop and insert errors options. If you set self-loop to yes, Gemini internally connects transmit data to receive data at test interfaces A and B.

If insert errors is set to yes, Gemini inserts approximately one error per second in the data stream of each transmitting test interface. This feature is only available for the BERT and Polls tests. In all other tests, Gemini ignores this setting.

```
>                                  [bert]
SELF-LOOP: no   INSERT ERRORS: no
```

You can find more information about these parameters in Section 4, "Gemini Parameters Reference".

2.1.2. TERM Menu

The TERM menu provides control of terminal configuration parameters for both of Gemini's data analyzers, and provides control and display of interface selection (530-A or RS-232) and modem control signals. Terminal configuration parameters include transmission protocol, bit rate and clock source, flow control options, and more. To access the TERM main menu, press the TERM key. Below is an illustration of this menu.

```
>                                  [bert]
TESTS↵     CALLS↵     INTF↵
```

Gemini provides two independent sets of terminal parameters: one set for call setup mode and another set for test mode. This allows you to perform, for example, asynchronous call setup followed by a synchronous BERT test, without reconfiguring terminal parameters.

Within the TERM menu, you can access three submenus: `TESTS`, `CALLS`, and `INTF`. The TERM\TESTS submenu allows you to select the terminal parameters for Gemini's test applications. The TERM\CALLS submenu allows you to alter the terminal parameters used for Call Setup. The TERM\INTF submenu allows you to control and/or display INTF interface leads that do not appear on Gemini's front panel.

For a complete listing of these menus, see Section 3, "Gemini Menu Reference". In Section 4, see "Test Terminal Parameters" for the test terminal parameters, and "Call Setup Terminal Parameters" for the calls terminal parameters.

2.1.3. CALL Menu

The CALL menu allows you to enter and send command strings to any device connected to Gemini's DTE interfaces. This is especially useful in setting up a call with autodial modems. When you press the CALL key, Gemini stops the current test and suspends that test mode so that it can enter Call Setup mode, which is indicated in the upper right corner of the display. Gemini will take a few seconds to reprogram its data analyzers when entering Call Setup mode. During this time, you will hear a ticking sound to remind you to wait until Gemini finishes. When you press the TESTS key again, Gemini will switch from Call Setup mode to the previous test mode. The following is an illustration of the CALL menu.

```
>                  Edit: A-Z [call_setup]
STRAP A: ATZ^M♦
```

Each line of the eight-line menu contains a command string. Gemini can send these strings to any RS-232 device connected to its DTE interfaces. Gemini sends commands that have an A suffix to test interface A, and sends commands that have a B suffix to test interface B. These strings are organized into categories based on how they are used with modems. For more information on using the CALL menu and Call Setup mode, see "Performing Call Setup" in this section.

2.1.4. FILE Menu

The FILE menu allows you to save and recall Gemini test setup files. Recalling a test setup file reprograms all Gemini's test parameters, terminal parameters, and call setup modem strings in a single step.

You can save your own test definitions in 5 user-defined test setup files. The user-defined setup files are stored in non-volatile memory, so they are saved even if the Gemini is turned off. The user-defined setup files are named file0, file1, and so on; you can create a label for each file to help you remember its purpose.

Gemini also has 25 predefined test setup files. You cannot modify the predefined test setup files, but you can modify any parameter once a predefined file has been recalled. The modified settings can then be saved in one of the 5 user-defined files.

File Recall

You recall Gemini test setup files from the recall line of the FILE menu. To recall a file, select the file using the + or - key and press ENTER. An illustration of this display is shown below:

```
>                                [call_setup]
RECALL: 1200_async↵      FDX·DIAL
```

Gemini prompts you to press ENTER again before recalling the file. If you decide not to recall the file, press ESC to return to the FILE menu:

```
Press <enter> to recall setup,
or <esc> to return to previous menu.
```

File Save

You can save Gemini test setup files on the save line of the FILE menu. The save line is located directly below the recall line. To save a file, use the + or - key to select the target file (`file0`- `file4`). Next, move the cursor to the `LBL` field and use the String Editor to enter a label for the file. Finally, press ENTER. Gemini prompts you to press ENTER again to save the file. If you decide not to save the file, press ESC to return to the FILE menu.

```
>                                [call_setup]
SAVE: file0↵          LBL: ♦
```

2.1.5. CONFIG Menu

The CONFIG menu allows you to check Gemini operating status and to set remote control protocol options. To access the CONFIG menu, press CONFIG.

Status, Model, Version

The first line of the CONFIG menu shows the Gemini status, model number, and software version. These are read-only fields. Below is an illustration of this menu line.

```
>                                  [bert]
STATUS: OK   MODEL: WARP    VER: 5.00
```

Remote Protocol

Remote Protocol allows you to select one of three options for remote control of Gemini. These options are GPIB (IEEE-488), RS-232 ACK/NAK, and RS-232 CR/LF. Section 5, "Remote Operation", fully details Gemini's remote control capabilities and options.

```
>                                  [bert]
REMOTE PROTOCOL: acknak↲
```

Protocol Response Mode

Protocol Response Mode allows you to set Gemini for verbose or terse command responses. Verbose responses are more readable by human eyes on the computer-Gemini control link. Terse responses contain fewer characters, simplify command decoding at the computer, and result in faster execution of test control programs. Please see Section 5, "Remote Operation" for further explanation of this option.

```
>                                  [bert]
PROTOCOL RESPONSE MODE: verbose
```

2.2. Performing Call Setup

Gemini can be used to send character strings to the devices connected to its DTE interfaces and monitor the response. Since Gemini has been traditionally used for modem testing, this section will assume a modem is connected to Gemini, but any 530-A/RS-232 device can be connected to Gemini for use with this feature.
Call Setup mode can be used to:

- Establish a call between autodial modems prior to running a test
- Configure modem options
- Test a modem's command mode operation

The next section lists the steps Gemini performs in Call Setup mode.

The following is a detailed step by step procedure performed by Gemini during Call Setup.

When CALL is pressed, Gemini performs these steps:

1. Stop any test (excluding Call Setup) in progress.
2. Program the data analyzers for Call Setup mode.
3. Program DTE A and DTE B with call setup terminal parameters.
4. Display the Call Setup menu on the display.

When SEND is pressed during Call Setup, Gemini performs these steps:

1. Turn on the RUN indicator
2. Transmit the selected string from the appropriate DTE port.
3. Buffer all transmitted and received data until RUN is pressed or until the buffer fills up.

2.2.1. Overview of Operation

Many modems have two modes of operation, command mode and data mode. In command mode, characters received from the DTE are interpreted as commands to the modem. Call Setup mode is usually used to communicate with a modem in its command mode rather than in its data transfer mode.

Briefly, here are the steps you will follow to use Gemini's Call Setup mode to communicate with the modems under test:

1. Enter the correct Call Setup terminal parameters for communicating with the modems in its command mode.
2. Press CALL to stop any test in progress and reprogram Gemini's DTEs using the Call Setup terminal parameters.
3. Enter appropriate command strings for selecting modem straps, originating, answering, and dropping the call, using the CALL menu.
4. Set RTS and/or DTR using the keys on the front panel.

NOTE: Many dial modems will not process commands unless DTR is active.

5. Select a command string to send using the CALL menu, then press SEND. This also activates the data monitor.
6. Press RESULTS to monitor the command and response on the main display.
7. When the response has been received, press RUN to disable the data monitor and review the modem response.

Entering Call Setup Terminal Parameters

Gemini uses a different set of terminal parameters in Call Setup mode than are used when running most of the tests. This is useful when the modem under test is configured to use a different protocol or data rate in command mode than in data mode.

The Call Setup terminal parameters are entered using the TERM\CALLS submenu, as detailed in the previous section "Menus Overview". For more information on these parameters, see Section 4, "Gemini Parameters Reference". For a listing of the menu structure, see Section 3, "Gemini Menu Reference".

Selecting Call Setup Mode

Before any modem commands can be sent, any test in progress must be stopped, which Gemini does automatically when you press CALL. Whenever Call Setup mode is active, Gemini will show `[call_setup]` in the upper right corner of its display. When TESTS is pressed again, Gemini will reprogram the data analyzers with the test terminal parameters and restore the previous test mode.

Entering Modem Command Strings

Gemini can store 4 command strings for each of its two DTEs. Each line in the CALL menu lists one command string entry. The name of the command string appears on the left side of the display, followed by a ":". Those command string names that end in `A` are sent to DTE A, while those command string names that end in `B` are sent to DTE B. The following list describes each of the call menu command strings:

`STRAP A`, `STRAP B`	modem initialization commands
`ORIG A`, `ORIG B`	call origination commands
`ANSW A`, `ANSW B`	call answer commands
`DROP A`, `DROP B`	call disconnect commands

The command strings may be edited from the front panel while in the CALL menu. Use the navigation keys to find the string you wish to edit. To see a complete listing of the CALL menu, see Section 3, "Gemini Menu Reference". For a complete description of using the Gemini String Editor, see "Gemini String Editor" later in this section.

Setting RTS and DTR

The Request To Send (RTS) and Data Terminal Ready (DTR) leads are controlled by the corresponding keys on the Gemini front panel. The LED next to each key shows the current state of the corresponding lead. When the LED is lit, the associated lead is active. When the LED is not lit, the associated lead is not active. Gemini does not automatically control these leads for you when using Call Setup.

Sending the Command String

The CALL menu is used to select which command string to send to the modem. To select a command string, use ↑ and ↓ to find the string you wish to send. Once the desired string appears in Gemini's display, press SEND to send the command to the modem.

Monitoring the Modem Response

When you press SEND, the selected string will be sent from the appropriate DTE. Gemini then automatically turns on its data monitor. The RUN indicator is turned on to show that Gemini is monitoring the terminal interface.

If you press RESULTS, Gemini displays the data sent and received by each DTE. Use ↑ or ↓ to scroll the results display, viewing data at both test interfaces (A and B). In the results display, each line is prefixed with a label to describe the information contained there. The following list describes the meaning of these labels:

`Tda`	Data transmitted by Gemini to DTE port A.
`Rda`	Data received by Gemini from DTE port A.
`Tdb`	Data transmitted by Gemini to DTE port B.
`Rdb`	Data received by Gemini from DTE port B.

Gemini's display has no way of representing some of the special characters that can be sent or received, such as the tab character. To display these special characters, Gemini uses the same techniques that are used to enter these characters using the Gemini String Editor. To find out how these characters are represented, see the section "Gemini String Editor" later in this section. The figure below illustrates the first two lines of the Call Setup results display.

```
Tda:                    AT·&F^M →→→→→→
Rda:                    AT·&F^M^M^JOK^M^J
```

Gemini monitors the data lines at A and B until RUN is pressed, or until the data buffer fills up. Gemini can store up to 2048 characters in its data buffer for each test interface.

When Gemini is monitoring the data, it will scroll the data off the display to the left as new data is received for displaying. You can not review data that has scrolled off the display while the Gemini is monitoring the data. You must deactivate the data monitor to review the data by pressing RUN. Note that this will also cause Gemini to stop transmitting data (if there is more data to transmit) and will also cause Gemini to stop buffering data received at either DTE port.

Reviewing the Modem Response

When the data monitor is off, the buffered data of the last command and response can be reviewed on the main display. Use ← and → to scroll the display one character at a time. Gemini beeps if you try to scroll past the first character or the last character in the data buffer. The hexadecimal equivalent for the leftmost character on the display is shown in the brackets at the left side of the display. Below is an example of reviewing the buffered data.

```
Tda[41]:AT Z^M→→→→
Rda[--]:→→→→AT Z^M
```

RESULTS is used to toggle between the data display and the current menu. For example, while reviewing the buffered data, you can see the menu by pressing RESULTS. To switch back to the buffered data, press RESULTS again. The RESULTS indicator is lit when monitoring or reviewing the buffered data.

Saving / Recalling Call Setup Parameters

You can save Call Setup parameters and strings (as well as all other test parameters) for reuse later. To do this, use the FILE menu to save user-defined test setups. See the section titled "FILE Menu", earlier in this section, for more detailed instructions.

2.3. Performing BER/Throughput (BERT) Tests

Gemini's bit error rate/throughput (BERT) tests measure modem error rate and throughput statistics independently at each of Gemini's test interfaces. The Gemini *Warp* has two BERT test applications; one is for low-speed testing, the other is for data rates up to 2.048 Mbps.

The BERT tests characterize the steady-state data transmission performance of an end-to-end data communications link. Each Gemini test interface (A, B) contains a data transmitter and a data receiver. The data transmitters send a selected test pattern. Each data receiver compares received data with the selected pattern and reports errors. The receivers also monitor the average rate at which data is received during the test and report throughput results.

Briefly, here are the steps you will follow to use Gemini's BERT test modes:

1. Select the desired BERT test application using the TEST menu.
2. Enter the desired terminal parameters for the test, using the TERM menu.
3. Select the test configuration, test duration, data pattern and block size parameters from the TEST menu.
4. Adjust the pattern synchronization parameters.
5. Select manual or semi-automatic test termination.
6. Specify test failure criteria.
7. Establish a call between the modems, using Call Setup if needed. Return to BERT test mode.
8. Press RTS to start data transmission. The analyzer will automatically synchronize itself with the incoming data. Monitor the SYNC indicator, which comes on when the analyzer is recognizing the pre-determined pattern.
9. Press RUN to begin analyzing the incoming data and gathering test statistics.
10. Press RESULTS to monitor the test results.
11. When the test has finished, the RUN indicator will be turned off. The RUN key may be used to manually stop the test at any time.

2.3.1. BERT vs. High-Speed BERT

The Gemini *Warp* comes with two BERT test applications. The two BERT tests have much in common, but there are important differences between them. Your selection will depend on the data rates, protocols, and physical interfaces required for your testing.

The original BERT application is designed for testing modems and other data communications equipment at rates up to 256 Kbps. You may select either the RS-232 or EIA/TIA 530-A physical interface. The test supports both asynchronous and synchronous data protocols.

The High-Speed BERT application is designed for testing data communications equipment at data rates from 56 Kbps to 2.048 Mbps. The RS-232 interface cannot support these higher data rates, so you must use the EIA/TIA 530-A interface. Asynchronous data protocols are not available in this test, either.

To select a BERT test application, access the TESTS menu. Set the test mode parameter to `bert` or `hs_bert`. The selected BERT test mode is displayed in the upper right corner of the screen, as shown below.

```
>                                       [hs_bert]
TEST MODE: hs_bert↵
```

2.3.2. Entering BERT Terminal Parameters

When the BERT test mode is selected, Gemini's DTEs are automatically reprogrammed according to the test terminal parameters. Test terminal parameters include the data format, clock source, and, for internal clock source, the data rate. You can specify these parameters in the TERM\TESTS submenu. You can select the physical interface using the TERM\INTF submenu.

Depending on which BERT test you have selected, certain selections may not appear in the TERM menus. For example, if you select the High-Speed BERT test, you will be able to select clock rates up to 2.048 Mbps, but you will not be able to select the RS-232 interface.

For more information about using these menus, see "Menus Overview" earlier in this section. For a complete listing of the menus, see section 3, "Gemini Menu Reference". For more information about the test terminal parameters, see section 4, "Gemini Parameters Reference".

2.3.3. Configuring the BERT Test

Before starting the test, select the test configuration, test duration, data pattern and block size. These parameters are selected using either the TESTS\BERT or TESTS\HS_BERT submenu.

Test Configuration

First, select the test configuration. Several full duplex and half duplex options are available. For example, `ta|rb` will transmit data from DTE A and analyze data at DTE B, while `ta&b|ra&b` will transmit and analyze at both terminals.

```
>BERT                              [bert]
CONFIGURATION: ta&b|ra&b
```

Test Duration

The test duration can be specified as the number of blocks (see Block Size below) to analyze at each test interface, or as the length of the test in seconds. First, choose whether the duration will be measured in blocks or seconds.

```
>BERT                              [bert]
TEST DURATION IN: blocks↵
```

Next, enter into the submenu and select the test duration desired. Exit from the submenu to continue adjusting test parameters.

```
>BERT\DURATION\BLOCKS              [bert]
#BLOCKS:    1000
```

Block Size (BERT)

Dividing the received data into blocks makes it possible to determine whether errors occur in bursts or are evenly distributed. Gemini provides block error counts for this purpose. For asynchronous data protocols, the block size is specified in characters. For synchronous protocols, you specify the number of bits per block. The menu will indicate if you are specifying characters or bits per block, as shown below.

```
>BERT                              [bert]
BLOCK SIZE: 10^2 chars
```

The minimum block size which can be used to perform a BERT Test depends upon the speed of transmission. If the block size selected is too small, Gemini displays an error message on the first results screen (see section 2.3.7, BERT Test Results). Adjust the block size upwards until the block overflow error no longer occurs.

```
\BERT  A:BLOCK OVERFLOW   Blocks:      0
       B:BLOCK OVERFLOW   Blocks:      0
```

Block Size (High-Speed BERT)

The High-Speed BERT allows a wider range of block sizes to be selected. The block size may be set anywhere from 2 to 10,000,000 octets. This allows you to estimate the effect of errors on a wider variety of communications protocols.

```
>BERT                          [hs_bert]
BLOCK SIZE: 53 octets
```

Test Pattern

The test pattern is transmitted continuously during the test. Use one of the predefined patterns, or define your own. Predefined test patterns include simple repeating bit patterns such as `alt`, and pseudo-random patterns like `511`. The patterns `b1` and `b2` can be redefined using the Gemini String Editor. See "Gemini String Editor", located in this section, for instructions on how to use the String Editor.

```
>BERT                             [bert]
PATTERN: space
```

2.3.4. Pattern Synchronization

During a BERT test, the data pattern is transmitted repeatedly, with no breaks in between. Before the analyzer can correctly count bit errors in the data stream, it must find its place in the pattern. This process is called synchronizing with the pattern, and once accomplished, the test is said to be "in sync".

Each Gemini test analyzer will attempt to synchronize with the selected pattern as soon as a data and/or clock signal is available at the test interface. Once the test is in sync, the SYNC indicator is turned on.

Before the analyzer can declare the test in sync, it must:

- Match five consecutive characters (bytes) exactly.
- Record less than 20 character errors over the next 100 characters.

Sync Losses (BERT)

Once in sync, the analyzer continuously monitors the incoming data to verify that pattern synchronization is maintained, and therefore, the test results are valid. Error conditions, particularly those affecting the clock, can cause the analyzer to lose its place in the pattern, causing a loss of sync. When a sync loss occurs, the SYNC indicator is turned off.

A sync loss is detected when any of the following conditions occur:

- A bit error rate of 30% or more occurs during any one second period.
- Too much time passes without any data being received.
- The user presses the SYNC key, forcing a sync break.

If you prefer that the analyzers remain in sync despite error bursts greater than 30%, set the parameter Sync Loss - Error Burst in the TESTS\BERT submenu to `no`. With this setting, the bit error rate will not be used to determine sync loss.

```
>BERT                                [bert]
SYNC LOSS - ERROR BURST: no
```

The time which may pass without any data received before a sync loss occurs may be set from 1 to 99 seconds. If the modems being tested use error correction or data compression techniques, be sure to set this parameter to a large enough value that sync losses do not occur during the retransmission or buffering of data.

```
>BERT                                [bert]
SYNC LOSS - NO DATA:  3 sec
```

Sync Losses (High-Speed BERT)

The High-Speed BERT test defines sync loss criteria somewhat differently that the original BERT test (described above). For the High-Speed BERT test, the maximum allowable error rate may be set to one of three values:

low - 100 bit errors in 1000 bits

medium - 250 bit errors in 1000 bits

high - 10,000 bit errors in 50,000 bits

```
>BERT                          [hs_bert]
SYNC LOSS THRESHOLD: medium
```

Regaining Pattern Synchronization

After a sync loss, Gemini automatically tries to regain pattern synchronization. When Gemini regains sync, the SYNC indicator flashes to indicate the analyzer is back in sync. Pressing SYNC while the indicator is flashing will stop the flashing. If resynchronization is not desired, set `Resync Enable` to `no`.

```
>BERT                                        [bert]
RESYNC ENABLE: no
```

2.3.5. Manual and Semi-Automatic Operation

When manual operation is selected, the test will run until the programmed test duration is reached, or until RUN is pressed. If semi-auto operation is selected, the test will also stop when any test error limit is reached.

```
>BERT                                        [bert]
EXECUTION MODE: manual
```

Test Error Limits

Test error limits have two uses: pass-fail testing and semi-auto operation. For pass-fail testing, the test fails if any test error limit is reached. In semi-auto mode, the test will stop automatically if any test error limit is reached.

The following test error limits may be set for a BERT test:

- number of bit errors
- number of block errors
- number of characters errors (only counted for async protocols)
- maximum time for pattern synchronization any time pattern is out of sync
- number of sync losses
- number of errored seconds

2.3.6. Running a BERT Test

Pressing the RTS key raises RTS and starts data transmission. The RTS indicator is turned on, indicating that the test interface is transmitting the BERT pattern. The data analyzer will begin pattern synchronization as soon as data is received. When the SYNC indicator is turned on, Gemini is in sync and ready to start counting errors and measuring throughput. Pressing RUN starts error and throughput analysis. The RUN indicator is on while the test is in progress. Test results may be viewed by pressing RESULTS.

2.3.7. BERT Test Results

Test results are updated continuously during each test run. After the test is complete, the results are available until a new test is started or until CLEAR is pressed. CLEAR may be pressed while the test is in progress; this restarts the test from the beginning. You may scroll the results by using ↑ and ↓.

Test Status

Gemini displays the current status of the BERT analyzer. In semi-automatic operation, this screen will show which test error limit was exceeded:

```
\BERT  A:BIT ERROR LIMIT  Blocks:      0
       B:STOPPED          Blocks:      0
```

Pass-Fail Results

To run a Pass-Fail test, define test error limits (see previous) and run the BERT test. If the selected test duration is reached before any test error limit is reached, Gemini reports that the modems have passed the test.

If any test error limit is reached before the test finishes, Gemini reports that the modems have failed the test.

```
\BERT   A:READY  Blocks Analyzed:      0
        B:READY  Blocks Analyzed:      0
```

Error Counts

Gemini reports the number of bit errors, errored characters, and errored blocks counted at each test interface. The errored characters count is only available for async data.

```
\BERT\A          Blocks Analyzed:      0
Ber:      0   Cer:      0   Bler:      0
```

```
\BERT\B          Blocks Analyzed:      0
Ber:      0   Cer:      0   Bler:      0
```

Throughput Measurements

Gemini measures the rate at which data is received at each test interface. Three data rates are measured: bits/second, characters/second, and blocks/second. The characters per second rate is only available for async data.

```
\BERT\A          Blocks Analyzed:      0
Bps:0.000E+0 Cps:0.000E+0  Blps:0.000E+0
```

```
\BERT\B          Blocks Analyzed:      0
Bps:0.000E+0 Cps:0.000E+0  Blps:0.000E+0
```

Clock Frequency

Gemini continuously samples the transmit and receive clock frequencies at each test interface. The samples are not averaged; the measurement is updated about once a second.

```
\BERT\A
Txclk:1.200E+3  Rxclk:1.200E+3
```

```
\BERT\B
Txclk:1.200E+3  Rxclk:1.200E+3
```

Sync Losses / Sync Duration

Gemini reports the number of sync losses during the test. A clock displays the time (in seconds) that the test has remained in sync.

```
\BERT\A
Sync loss:     0       Duration:       0
```

```
\BERT\B
Sync loss:     0       Duration:       0
```

Total No Sync Seconds / Error Free Seconds / Errored Seconds

Gemini reports the total number of seconds that there was no pattern sync during the test as Total No Sync Seconds. Each second that the test is in sync, Gemini measures either an error free second if no errors occur, or an errored second if at least one error occurred. These results are displayed as EFS (Error Free Seconds) and Errored Seconds.

```
\BERT\A   Total No Sync Seconds:       0
EFS:       0    Errored Seconds:       0
```

```
\BERT\B   Total No Sync Seconds:       0
EFS:       0    Errored Seconds:       0
```

Total Test Seconds / Total Error Analysis Seconds

Gemini reports the duration of the test in Total Test Seconds. The duration is measured as the moment RUN is pressed and pattern sync is first established until the test is stopped either automatically by Gemini or manually by pressing RUN. Each second of the test that the pattern is in sync is measured as Total Error Analysis Seconds.

```
\BERT\A      Total Test Seconds:       0
   Total Error Analysis Seconds:       0
```

```
\BERT\B      Total Test Seconds:       0
   Total Error Analysis Seconds:       0
```

2.3.8. Example: Running a TAS-Defined BER/Throughput Test

In this example, you will recall and execute a TAS-defined BER/Throughput test for a Hayes-compatible 9,600 bps dial modem. The configuration for this test is shown in Figure 2-1. Please note that, for this example, the telephone number for the modem at DTE A is **1**, and for the modem at DTE B is **2**.

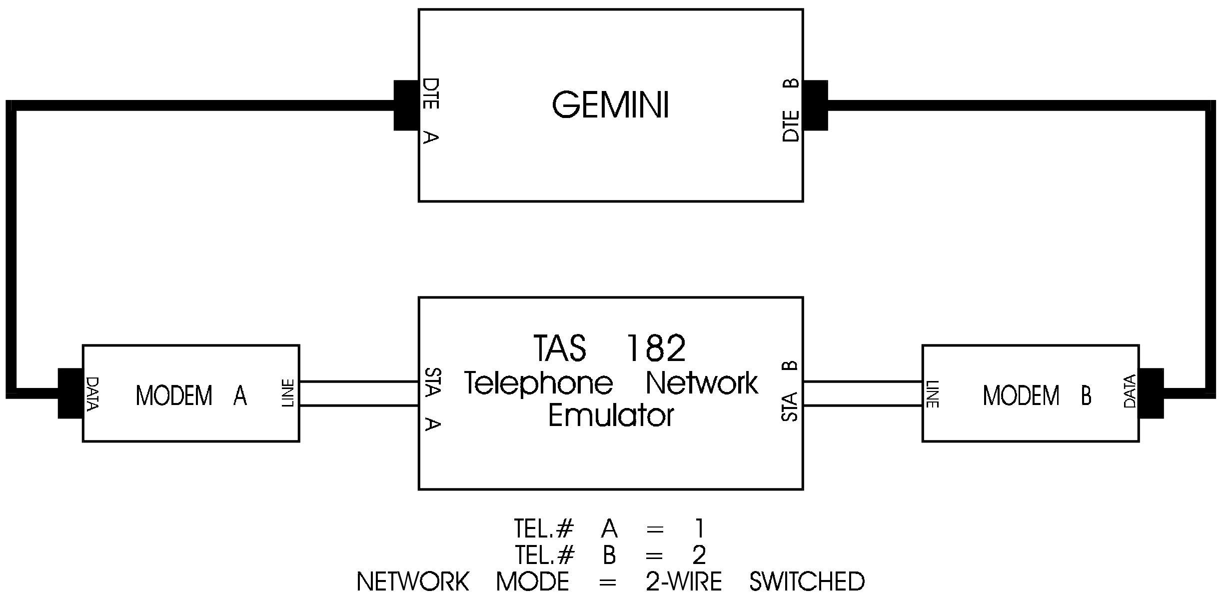

Figure 2-1. BERT Test Configuration

Recall the TAS-defined file for testing Hayes-compatible 9,600 bps dial modems.

1. Press FILE.
2. Use ↑ or ↓ to find `RECALL`.
3. Use + or - to select the file to recall. For this example, select

   `9600_async`.
4. Press ENTER to recall the file.
5. After you press ENTER, Gemini displays the following message:

```
Press <enter> to recall setup,
or <esc> to return to previous menu.
```

6. At this point, press ENTER to finish recalling the file.

Establish a call between the two modems.

1. Press CALL.
2. Press the DTR buttons for stations A and B. These buttons are located in the middle of the front panel. Activating DTR ensures that the modems will respond to call setup commands.
3. Use ↑ to select the menu line labeled `STRAP A`. Press SEND to send the modem initialization commands (straps) to modem A.
4. Use ↓ to select the menu line labeled `STRAP B`. Press SEND to send the modem initialization commands (straps) to modem B.
5. Use ↓ to select the menu line labeled `ANSW B`. Press SEND to send the call answer command to modem B.
6. Use ↑ to select the menu line labeled `ORIG A`. Press SEND to send the call originate command to modem A.

Execute the BERT test.

1. Press TESTS.
2. Use ↑ to select the menu line labeled `TEST MODE`.
3. Use + or - to select `bert`.
4. Press RTS A key to begin the flow of test data from DTE A. Test data should now be flowing into modem A, through the telephone network simulator, into modem B, then into DTE B. The SYNC indicator for DTE B should now be on. This indicates that Gemini's data receiver at DTE B is now synchronized with the test pattern.
5. Press RUN to begin the BER/Throughput test.
6. Press RESULTS to monitor the test results. Use ↑ or ↓ to scroll through the results screens.

Creating a User-Defined BERT Test

To create a BERT test, set the terminal parameters in the TERM menu, then set BERT test parameters in the TESTS\BERT submenu. For example, the following steps create a bi-directional switched-carrier BERT test for a 19,200 bps private line modem. For this test, Gemini supplies the modem transmit clock.

1. Enter the TERM\TESTS submenu, and set the following parameters:

```
PROTOCOL: sync
CLK A: 19200  bps   OFFSET:   0.0%
CLK B: 19200  bps   OFFSET:   0.0%
FLOW A: none     FLOW B: none
```

2. Enter the TESTS menu and select `bert` test mode. Enter the TESTS\BERT submenu and set the following parameters (the highlighted parameters are not used in this example):

```
CONFIGURATION: ta&b|ra&b
TEST DURATION IN: BLOCKS↵
  #BLOCK:     100
BLOCK SIZE: 10^3
PATTERN: space
RESYNC ENABLE: yes
SYNC LOSS - ERROR BURST: yes
SYNC LOSS - NO DATA:  3 sec
EXECUTION MODE: manual
SYNC TIMEOUT:   10 sec
BIT ERROR LIMIT     A:  10000  B:  10000
CHAR ERROR LIMIT    A:    200  B:    200
BLOCK ERROR LIMIT   A:     50  B:     50
SYNC LOSS LIMIT     A:      2  B:      2
ERRORED SEC LMT     A:    200  B:    200
```

Executing the User-Defined BERT Test

To execute this test, perform the following steps:

1. Activate DTR A and DTR B.
2. Activate RTS A and RTS B.
3. Press RUN to begin the test.
4. Press RESULTS to see the test results display.

All of the BERT parameters and terminal parameters are described fully in Section 4, "Gemini Parameters Reference".

2.4. Performing Connect Reliability Tests

The Connect Reliability Test is an automatic test designed specifically for testing and characterizing the call connect and initial data transfer reliability of switched line modems. For this test Gemini is configured as two independent terminals, stations A and B, both controlled by one source to provide the proper synchronization between the two ends. One side is designated the originate side, and the other is the answer side. The general test procedure is to configure the modems, place a call, transmit (and/or receive) a specified data pattern, and then terminate the call. This procedure may be repeated without user intervention. Test statistics recorded include number of call attempts, number of failed calls, and a station by station breakdown of the failure causes.

The following is a detailed step by step procedure performed by Gemini for the Connect Reliability test. All parameter names which appear in **BOLD CAPS** are user programmable parameters.

1. Drop (deactivate) DTR
2. At both stations, wait for the **INTER-CALL DELAY** interval.
3. Send **STRAP** command strings (from CALL menu) to the answer and originate modems, and delay for **STRAP/DTR DELAY** intervals at each modem.
4. For each modem, if **DTR CONTROL** is YES, raise the DTR signal for that modem, and delay for the **DTR/CALL** interval.
5. Send **ANSW** (answer) command string (from CALL menu) to the answer modem, and delay for **ANSWER STRING DELAY** interval.
6. Send **ORIG** (originate) command string (from CALL menu) to the originate modem and begin logging modem response.
7. Begin **CONNECT TIMEOUT** timer at both modems and begin looking for **CONNECT EVENT** (either DCD, **EXPECTED RESPONSE**, or both). If the timer expires prior to detection of **CONNECT EVENT** the call is aborted.
8. Once connect is confirmed, stop logging modem connect response.
9. If RTS control is **YES**; wait the **CONNECT/RTS** interval, then raise RTS at each transmitting station.
10. At the transmitting station(s), start the **CTS TIMEOUT** timer and begin looking for CTS active. If timeout expires prior to detection of CTS active the call is aborted.

NOTE: CTS TIMEOUT is only checked if either TERM\CALLS or TERM\TEST flow control is set to CTS.

11. After detection of CTS, at each transmitting station delay for **CTS/XMIT DELAY** interval.

NOTE: Gemini requires at least 0.25 msec for this delay

12. After completion of **CTS/XMIT DELAY** begin **XFER TIMEOUT** timer, and then begin sending **XMIT TEST MESSAGE**. If the timer expires prior to the complete message being sent (or received), the call is aborted.
13. When data transfer is completed (or timer expired) send the **DROP** command strings (from CALL menu) to the answer and originate modems and delay for their **DROP STRING DELAY** intervals.
14. Repeat this procedure for each **#CALLS PER TEST**.

In addition to the parameters indicated above, the user may specify the following:

- Call flow control (TERM/CALLS submenu)
- Test flow control (TERM/TESTS submenu)
- Up to two user defined test messages

The test message sent during the Connect Reliability test consists of two components, the header and the body. The header is always made up of eight (8) ASCII Sync characters (16 hex), while the body is the message selected by the user. Errors in the header and body of the test message are maintained independently.

If an error is detected and the call is aborted, the abort sequence consists of sending the **DROP** command strings to both modems, delaying for the **DROP STRING DELAY** interval, and delaying for the **INTER-CALL DELAY** interval.

2.4.1. Setting the Test Parameters

To enter the settings for a Connect Reliability test, enter the TESTS menu and select `TEST MODE: calls`. Next, press ENTER to see the Connect Reliability test parameters. Connect Reliability parameters include test configuration, # calls per test, originate station, and more. To set test parameters, scroll to the desired menu line and use the + and - keys to edit menu entries. For a full description of each parameter, see Section 3, "Gemini Parameters Reference". Terminal parameters (protocol, bit rate, flow control, etc.) for Connect Reliability test are contained in the TERM\TESTS submenu. Terminal parameters for the call setup portion of the Connect Reliability test are in the TERM\CALLS submenu. These parameters must be properly set to ensure correct test operation.

2.4.2. Connect Reliability Test Control Keys

Several keys control the operation of the Connect Reliability test. These keys, and the functions they perform, are as follows:

RTS (A and B) - When the RTS control option is enabled, the RTS keys are inactive. The RTS lead will be controlled by the test. When RTS control is disabled, the RTS keys control the RTS lead.

DTR (A and B) - will be defined according to the DTR control options. When DTR control is enabled, the DTR keys are not active (DTR indicator off) and the Connect Reliability test will control the operation of DTR. When DTR control is disabled, the DTR keys will control the RS-232 DTR lead and indicator.

SYNC (A and B) - are not active during a Connect Reliability test. The SYNC indicator at each test interface is controlled by the Connect Reliability test. The SYNC indicator comes on whenever a call is completed (from originate to drop). It is turned off whenever any failure condition is detected (and at the end of the test).

RUN - Gemini starts the Connect Reliability test by placing a call. Turning the RUN indicator off immediately aborts the current test in progress.

CLEAR - clears the test results registers.

In the Connect Reliability test, the SEND key, the SELF LOOP indicator, and the INSERT ERRORS indicator are not used.

2.4.3. Running the Connect Reliability Test

Perform the following steps to start the Connect Reliability test:

1. Recall a file corresponding to the type of modem you wish to test.
2. Press the FILE key and choose a file. For this example we will recall the `1200_async` file for testing Hayes-compatible 1200 bps asynchronous modems.
3. Press the TESTS key and change the test mode to `calls`.
4. Press the ENTER key to view the Connect Reliability test parameters and set the number of calls per test.
5. Use the ↓ key to view the settings for delays and other conditions that apply to the modems during the Connect Reliability test.
6. Use the +/- keys to change any settings that aren't acceptable for the modems you have selected.

7. When all changes have been made, press RUN to start the test and press RESULTS to display the progress of the test.

2.4.4. Monitoring Test Results

Press RESULTS to view the test results. Use ↑ and ↓ to scroll through the Connect Reliability results.

Test Status

The first result screen shows the number of calls attempted, and the number of failures.

```
\CALLS
Attempts:      0       Failures:       0
```

Error Counts

The next four screens provide detailed test error counts. There are two screens for each of Gemini's two test interfaces. The first display counts for each of the three call setup failure conditions:

- No CTS - Clear To Send was not detected prior to expiration of the CTS TIMEOUT.
- No Carrier - Data Carrier Detect was not detected prior to expiration of the CONNECT TIMEOUT. If DCD is not selected as part of the CONNECT EVENT, this count will always be 0.
- Bad Response - Modem response did not match the EXPECTED RESPONSE. If RESP is not selected as part of the CONNECT EVENT, this count will always be 0.

```
\CALLS\A                     No Cts:       0
No Carrier:     0  Bad Response:       0
```

```
\CALLS\B                     No Cts:       0
No Carrier:     0  Bad Response:       0
```

The next screen displays counts for each of the data transfer failure conditions:

- Xfer Time-outs - Message was not received prior to expiration of the XFER TIMEOUT interval.
- Startup Errs - Messages with errors in the header section.
- Data Errs - Messages with errors in the body of the message.

```
\CALLS\A          Xfer Time-outs:       0
Startup Errs:      0   Data Errs:       0
```

```
\CALLS\B          Xfer Time-outs:       0
Startup Errs:      0   Data Errs:       0
```

Response Monitor

The last two results screens are used to monitor the modem response. The most recent command response returned is shown for each test interface.

```
\CALLS\A
Response:
```

```
\CALLS\B
Response:
```

2.4.5. Example: Running a TAS-Defined Connect Reliability Test

In this example, you will recall and execute a TAS-defined Connect Reliability test for a Hayes-compatible 1,200 bps dial modem. The configuration for this test is shown in Figure 2-2. Please note that, for this example, the telephone number for the modem at DTE A is **1**, and the telephone number for the modem at DTE B is **2**.

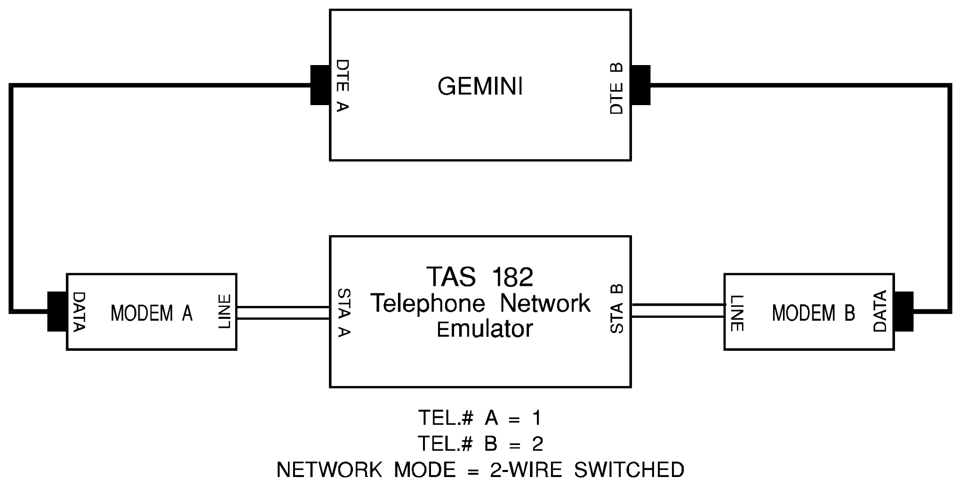

Figure 2-2. Connect Reliability Test Configuration

Recall the TAS-defined file for testing Hayes-compatible 1,200 bps dial modems.

1. Press the FILE menu button.
2. Use ↑ or ↓ to select the recall option.
3. Use + or - to select the file to recall. For this example, select

   `1200_async`.

4. Press ENTER to recall the file.
5. After you press ENTER, Gemini displays the following message:

```
Press <enter> to recall setup
or <esc> to return to previous menu.
```

6. Press ENTER to finish recalling `1200_async`.

Execute the Connect Reliability test.

1. Press the TESTS key.
2. Use ↑ to select the menu line labeled `TEST MODE`.
3. Use + or - to select `TEST MODE: calls`.
4. Press RUN to begin the Connect Reliability test.
5. Press RESULTS to monitor the test results.
6. Use ↑ or ↓ key to scroll through the test results.

2.4.6. Creating a User-Defined Connect Reliability Test

To create a Connect Reliability test, set the terminal parameters in the TERM\TESTS and TERM\CALLS submenus, then set Connect Reliability test parameters in the TESTS\CALLS submenu. For example, the following steps create a bi-directional Connect Reliability test for a 19,200 bps dial-up modem.

1. Enter the TERM\TESTS submenu and set the following test parameters:

```
PROTOCOL: async↵
CLK A: 19200  bps    OFFSET:   0.0%
CLK B: 19200  bps    OFFSET:   0.0%
FLOW A: none     FLOW B: none
```

2. Enter the TERM\CALLS submenu, and set the following call setup parameters:

```
PROTOCOL: async↵
CLK A: 19200  bps    OFFSET:   0.0%
CLK B: 19200  bps    OFFSET:   0.0%
FLOW A: none     FLOW B: none
```

3. Enter the TESTS menu and set `TEST MODE: calls`. Enter the TESTS\CALLS submenu and set the following parameters:

```
CONFIGURATION: ta&b|ra&b
#CALLS PER TEST:    100
DTR CONTROL:        A: yes   B: yes
RTS CONTROL:        A: yes   B: yes
DELAY BEFORE CALL:  1.0 sec
ORIGINATE STATION: A
STRAP/DTR DELAY     A: 1.20  B: 1.20  sec
DTR/CALL DELAY      A: 0.10  B: 0.10  sec
ANSW STRING DELAY   A: 1.20  B: 1.20  sec
EXPECTED RESP A: CONNECT
EXPECTED RESP B: CONNECT
CONNECT EVENT   A: dcd&str  B: dcd&str
CONNECT TIMEOUT     A:  25   B:  25   sec
CONNECT/RTS DELAY   A: 1.00  B: 1.00  sec
CTS TIMEOUT         A: 1000  B: 1000  ms
CTS/XMIT DELAY      A:   10  B:   10  ms
XMIT TEST MESSAGE   A: 511   B: 511
TRANSFER TIMEOUT:     5 sec
DROP STRING DELAY   A: 1.00  B: 1.00  sec
```

2.4.7. Executing the User-Defined Connect Reliability Test

To execute this test, perform the following steps:

1. Press RUN to begin the test.
2. Press RESULTS to see the test results display.

2.5. Performing Data Compression / File Transfer Tests

The Data Compression / File Transfer tests measure the effective data transfer rate of modems which use data compression and error control protocols. The tests use Gemini’s two DTE interfaces to transfer files at data rates up to 2.048 Mbps, measuring the transfer time and calculating the effective transfer rate.

If the file transfer is repeated multiple times, Gemini calculates the average, minimum, and maximum transfer rate during the test run. Gemini can be configured to test for error conditions which might invalidate the performance measurements.

The Gemini *Warp* has two Data Compression / File Transfer test applications; one is for low-speed testing, the other is for data rates up to 2.048 Mbps.

Briefly, here are the steps you will follow to use Gemini's Data Compression / File Transfer test to evaluate modem performance:

1. Select the desired test application using the TEST menu.
2. Enter the desired terminal parameters for the test, using the TERM menu.
3. For bit synchronous testing, set the frame size, address and control fields
4. Select the test configuration, test duration, data pattern, and file size.
5. Select appropriate error detection parameters
6. Establish a call between the modems, using Call Setup if needed. Return to the Data Compression / File Transfer test application.
7. Press RUN to start the test. Gemini loads the selected test pattern into memory and begins transmitting data.
8. Press RESULTS to monitor the test results.
9. When the test has finished, the RUN indicator will be turned off. The accumulated test statistics are available on the main display.

2.5.1. Low-Speed vs. High-Speed Data Compression / File Transfer Test

The Gemini *Warp* comes with two Data Compression / File Transfer test applications. The two tests have much in common, but there are important differences between them. Your selection will depend on the data rates, protocols, and physical interfaces required for your testing.

The original application is designed for testing modems and other data communications equipment at rates up to 256 Kbps. You may select either the RS-232 or EIA/TIA 530-A physical interface. The test supports both asynchronous and synchronous data protocols.

The High-Speed Data Compression / File Transfer application is designed for testing data communications equipment at data rates from 56 Kbps to 2.048 Mbps. The RS-232 interface cannot support these higher data rates, so you must use the EIA/TIA 530-A interface. The high-speed application always uses the bit-oriented HDLC protocol.

To select one of these test applications, press the TESTS key twice. Use the + or - keys to set the test mode to `data_comp` (low-speed) or `hs_dcmp` (high-speed). The selected test mode is displayed in the upper right corner of the screen, as shown below.

```
>                              [hs_dcmp]
TEST MODE: hs_dcmp↵
```

2.5.2. Entering Data Compression Test Terminal Parameters

When a Data Compression / File Transfer test is selected, Gemini's DTEs are automatically reprogrammed according to the test terminal parameters. Test terminal parameters include the data format, clock source, and, for internal clock, the data rate.

The test terminal parameters are entered using the TERM\TESTS submenu. Depending on which Data Compression test you have selected, different selections will appear in the TERM menus. For example, if you select the High-Speed BERT test, you will be able to select clock rates up to 2.048 Mbps, but you will not be able to select the RS-232 interface.

When selecting terminal parameters for this test, note the following important points:

- If sync mode is selected, a bit-oriented protocol is used. The test pattern is divided into frames as it is transmitted. Each frame has the format: <flags><address field><control field><data><checksum><flags>. See section 2.5.6., Synchronous Protocol Parameters, for the parameters which specify the address, control, and data fields of each frame.
- Although the effective transfer rate depends on the contents of the file being transferred, the maximum effective transfer rate cannot exceed the data rate between the DTE and DCE. To measure performance properly, the DTE rate must be set high enough to ensure that it does not limit the effective transfer rate.

- When the DTE rate is set as described above, the DCE must use flow control to prevent Gemini from sending it data faster than it can handle. In async mode, CTS or XOFF flow control should be selected. XOFF flow control should be used with caution in bi-directional or loopback configurations, since the XON and XOFF characters may occur in the file being transferred. XOFF flow control can always be safely used for one-way file transfers.
- In sync mode, CTS flow control selection is supported. When CTS flow control is selected, the transmitting DTE checks whether CTS is asserted before transmitting each frame. An alternative method of flow control during synchronous operation is to program the DCE to slow or stop the transmit clock to throttle the data flow from Gemini.

2.5.3. Setting the Test Parameters

The test configuration parameter is used to select a data path for the test. For one-way transfers, the file is sent from DTE A to DTE B, or vice versa.

Bi-directional file transfers may be selected. In this mode, both DTE ports begin transmitting the test file at the same time. The file transfer in both directions must be completed before another transfer may begin.

```
>DCMP                        [data_comp]
CONFIGURATION: ta&b|ra&b
```

Loopback configurations (from DTE A to DTE A, for example) are also supported. Gemini does not provide the remote loopback in this configuration; another device must do so.

Test Duration

Select the number of file transfers desired. When the selected number of file transfers has been attempted, Gemini will automatically stop running the test.

```
>DCMP                        [data_comp]
TEST DURATION:      6 transfers
```

Defining the Test File

The Gemini software EPROMs contain several predefined data patterns, including all those defined in the TIA-TSB-38 test standard. Any of the predefined patterns may be selected as the test file, or a user-defined pattern (`d1`) may be chosen. The user-defined test pattern may be up to 65,536 bytes long. The user-defined test pattern can be downloaded to Gemini using the remote commands `TEST:CLRP` and `TEST:LOADP`.

```
>DCMP                         [data_comp]
PATTERN: ascii          LENGTH:    32768
```

If you are testing using the TIA-TSB-38 standard, refer to the table below, which shows the name of each test pattern listed in the TIA-TSB-38 standard and the corresponding Gemini pattern.

TIA-TSB-38	**GEMINI *Warp***
1.TST	graphic
2.TST	text
3.TST	exe
4.TST	random
5.TST	mixed3

Table 2-1. Data Compression Test Patterns

The selected data pattern may be repeated from 1 to 100 times. In this way files over 6 Mbytes long may be transferred.

```
>DCMP                         [data_comp]
REPEAT PATTERN: 100  FILE SIZE:  3276800
```

2.5.4. Detecting Error Conditions

Gemini can test for several error conditions which might invalidate the performance measurements. When one of these conditions occurs, the current file transfer will be aborted, and the transfer time will not be measured. When Gemini aborts a transmission for any reason, it is recorded as a "failed transfer".

The test can be configured to check for any of these error conditions:

- Excessive errors
- File transfer time-out
- File header time-out

Excessive Errors

Gemini checks the incoming data against the test pattern to detect transmission errors not corrected by the DCEs under test. The error limit parameter is set to the maximum number of character (frame) errors allowed during a single file transfer. When an async test protocol is selected, the error limit is specified in characters. When the bit-oriented protocol is selected, the error limit is specified in frames.

Usually, when using data compression and error correction, there should be no errors detected at the receiving DTE. Setting the error limit to 1 ensures that any error detected results in a failed transfer.

Setting the error limit to 0 allows an unlimited number of character errors to be recorded. Set the error limit to 0 to prevent Gemini from ever recording a failed transfer due to excessive errors.

TIP: When testing synchronous DCEs, it is often desirable to determine whether frames are being corrupted or discarded. If the error limit is set to 1, either condition will cause a failed transfer. To determine the true problem, set the error limit to 0 before running the test. If frames are discarded, the file transfer will time-out, and the test results will show the percentage of the file received. If frames are corrupted, the file transfer will not time-out, and the test results will show the number of errored frames.

```
>DCMP                        [data_comp]
ERROR LIMIT:       0 chars
```

File Transfer Time-Out

Under some conditions the file transfer may never be completed. For example, the call may be dropped during the test. The file transfer timeout is used to set an upper limit on the allowable transfer time.

The file transfer time-out must be set to a value large enough to ensure than normal transfers are given enough time to finish.

```
>DCMP                        [data_comp]
FILE TRANSFER TIMEOUT:  100 seconds
```

File Header Time-Out (Low-Speed Test)

If the call is not connected properly, no data will be transferred between the DTEs. Rather than wait for the long file transfer time-out to detect this condition, the file header time-out may be used to abort the transfer.

The file header time-out occurs if the first *n* characters are not received within the programmed time period. The number *n* is also programmable. Typically, *n* will be set to a small number of characters, while the time-out period will be only a few seconds.

```
>DCMP                        [data_comp]
FIRST   10 CHARS RX TIMEOUT:   30 secs
```

First Frame Time-Out (High-Speed Test)

If the call is not connected properly, no data will be transferred between the DTEs. Rather than wait for the long file transfer time-out to detect this condition, the first frame time-out may be used to abort the transfer.

The first frame time-out occurs if the first HDLC frame is not received within the specified period. Typically, the time-out period will be only a few seconds.

```
>DCMP                          [hs_dcmp]
FIRST FRAME RX TIMEOUT:   5 seconds
```

Inter-Transfer Delay

After each file transfer is completed (or aborted), Gemini waits a programmable time period before starting the next file transfer. The inter-transfer delay should be set long enough so that, in the case of a failed transfer, any data buffered in the DCEs will be received prior to the start of the next file transfer. If any data is still buffered when the next file transfer is started, Gemini will mistakenly count errors, as the buffered data will not match the expected characters.

```
>DCMP                        [data_comp]
INTER-TRANSFER DELAY:   5 seconds
```

2.5.5. Optional Test Parameters

RTS Control Option (Low-Speed Test)

This parameter is used to select whether the RTS signal will be under automatic control. If automatic control is selected, RTS will be raised at the start of each data transfer, and dropped when the transfer is completed.

When automatic control is disabled, the RTS keys are used to raise and lower the RTS signal.

```
>DCMP                       [data_comp]
RTS CONTROL A: no     RTS CONTROL B: no
```

RTS Control (High-Speed Test)

When using the High-Speed Data Compression / File Transfer test, the RTS keys are used to raise and lower the RTS signal.

Semi-Auto Mode

Like other Gemini test applications, the Data Compression / File Transfer test supports a "semi-auto" mode. In this mode, the test will be automatically stopped when one or more of the programmed error limits are reached.

```
>DCMP                       [data_comp]
STOP TEST: semi-auto
```

Only one semi-auto mode error limit is currently supported. This is a limit on the number of failed transfers which may occur before the test is halted. Setting this parameter to 0 disables the limit on the number of failed transfers.

```
>DCMP                       [data_comp]
FAILED TRANSFER LIMIT: 1
```

2.5.6. Synchronous Protocol Parameters

When sync mode is selected, Gemini uses a bit-oriented protocol. The test pattern is divided into frames as it is transmitted. Each frame has the format: <flags><address field><control field><data><checksum><flags>. Before starting the test, select the frame size, inter-frame delay, last frame delay, and the contents of the address and control fields.

Frame Size

Each frame may contain from 1 to 65536 data octets.

```
>DCMP                        [data_comp]
HDLC FRAME SIZE:  1024 bytes
```

Address and Control Fields

The contents of the address and control fields for each frame are programmable. Every frame will contain the same address and control field.

```
>DCMP                        [data_comp]
HDLC FRAME ADDR: FF   CONTROL FIELD: 13
```

Inter-Frame Delay

This parameter controls the delay between transmitted frames. The inter-frame delay may be up to 9.999 seconds long, in steps of 1 millisecond.

```
>DCMP                        [data_comp]
HDLC INTER-FRAME DELAY:    1 msec
```

Last Frame Delay (Low-Speed Test)

When RTS Control is selected (see RTS Control Option above), Gemini will drop RTS at the end of each file transfer. If RTS is dropped before the checksum and closing flag of the last frame are transmitted, the last frame may be corrupted. This delay must be set long enough to allow the last frame to be completely transmitted before RTS is dropped.

```
>DCMP                        [data_comp]
HDLC INTER-FRAME DELAY:    1 msec
```

2.5.7. Test Results

The results screens display test status, performance measurements, and error counts. The results screens are accessed by pressing the RESULTS key. Pressing the CLEAR key resets all the displayed results.

Test Status

The first screen shows the overall test status. The number of completed transfers in each direction is shown, along with an indication of test progress.

```
\DCMP  A→B: READY      Attempts:      0
       B→A: READY      Attempts:      0
```

When the test results are cleared, Gemini indicates `READY` on the first screen. When a file transfer is in progress, the display is changed to `SENDING`. Between transfers, the display shows `COMPLETE` or `FAILED`, indicating the result of the previous file transfer. When the test is over, `TEST DONE` is displayed while valid results are available.

The next two screens show the percentage of the file transmitted and received:

```
\DCMP   Tx: 0%    [                    ]
[A→B]   Rx: 0%    [                    ]
```

```
\DCMP   Tx: 0%    [                    ]
[B→A]   Rx: 0%    [                    ]
```

Performance Measurements

The next three screens show performance measurements. The first shows the transfer rate and elapsed time for the current (or most recent) file transfer. The next two screens show the highest, lowest, and average transfer rate recorded.

If an async protocol is selected, test results are expressed in characters/second:

```
\DCMP  A→B CPS:0.000E+0   Time:  0:00:00
       B→A CPS:0.000E+0   Time:  0:00:00
```

```
\DCMP  Transfers:       0   Avg:0.000E+0
[A→B]    Max CPS:0.000E+0   Min:0.000E+0
```

```
\DCMP  Transfers:       0   Avg:0.000E+0
[B→A]    Max CPS:0.000E+0   Min:0.000E+0
```

If a sync protocol is selected, test results are expressed in bits/second:

```
\DCMP  A→B BPS:0.000E+0   Time:  0:00:00
       B→A BPS:0.000E+0   Time:  0:00:00
```

```
\DCMP  Transfers:       0   Avg:0.000E+0
[A→B]    Max BPS:0.000E+0   Min:0.000E+0
```

```
\DCMP  Transfers:       0   Avg:0.000E+0
[B→A]    Max BPS:0.000E+0   Min:0.000E+0
```

Failed Transfers

The next two screens show the number of failed transfers.. The failed transfer count is broken down into failures due to time-outs and failures due to excessive error counts.

For bi-directional transfers, the failed transfer counts indicate whether the failure condition occurred in the A to B direction, or the B to A direction. For example, if the error limit is exceeded in the A to B direction, the A to B failed transfer count will be incremented, while the B to A failed transfer count will *not* be incremented.

```
\DCMP  Transfers:       0  Failed:     0
[A→B]  Timed Out:       0  ErrLim:     0
```

```
\DCMP  Transfers:       0  Failed:     0
[B→A]  Timed Out:       0  ErrLim:     0
```

Error Counts

The last two screens show error counts. The counts are accumulated at the end of each successful transfer. Errors which may have occurred during failed transfers are not counted.

For async tests, the number of character errors is displayed:

```
\DCMP  Transfers:       0
[A→B]  Char Errs:       0
```

```
\DCMP  Transfers:        0
[B→A]  Char Errs:        0
```

For sync tests, the number of frames received and the number of errored frames are displayed:

```
\DCMP  Transfers:        0
[A→B]  Frames:           0 Errs:         0
```

```
\DCMP  Transfers:        0
[B→A]  Frames:           0 Errs:         0
```

2.6. Performing Multi-Point Polling

The Gemini Multi-point Polling test simulates a multidrop network, where a master device and a number of slave devices share a common bus. In this network configuration the master polls each slave in turn, then waits for a response. Each slave has a unique address, and responds only to polls addressed to it.

Since each Gemini contains two data terminals, a single Gemini unit can be configured to be a master and a slave or as two slaves. Using multiple Gemini, networks of up to 21 slaves may be created.

In any test configuration, one Gemini DTE is always selected as the master. This DTE polls each slave in turn, then monitors the response. The master measures response times for each slave, and reports response errors or timeouts.

Each DTE selected as a slave is assigned a unique address. Each slave responds to polls addressed to it, reports the number of polls received, and counts poll message errors.

Briefly, here are the steps you will follow to use Gemini's Multi-point Polling test:

1. Enter the desired terminal parameters for the test using the TERM menu.
2. Select the Multipoint Polling test (`multi_pt`) using the TESTS menu. This stops any other test in progress, and reprograms each Gemini DTE using the selected terminal parameters.
3. Define the communications protocol.
4. Select one Gemini DTE as the master. For the master, enter a list of slave addresses to poll, and specify a response timeout and inter-poll delay. Select the test duration (number of polls to be sent to each slave) and the RTS control option.
5. For each slave DTE, enter a unique address, and specify any response delay.
6. For each Gemini configured with two slave DTEs, press RUN to start listening for polls. Then press RUN on the Gemini containing the master to start polling each slave.
7. Press RESULTS to monitor the test results on the main display.
8. When the test has finished, the RUN indicator on the master will be turned off. Any other Gemini should be stopped manually be pressing RUN.

2.6.1. Multi-Point Polling vs. Polls Test

Gemini now provides two polling tests. There are significant differences between the Multi-point Polling test and the older Polls test.

The Polls test transmits a poll message repeatedly, separated by an interpoll delay. There is no response to the poll message; the receiver analyzes each poll, then discards it. In the Multi-point Polling test, there is a response sent for each poll message. The Multi-point Polling test measures the response time for each poll, and reports the minimum, maximum, and average response time.

With the Multi-point Polling test, multiple Gemini units may be used to simulate networks with up to twenty one slave devices. The Polls test only simulates point-to-point connections.

During the Multipoint Polling test, Gemini performs steps depending on master or slave configuration. Below is a listing of steps for each configuration with adjustable test parameters listed in **BOLD CAPS**. Here is a listing of each of the steps associated with master DTE operation:

1. Read next address from **POLL LIST**.
2. Start the **RESPONSE TIMEOUT**. If this timeout expires during any step, record one response timeout for that slave and proceed to step 11.
3. If RTS is under test control, raise RTS and start RTS/CTS timer.
4. Wait for CTS. When CTS is detected stop the RTS/CTS timer, if running and update the RTS/CTS timing results.
5. Wait the **CTS/XMIT DELAY**.
6. Transmit the poll message, which is determined by the **PROTOCOL**, the slave address read from the **POLL LIST** (in step 1), and the **POLL** message field. Start the response timer.
7. If RTS is under test control, wait the **XMIT/RTS DELAY** and lower RTS
8. If **CARRIER DETECT** is enabled, do not proceed until DCD is detected. (Master will timeout if **RESPONSE TIMEOUT** expires).
9. Wait for the response message, consisting of the **MASTER ADDRESS**, the **SLAVE ADDRESS**, and the **RESPONSE** fields. When the first character of the response is received, stop the response timer and record the result.
10. If **CARRIER DETECT** is enabled, do not proceed until DCD is dropped. (Master will timeout if **RESPONSE TIMEOUT** expires).
11. Increment the number of polls sent to this slave. If each slave has been sent **TEST DURATION** number of polls, end of test.

12. If RTS is under test control, delay the **RESPONSE/RTS DELAY**, else delay the **RESPONSE/XMIT DELAY.**
13. Go back to step 1.

The follow is the step by step procedure for each slave DTE:

1. Listen to each poll.
2. If poll message received matches the poll message defined by **SLAVEA** or **SLAVEB** address and the **POLL** message field, go to step 4.
3. Go to step 1.
4. If RTS is under test control, wait the **POLL/RTS DELAY**, raise RTS, and start RTS/CTS timer.
5. Wait for CTS. When CTS is detected stop the RTS/CTS timer, if running and update the RTS/CTS timing results.
6. Wait the **CTS/XMIT DELAY**.
7. Transmit the response message, determined by the **MASTER ADDRESS**, the **SLAVEA** or **SLAVEB** address, and the **RESPONSE** message field.
8. If RTS under test control, wait the **XMIT/RTS DELAY** and drop RTS.
9. Go back to step 1.

2.6.2. Entering Multi-Point Polling Terminal Parameters

When Multi-Point Polling mode is selected, Gemini's DTEs are automatically reprogrammed according to the Test terminal parameters. Test terminal parameters include the data format, clock source, and, for internal clock, the data rate.

The Test terminal parameters are entered using the TERM\TESTS submenu. See section 4, "Gemini Parameter Reference" for a description of each Test terminal parameter.

Although the TERM\TESTS submenu contains selections for flow control, the Multi-point Polling test always uses CTS flow control. The flow control selection in the TERM\TESTS submenu is ignored.

2.6.3. Selecting the Multi-Point Polling Test

Multi-point Polling test mode is selected by choosing `TEST MODE: multi_pt` from the TESTS menu. Whenever Multi-Point Polling test mode has been selected, `[multi_pt]` will appear in the upper right corner of the main display.

2.6.4. Specifying the Poll and Response Protocols

Each time a poll or response message is sent, the DTE sending the message:

- Raises Request To Send (RTS) if RTS is under test control, then waits for Clear To Send (CTS)
- After receiving CTS, delays the **CTS/XMIT** interval
- Transmits the poll or response message
- If RTS is under test control delays the **XMIT/RTS** interval before it drops RTS.

When waiting for a poll or response message, each DTE:

- Waits for Data Carrier Detect (DCD) active
- Checks the incoming message against the expected pattern
- Waits for DCD inactive

The parameters defining this protocol can be specified prior to running a test. You can specify the format of the poll and response messages, the duration of the CTS/XMIT and XMIT/RTS delays, or RESPONSE/XMIT delay, if and whether to test or ignore DCD at the receiver.

Message Protocol

Each poll and response message contains both *address* and *message* fields. The address and message fields are framed using one of four available protocols. There are three synchronous protocols and one asynchronous protocol.

If synchronous data format has been selected, one of the three synchronous protocols must be selected. The same protocol must be selected on each Gemini which will be used in the test network. The selection is made from the TESTS\MULTI_PT\TEST OPERATION submenu. The possible selections for the SYNC PROTOCOL are:

Monosync <SYN><SOH><address><STX><message><ETX>

Bisync <SYN><SYN><SOH><address><STX><message><ETX>

HDLC <Flag><address><message><Checksum><Flag>

If asynchronous data format has been selected, the poll or response message is always sent using the following format:

Async <address><message>

Poll Message

The poll message consists of two fields (slave address and message), framed by one of the four protocols described above. The slave address field is 1 to 8 characters long. The message field is 0 to 80 characters long.

The slave address field is filled from the master poll list (see "Configuring the Master DTE"). The slave address specifies which slave should respond to the poll.

The message field appears as the POLL selection in the TESTS\MULTI_PT\POLL/RESPONSE DEFINITION submenu. This field may be set to any string up to 80 characters long using the Gemini String Editor.

The message field can be omitted, if desired, leaving only the slave address in the poll message.

Response Message Format

The response message consists of three fields (master address, slave address, and message). The master address field is from 0 to 8 characters long. The slave address field is 1 to 8 characters long. The message field is 0 to 80 characters long.

The slave address field is filled with the responding slave's address (see "Configuring the Slave DTEs"). The slave address is always included in the response message. It is used to verify that the correct slave has responded to the poll.

The master address field appears as the `MASTER ADDRESS` selection under the TESTS\MULTI_PT\POLL/RESPONSE DEFINITION submenu. This field may be set to any string up to 8 characters long using the Gemini String Editor.

The message field appears as the `RESPONSE` selection. This field may be set to any string up to 8 characters long using the Gemini String Editor.

The master address field and the message field can be omitted, if desired, leaving only the slave address in the response message.

Data Carrier Detect (DCD) Option

Both master and slave DTEs can optionally test the Data Carrier Detect (DCD) signal when analyzing polls and responses. When DCD testing is enabled, a DTE waits for DCD before accepting any characters. The DTE will also wait for DCD to be inactive before accepting the poll or response message.

The default selection is to ignore the state of DCD. DCD must be ignored if it is not switched by the Data Circuit-terminating Equipment (DCE), otherwise, a master DTE will time-out while a slave DTE will wait forever for a poll to be completed.

Request To Send (RTS) Control Option

Both master and slave DTEs can optionally control the Request To Send (RTS) signal during the test. When RTS control is set to Yes, the master raises the RTS before sending a poll message and lowers it after sending the poll. Similarly the slave raises the RTS before sending the response message and lowers it after sending the response. Note that this option can not be selected individually for each of the data analyzers. Hence when a Gemini is configured as one Master, one Slave the same option is applied to both the Master and the Slave.

2.6.5. Configuring the Master DTE

One Gemini DTE must always be selected as the master before running the test. The master is selected from the TERM\MULTI_PT\TEST OPERATION submenu. Either DTE A or B may be selected as the master.

Poll List

The master sends the poll message to each slave address in turn. The `POLL LIST` selection on the TESTS\MULTI_PT\MASTER submenu specifies the set of slave addresses that will be polled. The format of the poll list is a series of up to 21 addresses, separated by colons. Each address may contain from 1 to 8 characters. Use the Gemini String Editor to enter the poll list.

Response Timeout

After sending a poll, the master waits for a response message from the slave. If a response is not received within the specified timeout interval, a response timeout occurs. The `RESPONSE TIMEOUT` selection in the TESTS\MULTI_PT\MASTER submenu specifies the timeout interval, in seconds.

Response/RTS Delay

After a response has been received, or a timeout occurs, the master polls the next slave in the poll list. Before sending the poll, the master delays the interval specified in the TESTS\MULTI_PT\MASTER submenu.

Test Duration

The test ends when a specified number of polls have been sent to each slave address. The test duration is selected from the TESTS\MULTI_PT\TEST OPERATION submenu.

2.6.6. Configuring Slave DTEs

Each slave DTE waits for a poll containing its address, then sends the response message. The poll message must be matched exactly, including the address, before a response is sent.

Slave Address

Use the TESTS\MULTI_PT\SLAVE submenu to enter a slave address for each DTE which is configured as a slave device. Slave addresses may be any string from 1 to 8 characters long. When selecting slave addresses, note the following important points:

- Do not use the colon (**:**) or asterisk (*****) in any slave address.
- The slave addresses in the poll list must match the slave addresses assigned to the slave DTEs. Each slave uses its address to recognize polls addressed to it.
- Do not assign more than one DTE the same address. The master only expects one response message to each poll.
- Be careful that one slave address is not embedded in another slave address. For example, having addresses "1" and "10" can result in poll message errors at slave "1". Making all the slave addresses the same length can avoid this situation.
- If ignore DCD is selected, make sure that no slave address is embedded in the poll message field. Otherwise, during asynchronous operation, a slave could mistake the address in the message field for the start of a poll, and record poll message errors.
- Poll/RTS Delay

After the slave receives a valid poll message, it sends the response message. Before raising RTS to begin the response, the slave waits the delay interval specified in the TESTS\MULTI_PT\SLAVE submenu.

2.6.7. Multi-Point Polling Control Keys

Several front panel keys control the operation of the Multi-point Polling test. If a key is not described here, it has no effect during this test. The controlling keys and their functions are as follows:

CLEAR - resets the test results registers. A clear is automatically performed when a test is started. While a test is running, pressing CLEAR restarts the test from the beginning.

RESULTS - displays the results menu.

RUN - starts and stops the test. A clear is automatically performed at the start of each test.

RTS (A and B) - control the state of the RTS leads when the test is not running or the RTS option set to No. When this option is set to Yes and the test is in progress it has no effect, the leads are controlled by the test and the RTS indicator is off. Whereas if this option is set to no, the leads can be controlled by the user, when the test is running.

DTR (A and B) - control the state of the DTR leads.

To start the Multi-point Polling test, press RUN. The test will run until the programmed test length is reached. Pressing RUN a second time terminates the test in progress. Pressing CLEAR while a test is in progress removes all results and restarts the test.

2.6.8. Monitoring Test Results

Press RESULTS to display the Results menu use ↑ and ↓ to scroll through the menu lines and view the results.

The results screens are divided into three sets: RTS-CTS timing, master results, and slave results. If the Gemini is configured to provide one master and one slave, then the master results and slave results screens. If the Gemini is configured as two slave devices, then only the slave results are displayed. In both the above cases the RTS-CTS timing screens are displayed only when the RTS control option is set to yes, i.e. the RTS is under test control.

RTS-CTS Timing

The first four screens show RTS-CTS timing statistics. Before each poll or response message is sent, the transmitter raises Request To Send (RTS), then waits for Clear To Send (CTS). The time between RTS being raised and CTS being received is measured.

There are two screens for each of Gemini's two test interfaces. The first screen shows the number of messages sent, the most recent RTS-CTS time recorded, and the average RTS-CTS time for the test. The time is reported in milliseconds.

The second screen shows the maximum and minimum RTS-CTS times recorded during the test.

```
\MPOL\A                  Polls:      0
RTS-CTS Time:        0      Avg:      0
```

```
\MPOL\A                  Polls:      0
Max RTS-CTS Time:      0    Min:      0
```

```
\MPOL\B                  Polls:      0
RTS-CTS Time:        0      Avg:      0
```

```
\MPOL\B                  Polls:      0
Max RTS-CTS Time:      0    Min:      0
```

Master Results

If either test interface is selected as the master, five screens display master results. Statistics are accumulated separately for polls to each slave device. When viewing any master results screen, use + and - to select results for each slave device. The address of the slave selected is displayed in the upper right corner of the MAIN DISPLAY.

An aggregate display shows statistics for all the polls made during the test run. When the aggregate screen is displayed, the slave address (*****) is shown.

The first screen displays the number of polls sent and the number of responses received in return.

```
\MPOL\MASTER\A            Slave:      *
Polls Sent:      0          Rcvd:     0
```

The second screen shows the number of response timeouts, and the number of responses with errors. The third screen breaks down the response errors into address errors and message errors. Address errors include errors in the slave address field and the master address field.

```
\MPOL\MASTER\A            Slave:      *
Timeouts:        0      Resp Errs:    0
```

```
\MPOL\MASTER\A            Slave:      *
Addr Errs:       0      Msg Errs:     0
```

The fourth and fifth master results screens display response time statistics. The fourth screen shows the response time recorded for the most recent poll, and the average response time for all polls. The fifth screen displays the maximum and minimum response times recorded during the test.

```
\MPOL\MASTER\A            Slave:      *
Response Time:   0          Avg:      0
```

```
\MPOL\MASTER\A            Slave:      *
Max Response Time: 0        Min:      0
```

Slave Results

One slave results screen is displayed for each slave configured. The slave results screen shows the slave's address, the number of polls received containing that address, and the number of polls with the correct address but containing message field errors.

```
\MPOL\SLAVE\B              Addr:       2
Polls Rcvd:      0      Msg Errs:      0
```

2.7. Performing Polls Tests

The Gemini Polls test characterizes the message transfer performance of a data communications link. Figure 2-3 shows an example of a Polls test configuration. Each test interface transmits a message repeatedly, separated by a poll delay time. Each test interface also receives poll messages from the opposite end of the connection and analyzes the received messages for errors. For a complete description of the possible errors during a Polls test, refer to the Polls RESULTS display description beginning on page 3-2 in section 3, "Menu Reference". Each Gemini test interface (A,B) independently transmits poll messages, receives poll messages from the opposite end of the connection, and measures and displays results.

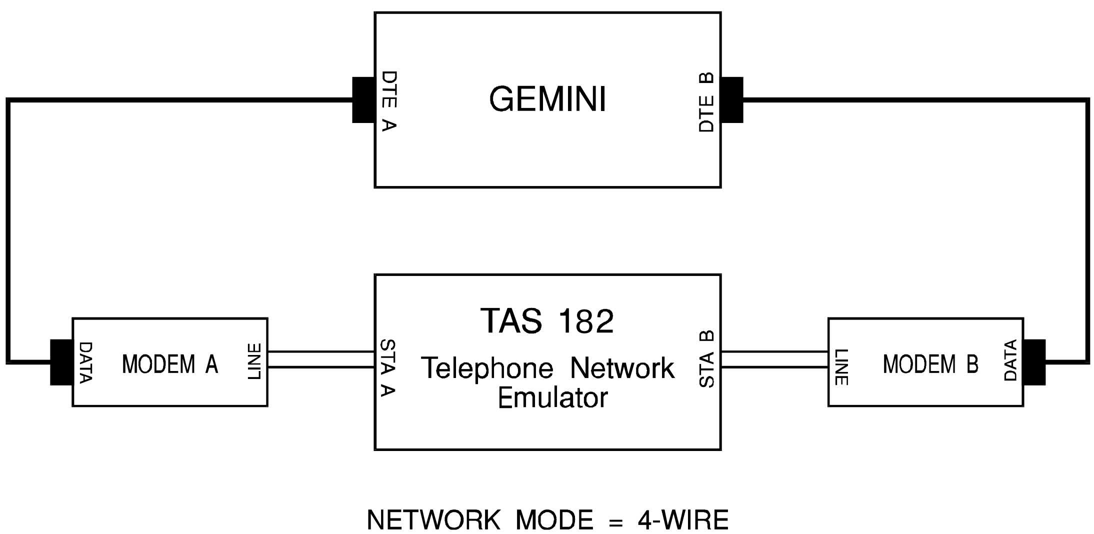

Figure 2-3. Polls Test Configuration

Each Gemini transmitter and each receiver can operate in one of two carrier modes: switched carrier or constant carrier. For switched carrier operation, a transmitter raises RTS before sending a message and lowers RTS after sending the message. The receiver at the opposite end of the connection starts reading the incoming poll message after the active transition of the DCD (data carrier detect) signal. For constant carrier operation, a transmitter does not switch RTS with each outgoing message and the receiver at the opposite end of the connection does not wait for an active DCD transition before it processes the incoming poll message.

Each of the two Gemini data analyzers measures and displays the following Polls test results:

- Number of poll messages analyzed
- Number of sync errors
- Number of message errors
- Number of false polls
- Transmit clock rate
- Receive clock rate
- RTS-CTS delay (msec: only measured when transmitter is in switched carrier mode)

2.7.1. Multi-Point Polling vs. Polls Test

Gemini provides two polling tests. There are significant differences between the Multi-point Polling test and the older Polls test.

The Polls test transmits a poll message repeatedly, separated by an interpoll delay. There is no response to the poll message; the receiver analyzes each poll, then discards it. In the Multi-point Polling test, there is a response sent for each poll message. The Multi-point Polling test measures the response time for each poll, and reports the minimum, maximum, and average response time.

With the Multi-point Polling test, multiple Gemini units may be used to simulate networks with up to twenty one slave devices. The Polls test only simulates point-to-point connections.

The Multi-Point Polling test always toggles RTS when transmitting. The Polls test offers the option to hold RTS constant during between polls.

2.7.2. Setting the Test Parameters

To enter the settings for a Polls test, enter the TESTS menu and select `TEST MODE: polls`. Next, press ENTER to see the Polls test parameters. Polls parameters include test configuration, # polls per test, poll delay, transmit/receive carrier modes, poll message, and test mode. To set test parameters, scroll to the desired menu line and use + or - to edit menu entries. For a full description of each Polls parameter, see Section 4, "Gemini Parameters Reference". Terminal parameters (protocol and bit rate) for Polls tests are contained in the TERM\TESTS submenu. These parameters must be properly set to ensure correct test operation.

2.7.3. Polls Test Control Keys

Several keys control the operation of the Polls test. These keys and the functions they perform are as follows:

RTS (A and B) - activate the RTS signal (pin 4) of the associated test interface. For the Polls test, RTS will also start the flow of data if that test interface is selected for data transmission by the test configuration parameter. The indicator next to the RTS button is lit when that station is selected as a transmitter.

SYNC (A and B) - have no functions for the Polls test.

RUN - Gemini starts monitoring the test results at both test interfaces. Gemini will continue to run until the test terminates, or until you press RUN again to stop the test. Note that RUN does not control the flow of data, this is controlled by RTS. RUN only enables the collection of test results.

CLEAR - resets the test results registers.

SEND - if pressed while the Polls test is running, Gemini inserts one error in the transmit data at each test interface.

To start the Polls test, use the RTS key(s) to start the flow of test data and press RUN to start the data analysis.

2.7.4. Monitoring Test Results

Press RESULTS to view the test results. The top of the menu displays pass-fail results and using ↑ and ↓, you can view the message errors, sync errors, false polls, transmit and receive clock frequencies, and RTS-CTS delay times.

Pass-Fail Results

To run a pass-fail test, define test error limits and run the Polls test. If the programmed test duration (number of polls) is reached before any test error limit is reached, Gemini reports that the modems have passed the test.

If any test error limit is reached before the test finishes, Gemini reports that the modems have failed the test.

```
\POLL   A:READY   Polls Analyzed:      0
        B:READY   Polls Analyzed:      0
```

Test Statistics

The next two screens display the test statistics:

- Rcvd - Number of polls received at this test interface.
- R-CTS - The elapsed time between Request To Send (RTS) being raised and Clear To Send (CTS) received for the most recent poll. If the test interface is not transmitting polls, this result will be 0.
- Ser - Sync Errors are counted if either of the first two characters of the poll message are incorrect. In sync mode, a sync error will also be counted if a partial poll message is received.
- Mer - Message Errors are counted if any character other than the first two is incorrect.
- Fpo - False Polls are only counted in switched carrier mode. A false poll is counted if Data Carrier Detect (DCD) is dropped before the first two characters of the poll are received.

```
\POLL\A      Rcvd:      0  R-CTS:      0
Ser:      0   Mer:      0    Fpo:      0
```

```
\POLL\B      Rcvd:      0  R-CTS:      0
Ser:      0   Mer:      0    Fpo:      0
```

Clock Frequency

Gemini continuously samples the transmit and receive clock frequencies at each test interface. The samples are not averaged; the measurement is updated about once a second.

```
\POLL\A
Txclk:1.200E+3  Rxclk:1.200E+3
```

```
\POLL\B
Txclk:1.200E+3  Rxclk:1.200E+3
```

2.7.5. Example: Running a TAS-Defined Polls Test

In this example, you will recall and execute a TAS defined Polls test for a switched-carrier, 9,600 bps private-line modem. Note that the telephone network simulator is configured for 4-wire private line operation. Since these are private-line modems, no call setup is required.

Recall the TAS-defined file for testing high-speed (9600 bps) private-line modems.

1. Press FILE.
2. Use ↑ or ↓ to select `RECALL`.
3. Use + or - to select the file to recall. For this example, select `hpl_sync`.
4. Press ENTER to recall the file.
5. After you press ENTER, Gemini displays the following message:

```
Press <enter> to recall setup,
or <esc> to return to previous menu.
```

6. Press ENTER to finish recalling the file.

Execute the Polls test.

1. Press DTR for stations A and B. These buttons are located in the middle of the front panel. Activating DTR indicates to the modems that Gemini is ready to transmit data.
2. Press TESTS key twice. The menu line `TEST MODE:` will appear.
3. Use + or - to select the `polls` test mode.
4. Press RTS A to begin the flow of test data from DTE A. Poll messages should now be flowing from DTE A, into modem A, through the telephone network simulator, into modem B, and then into DTE B.
5. Press RUN to begin the Polls test.
6. Press RESULTS to monitor the test results. Use ↑ or ↓ to scroll through the polls test results.

2.7.6. Creating a User-Defined Polls Test

To create a Polls test, set the terminal parameters in the TERM menu, then set Polls test parameters in the TESTS\POLLS submenu. For example, the following steps create a bi-directional switched-carrier Polls test for a 19,200 bps private line modem. For this test, Gemini supplies the modem transmit clock.

1. Enter the TERM\TESTS submenu, and set the following parameters (the highlighted line is not used by the Polls test):

```
PROTOCOL: sync
CLK A: 19200  bps    OFFSET:   0.0%
CLK B: 19200  bps    OFFSET:   0.0%
FLOW A: cts       FLOW B: cts
```

2. Enter the TESTS menu and set the `TEST MODE: polls`. Enter the TESTS\POLLS submenu, and set the following parameters (the highlighted lines are not used in this example):

```
CONFIGURATION: ta&b|ra&b
#POLLS:    1000
POLL DELAY:   10 msec
POLL MESSAGE: syn
CARRIER MODE  XMT A: sw     RCV B: sw
CARRIER MODE  XMT B: sw     RCV A: sw
EXECUTION MODE: manual
SYNC ERROR LIMIT    A:      0  B:      0
MESSAGE ERROR LIMIT A:      0  B:      0
FALSE POLL LIMIT    A:      0  B:      0
CTS TIMEOUT     A:   0 msec  B:   0 msec
```

To execute the above test, perform the following steps:

1. Activate DTR A and DTR B.
2. Activate RTS A and RTS B.
3. Press RUN to begin the test.
4. Press RESULTS to see the test results display.

2.8. Performing Character Echo Delay Tests

The Gemini Character Echo test simulates an environment where data (keystrokes) from a local DTE is transmitted over the network to a remote DTE. The data is passed through all components of local and remote modems, and is processed by the remote DTE.

This test uses two asynchronous DTE interfaces on a single Gemini unit at rates up to 256 Kbps. It measures minimum, maximum, average and current values of one way character latency and round trip character latency. One way character latency is defined as the time duration between the start bit of a character is sent from a transmitting DTE to the time the stop bit of the same is received at the receiving DTE. Round trip character latency is defined as the time duration between the start bit of a character is sent from a transmitting DTE to the time the stop bit of its echo is received.

Briefly, here are the steps to follow to use Gemini's Character Echo Delay test.

1. Select the Echo test mode using the TEST menu.

2. Select the echo type to be char_echo.

3. Select the test configuration, number of iterations, minimum and span of delay, pattern attributes and time-out.

4. Enter the desired terminal parameters for the test, using the TERM menu. (Asynchronous is the only protocol allowed.)

5. Establish a call between the modems, using Call Setup if needed. Return to Echo test mode.

6. Press RUN to start the test. Gemini loads a random file into memory and begins running the test.

7. Press the RESULTS key to monitor the test results.

8. When the test is finished, the RUN indicator will be turned off. The accumulated test statistics are available on the main display.

During the Character Echo test, Gemini will perform the following procedure. Those parameters that are set by the user are listed in **BOLD CAPITAL LETTERS**.

1. Load the test patterns. (unless already loaded from a previous test).

2. Clear test results from the analyzers.

3. Start the transmitter selected in the **CONFIGURATION**. The transmitter reads a character from the random file loaded into its memory. If **RESET SEQUENCE** is set to Yes, it starts from the first character of the random file every time the test is started. If **RESET SEQUENCE** is set to No it continues with the next character in sequence from the last time the test was run.

4. At the transmitter, start the **TIMEOUT**. If the **TIMEOUT** expires before the echo of the transmitted character is received, record it as an errored iteration and proceed to step 9.

5. The transmitter then transmits the character read. (If **FILTER SEQUENCE** is set to yes, AND if the data size in a character is set to 8 bits, no two consecutive transmitted characters will be identical.)

6. When the receiving side receives the character, it compares it with the expected character, if the received and the expected characters do not match the iteration is marked as an errored iteration and the test proceeds to step 9, else it echoes back the same character to the transmitting side.

7. When the transmitting side receives the echo, it is compared with the character sent before, if they do not match it is marked as an errored iteration.

8. The transmitting side and the receiving side increment the number of iterations attempted. If the number of iterations attempted has reached the **NO OF ITERATIONS**, go to step 10.

9. Wait the random amount of delay. This delay is uniformly distributed with minimum value of **MINIMUM** and width equal to **SPAN.** Then go to step 2.

10. End of test.

2.8.1. Entering Character Echo Delay Test Terminal Parameters

When Character Echo Delay Test mode is selected, Gemini's DTEs are automatically reprogrammed according to the test terminal parameters. Test terminal parameters include the data format, clock source, and, for internal clock, the data rate.

The test terminal parameters are entered using the TERM\TESTS submenu. See section 4, the "Gemini Parameter Reference" for descriptions of all the test terminal parameters.

When selecting terminal parameters for this test, note the following important points:

- This test can be run in Asynchronous mode only. When attempted to run in Synchronous mode from the front panel, an error message appears on the display.
- The DCE may use flow control to prevent Gemini from sending data faster than it can handle. This test supports CTS flow control only.

2.8.2. Selecting Character Echo Delay Test

To select Character Echo Delay test, select the test mode echo. Enter the submenu by pressing ENTER. Gemini will either display Echo Type as blk_ack for the Block Acknowledgment Delay test, or char_echo for the Character Echo Delay test.

```
>                                  [echo]
ECHO TYPE: char_echo↵
```

Press the + or - key to select the desired echo type.

2.8.3. Entering Character Echo Delay Test Parameters

Before starting the test, select the test configuration, number of iterations, delay attributes and pattern attributes.

Test Configuration

The test configuration parameter is used to select a data path for the test. The transmitting side, selected in the configuration, sends a character in every iteration and the receiving side echoes back the same character when it is received.

```
>ECHO                              [echo]
CONFIGURATION: ta|rb
```

Number of Iterations

Select the number of iterations desired. When the selected number of iterations has been attempted, Gemini will automatically stop running the test.

```
>ECHO                                     [echo]
NO OF ITERATIONS:  100
```

Defining the Delay

The inter-iteration delay is the duration between the time transmitting side receives echo of last character transmitted, to the time the next character is transmitted. It takes any random value determined by two programmable parameters. The actual inter-iteration delay is uniformly distributed with a minimum value of MINIMUM and with a width equal to SPAN. Thus the inter-iteration delay can be any value between MINIMUM and MINIMUM+SPAN.

```
>ECHO                                     [echo]
DELAY   MIN:   50 msec   SPAN:  450 msec
```

2.8.4. Entering the Pattern Attribute Parameters

Character Echo Delay test has two programmable parameters to determine the sequence of characters sent.

Reset Sequence

The Character Echo Delay test can send characters from the beginning of the random file or from the location where it left off last time the test was run. When this option is set to Yes, the test starts from the beginning of the random file, otherwise it starts from the location where it left last time the test was run.

```
>ECHO                                     [echo]
RESET SEQUENCE: yes
```

Filter Sequence

This parameters enables/disables transmission of two consecutive identical characters, if the data size is 8 bits. With this option set to Yes, Gemini does not transmit two consecutive identical characters. This parameter is effective only when the data size is 8 bits, otherwise this parameter is ignored.

```
>ECHO                                     [echo]
FILTER SEQUENCE: yes
```

The random file used in this test is referred as 4.TST in TIA-TSB-38. It is 32 Kbyte in size and is taken from a 64 bit random number generator. Its characteristics are typical for files compressed with Ziv-Lempel algorithm.

The Filter Sequence and Reset Sequence parameters can be used to change the attributes of the characters transmitted in the test. By selecting the Filter Sequence option to Yes, Reset Sequence to No, AND with asynchronous character format of 8 data bits, no parity bits and 1 stop bit, no two consecutive transmitted characters would be identical. Hence the characters in every iterations would be different and the test is run according to the TIA-TSB-38 document.

2.8.5. Detecting Timeout Conditions

Timeouts may occur when the transmitter does not receive the echoed character. When this happens, that iteration will be aborted, and the times for that iteration will not be measured.

Time-out Duration

Under some conditions an iteration may never be completed. For example, the transmitted character is errored when received or never received or the echoed character is either lost or errored. The Timeout is used to set an upper limit on the allowable time for the transmitting side to receive its echo back.

The Timeout must be set to a large enough value to ensure that normal iterations will be given enough time to complete.

```
>ECHO                                [echo]
ECHO TIMEOUT:   100 msec
```

2.8.6. Character Echo Delay Control Keys

Several front panel keys control the operation of the Character Echo Delay test. If a key is not described here, it has no effect during this test. The controlling keys and their functions are as follows.

CLEAR - resets the test results registers. A clear is automatically performed when a test is started. While a test is running, pressing **CLEAR** clears the results.

RESULTS - displays the results screen.

RUN - starts and stops the test. A clear is automatically performed at the start of the test.

SEND - runs the test for a single iteration if the test is not running, else this key has no effect.

RTS (A and B) - controls the state of the RTS leads.

DTR (A and B) - controls the state of the DTE leads.

2.8.7. Test Results

Press RESULTS to view the test results. The results screens may be divided into two sets: iterations and timings. The iterations results are displayed in one screen whereas the timing results are displayed in four screens. Use ↑ and ↓ to scroll through the result screens.

Iteration Results

The first screen shows the number of iterations attempted (Analyzed), the number of timed out and errored iterations. The timings of errored iterations are not considered for computing any timing results.

```
\ECHO  ITERATIONS      Analyzed:      0
     Timed Out:      0  Errored:      0
```

Timing Results

The next four screen provide detailed timing results. The timing results displayed are the minimum, maximum, average and current values of one way character latency and round trip character latency.

```
\ECHO  MIN DELAYS
  One Way:    0 msec Rnd Trip:    0 msec
```

```
\ECHO  MAX DELAYS
  One Way:    0 msec Rnd Trip:    0 msec
```

```
\ECHO  AVG DELAYS
One Way:0.000E+0ms     Rnd Trip:0.000E+0ms
```

```
\ECHO CURR DELAYS
  One Way:    0 msec Rnd Trip:    0 msec
```

2.9. Performing Block Acknowledgment Delay Test

The Gemini Block Acknowledgment Delay simulates an environment, where the transmitting DTE transmits a block of data over the network to the receiving DTE and the receiving DTE sends an acknowledgment back to the transmitting DTE. The transmitting DTE can not transmit next block unless the last block of data is acknowledged.

This test uses two asynchronous DTE interfaces at rates up to 256 Kbps. It measures the minimum, maximum, average and current values of one way character latency, one way block latency and round trip delay. One way character latency is defined as the time duration between the start bit of the first character of a block is transmitted from the transmitting DTE to the stop bit of the same is received at the receiving DTE. One way block latency is defined as the time duration between the start bit of the first character is transmitted from the transmitting DTE to the stop bit of the last character is received at the receiving DTE. Round trip delay is defined as the time duration between the start bit of the first character is transmitted from the transmitting DTE to the last bit of its acknowledgment is received by the transmitting DTE.

Briefly, here are the steps to follow to use Gemini's Block Acknowledgment Delay test to evaluate modem performance.

1. Select the Echo test mode using the TEST menu.

2. Select the echo type to be blk_ack.

3. Select the test configuration, number of iterations, block size, pattern attributes and time-out.

4. Enter the desired terminal parameters for the test, using the TERM menu. (Asynchronous protocol is the only protocol allowed.)

5. Establish a call between the modems, using Call Setup if needed. Return to Echo test mode.

6. Press RUN to start the test. Gemini loads a random file into memory and begins running the test.

7. Press the RESULTS key to monitor the test results.

8. When the test is finished, the RUN indicator will be turned off. The accumulated test statistics are available on the main display.

During the Block Acknowledgment Delay test, Gemini will perform the following procedure. Those parameters that are set by the user are listed in **BOLD CAPITAL LETTERS.**

1. Load the test patterns. (unless already loaded from a previous test).

2. Clear test results from the analyzers.

3. Start the transmitter selected in the **CONFIGURATION**. The transmitter reads a block of characters from the random file loaded into its memory. The size of the block is **BLOCK SIZE.** If **RESET SEQUENCE** is set to Yes, it starts from the first character of the random file every time the test is started, otherwise it starts from the character where it stopped the last time the test was run.

4. The transmitter then transmits the block of characters read. (If **FILTER SEQUENCE** is set to Yes, AND if the data size in a character is set to 8 bits, no two consecutive transmitted characters will be identical.)

5. At the transmitter, start the **TIMEOUT.** If the **TIMEOUT** expires before the acknowledgment of the transmitted block is received, record the iteration as an errored iteration and the test proceeds to step 9.

6. When the receiving side receives the block of characters, it compares it with the expected block, if the received block and the expected block do not match the iteration is marked as an errored iteration and the test proceeds to step 9, otherwise it transmits back an acknowledgment to the transmitting side.

7. When the transmitting side receives the acknowledgment, it is compared with the expected acknowledgment, if they do not match it is marked as an errored iteration.

8. The transmitting side and the receiving side increment the number of iterations attempted. If the number of iterations attempted has reached the **NO OF ITERATIONS**, go to step 10.

9. Go to step 2.

10. End of test.

2.9.1. Entering Block Acknowledgment Delay Test Terminal Parameters

When Block Acknowledgment Delay Test mode is selected, Gemini's DTEs are automatically reprogrammed according to the test terminal parameters. Test terminal parameters include the data format, clock source, and, for internal clock, the data rate.

The test terminal parameters are entered using the TERM\TESTS submenu. See section 4, the "Gemini Parameter Reference" for descriptions of all the test terminal parameters.

When selecting terminal parameters for this test, note the following important points:

- This test can be run in Asynchronous mode only. When attempted to run in Synchronous mode from the front panel, an error message appears on the display.
- The DCE may use flow control to prevent Gemini from sending data faster than it can handle. This test supports CTS flow control only.

2.9.2. Selecting Block Acknowledgment Delay Test

To select Block Acknowledgment Delay test, select the test mode echo. Enter the submenu by pressing ENTER. Gemini will either display Echo Type as blk_ack for the Block Acknowledgment Delay test, or char_echo for the Character Echo Delay test.

```
>                                  [echo]
ECHO TYPE: blk_ack↵
```

Press the + or - key to select the desired echo type.

2.9.3. Entering Block Acknowledgment Delay Test Parameters

Before starting the test, select the test configuration, number of iterations, delay attributes and pattern attributes.

Test Configuration

The test configuration parameter is used to select a data path for the test. The transmitting side, selected in the configuration, sends a block of characters in every iteration and the receiving side echoes back the same character when it is received.

```
>ECHO                         [echo]
CONFIGURATION: ta|rb
```

Number of Iterations

Select the number of iterations desired. When the selected number of iterations has been attempted, Gemini will automatically stop running the test.

```
>ECHO                         [echo]
NO OF ITERATIONS:  100
```

Defining the Block Size

This parameter defines the size of the block transmitted by the transmitting DTE. The receiving DTE compares the received block for the expected block and transmits back an acknowledgment if the they match.

```
>ECHO                         [echo]
BLOCK SIZE:  100 char
```

2.9.4. Entering the Pattern Attribute Parameters

The Block Acknowledgment Delay test has two programmable parameters to determine the sequence of characters sent.

Reset Sequence

The Block Acknowledgment Delay test can send block of characters from the beginning of the random file or from the location where it stopped last time the test was run. When this option is set to yes, the it starts from the beginning of the random file, otherwise it starts from the location where it left last time the test was run.

```
>ECHO                             [echo]
RESET SEQUENCE: yes
```

Filter Sequence

This parameters enables/disables transmission of two consecutive identical characters in a block, if the data size is 8 bits. With this option set to yes, Gemini does not transmit two consecutive identical characters. This parameter is effective only when the data size is 8 bits, otherwise this parameter is ignored.

```
>ECHO                             [echo]
FILTER SEQUENCE: yes
```

The random file used in this test is referred as 4.TST in TIA-TSB-38. It is 32 Kbyte in size and is taken from a 64 bit random number generator. Its characteristics are typical for files compressed with Ziv-Lempel algorithm.

The Filter Sequence and Reset Sequence parameters can be used to change the attributes of the characters transmitted in the test. By selecting the Filter Sequence option to Yes, Reset Sequence to No, AND with asynchronous character format of 8 data bits, no parity bits and 1 stop bit, no two consecutive transmitted characters in a block would be identical. Hence the characters in every iterations would be different and the test is run according to the TIA-TSB-38 document.

2.9.5. Detecting Timeout Conditions

Timeouts may occur when the transmitter does not receive an acknowledgment to the transmitted block of data. When timeout occurs, that iteration will be aborted, and the times for that iteration will not be measured.

Time-out Duration

Under some conditions an iteration may never be completed. For example, the transmitted block of data is partially or completely lost or received in error or the acknowledgment is lost or received in error. The Timeout is used to set an upper limit on the allowable time for the transmitting side to receive its acknowledgment back.

The Timeout must be set to a large enough value to ensure that normal iterations will be given enough time to complete.

```
>ECHO                                    [echo]
ECHO TIMEOUT:   100 msec
```

2.9.6. Block Acknowledgment Delay Control Keys

Several front panel keys control the operation of the Block Acknowledgment Delay test. If a key is not described here, it has no effect during this test. The controlling keys and their functions are as follows.

CLEAR - resets the test results registers. A clear is automatically performed when a test is started. While a test is running, pressing **CLEAR** clears the results.

RESULTS - displays the results screen.

RUN - starts and stops the test. A clear is automatically performed at the start of the test.

SEND - runs the test for a single iteration, when the test is not running, else this key has no effect.

RTS (A and B) - controls the state of the RTS leads.

DTR (A and B) - controls the state of the DTE leads.

2.9.7. Test Results

Press RESULTS to view the test results. The results screens may be divided into two sets: iterations and timings. The iterations results are displayed in one screen whereas the timing results are displayed in four screens. Use ↑ and ↓ to scroll through the result screens.

Iteration Results

The first screen shows the number of iterations attempted (Analyzed), the number of timed out and errored iterations. The timings of errored iterations are not considered for computing any timing results.

```
\ECHO  ITERATIONS      Analyzed:      0
 Timed Out:      0      Errored:      0
```

Timing Results

The next four screen provide detailed timing results. The timing results displayed are the minimum, maximum, average and current values of one way character latency and round trip character latency.

```
\ECHO  MIN DELAYS Oneway Char:    0 msec
Oneway Blk:    0 msec RndTrip:    0 msec
```

```
\ECHO  MAX DELAYS Oneway Char:    0 msec
Oneway Blk:    0 msec RndTrip:    0 msec
```

```
\ECHO AVG DELAYS  Oneway Char:0.000E+0ms
Oneway Blk:0.000E+0ms RndTrip:0.000E+0ms
```

```
\ECHO CURR DELAYS Oneway Char:    0 msec
Oneway Blk:    0 msec RndTrip:    0 msec
```

2.10. Performing Signal Timing Measurements

The TEST\TIMING sub menu allows you to configure the timing system to measure the time between selected start and stop events. A single measurement can be taken, or measurements can be taken repeatedly. The start and stop events can be triggered by almost any of the signals on either A or B ports, and can be triggered by rising or falling edge.

Here are the necessary steps to use Gemini's timing measurement system:

1. Enter the TEST\TIMING menu.
2. Select the measurement start and stop events.
3. Select measurement mode and enable measurement.
4. Monitor the timing measurement results.

Entering the TIMING Configuration Menu

To access the timing measurement configuration menu, enter the TESTS menu, press the down arrow to view the TIMING↵ option. Pressing ENTER brings up the first line of the timing configuration menu.

Selecting START and STOP Events

Move to the START EVENT menu and select the A or B interface and the signal to use to trigger the start of timing measurements. The "+" and "-" signs indicate rising and falling edges, respectively. Move down to the STOP EVENT menu and select A or B interface and the signal to use to stop the timing measurement. Note that not all signals are valid when using the 530-A interface.

Selecting Measurement Mode and Enabling Measurements

Move to the TRIGGER/MEASURE menu and select the trigger mode. CONTINUOUS mode takes measurements repeatedly (up to several measurements per second). SINGLE mode records only the first measurement taken and stops. Enable measurements by setting MEASURE to ENABLED. In SINGLE mode, this will automatically switch back to DISABLED when the measurement has completed.

Monitoring Measurement Results

Enter the RESULTS menu and scroll down to the TIMING results screen. This screen contains the timing measurement system "Status" and "Timing" measurement result. Note that the timing results are available in all test modes. The "Status" will indicate one of the following:

INDICATOR	DESCRIPTION
ARMED	The measurement system is waiting for the start event.
MEASURING	The timer is running, waiting for the stop event.
COMPLETE	The start and stop events have occurred, and the resulting measurement is displayed. (SINGLE mode only)
DISABLED	Timing measurements are disabled.
INVALID	The timing measurement configuration is not valid. (Usually caused by selecting signals not supported by the interface.)
OVERFLOW	The measurement value overflowed before a stop event occurred. (The measurement system is disabled once this occurs.)

Table 2-2. Status Indicators

The measurement "Timing" result is updated when the system reaches the COMPLETE state. In continuous mode, this state is never displayed because the system transitions immediately to the ARMED state.

Single Mode Measurements

In single mode, the system becomes armed as soon as it is enabled (from the configuration menu). When the start event occurs, the system begins measuring. If no stop event occurs, the measurement overflows and the system becomes disabled. Otherwise, when the stop event occurs, the measurement value is updated on the results screen, the status becomes "complete", and the measurement system is disabled. To take another measurement, the system must be enabled again, using the timing configuration menu.

Continuous Mode Measurements

Continuous mode operation is identical to single operation except that when a measurement is completed, the system transitions back to the armed state. Because this transition happens immediately, the status never indicates "complete". This may cause confusion when measuring short, regular events. If the events are short, there is no time to display the "measuring" status before going back to the "armed" state; therefore, the status will appear to stay "armed" even though it is actually taking measurements.

The measurement system will not necessarily capture every measurement. When a measurement completes, a setup time is required to arm the system for a new measurement. Any start events which occur during this time are ignored. This setup time varies, but can be as large as 0.5 seconds (worst case).

2.11. Controlling and Monitoring Test Interface Signals

The TERM\INTF sub menu allows control of the interface selection (RS232 or 530-A). Once selected, pressing ENTER will lead to the menu for controlling and/or viewing interface signals not available on the front panel DTE A/B displays. (See section 8 for details on the interface pins.)

2.11.1. RS-232 Signals

The DRS and SQD/RL signals can be configured as input or output from the TERM\INTF\RS232 sub menu. The direction of these signals is controlled by their respective "enable" settings. When "enable" is set to "yes", the corresponding signal is output on the interface. When "enable" is set to "no", the level at the interface is reflected on the menu as "SQD" for the SQD/RL signal or as "DRS_IN" for the DRS signal.

The following signals can be controlled from the TERM\INTF\RS232 sub menu.

- STD - secondary transmit data
- SRTS - secondary request to send
- LL - local loop back
- DRS - data rate select (bi-directional)
- RL - remote loop back (bi-directional)

The sub menu also allows you to view the status of the following interface input signals:

- SRD - secondary receive data
- SCTS - secondary clear to send
- SDCD - secondary data carrier detect
- RI - ring indicator
- TM - test mode
- DRS - data rate select (bi-directional)
- SQD - signal quality (bi-directional)

2.11.2. 530A Signals

The following signals can be controlled from the TERM\INTF\530A sub menu.

- LL - local loop back
- RL - remote loop back (bi-directional)

The sub menu also allows you to view the status of the following interface input signals:

- RI - ring indicator
- TM - test mode

2.12. Gemini String Editor

Several Gemini menu items require you to enter or modify text strings. The Gemini String Editor allows you to create and modify text strings. Examples of menu items that require string input or modification are listed below:

- Modem command strings (CALL)
- BERT user patterns b1 and b2 (TESTS)
- Polls user patterns p1 and p2 (TESTS)
- File labels (FILE)

The String Editor allows you to set a character to any 8-bit binary value. This feature allows you to enter ASCII printable characters, ASCII non printable (control) characters, and non-ASCII 8-bit quantities. You can enter an ASCII printable character directly, or you can enter the hexadecimal value of the character. You can enter an ASCII control character (00 to 1F hex) as a control character sequence (^*character*), or you can enter the hexadecimal equivalent. You must enter characters in the range 7F to FF hex as hexadecimal values. For example, the character sequence ABC<RETURN> can be represented by any of the following strings:

- ABC^M
- ABC<0D>
- <41><42><43><0D>
- <4142430D>

Gemini interprets the sequences contained in each character string, and stores each string as a sequence of 8-bit values.

2.12.1. String Editor Syntax

All printable ASCII characters may be entered directly, with five exceptions: ^, <, ", >, and \. These metacharacters are used to enter non-printing ASCII characters. The " character is used to delimit strings in command messages.

Control characters (ASCII 0 to 31) may be entered using the ^ metacharacter. For example, entering ^M produces a carriage return (ASCII 13).

Any 8-bit character may be entered using the < and > metacharacters to delimit a sequence of hexadecimal values. For example, another way to enter a carriage return is <0D>. A sequence of characters may also be entered: <80F7200D>.

To enter one of the four metacharacters, precede it with the \ metacharacter; for example, entering `AT \\P DT2^M` will specify the string `AT \P DT2^M`.

2.12.2. Entering a String

To enter a string, use ← and → to position the cursor and use + or - to select the character value. As you press the + or - key, the String Editor scrolls through the list of characters in the current edit range. Gemini shows the current edit range on the top line of the display, in the Edit field. Continue to scroll through the list until you reach the desired character.

Changing the Edit Range

To change the edit range, press ENTER. Gemini will display the following Edit Range menu:

```
Select editing mode...
EDIT RANGE:  A-Z
```

Use + or - to select the edit range, then press ESC to return to the character string. Table 2-3 defines each of the edit range choices:

IDENTIFIER	RANGE
A-Z	Upper Case Alphabetic
a-z	Lower Case Alphabetic
0-9	Decimal Digits
^\...	^_'{|}~!"#$%&'()*+,- ./:;<=>?@[\} and SPACE
ins/del	insert and delete
hex	<>0123456789ABCDEF
ctrl	^ABCDEFGHIJKLMNOPQRS TUVWXYZ[\]-@
all	all printable ASCII characters

Table 2-3. String Edit Ranges

Inserting and Deleting Characters

To insert characters in a string, perform the following steps:

1. Select the `ins/del` edit range.
2. Position the cursor at the point in the string where you wish to insert characters.
3. Press + to insert a space at the cursor position.

To delete characters from a string, perform the following steps:

1. Select the `ins/del` edit range.
2. Position the cursor at the point in the string where you wish to delete characters.
3. Press - to delete the character at the cursor position.

Entering Printable ASCII Characters

To enter a printable ASCII character, select the edit range that contains the character. Next, press + or - until you locate the character.

Entering Pauses

Gemini allows pauses to be placed in strings that are used for call setup only. In all other strings, pause specifiers are interpreted literally as part of the string. Pauses in call setup strings are useful for switching networks and autodial modems. A pause is specified by using a `\` character followed by a `P` followed by the number of seconds you want the pause to last followed by a space. You may specify a pause from 1 to 99 seconds. For example to specify a pause for five seconds in a string, enter this string:

```
ATZ^M\P5 ATDT5551234^M
```

Gemini does not send the space after the pause. This space is used as a place holder for Gemini to interpret pause information. Below is an example of a string with a pause of thirty seconds with a space after the pause:

```
ATZ^M\P30  ATDT5551234^M
```

Entering ASCII Control Characters

The String Editor provides two options for entering ASCII control characters. You can enter a control character as a ^*character* sequence, or you can enter the hexadecimal value of the control character. To enter the control character as a ^*character* sequence, perform the following steps:

1. Select the `ctrl` edit range.
2. Enter the `^` character using + and -.
3. Use → to move one space to the right.
4. Enter the desired character using + and -.

For example, to enter the control character <CARRIAGE RETURN>, you must enter the sequence `^M`. Gemini interprets this sequence as carriage return (hex value 0D).

To enter a control character as a hexadecimal value, perform the following steps:

1. Select the `hex` edit range.
2. Enter the `<` character.
3. Use → to move one space to the right.
4. Enter the hex value for the character (use two digits).
5. Use → to move one space to the right.
6. Enter the `>` character.

For example, to enter the control character <CARRIAGE RETURN>, you must enter the sequence `<0D>`.

If you wish to enter the hex values for several characters in sequence, you can enclose the sequence with a single pair of brackets. For example, to enter the sequence <CARRIAGE RETURN><LINE FEED> you can enter `<0D 0A>`.

Table 2-4 on the following page lists each ASCII control character and its String Editor implementation.

CHAR	HEX	NAME
^@	00	NUL
^A	01	SOH
^B	02	STX
^C	03	ETX
^D	04	EOT
^E	05	ENQ
^F	06	ACK
^G	07	BEL
^H	08	BS
^I	09	HT
^J	0A	LF
^K	0B	VT
^L	0C	FF
^M	0D	CR
^N	0E	SO
^O	0F	SI
^P	10	DLE
^Q	11	DC1 (XON)
^R	12	DC2 (sometimes XON)
^S	13	DC3 (XOFF)
^T	14	DC4 (sometimes XOFF)
^U	15	NAK
^V	16	SYN
^W	17	ETB
^X	18	CAN
^Y	19	EM
^Z	1A	SUB
^[	1B	ESC
^\	1C	FS
^]	1D	GS
^^	1E	RS
^-	1F	US

Table 2-4. ASCII Control Character Codes

Entering Non-ASCII Characters

Non-ASCII characters have 8-bit hex values from 80 to FF hex. You must enter these characters as hexadecimal values. The procedure for entering these characters is the same as the procedure for entering the hex values for ASCII control characters.

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3.0. GEMINI MENU REFERENCE

3.1. TESTS Menu

The TESTS menu allows you to select the Gemini test mode and set test parameters. The TESTS main menu contains three lines. The first line allows you to select the test mode. The second line allows timing measurement configuration. The third line allows you to set the self-loop and insert-errors options.

Available test modes are bert, polls, calls, data_comp, multi_pt, echo, and hs_bert. Each test mode provides submenus for setting the test parameters. Figures 3-1 through 3-21 show the TESTS menu layout. The top display is shown first, with the submenus following. For more information on test operation, please refer to Section 2, "Local Operation". For further description of each parameter, please refer to Section 4, "Gemini Parameter Reference".

```
>                              [bert]
TEST MODE: bert↵
```

```
TEST MODE: bert↵
TIMING↵
SELF-LOOP: no   INSERT ERRORS: no
```

Figure 3-1. TESTS Main Menu

```
>                              [bert]
TEST MODE: bert↵
```

```
CONFIGURATION: ta&b|ra&b
TEST DURATION IN: blocks↵
BLOCK SIZE: 10^2 chars
PATTERN: space
RESYNC ENABLE: yes
SYNC LOSS - ERROR BURST: yes
SYNC LOSS - NO DATA:  3 sec
EXECUTION MODE: manual
SYNC TIMEOUT:   10 sec
BIT ERROR LIMIT     A:  10000  B:  10000
CHAR ERROR LIMIT    A:    200  B:    200
BLOCK ERROR LIMIT   A:     50  B:     50
SYNC LOSS LIMIT     A:      2  B:      2
ERRORED SEC LMT     A:    200  B:    200
```

Figure 3-2. TESTS Menu, BERT Submenu

```
>BERT                              [bert]
TEST DURATION IN: blocks↵
```

```
#BLOCKS:   1000
```

Figure 3-3. TESTS Menu, BERT\Duration in Blocks Submenu

```
>BERT                              [bert]
TEST DURATION IN: seconds↵
```

```
#SECONDS:   100
```

Figure 3-4. TESTS Menu, BERT\Duration in Seconds Submenu

```
>                              [polls]
TEST MODE: polls↵
```

```
CONFIGURATION: ta&b|ra&b
#POLLS:    1000
POLL DELAY:   10 msec
POLL MESSAGE: fox
CARRIER MODE  XMT A: const  RCV B: const
CARRIER MODE  XMT B: const  RCV A: const
EXECUTION MODE: manual
SYNC ERROR LIMIT    A:      0  B:      0
MESSAGE ERROR LIMIT A:      0  B:      0
FALSE POLL LIMIT    A:      0  B:      0
CTS TIMEOUT     A:   0 msec  B:   0 msec
```

Figure 3-5. TESTS Menu, Polls Submenu

```
>                              [calls]
TEST MODE: calls↵
```

```
CONFIGURATION: ta&b|ra&b
#CALLS PER TEST:    1000
DTR CONTROL        A: yes   B: yes
RTS CONTROL        A: yes   B: yes
DELAY BEFORE CALL:  1.0 sec
ORIGINATE STATION: A
STRAP/DTR DELAY    A: 2.00  B: 2.00  sec
DTR/CALL DELAY     A: 0.10  B: 0.10  sec
ANSW STRING DELAY  A: 1.00  B: 1.00  sec
EXPECTED RESP A: CONNECT
EXPECTED RESP B: CONNECT
CONNECT EVENT   A: dcd&str  B: dcd&str
CONNECT TIMEOUT    A:  20   B:  20   sec
CONNECT/RTS DELAY  A: 1.00  B: 1.00  sec
CTS TIMEOUT        A: 1000  B: 1000  ms
CTS/XMIT DELAY     A:   10  B:   10  ms
XMIT TEST MESSAGE  A: 511   B: 511
TRANSFER TIMEOUT:    5 sec
DROP STRING DELAY  A: 1.00  B: 1.00  sec
```

Figure 3-6. TESTS Menu, Calls Submenu

```
>                              [data_comp]
TEST MODE: data_comp↵
```

```
CONFIGURATION: ta&b|ra&b
TEST DURATION:         1 transfers
PATTERN: ascii            LENGTH:  32768
REPEAT PATTERN:   1  FILE SIZE:    32768
MEASURE TRANSFER RATE: end_to_end
INTER-TRANSFER DELAY:   5 seconds
FILE TRANSFER TIMEOUT:   30 seconds
ERROR LIMIT:       1 bits
FIRST   10 CHARS RX TIMEOUT:   30 secs
RTS CONTROL A: no     RTS CONTROL B: no
HDLC FRAME SIZE:    1024 bytes
HDLC INTER-FRAME DELAY:    0 msec
HDLC LAST FRAME/RTS DELAY:    1 msec
HDLC FRAME ADDR: FF   CONTROL FIELD: 13
STOP TEST: manual
FAILED TRANSFER LIMIT:       1
```

Figure 3-7. TESTS Menu, Data Compression/File Transfer Submenu

```
>                              [multi_pt]
TEST MODE: multi_pt↵
```

```
TEST OPERATION↵
POLL/RESPONSE DEFINITION↵
MASTER↵
SLAVE↵
```

Figure 3-8. TESTS Menu, Multipoint Submenu

```
>MPOL                         [multi_pt]
TEST OPERATION↵
```

```
MASTER DTE: a
TEST DURATION:       0 polls
SYNC PROTOCOL: bisync
```

Figure 3-9. TESTS Menu, Multipoint\Test Operation Submenu

```
>MPOL                          [multi_pt]
POLL/RESPONSE DEFINITION↵
```

```
POLL:
RESPONSE:
MASTER ADDRESS:
RTS CONTROL: yes↵
CARRIER DETECT  A: ignore
CARRIER DETECT  B: ignore
```

Figure 3-10. TESTS Menu, Multipoint\Poll/Response Definition Submenu

```
>MPOL\POLL                     [multi_pt]
RTS CONTROL: yes↵
```

```
CTS/XMIT DELAY  A:      0.0 msec
CTS/XMIT DELAY  B:      0.0 msec
XMIT/RTS DELAY  A:      0.0 msec
XMIT/RTS DELAY  B:      0.0 msec
```

Figure 3-11. TESTS Menu, Multipoint\Poll/Response Definitions\RTS control=yes Submenu

```
>MPOL\POLL                     [multi_pt]
RTS CONTROL: no↵
```

```
RESPONSE/XMIT DELAY  A:      0.0 msec
RESPONSE/XMIT DELAY  B:      0.0 msec
```

Figure 3-12. TESTS Menu, Multipoint\Poll/Response Definitions\RTS control=no Submenu

```
>MPOL                          [multi_pt]
MASTER↵
```

```
POLL LIST: 2
RESPONSE TIMEOUT:    5 seconds
RESPONSE/RTS DELAY:     0.0 msec
```

Figure 3-13. TESTS Menu, Multipoint\Master Submenu

```
>MPOL                                [multi_pt]
SLAVE↵
```

```
SLAVEA: 1
SLAVEB: 2
POLL/RTS DELAY A:        0.0 msec
POLL/RTS DELAY B:        0.0 msec
```

Figure 3-14. TESTS Menu, Multipoint\Slave Submenu

```
>                                    [echo]
TEST MODE: echo↵
```

```
TEST TYPE: char_echo↵
```

Figure 3-15. TESTS Menu, ECHO Submenu

```
>ECHO                                [echo]
TEST TYPE: char_echo↵
```

```
CONFIGURATION: ta|rb
NO OF ITERATIONS:      100
DELAY   MIN:   50 msec  SPAN:  450 msec
RESET SEQUENCE: no
FILTER SEQUENCE: yes
ECHO TIMEOUT:   100 msec
```

Figure 3-16. TESTS Menu, ECHO\Test\Character Echo Submenu

```
>ECHO                                [echo]
TEST TYPE: blk_ack↵
```

```
CONFIGURATION: ta|rb
NO OF ITERATIONS:      100
BLOCK SIZE:  133 char
RESET SEQUENCE: no
FILTER SEQUENCE: yes
ECHO TIMEOUT:   100 msec
```

Figure 3-17. TESTS Menu, ECHO\Test\Block Acknowledgment Submenu

```
>                              [hs_bert]
TEST MODE: hs_bert↵
```

```
CONFIGURATION: ta&b|ra&b
TEST DURATION IN: blocks↵
BLOCK SIZE: 1024 octets
PATTERN: space
RESYNC ENABLE: yes
SYNC LOSS THRESHOLD: medium
SYNC LOSS - NO DATA:  3 sec
EXECUTION MODE: manual
SYNC TIMEOUT:   10 sec
BIT ERROR LIMIT     A:  10000  B:  10000
BLOCK ERROR LIMIT   A:     50  B:     50
SYNC LOSS LIMIT     A:      2  B:      2
ERRORED SEC LMT     A:    200  B:    200
```

Figure 3-18. TESTS Menu, High-Speed BERT Submenu

```
>HS_BERT                       [hs_bert]
TEST DURATION IN: blocks↵
```

```
#BLOCKS:   1000
```

Figure 3-19. TESTS Menu, High-Speed BERT\Duration in Blocks Submenu

```
>HS_BERT                       [hs_bert]
TEST DURATION IN: seconds↵
```

```
#SECONDS:   100
```

Figure 3-20. TESTS Menu, High-Speed BERT\Duration in Seconds Submenu

```
>                              [hs_dcmp]
TEST MODE: hs_dcmp↵
```

```
CONFIGURATION: ta&b|ra&b
TEST DURATION:         1 transfers
PATTERN: ascii            LENGTH:  32768
REPEAT PATTERN:   1  FILE SIZE:    32768
MEASURE TRANSFER RATE: end_to_end
INTER-TRANSFER DELAY:   5 seconds
FILE TRANSFER TIMEOUT:   30 seconds
FIRST FRAME TIMEOUT:   30 seconds
ERROR LIMIT:      1
STOP TEST: manual
FAILED TRANSFER LIMIT:       1
```

Figure 3-21. TESTS Menu, High-Speed Data Compression Submenu

```
>                              [bert]
TIMING↵
```

```
TRIGGER: continuous   MEASURE: disabled
[START EVENT] DTE: A   SIGNAL: rts+
[STOP EVENT]  DTE: A   SIGNAL: rts+
```

Figure 3-22. TESTS Menu, Timing Submenu

3.2. TERM Menu

The TERM menu controls the data format, protocol, and interface selection for each of Gemini's two test interfaces. The Terminal Parameters menu also allows you to set and/or read interface control signals that do not appear on the front panel.

The TERM menu contains three submenus, TESTS, CALLS and INTF. The TESTS submenu controls the data format and protocol for test data transmission. The TESTS parameters apply when Gemini is in its BERT, message transfer part of Connect Reliability, Data Compression / File Transfer , Multipoint Polling, or Polls test mode. The CALLS submenu controls the data format and protocol for call setup. The CALLS parameters apply when Gemini is operating in its call setup mode, and during the call setup part of the Connect Reliability test mode. The INTF submenu allows you to select the interface to use, view and set test interface output signals, and view interface input signals. Figures 3-22. through 3-34 show the TERM menu organization.

```
>                           [call_setup]
TESTS↵    CALLS↵    INTF↵
```

Figure 3-22. TERM Main Menu

```
>                           [call_setup]
TESTS↵    CALLS↵    INTF↵
```

```
PROTOCOL: async↵
CLK A: 1200   bps    OFFSET:   0.0%
CLK B: 1200   bps    OFFSET:   0.0%
FLOW A: none     FLOW B: none
```

Figure 3-23. TERM-Tests\Protocol Submenu

```
>TESTS                      [call_setup]
PROTOCOL: async↵
```

```
DATA: 7  PARITY: odd    STOP: 1
```

Figure 3-24. TERM-Tests\Protocol\Async Submenu

When the high-speed applications are active, the TESTS submenu changes:

```
>                              [hs_bert]
TESTS↵    CALLS↵    INTF↵
```

```
PROTOCOL: sync
CLK A: 2048000 bps   CLK B: 2048000 bps
```

Figure 3-25. TERM-TESTS\Protocol Submenu (High-Speed BERT)

```
>                              [hs_dcmp]
TESTS↵    CALLS↵    INTF↵
```

```
PROTOCOL: nrz
HDLC FRAME ADDR: FF   CONTROL FIELD: 13
HDLC FRAME SIZE:    1024 octets
HDLC INTER-FRAME DELAY:    0 msec
TX CLOCK A: 2048000  TX CLOCK B: 2048000
FLOW CTL A: none     FLOW CTL B: none
```

Figure 3-26. TERM-TESTS\Protocol Submenu (High-Speed Data Compression)

The CALLS submenu controls the data format and protocol for call setup:

```
>                            [call_setup]
TESTS↵    CALLS↵    INTF↵
```

```
PROTOCOL: async↵
CLK A: 1200   bps    OFFSET:   0.0%
CLK B: 1200   bps    OFFSET:   0.0%
FLOW A: none     FLOW B: none
```

Figure 3-27. TERM-CALLS Submenu

```
>CALLS                       [call_setup]
PROTOCOL: async↵
```

```
DATA: 7  PARITY: odd    STOP: 1
INTER-CHARACTER DELAY:  50 msec
```

Figure 3-28. TERM-CALLS \Protocol\Async Submenu

```
>CALLS                       [call_setup]
PROTOCOL: sync↵
```

```
CHAR: 8BN↵  #SYNC CHARS: 2
SYN1: 16    SYN2: 16
```

Figure 3-29. TERM CALLS\Protocol\Sync Submenu

```
>CALLS\PROTOCOL\SYNC        [call_setup]
CHAR: 8BN↵   #SYNC CHARS: 2
```

```
CODE: ascii
```

Figure 3-30. TERM CALLS\Protocol\Sync\8BN Submenu

```
>CALLS                      [call_setup]
PROTOCOL: hdlc↵
```

```
CHAR: 8BN↵  ADDR: FF  CTRL: 13
```

Figure 3-31. TERM CALLS\Protocol\HDLC Submenu

```
>CALLS\PROTOCOL\HDLC        [call_setup]
CHAR: 8BN↵   ADDR: FF  CTRL: 13
```

```
CODE: ascii
```

Figure 3-32. TERM CALLS\Protocol\HDCL\8BN Submenu

```
>                           [call_setup]
TESTS↵    CALLS↵    INTF↵
```

```
DTE A: rs232↵
DTE B: rs232↵
```

Figure 3-33. TERM-INTF Submenu

```
>INTF                       [call_setup]
DTE A: rs232↵
```

```
STD: 1   SRTS: 1   LL: 1
SRD: 0   SCTS: 1   SDCD: 1
RI: 1    TM:   1   SQD: 1   DRS IN: 1
RL ENABLE: no      RL: 1
DRS OUT ENABLE:    no    DRS OUT: 1
```

Figure 3-34. TERM-INTF\DTE\RS232 Submenu

```
>INTF                       [call_setup]
DTE A: 530a↵
```

```
LL: 1   RL: 1
RI: 1   TM: 1
```

Figure 3-35. TERM INTF\DTE\530A Submenu

3.3. CALL Menu

The CALL menu facilitates call setup for autodial modems. To perform call setup, press CALL to enter call setup mode. Gemini can perform call setup using one of several data formats and protocols. Set the desired data format and protocol parameters in the TERM menu, CALLS submenu.

Each line of the CALL menu contains a character string that can be transmitted to one of the test interfaces. Each command string can be up to eighty characters in length. Gemini transmits string names that have A suffix from DTE A and transmits string names that have B suffix from DTE B. For example, Gemini transmits the STRAP A string from DTE A. Figure 3-35 shows the CALL menu.

```
>                Edit: A-Z [call_setup]
STRAP A: ATZ^M♦
```

```
STRAP A: ATZ^M
STRAP B: ATZ^M
ORIG  A: ATDT2^M
ORIG  B: ATDT1^M
ANSW  A: ATS0=1^M
ANSW  B: ATS0=1^M
DROP  A: \P2 +++\P2 ATH^M
DROP  B: \P2 +++\P2 ATH^M
```

Figure 3-36. CALL Setup Main Menu

After you select a character string, press SEND to transmit the string to the designated test interface. If you press RESULTS before or after you press SEND, you can view the transaction on Gemini's built-in data monitor.

Gemini provides two methods for entering and editing modem command strings. You can use the Gemini String Editor to edit the contents of any command string (see the "Gemini String Editor" section of Section 2), or you can enter command strings via an attached terminal or PC (see Section 4, "Remote Operation").

3.4. FILE Menu

The FILE menu allows you to quickly save or recall Gemini test configuration files. These files contain the settings for each of the parameters contained in the TESTS, TERM, and CALL menus.

The save function stores the current test configuration to a read/write memory file. Gemini saves read/write memory file contents in battery-backed random access memory (RAM).

The recall function loads a set of test parameters from read/write memory or from read-only memory (ROM). TAS supplies predefined test configurations for popular modem types in the ROM test configuration files. The predefined test configurations are located in an appendix in the back of this manual.
Figure 3-36 shows the FILE menu.

```
>                              [call_setup]
RECALL: 1200_async↵            FDX·DIAL
```

```
RECALL: 1200_async↵             FDX DIAL
SAVE: file0↵              LBL:
```

Figure 3-37. FILE Main Menu

3.5. CONFIG Menu

The CONFIG menu has two functions. First, it allows you to read the current Gemini operating status, model number, and software version number. Second, the CONFIG menu allows you to set the Gemini for GPIB, ACK/NAK, or RS-232 remote control. Figures 3-37 through 3-40 show the CONFIG menu layout.

```
>                            [call_setup]
STATUS: OK   MODEL: WARP    VER: 5.00
```

```
STATUS: OK   MODEL: WARP    VER: 5.00
REMOTE PROTOCOL: acknak↵
PROTOCOL RESPONSE MODE: verbose
```

Figure 3-38. CONFIG Main Menu

```
>                            [call_setup]
REMOTE PROTOCOL: acknak↵
```

```
BAUD RATE: 19200  ADDRESS:  1
DATA: 7  PARITY: odd    STOP: 1
```

Figure 3-39. CONFIG\Remote Protocol\ACKNAK Submenu

```
>                            [call_setup]
REMOTE PROTOCOL: gpib↵
```

```
ADDRESS:  1
```

Figure 3-40. CONFIG\Remote Protocol\GPIB Submenu

```
>                            [call_setup]
REMOTE PROTOCOL: crlf↵
```

```
BAUD RATE: 19200
DATA: 7  PARITY: odd    STOP: 1
```

Figure 3-41. CONFIG\Remote Protocol\CRLF Submenu

3.6. Test Results Displays

Gemini shows test results on its main display. To access the test results, press RESULTS. When the results display is active, the RESULTS indicator is on. To return to the menu display, press RESULTS again. When the menu display is active, the RESULTS indicator is off.

Each results display contains multiple lines of information. To scroll through the lines of the results display, use ↑ and ↓.

The contents of the results display depend upon the test mode. If the test mode is BERT, the results display contains the BERT test results. If the test mode is Connect Reliability, the results display contains the Connect Reliability test results. If the test mode is Call Setup, the results display shows the transmit data and receive data (Td and Rd) for DTE A and DTE B. If the test mode is Data Compression/File Transfer, the results display contains the Data Compression/File Transfer results. If the test mode is Multipoint Polling, the results display contains the Multipoint Polling test results. If the test mode is Polls, the results display contains the Polls test results.

The Timing Measurement results are given at the end of each test's results. To view timing results, scroll through the current test's results using the ↓ key; timing results are at the bottom of the menu. The Timing Measurements results screen is shown only once at the end of this section of the manual.

3.6.1. Bit Error Rate/Throughput Results Display

```
\BERT  A:STOPPED          Blocks:      0
       B:STOPPED          Blocks:      0
```

```
\BERT   A:READY  Blocks Analyzed:      0
        B:READY  Blocks Analyzed:      0
```

```
\BERT\A                   Blocks:      0
Ber:      0   Cer:      0   Bler:      0
```

```
\BERT\B                   Blocks:      0
Ber:      0   Cer:      0   Bler:      0
```

```
\BERT\A                   Blocks:      0
Bps:0.000E+0 Cps:0.000E+0  Blps:0.000E+0
```

```
\BERT\B                   Blocks:      0
Bps:0.000E+0 Cps:0.000E+0  Blps:0.000E+0
```

```
\BERT\A
Txclk:1.200E+3  Rxclk:1.200E+3
```

```
\BERT\B
Txclk:1.200E+3  Rxclk:1.200E+3
```

```
\BERT\A
Sync loss:     0       Duration:       0
```

```
\BERT\B
Sync loss:     0       Duration:       0
```

```
\BERT\A   Total No Sync Seconds:       0
EFS:      0     Errored Seconds:       0
```

```
\BERT\B   Total No Sync Seconds:       0
EFS:      0     Errored Seconds:       0
```

```
\BERT\A      Total Test Seconds:       0
   Total Error Analysis Seconds:       0
```

```
\BERT\B      Total Test Seconds:       0
   Total Error Analysis Seconds:       0
```

Figure 3-42. Bit Error Rate/Throughput Results Display

3.6.2. Polls Results Display

```
\POLL   A:READY   Polls Analyzed:      0
        B:READY   Polls Analyzed:      0
```

```
\POLL\A      Rcvd:      0  R-CTS:      0
Ser:      0   Mer:      0    Fpo:      0
```

```
\POLL\B      Rcvd:      0  R-CTS:      0
Ser:      0   Mer:      0    Fpo:      0
```

```
\POLL\A
Txclk:1.200E+3  Rxclk:1.200E+3
```

```
\POLL\B
Txclk:1.200E+3  Rxclk:1.200E+3
```

Figure 3-43. Polls Results Display

3.6.3. Connect Reliability Results Display

```
\CALLS
Attempts:      0       Failures:       0
```

```
\CALLS\A                 No Cts:       0
No Carrier:     0  Bad Response:       0
```

```
\CALLS\B                 No Cts:       0
No Carrier:     0  Bad Response:       0
```

```
\CALLS\A        Xfer Time-outs:        0
Startup Errs:     0   Data Errs:       0
```

```
\CALLS\B        Xfer Time-outs:        0
Startup Errs:     0   Data Errs:       0
```

```
\CALLS\A
Response:
```

```
\CALLS\B
Response:
```

Figure 3-44. Connect Reliability Results Display

3.6.4. Call Setup Results Display

```
Tda: AT &F^M→→→→→→→
Rda: AT &F^M^M^JOK^M^J
```

```
Tdb: AT &F^M→→→→→→→
Rdb: AT &F^M^M^JOK^M^J
```

Figure 3-45. Call Setup Results

3.6.5. Data Compression / File Transfer Results Display (Async Test Protocol)

```
\DCMP  A→B: READY      Attempts:       0
       B→A: READY      Attempts:       0
```

```
\DCMP   Tx: 0%    [                     ]
[A→B]   Rx: 0%    [                     ]
```

```
\DCMP   Tx: 0%    [                     ]
[B→A]   Rx: 0%    [                     ]
```

```
\DCMP  A→B CPS:0.000E+0   Time:  0:00:00
       B→A CPS:0.000E+0   Time:  0:00:00
```

```
\DCMP  Transfers:       0   Avg:0.000E+0
[A→B]    Max CPS:0.000E+0   Min:0.000E+0
```

```
\DCMP  Transfers:       0   Avg:0.000E+0
[B→A]    Max CPS:0.000E+0   Min:0.000E+0
```

```
\DCMP  Transfers:       0  Failed:     0
[A→B]  Timed Out:       0  ErrLim:     0
```

```
\DCMP  Transfers:       0  Failed:     0
[B→A]  Timed Out:       0  ErrLim:     0
```

```
\DCMP  Transfers:       0
[A→B]  Char Errs:       0
```

```
\DCMP  Transfers:       0
[B→A]  Char Errs:       0
```

Figure 3-46. Data Compression / File Transfer Results Display (Async Test Protocol)

3.6.6. Data Compression / File Transfer Results Display (Sync Test Protocol)

```
\DCMP  A→B: READY      Attempts:       0
       B→A: READY      Attempts:       0
```

```
\DCMP   Tx: 0%    [                    ]
[A→B]   Rx: 0%    [                    ]
```

```
\DCMP   Tx: 0%    [                    ]
[B→A]   Rx: 0%    [                    ]
```

```
\DCMP  A→B BPS:0.000E+0   Time:  0:00:00
       B→A BPS:0.000E+0   Time:  0:00:00
```

```
\DCMP  Transfers:       0   Avg:0.000E+0
[A→B]    Max BPS:0.000E+0   Min:0.000E+0
```

```
\DCMP  Transfers:       0   Avg:0.000E+0
[B→A]    Max BPS:0.000E+0   Min:0.000E+0
```

```
\DCMP  Transfers:       0  Failed:     0
[A→B]  Timed Out:       0  ErrLim:     0
```

```
\DCMP  Transfers:       0  Failed:     0
[B→A]  Timed Out:       0  ErrLim:     0
```

```
\DCMP  Transfers:       0
[A→B]  Frames:          0 Errs:        0
```

```
\DCMP  Transfers:       0
[B→A]  Frames:          0 Errs:        0
```

Figure 3-47. Data Compression / File Transfer Results Display (Sync Test Protocol)

3.6.7. Multi-Point Polling Results Display

```
\MPOL\A                   Polls:      0
RTS-CTS Time:        0       Avg:      0
```

```
\MPOL\A                   Polls:      0
Max RTS-CTS Time:      0     Min:      0
```

```
\MPOL\B                   Polls:      0
RTS-CTS Time:        0       Avg:      0
```

```
\MPOL\B                   Polls:      0
Max RTS-CTS Time:      0     Min:      0
```

```
\MPOL\MASTER\A            Slave:      *
Polls Sent:      0          Rcvd:      0
```

```
\MPOL\MASTER\A            Slave:      *
Timeouts:       0       Resp Errs:     0
```

```
\MPOL\MASTER\A            Slave:      *
Addr Errs:      0       Msg Errs:      0
```

```
\MPOL\MASTER\A            Slave:      *
Response Time:       0      Avg:      0
```

```
\MPOL\MASTER\A            Slave:      *
Max Response Time:       0  Min:      0
```

```
\MPOL\SLAVE\B              Addr:      2
Polls Rcvd:      0      Msg Errs:      0
```

Figure 3-48. Multi-Point Polling Results Display

3.6.8. Character Echo Delay Results Display

```
\ECHO  ITERATIONS      Analyzed:      0
    Timed Out:      0   Errored:      0
```

```
\ECHO  MIN DELAYS
  One Way:    0 msec Rnd Trip:    0 msec
```

```
\ECHO  MAX DELAYS
  One Way:    0 msec Rnd Trip:    0 msec
```

```
\ECHO  AVG DELAYS
One Way:  0.000E+0ms Rnd Trip: 0.000E+0ms
```

```
\ECHO CURR DELAYS
  One Way:    0 msec Rnd Trip:    0 msec
```

Figure 3-49 Character Echo Delay Results Display

3.6.9. Block Acknowledgment Results Display

```
\ECHO  ITERATIONS      Analyzed:      0
    Timed Out:      0   Errored:      0
```

```
\ECHO  MIN DELAYS  Oneway Char:   0 msec
Oneway Blk:   0 msec   RndTrip:   0 msec
```

```
\ECHO  MAX DELAYS  Oneway Char:   0 msec
Oneway Blk:   0 msec   RndTrip:   0 msec
```

```
\ECHO  AVG DELAYS Oneway Char:0.000E+0ms
Oneway Blk:0.000E+0ms RndTrip:0.000E+0ms
```

```
\ECHO  CURR DELAYS Oneway Char:   0 msec
Oneway Blk:   0 msec   RndTrip:   0 msec
```

Figure 3-50 Block Acknowledgment Delay Results Display

3.6.10. Timing Measurement Results Display

```
\BERT                    Status: DISABLED
A RTS+ to A RTS+         Timing:     0.00 ms
```

Figure 3-51. Timing Measurement Results Display

4.0. GEMINI PARAMETER REFERENCE

This section describes the parameters for the performance tests of the Gemini *Warp*. These are divided into General Test Parameters (including timing measurements), BERT, Block Acknowledgment Delay, Character Echo Delay Connect Reliability, Data Compression / File Transfer, High-Speed BERT, High-Speed Data Compression, Multi-Point Polling, and Polls test parameters. Use this section for reference after you are familiar with the Gemini *Warp*, and have read Section 2, "Local Operation", and/or Section 5, "Remote Operation", and Section 3, Menu Reference.

4.1. General Test Parameters

Select Test Mode

TESTS Menu: TEST MODE

Remote Link: /TEST:MODE=selection/

Remarks: This parameter is used to choose which test Gemini will perform.

Selections:

bert	Select the Bit Error Rate / Throughput test
calls	Select the Call Connect Reliability test
data_comp	Select the Data Compression / File Transfer test
echo	Select Character Echo or Block Acknowledge Delay test
hs_bert	Select High-Speed BERT test
hs_dcmp	Select High-Speed Data Compression test
multi_pt	Select the Multi-Point Polling test
polls	Select the Polling test
call_setup	Select Call Setup / Message Transfer mode (remote link only, press CALL button to use call_setup mode on front panel)
idle	Disable all tests (remote link only)

Timing Measurement Trigger

TESTS Menu: \TIMING\TRIGGER

Remote Link: /TIME:TRIG=*selection*/

Remarks: This parameter specifies the trigger mode for the time measurement. The timing measurement is performed in parallel with all of the performance tests.

The trigger modes are:

- Continuous - measurement restarts automatically after each measurement cycle.
- Single - measurement stops after first complete measurement cycle.

Regardless of the trigger mode, no measurement will begin until the MEASURE parameter has been set to **enable**.

Selections:

continuous	Perform continuous timing measurements
single	Perform single measurement

Timing Measurement Enable

TESTS Menu: \TIMING\MEASURE

Remote Link: /TIME:MEAS=*selection*/

Remarks: This parameter enables or disables the timing measurement. When enabled a measurement will begin when the start event is detected. When disabled no measurement will occur.

Selections:

enabled	Enable timing measurements
disabled	Disable timing measurements

Timing Measurement Start Event Terminal

TESTS Menu: \TIMING\START EVENT DTE

Remote Link: /TIME:T0DTE=*selection*/

Remarks: This parameter selects the terminal from which the start event of the timing measurement will be provided.

Selections:

a	Start event signal on station A
b	Start event signal on station B

Timing Measurement Start Event Signal

TESTS Menu: \TIMING\START EVENT SIGNAL

Remote Link: /TIME:T0SIG=*selection*/

Remarks: This parameter selects the signal which will be the start event, both the signal and the edge are specified. The signal name is appended with a + to indicate the signal transition from inactive to active (mark to space). The signal name is appended with a - to indicate the signal transition from active to inactive (space to mark).

Selections: rts+, rts-, cts+, cts-, dsr+, dsr-, dtr+, dtr-, dcd+, dcd-, td+, td-, tc+, tc-, rd+, rd-, rc+, rc-, ri+, ri-, etc+, etc-, sdcd+, sdcd-, scts+, scts-, srts+, srts-, std+, std-, srd+, srd-

Timing Measurement Stop Event Terminal

TESTS Menu: \TIMING\STOP EVENT DTE

Remote Link: /TIME:T1DTE=*selection*/

Remarks: This parameter selects the terminal from which the stop event of the timing measurement will be provided.

Selections:

a Stop event signal on station A

b Stop event signal on station B

Timing Measurement Stop Event Signal

TESTS Menu: \TIMING\STOP EVENT SIGNAL

Remote Link: /TIME:T1SIG=*selection*/

Remarks: This parameter selects the signal which will be the stop event, both the signal and the edge are specified. The signal name is appended with a + to indicate the signal transition from inactive to active (mark to space). The signal name is appended with a - to indicate the signal transition from active to inactive (space to mark).

Selections: rts+, rts-, cts+, cts-, dsr+, dsr-, dtr+, dtr-, dcd+, dcd-, td+, td-, tc+, tc-, rd+, rd-, rc+, rc-, ri+, ri-, etc+, etc-, sdcd+, sdcd-, scts+, scts-, srts+, srts-, std+, std-, srd+, srd-

Self-Loop Test

TESTS Menu: SELF-LOOP

Remote Link: /TEST:LOOP=*selection*/

Remarks: If **yes**, Gemini internally connects transmit data to receive data at each test interface. This allows you to verify the Gemini transmitter and receiver operation. SELF-LOOP can be used to verify BERT, CALLS, and Data_Comp tests only, and only under the following conditions:

- The test protocol must be **async**.
- The test flow control options are set to **none**.

Selections:

yes	Enable self-loop option
no	Normal operation

Error Insertion

TESTS Menu: INSERT ERRORS

Remote Link: /TEST:IERR=*selection*/

Remarks: If **yes**, Gemini inserts one error per second into the transmit data stream at each test interface. This option only applies to BERT and POLLS tests.

Selections:

yes	Insert one error each second into the transmitted data
no	Do not insert errors into transmitted data

4.2. BERT Test Parameters

Test Configuration

TESTS Menu:	BERT\CONFIGURATION
Remote Link:	/BERT:CNFG=*selection*/
Remarks:	This parameter determines which terminal interface(s) will transmit the BERT pattern and which will analyze received data. Any terminal interface not configured to transmit will ignore the flow control setting for that interface and use no flow control.
Selections:	ta|ra — Transmit from DTE A, analyze at DTE A ta|rb — Transmit from DTE A, analyze at DTE B tb|ra — Transmit from DTE B, analyze at DTE A tb|rb — Transmit from DTE B, analyze at DTE B ta&b|ra — Transmit from DTE A and B, analyze at DTE A ta&b|rb — Transmit from DTE A and B, analyze at DTE B ta&b|ra&b — Transmit from DTE A and B, analyze at DTE A and B

Test Duration

TESTS Menu:	BERT\TEST DURATION IN
Remote Link:	/BERT:TDL=*selection*/
Remarks:	Use this parameter to indicate if the duration of the BERT is number of blocks (see Test Duration: Blocks) or number of test seconds (see Test Duration: Seconds). The default duration is blocks. Gemini will automatically terminate the test based on the settings of these parameters. See also: Test Duration: Blocks, Test Duration: Seconds
Selections:	blocks — Analyze until specified number of blocks are received seconds — Analyze until specified number of test seconds elapse

Test Duration: Blocks

TESTS Menu: BERT\DURATION\BLOCKS\#BLOCKS

Remote Link: /BERT:NBLK=*selection*/

Remarks: This parameter determines the duration of the BERT test as the number of blocks to receive. Gemini automatically terminates the test when the data analyzers have received the specified number of blocks.

See also: Block Size, Test Duration

Selections:

1 - 1,000,000	Analyze until specified number of blocks are received
0	Continuous operation

Test Duration: Seconds

TESTS Menu: BERT\DURATION\SECONDS\#SECONDS

Remote Link: /BERT:NTS=*selection*/

Remarks: This parameter determines the duration of the BERT test as total test seconds. Gemini automatically terminates the test when the specified number of test seconds have elapsed, as measured by the BERT result Total Test Seconds.

See also: Test Duration

Selections:

1 - 1,000,000	Analyze until specified number of seconds elapse
0	Continuous operation

Block Size

TESTS Menu:	BERT\BLOCK SIZE
Remote Link:	/BERT:BSIZ=*selection*/
Remarks:	This parameter is used for two purposes. The test duration is specified as the number of blocks to be analyzed. It is also used to record block errors. The units used for this parameter depend on the character format selected. For async, the block size is the number of characters. For sync, the block size is the number of bits. The front panel indicates 'chars' or 'bits' In previous versions of Gemini's software "10Ex" syntax was the only syntax available. It is retained in this version for backward compatibility only. New remote controllers should use the "10^x" syntax. See also: Test Duration, Block Error Count, Test Protocol
Selections:	10^2 - 10^8 Block sizes in powers of 10 starting at 100 2^5 - 2^28 Block sizes in powers of 2 starting at 32 10E2 - 10E8 Block sizes in powers of 10 starting at 100 (remote link only) 2E5 - 2E28 Block sizes in powers of 2 starting at 32 (remote link only)

The minimum block size which can be used to perform a BERT Test depends upon the speed of transmission. Use Table 4-1 to determine the minimum block size to be set.

BLOCK SIZE	CLOCK RATE
32 bits (2^5)	up to 9600 bps
64 bits (2^6)	up to 19200 bps
100 bits (10^2)	up to 36000 bps
128 bits (2^7(	up to 38400 bps
256 bits (2^8)	up to 76800 bps
512 bits (2^9)	up to 153600 bps
1000 bits (10^3) or more	up to 256000 bps

Table 4-1. Block Size Settings

Test Pattern

TESTS Menu: BERT\PATTERN

Remote Link: /BERT:PATT=*selection*/

Remarks: This parameter selects the BERT data pattern. All the patterns are fixed except for **b1** and **b2**, which can be modified using the Gemini String Editor.

See also: User-defined Test Patterns

Selections:

63, 511, 2047	Pseudo-random patterns
mark	Pattern of all 1's
space	Pattern of all 0's
alt	Alternating 1's and 0's
b1, b2	User-defined patterns

User-Defined Test Patterns

TESTS Menu: BERT\PATTERN\B1, BERT\PATTERN\B2

Remote Link: /BERT:B1="pattern"/

/BERT:B2="pattern"/

Remarks: The data patterns **b1** and **b2** can be modified using the Gemini String Editor. Each pattern may contain up to 256 characters (async), or 2048 bits (sync).

Selections: See Gemini String Editor for parameter string syntax

Enable Pattern Resynchronization

TESTS Menu: BERT\RESYNC ENABLE

Remote Link: /BERT:RSEN=*selection*/

Remarks: This parameter controls whether the analyzer will attempt to regain pattern synchronization after a sync loss. To disable resynchronization, set this parameter to **no** after the analyzer is in sync, but before starting the test run.

Selections:

yes	Enable resynchronization after sync loss
no	Disable resynchronization after sync loss

Sync Loss Criteria: On Error Burst

TESTS Menu: BERT\SYNC LOSS - ERROR BURST

Remote Link: BERT:SLERRB=*selection*/

Remarks: This parameter determines whether pattern sync is dropped when the bit error rate is excessive. The threshold used is 30% bit errors over a one second interval; the threshold cannot be adjusted.

Selections:

yes Drop sync if 30% bit errors measured in one second

no Never drop sync because of error rate

Sync Loss Criteria: No Data Timeout

TESTS Menu: BERT\SYNC LOSS - NO DATA

Remote Link: /BERT:SLNDTO=*selection*/

Remarks: If no data is received during the interval specified, the BERT analyzer will drop pattern sync. When running throughput tests on modems using error correction or data compression, the interval should be set to a large value so that pattern sync is not lost during normal operation.

Selections: 1 to 99: Number of seconds of no data before sync dropped

Test Execution Mode

TESTS Menu: BERT\EXECUTION MODE

Remote Link: /BERT:MODE=*selection*/

Remarks: This parameter controls the conditions under which a BERT test is automatically stopped.

See also: Test Duration, Bit Error Limit, Block Error Limit, Character Error Limit, Sync Timeout, Sync Loss Limit

Selections:

manual: Test stops when selected number of blocks received

semi-auto: Test stops when any test error limit is reached, or selected number of blocks are received

Bit Error Limit

TESTS Menu: BERT\BIT ERROR LIMIT

Remote Link: /BERT:BITLA=*selection*/, /BERT:BITLB=*selection*/

Remarks: If the number of bit errors recorded during a test run exceeds this limit, the pass-fail status will be **failed.** If semi-auto execution mode is selected, the test will stop.

Selections:

1-1000000	Selects test bit error limit
0	Disables test bit error limit

Character Error Limit

TESTS Menu: BERT\CHAR ERROR LIMIT

Remote Link: /BERT:CHRLA=*selection*/, /BERT:CHRLB=*selection*/

Remarks: If the number of character errors recorded during a test run exceeds this limit, the pass-fail status will be **failed.** If semi-auto execution mode is selected, the test will stop.

Since character errors are only recorded when async test protocol is selected, this parameter has no effect in sync mode.

Selections:

1-1000000	Selects test character error limit
0	Disables test character error limit

Block Error Limit

TESTS Menu: BERT\BLOCK ERROR LIMIT

Remote Link: /BERT:BLKLA=*selection*/, /BERT:BLKLB=*selection*/

Remarks: If the number of block errors recorded during a test run exceeds this limit, the pass-fail status will be **failed.** If semi-auto execution mode is selected, the test will stop.

See also: Block Size

Selections:

1-1000000	Selects test block error limit
0	Disables test block error limit

Sync Timeout

TESTS Menu: BERT\SYNC TIMEOUT

Remote Link: /BERT:RTSD=*selection*/

Remarks: If, during a test run, the analyzer cannot synchronize with the test pattern with the specified time limit, the pass-fail status will be **failed.** If semi-auto execution mode is selected, the test will stop.

Selections:

1-1000	Selects pattern sync timeout interval
0	Disables sync timeout

Sync Loss Limit

TESTS Menu: BERT\SYNC LOSS LIMIT

Remote Link: /BERT:BRKLA=*selection*/, /BERT:BRKLB=*selection*/

Remarks: If the number of sync losses recorded during a test run exceeds this limit, the pass-fail status will be **failed.** If semi-auto execution mode is selected, the test will stop.

See also: Sync Loss Criteria: On Error Burst
Sync Loss Criteria: No Data Timeout

Selections:

1-100000000	Selects test sync loss limit
0	Disables test sync loss limit

Errored Second Limit

TESTS Menu: BERT\ERRORED SEC LMT

Remote Link: /BERT:ESLA=*selection*/, /BERT:ESLB=*selection*/

Remarks: If the number of errored seconds recorded during a test run exceeds this limit, the pass-fail status will be **failed.** If semi-auto execution mode is selected, the test will stop.

Selections:

1-1000000	Selects test errored second limit
0	Disables test errored second limit

4.3. Block Acknowledge Delay Test Parameters

Test Configuration

TESTS Menu: ECHO\BLK_ACK\CONFIGURATION

Remote Link: /ECHO:CNFG=*selection*/

Remarks: This parameter determines which terminal interface will transmit block of characters and which will send back the acknowledge.

Selection:

ta|rb Transmit from DTE A, send back acknowledgment from DTE B

tb|ra Transmit from DTE B, send back acknowledgment from DTE A

Block Size

TESTS Menu: ECHO\BLK_ACK\BLOCK SIZE

Remote Link: /ECHO:BSIZ=*selection*/

Remarks: This parameter determines the size of blocks transmitted by the transmitting DTE.

Selection: 1-9999 Block size in number of characters

Number of Iterations

TEST Menu: ECHO\BLK_ACK\NO OF ITERATION

Remote Link: /ECHO:ITER=selection/

Remarks: This parameter determines the duration of the test. Gemini automatically terminates the test when the number of iteration specified have been attempted.

Selection:

1-9999999 Attempt specified number of iterations.

0 Continuos operation

Reset Sequence

TEST Menu: ECHO\BLK_ACK\RESET SEQUENCE

Remote Link: /ECHO:RSEQ=selection/

Remarks: This parameter determines whether the transmission of block of characters is begun from the beginning of the random file or the location where it stopped, last time the test was run.

Selection:

yes Test starts from the beginning of the random file.

no Test starts from the location where it stopped last time the test was run.

Filter Sequence

TESTS Menu: ECHO\BLK_ACK\FILTER SEQUENCE

Remote Link: /ECHO:FILT=selection/

Remarks: This parameter determines whether two consecutive characters in a block be identical.

Selection:

yes No two consecutive characters will be identical.

no Characters are read from the random file and transmitted as they read.

Timeout

TESTS Menu: ECHO\BLK_ACK\TIMEOUT

Remote Link: /ECHO:TLIM=selection/

Remarks: This parameter determines the maximum amount of time the transmitting DTE should wait for the acknowledgment after the first character of a block is transmitted.

Selection: 1-10000 Timeout in milliseconds

4.4. Character Echo Delay Test Parameters

Test Configuration

TESTS Menu: ECHO\CHAR_ECHO\CONFIGURATION

Remote Link: /ECHO:CNFG=*selection*/

Remarks: This parameter determines which terminal interface will transmit the characters and which will echo back the characters.

Selection:

ta|rb	Transmit from DTE A, echo back from DTE B
tb|ra	Transmit from DTE B, echo back from DTE A

Intercharacter Delay

TESTS Menu: ECHO\CHAR_ECHO\MINIMUM

ECHO\CHAR_ECHO\SPAN

Remote Link: /ECHO:MIN=*selection*/

/ECHO:WID=*selection*/

Remarks: The first parameter determines the minimum amount of delaybetween an echo of the last character received to the next character transmitted.

The second parameter determines the span of time interval between an echo of the last character received to the next character transmitted.

Number of Iteration

TEST Menu: ECHO\CHAR_ECHO\NO OF ITERATION

Remote Link: /ECHO:ITER=selection/

Remarks: This parameter determines the duration of the test. Gemini automatically terminates the test when the number of iteration specified have been attempted.

Selection:

1-9999999	Attempt specified number of iterations.
0	Continuos operation

Reset Sequence

TEST Menu: ECHO\CHAR_ECHO\RESET SEQUENCE

Remote Link: /ECHO:RSEQ=selection/

Remarks: This parameter determines whether the transmission of characters is begun from the beginning of the random file or the location where it stopped, last time the test was run.

Selection:

yes	Test starts from the beginning of the random file.
no	Test starts from the location where it stopped last time the test was run.

Filter Sequence

TESTS Menu: ECHO\CHAR_ECHO\FILTER SEQUENCE

Remote Link: /ECHO:FILT=selection/

Remarks: This parameter determines whether two consecutive characters be identical.

Selection:

yes	No two consecutive characters will be identical.
no	Characters are read from the random file and transmitted as they appear.

Timeout

TESTS Menu: ECHO\CHAR_ECHO\TIMEOUT

Remote Link: /ECHO:TLIM=selection/

Remarks: This parameter determines the maximum amount of time the transmitting DTE should wait for the echo after a character is transmitted.

Selection:

1-10000	Timeout in milliseconds 4.5. CALLS Test Parameters

4.5. CALLS Test Parameters

Test Configuration

TESTS Menu: CALLS\CONFIGURATION

Remote Link: /CALL:CNFG=*selection*/

Remarks: This parameter determines which terminal interface(s) will transmit the data pattern and which will analyze received data during the data transfer portion of the CALLS test

Selections:

ta|rb	Transmit from DTE A, analyze at DTE B
tb|ra	Transmit from DTE B, analyze at DTE A
ta&b|ra&b	Transmit from DTE A and B, analyze at DTE A and B

Test Duration

TESTS Menu: CALLS\#CALLS PER TEST

Remote Link: /CALL:CALLS=*selection*/

Remarks: This parameter determines the duration of the CALLS test. Gemini automatically terminates the test when the number of calls specified have been attempted.

Selections:

1-1000000	Attempt specified number of calls
0	Continuous operation

Data Terminal Ready (DTR) Control Option

TESTS Menu: CALLS\DTR CONTROL

Remote Link: /CALL:DTRCA =*selection*/, /CALL:DTRCB =*selection*/

Remarks: This parameter determines whether the DTR lead will be controlled exclusively by the Calls test. When set to **no**, the DTR lead can be controlled using the DTR key on the front panel.

Selections:

yes	Gemini automatically controls DTR during test
no	DTR key determines state of DTR during test

Request To Send (RTS) Control Option

TESTS Menu: CALLS\RTS CONTROL

Remote Link: /CALL:RTSA=*selction*/, /CALL:RTSB=*selection*/

Remarks: This parameter determines whether the RTS lead will be controlled exclusively by the Calls test. When set to no, the RTS lead can be controlled using the RTS key on the front panel.

Selections:

yes	Gemini automatically controls RTS during test
no	RTS key determines state of RTS during test.

Delay Before Call

TESTS Menu: CALLS\DELAY BEFORE CALL

Remote Link: /CALL:CTCD=*selection*/

Remarks: This parameter is provided to allow the network time to completely disconnect the call and reinitialize the line for another call to take place. It comes into effect after the Drop String Delay .

Selections: 0 to 999 Delay time (in 1/10s of a second)

Originating Station

TESTS Menu: CALLS\ORIGINATE STATION

Remote Link: /CALL:OSTA=*selection*/

Remarks: This parameter determines which station, **A** or **B,** will originate the call during a **CALLS** test.

Selections:

A	DTE A originates the call, DTE B answers the call
B	DTE B originates the call, DTE A answers the call

Modem Strap / Raise DTR Delay

TESTS Menu: CALLS\STRAP-DTR DELAY

Remote Link: /CALL:STRPDA=*selection*/, /CALL:STRPDB=*selection*/

Remarks: This delay allows time for the modem to process the strap command before DTR is raised.

Selections: 0 to 999 Delay time (in 1/100s of a second)

Raise DTR / Originate Call Delay

TESTS Menu: CALLS\DTR-CALL DELAY

Remote Link: /CALL:DTRDA=*selection*/, /CALL:DTRDB=*selection*/

Remarks: This delay allows time for the modem to respond to DTR before the answer command is sent to it.

Selections: 0 to 999 Delay time (in 1/100s of a second)

Answer String Delay

TESTS Menu: CALLS\ANSW STRING DELAY

Remote Link: /CALL:ANSWDA=*selection*/,
/CALL:ANSWDB=*selection*/

Remarks: This delay allows time for the answering modem to process the answer string before the originate command is sent to the other modem.

Selections: 0 to 999 Delay time (in 1/100s of a second)

Expected Connect Response String

TESTS Menu: CALLS\EXPECTED RESPONSE A

CALLS\EXPECTED RESPONSE B

Remote Link: /CALL:CSTRA="*pattern*"/, /CALL:CSTRB="*pattern*"/

Remarks: This parameter defines the response string expected from the modem when an end-to-end connection has been established.

See also: Connect Event Definition

Selections: See Gemini String Editor for parameter string syntax

Connect Event Definition

TESTS Menu: CALLS\CONNECT EVENT A

CALLS\CONNECT EVENT B

Remote Link: /CALL:EVA=*selection*/, /CALL:EVB=*selection*/

Remarks: This parameter specifies whether DCD, a response string, or both, is used to detect when the end-to-end connection has been established.

See also: Expected Connect Response String

Selections:

dcd	Test for DCD, ignore response string
str	Test for response string, ignore DCD
dcd&str	Test for DCD and response string

Connect Timeout

TESTS Menu: CALLS\CONNECT TIMEOUT A,

CALLS\CONNECT TIMEOUT B

Remote Link: /CALL:EVTOA=*selection*/, /CALL:EVTOB=*selection*/

Remarks: This parameter sets the maximum time the Calls test waits for the Connect Event. If this time limit is reached, the No Connect Event count is incremented and the call is aborted.

Selections: 0 to 999 Timeout interval (in seconds)

Connect Event / Raise RTS Delay

TESTS Menu: CALLS\CONNECT-RTS DELAY A,

CALLS\CONNECT-RTS DELAY B

Remote Link: /CALL:CRTDA=*selection*/, /CALL:CRTDB=*selection*/

Remarks: This delay controls the time between the Connect Event and the time RTS is raised.

NOTE: CRTDj should not be set to less than 5 (0.05 secs). If the Call Setup Protocol (CPCL) parameters are set differently from the Test Protocol (TPCL) parameters, then the value of CRTDj should not be set to less than 25 (0.25 secs).

Selections: 0 to 999 Delay time (in 1/100s of a second)

CTS Timeout

TESTS Menu: CALLS\CTS TIMEOUT A, CALLS\CTS TIMEOUT B

Remote Link: /CALL:CTSTOA=*selection*/, /CALL:CTSTOB=*selection*/

Remarks: This parameter sets the maximum time the Calls test waits for CTS after RTS is raised. If this time limit is reached, the No CTS count is incremented and the call is aborted.

Selections: 0 to 9999 Timeout interval (in milliseconds)

CTS Detected / Start Data Transfer Delay

TESTS Menu: CALLS\CTS-XMIT DELAY A,

CALLS\CTS-XMIT DELAY B

Remote Link: /CALL:CTXDA=*selection*/, /CALL:CTXDB=*selection*/

Remarks: This parameter sets the delay time from CTS to the start of data transmission. If the Flow Control option is not CTS, then this delay will take effect immediately after RTS is turned on.

Selections: 0 to 9999 Delay time (in milliseconds)

Test Message

TESTS Menu: CALLS\XMIT TEST MESSAGE

Remote Link: /CALL:AXMT=*selection*/, /CALL:BXMT=*selection*/

Remarks: This parameter selects the Calls test data pattern. All the patterns are fixed except for **c1** and **c2**, which can be modified using the Gemini String Editor.

See also: User-defined Test Messages

Selections:

63, 511, 2047	Pseudo-random patterns
c1, c2	User-defined patterns

User-Defined Test Messages

TESTS Menu: CALLS\XMIT TEST MESSAGE\C1

CALLS\XMIT TEST MESSAGE\C2

Remote Link: /CALL:C1="string"/

/CALL:C2="string"/

Remarks: The data patterns **c1** and **c2** can be modified using the Gemini String Editor. Each pattern may contain up to 256 characters (async), or 2048 bits (sync).

Selections: See Gemini String Editor for parameter string syntax

Data Transfer Timeout

TESTS Menu: CALLS\TRANSFER TIMEOUT

Remote Link: /CALL:XFTO=*selection*/

Remarks: This parameter sets the maximum time the Calls test waits for the data transfer to complete. If this time limit is reached, the Transfer Timeout count is incremented and the data transfer is aborted.

Selections: 0 to 999 Timeout interval (in seconds)

Drop String Sent / Lower DTR Delay

TESTS Menu: CALLS\DROP STRING DELAY A,

CALLS\DROP STRING DELAY B

Remote Link: /CALL:DROPDA=*selection*/, /CALL:DROPDB=*selection*/

Remarks: This parameter sets the delay time after the drop call command before DTR is lowered. This delay allows time for the modem to process the drop call command.

Selections: 0 to 999 Delay time (in 1/100s of a second)

Modem Command String: Answer

CALL Menu: ANSW A,

ANSW B

Remote Link: /CALL:ANSWA=*selection*/, /CALL:ANSWB=*selection*/

Remarks: This command sets the answer modem command string. Gemini will send this string to the modem during a calls test to enable the modem's auto answer feature. This string is also used in call setup mode from the front panel.

Selections: See Gemini String Editor for parameter string syntax

Modem Command String: Drop

CALL Menu: DROP A,

DROP B

Remote Link: /CALL:DROPA=*selection*/, /CALL:DROPB=*selection*/

Remarks: This command sets the drop modem command string. Gemini will send this string to the modem during a calls test to tell the modem to drop the call (hang up phone). This string is also used in call setup mode from the front panel.

Selections: See Gemini String Editor for parameter string syntax

Modem Command String: Originate

CALL Menu: ORIG A,

ORIG B

Remote Link: /CALL:ORIGA=*selection*/, /CALL:ORIGB=*selection*/

Remarks: This command sets the originate modem command string. Gemini will send this string to the modem during a calls test to tell the modem to dial a phone number. The phone number is embedded in the string. This string is also used in call setup mode from the front panel.

Selections: See Gemini String Editor for parameter string syntax

Modem Command String: Strap

CALL Menu: STRAP A,

STRAP B

Remote Link: /CALL:STRPA=*selection*/, /CALL:STRPB=*selection*/

Remarks: This command sets the strap modem command string. Gemini will send this string to the modem during a calls test to configure the modem before any other string is sent. This string is also used in call setup mode from the front panel.

Selections: See Gemini String Editor for parameter string syntax

4.6. Data Compression / File Transfer Test Parameters

Test Configuration

TESTS Menu: DCMP\CONFIGURATION

Remote Link: /DCMP:CNFG=*selection*/

Remarks: This parameter determines which terminal interface(s) will transmit the test file and which will analyze received data.

Selections:

ta|ra	Transmit from DTE A, analyze at DTE A
ta|rb	Transmit from DTE A, analyze at DTE B
tb|ra	Transmit from DTE B, analyze at DTE A
tb|rb	Transmit from DTE B, analyze at DTE B
ta&b|ra&b	Transmit from DTE A and B, analyze at DTE A and B

Test Duration

TESTS Menu: DCMP\TEST DURATION

Remote Link: /DCMP:NXFERS=*selection*/

Remarks: This parameter determines the duration of the test. Gemini automatically terminates the test when the specified number of file transfers have been attempted.

See also: Test Pattern, Number of Patterns per File

Selections:

1-1000000	Analyze until specified number of transfers attempted
0	Continuous operation

Test Pattern

TESTS Menu:	DCMP\PATTERN
Remote Link:	/DCMP:PATT=*selection*/
Remarks:	This parameter selects the test data pattern. A test file consists of one or more repetitions of this pattern. All the patterns are fixed except for **d1**, which can be loaded into the Gemini using the remote control interface. See also: User-defined Pattern Buffer

Selections:

ascii	ASCII text file
base	DBASE database file
c_source	C language program source file **
combo	Combination of several files
exe	IBM-PC executable file (3.TST) *
fox	THE QUICK BROWN FOX...
graphic	Graphics metafile (1.TST) *
image	Bitmapped image file **
mixed3	Combination of 3 different files (5.TST) *
random	Random data - almost noncompressible (4.TST) *
spreadsheet	1-2-3 spreadsheet data file **
text	Word processor data file (2.TST) *
d1	User-defined test pattern

* Pattern defined by draft standard TIA-TSB38.

** Pattern defined by CCITT Study Group XVII test file.

User-Defined Pattern Buffer

TESTS Menu:	not available
Remote Link:	/DCMP:LOADP=*string*/, /DCMP:CLRP/
Remarks:	The user-defined test pattern **d1** can be loaded into Gemini using the remote control interface. The command DCMP:CLRP clears the user-defined pattern. The command DCMP:LOADP appends its string argument to the user-defined pattern.

Number of Patterns per File

TESTS Menu:	DCMP\REPEAT PATTERN
Remote Link:	/DCMP:NPATT=*selection*/
Remarks:	A test file consists of one or more repetitions of the test file. By repeating the test pattern, file transfers of several megabytes can be simulated.
Selections:	1 to 100: Number of times pattern is repeated each file transfer

Transfer Rate Measurement

TESTS Menu: DCMP\MEASURE TRANSFER RATE

Remote Link: /DCMP:MEAS=*selection*/

Remarks: When the test protocol is asynchronous, the transfer rate is calculated as the number of characters transferred divided by the transfer time. When the test protocol is synchronous, the transfer rate is calculated as the number of bits transferred divided by the transfer time. The transfer time can be measured in one of two ways.

If **end-to-end** is selected, the transfer time will be measured from the time the first character is sent by the transmitter. If **at_receiver** is selected, the transfer time will be measured from the time the first character arrives at the receiver. The two measurements differ by the time needed for the first character to arrive at the receiver.

Selections:

end_to_end	First character sent to last character received
at_receiver	First character received to last character received

Inter-Transfer Delay

TESTS Menu:	DCMP\INTER-TRANSFER DELAY
Remote Link:	/DCMP:XFERD=*selection*/
Remarks:	This parameter specifies the time Gemini will wait between file transfers. This parameter should be set to a value large enough that, should a failed transfer occur, any data buffered in either modem will have arrived at the receiver before the start of the next file transfer.
Selections:	1 to 100 Delay interval (in seconds)

File Transfer Timeout

TESTS Menu: DCMP\FILE TRANSFER TIMEOUT

Remote Link: /DCMP:TIMET=*selection*/

Remarks: This timeout is used to abort a file transfer which cannot be completed within a reasonable time. If the file transfer does not complete within the specified interval, the file transfer is aborted and a failed transfer recorded.

Selections: 1 to 9999 Limit on file transfer time (in seconds)

Character Error Limit

TESTS Menu: DCMP\ERROR LIMIT

Remote Link: /DCMP:CLIM=*selection*/

Remarks: This parameter establishes an upper limit on the number of errors acceptable during a file transfer. If the specified number of errors occur during a single file transfer, that transfer is aborted and a failed transfer recorded.

In asynchronous test errors are defined as characters errors, while in synchronous tests errors are defined as bit errors.

NOTE: that this parameter can be used to abort the transfer if <u>any</u> errors are detected, by setting the limit to **1**.

Selections: 1-1000000 Limit on number character errors during file transfer

0 No limit on character errors

File Header Timeout

TESTS Menu: DCMP\FIRST n CHARS RX TIMEOUT

Remote Link: /DCMP:TIMEH=*selection*/

Remarks: Use this timeout to abort a file transfer quickly if the first characters cannot be transferred within a given time.

See also: File Header Size

Selections: 1 to 9999 Timeout interval for transfer of file "header"

File Header Size

TESTS Menu: DCMP\FIRST n CHARS RX TIMEOUT

Remote Link: /DCMP:HSIZ=*selection*/

Remarks: This parameter defines the first *n* characters of a test file as the file "header". If this file "header" is not transferred within the File Header Timeout interval, the file transfer will be aborted and a failed transfer recorded.

See also: File Header Timeout

Selections: 1 to 9999 Number of characters in file "header"

RTS Control Option

TESTS Menu: DCMP\RTS CONTROL A, DCMP\RTS CONTROL B

Remote Link: /DCMP:RTSA=*selection*/, /DCMP:RTSB=*selection*/

Remarks: This parameter determines whether RTS is raised by the transmitter before the first character is sent, and dropped after the last character is sent.

If the RTS control option is disabled, RTS is controlled using the RTS key on the front panel (or the INTF:RTSj command)

Selections:

yes Transmitter raises and lowers RTS during file transfer

no RTS controlled by user

HDLC Frame Size

TESTS Menu: \DCMP\HDLC FRAME SIZE

Remote Link: /DCMP:FRAME=*selection*/

Remarks: This parameter specifies the size of the HDLC frame transmitted by Gemini during a synchronous Data Compression/File Transfer test. The frame size is in octets.

See also: HDLC Frame Address, HDLC Control Field, HDLC Inter-Frame Delay

Selections: 1 to 65536 Number of octets in each HDLC frame.

HDLC Inter-Frame Delay

TESTS Menu:	\DCMP\HDLC INTER-FRAME DELAY
Remote Link:	/DCMP:FRD=*selection*/
Remarks:	This parameter specifies the time Gemini will wait between frame transmissions during synchronous Data Compression/File Transfer tests.
	See also: HDLC Last Frame/RTS Delay
Selections:	0 to 9999 Delay interval (in msec)

HDLC Last Frame/RTS Delay

TESTS Menu:	\DCMP\HDLC LAST FRAME/RTS DELAY
Remote Link:	/DCMP:FRLD=*selection*/
Remarks:	This parameter specifies the time that Gemini will wait between the transmission of the last byte of the last frame and the time that RTS is made inactive during a synchronous Data Compression/File Transfer test.
	See also: HDLC Inter-Frame Delay
Selections:	0 to 9999 Delay interval (in msec)

HDLC Frame Address

TESTS Menu:	\DCMP\HDLC FRAME ADDR
Remote Link:	/DCMP:ADDR=*selection*/
Remarks:	This parameter specifies the value of the 8 bit address field which Gemini inserts into each frame during synchronous Data Compression/File Transfer tests. An 8-bit address field and an 8-bit control field precede the data in each frame. The address and control fields are the same for all frames transmitted.
	See also: HDLC Control Field
Selections:	00 to FF Hexadecimal representation of address field.

HDLC Control Field

TESTS Menu:	\DCMP\HDLC CONTROL FIELD	
Remote Link:	/DCMP:CTRL=*selection*/	
Remarks:	This parameter specifies the value of the 8 bit control field which Gemini inserts into each frame during synchronous Data Compression/File Transfer tests. An 8-bit address field and an 8-bit control field precede the data in each frame. The address and control fields are the same for all frames transmitted.	
	See also:	HDLC Address Field
Selections:	00 to FF	Hexadecimal representation of control field.

Test Execution Mode

TESTS Menu:	\DCMP\STOP TEST	
Remote Link:	/DCMP:TERM=*selection*/	
Remarks:	This parameter controls the conditions under which a Data Compression / File Transfer test is automatically stopped.	
	See also:	Test Duration, Failed Transfer Limit
Selections:	manual	Stop after selected number of transfers attempted
	semi-auto	Stop when any test error limit is reached, or after selected number of transfers attempted

Failed Transfer Limit

TESTS Menu:	DCMP\FAILED TRANSFER LIMIT	
Remote Link:	/DCMP:FLIM=*selection*/	
Remarks:	If the number of failed transfers recorded during a test run exceeds this limit, and semi-auto execution mode is selected, the test will stop.	
Selections:	1-1000000	Selects failed transfer limit
	0	Disables failed transfer limit

4.7. High-Speed BERT Test Parameters

Test Configuration

TESTS Menu: HS_BERT\CONFIGURATION

Remote Link: /HSBT:CNFG=*selection*/

Remarks: This parameter determines which terminal interface(s) will transmit the BERT pattern and which will analyze received data.

Any terminal interface not configured to transmit will ignore the flow control setting for that interface and use no flow control.

Selections:

ta|ra	Transmit from DTE A, analyze at DTE A
ta|rb	Transmit from DTE A, analyze at DTE B
tb|ra	Transmit from DTE B, analyze at DTE A
tb|rb	Transmit from DTE B, analyze at DTE B
ta&b|ra	Transmit from DTE A and B, analyze at DTE A
ta&b|rb	Transmit from DTE A and B, analyze at DTE B
ta&b|ra&b	Transmit from DTE A and B, analyze at DTE A and B

Test Duration

TESTS Menu: HS_BERT\TEST DURATION IN

Remote Link: /HSBT:TDL=*selection*/

Remarks: Use this parameter to indicate if the duration of the BERT is number of blocks (see Test Duration: Blocks) or number of test seconds (see Test Duration: Seconds). The default duration is blocks. Gemini will automatically terminate the test based on the settings of these parameters.

See also: Test Duration: Blocks, Test Duration: Seconds

Selections:

blocks	Analyze until specified number of blocks are received
seconds	Analyze until specified number of test seconds elapse.

Test Duration: Blocks

TESTS Menu: HS_BERT\DURATION\BLOCKS\#BLOCKS

Remote Link: /HSBT:NBLK=*selection*/

Remarks: This parameter determines the duration of the BERT test as the number of blocks to receive. Gemini automatically terminates the test when the data analyzers have received the specified number of blocks.

See also: Block Size, Test Duration

Selections:

1 - 1,000,000	Analyze until specified number of blocks are received
0	Continuous operation

Test Duration: Seconds

TESTS Menu: HS_BERT\DURATION\SECONDS\#SECONDS

Remote Link: /HSBT:NTS=*selection*/

Remarks: This parameter determines the duration of the BERT test as total test seconds. Gemini automatically terminates the test when the specified number of test seconds have elapsed, as measured by the BERT result Total Test Seconds.

See also: Test Duration

Selections:

1 - 1,000,000	Analyze until specified number of seconds elapse
0	Continuous operation

Block Size

TESTS Menu: HS_BERT\BLOCK SIZE

Remote Link: /HSBT:BSIZ=*selection*/

Remarks: This parameter is used for two purposes. The test duration is specified as the number of blocks to be analyzed. It is also used to record block errors.

See also: Test Duration, Block Error Count

Selections:

2 - 100,000,000	Block size (in octets)

Test Pattern

TESTS Menu: HS_BERT\PATTERN

Remote Link: /HSBT:PATT=*selection*/

Remarks: This parameter selects the BERT data pattern. All the patterns are fixed except for **b1** and **b2**, which can be modified using the Gemini String Editor.

See also: User-defined Test Patterns

Selections:

63, 511, 2047, 2^15,	Pseudo-random patterns 2^20, 2^23
mark	Pattern of all 1's
space	Pattern of all 0's
alt	Alternating 1's and 0's
b1, b2	User-defined patterns

User-Defined Test Patterns

TESTS Menu: HS_BERT\PATTERN\B1, HS_BERT\PATTERN\B2

Remote Link: /HSBT:B1="pattern"/

/HSBT:B2="pattern"/

Remarks: The data patterns **b1** and **b2** can be modified using the Gemini String Editor. Each pattern may contain up to 256 characters (async), or 2048 bits (sync).

Selections: See Gemini String Editor for parameter string syntax

Enable Pattern Resynchronization

TESTS Menu: HS_BERT\RESYNC ENABLE

Remote Link: /HSBT:RSEN=*selection*/

Remarks: This parameter controls whether the analyzer will attempt to regain pattern synchronization after a sync loss. To disable resynchronization, set this parameter to **no** after the analyzer is in sync, but before starting the test run.

Selections:

yes	Enable resynchronization after sync loss
no	Disable resynchronization after sync loss

Sync Loss Criteria: Sync Loss Threshold

TESTS Menu: HS_BERT\SYNC LOSS THRESHOLD

Remote Link: HSBT:SLTHR=*selection*/

Remarks: This parameter sets the sensitivity of the test to bursts of errors. If the specified error rate is exceeded, the BERT analyzer will drop pattern sync.

Selections:

low	100 bit errors in 1000 bits
medium	250 bit errors in 1000 bits
high	10,000 bit errors in 50,000 bits

Sync Loss Criteria: No Data Timeout

TESTS Menu: HS_BERT\SYNC LOSS - NO DATA

Remote Link: /HSBT:SLNDTO=*selection*/

Remarks: If no data is received during the interval specified, the BERT analyzer will drop pattern sync. When running throughput tests on modems using error correction or data compression, the interval should be set to a large value so that pattern sync is not lost during normal operation.

Selections: 1 to 99 Number of seconds of no data before sync dropped

Test Execution Mode

TESTS Menu: HS_BERT\EXECUTION MODE

Remote Link: /HSBT:MODE=*selection*/

Remarks: This parameter controls the conditions under which a BERT test is automatically stopped.

See also: Test Duration, Bit Error Limit, Block Error Limit, Sync Timeout, Sync Loss Limit

Selections:

manual	Test stops only when selected number of blocks received or selected duration has elapsed
semi-auto	Test stops when any test error limit is reached, or selected number of blocks are received, or selected test duration has elapsed

Bit Error Limit

TESTS Menu: HS_BERT\BIT ERROR LIMIT

Remote Link: /HSBT:BITLA=*selection*/, /HSBT:BITLB=*selection*/

Remarks: If the number of bit errors recorded during a test run exceeds this limit, the pass-fail status will be **failed.** If semi-auto execution mode is selected, the test will stop.

Selections:

1-100000000	Selects test bit error limit
0	Disables test bit error limit

Block Error Limit

TESTS Menu: HS_BERT\BLOCK ERROR LIMIT

Remote Link: /HSBT:BLKLA=*selection*/, /HSBT:BLKLB=*selection*/

Remarks: If the number of block errors recorded during a test run exceeds this limit, the pass-fail status will be **failed.** If semi-auto execution mode is selected, the test will stop.

See also: Block Size

Selections:

1-100000000	Selects test block error limit
0	Disables test block error limit

Sync Timeout

TESTS Menu: HS_BERT\SYNC TIMEOUT

Remote Link: /HSBT:RTSD=*selection*/

Remarks: If, during a test run, the analyzer cannot synchronize with the test pattern with the specified time limit, the pass-fail status will be **failed.** If semi-auto execution mode is selected, the test will stop.

Selections:

1-1000000	Selects pattern sync timeout interval
0	Disables sync timeout

Sync Loss Limit

TESTS Menu: HS_BERT\SYNC LOSS LIMIT

Remote Link: /HSBT:BRKLA=*selection*/, /HSBT:BRKLB=*selection*/

Remarks: If the number of sync losses recorded during a test run exceeds this limit, the pass-fail status will be **failed.** If semi-auto execution mode is selected, the test will stop.

See also: Sync Loss Criteria: On Error Burst
Sync Loss Criteria: No Data Timeout

Selections:

1-100000000	Selects test sync loss limit
0	Disables test sync loss limit

Errored Second Limit

TESTS Menu: HS_BERT\ERRORED SEC LMT

Remote Link: /HSBT:ESLA=*selection*/, /HSBT:ESLB=*selection*/

Remarks: If the number of errored seconds recorded during a test run exceeds this limit, the pass-fail status will be **failed.** If semi-auto execution mode is selected, the test will stop.

Selections:

1-1000000	Selects test errored second limit
0	Disables test errored second limit

High-Speed BERT Test: Data Protocol

TERM Menu: \TESTS\PROTOCOL

Remote Link: /HSBT:PCL=*selection*/

Remarks: This parameter selects the character format used for test data transmission. When **sync** is chosen NRZ (Non-Return to Zero) encoding is used. For NRZ encoding a ‘1’ is represented by a High level, and a ‘0’ is represented by a Low level. When **sync-nrzi** is chosen NRZI (Non-Return to Zero Inverted) encoding is used. For NRZI encoding a ‘1’ is represented by no change in level, and a ‘0’ is represented by a change in level.

Selections:

sync	Selects synchronous NRZ encoding
sync-nrzi	Selects synchronous NRZI encoding

High-Speed BERT Test: Transmit Clock Source

TERM Menu: \TESTS\CLK A, \TESTS\CLK B

Remote Link: /HSBT:CLKA=*selection*/, /HSBT:CLKB=*selection*/

Remarks: The source of the transmit clock at each test interface is determined by setting of the CLK parameter. There are three possible clock sources:

- Gemini internal clock
- Modem supplied clock via the test interface (pin 15)
- TTL clock via the BNC connector on the rear panel

See Also: High-Speed BERT Test: Data Protocol

Selections:

modem	Modem supplies clock via the test interface
ext	External TTL clock provided via the BNC connector
56000, 64000,...	Use clock internal to Gemini

High-Speed BERT Test: Receive Clock Source

For the High-Speed BERT test, receive clock is always provided by the DCE via the Receive Clock (RC) pin(s) on the selected test interface.

High-Speed BERT Test: Flow Control

For the High-Speed BERT test, Gemini always accepts flow control from the DCE via the Clear To Send (CTS) pin on the selected test interface.

4.8. High-Speed Data Compression / File Transfer Test Parameters

Test Configuration

TESTS Menu: HS_DCMP\CONFIGURATION

Remote Link: /HSDT:CNFG=*selection*/

Remarks: This parameter determines which terminal interface(s) will transmit the test file and which will analyze received data.

Selections:

ta|ra	Transmit from DTE A, analyze at DTE A
ta|rb	Transmit from DTE A, analyze at DTE B
tb|ra	Transmit from DTE B, analyze at DTE A
tb|rb	Transmit from DTE B, analyze at DTE B
ta&b|ra&b	Transmit from DTE A and B, analyze at DTE A and B

Test Duration

TESTS Menu: HS_DCMP\TEST DURATION

Remote Link: /HSDT:NXFERS=*selection*/

Remarks: This parameter determines the duration of the test. Gemini automatically terminates the test when the specified number of file transfers have been attempted.

See also: Test Pattern, Number of Patterns per File

Selections:

1-1000000	Analyze until specified number of transfers attempted
0	Continuous operation

Test Pattern

TESTS Menu:	HS_DCMP\PATTERN	
Remote Link:	/HSDT:PATT=*selection*/	
Remarks:	This parameter selects the test data pattern. A test file consists of one or more repetitions of this pattern. All the patterns are fixed except for **d1**, which can be loaded into the Gemini using the remote control interface.	
	See also:	User-defined Pattern Buffer
Selections:	ascii	ASCII text file
	base	DBASE database file
	c_source	C language program source file **
	combo	Combination of several files
	exe	IBM-PC executable file (3.TST) *
	fox	THE QUICK BROWN FOX...
	graphic	Graphics metafile (1.TST) *
	image	Bitmapped image file **
	mixed3	Combination of 3 different files (5.TST) *
	random	Random data - almost noncompressible (4.TST) *
	spreadsheet	1-2-3 spreadsheet data file **
	text	Word processor data file (2.TST) *
	d1	User-defined test pattern

* Pattern defined by draft standard TIA-TSB38.

** Pattern defined by CCITT Study Group XVII test file.

Number of Patterns per File

TESTS Menu:	HS_DCMP\REPEAT PATTERN	
Remote Link:	/HSDT:NPATT=*selection*/	
Remarks:	A test file consists of one or more repetitions of the test file. By repeating the test pattern, file transfers of several megabytes can be simulated.	
Selections:	1 to 100	Number of times pattern is repeated each file transfer

Transfer Rate Measurement

TESTS Menu: HS_DCMP\MEASURE TRANSFER RATE

Remote Link: /HSDT:MEAS=*selection*/

Remarks: When the test protocol is asynchronous, the transfer rate is calculated as the number of characters transferred divided by the transfer time. When the test protocol is synchronous, the transfer rate is calculated as the number of bits transferred divided by the transfer time. The transfer time can be measured in one of two ways.

If **end-to-end** is selected, the transfer time will be measured from the time the first character is sent by the transmitter. If **at_receiver** is selected, the transfer time will be measured from the time the first character arrives at the receiver. The two measurements differ by the time needed for the first character to arrive at the receiver.

Selections:

end_to_end	First character sent to last character received
at_receiver	First character received to last character received

Inter-Transfer Delay

TESTS Menu: HS_DCMP\INTER-TRANSFER DELAY

Remote Link: /HSDT:XFERD=*selection*/

Remarks: This parameter specifies the time Gemini will wait between file transfers. This parameter should be set to a value large enough that, should a failed transfer occur, any data buffered in either modem will have arrived at the receiver before the start of the next file transfer.

Selections:

1 to 100	Delay interval (in seconds)

File Transfer Timeout

TESTS Menu: HS_DCMP\FILE TRANSFER TIMEOUT

Remote Link: /HSDT:TIMET=*selection*/

Remarks: This timeout is used to abort a file transfer which cannot be completed within a reasonable time. If the file transfer does not complete within the specified interval, the file transfer is aborted and a failed transfer recorded.

Selections:

1 to 9999	Limit on file transfer time (in seconds)

First Frame Timeout

TESTS Menu: HS_DCMP\FIRST FRAME TIMEOUT

Remote Link: /HSDT:TIMEH=*selection*/

Remarks: Use this timeout to abort a file transfer quickly if the first HDLC frame cannot be transferred.

Selections:

1 to 9999	Limit on file frame arrival time (in seconds)

Frame Error Limit

TESTS Menu: HS_DCMP\ERROR LIMIT

Remote Link: /HSDT:CLIM=*selection*/

Remarks: This parameter establishes an upper limit on the number of frame errors acceptable during a file transfer. If the specified number of errors occur during a single file transfer, that transfer is aborted and a failed transfer recorded.

> **NOTE:** this parameter can be used to abort the transfer if any errors are detected, by setting the limit to **1**.

Selections:

1-1000000	Limit on number of frame errors during a file transfer
0	No limit on the number of frame errors

High-Speed Data Compression Test: Data Protocol

TERM Menu: TESTS\PROTOCOL

Remote Link: /HSDT:PCL=*selection*/

Remarks: This parameter selects whether the bits in HDLC frames transmitted by Gemini are encoded using the NRZ or NRZI coding method.

Selections:

nrz	NRZ coding method
nrzi	NRZI coding method

HDLC Frame Size

TERM Menu: TESTS\HDLC FRAME SIZE

Remote Link: /HSDT:FRAME=*selection*/

Remarks: This parameter specifies the number of data octets in each HDLC frame transmitted by Gemini.

See also: HDLC Frame Address, HDLC Control Field, HDLC Inter-Frame Delay

Selections: 1 to 65536 Number of data octets in each HDLC frame.

HDLC Inter-Frame Delay

TERM Menu: TESTS\HDLC INTER-FRAME DELAY

Remote Link: /HSDT:FRD=*selection*/

Remarks: This parameter specifies the time Gemini will wait between frame transmissions.

Selections: 0 to 9999 Delay interval (in msec)

HDLC Frame Address

TERM Menu: TESTS\HDLC FRAME ADDR

Remote Link: /HSDT:ADDR=*selection*/

Remarks: This parameter specifies the value of the 8 bit address field which Gemini inserts into each frame during synchronous Data Compression/File Transfer tests. An 8-bit address field and an 8-bit control field precede the data in each frame. The address and control fields are the same for all frames transmitted.

See also: HDLC Control Field

Selections: 00 to FF Hexadecimal representation of address field.

HDLC Control Field

TERM Menu: TESTS\HDLC CONTROL FIELD

Remote Link: /HSDT:CTRL=*selection*/

Remarks: This parameter specifies the value of the 8 bit control field which Gemini inserts into each frame during synchronous Data Compression/File Transfer tests. An 8-bit address field and an 8-bit control field precede the data in each frame. The address and control fields are the same for all frames transmitted.

See also: HDLC Address Field

Selections: 00 to FF — Hexadecimal representation of control field.

High-Speed Data Compression Test: Transmit Clock Source

TERM Menu: TESTS\TX CLOCK A, TESTS\TX CLOCK B

Remote Link: /HSDT:CLKA=*selection*/, /HSDT:CLKB=*selection*/

Remarks: The source of the transmit clock at each test interface is determined by setting of the CLK parameter. There are three possible clock sources:

- Gemini internal clock
- Modem supplied clock via the 530-A interface (pin 15)
- TTL clock via the BNC connector on the rear panel

Selections:

modem	Modem supplies clock via the test interface
ext	External TTL clock provided via the BNC connector
75, ..., 2048000	Use clock internal to Gemini

High-Speed Data Compression Test: Receive Clock Source

For the High-Speed Data Compression / File Transfer test, receive clock is always provided by the DCE via the Receive Clock (RC) pin(s) on the 530-A interface.

High-Speed Data Compression Test: Flow Control

TERM Menu: TESTS\FLOW CTL A, TESTS\FLOW CTL B

Remote Link: /HSDT:FLOWA=*selection*/, /HSDT:FLOWB=*selection*/

Remarks: Selects whether Gemini monitors the Clear To Send (CTS) signal; transmitting HDLC frames only when CTS is asserted.

Selections:

none	Do not accept flow control from the DCE
cts	Monitor the CTS signal; only transmit when CTS is asserted.

4.9. Multi-Point Polling Test Parameters

Master DTE

TESTS Menu: MPOL\OPERATION\MASTER DTE

Remote Link: /MPOL:MASTR=*selection*/

Remarks: Select one DTE as master. Select **none** if multiple Gemini units are used and a master has already been selected on another unit.

Selections:

a	DTE A selected as master DTE, DTE B is slave
b	DTE B selected as master DTE, DTE A is slave
none	Both DTE A and DTE B are slaves

Test Duration

TESTS Menu: MPOL\OPERATION\TEST DURATION

Remote Link: /MPOL:NPOL=*selection*/

Remarks: This parameter determines the duration of the test. Gemini automatically terminates the test when the specified number of polls have been sent to each slave.

See also: Master Poll List

Selections:

1-1000000	Run until specified number of polls sent to each slave
0	Continuous operation

Synchronous Protocol

TESTS Menu: MPOL\OPERATION\SYNC PROTOCOL

Remote Link: /MPOL:SPCL=*selection*/

Remarks: If the Test data protocol is **sync**, this parameter is used to select one of the 3 supported synchronous protocols.

Selections:

monosync	<SYN><SOH><addr><STX><msg><ETX>
bisync	<SYN><SYN><SOH><addr><STX><msg><ETX>
HDLC	<Flag><addr><msg><Frame Checksum><Flag>

Poll Message

TESTS Menu: MPOL\POLL\POLL

Remote Link: /MPOL:PMSG="*pattern*"/

Remarks: The poll message sent to each slave contains two fields: the slave address and the message field. This parameter defines the message field. The message field may be zero-length.

The master uses this field to transmit the desired poll message. Slave DTEs use this field to detect poll message errors.

Selections: See Gemini String Editor for parameter string syntax

Response Message

TESTS Menu: MPOL\POLL\RESPONSE

Remote Link: /MPOL:RMSG="*pattern*"/

Remarks: The response message returned by each slave contains three fields: the master address, the slave address, and the message field. This parameter defines the message field. The message field may be zero-length.

Slave DTEs use this field to transmit the desired poll response. The master DTE uses this field to count response message errors.

Selections: See Gemini String Editor for parameter string syntax

Master Address

TESTS Menu: MPOL\POLL\MASTER ADDRESS

Remote Link: /MPOL:MADDR="*pattern*"/

Remarks: The response message returned by each slave contains three fields: the master address, the slave address, and the message field. This parameter defines the master address field. The master address field may be zero-length.

Slave DTEs use this field to transmit the desired poll response. The master DTE uses this field to count response address errors.

Selections: See Gemini String Editor for parameter string syntax

RTS Control Option

TESTS Menu: MPOL\POLL\RTS CONTROL

Remote Link: /MPOL:RTS=*selection*/

Remarks: This parameter determines whether RTS is raised by the transmitter before the first character of a poll is sent, and dropped after the last character of the poll is sent.

If the RTS control option is disabled, RTS is controlled using the RTS key on the front panel (or the INTF:RTSj command)

See also: CTS Received / Transmit Delay, Transmit Complete / Drop RTS Delay, Response / Transmit Delay

Selections:

yes	Transmitter raises and lowers RTS while polling
no	RTS controlled by user

CTS Received / Transmit Delay

TESTS Menu: MPOL\POLL\DELAY\CTS-XMIT DELAY A,

MPOL\POLL\DELAY\CTS-XMIT DELAY B

Remote Link: /MPOL:CTSDA=*selection*/, /MPOL:CTSDB=*selection*/

Remarks: This parameter specifies the delay between Clear To Send (CTS) and the transmission of a poll or response. This parameter is only used when the RTS Control option is set to **yes**.

Selections:

1-100000	Delay interval (in 1/10ths of a millisecond)
0	No delay

Transmit Complete / Drop RTS Delay

TESTS Menu: MPOL\POLL\DELAY\XMIT-RTS DELAY A,

MPOL\POLL\DELAY\XMIT-RTS DELAY B

Remote Link: /MPOL:SENTDA=*selection*/, /MPOL:SENTDB=*selection*/

Remarks: This parameter specifies a delay between the end of a poll or response transmission and the lowering of RTS by the transmitter. This parameter is only used when the RTS Control option is set to **yes**.

When HDLC protocol is selected, this delay must be longer than 3 character times. The delay is required to allow time for the frame checksum and closing flags to be sent before RTS is dropped.

Selections:

1-100000	Delay interval (in 1/10ths of a millisecond)
0	No delay

Response Received / Transmit Delay

TESTS Menu: MPOL\POLL\DELAY\RESPONSE-XMIT DELAY A,

MPOL\POLL\DELAY\RESPONSE-XMIT DELAY B

Remote Link: /MPOL:RSXTDA=*selection*/, /MPOL:RSXTDB=*selection*/

Remarks: This parameter specifies the delay between when a poll or response is received and the transmission of a response or the next poll. This parameter is only used when the RTS Control option is set to **no**.

Selections:

1-1000000	Delay interval (in 1/10ths of a millisecond)
0	No delay

Data Carrier Detect (DCD) Option

TESTS Menu: MPOL\POLL\CARRIER DETECT A,
MPOL\POLL\CARRIER DETECT B

Remote Link: /MPOL:DCDA=*selection*/, /MPOL:DCDB=*selection*/

Remarks: Each DTE can either test or ignore Data Carrier Detect (DCD). If test DCD is selected, the receiver will wait for DCD to be present before accepting any characters. A message will not be complete until DCD is dropped.

If the DCE does not switch DCD with each poll, this option must be set to **ignore** DCD. Otherwise the master DTE will timeout waiting for DCD to drop, while a slave DTE will wait forever for the poll to be completed.

If this option is set to ignore DCD, make certain no slave address is embedded in the poll message field. Otherwise a slave could mistake the address in the message field for the start of a poll, and record poll message errors.

Selections:

test DCD must be present before characters are accepted

ignore State of DCD is ignored by receiver

Master Poll List

TESTS Menu: MPOL\MASTER\POLL LIST

Remote Link: /MPOL:SADDR=*selection*/

Remarks: The master DTE polls each slave in this polling list in turn. The poll list is a sequence of slave addresses separated by colons(:). Each slave address is a string from 1 to 8 characters long.

1. Colons (:), and asterisks (*) can **not** be used in any slave's address.
2. Define the slave addresses to be of equal length. This will eliminate the possibility of duplicating smaller addresses within larger ones. For example, the address "25" is contained within the address "1025".
3. Avoid having slave addresses embedded inside the poll or response message.

See also: Slave Address

Selections: See Gemini String Editor for parameter string syntax

Response Timeout

TESTS Menu: MPOL\MASTER\RESPONSE TIMEOUT

Remote Link: /MPOL:RTLIM=*selection*/

Remarks: After the master transmits a poll, it waits for a response from the slave. If no response is received before this timeout expires, a response timeout is recorded.

Selections: 1 to 9999 Timeout interval (in seconds)

Response Received / Raise RTS Delay

TESTS Menu: MPOL\MASTER\RESPONSE-RTS DELAY

Remote Link: /MPOL:POLLD=*selection*/

Remarks: The master waits this delay after a poll is received or a response timeout is recorded, and before raising RTS to begin the next poll.

Selections:

1-100000	Delay interval (in 1/10ths of a millisecond)
0	No delay

Slave Address

TESTS Menu: MPOL\SLAVE\SLAVE A, MPOL\SLAVE\SLAVE B

Remote Link: /MPOL:ADDRA="*pattern*"/, /MPOL:ADDRB="*pattern*"/

Remarks: The slave DTE responds to polls containing this address. The response message will always include this address.

This address must match one of the addresses in the Master Poll List, otherwise this slave will never respond to any polls.

See also: Master Poll List

Selections: See Gemini String Editor for parameter string syntax

Poll Received / Raise RTS Delay

TESTS Menu: MPOL\SLAVE\POLL-RTS DELAY A,

MPOL\SLAVE\POLL-RTS DELAY B

Remote Link: /MPOL:RESPDA=*selection*/, /MPOL:RESPDB=*selection*/

Remarks: This parameter specifies the delay between the receipt of a poll and RTS being raised to begin the response.

Selections:

1-100000	Delay interval (in 1/10ths of a millisecond)
0	No delay

Report Slave Results

RESULTS Menu: Use the + and - keys to select slave results.

Remote Link: /MPOL:SLAVE="*pattern*"/

Remarks: This command allows the user to specify which slave to query for results. The address must be a valid slave address or an asterisk (*) to specify all slaves.

Selections: See Gemini String Editor for parameter string syntax

4.10. POLLS Test Parameters

Test Configuration

TESTS Menu: POLL\CONFIGURATION

Remote Link: /POLL:CNFG=*selection*/

Remarks: This parameter determines which terminal interface(s) will transmit the Polling test pattern and which will analyze received data.

Selections:

ta|ra	Transmit from DTE A, analyze at DTE A
ta|rb	Transmit from DTE A, analyze at DTE B
tb|ra	Transmit from DTE B, analyze at DTE A
tb|rb	Transmit from DTE B, analyze at DTE B
ta&b|ra&b	Transmit from DTE A and B, analyze at DTE A and B

Test Duration

TESTS Menu: POLL\#POLLS

Remote Link: /POLL:NPOL=*selection*/

Remarks: This parameter determines the duration of the Polling test. Gemini automatically terminates the test when the data analyzers have received the specified number of polls.

Selections:

1-9999999	Analyze until specified number of polls are received
0	Continuous operation

Poll Delay Interval

TESTS Menu: POLL\POLL DELAY

Remote Link: /POLL:PDLY=*selection*/

Remarks: This parameter determines the time from the end of one poll message transmission to the beginning of the next. For switched carrier modems, this is equivalent to the CTS OFF to RTS ON delay.

Selections:

1-2000	Poll delay interval (in milliseconds)

Test Message

TESTS Menu: POLL\MESSAGE

Remote Link: /POLL:PMSG=*selection*/

Remarks: This parameter selects the Polling test message. All the patterns are fixed except for **p1** and **p2**, which can be modified using the Gemini String Editor.

If the Transmitter Carrier Mode is **constant** or **sw2**, Gemini will send a '2' (ASCII 32) before sending the **syn** pattern or a SYN (ASCII 16) before sending the **fox**, **p1**, or **p2** patterns in order to guarantee that the beginning of the poll can be determined.

See also:User-defined Test Patterns, Transmitter Carrier Mode

Selections:

syn	SYN SYN EOT
fox	THE QUICK BROWN FOX JUMPED OVER THE LAZY DOG'S BACK
p1, p2	User-defined patterns

User-Defined Test Patterns

TESTS Menu: POLL\PATTERN\P1, POLL\PATTERN\P2

Remote Link: /POLL:P1="pattern"/

/POLL:P2="pattern"/

Remarks: The data patterns **p1** and **p2** can be modified using the Gemini String Editor. Each pattern may contain up to 256 characters (async), or 2048 bits (sync).

Selections: See Gemini String Editor for parameter string syntax

Receiver Carrier Mode

TESTS Menu: POLL\CARRIER MODE RCV A,

POLL\CARRIER MODE RCV B

Remote Link: /POLL:RXCRA=*selection*/, /POLL:RXCRB=*selection*/

Remarks: This parameter determines whether the receiver will look for Data Carrier Detect (DCD) before accepting a poll message. If switched carrier mode is selected, the analyzer will count a *false poll* if a transition on DCD is detected without any poll message being received.

See also: Transmitter Carrier Mode

Selections:

sw	Test for DCD before accepting polls; count false polls
const	Ignore state of DCD

Transmitter Carrier Mode

TESTS Menu: POLL\CARRIER MODE XMT A,

POLL\CARRIER MODE XMT B

Remote Link: /POLL:TXCRA=*selection*/, /POLL:TXCRB=*selection*/

Remarks: This parameter controls the Polling test's handling of RTS. If a switched carrier mode is selected, the transmitter will raise RTS before each poll message is sent, then drop RTS after the poll message is sent. If constant carrier mode is selected, RTS will be on throughout the test run.

If the receiver carrier mode is **sw**, then the corresponding transmitter carrier mode must be **sw**.

If the receiver carrier mode is **const**, the transmitter carrier mode may be **const** or **sw2**. Select **sw2** to raise RTS before each poll, or **const** to keep RTS on during the test run.

See also: Receiver Carrier Mode

Selections:

sw, sw2	Raise RTS before each poll message sent
const	Raise RTS at start of test run

Test Execution Mode

TESTS Menu: POLL\EXECUTION MODE

Remote Link: /POLL:MODE=*selection*/

Remarks: This parameter controls the conditions under which a POLL test is automatically stopped.

See also: Test Duration, Sync Error Limit, Message Error Limit, False Poll Limit, CTS Timeout Limit

Selections:

manual	Test stops when selected number of polls received
semi-auto	Test stops when any test error limit is reached, or selected number of polls are received

Sync Error Limit

TESTS Menu: POLL\SYNC ERROR LIMIT

Remote Link: /POLL:SYNLA=*selection*/, /POLL:SYNLB=*selection*/

Remarks: If the number of sync errors reaches this limit, the test status will be set to failed. If semi-automatic execution mode is selected, Gemini will automatically stop the test.

See also: Test Duration, Message Error Limit, False Poll Limit, CTS Timeout Limit

Selections:

1-9999999	Sets sync error limit
0	Disables sync error limit

Message Error Limit

TESTS Menu: POLL\MESSAGE ERROR LIMIT

Remote Link: /POLL:MSGLA=*selection*/, /POLL:MSGLB=*selection*/

Remarks: If the number of message errors reaches this limit, the test status will be set to failed. If semi-automatic execution mode is selected, Gemini will automatically stop the test.

See also: Test Duration, Sync Error Limit, False Poll Limit, CTS Timeout Limit

Selections:

1-9999999	Sets message error limit
0	Disables message error limit

False Poll Limit

TESTS Menu: POLL\FALSE POLL LIMIT

Remote Link: /POLL:FPOLA=*selection*/, /POLL:FPOLB=*selection*/

Remarks: If the number of false polls reaches this limit, the test status will be set to failed. If semi-automatic execution mode is selected, Gemini will automatically stop the test.

See also: Test Duration, Sync Error Limit, Message Error Limit, CTS Timeout Limit

Selections:

1-9999999	Sets false poll limit
0	Disables false poll limit

CTS Timeout Limit

TESTS Menu: POLL\CTS TIMEOUT

Remote Link: /POLL:CTOA=*selection*/, /POLL:CTOB=*selection*/

Remarks: If the delay between RTS and CTS reaches this limit, the test status will be set to failed. If semi-automatic execution mode is selected, Gemini will automatically stop the test. This timeout applies to switched carrier operation only.

See also: Test Duration, Sync Error Limit, Message Error Limit, False Poll Limit

Selections:

1-9999	Sets CTS Timeout limit in milliseconds
0	Disables CTS Timeout

4.11. Test Terminal Parameters

Gemini supports two independent sets of terminal parameters. The Test terminal parameters, described in this section, are used for data transfers in the BERT, Connect Reliability, Data Compression/File Transfer, Multipoint Polling, and Polling tests.

The High-Speed BERT test does not use the test terminal parameters listed in this section. See section 4.7 for terminal parameters for the High-Speed BERT test.

The other set of terminal parameters are used for sending commands to the modem. They are used when Gemini is in Call Setup mode, and by the Connect Reliability test for sending command strings.

Test Data Protocol

TERM Menu: \TESTS\PROTOCOL

Remote Link: /TPCL:PCL=*selection*/

Remarks: This parameter selects the character format used for test data transmission. If asynchronous data is chosen, the character size, parity, and stop bits must also be configured. The synchronous data format is always 8-bit, no parity. When **sync** is chosen NRZ (Non-Return to Zero) encoding is used, with NRZ encoding a ‘1’ is represented by a High level, and a ‘0’ is represented by a Low level. When **sync-nrzi** is chosen NRZI (Non-Return to Zero Inverted) encoding is used, with NRZI encoding a ‘1’ is represented by no change in level, and a ‘0’ is represented by a change in level.

See also: Receiver Clock Source

Selections:

sync	Selects synchronous character format with NRZ encoding
async	Selects asynchronous character format
sync-nrzi	Selects synchronous character format with NRZI encoding

Asynchronous Character Size

TERM Menu: \TESTS\PROTOCOL\ASYNC\DATA

Remote Link: /ATST:DATA=*selection*/

Remarks: This parameter only applies if asynchronous data format has been selected.

Selections: 5 to 8 Selects number of data bits per character

Parity Bit

TERM Menu: \TESTS\PROTOCOL\ASYNC\PARITY

Remote Link: /ATST:PARI=*selection*/

Remarks: This parameter only applies if asynchronous data format has been selected.

Selections:

odd	Add parity bit to each character; ensure odd # of 1's
even	Add parity bit to each character; ensure even # of 1's
none	Do not add a parity bit to each character

Number of Stop Bits

TERM Menu: \TESTS\PROTOCOL\ASYNC\STOP

Remote Link: /ATST:STOP=*selection*/

Remarks: This parameter only applies if asynchronous data format has been selected.

Selections: 1, 1.5, 2 Select number of stop bits sent with each character

Transmit Clock Source

TERM Menu: \TESTS\CLK A, \TESTS\CLK B

Remote Link: /TPCL:CLKA=*selection*/, /TPCL:CLKB=*selection*/

Remarks: The source of the transmit clock at each test interface is determined by setting of the CLK parameter. There are three possible clock sources:

- Gemini internal clock
- Modem supplied clock via the test interface (pin 15)
- TTL clock via the BNC connector on the rear panel

If the test data protocol is **async**, an external clock source must be 16 times the desired data rate. If the test data protocol is **sync**, an external clock source should equal the desired data rate.

See Also: Test Data Protocol, Internal Clock Rate Selection: Basic Rate

Selections:

modem	Modem supplies clock via the test interface
ext	External TTL clock provided via the BNC connector
75, 300, ...	Use clock internal to Gemini

Receive Clock Source

TERM Menu: \TESTS\CLK A, \TESTS\CLK B

Remote Link: /TPCL:CLKA=*selection*/, /TPCL:CLKB=*selection*/

Remarks: The source of the receive clock at each test interface is determined by a combination of the PROTOCOL and CLK parameters. There are three possible clock sources:

- Gemini internal clock
- Modem supplied clock via the test interface (pin 17)
- TTL clock via the BNC connector on the rear panel

If the test data protocol is **sync**, the receive clock source is always pin 17 on the test interface.

If the test data protocol is **async**, then the CLK parameter selection determines the receive clock source (see below). If an external clock source is selected, the clock provided must be 16 times the desired data rate.

See Also: Test Data Protocol, Internal Clock Rate Selection: Basic Rate

Selections:

ASYNC

modem	Modem supplies clock via the test interface
ext	External TTL clock provided via the BNC connector
75, 300, ...	Use clock internal to Gemini

SYNC

(any selection) Modem supplies clock via the test interface

Internal Clock Rate Selection: Basic Rate

TERM Menu: \TESTS\CLK A, \TESTS\CLK B

Remote Link: /TPCL:CLKA=*selection*/, /TPCL:CLKB=*selection*/

Remarks: This parameter selects the basic clock rate. The selected rate may be adjusted from -10% to +10% by adding an offset.

See also: Internal Clock Rate Selection: Clock Offset, Transmit Clock Source, Receive Clock Source

Selections: 45, 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 4800, 7200, 9600, 12000, 14400, 16000, 16800, 18000, 19200, 21600, 24000, 25600, 26400, 28000, 28800, 31200, 32000, 33600, 36000, 38400, 48000, 56000, 57600, 64000, 72000, 76800, 96000, 102400, 112000, 115200, 128000, 144000, 153600, 192000, 224000, 230400, 256000

Internal Clock Rate Selection: Clock Offset

TERM Menu: \TESTS\OFFSET A, \TESTS\OFFSET B

Remote Link: /TPCL:OFSA=*selection*/, /TPCL:OFSB=*selection*/

Remarks: This parameter adjusts the basic clock rate up or down in increments of 1/10th of a percent.

When an external clock source is selected, this parameter has no effect.

See also: Internal Clock Rate Selection: Basic Rate, Transmit Clock Source, Receive Clock Source

Selections: ±10.0% Offset relative to basic clock rate

Flow Control

TERM Menu: \TESTS\FLOW A, \TESTS\FLOW B

Remote Link: /TPCL:FLOWA=*selection*/, TPCL:FLOWB=*selection*/

Remarks: These parameters determine which flow control method is used by Gemini when transmitting test data.

When configuring a bi-directional test, XON/XOFF flow control should be used with caution. For example, if a BERT test is run using one of the built-in pseudorandom patterns, Gemini will interpret XON and XOFF characters appearing in the pattern as flow control characters.

The Polling test always assumes CTS flow control, regardless of the setting of this parameter.

Selections:

none	Disable all flow control
cts	Transmitter accepts CTS flow control
xoff	Transmitter accepts ASCII XON/XOFF flow control

4.12. Call Setup Terminal Parameters

Gemini supports two independent sets of terminal parameters. The Call Setup terminal parameters, described in this section, are used for sending commands to the modem. They are used when Gemini is in Call Setup mode, and by the Connect Reliability test for sending command strings.

The other set of terminal parameters is used for data transfers. The Test terminal parameters are used for data transfers in the BERT, Connect Reliability, Data Compression/File Transfer, Multipoint Polling, and Polls tests.

Call Setup Data Protocol

TERM Menu: \CALLS\PROTOCOL

Remote Link: /CPCL:PCL=*selection*/

Remarks: This parameter selects the character format used for call setup commands. If **async**, **sync**, or **hdlc** is selected, appropriate selections should be made for character size, parity, and so on.

If **async-v.25**, **sync-v.25**, or **hdlc-v.25** is selected, other parameters are fixed as follows:

ASYNC	7 data bits/character, even parity, 1 stop bit, 0 msec intercharacter delay
SYNC	7 data bits/character, odd parity
HDLC	7 data bits/character, odd parity, address field = FF, control field = 13 (hex)

See also: Receiver Clock Source

Selections:

async	Selects asynchronous character format
async-v.25	Selects V.25 bis asynchronous character format
sync	Selects synchronous character format
sync-v.25	Selects V.25 bis synchronous character format
hdlc	Selects bit-oriented HDLC protocol
hdlc-v.25	Selects V.25 bis bit-oriented protocol

NOTE: async_v.25, sync_v.25, and hdlc_v.25 represent async V.25 bis, sync V.25 bis, and hdlc V.25 bis CCITT modulation standards.

Asynchronous Character Size

TERM Menu: \CALLS\PROTOCOL\ASYNC\DATA

Remote Link: /ACLL:DATA=*selection*/

Remarks: This parameter only applies if asynchronous data format has been selected.

Selections:

5 to 8	Selects number of data bits per character

Parity Bit

TERM Menu: \CALLS\PROTOCOL\ASYNC\PARITY

Remote Link: /ACLL:PARI=*selection*/

Remarks: This parameter only applies if asynchronous data format has been selected.

Selections:

odd	Add parity bit to each character; ensure odd # of 1's
even	Add parity bit to each character; ensure even # of 1's
none	Do not add a parity bit to each character

Number of Stop Bits

TERM Menu: \CALLS\PROTOCOL\ASYNC\STOP

Remote Link: /ACLL:STOP=*selection*/

Remarks: This parameter only applies if asynchronous data format has been selected.

Selections:

1, 1.5, 2	Select number of stop bits sent with each character

Inter-Character Delay

TERM Menu: \CALLS\PROTOCOL\ASYNC\INTERCHARACTER DELAY

Remote Link: /ACLL:CHRD=*selection*/

Remarks: Sets the time interval between transmitted characters. This parameter applies to both the **async** and **async-v.25** character formats.

Selections:

0 to 999	Inter-character delay (in milliseconds)

Synchronous Character Format

TERM Menu: \CALLS\PROTOCOL\SYNC\CHAR

Remote Link: /SCLL:CHAR=*selection*/

Remarks: The synchronous character format is always 8 bits, with no framing bits. For ASCII data, only 7 bits are needed, so the high-order bit can be used as a parity bit.

Selections:

8BN	8 data bits, no parity
7BO	7 data bits, odd parity
7BE	7 data bits, even parity
7BM	7 data bits, mark parity
7BS	7 data bits, space parity

Synchronous Character Encoding

TERM Menu: \CALLS\PROTOCOL\SYNC\8BN\CODE

Remote Link: /SCLL:CODE=*selection*/

Remarks: If 8 data bits per character is selected, modem commands may be encoded in the 7-bit ASCII format or the 8-bit EBCDIC format. If ASCII encoding is selected, the high-order bit is always 0.

See also: Synchronous Character Format

Selections:

ascii	Use ASCII encoding
ebcdic	Use EBCDIC encoding

Number of Sync Characters

TERM Menu: \CALLS\PROTOCOL\SYNC\# SYNC CHARS

Remote Link: /SCLL:NSYN=*selection*/

Remarks: When **sync** protocol is used, each command string sent is preceded by 1 or 2 sync characters.

See also: Sync Characters

Selections:

1 to 2	Selects 1 or 2 sync characters

Sync Characters

TERM Menu: \CALLS\PROTOCOL\SYNC\SYN1,
\CALLS\PROTOCOL\SYNC\SYN2

Remote Link: /SCLL:SYN1=*selection*/, /SCLL:SYN2=*selection*/

Remarks: When **sync** protocol is used, each command string sent is preceded by 1 or 2 sync characters.

See also: Number of Sync Characters

Selections:

00 to FF	Hexadecimal representation of each sync character

HDLC Character Format

TERM Menu: \CALLS\PROTOCOL\HDLC\CHAR

Remote Link: /HCLL:CHAR=*selection*/

Remarks: The synchronous character format is always 8 bits, with no framing bits. For ASCII data, only 7 bits are needed, so the high-order bit can be used as a parity bit.

Selections:

8BN	8 data bits, no parity
7BO	7 data bits, odd parity
7BE	7 data bits, even parity
7BM	7 data bits, mark parity
7BS	7 data bits, space parity

HDLC Character Encoding

TERM Menu: \CALLS\PROTOCOL\HDLC\8BN\CODE

Remote Link: /HCLL:CODE=*selection*/

Remarks: If 8 data bits per character is selected, modem commands may be encoded in the 7-bit ASCII format or the 8-bit EBCDIC format. If ASCII encoding is selected, the high-order bit is always 0.

See also: HDLC Character Format

Selections:

ascii	Use ASCII encoding
ebcdic	Use EBCDIC encoding

HDLC Control/Data Fields

TERM Menu: \CALLS\PROTOCOL\HDLC\ADDR,

\CALLS\PROTOCOL\HDLC\CTRL

Remote Link: /HCLL:ADDR=*selection*/, /HCLL:CTRL=*selection*/

Remarks: When **hdlc** protocol is used, each command string sent is preceded by an 8-bit address and an 8-bit control field.

Selections:

00 to FF	Hexadecimal representation of control/data fields

Transmit Clock Source

TERM Menu: \CALLS\CLK A, \CALLS\CLK B

Remote Link: /CPCL:CLKA=*selection*/, /CPCL:CLKB=*selection*/

Remarks: The source of the transmit clock at each test interface is determined by setting of the CLK parameter. There are three possible clock sources:

- Gemini internal clock
- Modem supplied clock via the test interface (pin 15)
- TTL clock via the BNC connector on the rear panel

If the test data protocol is **async**, an external clock source must be 16 times the desired data rate. If the test data protocol is **sync**, an external clock source should equal the desired data rate.

See Also: Call Setup Data Protocol, Internal Clock Rate Selection: Basic Rate

Selections:

modem	Modem supplies clock via the test interface
ext	External TTL clock provided via the BNC connector
75, 300, ...	Use clock internal to Gemini

Receive Clock Source

TERM Menu: \CALLS\CLK A, \CALLS\CLK B

Remote Link: /CPCL:CLKA=*selection*/, /CPCL:CLKB=*selection*/

Remarks: The source of the receive clock at each test interface is determined by a combination of the PROTOCOL and CLK parameters. There are three possible clock sources:

- Gemini internal clock
- Modem supplied clock via the test interface (pin 17)
- TTL clock via the BNC connector on the rear panel

If the Call Setup data protocol is **sync** or **hdlc**, the receive clock source is always pin 17 on the test interface.

If the Call Setup data protocol is **async**, then the CLK parameter selection determines the receive clock source (see below). If an external clock source is selected, the clock provided must be 16 times the desired data rate.

See Also: Call Setup Data Protocol, Internal Clock Rate Selection: Basic Rate

Selections:

ASYNC

modem	Modem supplies clock via the test interface
ext	External TTL clock provided via the BNC connector
75, 300, ...	Use clock internal to Gemini

SYNC or HDLC

(any selection) Modem supplies clock via the test interface

Internal Clock Rate Selection: Basic Rate

TERM Menu: \CALLS\CLK A, \CALLS\CLK B

Remote Link: /CPCL:CLKA=*selection*/, /CPCL:CLKB=*selection*/

Remarks: This parameter selects the basic clock rate. The selected rate may be adjusted up to 10% in either direction by adding an offset.

See also:Internal Clock Rate Selection: Clock Offset, Transmit Clock Source, Receive Clock Source

Selections: 45, 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 4800, 7200, 9600, 12000, 14400, 16000, 16800, 18000, 19200, 21600, 24000, 25600, 26400, 28000, 28800, 31200, 32000, 33600, 36000, 38400, 48000, 56000, 57600, 64000, 72000, 76800, 96000, 102400, 112000, 115200, 128000,144000, 153600, 192000, 224000, 230400, 256000

Internal Clock Rate Selection: Clock Offset

TERM Menu: \CALLS\OFFSET A, \CALLS\OFFSET B

Remote Link: /CPCL:OFSA=*selection*/, /CPCL:OFSB=*selection*/

Remarks: This parameter adjusts the basic clock rate up or down in increments of 1/10th of a percent.

When an external clock source is selected, this parameter has no effect.

See also: Internal Clock Rate Selection: Basic Rate, Transmit Clock Source, Receive Clock Source

Selections: ±10.0% Offset relative to basic clock rate

Flow Control

TERM Menu: \CALLS\FLOW A, \CALLS\FLOW B

Remote Link: /CPCL:FLOWA=*selection*/, CPCL:FLOWB=*selection*/

Remarks: These parameters determine which flow control method is used by Gemini when transmitting modem commands.

Selections:

none Disable all flow control

cts Transmitter accepts CTS flow control

xoff Transmitter accepts ASCII XON/XOFF flow control

4.13. Terminal Interface Parameters

Gemini supports two interfaces at both stations A and B. The Terminal Interface parameters described in this section are used to select which interface is active for each station, to allow control of the signals which do not have buttons on the front panel, and to display the values of those signals which do not have LEDs on the front panel. For the RS-232 interface these parameters also allow the independent direction control of two signals.

Terminal Interface

TERM Menu: \INTF\DTE A, \INTF\DTE B

Remote Link: /INTF:DTEA=*selection*/, /INTF:DTEB=selection/

Remarks: This parameter selects the currently active interface for the station A or station B data terminal interface. The selections are **rs232**, and **530a**. When **rs232** is selected the 25 pin D-sub connector at the rear of Gemini is active, when **530a** is selected the 26 pin EIA/TIA 530-A Alt-A connector is active.

Selections:

rs232	Selects RS232 terminal interface
530a	Selects 530A terminal interface

Secondary Transmit Data

TERM Menu: \INTF\DTE A\RS232\STD, \INTF\DTE B\RS232\STD

Remote Link: /INTF:STDA=*selection*/, /INTF:STDB=selection/

Remarks: This parameter specifies the STD (Secondary Transmit Data) signal level driven by Gemini. This signal is only available on the RS-232 interface.

Selections:

0	STD signal driven low (mark)
1	STD signal driven high (space)

Secondary Request To Send

TERM Menu: \INTF\DTE A\RS232\SRTS, \INTF\DTE B\RS232\SRTS

Remote Link: /INTF:SRTSA=*selection*/, /INTF:SRTSB=selection/

Remarks: This parameter specifies the SRTS (Secondary Request To Send) signal level driven by Gemini. This signal is only available on the RS-232 interface.

Selections:

0	SRTS signal driven inactive (mark)
1	SRTS signal driven active (space)

Local Loopback

TERM Menu: \INTF\DTE A\RS232\LL, \INTF\DTE B\RS232\LL

\INTF\DTE A\530A\LL, \INTF\DTE B\530A\LL

Remote Link: /INTF:LLA=*selection*/, /INTF:LLB=selection/

Remarks: This parameter specifies the LL (Local Loopback) signal level driven by Gemini. This signal is available on both the RS-232 interface and the 530A interface.

Selections:

0 LL signal driven inactive (mark)

1 LL signal driven active (space)

Secondary Receive Data

TERM Menu: \INTF\DTE A\RS232\SRD, \INTF\DTE B\RS232\SRD

Remote Link: /INTF:SRDA/, /INTF:SRDB/

Remarks: This parameter displays the SRD (Secondary Receive Data) signal level being received by Gemini. This signal is only available on the RS-232 interface.

Selections:

0 SRD signal detected low (mark)

1 SRD signal detected high (space)

Secondary Clear to Send

TERM Menu: \INTF\DTE A\RS232\SCTS, \INTF\DTE B\RS232\SCTS

Remote Link: /INTF:SCTSA/, /INTF:SCTSB/

Remarks: This parameter displays the SCTS (Secondary Clear To Send) signal level being received by Gemini. This signal is only available on the RS-232 interface.

Selections:

0 SCTS signal detected inactive (mark)

1 SCTS signal detected active (space)

Secondary Data Carrier Detect

TERM Menu: \INTF\DTE A\RS232\SDCD, \INTF\DTE B\RS232\SDCD

Remote Link: /INTF:SDCDA/, /INTF:SDCDB/

Remarks: This parameter displays the SDCD (Secondary Data Carrier Detect) signal level being received by Gemini. This signal is only available on the RS-232 interface.

Selections:

0	SDCD signal detected inactive (mark)
1	SDCD signal detected active (space)

Ring Indicator

TERM Menu: \INTF\DTE A\RS232\RI, \INTF\DTE B\RS232\RI

\INTF\DTE A\530A\RI, \INTF\DTE B\530B\RI

Remote Link: /INTF:RIA/, /INTF:RIB/

Remarks: This parameter displays the RI (Ring Indicator) signal level being received by Gemini. This signal is available on both the RS-232 interface and the 530A interface.

Selections:

0	RI signal detected inactive (mark)
1	RI signal detected active (space)

Test Mode

TERM Menu: \INTF\DTE A\RS232\TM, \INTF\DTE B\RS232\TM

\INTF\DTE A\530A\TM, \INTF\DTE B\530B\TM

Remote Link: /INTF:TMA/, /INTF:TMB/

Remarks: This parameter displays the TM (Test Mode) signal level being received by Gemini. This signal is available on both the RS-232 interface and the 530A interface.

Selections:

0	TM signal detected inactive (mark)
1	TM signal detected active (space)

Signal Quality

TERM Menu: \INTF\DTE A\RS232\SQ, \INTF\DTE B\RS232\SQD

Remote Link: /INTF:SQA/, /INTF:SQB/

Remarks: This parameter displays the SQD (Signal Quality) signal level being received by Gemini. This signal is only available on the RS-232 interface.

NOTE: When RLEN is set to **yes**, the SQD signal is no longer available, pin 21 on the RS-232 interface is programmed as an output (signal RL). If SQD is read, the value returned will be the setting of the RL (Remote Loopback) parameter.

Selections:

0	SQD signal detected inactive (mark)
1	SQD signal detected active (space)

Data Rate Select (DCE Supplied)

TERM Menu: \INTF\DTE A\RS232\DRS IN, \INTF\DTE B\RS232\DRS IN

Remote Link: /INTF:DRS_INA/, /INTF:DRS_INB/

Remarks: This parameter displays the DCE generated DRS (Data Rate Select) signal level being received by Gemini. This signal is only available on the RS-232 interface.

NOTE: When DRS_OUT_EN is set to **yes**, the DCE generated DRS signal is no longer available, pin 23 on the RS-232 interface is programmed as an output (DTE generated DRS). If DRS is read, the value returned will be the setting of the DRS_OUT (DTE generated Data Rate Select) parameter.

Selections:

0	DCE generated DRS signal detected inactive (mark)
1	DCE generated DRS signal detected active (space)

Remote Loopback Output Enable

TERM Menu: \INTF\DTE A\RS232\RL ENABLE,
\INTF\DTE B\RS232\RL ENABLE

Remote Link: /INTF:RLENA/, /INTF:RLENB/

Remarks: This parameter specifies whether pin 21 on the RS-232 interface is programmed as an input (signal SQ), or an output (signal RL).

Selections:

no	Pin 21 programmed to be an input (signal SQ)
yes	Pin 21 programmed to be an output (signal RL)

Remote Loopback

TERM Menu: \INTF\DTE A\RS232\RL, \INTF\DTE B\RS232\RL

Remote Link: /INTF:RLA/, /INTF:RLB/

Remarks: This parameter specifies the RL (Remote Loopback) signal level driven by Gemini. This signal is available on both the RS-232 interface and the 530A interface.

> **NOTE :** When the selected interface is RS-232, the RL signal output is only available when the RLEN parameter has been yes to **yes**, when RLEN is **no**, setting RL will have no effect until RLEN is changed back to **yes**. Also if RL is read while RLEN is set to **no**, the response will be the setting of RL (not the signal on the line SQ).

Selections:

Selections:	0	RL signal driven low (mark)
	1	RL signal driven high (space)

Data Rate Select Output Enable

TERM Menu: \INTF\DTE A\RS232\DRS OUT ENABLE,
\INTF\DTE B\RS232\DRS OUT ENABLE

Remote Link: /INTF:DRS_OUT_ENA/, /INTF:DRS_OUT_ENB/

Remarks: This parameter specifies whether pin 23 on the RS-232 interface is programmed as an input (signal DRS supplied by DCE), or an output (signal DRS supplied by DTE).

Selections:	no	Pin 23 programmed to be an input
	yes	Pin 23 programmed to be an output

Data Rate Select (DTE Supplied)

TERM Menu:	\INTF\DTE A\RS232\DRS_OUT, \INTF\DTE B\RS232\DRS_OUT
Remote Link:	/INTF:DRS_OUTA/, /INTF:DRS_OUTB/
Remarks:	This parameter specifies the RL (Remote Loopback) signal level driven by Gemini. This signal is available only on the RS-232 interface.

NOTE: The DRS_OUT signal output is only available when the DRS_OUT_EN parameter has been yes to **yes**, when DRS_OUT_EN is **no**, setting DRS_OUT will have no effect until DRS_OUT_EN is changed back to **yes**. Also if DRS_OUT is read while DRS_OUT_EN is set to **no**, the response will be the setting of DRS_OUT (not the signal on the line DRS_IN).

Selections:	0	DRS_OUT signal driven low (mark)
	1	DRS_OUT signal driven high (space)

5.0. REMOTE OPERATION

A computer or terminal can control Gemini by issuing commands to Gemini's GPIB or RS-232 remote control port. Gemini supports three control link protocols:

- RS-232 CR/LF
- RS-232 ACK/NAK
- GPIB

CR/LF (carriage return/line feed) is a simple command-line protocol, and allows you to control Gemini from a dumb terminal or a computer. In addition to being easiest to implement, the CR/LF protocol provides a convenient way to practice using the Gemini command set.

ACK/NAK is a more sophisticated serial control protocol that includes error-checking and command retransmission.

GPIB (General Purpose Instrumentation Bus) is the industry-standard parallel-bus instrument control protocol.

You can use Gemini's remote control features to design computer-controlled automatic test procedures for data communications equipment, or to access and control a Gemini unit at a remote location via modem link.

Figure 5-1 shows Gemini being used in an automatic modem test system. In this configuration, a computer controls the Gemini, a TAS Telephone Network Emulator, a TAS Modem Test Switch, and other test equipment via the GPIB. The control bus originates at the computer and is connected to each piece of test equipment. This type of configuration is simple to set up and operate, provided that the computer has GPIB controller capability.

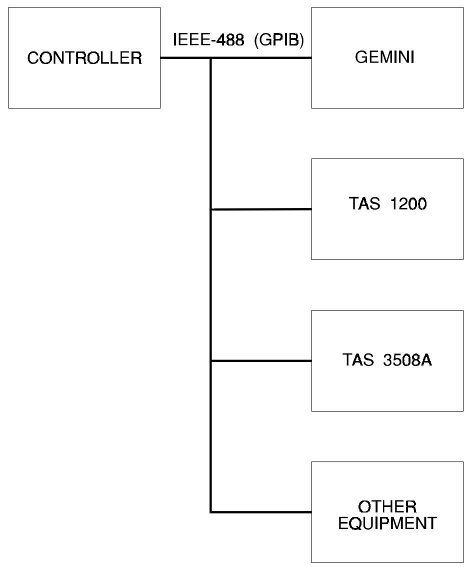

Figure 5-1. GPIB Automatic Modem Test System

Figure 5-2 shows a typical RS-232 control application. This type of setup might be used when Gemini is the only instrument to be controlled, or when a GPIB control computer is not available.

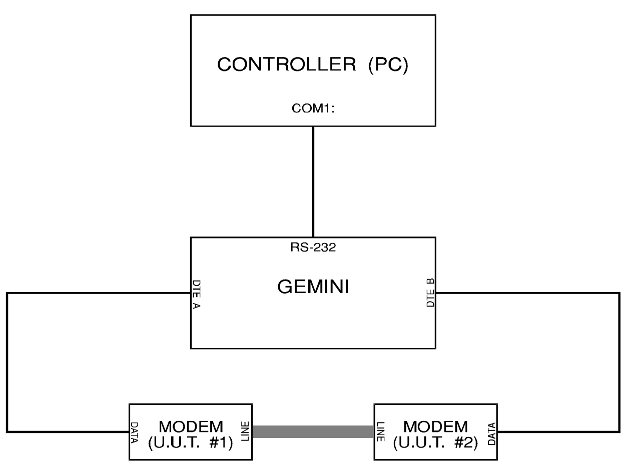

Figure 5-2. RS-232 Control of Gemini

Gemini can also be controlled via modem link. In Figure 5-3, a computer at a central site directs a Gemini at each end of a communications link to perform a series of tests. The computer sends commands to each Gemini via a modem link.

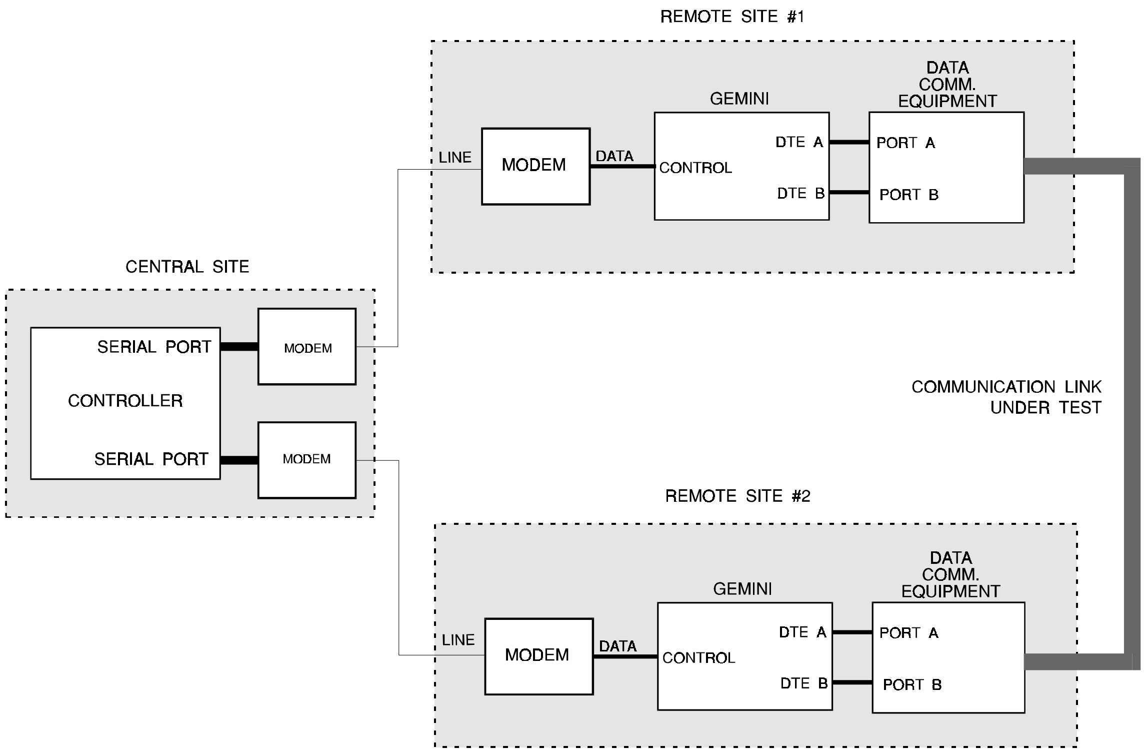

Figure 5-3. Gemini Control via Modem Link

Gemini includes a built-in RS-232/GPIB protocol converter. This means that a computer can control instruments attached to Gemini's GPIB port by sending commands to Gemini's RS-232 port. The advantage of this configuration is that a computer does not have to be a GPIB controller to control GPIB instruments. Since Gemini performs the bus conversion, a computer can control Gemini and several GPIB instruments from a single serial port.

TAS uses the Gemini protocol converter feature in TASKIT automatic modem test software. In one of the standard TASKIT modem test configurations, a computer controls Gemini via RS-232 (null modem cable), and controls the telephone network emulator indirectly via Gemini's GPIB port. Figure 5-4 illustrates this configuration.

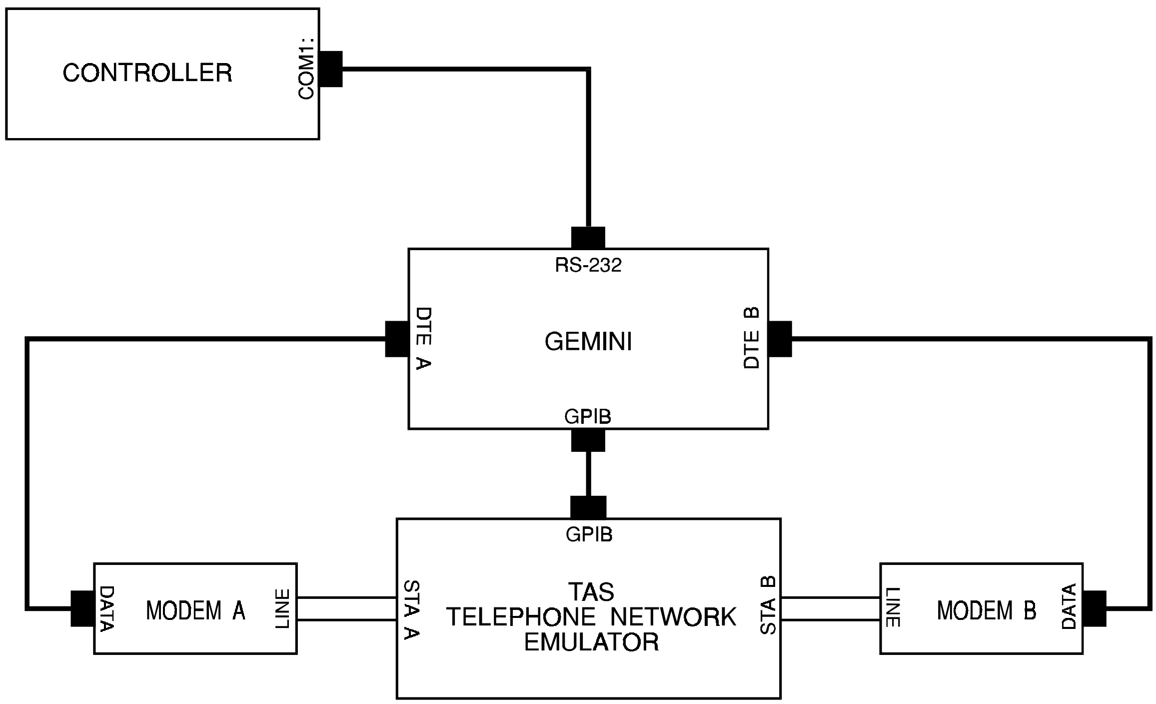

Figure 5-4. TAS KIT Modem Test Configuration

5.1. Configuring Gemini for Remote Control

Before you can control Gemini from a remote terminal or computer, you must first set the remote control configuration. The remote configuration can be set only via the Gemini front panel. To set the remote control configuration, you must perform the following steps:

1. Select the CONFIG menu, by pressing the CONFIG key.
2. Use ↑ or ↓ to scroll to the REMOTE PROTOCOL menu line.
3. Select the desired protocol (gpib, crlf, or acknak), by using + or -.
4. Press ENTER to access the submenu of the parameters associated with the selected protocol.
5. Use the cursor keys to select different parameters and use + and - to set them to the desired setup.

For example, to configure Gemini for RS-232 CR/LF control, select REMOTE PROTOCOL: crlf, and press ENTER to select the submenu. Next, set the baud rate, parity, and stop options for the CR/LF protocol.

For more information on the Gemini CONFIG menu, see Section 3, "Menu Reference". For detailed information on each of the Gemini link control protocols, see the "Remote Control Protocol" information in Section 3.

5.2. Overview of Gemini Commands

Gemini commands are arranged in functional groups. Each group focuses on controlling a certain aspect of the Gemini. For example, the commands within the BERT command group allow control of Gemini's BERT test.

To perform a test, Gemini must be properly configured before the test can be executed. It may also be necessary to set up a call between two modems before the test is run. As an example, the following operations might be required to perform an automatic BERT, Multi-Point Poll, Data Compression/File Transfer Character Echo or Block Acknowledgment Delay test on an autodial modem. The command group(s) associated with each test operation are listed in parentheses.

- Check Gemini status, model #, and software version (CNFG)
- Set terminal parameters for call setup (CPCL, ACLL, SCLL, HCLL)
- Set terminal parameters for test data transmission (TPCL, ATST, HSBT, DCMP, and MPOL)
- Set test parameters (BERT, HSBT, POLL, CALLS, DCMP, MPOL and ECHO).
- Set up call (CALL or MSGX, INTF)
- Execute the test (TEST, BERT, HSBT, POLL, CALLS, INTF, DCMP, MPOL and ECHO)

The following brief descriptions outline the function of each Gemini command group. For a complete description, refer to Section 6 "Gemini Remote Commands Reference".

ACLL: determines the data format for asynchronous call setup, including character size, parity, number of stop bits, and intercharacter delay.

ATST: determines the data format for asynchronous BERT tests and POLLS tests, including character size, parity, and number of stop bits.

BERT: determines BERT test execution parameters and reports BERT test results.

CALL: determines connect reliability test execution parameters, modem call connect/disconnect command strings, and sends the strings.

CNFG: reports Gemini status, model #, and software cartridge version. Also determines command response format.

CPCL: determines the call setup protocol, clock rate, clock offset, and flow control options.

DCMP: determines data compression test execution parameters and reports test results.

ECHO: determines Character Echo and Block Acknowledgment Delay test execution parameters and reports test results.

FILE: saves, recalls, and names Gemini test configuration files.

GPIB: determines GPIB options and RS-232/GPIB translator options.

HCLL: determines the data format for HDLC call setup.

HSBT: determines High-Speed BERT test execution parameters, data transmission protocol, and clock rate. Reports High-Speed BERT test results.

INTF: controls and/or reports the status of DTE A and DTE B interface control signals.

MPOL: determines Multi-Point Polling test execution parameters and reports test results.

MSGX: controls Gemini's built-in dual data analyzer. This command group allows you to send commands from DTE A or DTE B, and to monitor and buffer the command responses.

POLL: determines Polling test execution parameters and reports Polling test results.

SCLL: determines the data format for sync call setup.

TEST: determines Gemini's test mode. Starts and stops test execution. Controls self-loop function and insert errors function.

TPCL: determines the test data transmission protocol, clock rate, clock offset, and flow control options.

5.3. Sending Commands to Gemini

5.3.1. Command Types

Gemini supports three distinct types of commands. These command types are SET commands, REPORT commands, and EXECUTE commands.

SET commands simply assign a value to a Gemini configuration parameter. For example, the command that sets the BERT pattern to 511 is a SET command. If Gemini receives a SET command without a parameter value, it returns the current setting of the parameter.

REPORT commands return a value. For example, the command that returns the bit error count for the BERT test is a REPORT command. All results available from the front panel can be obtained over the remote link by the REPORT commands.

EXECUTE commands instruct Gemini to perform an operation. For example, the command that instructs Gemini to start running the BERT test is an EXECUTE command. EXECUTE commands do not return a value.

5.3.2. Command Sequence

To execute a Gemini command, a controller must follow a simple three-step sequence:

1. Check for any pending command response. Gemini does not execute a new command if the result from a previous command has not been read.
2. Send the command to the Gemini.
3. Read the command response from the Gemini.

5.3.3. Command Messages

A Gemini command message consists of one or more command frames. A command frame consists of a command group name and one or more commands. A forward slash precedes and follows each command frame. A colon follows the command group name, and a comma follows each command name except the last command. Gemini ignores white space within the command frame. The command frame has the following syntax:

```
/command group: command1, command2, ..., commandn/
```

All of the commands within a command frame must belong to the same command group. An example of a command group is BERT:

```
/BERT: CNFG=ta|rb, BSIZ=10E3, NBLK=1000, MODE=0/
```

The above command performs the following BERT test operations:

- SET test configuration to transmit A receive B.
- SET block size to 1000.
- SET # blocks per test to 1000.
- SET test mode to 0 (manual termination).

All of the commands in the previous example are SET commands. An example of a REPORT command is:

```
/BERT: BERa/
```

This command instructs Gemini to report the number of bit errors measured at DTE A. After reading this section, you may wish to look at Section 6, "Remote Command Reference". This section summarizes all remote commands and breaks them down into types (SET, REPORT, EXECUTE). With this reference, you can quickly find the command you need to obtain the results for a specific test.

If Gemini receives a SET command without a parameter value, it returns the current value of the parameter. For example, the following message tells Gemini to return the value of the BSIZ parameter:

```
/BERT: BSIZ/
```

A similar command was used to SET the BSIZ parameter:

```
/BERT: BSIZ=10E3/
```

An example of an EXECUTE command is:

```
/TEST: RUN/
```

This command tells Gemini to EXECUTE the current test.

A command message can contain more than one command frame. For example, the following command message tells Gemini to SET the test mode to BERT, EXECUTE the BERT test, and REPORT the bit error count at DTE B:

```
/TEST: MODE=BERT, RUN/BERT: BERb/
```

A single forward slash separates the TEST command group from the BERT command group.

5.3.4. Response Messages

Gemini provides an explicit response to each command message that it receives. A response message can be one of three types:

1. a command completion message.
2. a value message.
3. an error message.

Gemini returns a command completion message in response to a SET command or EXECUTE command. The command completion message is:

```
/C/
```

Gemini returns a value message in response to a REPORT command. The form of the value message is:

```
/command group:command=value/
```

For example, if the controller sends the message

```
/BERT:BERb/
```

Gemini might respond with

```
/BERT:BERb=0000017/
```

This response indicates that Gemini detected 17 bit errors at DTE B.

Gemini returns an error message when it detects a problem with command syntax, or when it detects an internal processing error. The form of the error message is:

```
/command group:Exxx/
```

where *xxx* is the error number.

For example, if the controller sends the message:

```
/BERT: BARb/
```

Gemini responds with:

```
/BERT:E006/
```

This response indicates that Gemini has detected a command error. Specifically, BARb is an illegal command. A listing of specific error messages and their meanings is listed in Section 7, "Gemini Error Codes".

5.3.5. Response to a Multiple-Command Message

Gemini returns only one response for each command message that it receives. If the command message contains multiple commands, Gemini responds to the last command in the message. For example, if the controller sends the command:

```
/TEST: MODE=BERT, RUN/BERT: BERb/
```

Gemini responds with the message:

```
/BERT:BERB=nnnnnnn/
```

where *nnnnnnn* is the number of bit errors detected at DTE B. Note that Gemini did not return completion messages for the MODE or RUN commands, since they preceded the BERb command. A REPORT command should always be the last command in a command message, since Gemini supplies a response for only the last command. In addition, a command message should contain only one REPORT command.

If one of the commands in a multiple command message results in an error, Gemini ceases processing the command message and reports the error. For example, if the controller sends the message:

```
/TEST: MODE=BART, RUN/BERT: BERb/
```

Gemini responds with:

```
/TEST:E001/
```

Gemini responds with an error message because the MODE command resulted in a value error. In the example, Gemini did not execute the RUN command or the BERb command, since these commands follow the command that contained the error.

5.3.6. Terse Responses

If the PROTOCOL RESPONSE MODE is terse, Gemini does not include the slashes, command group name, or parameter name in the response. The following command transactions illustrate the format of terse responses.

```
Command:  /BERT: BSIZ=10E3/
Response: C

Command:  /BERT: BSIZ/
Response: 10E3

Command:  /BERT: BERb/
Response: 0000017

Command:  /BERT: BARb/
Response: E006
```

5.4. Message Transfer Feature

Message Transfer allows you to communicate directly with a device connected to either of Gemini's DTE ports. This feature is accessed only by remote link and is not available from the front panel. For more information on configuring Gemini for remote control, see "Configuring Gemini for Remote Control" in this section. Use the Message Transfer feature to send commands to the communications device being tested, to test a modem's command functionality, or to test simple message transfer from one DTE port to the other.

This section will outline how to use Message Transfer commands to send strings to Gemini's DTE ports. Examples are provided to help illustrate message transfer usage. The next section explains what Gemini does during a message transfer.

5.4.1. Using the Message Transfer Feature

To accomplish a Message Transfer, Gemini completes a cycle of steps. Gemini does not control DTR, RTS, or any other leads during Message Transfer. If you need these leads to be controlled, use the INTF commands. For the INTF command format, see "Gemini Commands Quick Reference" in section 6. Gemini will begin the message transfer by sending the string specified by the TSTR command to the destination DTE, specified by the CNFG command.

When the transfer begins, Gemini also starts buffering data received at both DTEs. Gemini can buffer up to 2048 characters and automatically stops buffering when that limit is reached. The CLIM command sets the number of characters Gemini will buffer, from 1 to 2048 characters.

The data received at the selected DTE is checked to the expected response string specified by RESP. If the buffered data contains the RESP string, Gemini stops buffering the data. If an empty response string is specified, Gemini will not check for an expected response. Gemini will only buffer data until the time limit, specified by TLIM, is reached. To tell Gemini to buffer data regardless of how much time expires, set TLIM to zero.

5.4.2. Setting Up a Transfer

In order to send a message or a string to a DTE port, you must start by setting up a few necessary conditions. First, Gemini must be in call_setup mode. To accomplish this, use the TEST:MODE command as shown here:

```
/TEST:MODE=CALL_SETUP/
```

To specify which port(s) to use, use the MSGX:CNFG command. For example, to tell Gemini to transmit the message out of DTE port A and receive the response from DTE port A, use the command:

```
/MSGX:CNFG=TA|RA/
```

Note that Gemini will buffer the data received at both DTEs but will check for the response only at the DTE indicated by the MSGX:CNFG command.
The string to transmit is specified using the TSTR command. The string is enclosed within double quotes ("). Please read "Specifying a String", located in this section, for more information about strings. To send the command AT S0=1 followed by a carriage return, use the command:

```
/MSGX:TSTR="AT S0=1^M"/
```

Gemini can check the response for a specific string. To tell Gemini to expect OK as a response, use the command:

```
/MSGX:RESP="OK"/
```

To tell Gemini not to check for a response, use the command:

```
/MSGX:RESP=""/
```

To set a time limit for the response, use the command TLIM. If TLIM is set to zero, Gemini will not timeout the response. For example, to tell Gemini to stop buffering data in 20 seconds, use the command:

```
/MSGX:TLIM=20/
```

Gemini's buffer limit is 2048 characters. When the buffer is filled, Gemini will stop buffering data. You can tell Gemini to stop buffering after any number of characters, from 0 to 2048, using the CLIM command. If CLIM is set to zero, Gemini will stop buffering at 2048 characters. For example, to tell Gemini to stop buffering after 30 characters, use the command:

```
/MSGX:CLIM=30/
```

5.4.3. Sending the Message and Checking Status

To begin sending the message use the command:

```
/MSGX:GO/
```

To stop the message transfer at any time, use the command:

```
/MSGX:STOP/
```

You can check the status of the transfer by using the STAT command. For example, to check the status of the transfer, use the command:

```
/MSGX:STAT/
```

Gemini will report back a number from 0 to 5. The following table lists the meaning of each response value.

CODE	DESCRIPTION
0	Message transmission not complete
1	Message transmission complete
2	Expected response received
3	Character limit reached (or receive buffer overflow)
4	Time limit reached
5	Stopped using MSGX:STOP

Table 5-1. Transfer Status Response Codes

To see how many characters are in the receive buffer, use the DAVj command. For example, to see how many characters are in the DTE A receive buffer, use the command:

```
/MSGX:DAVA/
```

The DUMPj command will return eighty characters from the receive buffer. For example, suppose that the buffer for DTE A is filled with 150 characters. The command:

```
/MSGX:DAVA/
```

will return:

```
/MSGX:DAVA=150/
```

To obtain the first eighty characters use the command

```
/MSGX:DUMPA/
```

Now, if you use the command

```
/MSGX:DAVA/
```

Gemini will report back the number of characters remaining in the buffer, as shown here:

```
/MSGX:DAVA=70/
```

Finally, the command:

```
/MSGX:DUMPA/
```

will return the remaining 70 characters. If the buffer is full, you will have to use successive /MSGX:DUMPA/ commands to obtain the entire contents of the DTE A receive buffer.

To clear the receive buffer of either DTE port, use the CLRj command. For example, to clear the received of DTE A, use the command

```
/MSGX:CLRA/
```

5.4.4. Specifying a String

The TSTR command allows you to specify the string to be transmitted to either DTE A or DTE B. The string specified in the double quotes is called an encoded string. For the TSTR command, this encoded string can be up to 256 characters. When Gemini receives this string, it decodes it. The decoded string length can be up to 80 characters. The encoded string length is longer because the encoded string length can contain special characters, hex values, and pause information. The following paragraphs explain how to encode a string.

Gemini allows a string to contain any standard ASCII value as well as non-ASCII eight-bit characters. Since not all of these characters can be represented by a single typographical character, Gemini interprets special character combinations.

For control characters, such as carriage return (ASCII value 0D in hex), Gemini interprets the `^` symbol as control. To specify a carriage return, you would use `^M`, as in the following example

```
/MSGX:TSTR="ATDT5551234^M"/
```

Gemini decodes these control character combinations as 1 character. For example, the above string decodes into a string length of 12 characters.

To specify a character in terms of its hexadecimal value, use the `<` and `>` symbols to enclose the hexadecimal value. For example, the following command is equivalent to the one above.

```
/MSGX:TSTR="ATDT5551234<0D>"/
```

These hexadecimal characters are decoded as 1 character, therefore the above string decodes into a string length of 12 characters.

Gemini also allows pauses to be placed into a string. This is useful for switching networks and autodial modems. A pause is specified by using a `\` character followed by a `P` followed by the number of seconds you want the pause to last followed by a space. You may specify a pause from 1 to 99 seconds. For example to specify a pause for 5 seconds in a string, use this command:

```
/MSGX:TSTR="ATZ^M\P5 ATDT5551234^M"/
```

Gemini does not send the space after the pause. This space is used as a place holder for Gemini to interpret pause information. To specify a string with a pause of 30 seconds with a space after the pause, use the following command:

```
/MSGX:TSTR="ATZ^M\P30  ATDT5551234^M"/
```

Gemini does not count the pause information as part of the decoded string, so the above string is decoded into a string length of 17 characters.

Because of these special character combinations, the following five characters must be preceded by a backslash (\ ) in order to be used in a string:

```
< > \ " ^
```

For example, placing a double quote preceded by a backslash within a string, as shown here:

```
/MSGX:TSTR="This is a \"quote\"."/
```

will cause Gemini to transmit:

```
This is a "quote".
```

Placing a backslash in a string, as shown in this command:

```
/MSGX:TSTR="This is a single backslash (\\)."/
```

will cause Gemini to transmit:

```
This is a single backslash (\).
```

5.5. Remote Control Examples

The following examples show you how to construct a test procedure for a variety of tests on a 14,400 bps dial modem. Each procedure consists of several operations. Each operation, in turn, results in one or more Gemini command messages. The description of the test procedure includes a description of each test operation, a brief description of each command message, and a brief description of each command.

When controlling Gemini by remote link, a computer program that performs automatic testing should follow each command message it sends to the Gemini with a step that checks Gemini's response. For example, an easy mistake is to attempt to send Gemini command messages when the Gemini is in local mode. When this happens, the Gemini will not process any commands, but will return an error message that indicates it is not in remote mode, specifically E019. A computer program should respond to that message to prevent invalid testing. A complete listing of all commands and Gemini's valid response can be found in Section 4, "Gemini Parameter Reference".

Figure 5-5 shows the test configuration for a 14,000 bps dial modem. Gemini DTE A is connected to Modem A, and Gemini DTE B is connected to Modem B. The line side of each modem is connected to a TAS 112 Telephone Network Emulator. The telephone number for Station A is 1, and the telephone number for Station B is 2. The controller connects to Gemini's RS-232 remote control port via a null modem cable.

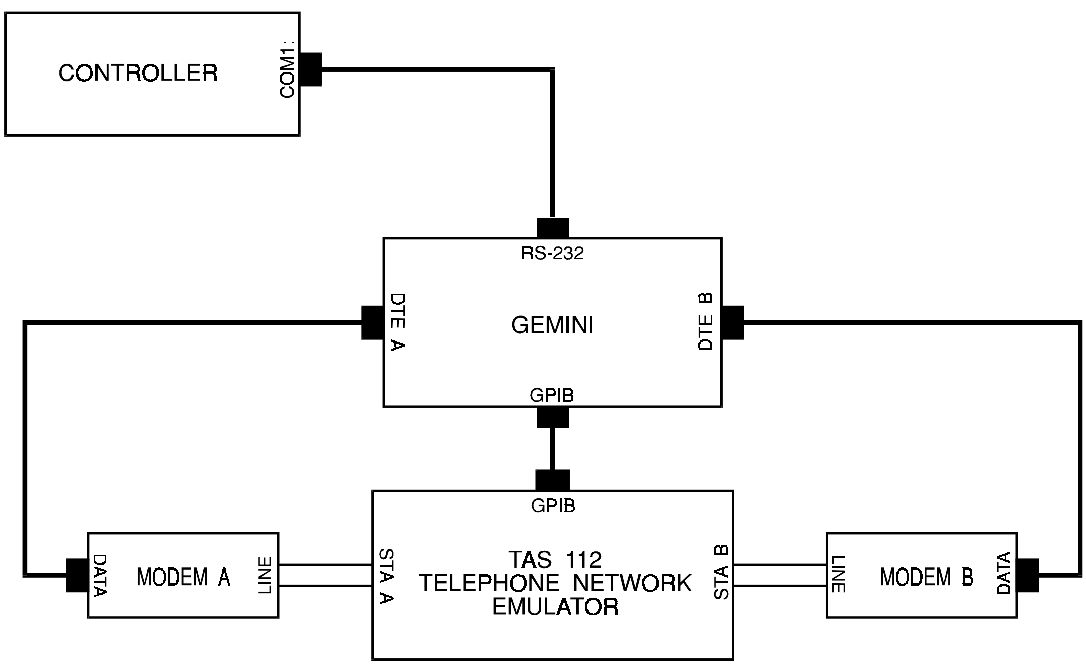

Figure 5-5. Test Configuration for 14,400 bps Dial Modem

5.5.1. BERT Test Example

This is an example of a typical BERT test using the test configuration shown in Figure 5-5. This complete test procedure includes the following basic steps: verify Gemini configuration and status, set terminal parameters for call setup, set terminal parameters for test, set BERT test options, setup the call, execute the BERT test, check BERT status and read the test results.

Step #1: Verify Gemini Configuration and Status

Different models of Gemini and versions of the software cartridge can have different features. For example, earlier versions may not have all the current commands available. It is important to verify that a particular set of commands will perform as expected on a particular Gemini. The following commands are used to insure that the appropriate hardware and firmware are being used and that Gemini has passed it's internal power-up diagnostics. By setting the response format to verbose, all of Gemini's valid responses can be accurately predicted.

1. Put Gemini in IDLE test mode (allows Gemini to process commands quicker).

    `/TEST: MODE=IDLE/`

2. Verify the Gemini model number.

    `/CNFG: MODL/`

3. Verify the version of the Gemini software cartridge.

    `/CNFG: VERS/`

4. Read the result of the power-up diagnostics.

    `/CNFG: STAT/`

5. Set VERBOSE response option.

    `/CNFG: RESP=VERBOSE/`

Step #2: Set the Terminal Parameters for Call Setup

The following steps set the terminal parameters that will be used for all call setup commands. Asynchronous protocol, 14.4 kbps clock rate, no flow control, 8 data bit no parity 1 stop bit data format, and 50 msec intercharacter delay are all set using the following commands.

Set the call setup protocol parameters.

1. Set the call setup protocol to async.

```
/CPCL: PCL=ASYNC/
```

2. Set DTE A clock to 14,400 bps.

```
/CPCL:CLKa=14400/
```

3. Set DTE B clock to 14,400 bps.

```
/CPCL: CLKb=14400/
```

4. Set DTE A clock offset to 0.

```
/CPCL: OFSa=0/
```

5. Set DTE B clock offset to 0.

```
/CPCL: OFSb=0/
```

6. Set DTE A flow control to none.

```
/CPCL: FLOWa=NONE/
```

7. Set DTE B flow control to none.

```
/CPCL: FLOWb=NONE/
```

Set the data format options for call setup.

1. Set # data bits to 8.

```
/ACLL: DATA=8/
```

2. Set parity to none.

```
/ACLL: PARI=NONE/
```

3. Set # stop bits to 1.

```
/ACLL: STOP=1/
```

4. Set the intercharacter delay to 50 msec.

```
/ACLL: CHRD=50/
```

Step #3: Set the Terminal Parameters for Tests

These terminal parameters are used when an actual test is executed, and may be different from the call setup terminal parameters. Asynchronous protocol, 14.4 kbps clock rate, no flow control, and 8 bit data no parity 1 stop bit data format are set through the following commands.

Set the test data protocol parameters.

1. Set the protocol to async.

    `/TPCL: PCL=ASYNC/`

2. Set DTE A clock to 14,400 bps.

    `/TPCL: CLKa=14400/`

3. Set DTE B clock to 14,400 bps.

    `/TPCL: CLKb=14400/`

4. Set DTE A clock offset to 0.

    `/TPCL: OFSa=0/`

5. Set DTE B clock offset to 0.

    `/TPCL: OFSb=0/`

6. Set DTE A flow control to none.

    `/TPCL: FLOWa=NONE/`

7. Set DTE B flow control to none.

    `/TPCL: FLOWb=NONE/`

Set the data format options for async test data transmission.

1. Set # data bits to 8.

    `/ATST: DATA=8/`

2. Set parity to none.

    `/ATST: PARI=NONE/`

3. Set # stop bits to 1.

    `/ATST: STOP=1/`

Step #4: Set the BERT Test Options

The following commands set the parameters that are specific to the BERT test. DTE A and B receive and transmit test configuration, 100 character block size, 100 block test duration, space pattern, pattern sync/resync options, and manual execution are set by the commands that follow.

Set the BERT parameters.

1. Set the Gemini to transmit on DTE A&B and receive and analyze results on DTE A&B.

   `/BERT: CNFG=TA&B|RA&B/`

2. Set block size to 100 characters/block.

   `/BERT: BSIZ=10^2/`

3. Set number of blocks/test to 100.

   `/BERT: NBLK=100/`

4. Set the pattern to space.

   `/BERT: PATT=SPACE/`

5. Set the RTS-SYNC delay to 30 seconds.

   `/BERT: RTSD=30/`

6. Set resync enable to yes.

   `/BERT: RSEN=Y/`

7. Set the BERT test execution mode to manual.

   `/BERT: MODE=0/`

Step #5: Set Up the Call

The following commands actually send standard "AT command set" messages to the modem. The modem attached to DTE B is set to answer on one ring, while the modem attached to DTE A is set to dial the phone number of modem B. This ultimately results in a connection being made between the two modems across the TAS 100 Series Telephone Network Emulator.

Set the test mode to call setup.

```
/TEST: MODE=CALL_SETUP/
```

Set DTR active at both terminals.

```
/INTF: DTRa=1, DTRb=1/
```

Send the call setup message to the modem at DTE B.

1. Set Gemini to transmit the call setup message on DTE B and check the response at DTE B.

   ```
   /MSGX: CNFG=tb|rb/
   ```

2. Clear the DTE B message buffer.

   ```
   /MSGX: CLRb/
   ```

3. Set the transmit string to AT S0=1^M (answer on one ring).

   ```
   /MSGX: TSTR="AT S0=1^M"/
   ```

4. Set the expected response to OK.

   ```
   /MSGX: RESP="OK"/
   ```

5. Set the response time limit to 5 seconds.

   ```
   /MSGX: TLIM=5/
   ```

6. Set the response # characters limit to 20.

   ```
   /MSGX: CLIM=20/
   ```

7. Execute the message transfer.

   ```
   /MSGX: GO/
   ```

Check message transfer status until the transfer has terminated.

```
/MSGX: STAT/
```

Send the call setup message to the modem at DTE A.

1. Set Gemini to transmit at DTE A and check the response at DTE A.

   ```
   /MSGX: CNFG=ta|ra/
   ```

2. Clear the DTE A message buffer.

   ```
   /MSGX: CLRa/
   ```

3. Set the transmit string to AT DT2^M (dial the telephone number 2).

   ```
   /MSGX: TSTR="AT DT2^M"/
   ```

4. Set the expected response to CONNECT 14400.

   ```
   /MSGX: RESP="CONNECT 14400"/
   ```

5. Set the response time limit to 10 seconds.

   ```
   /MSGX: TLIM=10/
   ```

6. Set the response # characters limit to 30.

   ```
   /MSGX: CLIM=30/
   ```

7. Execute the message transfer.

   ```
   /MSGX: GO/
   ```

Check message transfer status until the transfer has terminated.

```
/MSGX: STAT/
```

Step #6: Execute the BERT Test

Set the BERT test mode, then activate RTS at both test interfaces to start the flow of test data.

1. Select the test mode to BERT.

   `/TEST: MODE=BERT/`

2. Disable error insertion.

   `/TEST: IERR=N/`

3. Disable self-loop.

   `/TEST: LOOP=N/`

4. Turn on RTS A to start data flow from DTE A.

   `/INTF: RTSa=1/`

5. Turn on RTS B to start data flow from DTE B.

   `/INTF: RTSb=1/`

Until data pattern sync is achieved, check for data pattern sync at both test interfaces.

1. Check for pattern sync at DTE A.

   `/BERT: SYNCa/`

2. Check for pattern sync at DTE B.

   `/BERT: SYNCb/`

3. After data pattern sync is achieved, run the BERT test.

   `/TEST: RUN/`

Step #7: Check Test Status and Read Results

While the BERT test is executing, you can check the test status and read the interim results.

1. Check the DTE A BERT status.

```
/BERT: STATa/
```

2. Check the DTE B BERT status.

```
/BERT: STATb/
```

3. Get the DTE A BERT results.

```
/BERT: RPTa/
```

4. Get the DTE B BERT results.

```
/BERT: RPTb/
```

5.5.2. Data Compression/File Transfer Test Example

This is an example of a typical Data Compression / File Transfer test using the test configuration shown in Figure 5-5. This complete test procedure includes the following basic steps: verify Gemini configuration and status, set terminal parameters for call setup, set terminal parameters for test, set DCMP test options, setup the call, execute the DCMP test, check DCMP status and read results.

Step #1: Verify Gemini Configuration and Status

Different models of Gemini and versions of the software cartridge can have different features. For example, earlier versions may not have all the current commands available. It is important to verify that a particular set of commands will perform as expected on a particular Gemini. The following commands are used to insure that the appropriate hardware and firmware are being used and that Gemini has passed its internal power-up diagnostics. By setting the response format to verbose, all of Gemini's valid responses can be accurately predicted.

Put Gemini in IDLE test mode (allows Gemini to process commands quicker).

```
/TEST: MODE=IDLE/
```

Verify the Gemini model number.

```
/CNFG: MODL/
```

Verify the version of the Gemini software cartridge.

```
/CNFG: VERS/
```

Read the result of the power-up diagnostics.

```
/CNFG: STAT/
```

Set VERBOSE response option.

```
/CNFG: RESP=VERBOSE/
```

Step #2: Set the Terminal Parameters for Call Setup

The following steps set the terminal parameters that will be used for all call setup commands. Asynchronous protocol, 14.4 kbps clock rate, no flow control, 8 data bit no parity 1 stop bit data format, and 50 msec intercharacter delay are all set using the following commands.

Set the call setup protocol parameters.

1. Set the call setup protocol to async.

   `/CPCL: PCL=ASYNC/`

2. Set DTE A clock to 57,600 bps.

   `/CPCL:CLKa=57600/`

3. Set DTE B clock to 57,600 bps.

   `/CPCL: CLKb=57600/`

4. Set DTE A clock offset to 0.

   `/CPCL: OFSa=0/`

5. Set DTE B clock offset to 0.

   `/CPCL: OFSb=0/`

6. Set DTE A flow control to none.

   `/CPCL: FLOWa=NONE/`

7. Set DTE B flow control to none.

   `/CPCL: FLOWb=NONE/`

Set the data format options for call setup.

1. Set # data bits to 7.

   `/ACLL: DATA=7/`

2. Set parity to odd.

   `/ACLL: PARI=ODD/`

3. Set # stop bits to 1.

   `/ACLL: STOP=1/`

4. Set the intercharacter delay to 50 msec.

   `/ACLL: CHRD=50/`

Step #3: Set the Terminal Parameters for Tests

These terminal parameters are used when an actual test is executed, and may be different from the call setup terminal parameters. Asynchronous protocol, 57.6 kbps clock rate, CTS flow control, and 7 bit data, odd parity, 1 stop bit data format are set using the following commands.

Set the test data protocol parameters.

1. Set the protocol to async.

   `/TPCL: PCL=ASYNC/`

2. Set DTE A clock to 57,600 bps.

   `/TPCL: CLKa=57600/`

3. Set DTE B clock to 57,600 bps.

   `/TPCL: CLKb=57600/`

4. Set DTE A clock offset to 0.

   `/TPCL: OFSa=0/`

5. Set DTE B clock offset to 0.

   `/TPCL: OFSb=0/`

6. Set DTE A flow control to CTS.

   `/TPCL: FLOWa=CTS/`

7. Set DTE B flow control to CTS.

   `/TPCL: FLOWb=CTS/`

Set the data format options for async test data transmission.

1. Set # data bits to 7.

   `/ATST: DATA=7/`

2. Set parity to odd.

   `/ATST: PARI=ODD/`

3. Set # stop bits to 1.

   `/ATST: STOP=1/`

Step #4: Set the DCMP Test Options

The following commands set the parameters that are specific to the Data Compression test. The data compression test is configured as follows: DTE A transmit and receive DTE B transmit and receive test configuration, 5 file transfers test duration, ascii test pattern with 1 pattern per file, measure transfer rate from end to end, wait 5 seconds before sending next file, timeout if file is not completely received in 30 seconds, abort the transfer if 1 character error occurs, timeout if first 10 characters are not received in 30 seconds, do not control RTS on either DTE, execute in manual mode.

Set the DCMP parameters.

1. Set the Gemini to transfer a file from DTE A to DTE B and from DTE B to DTE A.

   `/DCMP: CNFG=TA&B|RA&B/`

2. Set 5 file transfers per test.

   `/DCMP: NXFERS=5/`

3. Set file pattern to ascii.

   `/DCMP: PATT=ASCII/`

4. Set 1 pattern repetition per file.

   `/DCMP: NPATT=1/`

5. Set the transfer rate to measure from end-to-end.

   `/DCMP: MEAS=end_to_end/`

6. Set inter-transfer delay to 5 seconds.

   `/DCMP: XFERD=5/`

7. Set the file transfer timeout to 30 seconds.

   `/DCMP: TIMET=30/`

8. Set the character error threshold to 1.

   `/DCMP: CLIM=1/`

9. Set the file header size to 10 characters.

   `/DCMP: HSIZ=10/`

10. Set the file header timeout to 30 seconds.

    `/DCMP: TIMEH=30/`

11 Set the RTS control for DTE A to no.

   `/DCMP: RTSA=N/`

12. Set the RTS control for DTE B to no.

```
/DCMP: RTSB=N/
```

13. Set the execution mode to manual.

```
/DCMP: TERM=0/
```

Step #5: Set Up the Call

The following commands send messages to the modems to dial a phone number and answer the phone and ultimately result in a connection being made between the two modems across the TAS 112 telephone network simulator. The Gemini communicates with the modems at 57.6 kbps while the modems connect at the maximum capacity of 14.4 kbps. Since the DTE rate is higher than the line rate, the modem's have to compress the data in order to keep up with the DTE rate.

Set the test mode to Call Setup.

```
/TEST: MODE=CALL_SETUP/
```

Set DTR active at both terminals.

```
/INTF: DTRa=1, DTRb=1/
```

Send the call setup strap message to the modem at DTE B.

1. Set Gemini to transmit the call setup message on DTE B and check the response at DTE B.

   ```
   /MSGX: CNFG=tb|rb/
   ```

2. Clear the DTE B message buffer.

   ```
   /MSGX: CLRb/
   ```

3. Set the transmit string to AT &F^M (use modem's defaults).

   ```
   /MSGX: TSTR="AT &F^M"/
   ```

4. Set the expected response to OK.

   ```
   /MSGX: RESP="OK"/
   ```

5. Set the response time limit to 10 seconds.

   ```
   /MSGX: TLIM=10/
   ```

6. Set the response # characters limit to 20.

   ```
   /MSGX: CLIM=20/
   ```

7. Execute the message transfer.

   ```
   /MSGX: GO/
   ```

Check message transfer status until the transfer has terminated.

```
/MSGX: STAT/
```

Send the call setup strap message to the modem at DTE A.

1. Set Gemini to transmit at DTE A and check the response at DTE A.

```
/MSGX: CNFG=ta|ra/
```

2. Clear the DTE A message buffer.

```
/MSGX: CLRa/
```

3. Set the transmit string to AT &F^M (use modem's defaults).

```
/MSGX: TSTR="AT &F^M"/
```

4. Set the expected response to OK.

```
/MSGX: RESP="OK"/
```

5. Set the response time limit to 5 seconds.

```
/MSGX: TLIM=5/
```

6. Set the response # characters limit to 20.

```
/MSGX: CLIM=20/
```

7. Execute the message transfer.

```
/MSGX: GO/
```

Check message transfer status until the transfer has terminated.

```
/MSGX: STAT/
```

Send the call setup answer message to the modem at DTE B.

1. Set Gemini to transmit at DTE B and check the response at DTE B.

   ```
   /MSGX: CNFG=tb|rb/
   ```

2. Clear the DTE B message buffer.

   ```
   /MSGX: CLRb/
   ```

3. Set the transmit string to AT L1 &C1 &D2 &M0 S0=1^M (low speaker volume, standard RS-232, async, answer on 1 ring).

   ```
   /MSGX: TSTR="AT L1 &C1 &D2 &M0 S0=1^M"/
   ```

4. Set the expected response to OK.

   ```
   /MSGX: RESP="OK"/
   ```

5. Set the response time limit to 10 seconds.

   ```
   /MSGX: TLIM=10/
   ```

6. Set the response # characters limit to 20.

   ```
   /MSGX: CLIM=20/
   ```

7. Execute the message transfer.

   ```
   /MSGX: GO/
   ```

Check message transfer status until the transfer has terminated.

```
/MSGX: STAT/
```

Send the call setup originate message to the modem at DTE A.

1. Set Gemini to transmit at DTE A and check the response at DTE A.

   `/MSGX: CNFG=ta|ra/`

2. Clear the DTE A message buffer.

   `/MSGX: CLRa/`

3. Set the transmit string to AT L1 &C1 &D2 &M0 DT2^M (low speaker volume, standard RS-232, async, dial 1).

   `/MSGX: TSTR="AT L1 &C1 &D2 &M0 DT2^M"/`

4. Set the expected response to CONNECT 57600.

   `/MSGX: RESP="CONNECT 57600"/`

5. Set the response time limit to 20 seconds.

   `/MSGX: TLIM=20/`

6. Set the response # characters limit to 30.

   `/MSGX: CLIM=30/`

7. Execute the message transfer.

   `/MSGX: GO/`

Check message transfer status until the transfer has terminated.

`/MSGX: STAT/`

Step #6: Execute the DCMP Test

Set the DCMP test mode, disable error insertion, disable self-loop, and begin running DCMP test.

1. Select the Data Compression test mode.

   `/TEST: MODE=data_comp/`

2. Disable error insertion.

   `/TEST: IERR=N/`

3. Disable self-loop.

   `/TEST: LOOP=N/`

Run the Data Compression test.

`/TEST: RUN/`

Step #7: Check Test Status and Read Results

While the Data Compression test is executing, you can check the test status and read the interim results. The transfer rate measured by the Data Compression test should agree with the expected effect of transmitting compressed data over a 14.4 kbps data line.

Check the DTE A test status.

```
/DCMP: STATa/
```

Check the DTE B test status.

```
/DCMP: STATb/
```

Get the DTE A test results.

```
/DCMP: RPTa/
```

Get the DTE B test results.

```
/DCMP: RPTb/
```

5.6. Connecting Gemini to the Host System

5.6.1. Using RS-232

The Gemini rear panel contains an RS-232C DCE control port. This port is used to connect the Gemini to a host computer or terminal. Connect the Gemini to the host using a straight-through RS-232 cable. A 9-pin to 25-pin converter cable is included with the Gemini for use with hosts which have the 9-pin IBM / AT style interface.

5.6.2. Using IEEE-488

The Gemini rear panel contains an IEEE-488 control port. This port is used to connect the Gemini to a host computer or terminal using a standard IEEE-488 cable. To communicate with Gemini via IEEE-488, the GPIB protocol must be used. GPIB is described in the next section, "Remote Control Protocols".

5.7. Remote Control Protocols

This section describes the three Transmission Layer Protocols available to communicate with the Gemini: GPIB, RS-232C CR/LF and RS-232C ACK/NAK. These protocols define the control characters and sequence of events which allow a message to be sent to and from the Gemini. All Protocols provide a Gemini response for every system controller command to the Gemini. The Gemini does not process a new command from the system controller until it completes the processing of a pending command.

In order to activate a specific protocol, the remote protocol parameters under the CONFIG menu must be set appropriately. For more information on this menu, see the "CONFIG Menu" section located in Section 2, "Local Operation".

5.7.1. RS-232C CR/LF Protocol

The Gemini Carriage Return/Line Feed (CR/LF) protocol allows simple, dumb terminal control of the Gemini. Select `crlf` under `REMOTE PROTOCOL` of the CONFIG menu. The default communication format is 7 data bits, odd parity, 1 stop bit, 19200 bps. To change this format, see Section 2, "Local Operation".

To enter a command at the terminal, simply type the command in response to the **>** prompt, followed by <RETURN> (i.e. "CR", Carriage Return or Enter). The Gemini executes the command and sends the response back to the terminal as a series of ASCII characters.

Polling for a Response

The Gemini automatically provides a response whenever it receives a command from the terminal. In the CR/LF protocol, the terminal or controller does not have to explicitly poll for a Gemini response.

Sending Commands to the Gemini

To send a command to the Gemini, simply type the command, followed by <RETURN>.

Receiving Responses from the Gemini

The Gemini automatically provides a response for every command. Some commands, such as TEST:MODE, take several seconds to complete. The Gemini sends the response to such commands back to the terminal after it has completed processing the command.

5.7.2. Gemini ACK/NAK Protocol

The Gemini ACK/NAK protocol supports RS-232C multipoint communication between a system controller and one or more Gemini units. The controller initiates all transactions. To communicate with a Gemini, the system controller must perform the following steps:

1. Poll the Gemini for pending response or system reset message.
2. Send the message, with address, control characters, and block checksum, to the Gemini.
3. Poll the Gemini for the command response.

Gemini expects to see Data Carrier Detect (DCD) active before it will accept ACK/NAK commands. Therefore, the system controller should raise Request To Send (RTS) while communicating with Gemini using ACK/NAK.

The following is an example of a system controller-Gemini command transaction. Controller polls for pending response:

`[a1] [a0] p <ENQ>`

Gemini responds:

`[a1] [a0] <EOT>`

Controller sends command:

`[a1] [a0] s <ENQ> <SOH> <STX>` *command* `<ETX>`
`[b2] [b1] [b0]`

Gemini responds:

`[a1] [a0] <ACK>`

Controller polls for response:

`[a1] [a0] p <ENQ>`

Gemini responds:

`[a1] [a0] <SOH> <STX>` *response* `<ETX> [b2] [b1] [b0]`

NOTE: Spaces in the previous examples are for clarity only. There are no spaces between command fields. The [ax] and [bx] fields are the address and block checksum fields, respectively. The "<>" denote ASCII control characters. The "p" indicates a poll message, and the "s" indicates a select message. The block check field is the two's complement of the checksum of all characters from the first address character through the <ETX> character. This sum is represented in three ASCII-decimal digits. For example, if the checksum is 201, then the block checksum should be 055 (256 - 201).

Polling for a Response

When the Gemini receives a command from the controller, it executes the command and prepares a response. The controller must poll the Gemini to receive this response. The poll sequence is:

`[a1] [a0] p <ENQ>`

The controller must pad the address field on the left with a space (hex 20). The controller should be prepared to handle one of three possible results.

1. No response.
2. No message:

   `[a1] [a0] <EOT>`

3. Response:

   `[a1] [a0] <SOH> <STX>` *`response`* `<ETX> [b2] [b1] [b0]`

The Gemini does not respond to a poll if it is configured illegally, if it detects an error in the poll message, or if it is not turned on. If the system controller does not receive a response from the Gemini, it should poll again.

The Gemini gives a no message response if it has no response pending.

Sending Commands to the Gemini

To send a command to the Gemini, the system controller must form a string which consists of the Gemini address, the select character "s", the ASCII control characters, the command, and a block checksum, as follows:

`[a1] [a0] s <ENQ> <SOH> <STX>` *`command`* `<ETX> [b2] [b1] [b0]`

The system controller must be prepared to handle one of three possible results:

1. No response.
2. Negative acknowledge:

   `[a1] [a0] <NAK>`
3. Positive acknowledge:

   `[a1] [a0] <ACK>`

The Gemini does not respond to the command if it is not addressed properly, if it is off, or if it detects an error in the command message control characters.

The Gemini responds with a negative acknowledgment (NAK) if it detects a transmission error in the command message (bad block sum), or if the command message is too long (greater than 128 characters). In this case, the controller should send the command message again.

The block sum is represented in ASCII-decimal on the control link, and is the two's complement of the module 256 sum of all the characters in the message, up to and including the `<ETX>` control character.

The Gemini returns a positive acknowledgment (ACK) when it detects no message transmission errors.

Receiving Responses from the TAS Gemini

The Gemini provides a command response when it is polled by the system controller. If the system controller detects a transmission error in the Gemini response, it should poll the Gemini, send the message again, and poll again for the response.

5.7.3. Gemini GPIB Protocol

The Gemini GPIB protocol supports a bus communication architecture in which the Gemini Dual Terminal Emulator is one of the devices being controlled. The system controller initiates all transactions. To communicate with the Gemini, a GPIB system controller must perform the following steps:

1. Poll the Gemini for a pending response or the system reset message.
2. Send the message to the Gemini.
3. Poll the Gemini for the command response.

The system controller must meet all GPIB electrical and mechanical specifications. The IEEE 488-1978 standard defines the GPIB interface functions and the subsets of those functions. The Gemini implements the subset indicated in the following table.

FUNCTION	DESCRIPTION	GEMINI
SH1	source handshake	full capability
AH1	acceptor handshake	full capability
T6	talker function	basic talker, My Listen Address (MLA) is received
TEO	extended talker	no capability
L4	listener function	basic listener, unaddress if My Talk Address (MTA) is received
LEO	extended listener	no capability
SR1	service request	full capability
RLO	remote-local	no capability - Gemini is always in remote mode
PPO	parallel poll	no capability
DCO	device clear	no capability
DTO	device trigger	no capability
CO	controller	no capability

Table 5-2. GPIB Subsets

The Gemini provides a GPIB status byte to indicate its current state. The Gemini states are:

- Idle - 02H
- Busy - 01H
- Ready To Respond (RTR) - 04H or 44H

Idle

This state indicates that the Gemini does not have a message to send and is ready to accept a command.

Busy

This state indicates that the Gemini is currently processing a command. The Gemini does not accept a new command until it has finished processing the current command and has provided the response to the controller.

Ready To Respond (RTR)

This state indicates that the Gemini currently has a message to send to the controller. The Gemini is always Ready To Respond when power is first applied, when it is reset, or when it has finished processing a command. When the Gemini is ready to respond, it activates the service request line (SRQ), and the RTR status = 44H. After the controller conducts the serial poll, SRQ goes inactive, and the RTR status equals 04H. Figure 5-7 shows a flowchart for a typical bus controller sequence.

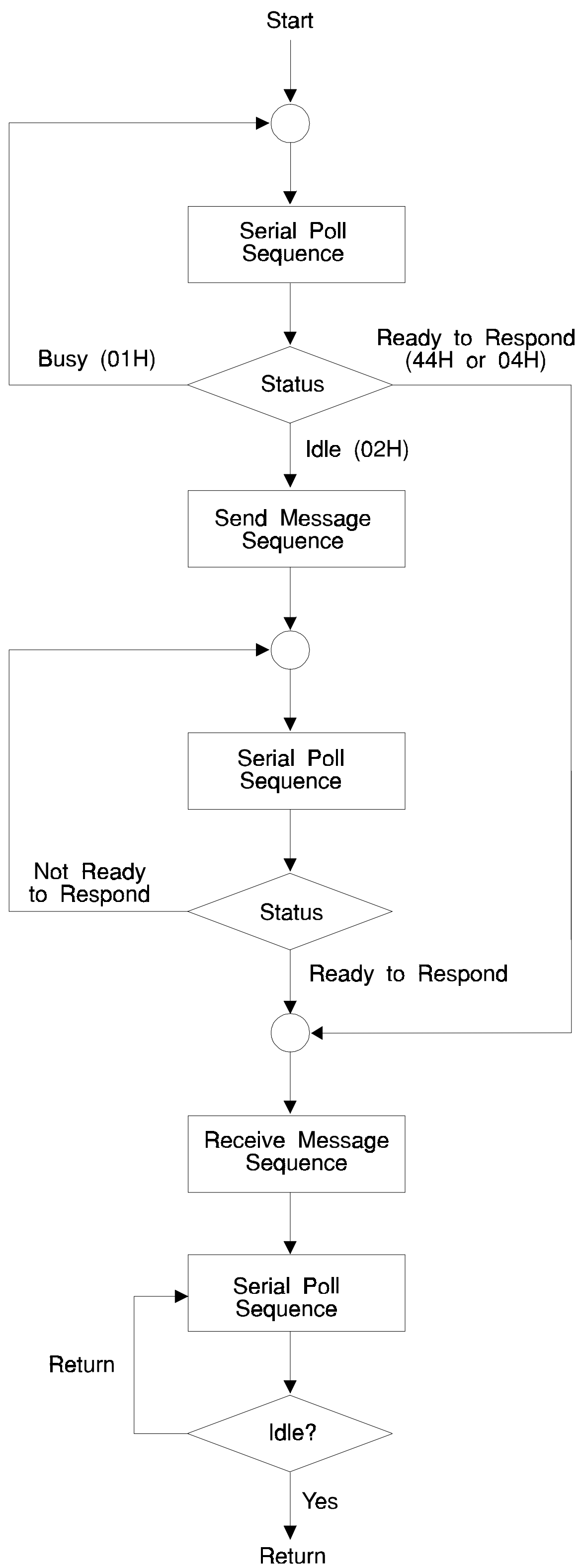

Figure 5-7. GPIB (IEEE-488) Bus Controller Sequence

Polling for a Response

The following list contains typical bus events required to effect a serial poll of the Gemini. Your actual bus sequence may be different:

1. ATN active
2. UNT - (UNTalk)
3. UNL - (UNListen)
4. SPE - (Serial Poll Enable)
5. MTA - (Gemini My Talk Address)
6. System controller programmed to listen
7. ATN inactive
8. Gemini sends status
9. ATN active
10. SPD - (Serial Poll Disable)
11. UNT - (UNTalk)

Always conduct a serial poll before sending a command to the Gemini. If the Gemini has a pending message to send, it does not accept a new command.

Sending Commands to the Gemini

The following list contains typical bus events required to send a command to the Gemini. Your actual bus sequence may be different:

1. ATN active
2. UNT - (UNTalk)
3. UNL - (UNListen)
4. MLA - (Gemini My Listen Address)
5. System controller programmed to talk
6. ATN inactive
7. System controller sends command to Gemini, and asserts EOI with last command character
8. ATN active
9. UNL - (UNListen)

Command strings must not be terminated with <CR> or <CR><LF>. The system controller signals the end of a command string by asserting EOI (end of interrupt) while it sends the last character of the command.

Some commands require several seconds of Gemini processing time. While most commands complete in less than 100 msec, commands such as TEST:MODE may require up to 3 seconds. The system controller should conduct serial polls until it detects that the Gemini status equals RTR.

Receiving Responses from the Gemini

The following is a list of typical bus events required to receive a response from the Gemini. Your actual bus sequence may be different:

1. ATN active
2. UNT - (UNTalk)
3. UNL - (UNListen)
4. MTA - (Gemini My Talk Address)
5. System controller programmed to listen
6. ATN inactive
7. Gemini sends data to system controller
8. System controller re-asserts control when EOI goes active
9. ATN active
10. UNT - (UNTalk)

The Gemini does not terminate its response message with a <CR> or <CR><LF>. The unit signals the end of a response message by raising EOI while it sends the last character of the response.

5.8. Using the RS-232/GPIB Translator Feature

Gemini's RS-232/GPIB Translator allows you to control GPIB instruments from an RS-232 control port. Figure 5-8 shows an application example. In the example, a TAS 182 Telephone Network Simulator is attached to the GPIB port of the Gemini. The controller encloses each TAS 182 command within a Gemini GPIB command and sends the command to Gemini. Gemini receives the GPIB command, extracts the TAS 182 command portion, and issues the command from its GPIB port. Gemini then encloses the TAS 182 command response within a GPIB command response, and provides the response to the controller.

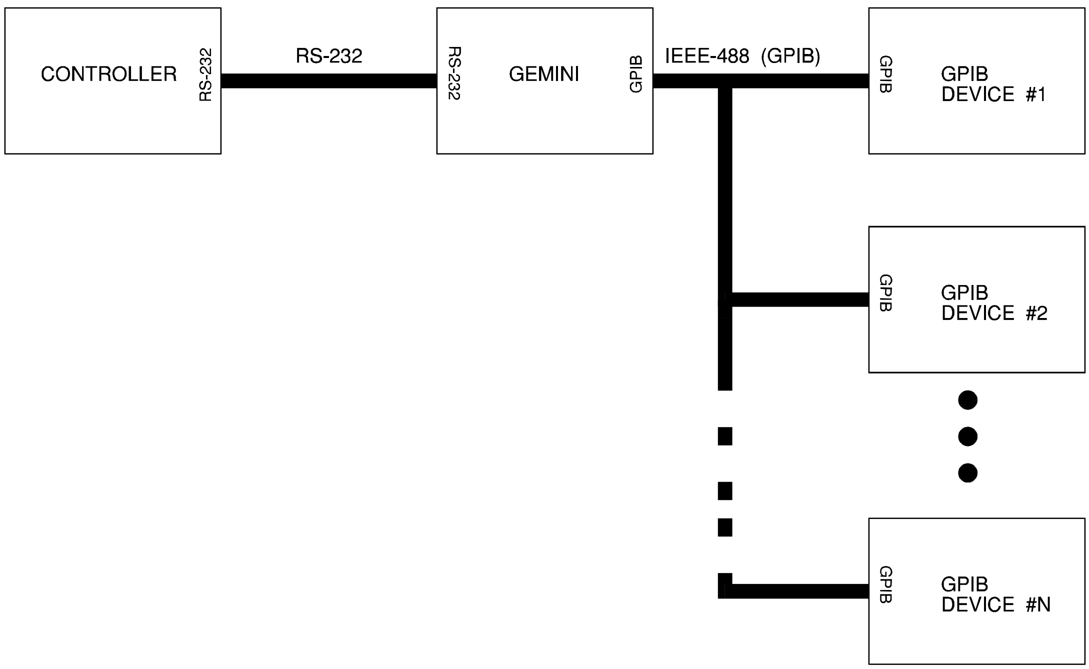

Figure 5-8. Gemini RS-232/GPIB Translator Configuration

The RS-232/GPIB Translator supports both TAS instruments and instruments from other manufacturers. As with any GPIB application, several instruments may coexist on the bus.

The GPIB command group controls the operation of the RS-232/GPIB Translator. The Translator commands are available whenever Gemini is controlled via its RS-232 control port. The Translator commands are not available when Gemini is controlled via its GPIB port. For specific information on the GPIB command group, see Section 6, "Gemini Remote Commands Reference".

When the RS-232/GPIB Translator is active, Gemini acts as a GPIB controller to control the devices attached to the GPIB bus. Gemini supports the following GPIB controller functions:

- Controller initialization
- Device addressing
- Device status check
- Data transfer
- Auxiliary functions, such as Go To Local and Local Lockout

To effect a data transaction with a GPIB device, the controller must perform the following operations:

1. Initialize the GPIB.
2. Set the device address.
3. Initialize the device.
4. Poll the device (if applicable).
5. Send the command.
6. Get the response (if applicable).
7. Restore the device (if applicable).

Initializing the Gemini GPIB Controller

The PON command initializes the Gemini GPIB controller to its power-on condition. This command is useful for establishing the state of the controller if it is hung up by an anomalous bus condition. For example, if the GPIB cable falls off of a device in the middle of a transaction, you can use the PON command to reinitialize the Gemini GPIB controller.

```
Command:  /GPIB: PON/
Response: /C/
```

Setting GPIB Addresses

Every device on the GPIB must have a unique primary (talker/listener) address. The MADDR command sets the address of the Gemini GPIB controller, and the ADDR command selects a GPIB device for a bus transaction. Gemini supports all GPIB primary addresses (0 to 30). Gemini does not support secondary addressing.

Setting the Controller Address

The MADDR command sets the Gemini GPIB controller address.

```
Command:  /GPIB: MADDR=0/
Response: /C/
```

Setting the Device Address

The ADDR command selects a GPIB device for bus transactions. Gemini performs transactions with only one GPIB device at a time, so you must set a new device address for each different device. If you wish to perform transactions with only one device, you do not need to set the device prior to each transaction.

```
Command:  /GPIB: ADDR=4/
Response: /C/
```

Clearing the GPIB

The controller clears the GPIB by issuing the Interface Clear (IFC) command to Gemini. When Gemini receives the IFC command, it issues the IFC command on the GPIB. The interface clear command signals all devices to abort bus transitions and place their bus drivers in a passive state. The controller should issue the Interface clear before any GPIB transactions occur, or after a device time-out occurs.

```
Command:  /GPIB: IFC/
Response: /C/
```

Setting the Input Termination Condition

The input terminator marks the end of a message from a GPIB device to the Gemini GPIB controller. Gemini supports four input termination conditions: the carriage return character, the line feed character, the carriage return/line feed character sequence, and the GPIB end-of-interrupt (EOI) signal. The Input Termination Condition (ITC) command tells Gemini which terminator to use.

Input terminators may differ from device to device. The controller must select the appropriate input terminator before starting a transaction with a device. The Gemini GPIB controller strips the input terminator from any GPIB message that it receives.

```
Command:  /GPIB: ITC=eoi/
Response: /C/
```

Setting the Device Time-Out

If a GPIB device does not respond to a command within a specified time period, Gemini returns a Device Time-out error message to the controller. The Device Time-out (DTO) command determines the time-out length. The default time-out length is 10 seconds.

```
Command:  /GPIB: DTO=10/
Response: /C/
```

Initializing a GPIB Device

The controller issues a Remote Enable command to Gemini to force a GPIB device to accept remote commands. When Gemini receives the command, it asserts the Remote Enable lead on the GPIB and places the device's address (as determined by the ADDR command) on the bus. The Remote Enable command overrides the device's front panel local/remote switch setting.

```
Command:  /GPIB: REN=1/
Response: /C/
```

Selective Device Clear

The implementation of the Selective Device Clear command is left to the manufacturer of the GPIB device. Some GPIB devices do not respond to this command.

```
Command:  /GPIB: CLR/
Response: /C/
```

Execute Trigger

The implementation of Device Trigger is left to the GPIB device manufacturer. Some GPIB devices do not respond to this command.

```
Command:  /GPIB: TRIG/
Response: /C/
```

Locking Out the Device's Front Panel

The controller can issue a Local Lockout command to Gemini to disable the front panel of a GPIB device. For most GPIB devices, the local lockout command must follow a remote enable command. The ADDR command determines the target of the Local Lockout command.

```
Command:  /GPIB: LLO/
Response: /C/
```

Polling a GPIB Device

The controller can conduct a serial poll of a GPIB device to determine the device's status. The controller conducts the serial poll by issuing a Serial Poll (SPOLL) command to Gemini. Gemini then issues a Serial Poll command on the GPIB and returns the serial poll status byte to the controller. The ADDR command determines the target device for the serial poll.

Seven out of the eight bits in the status byte (B0-B5 and B7) are determined by the GPIB device manufacturer. Bit B6 indicates the state of the GPIB Service Request (SRQ) line.

```
Command:  /GPIB:SPOLL/
Response: /GPIB:SPOLL=xx/
(xx is the hex-coded value of device's status byte)
```

5.8.1. Performing Command Transactions

Gemini provides two ways to perform a command transaction with a GPIB device. The OUT and IN commands can be used to control GPIB devices from virtually any manufacturer. The TAS Send (TSND) command is designed to perform transfers with TAS devices. The OUT command transfers messages to a GPIB device, and the IN command transfers messages from a GPIB device. The TSND command transfers a message to the GPIB device, retrieves the response from the device, and returns the response to the controller.

Setting the Message

The Message (MSG) command specifies the message to be sent to a GPIB device.

```
Command:  /GPIB: MSG="/RN, L500/"/
Response: /C/
```

Sending the Message

The OUT command causes Gemini to transfer the contents of the message buffer to the selected device. The ADDR command selects the device. Gemini applies the selected command terminator to the end of the message. The ITC command specifies the command terminator.

```
Command:  /GPIB: OUT/
Response: /C/
```

Receiving Messages from a Device

The IN command directs Gemini to receive a message from the selected GPIB device and to provide the message to the controller. Gemini collects the entire message, up to the input terminator. If Gemini does not receive the entire message before the device time-out interval expires, Gemini sends a Device Time-Out status code to the controller.

```
Command:  /GPIB: IN/
Response: /GPIB:IN=/C//
```

5.8.2. Performing OUT/IN Transfers Using TAS SEND (TSND)

The TSND command can be used in lieu of separate OUT and IN commands, and is designed to be used to control TAS Telephone Network Simulators and Loop Emulators. The TSND command directs Gemini to send a message to a GPIB device, collect the response, and forward the response to the controller. The ADDR command selects the device. The MSG command specifies the message to be sent to the device. Before executing the TSND command, the controller must poll the device to ensure that it is idle (SPOLL=02).

```
Command:  /GPIB: TSND/
Response: /GPIB:TSND=/C//
```

5.8.3. Encoding GPIB Messages

The controller must encode all GPIB messages (MSG contents) according to Gemini String Coding Conventions. These conventions are summarized as follows:

- All GPIB messages must be enclosed within quotes.
- Each printable ASCII character (0x20 to 0x7E) may be entered directly, or may be represented by its hexadecimal value. For example, the character "A" may be represented as A or as <41>.
- An ASCII control character (0x00 to 0x1F) may be represented by its hex value, or by a caret (^) followed by the control character. For example, the CARRIAGE RETURN control character may be represented as <0D> or as ^M.
- Each 8-bit value from 0x7F to 0xFF must be represented by its hexadecimal value. For example, the 8-bit value 0x7F must be represented as <7F>.

Gemini uses each of the following five characters to interpret message strings:

```
< > \ " ^
```

If any of these characters is used in a message string, it must be preceded by a backslash (\).

GPIB MSG strings must be encoded according to the Gemini String Coding Conventions before they are transmitted to the Gemini. The MSG string

```
"hello, world"<CR><LF>
```

could be encoded in any of the following ways:

```
\"hello, world\"<0D><0A>
\"hello, world\"^M^J
<22>hello, world<22><0D><0A>
```

5.8.4. Decoding GPIB Responses

When Gemini receives a message from a GPIB device, it encodes the message and transfers it to the controller. Gemini encodes messages according to the Gemini String Coding Conventions.

- Gemini encloses the message within quotes.
- Gemini passes printable ASCII characters (0x20 to 0x7E) to the controller without encoding.
- Gemini represents ASCII control characters by their hexadecimal values. For example, the CARRIAGE RETURN character is represented by <OD>.
- Gemini represents each 8-bit quantity in the range 0x7F to 0xFF by its hexadecimal value. For example, the quantity 0xA2 is represented by <A2>.
- Gemini precedes each of the five characters (`< > " \ >`) with a back slash (`\`).

5.8.5. Restoring Front Panel Control

The Go To Local (GTL) command returns the GPIB device to front panel control. Some devices also revert to front panel control in response to a Remote Enable (REN=0) command.

```
Command:  /GPIB: GTL/
Response: /C/
```

5.8.6. Example #1: Performing a Transaction Using OUT and IN

The following example shows a complete command transaction with a GPIB device. In the example, the OUT command transfers data to the device, and the IN command transfers data from the device to the controller.

1. Initialize the Gemini GPIB Controller.

```
Command:   /GPIB: PON, MADDR=0, IFC/
Response:  /C/
```

Effect: Reset the Gemini GPIB controller to power-on defaults, set the Gemini GPIB controller address to 0, and clear the GPIB.

2. Initialize the GPIB Device.

```
Command:   /GPIB: ADDR=1, ITC=eoi, DTO=15, REN=1, LLO/
Response:  /C/
```

Effect: Set the GPIB device address to 1, set the input termination condition to eoi, set the Device Time-Out to 15 seconds, enable the device for remote control, and lock out the device's front panel.

3. Poll the GPIB device to ensure that it is idle before sending the message.

```
Command:   /GPIB: SPOLL/
Response:  /GPIB:SPOLL=xx/
```

Effect: Perform a serial poll of the GPIB device at ADDR=1.

4. Place the message to be sent to the GPIB device into the message buffer, and send the message.

```
Command:   /GPIB: MSG="CURRENT=100", OUT/
Response:  /C/
```

Effect: Place the device command into the message buffer and send the command.

5. Perform serial polls of the device.

```
Command:   /GPIB: SPOLL/
Response:  /GPIB:SPOLL=xx/
```

Effect: Perform serial poll to get device status *xx*.

6. Get the response from the GPIB device.

```
Command:   /GPIB: IN/
Response:  /GPIB:IN=OKAY/
```

Effect: Get the response message "OKAY" from the GPIB device.

7. Restore the device to front panel control.

```
Command:   /GPIB: GTL, REN=0/
Response:  /C/
```

Effect: Restore front panel control, disable remote control.

5.8.7. Example #2: Command Transaction Using TSND

The following example shows a command transaction that uses the TSND command. Note that TSND automatically polls the device for a response after transferring the command message. TSND also eliminates the need for the IN command. The TSND command is designed to work with TAS Telephone Network Emulators and Loop Emulators.

1. Initialize the Gemini GPIB Controller.

```
Command:   /GPIB: PON, MADDR=0, IFC/
Response:  /C/
```

Effect: Reset the Gemini GPIB controller to power-on defaults, set the Gemini GPIB controller address to 0, and clear the GPIB.

2. Initialize the GPIB Device.

```
Command:   /GPIB: ADDR=1, ITC=eoi, DTO=15, WTIM=60/
Response:  /C/
```

Effect: Set the GPIB device address to 1, set the input termination condition to eoi, set the Device Time-Out to 15 seconds, set the TSND response timeout to 60 seconds.

3. Poll the GPIB device to ensure that it is idle before sending the message. Poll until the device status is 02.

```
Command:   /GPIB: SPOLL/
Response:  /GPIB:SPOLL=xx/
```

Effect: Perform a serial poll of the GPIB device at ADDR=1. If the status is Ready To Respond (04 or 44), the controller must execute an IN command to clear the device response buffer.

4. Place the message to be sent to the GPIB device into the message buffer, and send the message.

```
Command:   /GPIB: MSG="/IO, Z/", TSND/
Response:  /GPIB:TSND=/C//
```

Effect: Place the device command into the message buffer and start the command transaction. The Gemini GPIB controller returns the response it received from the GPIB device; in this case the device is a TAS Telephone Network Emulator.

6.0. GEMINI COMMANDS QUICK REFERENCE

This section is designed to help those who are already familiar with the Gemini command set to easily find and use commands. The Gemini Parameter Reference provides a complete description of each command group and all commands within each group.

You should be thoroughly familiar with Section 5, "Remote Operation", of this manual before you attempt to use Gemini remote commands. The "Remote Operation" section provides the details of the Gemini command message format and syntax.

Since Gemini contains two complete data analyzers, many basic Gemini commands can apply to DTE A or to DTE B. For example, the command `/INTF: RTSa=1/` tells Gemini to turn on the RTS signal at DTE A, while the command `/INTF: RTSb=1/` tells Gemini to turn on RTS at DTE B. Rather than show two separate commands, the command reference puts a **`j`** suffix on the command as a place holder for the **`a`** or **`b`**. When you use the command, put an **`a`** or a **`b`** in place of the **`j`**.

Gemini commands are divided into three types: SET, REPORT, and EXECUTE. In the Commands Quick Reference, these three types are indicated by individual subheadings. SET commands are issued to Gemini in the format:

```
/command group:parameter=setting/
```

Gemini will respond to a legal SET command with the response:

```
/C/
```

REPORT commands require the format:

```
/command group:name/
```

Gemini will provide the requested information as:

```
/command group:name=response/
```

where `response` can be more than one value separated by commas. All SET commands respond like REPORT commands if "=*setting*" is left off. The returned value is the current setting of the parameter. Execute commands require the format:

```
/command group:command/
```

If the command is successful, Gemini will respond with:

```
/C/
```

ACLL Async Call Setup Data Format *Set Commands*

NAME	DESCRIPTION	AVAILABLE SETTINGS
CHRD	*intercharacter delay*	*0 to 999 (msec)*
DATA	*# data bits*	*5, 6, 7, 8*
PARI	*parity*	*even, odd, none*
STOP	*# stop bits*	*1, 1.5, 2*

ATST Async Test Data Format *Set Commands*

NAME	DESCRIPTION	AVAILABLE SETTINGS
DATA	*# data bits*	*5, 6, 7, 8*
PARI	*parity*	*even, odd, none*
STOP	*# stop bits*	*1, 1.5, 2*

BERT Bit Error Rate & Throughput *Set Commands*

NAME	DESCRIPTION	AVAILABLE SETTINGS
B1	*user pattern #1*	*string*
B2	*user pattern #2*	*string*
BITLj	*bit errors limit*	*0 to 1000000*
BLKLj	*block errors limit*	*0 to 1000000*
BRKLj	*sync breaks limit*	*0 to 1000000*
BSIZ	*block size*	*10^2 (or 10E2) to 10^8 (or 10E8),* *2^5 (or 2E5) to 2^28 (or 2E28)*
CHRLj	*character errors limit*	*0 to 1000000*
CNFG	*test configuration*	*ta|ra, ta|rb, tb|ra, tb|rb, ta&b|ra, ta&b|rb, ta&b|ra&b*
ESLj	*errored second limit*	*0 to 1000000*
MODE	*test execution mode*	*0 (manual), 1 (semiautomatic)*
NBLK	*number of blocks/test*	*0 to 1000000*
NTS	*number of seconds/test*	*0 to 1000000*
PATT	*data pattern*	*63, 511, 2047, alt, mark, space, b1, b2*
RSEN	*resync enable*	*y, n*
RTSD	*sync time-out*	*0 to 1000*
SLERRB	*sync loss; error bursts enable*	*y, n*
SLNDTO	*sync loss; no data time-out*	*1 to 99*
TDL	*test duration limit*	*blocks, seconds*

BERT Bit Error Rate & Throughput *Execute Commands*

NAME	DESCRIPTION
SBRKj	*force DTE to lose sync*
SRSTj	*after DTE regains sync, reset sync status from regained (2) to in sync (1)*

BERT Bit Error Rate & Throughput *Report Commands*

NAME	DESCRIPTION	RETURNED VALUE
BAj	*report blocks analyzed*	*0000000 to 9999999*
BERj	*report bit errors*	*0000000 to 9999999*
BLERj	*report block errors*	*0000000 to 9999999*
BLPSj	*report blocks/sec*	*1.000E-9 to 9.999E+9*
BPSj	*report bits/sec*	*1.000E-9 to 9.999E+9*
CERj	*report character errors*	*0000000 to 9999999*
CPSj	*report characters/sec*	*1.000E-9 to 9.999E+9*
EASj	*report error analysis seconds*	*0000000 to 99999999*
EFSj	*report error free seconds*	*00000000 to 99999999*
ERPTj	*report extended results*	*(see Note [1])*
ERPTX	*BERT:ERPTj for A and B*	*(see Note [1])*
ESj	*report errored seconds*	*00000000 to 99999999*
NSSj	*report no sync seconds*	*00000000 to 99999999*
RCLKj	*report receive clock freq.*	*1.000E-9 to 9.999E+9*
RPTj	*report all test results*	*(see Note [2])*
SLOSSj	*report # sync losses*	*0000000 to 9999999*
STATj	*report test execution status*	*0 (running, no errors), 1 (running, errors), 2 (stopped, no errors), 3 (stopped, errors), 4 (stopped, bit error limit), 5 (stopped, character error limit), 6 (stopped, block error limit), 7 (stopped, sync loss limit), 8 (stopped, results overflow), 9 (stopped, sync time-out), 10 (stopped, errored second limit), 11 (stopped, buffer overflow)*
SYNCj	*report sync status*	*0 (no sync), 1 (sync), 2 (recovered sync)*
TCLKj	*report transmit clock freq.*	*1.000E-9 to 9.999E+9*
TTSj	*report total test seconds*	*00000000 to 99999999*

Note[1] The BERT:ERPTj command provides results, delimited by a comma and a space, in the following order: test status, blocks analyzed, bit errors, character errors, block errors, transmit clock frequency, receive clock frequency, bits per second, characters per second, block per second, sync status, sync losses, duration since last sync loss, no sync seconds, error free seconds, errored seconds, total test seconds, error analysis seconds, (reserved), (reserved), (reserved), (reserved). The last four reserved fields are reported as a string of 'X' unless otherwise specified.

Note [2] The BERT: RPTj command provides results, delimited by a comma and a space, in the following order: blocks analyzed, bit errors, character errors, block errors, sync losses, transmit clock frequency, receive clock frequency, bits/sec, characters/sec, blocks/sec, and sync status.

CALL Connect Reliability Test *Set Commands*

NAME	DESCRIPTION	AVAILABLE SETTINGS
ANSWDj	*post answer string delay*	*0-999 (1/100 sec)*
ANSWj	*call answer command*	*string*
AXMT	*a side transmit test message string*	*63, 511, 2047, c1, c2*
BXMT	*b side transmit test message string*	*63, 511, 2047, c1, c2*
C1	*user defined test message #1*	*string*
C2	*user defined test message #2*	*string*
CALLS	*number of calls per test*	*0-1000000*
CNFG	*data transfer configuration option*	*ta|ra, ta|rb, tb|ra, tb|rb, ta&b|ra, ta&b|rb, ta&b|ra&b*
CRTDj	*connect to RTS on delay (see Note[3])*	*0-999 (1/100 sec)*
CSTRj	*expected connect response string*	*string*
CTCD	*delay before call (call to call delay)*	*0-999 (1/10 sec)*
CTSTOj	*CTS timeout (no CTS present)*	*1-9999 (msec)*
CTXDj	*CTS on to transmit data delay*	*0-9999 (msec)*
DROPDj	*post drop string delay*	*0-999 (1/100 sec)*
DROPj	*call disconnect command*	*string*
DTRCj	*DTR control option*	*y, n*
DTRDj	*DTR on to call delay*	*0-999 (1/100 sec)*
EVj	*connect event option (call setup event)*	*dcd, str, dcd&str*
EVTOj	*connect event timeout*	*0-999 (sec)*
ORIGj	*call originate command*	*string*
OSTA	*originate station option*	*a, b*
RTS	*RTS control option*	*y, n*
STRPDj	*strap to DTR delay*	*0-999 (1/100 sec)*
STRPj	*modem initialization command*	*string*
XFTO	*data transfer timeout*	*0-999 (secs)*

Note [3] CRTDj should not be set to less than 5 (0.05 secs.). If the Call Setup Protocol (CPCL) parameters are set differently from the Test Protocol (TPCL) parameters, then the value of CRTDj should not be set to less than 25 (0.25 secs).

CALL Connect Reliability Test *Report Commands*

NAME	DESCRIPTION	RETURNED VALUE
EDTAj	*data errors in test message count*	*0000000-9999999*
ESUPj	*startup errors in test message count*	*0000000-9999999*
NATTM	*number of attempts*	*0000000-9999999*
NFAIL	*number of failures*	*0000000-9999999*
NOCDj	*no CD timeout count*	*0000000-9999999*
NOCTj	*no CTS count*	*0000000-9999999*
NORSPj	*bad connect response timeout count*	*0000000-9999999*
NXFTOj	*data transfer timeout count*	*0000000-9999999*
RMSGj	*response message to connect*	*string*
RPTj	*report all test results*	*(see Note [4])*
STATj	*report test execution status*	*0 (running, no errors), 1 (running, errors), 2 (stopped, no errors), 3 (stopped, errors), 4 (ready to run)*

CNFG Gemini Configuration *Set Commands*

NAME	DESCRIPTION	AVAILABLE SETTINGS
RESP	*response mode*	*verbose, terse*

CNFG Gemini Configuration *Execute Commands*

NAME	DESCRIPTION
LOC	*force to local (see Note [5])*
LOCK	*disable REMOTE key on front panel (see Note [5])*
REM	*force to remote mode (see Note [5])*

CNFG Gemini Configuration *Report Commands*

NAME	DESCRIPTION	RETURNED VALUE
MODL	*model #*	*WARP*
STAT	*power-up status*	*nnn*
VERS	*version number*	*5.xx*

Note [4] The CALL: RPTj command provides results, delimited with a comma and a space, in the following order: number of attempts, number of failures, number of CTS timeouts, number of DCD timeouts, number of No Connect Response Timeouts, number of startup errors, number of data errors, number of data transfer timeouts, and test status.

Note [5] This command is available only in CR/LF and ACK/NAK remote protocols.

CPCL Call Setup Protocol *Set Commands*

NAME	DESCRIPTION	AVAILABLE SETTINGS
CLKj	*clock source / rate*	*45, 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 4800, 7200, 9600, 12000, 14400, 16000, 16800, 18000, 19200, 21600, 24000, 25600, 26400, 28000, 28800, 31200, 32000, 33600, 36000, 38400, 48000, 56000, 57600, 64000, 72000, 76800, 96000, 102400, 112000, 115200, 128000,144000, 153600, 192000, 224000, 230400, 256000, modem, ext*
FLOWj	*flow control*	*none, cts, xoff*
OFSj	*clock offset*	*-100 to +100 (+/-10.0%)*
PCL	*protocol*	*async, async-v.25*[6] *, sync, sync-v.25*[6]*, hdlc, hdlc-v.25*[6]

DCMP Data Compression / File Transfer Test *Set Commands*

NAME	DESCRIPTION	AVAILABLE SETTINGS
ADDR	*sets the HDLC address field*	*00 to FF*
CLIM	*sets the error threshold; error count is in characters for asynchronous tests, bits for synchronous tests*	*0 to 1000000*
CNFG	*configures the receive/transmit signal*	*ta|ra, ta|rb, tb|ra, tb|rb, ta&b|ra&b*
CTRL	*sets the HDLC control field*	*00 to FF*
FLIM	*set failed file transfer limit (semi-automatic mode only)*	*0 to 1000000*
FRAME	*Sets the HDLC frame size*	*1 to 65536*
FRD	*Sets the inter-frame delay interval*	*0 to 9999 msec*
FRLD	*Sets the last frame to RTS delay interval*	*0 to 9999 msec*
HSIZ	*aborts file transfer per TIMEH limit*	*1 to 9999*
LOADP	*loads user defined pattern (see CLRP)*	*string*
MEAS	*set measurement configuration*	*end_to_end, at_receiver*
NPATT	*number of pattern repetitions*	*1 to 100*
NXFERS	*sets number of transferred files per test*	*0 to 1000000*
PATT	*selects the transfer pattern*	*ascii, base, c_source, combo, exe, fox, graphic, image, mixed3, random, spreadsheet, text, d1*
RTSj	*enables RTS control*	*y, n*
TERM	*test termination condition*	*0 (manual), 1 (semi-auto)*
TIMEH	*sets file header timeout*	*1 to 9999 (sec)*
TIMET	*sets file transfer timeout*	*1 to 9999 (sec)*
XFERD	*sets inter-transfer delay*	*1 to 100 (sec)*

Note [6] Sync V.25, async V.25 and hdlc V.25 settings represent sync V.25 bis, async V.25 bis, and hdlc V.25 bis standards respectively.

DCMP Data Compression / File Transfer Test *Execute Commands*

NAME	DESCRIPTION
CLRP	*clears the pattern buffer*
SRSTj	*resets the Sync LED after failed transfer (see SYNCj)*

DCMP Data Compression / File Transfer Test *Report Commands*

NAME	DESCRIPTION	RETURNED VALUE
ABPSj	*average file transfer rate (bits/sec)*	*1.000E-9 to 9.999E+9*
ACPSj	*average file transfer rate (chars/sec)*	*1.000E-9 to 9.999E+9*
CBPSj	*transfer rate for current file (bits/sec)*	*1.000E-9 to 9.999E+9*
CCPSj	*transfer rate for current file (chars/sec)*	*1.000E-9 to 9.999E+9*
CERRj	*reports total error count in successful transfers only. Errors are counted as character errors for asynchronous tests, and bit errors for synchronous tests.*	*0000000 to 9999999*
CERRTj	*failed transfers per the character error threshold*	*0000000 to 9999999*
CHARj	*number of characters received in asynchronous test mode during current transfer. In synchronous testing the number of frames received is reported (FRRj reports frames received and should be used in place of CHARj for synchronous testing).*	*0000000 to 9999999*
CLIMj	*number of transfers which have failed due to the CLIM threshold being exceeded. This report is identical to CERRTj and should be used in its place.*	*0000000 to 9999999*
FAILj	*total number of failed transfers*	*0000000 to 9999999*
FPCTj	*percentage of current file transferred*	*000-100 (in %)*
FRRj	*number of frames received in synchronous data compression testing during current transfer*	*0000000 to 9999999*
FSIZ	*reports current file size*	*string*
HBPSj	*highest transfer rate (bit/sec)*	*1.000E-9 to 9.999E+9*
HCPSj	*highest transfer rate (char/sec)*	*1.000E-9 to 9.999E+9*
LBPSj	*lowest transfer rate (bit/sec)*	*1.000E-9 to 9.999E+9*
LCPSj	*lowest transfer rates (char/sec)*	*1.000E-9 to 9.999+9*
NATTMj	*number of transfer attempts made*	*0000000 to 9999999*
RPTj	*reports all results*	*(see Note [7])*

Note [7] DCMP:RPTj reports the results, delimited by a comma, in the following order: completed file transfers, number of attempted transfers, failed transfers due to error threshold and header/file transfer timeout, failed transfers due to error threshold, failed transfers due to TIMET limit, failed transfers due to TIMEH limit, average file transfer rate (char/sec for async, bits/sec for sync), lowest transfer rate (char/sec for async, bits/sec for sync), highest transfer rate (char/sec for async, bits/sec for sync), transfer rate for current file (char/sec for async, bits/sec for sync), elapsed time of current transfer, number of characters received (frames received for synchronous data compression tests), status of file header transfer, run status, transfer status, stop status, failed transfer status, failed transfer limit status.

DCMP Data Compression / File Transfer Test (Cont.) *Report Commands*

NAME	DESCRIPTION	RETURNED VALUE
STATj	*reports current test status*	*(see Note [8])*
SYNCj	*status of pattern sync*	*0 (no sync), 1 (sync), 2 (regained sync)*
TIMEj	*elapsed time (in sec.) of current transfer*	*0000001 to 9999999 (in sec.)*
TIMEHj	*reports failed transfers due to TIMEH limit*	*0000000 to 9999999*
TIMETj	*reports failed transfer due to TIMET limit*	*0000000 to 9999999*
XFERj	*completed file transfers*	*0000000 to 9999999*

ECHO Character Echo / Block Acknowledgment *Set Commands*

NAME	DESCRIPTION	AVAILABLE SETTINGS
BSIZ	*block size*	*1 to 9999*
CNFG	*test configuration*	*ta|rb, tb|ra*
FILT	*filter out consecutive characters*	*y, n*
ITER	*number of iterations*	*0 to 9999999*
MIN	*lower limit of uniform distribution for intercharacter delay*	*10 to 1000*
RSEQ	*set random number generator seed to initial value*	*y, n*
TLIM	*echo timeout*	*1 to 10000*
TYPE	*selects test type*	*char_echo, blk_ack*
WID	*width of uniform distribution for intercharacter delay*	*0 to 1000*

ECHO Character Echo / Block Acknowledgment *Execute Commands*

NAME	DESCRIPTION
SRSTj	*resets the Sync LED after a timeout or errored iteration*
SEND	*runs a single iteration of Echo test*

Note [8] DCMP:STATj reports five values, separated by commas: run status (0=not running, 1=running), transfer status (0=not running, 1=transfer in progress, 2=between transfers), stop status (0=running, 1=results reset, 2=user stopped, 3=test limit reached, 4=results counter full, 5=semi-auto limit reached), failed transfer status (0=no failed transfers, 1=at least one failed transfer), failed transfer limit status (0=not reached, 1=reached).

ECHO Character Echo / Block Acknowledgment *Report Commands*

NAME	DESCRIPTION	RETURNED VALUE
AVGT	*report average times*	*(see Note[9])*
CER	*report errored iterations*	*0000000 to 9999999*
CURRT	*report current times*	*(see Note[9])*
IA	*report number of iterations analyzed*	*0000000 to 9999999*
ITO	*report number of timeouts*	*0000000 to 9999999*
MAXT	*report maximum times*	*(see Note[9])*
MINT	*report minimum times*	*(see Note[9])*
RPT	*report all test results*	*(see Note[10])*
RT	*report all times*	*(see Note[11])*
STAT	*report test execution status*	*0 (running), 1 (ready to run), 2 (test limit reached), 3 (user stopped)*
SYNCj	*report sync status*	*0 (no sync), 1 (sync), 2 (recovered sync)*

FILE File Save and Recall *Set Commands*

NAME	DESCRIPTION	AVAILABLE SETTINGS
FLBL	*12-character file label*	*ssssssssssss*
FNAM	*file name*	*(see Note [12])*

Note [9] Reports three values separated by commas: one-way character latency, round trip delay, one-way block latency. In Character Echo Delay test the value of one-way block latency is reported as zero.

Note [10] The ECHO:RPT command provides results delimited by a comma in the following order: iterations analyzed, errored iterations, timed out iterations, minimum one-way character latency, minimum round trip delay, minimum one-way block latency, maximum one-way character latency, maximum round trip delay, maximum one-way block latency, average one-way character latency, average round trip delay, average one-way block latency, current one-way character latency, current round trip delay, current one-way block latency, test execution status. In Character Echo Delay test all one-way block latency values are reported as zero.

Note [11] The ECHO:RT command provides results delimited by a comma in the following order: minimum one-way character latency, minimum round trip delay, minimum one-way block latency, maximum one-way character latency, maximum round trip delay, maximum one-way block latency, average one-way character latency, average round trip delay, average one-way block latency, current one-way character latency, current round trip delay, current one-way block latency, test execution status. In Character Echo Delay test all one-way block latency values are reported as zero.

Note [12] FNAM options are the read/write files: file0, file1, file2, file3, file4, and the read-only files 1200_async, 2400_sync, 2400_async, 9600_sync, 9600_async, 14.4k_sync, 14.4k_async, 19.2k_sync, 19.2k_async, 38.4k_async, 57.6k_async, 64.0k_async, 76.8k_async, 96.0k_async, 102.4k_async, 115.2k_async, 128.0k_async, hpl_sync, isdn_sync, 2.048m_sync, hs_bert, mpol_master, mpol_slave, char_echo, and block_ack.

FILE File Save and Recall *Execute Commands*

NAME	DESCRIPTION
FRCL	*recall file with current name (see FNAM)*
FSAV	*save file with current name and label (see FNAM and FLBL)*

GPIB RS-232/GPIB Command Translator *Set Commands*

NAME	DESCRIPTION	AVAILABLE SETTINGS
ADDR	*set device address*	*0-30*
DTO	*set device time-out*	*0-100 (sec)*
ITC	*set input terminator*	*eoi, cr, lf, crlf*
MADDR	*set controller address*	*0-30*
MSG	*set output message*	*string*
REN	*remote enable*	*0, 1*
WTIM	*TSND response time-out*	*0-100 (sec)*

GPIB RS-232/GPIB Command Translator *Execute Commands*

NAME	DESCRIPTION
CLR	*selective device clear*
GTL	*go to local mode*
IFC	*interface clear*
LLO	*local front panel lockout*
OUT	*transfer message to device*
PON	*controller power-on reset*
TRIG	*device trigger*

GPIB RS-232/GPIB Command Translator *Report Commands*

NAME	DESCRIPTION	RETURNED VALUE
IN	*get input from device*	*string*
SPOLL	*serial poll*	*string*
TSND	*TAS-specific cmd transaction*	*string*

HCLL HDLC Call Setup Data Format *Set Commands*

NAME	DESCRIPTION	AVAILABLE SETTINGS
ADDR	*hdlc address field*	*0x00-0xFF*
CHAR	*character format*	*8BN, 7BO, 7BE, 7BM, 7BS*
CODE	*character coding*	*ascii, ebcdic*
CTRL	*hdlc control field*	*0x00-0xFF*

HSBT High Speed Bit Error Rate & Throughput *Set Commands*

NAME	DESCRIPTION	AVAILABLE SETTINGS
B1	*user pattern #1*	*string*
B2	*user pattern #2*	*string*
BITLj	*bit errors limit*	*0 to 1000000 (0 = no limit)*
BLKLj	*block errors limit*	*0 to 1000000 (0 = no limit)*
BRKLj	*sync breaks limit*	*0 to 1000000 (0 = no limit)*
BSIZ	*block size*	*2 to 10000000*
CLKj	*clock source / rate*	*75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 4800, 7200, 9600, 12000, 14400, 16000, 16800, 18000, 19200, 21600, 24000, 25600, 26400, 28000, 28800, 31200, 32000, 33600, 36000, 38400, 48000, 56000, 57600, 64000, 72000, 76800, 96000, 102400, 112000, 115200, 128000,144000, 153600, 168000, 192000, 224000, 230400, 256000, 280000, 320000, 336000, 384000, 392000, 448000, 504000, 512000, 560000, 576000, 616000, 640000, 672000, 704000, 728000, 768000, 784000, 832000, 840000, 896000, 952000, 960000, 1008000, 1024000, 1064000, 1088000, 1120000, 1152000, 1176000, 1216000, 1232000, 1280000, 1288000, 1344000, 1400000, 1408000, 1456000, 1472000, 1512000, 1536000, 1544000, 1568000, 1600000, 1624000, 1664000, 1680000, 1728000, 1736000, 1792000, 1848000, 1856000, 1904000, 1920000, 1960000, 1984000, 2016000, 2048000, modem, ext*
CNFG	*test configuration*	*ta|ra, ta|rb, tb|ra, tb|rb, ta&b|ra, ta&b|rb, ta&b|ra&b*
ESLj	*errored second limit*	*0 to 1000000*
MODE	*test execution mode*	*0 (manual), 1 (semiautomatic)*
NBLK	*number of blocks/test*	*0 to 2^31 - 1 (0 = continuos)*
NTS	*number of seconds/test*	*0 to 1000000*
PATT	*data pattern*	*63, 511, 2047, 2^15, 2^20, 2^23, alt, mark, space, b1, b2*
PCL	*terminal protocol*	*sync, sync-nrzi*
RSEN	*resync enable*	*y, n*
RTSD	*sync time-out*	*0 to 1000*
SLNDTO	*sync loss; no data time-out*	*1 to 99*
SLTHR	*sync loss threshold*	*low, medium, high*
TDL	*test duration limit*	*blocks, seconds*

HSBT High Speed Bit Error Rate & Throughput *Execute Commands*

NAME	DESCRIPTION
SBRKj	*force DTE to lose sync*
SRSTj	*after DTE regains sync, reset sync status from regained (2) to in sync (1)*

HSBT High Speed Bit Error Rate & Throughput *Report Commands*

NAME	DESCRIPTION	RETURNED VALUE
BAj	*report blocks analyzed*	*0 to 2^31 - 1*
BERj	*report bit errors*	*0 to 2^31 - 1*
BLERj	*report block errors*	*0 to 2^31 - 1*
BLPSj	*report blocks/sec*	*0.000E-9 to 2.560E+5*
BPSj	*report bits/sec*	*0.000E-9 to 2.048E+5*
EASj	*report error analysis seconds*	*0 to 2^31 - 1*
EFSj	*report error free seconds*	*0 to 2^31 - 1*
ESj	*report errored seconds*	*0 to 2^31 - 1*
NSSj	*report no sync seconds*	*0 to 2^31 - 1*
PEFSj	*report error free seconds as a percentage of error analysis seconds*	*0 to 100*
RCLKj	*report receive clock freq.*	*0.000E+0 to 2.048E+6*
RPTj	*report all test results*	*(see Note [13])*
RPTX	*report all test results (both sides)*	*(see Note [14])*
SLOSSj	*report # sync losses*	*0 to 2^31 - 1*
STATj	*report test execution status*	*0 (running, no errors), 1 (running, errors), 2 (stopped, no errors), 3 (stopped, errors), 4 (stopped, bit error limit), 5 (stopped, block error limit), 6 (stopped, sync loss limit), 7 (stopped, errored seconds limit), 8 (stopped, sync time-out)*
SYNCj	*report sync status*	*0 (no sync), 1 (in sync), 2 (regained sync)*
TCLKj	*report transmit clock freq.*	*0.000E-9 to 2.048E+6*
TTSj	*report total test seconds*	*0 to 2^31 - 1*

Note [13] The HSBT: RPTj command provides results, delimited by a comma and a space, in the following order: test status, blocks analyzed, bit errors, block errors, transmit clock frequency, receive clock frequency, sync losses, bits/sec, blocks/sec, sync status, duration since last sync loss, no sync seconds, error free seconds, errored seconds, total test seconds, error analysis seconds.

Note [14] The HSBT: RPTX command provides results, delimited by a comma and a space, of side A followed by B side in the following order, blocks analyzed, bit errors, block errors, transmit clock frequency, receive clock frequency, sync losses, bits/sec, blocks/sec, sync status, duration since last sync loss, no sync seconds, error free seconds, errored seconds, total test seconds, error analysis seconds.

HSDT High-Speed Data Compression Test *Set Commands*

NAME	DESCRIPTION	AVAILABLE SETTINGS
ADDR	*HDLC address field*	*00 to FF*
CLIM	*error threshold for file transfer failure*	*0 to 1000000 errored frames*
CLKj	*clock source / rate*	*75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 4800, 7200, 9600, 12000, 14400, 16000, 16800, 18000, 19200, 21600, 24000, 25600, 26400, 28000, 28800, 31200, 32000, 33600, 36000, 38400, 48000, 56000, 57600, 64000, 72000, 76800, 96000, 102400, 112000, 115200, 128000,144000, 153600, 168000, 192000, 224000, 230400, 256000, 280000, 320000, 336000, 384000, 392000, 448000, 504000, 512000, 560000, 576000, 616000, 640000, 672000, 704000, 728000, 768000, 784000, 832000, 840000, 896000, 952000, 960000, 1008000, 1024000, 1064000, 1088000, 1120000, 1152000, 1176000, 1216000, 1232000, 1280000, 1288000, 1344000, 1400000, 1408000, 1456000, 1472000, 1512000, 1536000, 1544000, 1568000, 1600000, 1624000, 1664000, 1680000, 1728000, 1736000, 1792000, 1848000, 1856000, 1904000, 1920000, 1960000, 1984000, 2016000, 2048000, modem, ext*
CNFG	*select transmitter / receiver*	*ta|ra, ta|rb, tb|ra, tb|rb, ta&b|ra&b*
CTRL	*HDLC control field*	*00 to FF*
FLIM	*set failed file transfer limit (semi-automatic mode only)*	*0 to 1000000*
FLOWj	*enable CTS flow control*	*none, cts*
FRAME	*HDLC frame size*	*1 to 65536 octets*
FRD	*inter-frame delay*	*0 to 9999 milliseconds*
MEAS	*measurement configuration*	*end_to_end, at_receiver*
NPATT	*number of pattern repetitions*	*1 to 100*
NXFERS	*number of file transfers per test run*	*0 to 1000000*
PATT	*selects the data pattern*	*ascii, base, c_source, combo, exe, fox, graphic, image, mixed3, random, spreadsheet, text, d1*
PCL	*selects bit encoding used*	*nrz, nrzi*
TERM	*test termination condition*	*0 (manual), 1 (semi-auto)*
TIMEH	*first frame timeout*	*1 to 9999 seconds*
TIMET	*file transfer timeout*	*1 to 9999 seconds*
XFERD	*inter-transfer delay*	*1 to 100 seconds*

HSDT High-Speed Data Compression Test *Execute Commands*

NAME	DESCRIPTION
SRSTj	*resets the Sync LED after failed transfer (see SYNCj)*

HSDT High-Speed Data Compression Test *Report Commands*

NAME	DESCRIPTION	RETURNED VALUE
ABPSj	*average file transfer rate (bits/sec)*	*1.000E-9 to 9.999E+9*
CBPSj	*transfer rate for current file (bits/sec)*	*1.000E-9 to 9.999E+9*
CERRj	*total frame error count*	*0000000 to 9999999*
CLIMj	*number of file transfers for which the frame error threshold (HSDT:CLIM) was exceeded*	*0000000 to 9999999*
FAILj	*total number of failed file transfers*	*0000000 to 9999999*
FPCTj	*percentage of current file transferred*	*000-100 (in %)*
FRRj	*number of frames received*	*0000000 to 9999999*
FSIZ	*size of file selected for this test*	*0000000 to 6553600*
HBPSj	*highest transfer rate recorded (bit/sec)*	*1.000E-9 to 9.999E+9*
LBPSj	*lowest transfer rate recorded (bit/sec)*	*1.000E-9 to 9.999E+9*
NATTMj	*number of file transfer attempts made*	*0000000 to 9999999*
RPTj	*reports all results*	*(see Note [15])*
STATj	*reports current test status*	*0 (results reset),* *1 (file transfer in progress),* *2 (last file transfer was successful),* *3 (last file transfer failed),* *4 (last file transfer was aborted),* *5 (restarting test after CLEAR),* *10 (test stopped by user),* *11 (file transfer limit reached),* *12 (failed transfer limit reached),* *20 (internal counter overflow)*
SYNCj	*file transfer status*	*0 (waiting for first HDLC frame),* *1 (frame error limit not exceeded),* *2 (frame error limit was exceeded)*
TIMEj	*elapsed time (in seconds) of current transfer*	*0000001 to 9999999*
TIMEHj	*number of file transfers for which the first frame timeout (TIMEH) was exceeded*	*0000000 to 9999999*
TIMETj	*number of file transfers for which the file transfer timeout (TIMET) was exceeded*	*0000000 to 9999999*
XFERj	*completed file transfers*	*0000000 to 9999999*

Note [15] HSDT:RPTj reports the test results, delimited by a comma, in the following order: completed file transfers, number of attempted transfers, total number of failed transfers, failed transfers due to error threshold CLIM, failed transfers due to TIMET timeout, failed transfers due to TIMEH timeout, average file transfer rate, lowest transfer rate, highest transfer rate, transfer rate for current file, elapsed time of current transfer, number of frames received, file transfer status, test status.

INTF Interface Lead Controls *Set Commands*

NAME	DESCRIPTION	AVAILABLE SETTINGS
DRS_OUTj	*set DTE supplied Data Rate Select (RS-232 interface only)*	*0,1*
DRS_OUT_ENj	*enable DTE supplied Data Rate Select (RS-232 interface only)*	*y, n*
DTEj	*select RS-232 or 530A interface*	*rs232, 530a*
DTRj	*set Data Terminal Ready*	*0, 1*
LLj	*set Local Loopback*	*0,1*
RLj	*set Remote Loopback*	*0,1*
RLENj	*enable RL output (RS-232 interface only)*	*y, n*
RTSj	*set Request To Send*	*0, 1*
SRTSj	*set secondary RTS (RS-232 interface only)*	*0, 1*
STDj	*set secondary TD (RS-232 interface only)*	*0, 1*

INTF Interface Lead Controls *Report Commands*

NAME	DESCRIPTION	RETURNED VALUE
CTSj	*report Clear to Send*	*0, 1*
DCDj	*report Data Carrier Detect*	*0, 1*
DSRj	*report Data Set Ready*	*0, 1*
DRSj	*report Data Rate Select*	*0, 1*
DRS_INj	*report Data Rate Select (DCE supplied)*	*0, 1*
PIN25j	*report Pin 25*	*0, 1*
RDj	*report Received Data*	*0, 1*
RIj	*report Ring Indicator*	*0, 1*
RPTj	*report all interface leads*	*(see Note [16])*
RPTX	*INTF:RPTj for both A and B*	*(see Note [16])*
SCTSj	*report Secondary Clear to Send*	*0, 1*
SDCDj	*report Secondary Data Carrier Detect*	*0, 1*
SQDj	*report Signal Quality Detect*	*0, 1*
SRDj	*report Secondary Received Data*	*0, 1*
TMj	*report Test Mode*	*0,1*

Note [16] INTF:RPTj reports the state of all the signals on the selected interface. The signals are reported in the same order they appear on the interface, starting with pin 1.
An active signal is indicated by a '1', an inactive signal by a '0'. Unsupported signals are indicated by an'X'.
For example: /INTF:RPTX=XXX111X1XXX000X0X001000X0/
If an RS-232 interface is selected, the report format is:
/INTF:RPTj=XXX<RTS><CTS><DSR>X<DCD>XXX<SDCD><SCTS><STD>X<SRD>X<LLB><SRTS><DTR><SQ|RL><RI><DRS>X<TM>/
If an EIA 530-A interface is selected, the report format is:
/INTF:RPTj=XXX<RTS><CTS><DSR>X<DCD>XXXXXXXXX,LBL>X<DTR><RL><RI>XX<TM>/
IINTF:RPTX reports signals for both interfaces, separated by a comma and space.
For example: /INTF:RPTX=XXX111X1XXX000X0X001000X0, XXX111X1XXX000X0X001000X0/

MPOL Multi-Point Polling Test *(Master) Set Commands*

NAME	**DESCRIPTION**	**AVAILABLE SETTINGS**
NPOL	*number of polls to send to each slave*	*0-1,000,000*
POLLD	*sets the inter-poll delay*	*0-100000 (x10 ms)*
RTLIM	*sets master response time-out limit*	*1-9,999 (sec)*
SADDR	*enters list of slave addresses for polling*	*string*
SLAVE	*selects results for a specific slave*	*string (slave address or *)*

MPOL Multi-Point Polling Test *(Slave) Set Commands*

NAME	**DESCRIPTION**	**AVAILABLE SETTINGS**
ADDRj	*sets the poll address for the slave*	*string*
RESPDj	*sets the slave response delay*	*0-100000 (x10 ms)*

MPOL Multi-Point Polling Test *(Common) Set Commands*

NAME	**DESCRIPTION**	**AVAILABLE SETTINGS**
CTSDj	*sets the CTS to message delay*	*0-100000 (x10 ms)*
DCDj	*test/ignore DCD signal*	*test, ignore*
MADDR	*adds the master address to response messages*	*string*
MASTR	*selects master DTE*	*A, B, none*
PMSG	*sets the multi-point poll message field*	*string*
RMSG	*sets the response message field*	*string*
RSXTDj	*sets the response to transmit delay*	*0 - 100000 (X10 ms)*
RTS	*enables RTS control*	*yes, no*
SENTDj	*sets delay between end of poll and RTS low*	*0-100000 (x10 ms)*
SPCL	*sets the synchronous protocol*	*bisync, HDLC, monosync*

MPOL Multi-Point Polling Test *(Master) Report Commands*

NAME	**DESCRIPTION**	**RETURNED VALUE**
AERR	*number of responses with erred address fields*	*0000000-9999999*
MERR	*number of responses with erred message fields*	*0000000-9999999*
MRPT	*reports master summary results*	*(see Note [17])*
RCVD	*number of correct responses*	*0000000-9999999*
RERR	*number of erred responses*	*0000000-9999999*
RT	*report response times (min, max, aver, last)*	*0000000-9999999 (for each)*
RTO	*number of waiting response time-outs*	*0000000-9999999*
SENT	*number of polls sent to this slave*	*0000000-9999999*

Note11 MPOL:MRPT reports all master results, delimited by a comma and a space, in the following order: number of polls sent, number of correct responses, number of waiting response timeouts, number of erred responses, number of responses with erred address fields, number of responses with erred message fields, status

MPOL Multi-Point Polling Test *(Slave) Report Commands*

NAME	DESCRIPTION	RETURNED VALUE
PERRj	*number of polls with erred message field*	*0000000-9999999*
POLLj	*number of polls received*	*0000000-9999999*
SRPTj	*reports all slave results*	*(see Note [18])*

MPOL Multi-Point Polling Test *(Common) Report Commands*

NAME	DESCRIPTION	RETURNED VALUE
CTSTj	*reports RTS/CTS message delays (min, max, avg, last)*	*0000000-9999999 (for each)*
STATj	*current test status for specified station*	*(see Note [19])*

MSGX Message Transfer *Set Commands*

NAME	DESCRIPTION	AVAILABLE SETTINGS
CLIM	*transfer characters limit*	*0-2048*
CNFG	*configuration*	*ta|ra, ta|rb, tb|ra, tb|rb*
RESP	*expected response string*	*string*
TLIM	*transfer time limit*	*0-99 (sec)*
TSTR	*transmit string*	*string*

MSGX Message Transfer *Execute Commands*

NAME	DESCRIPTION
CLRj	*clear the transfer buffer*
GO	*execute the transfer*
STOP	*halt the transfer*

MSGX Message Transfer *Report Commands*

NAME	DESCRIPTION	RETURNED VALUE
DAVj	*read # characters in buffer*	*0-2048*
DUMPj	*read transfer buffer contents*	*string*
STAT	*read transfer status*	*0 (transmission not complete), 1 (transmission complete), 2 (expected response received), 3 (character limit reached), 4 (time limit reached), 5 (stopped by user)*

Note [18] MPOL:SRPTj reports all slave results, delimited by a comma and a space, in the following order: number of polls received, number of polls with erred message fields, status

Note [19] MPOL:STATj reports five values, separated by a comma and a space: run status (0=not running, 1=running), config status (0=DTE is master, 1=DTE is slave), stop status (0=running, 1=results reset, 2=user stopped, 3=poll limit reached, 4=results counter full), error status (0=no errors, 1=at least one error), reserved (0).

POLL Polling Performance Test *Set Commands*

<table>
<tr><th>NAME</th><th>DESCRIPTION</th><th>AVAILABLE SETTINGS</th></tr>
<tr><td>CNFG</td><td>test configuration</td><td>ta|ra, ta|rb, tb|ra, tb|rb, ta&b|ra, ta&b|rb, ta&b|ra&b</td></tr>
<tr><td>CTOj</td><td>CTS time-out limit</td><td>0 to 9999 (msec)</td></tr>
<tr><td>FPOLj</td><td>false polls limit</td><td>0 to 9999999</td></tr>
<tr><td>MODE</td><td>test execution mode</td><td>0 (manual), 1 (semiautomatic)</td></tr>
<tr><td>MSGLj</td><td>message errors limit</td><td>0 to 9999999</td></tr>
<tr><td>NPOL</td><td>number of polls per test</td><td>0 to 9999999</td></tr>
<tr><td>P1</td><td>user poll message #1</td><td>string</td></tr>
<tr><td>P2</td><td>user poll message #2</td><td>string</td></tr>
<tr><td>PDLY</td><td>poll delay</td><td>1 to 2000 (msec)</td></tr>
<tr><td>PMSG</td><td>poll message</td><td>syn, fox, p1, p2</td></tr>
<tr><td>RXCRj</td><td>receive carrier mode</td><td>sw, const</td></tr>
<tr><td>SYNLj</td><td>sync errors limit</td><td>0 to 9999999</td></tr>
<tr><td>TXCRj</td><td>transmit carrier mode</td><td>sw, sw2, const</td></tr>
</table>

POLL Polling Performance *Test Report Commands*

NAME	DESCRIPTION	RETURNED VALUE
CTSTj	*report RTS-CTS delay*	*00000 to 10000 (msec)*
FPOj	*report # false polls*	*0000000 to 9999999*
MERRj	*report # message errors*	*0000000 to 9999999*
RCLKj	*report receive clock freq.*	*1.000E-9 to 9.999E+9*
RCVDj	*report # polls received*	*0000000 to 9999999*
RPTj	*report all test results*	*(see Note [20])*
SENTj	*report # of polls transmitted*	*0000000 to 9999999*
SERRj	*report # sync errors*	*0000000 to 9999999*
STATj	*report test execution status*	*0 (running, no errors), 1 (running, errors), 2 (stopped, no errors), 3 (stopped, errors), 4 (stopped, sync error limit), 5 (stopped, message error limit), 6 (stopped, false poll limit), 7 (stopped, RTS-CTS delay limit), 8 (stopped, results overflow)*
TCLKj	*report transmit clock freq.*	*1.000E-9 to 9.999E+9*

Note [20] POLL:RPTj reports all POLL results, delimited by a comma and a space, in this order: number of polls received, number of sync errors, number of message errors, number of false polls, RTS-CTS delay, transmit clock frequency, receive clock frequency, test execution status.

SCLL Sync Call Setup Data Format *Set Commands*

NAME	DESCRIPTION	AVAILABLE SETTINGS
CHAR	*character format*	*8BN, 7BO, 7BE, 7BM, 7BS*
CODE	*character coding*	*ascii, ebcdic*
NSYN	*# sync characters*	*1, 2*
SYN1	*sync character #1*	*0x00 to 0xFF*
SYN2	*sync character #2*	*0x00 to 0xFF*

TEST Test Execution *Set Commands*

NAME	DESCRIPTION	AVAILABLE SETTINGS
IERR	*insert errors*	*y, n*
LOADP	*loads user-defined test pattern (see TEST:CLRP)*	*string*
LOOP	*self-loop*	*y, n*
MODE	*test mode*	*bert, calls, call_setup, data_comp, echo, hs_bert, hs_dcmp, idle, multi_pt, polls*

TEST Test Execution *Execute Commands*

NAME	DESCRIPTION
CLR	*clear all test results*
CLRP	*clears the 64K byte pattern user-defined test pattern (see TEST:LOADP)*
RUN	*execute the test*
STOP	*stop the test*

TEST Test Execution *Report Commands*

NAME	DESCRIPTION	RETURNED VALUE
STATj	*report pass/fail status*	*error, fail, pass, ready, run, stop*

TIME Timing Measurement *Set Commands*

NAME	DESCRIPTION	AVAILABLE SETTINGS
MEAS	*enable or disable timing measurement*	*enabled, disabled*
T0DTE	*select start event terminal*	*a, b*
T0SIG	*select start event signal*	*rts+, rts-, cts+, cts-, dsr+, dsr-, dtr+, dtr-, dcd+, dcd-, td+, td-, tc+, tc-, rd+, rd-, rc+, rc-, ri+, ri-, etc+, etc-, sdcd+, sdcd-, scts+, scts-, srts+, srts-, std+, std-, srd+, srd-*
T1DTE	*select stop event terminal*	*a, b*
T1SIG	*select stop event signal*	*rts+, rts-, cts+, cts-, dsr+, dsr-, dtr+, dtr-, dcd+, dcd-, td+, td-, tc+, tc-, rd+, rd-, rc+, rc-, ri+, ri-, etc+, etc-, sdcd+, sdcd-, scts+, scts-, srts+, srts-, std+, std-, srd+, srd-*
TRIG	*set measurement trigger mode*	*continuous, single*

TIME Timing Measurement *Report Commands*

NAME	DESCRIPTION	RETURNED VALUE
STAT	*report timing measurement status*	*disabled, armed, measuring, complete, overflow, invalid*
TIME	*report last complete time interval measurement*	*0 to 99999.99 msec*

TPCL Test Protocol *Set Commands*

NAME	DESCRIPTION	AVAILABLE SETTINGS
CLKj	*transmit clock*	*45, 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 4800, 7200, 9600, 12000, 14400, 16000, 16800, 18000, 19200, 21600, 24000, 25600, 26400, 28000, 28800, 31200, 32000, 33600, 36000, 38400, 48000, 56000, 57600, 64000, 72000, 76800, 96000, 102400, 112000, 115200, 128000,144000, 153600, 192000, 224000, 230400, 256000, modem, ext*
FLOWj	*flow control*	*none, cts, xoff*
OFSj	*clock offset*	*-100 to +100 (-10.0% to +10.0%)*
PCL	*protocol*	*async, sync, sync-nrzi*

7.0. GEMINI ERROR CODES

Gemini provides error codes to indicate its current state of operation. Error conditions are reported on the front panel and the remote control (GPIB or RS-232) interfaces. For more information on reading error codes, see the CNFG command group in section 5, "Remote Commands Reference".

Error Code	Description
000	All is well with Gemini
001	Command value error There is a syntax error in the value assigned by the command, or the value assigned is outside the legal range for the parameter. See the Remote Command Reference section of this manual for the available settings for each Gemini command.
002	Command syntax error
003	Command group syntax error There is an syntax error which prevents Gemini from parsing the command correctly. Gemini commands have the form /*group*:*command*/ or /*group*:*command*=*value*/. Make sure you are using the correct form of the command. Also make sure that the '/', ':', and '=' characters are properly placed, and that there are no extra characters preceding or following the command.
004	Command failure Gemini was unable to execute a correctly specified command.
005	Undefined command group The command group name is misspelled. The command group name precedes the ':' in the command; for example, /**TEST**:RUN/.
006	Undefined command The command name is misspelled. The command name follows the ':' in the command; for example, /TEST:**RUN**/.
007	Reserved

Error Code	Description
008	GPIB receive device time-out A GPIB device did not respond to a command within the time specified by the /GPIB:DTO/ command. Verify that the device is powered on and connected properly to the GPIB. Make sure the device's GPIB address matches that used by Gemini (see the GPIB:ADDR command).
009	GPIB in incorrect state during TSND The TAS equipment being controlled via TSND must be idle before a command is sent using GPIB:TSND. Poll the device using /GPIB:SPOLL/ until /GPIB:SPOLL=2/, then send /GPIB:TSND/.
010	RS-232/GPIB translator cannot be used Gemini cannot forward commands received from its GPIB interface to another GPIB device. When using GPIB to control Gemini, send commands directly to all devices on the GPIB bus.
011-018	Reserved
019	Remote command ignored in local mode Gemini must be placed in remote control mode before sending any command which changes parameter values. To place Gemini in remote control mode, issue the command /CNFG:REM/ or press the Remote key on the front panel.
020	Reserved
021	GPIB response (message) time out A TAS device did not respond to a /GPIB:TSND/ command within the time specified by /GPIB:WTIM/. Verify that the device is powered on and connected properly to the GPIB. Make sure the device's GPIB address matches that used by Gemini (see the GPIB:ADDR command).
022-029	Reserved

Error Code	Description
030	Transceiver A DPRAM failure
031	Transceiver B DPRAM failure
032	Transceiver A boot failure
033	Transceiver B boot failure
034	Transceiver A load failure
035	Transceiver B load failure
036	Transceiver A not done
037	Transceiver B not done
038	Transceiver A unexpected response
039	Transceiver B unexpected response
	These error codes indicate potential problems with the Gemini hardware and/or software. Contact TAS for more information.
040-042	Reserved
043	ROM checksum failure
	Gemini was unable to read and verify its system software ROMs. The system software ROMs for the Gemini *Warp* are located inside the unit. Contact TAS for more information.
044	Software system exception
	The Gemini system software has detected a condition which prevents correct operation. Further information about the error is displayed on Gemini's front panel. Please record this information and contact TAS for service.
045	Diagnostics failed
	Gemini was unable to complete its power-on diagnostics. Contact TAS for service.
046	Incompatible software version
	The system software installed does not support this Gemini model. Gemini *Warp* requires software revisions 5.00 or higher.

Error Code	**Description**
047	Reserved
048	Missing / incorrect version EPROM Gemini was unable to read and verify an EPROM which identifies the hardware revision of the unit. Contact TAS for service.
049	Unknown interface Gemini was unable to detect the presence of an interface module. Verify that the interface card is installed correctly in the unit.
050	Invalid message transfer string Gemini could not parse a string loaded using a /MSGX:TSTR/ or /MSGX:RESP/ command. See section 5.4.4, Specifying a String, for more information about the syntax used to encode 8-bit data in Gemini commands.
051-059	Reserved
060	Syntax error in Multi-point string Gemini could not parse a string loaded using a /MPOL:ADDRj/, /MPOL:MADDR/, /MPOL:PMSG/, /MPOL:RMSG/, or /MPOL:SADDR/ command. See section 5.4.4, Specifying a String, for more information about the syntax used to encode 8-bit data in Gemini commands.
061	Slave address not in poll list The address specified in the /MPOL:SLAVE/ command must match one of the addresses in the poll list. See section 4.8, Multi-Point Polling Parameters, for more information.
062	No master configured This Gemini is configured with both DTEs acting as slave devices in a Multi-Point polling test. Since neither DTE is configured as the master device, results from the master device are not available. You must read these results from the Gemini unit which has a DTE configured as the master device.

Error Code	Description
063	Slave results request from master The command issued requests results from a DTE configured as slave device in a Multi-Point polling test. The DTE specified in the command is configured to be the master device, so these results are not available.
064-079	Reserved
080	Invalid timing measurement setup An attempt was made to perform a timing measurement on a signal which is not available on the selected interface. See section 8, Technical Specifications, for lists of the signals available on each interface.
090	Attempt to run Echo test with sync protocol The Character Echo and Block Acknowledgment tests are only defined for asynchronous data protocols. Send the command /TPCL:PCL=**async**/ before running either test.
091	Attempt to run a single iteration of Echo test while the test is running The command /ECHO:SEND/ was issued even though a Character Echo or Block Acknowledgment test was already running. The test continues to run, but the /ECHO:SEND/ command is not executed.

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8.0. TECHNICAL SPECIFICATIONS

8.1. General

AC Power

Voltage	85-265 VAC (auto ranging)
Frequency	47-440 Hertz
Dissipation	50 Watts (maximum)
Fuse Type	2A, 250V slow-blow fuse

Operating Environment

Temperature	0 to 50 degrees C (32 to 122 degrees F)
Humidity	10% to 90% non-condensing

Dimensions and Weight

Height	3.5 inches
Width	11.5 inches
Depth	14.5 inches
Weight	9.5 pounds (maximum)

8.2. Remote Control Interfaces

IEEE-488

Capabilities	talker/listener, controller

RS-232

Data Rates	300, 1200, 2400, 4800, 9600, 19200 bits per second
Character Size	7 or 8 bits
Parity	odd, even, none
Stop Bits	1, 1.5, or 2

Technical Specifications are subject to change without notice.

8.3. Data Analyzers (A and B)

Test Interfaces (A & B)

Physical Interfaces	RS-232 (with V.10 signal levels)
	ANSI/EIA/TIA-530-A Alt A

Output Levels of RS-232 Drivers

	Min	Max
Space	4.0V	6.0V
Mark	-4.0V	-6.0V

Input Levels of RS-232 Receivers

Mark	<2.3V
Space	>2.7V

Terminal Parameters

Data Formats[1]	async, sync, HDLC
Clock Sources	internal, modem, external
Flow Control	CTS, XON/XOFF, none

Async Data Format Options

Character Size	5, 6, 7, or 8 bits
Parity	odd, even, none
Stop Bits	1, 1.5, or 2

Sync Data Format Options[2]

Data Encoding	NRZ, NRZI
Parity	8 data bits - no parity, 7 data bits - odd parity, 7 data bits - even parity, 7 data bits - mark parity, 7 data bits - space parity

1 All terminal data formats are not available in all test applications. See section 8.4 for details.

2 All sync data format options are not available in all test applications. See section 8.4 for details.

HDLC Data Format Options[3]

Parity	8 data bits - no parity, 7 data bits - odd parity, 7 data bits - even parity, 7 data bits - mark parity, 7 data bits - space parity
Data Code	ASCII, EBCDIC
Address Field	00 to FF (hex)
Control Field	00 to FF (hex)

Internal Clock (Async)

Frequencies	45, 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 4800, 7200, 9600, 12000, 14400, 16000, 16800, 18000, 19200, 21600, 24000, 25600, 264000, 28000, 28800, 31200, 32000, 33600, 36000, 38400, 48000, 56000, 57600, 64000, 72000, 76800, 96000, 102400, 112000, 115200, 128000, 144000, 153600, 192000, 224000, 230400, 256000
Accuracy	+/- 0.01%
Clock Offset	-10% to +10% in 0.1% steps
Clock Accuracy	+/- 0.111% with offset

External Clock (Async)

Frequency Range	45 to 256000 bits per second

NOTE: Async external clock frequencies must be 16 times the desired bit rate.

3 All HDLC data format options are not available in all test applications. See section 8.4 for details.

Internal Clock (Sync/HDLC)

Frequencies[4]	75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 4800, 7200, 9600, 12000, 14400, 16000, 16800, 18000, 19200, 21600, 24000, 25600, 264000, 28000, 28800, 31200, 32000, 33600, 36000, 38400, 48000, 56000, 57600, 64000, 72000, 76800, 96000, 102400, 112000, 115200, 128000, 144000, 153600, 168000, 192000, 224000, 230400, 256000, 280000, 320000, 336000, 384000, 392000, 448000, 504000, 512000, 560000, 576000, 616000, 640000, 672000, 704000, 728000, 768000, 784000, 832000, 840000, 896000, 952000, 960000, 1008000, 1024000, 1064000, 1088000, 1120000, 1152000, 1176000, 1216000, 1232000, 1280000, 1288000, 1344000, 1400000, 1408000, 1456000, 1472000, 1512000, 1536000, 1544000, 1568000, 1600000, 1624000, 1664000, 1680000, 1728000, 1736000, 1792000, 1848000, 1856000, 1904000, 1920000, 1960000, 1984000, 2016000, 2048000
Accuracy	+/- 0.01%
Clock Offset	-10% to +10% in 0.1% steps
Clock Accuracy	+/- 0.111% with offset

External Clock (Sync/HDLC):

Frequency Range[4]	75 to 2048000 bits per second

Modem Clock (Sync/HDLC only):

Frequency Range[4]	75 to 2048000 bits per second

Other Features:

Self-Loop in all test modes

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4 Data rates above 256000 bits per second are not available in all test applications. See section 8.4 for details.

8.4. Performance Tests

Bit Error Rate / Throughput (BERT) Test

Data Rates	45 to 256000 bps (Async) 75 to 256000 bps (Sync)
Flow Control	CTS, XON/XOFF, none
Test Configurations	Transmit DTE A - Analyze DTE A Transmit DTE A - Analyze DTE B Transmit DTE B - Analyze DTE A Transmit DTE B - Analyze DTE B Transmit DTE A&B - Analyze DTE A Transmit DTE A&B - Analyze DTE B Transmit DTE A&B - Analyze DTE A&B
# Blocks per Test	1 to 1000000, or continuous operation
# Seconds per Test	1 to 1000000, or continuous operation
Max. Test Duration	2.1 billion bytes (received)
Block Size	25 to 228 and 102 to 108 characters (Async) 25 to 228 and 102 to 108 bits (Sync)
Test Patterns	63, 511, 2047, MARK, SPACE, ALT, two user-defined patterns
User-Defined Patterns	1 to 256 characters
Automatic Test Limits	Bit errors, character errors, block errors, errored seconds, sync losses, sync time-out
Test Results[5]	Test status, Pass/Fail results, pattern sync status, blocks analyzed, bit errors, character errors, block errors, sync losses, throughput in bits, characters, and blocks/second, transmit clock speed, receive clock speed, seconds since last sync loss, error free seconds, errored seconds, no sync seconds, total test seconds,error analysis seconds

5 Character errors and characters per second reported in async only

High-Speed Bit Error Rate / Throughput (BERT) Test

Data Rates	75 to 2048000 bps (Sync only)
Flow Control	none
Test Configurations	Transmit DTE A - Analyze DTE A Transmit DTE A - Analyze DTE B Transmit DTE B - Analyze DTE A Transmit DTE B - Analyze DTE B Transmit DTE A&B - Analyze DTE A Transmit DTE A&B - Analyze DTE B Transmit DTE A&B - Analyze DTE A&B
# Blocks per Test	1 to 1000000, or continuous operation
# Seconds per Test	1 to 1000000, or continuous operation
Max. Test Duration	231-1 blocks received
Block Size	5 to 100,000,000 octets
Test Patterns	63, 511, 2047, 215 - 1, 220 - 1, 223 - 1, MARK, SPACE, ALT, two user-defined patterns
User-Defined Patterns	1 to 256 characters
Automatic Test Limits	Bit errors, block errors, errored seconds, sync losses, sync time-out
Test Results	Test status, Pass/Fail results, pattern sync status, blocks analyzed, bit errors, block errors, sync losses, throughput in bits and blocks/second, transmit clock speed, receive clock speed, seconds since last sync loss, error free seconds, errored seconds, no sync seconds, total test seconds, error analysis seconds

Message Error Rate (Polls) Test

Data Rates	45 to 256000 bps (Async) 75 to 256000 bps (Sync)
Flow Control	CTS
Test Configurations	Transmit DTE A - Analyze DTE A Transmit DTE A - Analyze DTE B Transmit DTE B - Analyze DTE A Transmit DTE B - Analyze DTE B Transmit DTE A&B - Analyze DTE A Transmit DTE A&B - Analyze DTE B Transmit DTE A&B - Analyze DTE A&B
# Polls per Test	1 to 1,000,000
Inter-Poll Delay	1 to 2000 milliseconds
Poll Messages	SYN-SYN-EOT, THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK^M^J, two user-defined patterns P1 and P2
User-Defined Patterns	1 to 256 characters
Test Protocol Options	Switched or constant Request To Send (RTS) switched or constant Data Carrier Detect (DCD)
Automatic Test Limits	Sync error limit, message error limit, false poll limit, CTS time-out
Test Results	Test status, Pass/Fail results, polls received, sync errors, message errors, false polls, RTS-CTS delay, transmit clock speed, receive clock speed

RTS-CTS Delay Results:

Measurement Range	0 to 9999 milliseconds
Resolution	1 millisecond
Accuracy	+/- 0.05 milliseconds

Call Connect Reliability (Calls) Test

Data Rates[6]	45 to 256000 bps (Async) 75 to 256000 bps (Sync)
Flow Control	CTS, XON/XOFF, none
Test Configurations	Originate Call at DTE A or B Transmit DTE A - Analyze DTE A Transmit DTE A - Analyze DTE B Transmit DTE B - Analyze DTE A Transmit DTE B - Analyze DTE B Transmit DTE A&B - Analyze DTE A Transmit DTE A&B - Analyze DTE B Transmit DTE A&B - Analyze DTE A&B
# Calls per Test	1 to 9,999,999
Modem Strap Strings	Strap, Originate, Answer, and Drop (each 0 to 80 characters in length)
Connect Events	DCD and/or modem connect string
Modem Connect String	0 to 80 characters
Test Messages	63, 511, 2047, two user-defined patterns
User-Defined Patterns	1 to 256 characters
Test Protocol Options	Switched or constant Data Terminal Ready (DTR), strap to DTR delay, DTR to call delay, answer strap to originate strap delay, switched or constant Request To Send (RTS), connect to RTS delay, CTS to test message delay, post drop string delay
Test Results	Test status, Pass/Fail results, attempted transfers, failed transfers, CTS time-outs, connect time-outs, header errors in test message, data errors in test message, data transfer time-outs, modem connect response string

6 Call setup and data transfer portions of test may use different data protocols. For example, modem straps might be sent using an async protocol while the data transfer is synchronous.

Data Compression / File Transfer Test

Data Rates	45 to 256000 bps (Async) 75 to 256000 bps (HDLC)
Flow Control	CTS, XON/XOFF, none (Async) CTS (HDLC)
Test Configurations	Transmit DTE A - Analyze DTE A Transmit DTE A - Analyze DTE B Transmit DTE B - Analyze DTE A Transmit DTE B - Analyze DTE B Transmit DTE A&B - Analyze DTE A&B
# Transfers per Test	1 -1,000,000
Test Patterns	12 pre-defined patterns, one user-defined pattern
Test Files	1 to 6,553,600 characters/octets
User-Defined Pattern	1 to 65536 characters/octets
Test Protocol Options	Inter-transfer delay, file header size, HDLC inter-frame delay, HDLC last frame to RTS drop delay, HDLC frame size, HDLC frame address, HDLC control field
Error Detection Options	File transfer time-out, file header time-out, character error limit (Async), bit error limit (HDLC)
Automatic Test Limits	Failed transfer limit
Test Results	Test status, attempted transfers, failed transfers, elapsed time and current transfer rate, min., max. and average transfer rates, number of characters/frames transferred, character/frame error counts, transfer time-outs
CTS active to transmit data delay	1.1 ms @ 1200 bps 0.5 ms @ 2400 bps 0.3 ms @ 4800 bps 0.2 ms @ 9600 bps < 0.1 ms @ 19200 bps or greater

High Speed Data Compression / File Transfer Test

Data Rates	75 to 2048000 bps (Sync only)
Flow Control	CTS, none
Test Configurations	Transmit DTE A - Analyze DTE A Transmit DTE A - Analyze DTE B Transmit DTE B - Analyze DTE A Transmit DTE B - Analyze DTE B Transmit DTE A&B - Analyze DTE A&B
# Transfers per Test	1 -1,000,000
Test Patterns	12 pre-defined patterns, one user-defined pattern
Test Files	1 to 6,553,600 octets
User-Defined Pattern	1 to 65536 octets
Test Protocol Options	Inter-transfer delay, file header size, HDLC inter-frame delay, HDLC frame size, HDLC frame address, HDLC control field
Error Detection Options	File transfer time-out, file header time-out, bit error limit (HDLC)
Automatic Test Limits	Failed transfer limit
Test Results	Test status, attempted transfers, failed transfers, elapsed time and current transfer rate, min., max. and average transfer rates, number of frames transferred, frame error counts, transfer time-outs
CTS active to transmit data delay	1.1 ms @ 1200 bps 0.5 ms @ 2400 bps 0.3 ms @ 4800 bps 0.2 ms @ 9600 bps < 0.1 ms @ 19200 bps or greater

Multi-Point Polling Test

Data Rates	45 to 256000 bps (Async) 75 to 256000 bps (Sync, HDLC)
Flow Control	CTS
Test Configurations	DTE A master & DTE B slave, DTE A slave & DTE B master, DTE A slave & DTE B slave, DTE A master, DTE A slave, DTE B master, DTE B slave
Number of polls	1 -1,000,000
Poll Message Protocols	Async, Monosync, Bisync, HDLC
Poll message	string, 0 to 80 characters
Response message	string, 0 to 80 characters
Master address	string, 0 to 8 characters
Slave address	string, 1 to 8 characters
Test Protocol Options	Switched/constant RTS, test/ignore DCD, CTS to transmit delay, poll to drop RTS delay, response received to poll delay, poll received to response delay
Number of slaves	Up to 21, two per Gemini
Test Results:	Master DTE (Results available for each slave or for all slaves): Test status, polls sent, correct responses received, response time-outs, response errors (address/message), response times (min., max, aver, last), RTS to CTS timing (min, max, aver, last) Slave DTE: Test status, polls received, number of polls received with message errors

Character Echo Test

Data Rates	45 to 256000 bps (Async only)
Flow Control	CTS, none
Test Configurations	Transmit DTE A - Analyze DTE B Transmit DTE B - Analyze DTE A
Number of iterations	1 - 9999999
Test Protocol Options	Random inter-character delay, filter consecutive identical characters, fixed or random test pattern
Inter-character delay:	Minimum delay 10 to 1000 milliseconds Span of random delay 0 to 1000 milliseconds
Error Detection Options	Response time-out
Test Results	Number of iterations attempts, errored iterations, iterations timed-out, one way character latency (min, max, avg, last), round trip character latency (min, max, avg, last)

Block Acknowledgment Test

Data Rates	45 to 256000 bps (Async only)
Flow Control	CTS, none
Test Configurations	Transmit DTE A - Analyze DTE B Transmit DTE B - Analyze DTE A
Number of iterations	1 - 9999999
Block Size	1 to 9999 characters
Test Protocol Options	Filter consecutive identical characters, fixed or random test pattern
Error Detection Options	Response time-out
Test Results	Number of iterations completed, errored iterations, iterations timed-out, one way character latency (min, max, avg, last), one way block latency (min, max, avg, last), block acknowledgment delay (min, max, avg, last)

Call Setup (Front Panel only)

Data Rates	45 to 256000 bps (Async) 75 to 256000 bps (Sync)
Test Configurations	Transmit DTE A - Analyze DTE A Transmit DTE B - Analyze DTE B
Modem Strap Strings	Strap, Originate, Answer, and Drop (each 0 to 80 characters in length)
Modem Response	Up to 2,048 characters

Message Transfer (Remote Control only)

Data Rates	45 to 256000 bps (Async) 75 to 256000 bps (Sync)
Test Configurations	Transmit DTE A - Analyze DTE A Transmit DTE A - Analyze DTE B Transmit DTE B - Analyze DTE B Transmit DTE B - Analyze DTE A
Transmit Message	256 characters encoded / 80 characters decoded
Expected Response	256 characters encoded / 80 characters decoded
Modem Response	up to 2,048 characters
Error Detection Options	Expected response string, response length limit, response time-out

Frequency Measurement

Range	45 Hz to 2.048 MHz
Resolution	100 PPM
Accuracy	+/-.01% +/- 1 digit

Timing Measurement

Range	10 μsec to 99,999.99 msec
Resolution	10 μsec
Accuracy	+/- 0.5 μsec

8.5. DTE A and DTE B Pin Assignments - RS-232 Interface

PIN #	SIGNAL NAME	GEMINI NAME	CCITT NAME	SOURCE	TIMING MEAS.
1	Frame Ground FG				N/A
2	Transmit data	TD	103	DTE	Yes
3	Receive data	RD	104	DCE	Yes
4	Request to send	RTS	105	DTE	Yes
5	Clear to send	CTS	106	DCE	Yes
6	Data set ready	DSR	107	DCE	Yes
7	Signal ground	SG	102		N/A
8	Data carrier detect	DCD	108	DCE	Yes
9	No connect				N/A
10	No connect				N/A
11	N/A				N/A
12	Secondary data carrier detect [7]	SDCD	122/112	DCE	Yes
13	Secondary clear to send	SCTS	121	DCE	Yes
14	Secondary xmit. data	STD	118	DTE	Yes
15	Transmit clock	TC	114	DCE	Yes
16	Secondary receive data	SRD	119	DCE	Yes
17	Receive clock	RC	115	DCE	Yes
18	Local loopback	LLB	141	DTE	No
19	Secondary request to send	SRTS	120	DTE	Yes
20	Data terminal ready	DTR	108.2	DTE	Yes
21	Signal quality/Remote Loopback [8]	SQ/RL	110/140	Either	No
22	Ring indicator	RI	125	DCE	Yes
23	Data rate select [9]	DRS_IN/DRS_OUT	112/111	Either	No
24	Transmit clock	ETC	113	DTE	Yes
25	Test Mode	TM	142	DCE	No

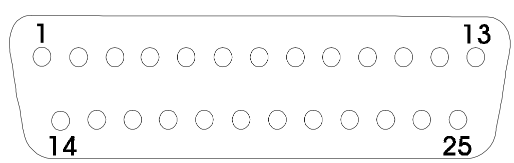


Figure 8-1. RS-232 Connector Pinout

7 Circuit 112 is sourced from the DCE.

8 Circuit 140 is sourced from the DTE, circuit 110 is sourced from the DCE, the default for pin 21 is SQD (circuit 110).

9 Circuit 111 is sourced from the DTE, circuit 112 is sourced from the DCE, the default for pin 23 is DRS_IN (circuit 112).

8.6. DTE A and DTE B Pin Assignments - 530-A Interface

PIN #	SIGNAL NAME	GEMINI NAME	CCITT NAME	SOURCE	TIMING MEAS.
1	Frame ground				N/A
2	Transmit data	TD+	103A	DTE	Yes
3	Receive data	RD+	104A	DCE	Yes
4	Request to send	RTS+	105A	DTE	Yes
5	Clear to send	CTS+	106A	DCE	Yes
6	DCE Ready	DSR	107	DCE	Yes
7	Ground				N/A
8	Receive Line Signal Detect	DCD+	109A	DCE	Yes
9	Receive clock	RC-	115B	DCE	Yes
10	Receive Line Signal Detect	DCD-	109B	DCE	Yes
11	Transmit Signal Timing Element Source-DTE Source	ETC-	113B	DTE	Yes
12	Transmit Signal Timing Element Source-DCE Source	TC-	114B	DCE	Yes
13	Clear to send	CTS-	106B	DCE	Yes
14	Transmit data	TD-	103B	DTE	Yes
15	Transmit Signal Timing Element Source	TC+	114A	DCE	Yes
16	Receive data	RD-	104A	DCE	Yes
17	Receive clock	RC+	115A	DCE	Yes
18	Local Loopback	LL	141	DTE	No
19	Request to send	RTS-	105B	DTE	Yes
20	DTE Ready	DTR	108	DTE	Yes
21	Remote loopback	RL	140	DTE	No
22	Ring Indicator	RI	125	DCE	Yes
23	Ground		102b		N/A
24	Transmit Signal Timing Element Source	ETC+	113A	DTE	Yes
25	Test Mode	TM	142	DCE	No
26	No Connect		N/A	N/A	N/A

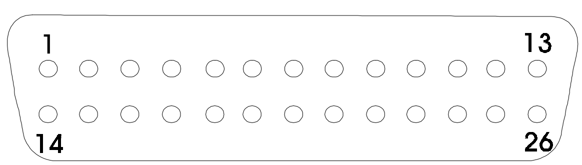


Figure 8-2. 530-A Connector Pinout

8.7. RS-232 Control Port Pin Assignments

PIN	SIGNAL	RS-232 CIRCUIT	SOURCE	V.24 CIRCUIT
1	Protective Ground	AA	---	101
2	Transmit Data	BA	DTE	118
3	Receive Data	BB	DCE	104
4	Request to Send	CA	DTE	105
5	Clear to Send	CB	DCE	106
6	Data Set Ready	CC	DCE	107
7	Signal Ground	AB	---	102
20	Data Terminal Ready	CD	DTE	108.2

8.8. GPIB Control Port Pin Assignments

PIN	FUNCTION
1	DIO1
2	DIO2
3	DIO3
4	DIO4
5	EOI
6	DAV
7	NRFD
8	NDAC
9	IFC
10	SRQ
11	ATN
12	Frame Ground
13	DIO5
14	DIO6
15	DIO7
16	DIO8
17	REN
18	Signal Ground
19	Signal Ground
20	Signal Ground
21	Signal Ground
22	Signal Ground
23	Signal Ground
24	Signal Ground

8.9. AUX Port Pin Assignments

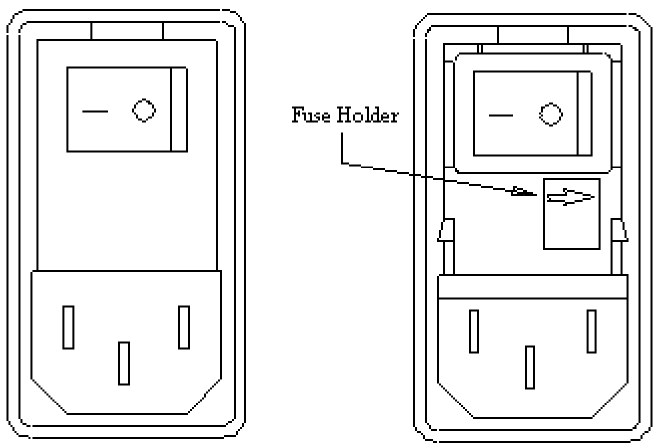
PIN	FUNCTION
1	Reserved
2	Reserved
3	Reserved
4	Reserved
5	Reserved
6	Reserved
7	Reserved
8	Reserved
9	Reserved

8.10. Fuse Replacement Procedure

The fuse is installed at the factory to match the most commonly used line voltage in the country of destination.

Caution - Disconnect from the supply before servicing

1. Locate the power entry module on rear panel.
2. Using a small screwdriver, pry open the cover to expose the fuse holder using the notch at the top of the power entry module (refer to diagram below).



3. Pull the fuse from the fuse holder.
4. To reinstall, select the proper fuse and place in the fuse holder.

TAS Part Number	Type
1800-0078	2A 250V Slow-Blow Fuse

5. Reinsert the fuse holder and close the power entry module.

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APPENDIX 1.0. GEMINI ROM FILES

This Appendix outlines the contents of the ROM files located in the Gemini's ROM cartridge. These files are used to execute built-in performance tests for specific modem types. Each test file is described, followed by a listing of the parameters set by each test file. Gemini default parameters are also provided.

A1.1. Predefined Test Configuration Files

1,200 bps Async (1200_async) - contains test settings for a 1,200 bps asynchronous modem with Hayes AT command set. This test configuration was verified on a pair of Hayes Smartmodem 1200 modems.

2,400 bps Async (2400_async) -contains test settings for a 2,400 bps asynchronous modem with Hayes AT command set. This test configuration was verified on a pair of Hayes Smartmodem 2400 modems.

2,400 bps Sync (2400_sync) -contains test settings for a 2,400 bps synchronous modem with Hayes AT command set. This file configures the modem for asynchronous call setup and synchronous test data transmission. This test configuration was verified on a pair of Hayes Smartmodem 2400 modems.

9,600 bps Async (9600_async) - contains test settings for a 9,600 bps asynchronous modem with Hayes AT command set. This file configures the modem for asynchronous call setup and asynchronous test data transmission. This test configuration was verified on a pair of Hayes Ultra 96 modems.

9,600 bps Sync (9600_sync) - contains test settings for a 9,600 bps synchronous modem with Hayes AT command set. This file configures the modem for asynchronous call setup and synchronous test data transmission. This test configuration was verified on a pair of Hayes Ultra 96 modems.

14,400 bps Async (14.4k_async) - contains test settings for a 14,400 bps asynchronous modem with Hayes AT command set. This file configures the modem for asynchronous call setup and asynchronous test data transmission.

14,400 bps Sync (14.4k_sync) - contains test settings for a 14,400 bps synchronous modem with Hayes AT command set. This file configures the modem for asynchronous call setup and synchronous test data transmission.

19,200 bps Async (19.2k_async) - contains test settings for a 19,200 bps asynchronous modem with Hayes AT command set. This file configures the modem for asynchronous call setup and asynchronous test data transmission.

19,200 bps Sync (19.2k_sync) - contains test settings for a 19,200 bps synchronous modem with Hayes AT command set. This file configures the modem for asynchronous call setup and synchronous test data transmission.

38,400 bps Async (38.4k_async) - contains test settings for a 38,400 bps asynchronous modem with Hayes AT command set. This file configures the modem for asynchronous call setup and asynchronous test data transmission.

57,600 bps Async (57.6k_async) - contains test settings for a 57,600 bps asynchronous modem with Hayes AT command set. This file configures the modem for asynchronous call setup and asynchronous test data transmission.

64,000 bps Async (64.0k_async) - contains test settings for a 64,000 bps asynchronous modem with Hayes AT command set. This file configures the modem for asynchronous call setup and asynchronous test data transmission.

76.800 bps Async (76.8k_async) - contains test settings for a 76,800 bps asynchronous modem with Hayes AT command set. This file configures the modem for asynchronous call setup and asynchronous test data transmission.

96,000 bps Async (96.0k_async) - contains test settings for a 96,000 bps asynchronous modem with Hayes AT command set. This file configures the modem for asynchronous call setup and asynchronous test data transmission.

102,400 bps Async (102.4k_async) - contains test settings for a 102,400 bps asynchronous modem with Hayes AT command set. This file configures the modem for asynchronous call setup and asynchronous test data transmission.

115,200 bps Async (115.2k_async) - contains test settings for a 115,200 bps asynchronous modem with Hayes AT command set. This file configures the modem for asynchronous call setup and asynchronous test data transmission.

128,000 bps Async (128.0k_async) - contains test settings for a 128,000 bps asynchronous modem with Hayes AT command set. This file configures the modem for asynchronous call setup and asynchronous test data transmission.

Leased-Line (hpl_sync) - contains the test settings for a high-speed (9,600 bps) private-line modem. Since this is a leased-line modem, no call setup is required. This file configures the modem for synchronous test data transmission with clock signal provided by the modem. This test configuration was verified on a pair of UDS 9600FP modems.

ISDN Synchronous (isdn_sync) - contains the test settings for an ISDN connection, synchronous communication with clock provided by the modem. The "L1" command is not used in any of the command strings because it is assumed it is not part of the modem's command set.

2.048 Mbps Sync (2.048m_sync) - configures the High-Speed BERT test using Gemini’s internal frequency synthesizers to generate the transmit clocks.

High-Speed BERT (hs_bert) - configures the High-Speed BERT test using DCE-provided transmit and receive clocks.

Multipoint Master (mpol_master) - contains the test settings to configure Gemini's DTE A port as a master in the multipoint polling configuration with six slaves to poll.

Multipoint Slave (mpol_slave) - contains the test settings to configure both of Gemini's DTE ports as slaves in a multipoint polling configuration.

Character Echo (char_echo) - configures Gemini to run the TSB-38 Character Echo test.

Block Acknowledgment (block_ack) - configures Gemini to run the TSB-38 Block Acknowledgment test.

Default Settings (factory) - contains the default settings for the following Gemini parameters. Since this file can be called from a remote link, the remote link parameters are not changed when this file is called.

A1.2. Contents of the ROM Files

On initial power up, Gemini sets all the parameters to their default settings. When a ROM file is recalled, Gemini resets particular parameters depending on the specific ROM file. To see how a parameter is set for a specific ROM file, look for the parameter under the ROM file listing. If it is not listed there, the parameter is set to the Gemini default setting. These default parameter settings are listed in this section before the ROM file listings. Refer to the "Gemini Parameter Reference" chapter for detailed information on each command group.

A1.2.1. Gemini Default Parameter Listing

ACLL:CHRD=50, DATA=7, PARI=ODD, STOP=1

ATST:DATA=7, PARI=ODD, STOP=1

BERT:B1="THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK^M^J"
BERT:B2="TAS GEMINI 1022 DUAL TERMINAL EMULATOR^M^J"
BERT:BITLj=10000, BLKLj=50, BRKLj=2, BSIZ=10E2, CHRLj=200
BERT:CNFG=TA&B|RA&B, MODE=0, NBLK=100
BERT:PATT=SPACE, RSEN=Y, RTSC=N, RTSD=10
BERT:SLERRB=Y, SLNDTO=3

CALL:ANSWA="ATS0=1^M"
CALL:ANSWB="ATS0=1^M"
CALL:ANSWDj=100, AXMT=511, BXMT=511
CALL:C1="Calls user pattern #1^M"
CALL:C2="Calls user pattern #2^M"
CALL:CALLS=1000, CNFG=TA&B|RA&B, CRTDj=100
CALL:CSTRj="CONNECT", CTCD=10, CTSTOj=1000, CTXDj=10
CALL:DROPA="\P2 +++\P2 ATH^M"
CALL:DROPB="\P2 +++\P2 ATH^M"
CALL:DROPDj=100, DTRCj=Y, DTRDj=10, EVj=DCD&STR
CALL:EVTOj=20, MSG=ORIGA
CALL:ORIGA="ATDT2^M"
CALL:ORIGB="ATDT1^M"
CALL:OSTA=A
CALL:STRPA="ATZ^M"
CALL:STRPB="ATZ^M"
CALL:STRPDj=200, XFTO=5

CNFG:RESP=VERBOSE

CPCL:CLKj=1200, FLOWj=NONE, OFSj=0, PCL=ASYNC

```
DCMP:CLIM=1, CNFG=TA&B|RA&B, FLIM=1, HSIZ=10
DCMP:MEAS=END_TO_END, NPATT=1, NXFERS=1
DCMP:PATT=ASCII, RTSj=N, TERM=0, TIMEH=30, TIMET=30, XFERD=5

GPIB:ADDR=1, DTO=5, ITC=EOI
GPIB:MADDR=0, GPIB:MSG=""
GPIB:REN=0
GPIB:WTIM=100

HCLL:ADDR=0xff, CHAR=8BN, CODE=ASCII, CTRL=0x13

INTF:DTRj=0, RTSj=0, SRTSj=0, STDj=1, TDj=1

MPOL:ADDRA="1"
MPOL:ADDRB="2"
MPOL:CTSDj=0, DCDj=IGNORE, MADDR="", MASTR=A
MPOL:NPOL=0, PMSG="", POLLD=0, RESPDj=0
MPOL:RMSG="", RTLIM=5, SADDR="2", SENTDj=0
MPOL:SLAVE="*", SPCL=BISYNC

MSGX:CLIM=0, CNFG=TA|RA, RESP=""
MSGX:TLIM=0, TSTR="AT"

POLL:CNFG=TA&B|RA&B, CTOj=0, FPOLj=0, MODE=0
POLL:MSGLj=0, NPOL=1000
POLL:P1="Polls user pattern #1^M"
POLL:P2="Polls user pattern #2^M"
POLL:PDLY=10, PMSG=FOX, RXCRj=CONST
POLL:SYNLj=0, TXCRj=CONST

SCLL:CHAR=8BN, CODE=ASCII, NSYN=2, SYN1=0x16, SYN2=0x16
TEST:IERR=N, LOOP=N, MODE=CALL_SETUP

TPCL:CLKj=1200, FLOWj=NONE, OFSj=0, PCL=ASYNC
```

A1.2.2. 1200_async

Parameters for Hayes Compatible 1200 Bps Modems, Asynchronous Call, Asynchronous Test.

BERT:BSIZ=10E2
BERT:CNFG=TA&B|RA&B
BERT:NBLK=1000
BERT:PATT=SPACE

CALL:ANSWA="AT L1 &C1 &D2 &M1 &X0 S0=1^M"
CALL:ANSWB="AT L1 &C1 &D2 &M1 &X0 S0=1^M"
CALL:AXMT=2047
CALL:BXMT=2047
CALL:EVTOA=50
CALL:EVTOB=50
CALL:ORIGA="AT L1 &C1 &D2 &M1 &X0 DT2^M"
CALL:ORIGB="AT L1 &C1 &D2 &M1 &X0 DT1^M"
CALL:STRPA="AT Z^M"
CALL:STRPB="AT Z^M"

CPCL:CLKA=1200
CPCL:CLKB=1200

POLL:CNFG=TA&B|RA&B

TESTMODE=CALL_SETUP

TPCL:CLKA=1200
TPCL:CLKB=1200
TPCL:FLOWA=CTS
TPCL:FLOWB=CTS
TPCL:PCL=ASYNC

A1.2.3. 2400_async

Parameters for Hayes Compatible 2400 Bps Modems, Asynchronous Call, Asynchronous Test.

BERT:BSIZ=10E2
BERT:CNFG=TA&B|RA&B
BERT:NBLK=1000
BERT:PATT=SPACE

CALL:ANSWA="AT L1 &C1 &D2 &M1 &X0 S0=1^M"
CALL:ANSWB="AT L1 &C1 &D2 &M1 &X0 S0=1^M"
CALL:AXMT=2047
CALL:BXMT=2047
CALL:EVTOA=50
CALL:EVTOB=50
CALL:ORIGA="AT L1 &C1 &D2 &M1 &X0 DT2^M"
CALL:ORIGB="AT L1 &C1 &D2 &M1 &X0 DT1^M"
CALL:STRPA="AT Z^M"
CALL:STRPB="AT Z^M"

CPCL:CLKA=2400
CPCL:CLKB=2400

POLL:CNFG=TA&B|RA&B

TESTMODE=CALL_SETUP

TPCL:CLKA=2400
TPCL:CLKB=2400
TPCL:FLOWA=CTS
TPCL:FLOWB=CTS
TPCL:PCL=ASYNC

A1.2.4. 2400_sync

Parameters for the Hayes Compatible 2400 Bps Modems, Asynchronous Call, Synchronous Test.

BERT:BITLA=10000
BERT:BITLB=10000
BERT:BLKLA=500
BERT:BLKLB=500
BERT:BRKLA=2
BERT:BRKLB=2
BERT:BSIZ=10E3
BERT:CHRLA=2000
BERT:CHRLB=2000
BERT:CNFG=TA&B|RA&B
BERT:NBLK=1000
BERT:PATT=511

CALL:ANSWA="AT L1 &C1 &D2 &M1 &X0 S0=1^M"
CALL:ANSWB="AT L1 &C1 &D2 &M1 &X0 S0=1^M"
CALL:AXMT=2047
CALL:BXMT=2047
CALL:EVTOA=50
CALL:EVTOB=50
CALL:ORIGA="AT L1 &C1 &D2 &M1 &X0 DT2^M"
CALL:ORIGB="AT L1 &C1 &D2 &M1 &X0 DT1^M"
CALL:STRPA="AT Z^M"
CALL:STRPB="AT Z^M"

CPCL:CLKA=2400
CPCL:CLKB=2400

POLL:CNFG=TA&B|RA&B

TESTMODE=CALL_SETUP

TPCL:CLKA=MODEM
TPCL:CLKB=MODEM
TPCL:FLOWA=CTS
TPCL:FLOWB=CTS
TPCL:PCL=SYNC

A1.2.5. 9600_async

Parameters for Hayes Compatible 9600 Bps Modems, Asynchronous Call, Asynchronous Test.

BERT:BSIZ=10E2
BERT:CNFG=TA&B|RA&B
BERT:NBLK=1000
BERT:PATT=SPACE

CALL:ANSWA="AT L1 &C1 &D2 &M1 &X0 S0=1^M"
CALL:ANSWB="AT L1 &C1 &D2 &M1 &X0 S0=1^M"
CALL:AXMT=2047
CALL:BXMT=2047
CALL:EVTOA=50
CALL:EVTOB=50
CALL:ORIGA="AT L1 &C1 &D2 &M1 &X0 DT2^M"
CALL:ORIGB="AT L1 &C1 &D2 &M1 &X0 DT1^M"
CALL:STRPA="AT &F^M"
CALL:STRPB="AT &F^M"
CPCL:CLKA=9600
CPCL:CLKB=9600

POLL:CNFG=TA&B|RA&B

TESTMODE=CALL_SETUP

TPCL:CLKA=9600
TPCL:CLKB=9600
TPCL:FLOWA=CTS
TPCL:FLOWB=CTS
TPCL:PCL=ASYNC

A1.2.6. 9600_sync

Parameters for Hayes Compatible 9600 Bps Modems, Asynchronous Call, Synchronous Test.

BERT:BITLA=10000
BERT:BITLB=10000
BERT:BLKLA=500
BERT:BLKLB=500
BERT:BRKLA=2
BERT:BRKLB=2
BERT:BSIZ=10E3
BERT:CHRLA=2000
BERT:CHRLB=2000
BERT:CNFG=TA&B|RA&B
BERT:NBLK=1000
BERT:PATT=511

CALL:ANSWA="AT L1 &C1 &D2 &M1 &X0 S0=1^M"
CALL:ANSWB="AT L1 &C1 &D2 &M1 &X0 S0=1^M"
CALL:AXMT=2047
CALL:BXMT=2047
CALL:EVTOA=50
CALL:EVTOB=50
CALL:ORIGA="AT L1 &C1 &D2 &M1 &X0 DT2^M"
CALL:ORIGB="AT L1 &C1 &D2 &M1 &X0 DT1^M"
CALL:STRPA="AT &F^M"
CALL:STRPB="AT &F^M"

CPCL:CLKA=9600
CPCL:CLKB=9600

POLL:CNFG=TA&B|RA&B

TESTMODE=CALL_SETUP

TPCL:CLKA=MODEM
TPCL:CLKB=MODEM
TPCL:FLOWA=CTS
TPCL:FLOWB=CTS
TPCL:PCL=SYNC

A1.2.7. 14.4k_async

Parameters for Hayes Compatible 14400 Bps Modems, Asynchronous Call, Asynchronous Test.

BERT:BSIZ=10E2
BERT:CNFG=TA&B|RA&B
BERT:NBLK=1000
BERT:PATT=SPACE

CALL:ANSWA="AT L1 &C1 &D2 &M1 &X0 S0=1^M"
CALL:ANSWB="AT L1 &C1 &D2 &M1 &X0 S0=1^M"
CALL:AXMT=2047
CALL:BXMT=2047
CALL:EVTOA=50
CALL:EVTOB=50
CALL:ORIGA="AT L1 &C1 &D2 &M1 &X0 DT2^M"
CALL:ORIGB="AT L1 &C1 &D2 &M1 &X0 DT1^M"
CALL:STRPA="AT &F^M"
CALL:STRPB="AT &F^M"

CPCL:CLKA=14400
CPCL:CLKB=14400

POLL:CNFG=TA&B|RA&B

TESTMODE=CALL_SETUP

TPCL:CLKA=14400
TPCL:CLKB=14400
TPCL:FLOWA=CTS
TPCL:FLOWB=CTS
TPCL:PCL=ASYNC

A1.2.8. 14.4k_sync

Parameters for Hayes Compatible 14400 Bps Modems, Asynchronous Call, Synchronous Test.

BERT:BITLA=10000
BERT:BITLB=10000
BERT:BLKLA=500
BERT:BLKLB=500
BERT:BRKLA=2
BERT:BRKLB=2
BERT:BSIZ=10E3
BERT:CHRLA=2000
BERT:CHRLB=2000
BERT:CNFG=TA&B|RA&B
BERT:NBLK=1000
BERT:PATT=511

CALL:ANSWA="AT L1 &C1 &D2 &M1 &X0 S0=1^M"
CALL:ANSWB="AT L1 &C1 &D2 &M1 &X0 S0=1^M"
CALL:AXMT=2047
CALL:BXMT=2047
CALL:EVTOA=50
CALL:EVTOB=50
CALL:ORIGA="AT L1 &C1 &D2 &M1 &X0 DT2^M"
CALL:ORIGB="AT L1 &C1 &D2 &M1 &X0 DT1^M"
CALL:STRPA="AT &F^M"
CALL:STRPB="AT &F^M"

CPCL:CLKA=14400
CPCL:CLKB=14400

POLL:CNFG=TA&B|RA&B

TESTMODE=CALL_SETUP

TPCL:CLKA=MODEM
TPCL:CLKB=MODEM
TPCL:FLOWA=CTS
TPCL:FLOWB=CTS
TPCL:PCL=SYNC

A1.2.9. 19.2k_async

Parameters for Hayes Compatible 19200 Bps Modems, Asynchronous Call, Asynchronous Test.

BERT:BSIZ=10E2
BERT:CNFG=TA&B|RA&B
BERT:NBLK=1000
BERT:PATT=SPACE

CALL:ANSWA="AT L1 &C1 &D2 &M1 &X0 S0=1^M"
CALL:ANSWB="AT L1 &C1 &D2 &M1 &X0 S0=1^M"
CALL:AXMT=2047
CALL:BXMT=2047
CALL:EVTOA=50
CALL:EVTOB=50
CALL:ORIGA="AT L1 &C1 &D2 &M1 &X0 DT2^M"
CALL:ORIGB="AT L1 &C1 &D2 &M1 &X0 DT1^M"
CALL:STRPA="AT &F^M"
CALL:STRPB="AT &F^M"

CPCL:CLKA=19200
CPCL:CLKB=19200

POLL:CNFG=TA&B|RA&B

TESTMODE=CALL_SETUP

TPCL:CLKA=19200
TPCL:CLKB=19200
TPCL:FLOWA=CTS
TPCL:FLOWB=CTS
TPCL:PCL=ASYNC

A1.2.10. 19.2k_sync

Parameters for Hayes Compatible 19200 Bps Modems, Asynchronous Call, Synchronous Test.

BERT:BITLA=10000
BERT:BITLB=10000
BERT:BLKLA=500
BERT:BLKLB=500
BERT:BRKLA=2
BERT:BRKLB=2
BERT:BSIZ=10E3
BERT:CHRLA=2000
BERT:CHRLB=2000
BERT:CNFG=TA&B|RA&B
BERT:NBLK=1000
BERT:PATT=511

CALL:ANSWA="AT L1 &C1 &D2 &M1 &X0 S0=1^M"
CALL:ANSWB="AT L1 &C1 &D2 &M1 &X0 S0=1^M"
CALL:AXMT=2047
CALL:BXMT=2047
CALL:EVTOA=50
CALL:EVTOB=50
CALL:ORIGA="AT L1 &C1 &D2 &M1 &X0 DT2^M"
CALL:ORIGB="AT L1 &C1 &D2 &M1 &X0 DT1^M"
CALL:STRPA="AT &F^M"
CALL:STRPB="AT &F^M"

CPCL:CLKA=19200
CPCL:CLKB=19200

POLL:CNFG=TA&B|RA&B

TESTMODE=CALL_SETUP

TPCL:CLKA=MODEM
TPCL:CLKB=MODEM
TPCL:FLOWA=CTS
TPCL:FLOWB=CTS
TPCL:PCL=SYNC

A1.2.11. 38.4k_async

Parameters for Hayes Compatible 38400 Bps Modems, Asynchronous Call, Asynchronous Test.

BERT:BSIZ=10E2
BERT:CNFG=TA&B|RA&B
BERT:NBLK=1000
BERT:PATT=SPACE

CALL:ANSWA="AT L1 &C1 &D2 &M1 &X0 S0=1^M"
CALL:ANSWB="AT L1 &C1 &D2 &M1 &X0 S0=1^M"
CALL:AXMT=2047
CALL:BXMT=2047
CALL:EVTOA=50
CALL:EVTOB=50
CALL:ORIGA="AT L1 &C1 &D2 &M1 &X0 DT2^M"
CALL:ORIGB="AT L1 &C1 &D2 &M1 &X0 DT1^M"
CALL:STRPA="AT &F^M"
CALL:STRPB="AT &F^M"

CPCL:CLKA=38400
CPCL:CLKB=38400

POLL:CNFG=TA&B|RA&B

TESTMODE=CALL_SETUP

TPCL:CLKA=38400
TPCL:CLKB=38400
TPCL:FLOWA=CTS
TPCL:FLOWB=CTS
TPCL:PCL=ASYNC

A1.2.12. 57.6k_async

Parameters for Hayes Compatible 57600 Bps Modems, Asynchronous Call, Asynchronous Test.

BERT:BSIZ=10E2
BERT:CNFG=TA&B|RA&B
BERT:NBLK=1000
BERT:PATT=SPACE

CALL:ANSWA="AT L1 &C1 &D2 &M1 &X0 S0=1^M"
CALL:ANSWB="AT L1 &C1 &D2 &M1 &X0 S0=1^M"
CALL:AXMT=2047
CALL:BXMT=2047
CALL:EVTOA=50
CALL:EVTOB=50
CALL:ORIGA="AT L1 &C1 &D2 &M1 &X0 DT2^M"
CALL:ORIGB="AT L1 &C1 &D2 &M1 &X0 DT1^M"
CALL:STRPA="AT &F^M"
CALL:STRPB="AT &F^M"

CPCL:CLKA=57600
CPCL:CLKB=57600

POLL:CNFG=TA&B|RA&B

TESTMODE=CALL_SETUP

TPCL:CLKA=57600
TPCL:CLKB=57600
TPCL:FLOWA=CTS
TPCL:FLOWB=CTS
TPCL:PCL=ASYNC

A1.2.13. 64.0k_async

Parameters for Hayes Compatible 64000 Bps Modems, Asynchronous Call, Asynchronous Test.

BERT:BSIZ=10E2
BERT:CNFG=TA&B|RA&B
BERT:NBLK=1000
BERT:PATT=SPACE

CALL:ANSWA="AT L1 &C1 &D2 &M1 &X0 S0=1^M"
CALL:ANSWB="AT L1 &C1 &D2 &M1 &X0 S0=1^M"
CALL:AXMT=2047
CALL:BXMT=2047
CALL:EVTOA=50
CALL:EVTOB=50
CALL:ORIGA="AT L1 &C1 &D2 &M1 &X0 DT2^M"
CALL:ORIGB="AT L1 &C1 &D2 &M1 &X0 DT1^M"
CALL:STRPA="AT &F^M"
CALL:STRPB="AT &F^M"

CPCL:CLKA=64000
CPCL:CLKB=64000

POLL:CNFG=TA&B|RA&B

TESTMODE=CALL_SETUP

TPCL:CLKA=64000
TPCL:CLKB=64000
TPCL:FLOWA=CTS
TPCL:FLOWB=CTS
TPCL:PCL=ASYNC

A1.2.14. 76.8k_async

Parameters for Hayes Compatible 76800 Bps Modems, Asynchronous Call, Asynchronous Test.

BERT:BSIZ=10E2
BERT:CNFG=TA&B|RA&B
BERT:NBLK=1000
BERT:PATT=SPACE

CALL:ANSWA="AT L1 &C1 &D2 &M1 &X0 S0=1^M"
CALL:ANSWB="AT L1 &C1 &D2 &M1 &X0 S0=1^M"
CALL:AXMT=2047
CALL:BXMT=2047
CALL:EVTOA=50
CALL:EVTOB=50
CALL:ORIGA="AT L1 &C1 &D2 &M1 &X0 DT2^M"
CALL:ORIGB="AT L1 &C1 &D2 &M1 &X0 DT1^M"
CALL:STRPA="AT &F^M"
CALL:STRPB="AT &F^M"

CPCL:CLKA=76800
CPCL:CLKB=76800

POLL:CNFG=TA&B|RA&B

TESTMODE=CALL_SETUP

TPCL:CLKA=76800
TPCL:CLKB=76800
TPCL:FLOWA=CTS
TPCL:FLOWB=CTS
TPCL:PCL=ASYNC

A1.2.15. 96.0k_async

Parameters for Hayes Compatible 96000 Bps Modems, Asynchronous Call, Asynchronous Test.

BERT:BSIZ=10E2
BERT:CNFG=TA&B|RA&B
BERT:NBLK=1000
BERT:PATT=SPACE

CALL:ANSWA="AT L1 &C1 &D2 &M1 &X0 S0=1^M"
CALL:ANSWB="AT L1 &C1 &D2 &M1 &X0 S0=1^M"
CALL:AXMT=2047
CALL:BXMT=2047
CALL:EVTOA=50
CALL:EVTOB=50
CALL:ORIGA="AT L1 &C1 &D2 &M1 &X0 DT2^M"
CALL:ORIGB="AT L1 &C1 &D2 &M1 &X0 DT1^M"
CALL:STRPA="AT &F^M"
CALL:STRPB="AT &F^M"

CPCL:CLKA=96000
CPCL:CLKB=96000

POLL:CNFG=TA&B|RA&B

TESTMODE=CALL_SETUP

TPCL:CLKA=96000
TPCL:CLKB=96000
TPCL:FLOWA=CTS
TPCL:FLOWB=CTS
TPCL:PCL=ASYNC

A1.2.16. 102.4k_async

Parameters for Hayes Compatible 102400 Bps Modems, Asynchronous Call, Asynchronous Test.

BERT:BSIZ=10E2
BERT:CNFG=TA&B|RA&B
BERT:NBLK=1000
BERT:PATT=SPACE

CALL:ANSWA="AT L1 &C1 &D2 &M1 &X0 S0=1^M"
CALL:ANSWB="AT L1 &C1 &D2 &M1 &X0 S0=1^M"
CALL:AXMT=2047
CALL:BXMT=2047
CALL:EVTOA=50
CALL:EVTOB=50
CALL:ORIGA="AT L1 &C1 &D2 &M1 &X0 DT2^M"
CALL:ORIGB="AT L1 &C1 &D2 &M1 &X0 DT1^M"
CALL:STRPA="AT &F^M"
CALL:STRPB="AT &F^M"

CPCL:CLKA=102400
CPCL:CLKB=102400

POLL:CNFG=TA&B|RA&B

TESTMODE=CALL_SETUP

TPCL:CLKA=102400
TPCL:CLKB=102400
TPCL:FLOWA=CTS
TPCL:FLOWB=CTS
TPCL:PCL=ASYNC

A1.2.17. 115.2k_async

Parameters for Hayes Compatible 115200 Bps Modems, Asynchronous Call, Asynchronous Test.

BERT:BSIZ=10E2
BERT:CNFG=TA&B|RA&B
BERT:NBLK=1000
BERT:PATT=SPACE

CALL:ANSWA="AT L1 &C1 &D2 &M1 &X0 S0=1^M"
CALL:ANSWB="AT L1 &C1 &D2 &M1 &X0 S0=1^M"
CALL:AXMT=2047
CALL:BXMT=2047
CALL:EVTOA=50
CALL:EVTOB=50
CALL:ORIGA="AT L1 &C1 &D2 &M1 &X0 DT2^M"
CALL:ORIGB="AT L1 &C1 &D2 &M1 &X0 DT1^M"
CALL:STRPA="AT &F^M"
CALL:STRPB="AT &F^M"

CPCL:CLKA=115200
CPCL:CLKB=115200

POLL:CNFG=TA&B|RA&B

TESTMODE=CALL_SETUP

TPCL:CLKA=115200
TPCL:CLKB=115200
TPCL:FLOWA=CTS
TPCL:FLOWB=CTS
TPCL:PCL=ASYNC

A1.2.18. 128.0k_async

Parameters for Hayes Compatible 128000 Bps Modems, Asynchronous Call, Asynchronous Test.

BERT:BSIZ=10E2
BERT:CNFG=TA&B|RA&B
BERT:NBLK=1000
BERT:PATT=SPACE

CALL:ANSWA="AT L1 &C1 &D2 &M1 &X0 S0=1^M"
CALL:ANSWB="AT L1 &C1 &D2 &M1 &X0 S0=1^M"
CALL:AXMT=2047
CALL:BXMT=2047
CALL:EVTOA=50
CALL:EVTOB=50
CALL:ORIGA="AT L1 &C1 &D2 &M1 &X0 DT2^M"
CALL:ORIGB="AT L1 &C1 &D2 &M1 &X0 DT1^M"
CALL:STRPA="AT &F^M"
CALL:STRPB="AT &F^M"

CPCL:CLKA=128000
CPCL:CLKB=128000

POLL:CNFG=TA&B|RA&B

TESTMODE=CALL_SETUP

TPCL:CLKA=128000
TPCL:CLKB=128000
TPCL:FLOWA=CTS
TPCL:FLOWB=CTS
TPCL:PCL=ASYNC

A1.2.19. hpl_sync

Parameters for High Speed Private line Modems, Synchronous Test.

BERT:BITLA=10000
BERT:BITLB=10000
BERT:BLKLA=500
BERT:BLKLB=500
BERT:BRKLA=2
BERT:BRKLB=2
BERT:BSIZ=10E3
BERT:CHRLA=2000
BERT:CHRLB=2000
BERT:CNFG=TA&B|RA&B
BERT:NBLK=1000
BERT:PATT=511

CALL:ANSWA=""
CALL:ANSWB=""
CALL:AXMT=2047
CALL:BXMT=2047
CALL:CNFG=TA|RB
CALL:CSTRA=""
CALL:CSTRB=""
CALL:DROPA=""
CALL:DROPB=""
CALL:EVTOA=50
CALL:EVTOB=50
CALL:ORIGA=""
CALL:ORIGB=""
CALL:STRPA=""
CALL:STRPB=""

CPCL:CLKA=9600
CPCL:CLKB=9600

POLL:CNFG=TA&B|RA&B
POLL:PMSG=SYN
POLL:RXCRA=SW
POLL:RXCRB=SW
POLL:TXCRA=SW
POLL:TXCRB=SW

TEST:MODE=BERT

```
TPCL:CLKA=MODEM
TPCL:CLKB=MODEM
TPCL:FLOWA=CTS
TPCL:FLOWB=CTS
TPCL:PCL=SYNC
```

A1.2.20. isdn_sync

Parameters for ISDN modems, Synchronous Test.

```
BERT:BITLA=10000
BERT:BITLB=10000
BERT:BLKLA=500
BERT:BLKLB=500
BERT:BRKLA=2
BERT:BRKLB=2
BERT:BSIZ=10E3
BERT:CHRLA=2000
BERT:CHRLB=2000
BERT:CNFG=TA&B|RA&B
BERT:NBLK=1000
BERT:PATT=511

CALL:ANSWA="AT &C1 &D2 &M1 &X0 S0=1^M"
CALL:ANSWB="AT &C1 &D2 &M1 &X0 S0=1^M"
CALL:AXMT=2047
CALL:BXMT=2047
CALL:EVTOA=50
CALL:EVTOB=50
CALL:ORIGA="AT &C1 &D2 &M1 &X0 DT2^M"
CALL:ORIGB="AT &C1 &D2 &M1 &X0 DT1^M"
CALL:STRPA="AT &F^M"
CALL:STRPB="AT &F^M"

CPCL:CLKA=9600
CPCL:CLKB=9600

POLL:CNFG=TA&B|RA&B

TEST:MODE=CALL_SETUP

TPCL:CLKA=MODEM
TPCL:CLKB=MODEM
TPCL:FLOWA=CTS
TPCL:FLOWB=CTS
TPCL:PCL=SYNC
```

A1.2.21. 2.048m_sync

Parameters for High-Speed BERT test using 2.048 Mbps transmit clocks generated by Gemini.

TEST:MODE=hs_bert

HSBT:CNFG=ta&b|ra&b, NBLK=1000000, BSIZ=53, PATT=2^23
HSBT:PCL=sync, CLKA=2048000, CLKB=2048000
HSBT:BITLA=10000, BITLB=10000
HSBT:BLKLA=500, BLKLB=500
HSBT:BRKLA=2, BRKLB=2

A1.2.22. hs_bert

Parameters for High-Speed BERT test using 2.048 Mbps transmit clocks generated the modem

TEST:MODE=hs_bert

HSBT:CNFG=ta&b|ra&b, NBLK=1000000, BSIZ=53, PATT=2^23
HSBT:PCL=sync, CLKA=modem, CLKB=modem
HSBT:BITLA=10000, BITLB=10000
HSBT:BLKLA=500, BLKLB=500
HSBT:BRKLA=2, BRKLB=2

A1.2.23. mpol_master

Parameters for Master Configuration in Multipoint Polling Test.

BERT:BITLA=10000
BERT:BITLB=10000
BERT:BLKLA=500
BERT:BLKLB=500
BERT:BRKLA=2
BERT:BRKLB=2
BERT:BSIZ=10E3
BERT:CHRLA=2000
BERT:CHRLB=2000
BERT:CNFG=TA&B|RA&B
BERT:NBLK=1000
BERT:PATT=511

CALL:ANSWA=""
CALL:ANSWB=""
CALL:AXMT=2047
CALL:BXMT=2047
CALL:CNFG=TA|RB
CALL:CSTRA=""
CALL:CSTRB=""
CALL:DROPA=""
CALL:DROPB=""
CALL:EVTOA=50
CALL:EVTOB=50
CALL:ORIGA=""
CALL:ORIGB=""
CALL:STRPA=""
CALL:STRPB=""

CPCL:CLKA=9600
CPCL:CLKB=9600

MPOL:ADDRA="01"
MPOL:ADDRB="02"
MPOL:DCDA=TEST
MPOL:DCDB=TEST
MPOL:MADDR="99"
MPOL:MASTR=A
MPOL:NPOL=100
MPOL:PMSG="The Quick Brown Fox Jumped Over The Lazy Dog's Back
0123456789"

```
MPOL:RMSG="I'm Ok"
MPOL:SADDR="01:02:03:04:05:06"
MPOL:SPCL=BISYNC

POLL:CNFG=TA&B|RA&B
POLL:PMSG=SYN
POLL:RXCRA=SW
POLL:RXCRB=SW
POLL:TXCRA=SW
POLL:TXCRB=SW

TEST:MODE=MULTI_PT

TPCL:CLKA=MODEM
TPCL:CLKB=MODEM
TPCL:FLOWA=CTS
TPCL:FLOWB=CTS
TPCL:PCL=SYNC
```

A1.2.24. mpol_slave

Parameters for Slave Configuration in Multipoint Polling Test.

BERT:BITLA=10000
BERT:BITLB=10000
BERT:BLKLA=500
BERT:BLKLB=500
BERT:BRKLA=2
BERT:BRKLB=2
BERT:BSIZ=10E3
BERT:CHRLA=2000
BERT:CHRLB=2000
BERT:CNFG=TA&B|RA&B
BERT:NBLK=1000
BERT:PATT=511

CALL:ANSWA=""
CALL:ANSWB=""
CALL:AXMT=2047
CALL:BXMT=2047
CALL:CNFG=TA|RB
CALL:CSTRA=""
CALL:CSTRB=""
CALL:DROPA=""
CALL:DROPB=""
CALL:EVTOA=50
CALL:EVTOB=50
CALL:ORIGA=""
CALL:ORIGB=""
CALL:STRPA=""
CALL:STRPB=""

CPCL:CLKA=9600
CPCL:CLKB=9600

MPOL:ADDRA="01"
MPOL:ADDRB="02"
MPOL:DCDA=TEST
MPOL:DCDB=TEST
MPOL:MADDR="99"
MPOL:MASTR=NONE
MPOL:NPOL=100
MPOL:PMSG="The Quick Brown Fox Jumped Over The Lazy Dog's Back
0123456789"

```
MPOL:RMSG="I'm Ok"
MPOL:SADDR="01:02:03:04:05:06"
MPOL:SPCL=BISYNC

POLL:CNFG=TA&B|RA&B
POLL:PMSG=SYN
POLL:RXCRA=SW
POLL:RXCRB=SW
POLL:TXCRA=SW
POLL:TXCRB=SW

TEST:MODE=MULTI_PT

TPCL:CLKA=MODEM
TPCL:CLKB=MODEM
TPCL:FLOWA=CTS
TPCL:FLOWB=CTS
TPCL:PCL=SYNC
```

A1.2.25. char_echo

Parameters for TSB-38 Character Echo test.

TEST:MODE=echo

ECHO:TYPE=char_echo, MIN=50, WID=450
ECHO:CNFG=ta&b|ra&b, ITER=100, TLIM=10000, RSEQ=no, FILT=yes

TPCL:PCL=async, CLKA=28800, CLKB=28800
ATST:DATA=8, PARI=none, STOP=1

CPCL:PCL=async, CLKA=28800, CLKB=28800
ACLL:CHRD=50, DATA=8, PARI=none, STOP=1

CALL:ANSWA="AT &C1 &D2 &M1 &X0 S0=1^M"
CALL:ANSWB="AT &C1 &D2 &M1 &X0 S0=1^M"
CALL:ORIGA="AT &C1 &D2 &M1 &X0 DT2^M"
CALL:ORIGB="AT &C1 &D2 &M1 &X0 DT1^M"
CALL:STRPA="AT &F^M"
CALL:STRPB="AT &F^M"

A1.2.26. block_ack

Parameters for TSB-38 Character Echo test.

TEST:MODE=echo
ECHO:TYPE=block_ack, BSIZ=133
ECHO:CNFG=ta&b|ra&b, ITER=100, TLIM=10000, RSEQ=no, FILT=yes

TPCL:PCL=async, CLKA=28800, CLKB=28800
ATST:DATA=8, PARI=none, STOP=1

CPCL:PCL=async, CLKA=28800, CLKB=28800
ACLL:CHRD=50, DATA=8, PARI=none, STOP=1

CALL:ANSWA="AT &C1 &D2 &M1 &X0 S0=1^M"
CALL:ANSWB="AT &C1 &D2 &M1 &X0 S0=1^M"
CALL:ORIGA="AT &C1 &D2 &M1 &X0 DT2^M"
CALL:ORIGB="AT &C1 &D2 &M1 &X0 DT1^M"
CALL:STRPA="AT &F^M"
CALL:STRPB="AT &F^M"

A1.2.27. factory

ACLL:CHRD=50, DATA=7, PARI=ODD, STOP=1

ATST:DATA=7, PARI=ODD, STOP=1

BERT:BITLj=10000, BLKLj=50, BRKLj=2, BSIZ=10E2, CHRLj=200
BERT:CNFG=TA&B|RA&B, MODE=0, NBLK=100
BERT:PATT=SPACE, RSEN=Y, RTSC=N, RTSD=10
BERT:ESLj=0, NTS=100, TDL=blocks
BERT:SLERRB=Y, SLNDTO=3

CALL:ANSWA="ATS0=1^M"
CALL:ANSWB="ATS0=1^M"
CALL:ANSWDj=100, AXMT=511, BXMT=511
CALL:CALLS=1000, CNFG=TA&B|RA&B, CRTDj=100
CALL:CSTRj="CONNECT", CTCD=10, CTSTOj=1000, CTXDj=10
CALL:DROPA="\P2 +++\P2 ATH^M"
CALL:DROPB="\P2 +++\P2 ATH^M"
CALL:DROPDj=100, DTRCj=Y, DTRDj=10, EVj=DCD&STR
CALL:EVTOj=20, MSG=ORIGA
CALL:ORIGA="ATDT2^M"
CALL:ORIGB="ATDT1^M"
CALL:OSTA=A
CALL:RTSj=Y
CALL:STRPA="ATZ^M"
CALL:STRPB="ATZ^M"
CALL:STRPDj=200, XFTO=5

CNFG:RESP=VERBOSE

CPCL:CLKj=1200, FLOWj=NONE, OFSj=0, PCL=ASYNC

DCMP:CLIM=1, CNFG=TA&B|RA&B, FLIM=1, HSIZ=10
DCMP:MEAS=END_TO_END, NPATT=1, NXFERS=1
DCMP:PATT=ASCII, RTSj=N, TERM=0, TIMEH=30DCMP:TIMET=30,
XFERD=5
DCMP:ADDR=13, CTRL=FF, FRAME=1024, FRD=0, FRLD=1, HSIZ=10

ECHO:TYPE=char_echo, CNFG=ta|rb, MIN=50, WID=450, ITER=100,
ECHO:RSEQ=n, FILT=y, TLIM=1000, BSIZ=133

GPIB:ADDR=1, DTO=5, ITC=EOI
GPIB:MADDR=0, GPIB:MSG=""
GPIB:REN=0

GPIB:WTIM=100

HCLL:ADDR=0xff, CHAR=8BN, CODE=ASCII, CTRL=0x13

HSBT:B1="THE QUICK BROWN FOX JUMPED OVER THE LAZY DOG’S BACK 0123456789^M^J"
HSBT:B2=“TAS GEMINI 1022 DUAL TERMINAL EMULATOR^M^J”
HSBT:BITLj=10000, BLKLj=50, BRKLj=2, BSIZ=1024
HSBT:CLKj=modem
HSBT:CNFG=ta&b|ra&b, ESLj=0
HSBT:MODE=0, NBLK=1000, NTS=100, PATT=2^20
HSBT:PCL=sync, RSEN=yes, RTSD=10, SLNDTO=3
HSBT:SLTHR=medium, TDL=0

INTF:DTRj=0, RTSj=0, SRTSj=0, STDj=1, TDj=1
INTF:DTEj=rs232, DRS_OUTj=0, Rlj=0

MPOL:ADDRA="1"
MPOL:ADDRB="2"
MPOL:CTSDj=0, DCDj=IGNORE, MADDR="", MASTR=A
MPOL:NPOL=0, PMSG="", POLLD=0, RESPDj=0
MPOL:RSXTDj=0.1, RTS=no
MPOL:RMSG="", RTLIM=5, SADDR="2", SENTDj=0
MPOL:SLAVE="*", SPCL=BISYNC

MSGX:CLIM=0, CNFG=TA|RA, RESP=""
MSGX:TLIM=0, TSTR="AT"

POLL:CNFG=TA&B|RA&B, CTOj=0, FPOLj=0, MODE=0
POLL:MSGLj=0, NPOL=1000
POLL:PDLY=10, PMSG=FOX, PTO=10, RXCRj=CONST
POLL:SYNLj=0, TXCRj=CONST

SCLL:CHAR=8BN, CODE=ASCII, NSYN=2, SYN1=0x16, SYN2=0x16

TEST:IERR=N, LOOP=N, MODE=CALL_SETUP

TPCL:CLKj=1200, FLOWj=NONE, OFSj=0, PCL=ASYNC

TIME:MEAS=disable, T0DTE=a, T0SIG=rts+, T1DTE=a, T1SIG=cts+, TRIG=single

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