Programming Reference

Motorola R-2550, and R-2600 Communications System Analyzer Series

MOTOROLA

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This manual documents the control and measurement functions provided by the remote interface to the R-2550 and R-2600 Communications System Analyzer Series (R-2600, R-2660, R-2670, R2680). It is intended to provide all the information necessary to develop application programs that remotely control both units. General usage of the R-2600 analyzers is described in the ***R-2600 Communications System Analyzer Series Operator's Manual,*** publication 68-80386B72. General usage of the R-2550 ***analyzers is described in the R-2550 Communications System Analyzer Operators Manual,*** publication 68-80309E54.

All of the analyzer models operate in a similar manner and many of the remote command are identical for all products. Where there are differences in the remote commands for the analyzers, the text clearly identifies them.

Section 1
Introduction discusses configuration requirements, the layer model provided by the remote interface, and the three modes of operation: Standard RS-232, Extended RS-232, and IEEE 488.2.

Section 2
Interface Functions discusses remote and local operations, RS-232 and IEEE 488.1 protocols, and print functions.

Section ***3***
Syntax Overview discusses the Talker and Listener syntax provided by the analyzer. Differences between the syntax of the Standard RS-232 mode and the Extended RS-232 and IEEE 488.2 modes are explained.

Section ***4***
Status Reporting discusses the control and status data structures provided by the IEEE 488.2 model. The capabilities of the model that are provided when operating under RS-232 control are described.

Section 5
Programming Conventions discusses optional command parameters and optional response parameters.

Section 6
Command Set Organization presents an overall description of the command set; describing command groupings and manual entries for the commands. A quick reference to the command set is also provided.

Sections ***7*** and on
The individual command and query pages give detailed descriptions of each command, including syntax, parameters, responses, and special notes.

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1. Introduction

The R-2550, and the R-2600 are both equipped with a standard RS-232 interface. Optionally, the R-2600 is equipped with an **IEEE 488** interface. An **IEEE 488** interface is not available on the R-2550 analyzer. Either of these interfaces may be used to remotely control the analyzer using a set of commands, queries, and responses that are defined within this document.

Note

Throughout this document, the term analyzer is used to refer to either the R-2550 or the R-2600. Whenever differences exist between the functionality of the two products, specific references to the model are made.

Configuration Requirements

All R-2550 software versions are capable of providing the applicable capabilities described throughout this reference.

The R-2600 must be equipped with software version V01.05 or greater to use the capabilities described throughout this reference. Software versions preceding V01.05 provide the remote control capabilities described in the original, and the "1 June 91" printing of the *Motorola R-2600 Communications System Analyzer Operator's Manual,* publication 68-P80386B72. The original printing has no date on the back cover. Subsequent revisions show the revised printing date on the back cover.

Note

Application programs developed for older versions of the R-2600 software are fully compatible with the material described in this document.

To use the IEEE-488 interface, the R-2600 must be equipped with the IEEE-488 option and software version V01.05 or greater.

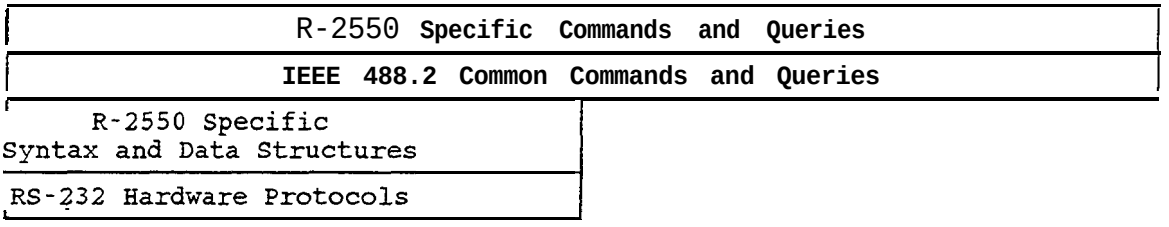
The set of installed options can be determined by accessing the *Version* menus. To determine the software version, press the SPF hardkey on the front panel. The *Special Functions* screen will be displayed. Cursor down to the Version selection and press the *Display Table* softkey. The *Version* screen will be displayed. Cursor down through each of the major option selections and press the *Display Table* softkey. *The* installed options will be displayed.

Layer Model

The Communications Analyzer is designed to act as a device under the influence of a controller. Communication between the Analyzer and a controller is accomplished using a set of codes and formats as defined in one of two models. Each model is built upon a layered protocol, which allows controllers using the RS-232 interface to access the IEEE 488.2 communications protocols.

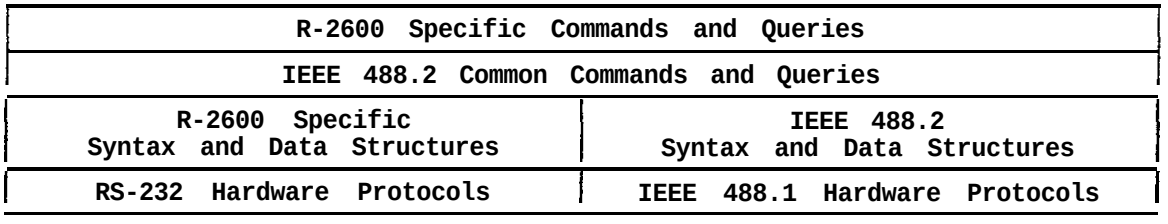
The layer model defines four different levels of communication that occur between the analyzer and a controller. At the lowest layer, the R-2600 supports either the RS-232 or the IEEE 488.1 hardware interfaces. Above this layer, the R-2600 supports either the IEEE 488.2 syntax and data structure model or the backwards-compatible RS-232 remote interface. An additional set of common IEEE 488.2 commands and queries exist at the third layer, providing access to the IEEE 488.2 data structures. The fourth and highest layer provides analyzer specific commands and queries.

R-2550 Remote Interface Layer Model



The R-2550 operates within the layer model in one of two modes, Standard RS-232, or Extended RS-232.

R-2600 **Remote Interface Layer Model**



The R-2600 operates within the layer model in one of three modes, Standard RS-232, Extended RS-232, and IEEE 488.2.

Remote Mode	Hardware	Status Reporting	Syntax
Standard RS-232	RS-232	Backwards Compatible	Backwards Compatible
Extended RS-232	RS-232	Backwards Compatible	IEEE 488.2
IEEE 488.2	IEEE 488.1	IEEE 488.2	IEEE 488.2

Note

Application programs using the Standard RS-232 model can gain access to the Extended RS-232 model via the G2 command.

Standard RS-232 Mode

When the analyzer is initially powered on, it assumes all communications will occur over the RS-232 hardware interface using the Standard RS-232 mode. On the R-2600, if activity is detected on the IEEE 488 interface, the R-2600 will immediately switch to the IEEE 488.2 mode. The Standard RS-232 mode is completely backward compatible with versions of software before Version V01.05. Application programs written for older versions of software can utilize the Standard RS-232 mode without change.

Extended RS-232 Mode

The Extended RS-232 mode provides some additional services from the IEEE 488.2 specification while operating over the RS-232 hardware interface. Within this mode, all of the IEEE 488.2 status and data structures and syntactic definitions are available to provide a consistent and powerful remote interface while still relying upon the RS-232 hardware for the low-level communications interface.

IEEE 488.2 Mode

The IEEE *488.2* mode provides a remote interface via the IEEE 488.1 hardware that is fully compliant with the IEEE 488.2 specification. This is the only mode of operation available for the IEEE *488* interface. The most important aspect of this specification is the status and error control/reporting capabilities, defined in Section 4.

2. Interface Functions

Remote, Local, and Local Lockout

The analyzer can be in one of three states: power off, local (front panel) control, and remote control. Upon power-up, the analyzer will automatically enter the local control state.

The R-2550 enters the remote control state upon detection that a remote device is trying to take control over the RS-232 interface. Once in the remote control state the R-2550 executes commands input through the RS-232 interface.

The analyzer enters the remote control state upon detection that a remote device is trying to take control over either the RS-232 or IEEE-488 interfaces. Once in the remote conuol state the analyzer executes commands input through the remote control interface.

The only front panel controls available to the operator are:

- power switch
- squelch knob
- brightness control knob
- volume control knob
- "go to local" hard key

The F1 hard key functions as the "go to local" key while in the remote control state. A local lockout feature is available when the analyzer is in the remote control state. The "go to local" hard key is not accepted while the local lockout feature is enabled. The local lockout feature is disabled upon entering the remote control state.

The analyzer will remain in the remote conuol state until any of the following occur:

- a "go to local" keystroke from front panel
- detection of "go to local" from remote controller
- power is switched off

The analyzer display indicates the unit is under remote control as long as it is in the remote control state. While the local lockout feature is enabled the display indicates local lockout is enabled. An indication that the F1 key is the "go to local" key is displayed if and only if the local lockout feature is disabled and the analyzer is in the remote control state.

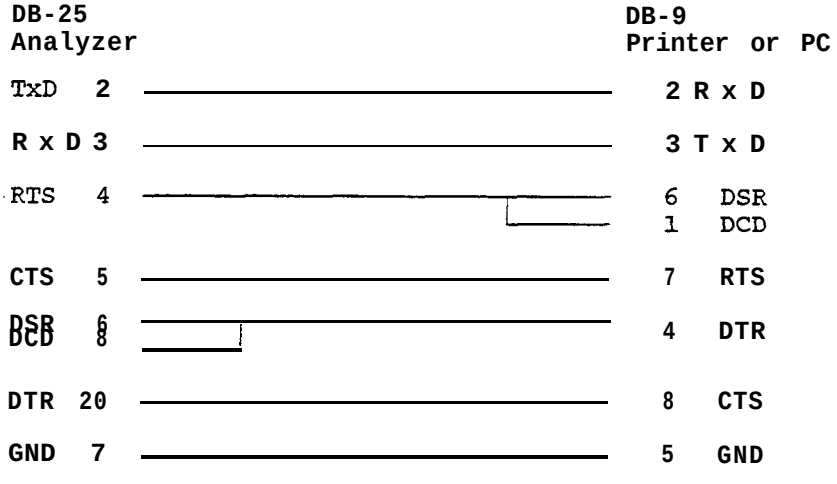
The analyzer will enter the local control state upon:

- powerup
- detection of the "go to local" command (GL) through the remote control interface
- acceptance of a "go to local" keystroke from the front panel

RS-232

The RS-232 **port** is a 25-pin female "D" connector that supports connectivity to the controller or printer output via serial connection. The following table describes the pin definitions.

Pin(s)	Name	Description
1	GND	ground
2	TXD	transmit data
3	RXD	receive data
4	RTS	request to send
5	CTS	clear to send
6	DSR	data set ready
7	SIG GND	signal ground
8	DCD~	data carrier detect (not connected)
9-19		not used
20	DTR~	data terminal ready
21		not used
22		Ring Indicator (not connected)
23-25		not used

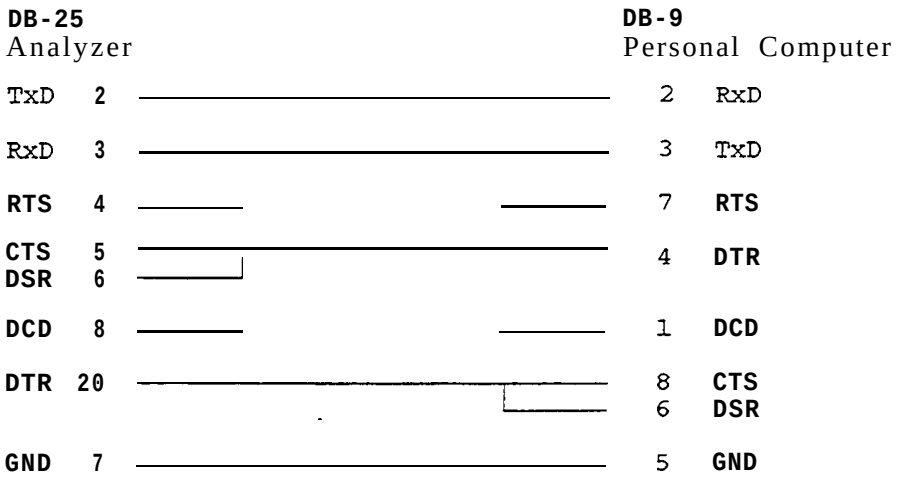


Cable Diagram: PN 3080387B59

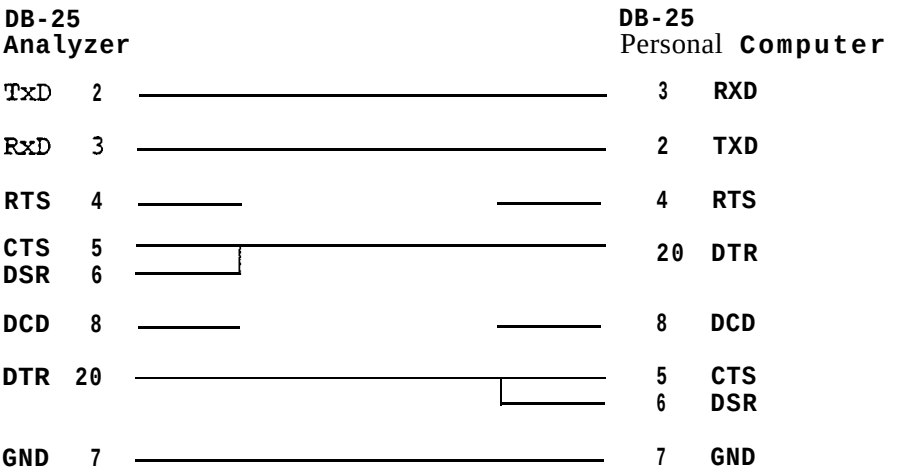
Note

For printer use, pins 5 and 20 of *this port should be tied together inside the cable to the printer. 30-80387B85 primer cable provides this interface. Using this cable allows normal RS-232 communications without any handshaking capabilities.*

The following cables diagrammed are used with the Monitor Service Software (MSS) and Field Installation Software (FIS) to install software options in the analyzer.



Cable Diagram: 25 to 9 pin



Cable Diagram: 25 pin

The RS-232 hardware interface supports the functionality described in the following table:

Baud Rate	150 300 1200 2400 4800 9600
Stop Bits	1 1.5 2
Parity	None Even odd
Data Bits	5 6 7 8
Auto Line-Feed	**Yes** No

IEEE 488 (available only on the R-2600)

The IEEE 488 interface provides a high-speed hardware interface supporting communication among multiple devices within the same area. Each device on the IEEE 488 bus has its own address, allowing the Controller in charge to communicate directly with any device on the bus. Devices can either talk or listen, depending on if the device is transmitting information or receiving information, respectively.

Interface Capability

The interface capabilities of the R-2600, as defined by IEEE 488.1, are SH1, AH1, TE6, LE4, SR1, RL1, PPO, DC1, DT1, CO, and E2.

Addressing

The R-2600 allows both primary and secondary addressing. Both Primary addresses and Secondary addresses range from 0 to 30. Secondary addressing can be disabled. The R-2600 uses the same address for both Talk and Listen modes.

The IEEE 488 address of the R-2600 is accessed from the *Remote Interface* menu. To modify the address, press the **SPF** hardkey on the front panel. The *Special Functions* screen will be displayed. Cursor down to the Remote Interface selection and press the *Display Table* softkey. The *Remote Interface* screen will be displayed. The screen allows modification of both the Primary and Secondary addresses.

Note

The Primary and Secondary address selections will only be available on the Remote Interface menu if the R-2600 is equipped with the ZEEE 488 option.

To disable secondary addressing, place the cursor on the Secondary Address and press the Disable softkey. The Secondary Address will be displayed as two dashes, indicating that Secondary Addressing has been disabled-

Note

The IEEE 488 Secondary Address will initially be disabled when the R-2600 is shipped from the factory. The Reset capabilities of the R-2600 will not alter the Primary or Secondary Address settings – they can only be modified under local control by operator interaction.

Bus Commands

The IEEE *488* interface provides both command and data communications, depending upon the bus commands on that interface. The setofbus commands is given in the following table.

Bus Command	Mnemonic	Description
DAV	Data Valid	Indicates the condition of information on the DIO signal lines.
NRFD	Not Ready for Data	Indicates the condition of readiness of the R-2600 to accept data.
NDAC	Not Data Accepted	Indicates the condition of acceptance of data by the R-2600.
ATN	Attention	Asserted true to indicate the data is to be interpreted as control data, device data otherwise.
IFC	Interface Clear	Places the R-2600 IEEE interface in a known, quiescent state.
SRQ	Service Request	The R-2600 asserts this line to request service from the controller.
EOI	End or Identify	Used by the R-2600 Talker state to indicate the end of a multi-byte transfer.

Print Functions

The standard print function gives the user the opportunity to send the data displayed on the R-2600 CRT display to a printer. When the <*PRT*> key is selected on the front panel, the data is sent over the RS-232 serial bus in ASCII format. With the standard print function, only the text information is printed, the scope trace data is not printed.

If the R-2600 has the Graphics Mode Option installed, the screen data can be sent over the RS-232 serial bus as graphics data. If the user's printer is capable of IBM-EPSON graphics, all of the data displayed on the CRT will be printed, including the scope trace.

The Graphics Control Command Sequence to implement 8-pin Bit Image Mode Graphics is as follows:

ESC + @	Printer Initialization.
ESC + A + 8	Line Space Setting
ESC + L + n1 + n2	Dot Density, number of columns of dots per line

Where: ESC = ASCII Escape Character 1B (Hexidecimal)

@ = Printer Initialization

A = Line Space Setting

8 = 8/72 of an inch

L = Dot Density Designation = Double Density

n1, n2 = number of columns of dots on a line = 0, 2

Note

The print function is not available on the R-2550.

3. Syntax Overview

The analyzer functions as a Listener when accepting information from a controller and as a Talker when responding with information back to the controller. The syntax for both the Listening and Talking formats is defined using BNF notation, which is described below.

Notation	Usage
[item]	item is optional
{ item }	item may occur 0 or more times
item1 | item2	select either item1 or item2

Example

[A]B|C[D]

can form the following strings

- **AB**
- B
- **CD**
- C

but the following strings are illegal

- **ABCD**
- **BB**
- **AD**
- D

Example

[E]{F}{G[H|I]}K

can form at Least the following strings

- K
- EK
- **EFFK**
- **EGK**
- **FGIK**
- **GGHK**

but the following strings are illegal

- EF
- **EEK**
- HIK
- **GHGIFK**
- **EFFGEK**
- **IK**

Listening Formats

The analyzer meets all required IEEE-488.2 encoding syntax. The syntax is specified to be very flexible to allow a maximum variety of controller's to utilize the analyzer remote interface. This flexibility also allows the analyzer language to appear in a form that is more understandable to the reader.

The following list gives the syntax for a <Terminated Program Message>, which is the syntax accepted by the analyzer as a Listener.

<Terminated Program Message>
[<Program Message>]<Program Message Terminator,

<Program Message Terminator>
[<White Space>] ^END | NL ^END | NL

<Program Message
{[<Program Message Unit>];}

<Program Message Unit>
<Command Message Unit> I <Query Message Unit>

<Command Message Unio
<Command Program Header> [<White Space> <Program Data> { <Program Data Separator>
<Program Data> }]

<Query Message Unit>
<Query Program Header> [<White Space> <Program Data> { <Program Data Separator>
<Program Data> }]

<Command Program Header,
[<White Space>] [*] <Alpha> { _ | <Alpha> | <Digit> }

<Query Program Header,
[<White Space>] [*] <Alpha> { _ | <Alpha> | <Digit> } ?

<Program Data>
<Decimal Numeric Program Data> I <String Program Data>

<Decimal Numeric Program Data>
<Mantissa> [<White Space>] [<Exponent>]

<Mantissa>
[+ I -] { <Digit> } . <Digit> { <Digit> } |
[+ | –] <Digit> { <Digit> } [. { <Digit> }]

<Exponent>
E | e { <White Space> } [+ | –] <Digit> { <Digit> }

<String Program Data>
'{''| <Non-Single Quote Character> }'|
"{""| <Non-Double Quote Character> }"

<Whi te Space>
<White Space Character> {<White Space Character, }

<White Space Character>
is an ASCII-encoded character in the following range:

- 00 through 09 (hexadecimal)
- 0B through 20

<Alpha>

is an ASCII-encoded character in the following ranges:

- 41 through 5A (hexadecimal)
- 61 through 7A
- 30 through 39
- 5F

<Digit>

is an ASCII-encoded character in the following range:

- 30 through 39 (hexadecimal)

<Non-Single Quote Character>

is an ASCII-encoded character in the following range:

- 00 through FF (hexadecimal) except 27

<Non-Double Quote Character>

is an ASCII-encoded character in the following range:

- 00 through FF (hexadecimal) except 22

Taking Formats

When the analyzer is in the Talker state, the response message follow a stricter syntax. This allows a conuollers with less capabilities to easily communicate with the analyzer.

The following list gives the syntax for a <Terminated Response Message>, which is the syntax generated by the analyzer as a Talker.

<Terminated Resnonse Message>
<Response Message> <Response Message Terminator>

<Response Message Terminator>
NL "END

<Response Message>
<Response Message Unit> { ; <Response Message Unit> }

<Response Message Unit>
[<Response Header> sp] <Response Data> { , <Response Data> }

<Response Header,
<Upper-case Alpha> { _ | <Upper-case Alpha> | <Digit> }

<Response D a -
&RI Numeric Response Data=- |
<NR2 Numeric Response Data>|
<String Response Data>|
<Arbitrary ASCII Response Data>

<NR1 Numeric Response Data,
[+ | -] <Digit> { <Digit> }

<NR2 Numeric Resnonse Data>
[+ I -] <Digit { <Digit> } . <Digit> { <Digit> }

<String Resnonse Data>
" { "" I <Character> } "

<Arbitrary ASCII Resnonse Data>
{ <ASCII Data Byte> } NL ^END

<Upper-case Alpha>
is an ASCII-encoded character in the following range:
- 41 through 5A (hexadecimal)

<Digit>
is an ASCII-encoded character in the following range:
- 30 through 39 (hexadecimal)

<ASCII Data Byte>
is an ASCII-encode character in the following range:
- 00 through FF (hexadecimal) except OA

Standard RS-232 Mode Format Exceptions

The syntax used by the analyzer when in the Standard RS-232 mode is slightly different than that of the Extended RS-232 and IEEE 488.2 modes. The following list specifies the differences for both Talking and Listening format when in this backward compatible mode.

Listening Formats

<Program Message Terminator>
[CR] NL

Talking Formats

<Response Message Unit>
[<Response Header> ;] <Response Data> { CR LF <Response Data> }

<Response Header>
<Alpha> { _ | <Alpha> | <Digit> }

<Response Data>
<NR1 Numeric Response Data> [<Units>] |
<NR2 Numeric Response Data, [<Units>] |
&ring Response Data>

<Units>
<Upper-case Alpha> { <Alpha> }

4. Status Reporting

The &vice status reporting model as specified by IEEE 488.2 is used by the analyzer to allow complete application program control over the analyzer. This model is always used for applications using the IEEE 488.2 interface. Portions of the model is also available to applications using the RS-232 interface.

Note

When controlling the analyzer using the RS-232 interface, the application program must specifically command the analyzer to use the IEEE 488.2 status reporting model through the use of the G2 command. Although IEEE 488 interface is not available on the R-2550 analyzer, the IEEE-488.2 status reporting model is available.

Status and error information is maintained in internal registers, as shown in the figure on the next page.

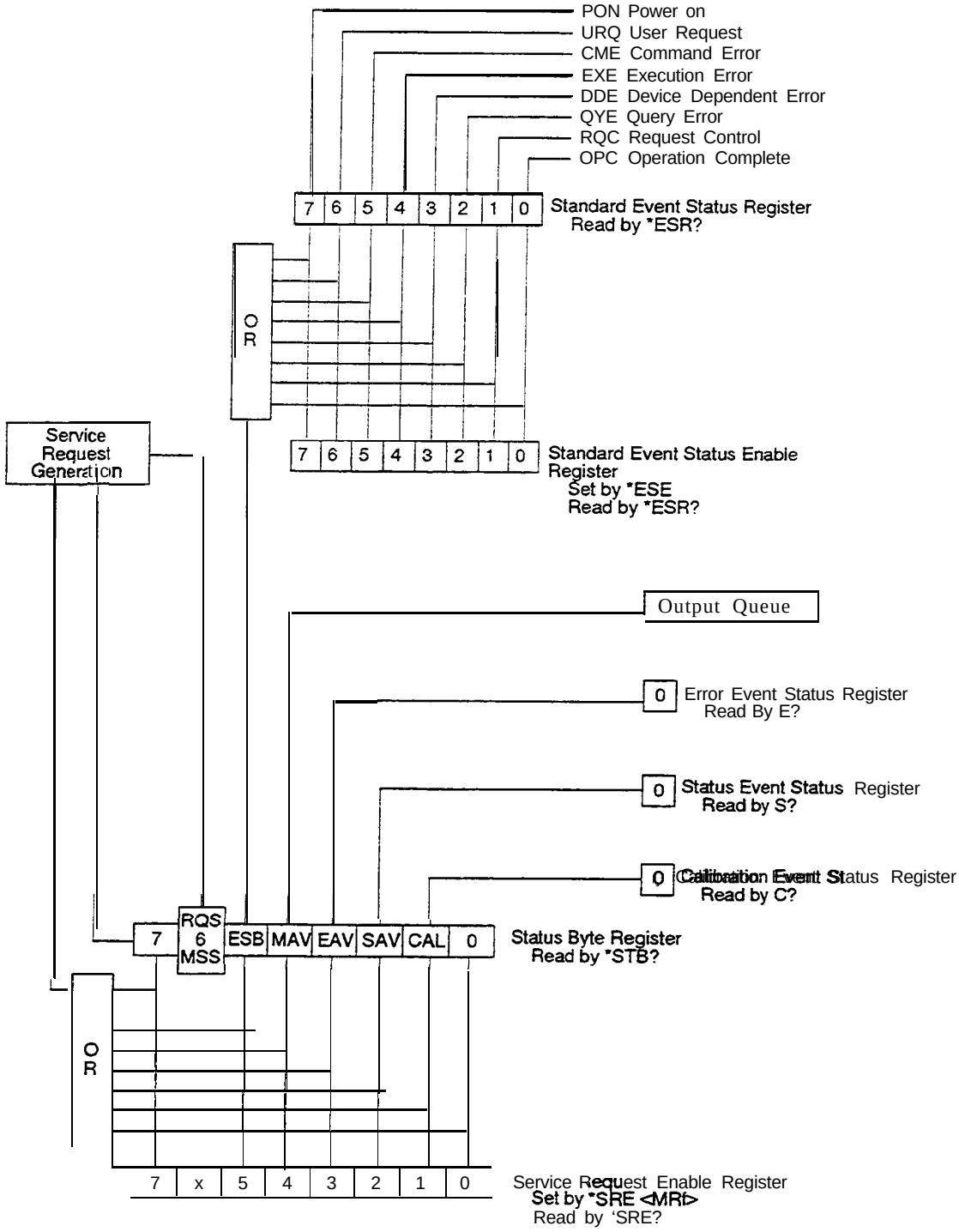
There are four *Event Status Registers* defined by the analyzer model, one of which is the *Standard Event Status Register* specified by IEEE 488.2. The remaining three are specific to the analyzer. These registers are:

Standard Event Status Register (8-bits wide}
Error Status Register (I-bit wide)
Status Event Status Register (I-bit wide)
Calibration Warning Status Register (1 -bit wide)

Per IEEE 488.2, the following queues and registers are also implemented:

Standard Event Status Enable Register (8-bits wide)
Output Queue
Status Byte Register (8-bits wide)
Service Request Enable Register (8-bits wide)

Analyzer Implementation of the IEEE 4882 Status Reporting Model



Standard Event Status Register

The Standard Event Status Register represents eight summary messages, each being defined by a single bit in the Register. Each bit is given a decimal weighting according to its position in the register.

Bit	Weight	Event Status Register Bit Definition
7	128	PON - Power On
6	64	URQ - User Request
5	32	CME - Command Error
4	16	EXE - Execution Error
3	8	DDE - Device Dependent Error
2	4	QYE - Query Error
1	2	RQC - Request Control
0	1	OPC - Operation Complete

The Standard Event Status Register can be read using the query *ESR?. The register is read destructively, i.e., its contents is cleared when read. The register can also be cleared by the command *CLS.

Each summary message represents a specific event that can occur in the analyzer. These summary message bits have a standardized meaning within IEEE 488.2.

Bit	Event	Description
PON	Power On	This event bit indicates that an off-to-on transition has occurred in the analyzer's power supply. This bit is initially set high when the analyzer is first powered on.
URQ	User Request	This event bit indicates the local control "F1 key press" has occurred.
CME	Command Error	This event bit indicates (1) an IEEE 488.2 syntax error has been detected by the parser, (2) a semantic error occurred indicating an unrecognized header was received, *or* (3), a Group Execute Trigger (GET) was entered into the Input Buffer inside of a <Program Message>.
EXE	Execution Error	This event bit indicates (1) a <Program Data> element is evaluated to be out of the range handled by the analyzer or (2) a valid message could not be executed due to a condition in the analyzer.
DDE	Device Dependent Error	This event bit indicates an error has occurred that is specific to the analyzer.
QYE	Query Error	This event bit indicates (1) an attempt is made to read the output queue when no output is present or pending, or (2) data in the Output Queue has been lost.
RQC	Request Control	This event bit indicates the device is requesting to become a controller. The analyzer will never assert this message.
OPC	Operation Complete	This event bit is generated in response to the *OPC command when all pending operations have completed.

Standard Event Status Enable Register

The *Standard Event Status Enable Register* provides a mask for the event bits in the *Standard Event Status Register*. Each bit is given a decimal weighting according to its position in the register.

Bit	Weight	Standard Event Status Enable Register
7	128	PON – Power On Bit Mask
6	64	URQ – User Request Bit Mask
5	32	CME – Command Error Bit Mask
4	16	EXE – Execution Error Bit Mask
3	8	DDE – Device Dependent Error Bit Mask
2	4	QYE – Query Error Bit Mask
1	2	RQC – Request Control Bit Mask
0	1	OPC – Operation Complete Bit Mask

The *Standard Event Status Enable Register can be* modified using the command *ESE. The register can be read by using the query *ESE?. The register is not read destructively, i.e., its contents are unchanged when read. The register is cleared by the command *CL.S.

Each bit of the register is logically "anded" with the corresponding bit of the *Standard Event Status Register*. The resulting eight bits are then logically "ored" together to form the Event Status Bit (ESB) message of the *Status Byte Register*. The ESB can be set if either of the following conditions are satisfied by any of the event bits: (1) a bit mask of 1 is defined for an event and then that event transitions from 0 to a 1 or (2) the event bit is already a 1 and its corresponding mask bit is set from a 0 to a 1.

Error Queue and Event Status Register

The analyzer maintains an *Error Message Queue* in which error messages are stored as they are detected. The queue can hold a maximum of 5 entries. The order of the error messages in the queue are First In, First Out.

Error	Description
00	Inquiry without measurement command
01	Invalid command *or* query mnemonic (prefix)
02	Invalid command or query mnemonic (suffix)
03	Numeric data too large
04	Numeric data too small
05	String data field too large
06	String data field too small
07	Invalid string field
08	Invalid input data
09	Invalid command or query for R-2600 mode
10	Invalid exponent format
11	Exponent out of range
12	Invalid mantissa format
13	Transmission error (RS-232 only)
14	Input Buffer overflow (RS-232 only)
15	Empty command
16	Output Buffer overflow
17	Voltmeter out of range
18	No input signal
19	Frequency counter measurement invalid
20	Frequency error measurement out of range
21	Monitor modulation measurement out of range
22	Input signal too high
23	Input signal too low
24	Invalid measurement reading
25	Non-optional parameter missing
98	Error queue overflow
99	Error queue empty

The Error Event Status Register contains a single event bit indicating the state of the Error Queue.

Bit State	Description
0	No errors
1	At least one error message is in the queue

The Error Event Status Register has no corresponding Event Status Enable Register - it cannot be masked out. The *Error Event Status Register* is cleared when the E? query is executed.

Status Queue and Event Status Register

The analyzer maintains a *Status Message Queue* in which status messages are stored as they are detected. The queue can holds a maximum of 5 entries. The order of the status messages in the queue is First In, Fit Out.

Status	Description
05	RF overtemp
6	RF overload
07	600-Ohm input load overload
98	Status queue overflow
99	Status queue empty

The Status Event Status Register contains a single event bit indicating the state of the Status Queue.

Bit State	Description
0	No errors
1	At least one status message is in the queue

The Status Event Status Register has no corresponding Event Status Enable Register – it cannot be masked out. The *Status Event Status Register* is cleared when the S? query is executed.

Calibration Event Status Register

The *Calibration Event Status Register contains* a single message bit indicating the current state of calibration for the analyzer. The state of the bit defines the calibration of the analyzer.

Bit State	Description
0	Communications Analyzer is calibrated
1	Communications Analyzer is not calibrated

The *Calibration Event Status Register has* no corresponding Event Status Enable Register – it cannot be masked out. The *Calibration Evenr Status Register* is cleared when the C? query is executed.

Status Byte Register

The *Status Byte Register* represents eight status messages, each being defined by a single bit in the Register. Each bit is given a decimal weighting according to its position in the register.

Bit	Weight	Status Byte Register Bit Definitions
7	128	not used
6	64	MSS – Master Status Summary
5	32	ESB – Event Status Bit
4	16	MAV – Message Available
3	8	EAV – Error Message Available
2	4	SAV – Status Message Available
1	2	CAL – Recalibration warning
0	1	not used

The Status Byte Register can be read with the query *STB?.

Each status message represents an specific event that can occur in the analyzer.

Bit	Summary Message	Description
7	unused	
MSS	Master Status Summary	This summary message bit indicates one of the other summary bits in the Status Byte Register is set.
ESB	Event Status Bit	This summary message bit indicates one of the events defined in the Standard Event Status Resister has occurred and that event has its corresponding bit mask enabled.
MAV	Message Available	This summary message bit indicates that the Output Queue has at least one output message available. When false, the Output Queue of the analyzer is either (1) empty or (2) a valid message could not be executed due to a condition in the analyzer.
SAV	Status Message Available	This summary message bit indicates at least *one* status message is available in the Status Message Queue.
EAV	Error Message Available	This summary message bit indicates at least one error message is available in the Error Message Queue.
CAL	Calibration Warning	This summary message bit indicates the analyzer has exceeded the temperature range of the calibration data. A CAL bit value of False indicates the analyzer is within calibration.
0	unused	

Service Request Enable Register

The *Service Request Enable Register* provides a mask for the event bits in the *Status Byte Register*. Each bit is given a decimal weighting according to its position in the register.

Bit	Weight	Service Request Enable Register
7	128	not used
6	64	not used (always 0)
5	32	ESB - Event Status Bit Mask
4	16	MAV - Message Available Bit Mask
3	8	EAV - Error Message Available Bit Mask
2	4	SAV - Status Message Available Bit Mask
1	2	CAL - Recalibration Warning Bit Mask
0	1	not used

The *Service Request Enable Register can be* modified using the command *SRE. The register can be read by using the query *SRE?. The register is not read destructively, i.e., its contents are unchanged when read. The register is cleared by the command *CLS.

Each bit of the register is logically "anded" with the corresponding bit of the Status Byte *Register*. The resulting eight bits are then logically "ored" together to form the Master Status (MSS) message of the *Status Byte Register. The* MSS can be set if either of the following conditions are satisfied by any of the event bits: (1) a bit mask of 1 is defined for an event and then that event transitions from 0 to a 1 or (2) the event bit is already a 1 and its corresponding mask bit is set from a 0 to a 1.

Note

Bit 6 *of the Status Byte Register (MSS) is not included in the above operation. Bit 6 of the Service Request Enable Register can never be set.*

5. Programming Conventions

Many of the commands allow the entry of optional command parameters. This allows faster remote control as well as simplified parameter setting. Response parameters may also be optionally specified. This is useful when only particular components of a complex measurement are important in the application.

Optional Command Parameters

The majority of the commands have parameters which may be optionally given in a <Command Message>. Each command's manual entry specifies which parameters are optional. Parameters that are not entered by the user, are not modified. In cases where other parameter settings are dependent upon an optional parameter which is not specified, the dependent parameter uses the current value of the parameter.

The syntactic format for a command with optional <Program Data> parameters is:

Header [P_1 [,[P_2 [,[P_3] ... [,[P_n]]]]]

Where Header is either a <Command Program Header> or a <Query Program Header> and P_x is a <Program Data>.

The <Program Data Separator>, the comma, is used as a place mark to indicate unspecified parameters. Trailing commas may be left off the command.

The following examples show both correct and incorrect usage of the optional command parameters. The command **RG** is used to modify the RF-Control to generate mode. The command takes 5 parameters:

P_1	Generate Frequency
P_2	Generate Port
P_3	Output Level
P_4	Modulation Type
P_5	Bandwidth

The parameter P_3, Output Level, is dependent upon the value of the parameter P_2, Generate Port. These two parameters are coupled since they are inter-dependent.

Examples showing *correct usage*

(1) RG **120.0230, 0, –60.0, 1, 0**

Sets generate mode to 120.023 MHz at the GEN OUT port with a level setting of –60.0 dBm with Wide-Band FM modulation. This is the conventional method of configuring the analyzer for a generate mode by supplying all five pertinent parameters.

(2) RG

Sets the analyzer back to the previous settings for the last time the analyzer was configured in Generate mode.

(3) R G , l

Sets generate mode at the Transceiver port. No other parameters are changed. Note: *the* output level *was is in the range of -130 to -50 dBm, which is valid for the Transceiver port.*

(4) RG 120.223

Sets the generate mode to 120.223 MHz.

(5) **RG ,,, 1**

Sets the generate mode modulation type to FM. *Note: the comma that would normally separate the Modulation Type parameter and the Bandwidth parameter is not specified since the Bandwidth parameter is not specified.*

(6) **RG ,,, 1,**

Sets the generate mode modulation type to FM. Note: *this command has the same effect as example (5).*

(7) **RG , 1, –130**

Sets the generate mode at the Transceiver port with an output level of -130.0 dBm.

(8) RG , 0, -10

Sets the generate mode at the Gen Out port with an output level of -10.0 dBm.

Examples ***showing incorrect usage***

(1) RG 120.300 0

The comma separator is missing between the Generate Frequency parameter and the Generate Port parameter.

(2) RG **120.300,0,,,,**

An extra comma is found at the end of the command.

(3) RG **,1;** RG ,,-10.0

The second command specifies an Output Level parameter mat is not in the range of -130 to -50 dBm.

(4) RG ,O; RG ,,-120.0

The second command specifies an Output Level parameter that is not in the range of -80 through +0 dBm.

Parameter ***Coupling Examples***

(1) RG **, 0, 0.0;** RG **,** 1

The first command specifies an Output Level of +0 dBm at the GEN OUT port. The second command switches to the Transceiver port and automatically changes the Output Level to -50 dBm.

(2) **RG , 1, –130; RG , 0**

The first command specifies an Output Level of -130 dBm at the Transceiver port. The second command switches to the GEN OUT port and automatically changes the Output Level to -80 dBm.

Optional Response Parameters

The M? and equivalent ? queries allow the controller to optionally specify which response parameters should be returned. Each of these queries takes a single <Decimal Numeric Program Data> parameter, which is optional. When this parameter is not specified, the queries return the exact syntax as specified by the corresponding measurement command. When the parameter is specified, it defines a single, specific response parameter to be returned. The range of the parameter varies according to the possible number of response parameters that may be returned upon initiation by the measurement command.

Examples

(1) The command/query sequence

MR 1; ?

returns

FE x.xx;IP x.x; MMP x.xx; MMN x.xx

(2) The command/query sequence

MR 1; ?1

returns

FE x.xx

(3) The command/query sequence

MR 1; ?3

returns

MMP x.xx

(4) The command/query sequence

MR 1; ?4

returns

MMN x.xx

6. Command Set Organization

Beginning with Section 7, descriptions are given of the commands, queries, and responses as implemented in the analyzer. The sections are organized by command groupings. Typically, commands from the same group will begin with the same alphabetic character.

Each of the following sections provides a brief table of the commands within the group. The table also describes the allowed *Window* Levels and ***Transparency*** of the command with respect to other commands and queries.

Window Levels

The analyzer CRT display supports multiple window levels. Different types of information are displayed in particular windows. For example, the Base window is used the majority of the time. This window presents the three major zones: Display, RF-Control, and Audio. Pressing the HELP softkey from the Base window places the display in a Help window. The following table describes the window levels that are used by the analyzer.

Window Level	Window Type
Base	Base
Level 1	calibrate Special Functions Memory Synthesizer Format Select Tables Expanded Scope Displays Expanded Spectrum Analyzer Displays Expanded Bar Graph Displays
Level 2	Help
Level 3	Push-to-Talk
Level 4	Auto-Switch to Monitor
Level 5	Screen Timeout Terminal Mode
Level 6	RF Over-Temperature Alarm

Commands and queries are allowed in different window levels, based upon the actions the analyzer must perform to carry out the command or query. Each command group table in the following sections specifies at which window levels each command is allowed. The analyzer will generate an Invalid Mode Error (Error 09) if an attempt is made to execute a command or query at an incorrect window level.

Command Transparency

There are a class of commands that are transparent to ongoing operations that the analyzer is executing. These commands and queries typically provide status or special control capabilities that deal with the manner in which the remote interface operates. For example, the common command *ESE may be issued at any time without affecting any operation associated with the above commands and queries.

Sequential and Overlapped Commands

Commands and queries may be executed as either sequential or overlapped, as defined by IEEE 488.2. Overlapped commands may execute in parallel with other commands. All commands and queries implemented by the analyzer are sequential.

Command Descriptions

Each command or query is described on a page with specific information content. The general form of each manual entry is shown in the following example.

HEADER

Command/Query Description

Description: Provides a brief description of the command or query.

Query Syntax: Defines the expected format of the input command or query. The syntax is identical for all three modes: Standard and Extended RS-232 and IEEE 488.2.

Standard RS-232 Response Syntax: Defines the format of the response message when the analyzer is operating in the Standard RS-232 mode. This entry is only provided for queries.

IEEE 488.2 **Response Syntax:** Defines the format of the response message when the analyzer is operating in the Extended RS-232 mode for the R-2550, or either the Extended RS232 or IEEE 488.2 mode for the R-2600. This entry is only provided for queries.

Parameters:

n1

Description:	Numeric parameter name
optional:	Is the parameter optional
Type:	Parameter type per IEEE 488.2
units:	Units of the parameter
Resolution:	Quantization of the parameter
Range:	Range of values the numeric may take on
Reset:	Value of parameter after reset

s2

Description:	**String** parameter name
optional:	Is the parameter optional
Type:	Parameter type per IEEE 488.2
Format:	Format of the parameter
Reset:	Value of parameter after reset
Notes:	Describes any special requirements or features of the command or query.

Note

*The Optional and **Reset fields** are not used in the definition of a response parameter. The Reset field is replaced with the **Power-On field** for values that are not reset by the *RST, FP, or FR commands. The Power-On **field** describes the parameter values when power is initially applied to the analyzer.*

Quick Overview

The following table lists all commands and queries implemented in the R-2550 and R-2600 Series.

nemonic	Description	Group
*CLS	Clear **Status Command**	**Common**
*ESE	**Standard Event Status Enable Command**	
*ESE?	**Standard Event Status Enable Query**	
*ESR?	**Standard Event Status Register Query**	
*IDN?	**Identification Query**	
*OPC	**Operation Complete Command**	
*OPC?	**Operation Complete Query**	
*OPT?	**Option Identification Query**	
*RST	**Reset Command**	
*SRE	**Service Request Enable Command**	
*SRE?	**Service Request Enable Query**	
*STB?	**Read Status Byte Query**	
*TRG	**Trigger Command**	
*TST?	**Self-Test Query**	
*WAI	**Wait-to-continue Command**	
CM	**Accuracy Mode Selection**	**Calibration**
CS	**Calibrate System**	
DE	**DTMF Encode**	**DTMF Encode**
DS	**DTMF Modulation Switch and Level**	**Modulation Source**
EA	**Tone A**	**Tone Encode**
EB	**Tone B**	**Modulation Source**
ED	**DPL Encode**	
EF	**DPL Encode Modulation Switch and Level**	
EG	**General Sequence Tone Encode**	
EN	**?L code Encode**	
EP	**?L Frequency Encode**	
EQ	**?L Encode Modulation Switch and Level**	
ES	**Cone Encode Modulation Switch and Level**	
ET	**General Sequence Tone Specification**	
FA	**Audio Filter/600 Ohm Input Load**	**Special Function**
FC	**Save Current State**	
FG	**Generate Mode Speaker**	
FI	**Decode Input Source**	
FO	**<reserved for internal use>**	
FP	**Set NVM to Factory Presets'**	
FR	**Reset all Control Functions**	
FS	**RS-232 Serial Port Setup**	
FV?	**Software Version Query**	
GB	**Enter Terminal Mode with Blank Screen**	**General Purpose**
GC	**Terminal Mode Character Write**	
GK	**Generate Simulated Key Press**	
GL	**Go To Local Control State**	
GM	**Local Lockout**	
GS	**Normal Screen (Leave Terminal Mode)**	
GZ	**Go To Cursor Zone**	
G2	**Force IEEE 488.2 Syntax**	
KS	**1 kHz Modulation Switch and Level**	**1 kHz Modulation Source**

Mnemonic	Description	Group
MA	AC Voltmeter	Metering
MD	DC Voltmeter	
MP	Preset Scan	
MR	RF Metering	
MS	Sinad Meter	
Mx	External Distortion Meter	
ND	DPL Decode	Non-Sequence Decode
NP	PL Decode	
NQ[?]	Non-Sequence Decode Status Query	
NT	DTMF Decode	
OB	Bar Graphs	
OE	External Oscilloscope	
OM	Modulation Oscilloscope	
OS	Spectrum Analyzer	
OT	Tracking Generator Oscilloscope	
PM	Preset Memory	Memory Presets
PS	Select Memory Preset	
RD	Duplex Mode	RF Control
RG	Generate Mode	
RM	Monitor Mode	
RT	Tracking Generator	
XS	External Modulation Switch and Level	External Modulation Source
C?	Calibration Warning Inquiry	Inquiry
E?	Error Inquiry	
[M]?	Measurement Inquiry	
S?	Status Inquiry	

The following table lists all commands and queries implemented in the R-2600.

Mnemonic	Description	Group
*CLS	Clear Status Command	Common
*ESE	Standard Event Status Enable Command	
*ESE?	Standard Event Status Enable Query	
*ESR?	Standard Event Status Register Query	
*IDN?	Identification Query	
*OPC	Operation Complete Command	
*OPC?	Operation Complete Query	
*OPT?	Option Identification Query	
*RST	Reset Command	
*SRE	Service Request Enable Command	
*SRE?	Service Request Enable Query	
*STB?	Read Status Byte Query	
*TRG	Trigger Command	
*TST?	Self-Test Query	
*WAI	Wait-to-Continue Command	
BC	DSAT Decode	Cellular
BD[?]	DSAT Code Query	
BE[?]	Electronic Serial Number Query	
BF	Cellular Format Setup	
BH[?]	Handoff Confirmation Query	
BL	Cellular Modulation Switch and Level	
BN[?]	Called Number Query	
BO	Cellular Encode	
BQ[?]	Test Status *Query*	
BS[?]	SAT Code Query	
BT[?]	Thermometer Status *Query*	
BV[?]	Voice Channel Number *Query*	
CM	Accuracy Mode Selection	Calibration
CS	Calibrate *System*	
DE	DTMF Encode	DTMF Encode
DS	DTMF Modulation Switch and Level	Modulation Source
EA	Cone A	Cone Encode
EB	Cone B	Modulation Source
ED	DPL Encode	
EF	DPL Encode Modulation Switch and Level	
EG	General Sequence Tone Encode	
EN	PL Code Encode	
EP	PL Frequency Encode	
EQ	PL Encode Modulation Switch and Level	
ER	Tone Remote Encode	
ES	Tone Encode Modulation Switch and Level	
ET	General Sequence Tone Specification	
EV	Select-V Encode	
El	Tone A/B Sequence 1 Encode	
E2	Tone A/B Sequence 2 Encode	
E3	Tone A/B Sequence 3 Encode	
E4	Tone A/B Sequence 4 Encode	
ES	6 Tone Encode	
FA	Audio Filter/600 Ohm Input Load	Special Function
FC	Save Current State	
FD	Set Deviation Alarm Level	
FF	Filter Selections	
FG	Generate Mode Speaker	
FI	Decode Input Source	
FO	reserved for internal *use>*	
FP	et NVM to Factory Presets	
FR	eset all Control Functions	
FS	S-232 Serial Port Setup	

Mnemonic	Description	Group
FV[?]	Software Version Query	
GB	Enter Terminal Mode with Blank Screen	General Purpose
GC	Terminal Mode Character Write	
GK	Generate Simulated Key Press	
GL	Go To Local Control State	
GM	Local Lockout	
GS	Normal Screen (Leave Terminal Mode)	
GZ	Go To Cursor Zone	
G2	Force IEEE 488.2 Syntax	
KS	1 kHz Modulation Switch and Level	1 kHz Modulation Source
MA	AC Voltmeter	Metering
MD	DC Voltmeter	
MF	Frequency Counter	
MR	RF Metering	
MS	Sinad Meter	
Mx	External Distortion Meter	
MZ	RF Scan	
ND	DPL Decode	Non-Sequence Decode
NP	PL Decode	
NQ[?]	Non-Sequence Decode Status Query	
NT	DTMF Decode	
OB	Bar Graphs	
OE	External Oscilloscope	
OG	Sweep Generator Oscilloscope	
OM	Modulation Oscilloscope	
OS	Spectrum Analyzer	
OT	Tracking Generator Oscilloscope	
PM	Preset Memory	Memory Presets
PS	Select Memory Preset	
RD	Duplex Mode	RF Control
RG	Generate Mode	
RM	Monitor Mode	
RS	Sweep Generator	
RT	Tracking Generator	
SG	General Sequence Decode	Sequence Decode
SQ[?]	Sequence Decode Status Query	
ss	Start Sequence Decode	
sv	Select-V Decode	
sx	Stop Sequence Decode	
S5	5/6 Decode	
xs	External Modulation Switch and Level	External Modulation Source
C?	Calibration Warning Inquiry	Inquiry
E?	Error Inquiry	
[M]?	Measurement Inquiry	
S?	Status Inquiry	

7. Common Commands

The IEEE 488.2 standard defines a set of common commands and queries which are useful in a wide range of instrument system applications. These common commands provide a standardized means of controlling and accessing the status and error information maintained in the analyzer.

The following table describes the common commands and queries implemented by the analyzer. All mandatory commands and queries are supported. The query *OPT? is also supported.

Note

The set of IEEE 488.2 common commands and queries are supported for application programs using the RS-232 interface.

Mnemonic	Description	Window Level	Transparent
*CLS	Clear Status Command	All	Yes
*ESE	Standard Event Status Enable Command	All	Yes
*ESE?	Standard Event Status Enable *Query*	All	Yes
*ESR?	Standard Event Status Register Query	All	Yes
*IDN?	Identification Query	All	Yes
*OPC	Operation Complete Command	All	Yes
*OPC?	Operation Complete Query	All	Yes
*OPT?	Option Identification Query	All	Yes
*RST	Reset command	Base	No
*SRE	Service Request Enable Command	All	Yes
*SRE?	Service Request Enable Query	All	Yes
*STB?	Read Status Byte Query	All	Yes
*TRG	Trigger Command	Base	No
*TST?	Self-Test Query	All	No
*WAI	Wait-to-Continue Command	All	Yes

*CLS

Clear **Status**

Description: **The** *CLS command clears the following status data structures:

Standard Event Status Register
Error Event Status Register
Status Event Status Register
Error Message Queue
Status Message Queue
Calibration Warning Status Register
Request-for-OPC Flag

If the *CLS command follows a <Program Message Terminator>, the *Output Queue* and MAV bit of the *Status Byte Register* will also be cleared.

Command Syntax: *CLS

Description: The *ESE command sets the *Standard Event Status Enable Register* bits. Each bit in the *Standard Evenr Status Enable Register* functions as a mask for the corresponding bit in the *Standard Event Status Register.* Reference the *ESR? query for a description of the events that may be masked or unmasked by this register.

Command Syntax: *ESE n1

Parameters:

n1

Description:	Standard Event Status Register Bit Mask
Optional:	No
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 through 255
Power-On:	0

*ESE?

Standard Event Status Enable Query

Description: The *ESE? query returns the current contents of the *Standard Event Status Enable Register*. Reference the *ESR? query for a description of the events that may be masked or unmasked by this register.

Query Syntax: *ESE?

Standard RS-232 Response Syntax: n1<CR-LF>

IEEE 488.2 Response Syntax: n1<LF>

Parameters:

n1

Description:	Standard Event Status Enable Register Bit Mask
Type:	<NR1 Numeric Response Data>
units:	None
Resolution	N/A
Range:	0 through 255

*ESR?

Standard Event Status Register Query

Description: The *ESR? query returns the current contents of the *Standard Event Status* Register. The register is cleared when read.

Bit	Weight	Event Status Register Bit Definition
7	128	PON – Power On
6	64	URQ – User Request
5	32	CME – Command Error
4	16	EXE – Execution Error
3	8	DDE – Device Dependent Error
2	4	QYE – Query Error
1	2	RQC – Request Control
0	1	OPC – Operation Complete

Query Syntax: *ESR?

Standard RS-232 Response Syntax: n1<CR-LF>

IEEE 488.2 Response Syntax: n1<LF>

Parameters:

n1

Description:	Standard Event Status Register Bit Values
Type:	<NR1 Numeric Response Data>
units:	None
Resolution:	N/A
Range:	0 through 2.55

*IDN? (R-2550)

Identification Query

Description: The *IDN? query uniquely identifies the analyzer over the system interface.

Query Syntax: *IDN?

Standard RS-232 Response Syntax: s 1 <CR-LF>

IEEE 488.2 Response Syntax: s1<LF>

Parameters: s1

Description:	Identification Suing
Type:	<Arbitrary ASCII Response Data>
Format:	28 characters encoded as "MOTOROLA,R-2600,0,V.01.LXX"

Note: XX represents the minor revision number

*IDN? (R-2600)

Identification Query

Description: The *IDN? query uniquely identifies the analyzer over the system interface.

Query Syntax: *IDN?

Standard RS-232 Response Syntax: s 1 <CR-LF>

IEEE 488.2 Response Syntax: s1<LF>

Parameters:

s1

Description:	Identification String
Type:	<Arbitrary ASCII Response Data>
Format:	28 characters encoded as "MOTOROLA,R-2600,0,V3.01.SXX"

Notes: XX represents the minor revision number

Description: **The** *OPC command will cause the analyzer to set the OPC message bit in the Standard *Event Status Register* when all pending operations become complete.

The analyzer utilizes the *Request-for-OPC Flag* to implement this command. This flag is cleared by the *CLS command, which will cause the OPC message bit to be unaffected by completion of pending operations until another *OPC command is executed.

Command Syntax: *OPC

*OPC?

Operation Complete Query

Description: **The** *OPC? query places a "1" in the *Output Queue* when all pending operations have completed.

Query Syntax: *OPC?

Standard RS-232 Response Syntax: nl <CR-LF>

IEEE 488.2 Response Syntax: nl <LF>

Parameters: nl

Description:	Operation Completed Flag
Type:	<NR1 Numeric Response Data>
units:	None
Resolution:	N/A
Range:	1

*OPT? (R-2550)

Option Identification Query

Description:

The *OPT? query identifies the reportable **R-2550 options.** The response string is encoded using one of the following tables. String positions are encoded with a "0" if the option is not installed. String positions are encoded with a **"1"** if the option is installed.

R-2550 Option Table

Position	Option Slice	Option
1		Tracking Generator
2		N/A
3		N/A

Query Syntax:

*OPT?

Standard RS-232 Response Syntax:

s1 <CR-LF>

Extended RS-232 Response Syntax:

s1<LF>

Parameters:

s1

Description: Reportable Options
Type: <Arbitrary ASCII Response String>
Format: 5 characters encoded as "1,2,3"

Notes:

Each option is represented by the character "1" if the option is present. The character "0" is used when the option is not present.

*OPT? (R-2600)

Option Identification Query

Description: The *OPT? query identifies the reportable R-2600 options. The response string is encoded using one of the following tables. Suing positions are encoded with a "0" if the option is not installed. Suing positions are encoded with a "1" if the option is installed.

R-2600 Option Table

Position	Option Slice	Option
1		Tracking Generator
2		Cable Fault
3		C-Msg Filter/600-Ohm load
4	Cellular	Cellular Testing
5	Cellular	EAMPS Signaling
6	Cellular	ETACS Signaling
7	Cellular	NAMPS Signaling
8	Cellular	NTACS Signaling
9	'Cellular	JTACS Signaling
10	Cellular	IEEE 488 GP-IB
11		CCITT Filter/600 Ohm Load
12		Phase Modulation
13		Graphics Printout
14		Enhanced SA/Markers
15		Full Test Setups

Query Syntax: *OPT?

Standard W-232
Response Syntax: s1 <CR-LF>

IEEE 488.2
Response Syntax: s1<LF>

Parameters: s1

Description: Reportable Options
Type: <Arbitrary ASCII Response String>
Format: 19 characters encoded as "1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1"

Each option is represented by the character "1" if the option is present. The character "0" is used when the option is not present.

Description: The *RST command causes the analyzer to reset to a set of factory preset parameters.

Command Syntax: *RST

Notes: Each individual command entry describes the reset or power-on values for the parameters of the analyzer.

Description: **The** *SRE command sets the *Service Request Enable Register* bits. Each bit in the *Status Byte Register* functions as a mask for the corresponding bit in the *Service Request Enable Register.* Reference the *STB? query for a description of the events that may be masked or unmasked by this register.

Command Syntax: *SRE n1

Parameters: n1

Description:	Service Request Enable Bit Mask
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 through 255
Power-On:	0

Notes: Bit 6 of the *Service Request Enable Register* is always zero and cannot be set by the execution of this command.

*SRE?

Service Request Enable Query

Description: The *SRE? query returns the current contents of the *Service Request Enable Register*. Refer to the *STB? query for a description of the events that may be masked or unmasked by this register.

Query Syntax: *SRE?

Standard RS-232 Response Syntax: n1<CR-LF>

IEEE 488.2 Response Syntax: n1<LF>

Parameters:

n1

Description:	Service Request Enable Register Bit Mask
Type:	<NR1 Numeric Response Data>
Units:	None
Resolution	N/A
Range:	0 through 63 or 128 through 255

Notes: Bit 6 of this register is always zero.

*STB?

Read **Status** Byte Query

Description:

The *STB? query reads the *Status Byte Register* and the MSS message bit., which is reported in bit position 6 instead of the RQS message bit.

Bit	Weight	Status Byte Register Bit Definitions
7	128	not used
6	64	MSS – Master Status Summary
5	32	ESB – Event Status Bit
4	16	MAV – Message Available
3	8	EAV – Error Message Available
2	4	SAV – Status Message Available
1	2	CAL – Recalibration warning
0	1	not used

Query Syntax: *STB?

Standard RS-232 Response Syntax: nl<CR-LF>

IEEE 488.2 Response Syntax: nl<LF>

Parameters:

nl

Description: Status Byte Register Bit Values
Type: <NR1 Numeric Response Data,
units: None
Resolution: N/A
Range: 0 through 255
Power On: 0

Description: The *TRG command is the device-specific analog of the IEEE 488.1 Group Execute Trigger (GET) interface message.

Command Syntax: **"TRG**

"TST?

Self-Test Query

Description: **The** *TST? query causes the analyzer to perform a self-test.

Query **Syntax:** *TST?

Standard RS-232 Response Syntax: n1<CR-LF>

IEEE 488.2 Response Syntax: n1<LF>

Parameters:

n1

Description:	Self-test Result
Type:	<NR1 Numeric Response Data>
units:	None
Resolution:	N/A
Range:	0: self-test passed 1: self-test failed

Description: **The** *WAI command prevents the analyzer from executing and further commands or queries until all pending operations have completed.

Command Syntax: *WAI

8. Calibration

The following table describes the Calibration commands and queries implemented by the analyzer.

Mnemonic	Description	Window Level	Transparent
CM	Accuracy Mode Selection	Base	No
CS	Calibrate System	Base	No

CM (R-2600)

Accuracy Mode Selection

Description:

The CM command selects between Normal and High Accuracy modes. Normal mode allows a range of ±10 degrees centigrade before the recalibration message is displayed. In High Accuracy mode, the range is ±5 degrees centigrade before the recalibration message is displayed.

Command Syntax:

CM n1

Parameters:

n1

Description:	Accuracy Mode Selection
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
"Range:	0: High
	1: Normal
Reset:	0

Notes:

The CM command is only available for a High-Accuracy R-2600, such as the Cellular Base Site R-2600/CBS.

The accuracy mode only affects the warning message to recalibrate the analyzer. The performance specifications and calibration times are not affected by the selection of either High or Normal mode.

Description: **The CS** command causes the analyzer to perform a self calibration of the RF input, RF output and modulation hardware.

Command Syntax: CS

Notes: *Caution:* Before starting self calibration be sure the 50-ohm load, attached by chain to the front panel, is connected. This provides the termination which is essential to proper calibration. Also ensure all connections to the RF I/O and ANT connectors are removed.

9. DTMF Modulation Source

The following table describes the DTMF Modulation Source commands and queries implemented by the analyzer.

Mnemonic	Description	Window Level	Transparent
DE	DTMF Encode	Base	No
DS	DTMF Modulation Switch and Level	Base	No

DE

DTMF Encode

Description: **The** DE command specifies a sequence of sixteen DTMF codes, a tone duration and inter-digit delay.

Command Syntax: DE s1,n2,n3

Parameters:

s1

Description:	DTMF Code Sequence
optional:	Yes
Type:	<String Program Data>
Format:	16 characters with the following constraints: • "0" through "9" . "A" through "D" • "*" • "#" • "–" (representing don't care) • "" (representing a space)
Reset:	"0123456789ABCD*#"

n2

Description:	DTMF Code Duration
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	mS
Resolution:	1 mS
Range:	1 through 9999
Reset:	100 mS

n3

Description:	DTMF Inter-digit Delay
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	mS
Resolution:	1 mS
Range:	0 through 9999
Reset:	5omS

Notes: The DS command sets the DTMF modulation source switch and specifies its level.

Description: **The** DS command sets the DTMF modulation source switch and specifies its modulation level.

Command Syntax: DS n1,n2

Parameters:

n1

Description:	DTMF Modulation Switch
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: continuous 1: Off 2: Burst
Reset:	1

n2

Description:	DTMF Modulation Level
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	Mode dependent, see notes
Resolution:	Mode dependent, see notes
Range:	Mode dependent, see notes
Reset:	0.000 v

Notes: The following table describes the Units, Resolution, and Range values for the Modulation Level based upon the RF-Control mode of the analyzer.

RF-Control Mode	Units	Resolution	Range
Monitor/Narrow-Band	V	0.005 v	0.000 - 0.795
Monitor/Wide-Band	V	0.05 v	0.00 - 7.95
Generate/AM	%	1 %	0 - 99
Generate/FM/Narrow-Band	kHz	0.05 kHz	0.00 - 9.95
Generate/FM/Narrow-Band	kHz	0.05 kHz	0.00 - 9.95
Generate/PM/Wide-Band	rad	0.01 rad	0.50 - 2.00
Generate/PM/Wide-Band	rad	0.1 rad	2.0 - 10.0

10. Tone Encode Modulation Source

The following table describes the Tone Encode Modulation Source commands and queries implemented by the R-2550.

Mnemonic	Description	Window Level	Transparent
EA	Tone A	Base	No
EB	Tone B	Base	No
ED	DPL Encode	Base	No
EF	DPL Encode Modulation Switch and Level	Base	No
EG	General Sequence Tone Encode	Base	No
EN	PL Code Encode	Base	No
EP	PL Frequency Encode	Base	No
EQ	PL Encode Modulation Switch and Level	Base	No
ES	Tone Encode Modulation Switch and Level	Base	No
ET	General Sequence Tone Specification	Base	No

The following table describes the Tone Encode Modulation Source commands and queries implemented by the R-2600.

Mnemonic	Description	Window Level	Transparent
EA	Tone A	Base	No
EB	Tone B	Base	No
ED	DPL Encode	Base	No
EF	DPL Encode Modulation Switch and Level	Base	No
EG	General Sequence Tone Encode	Base	No
EN	PL Code Encode	Base	No
EP	PL Frequency Encode	Base	No
EQ	PL Encode Modulation Switch and Level	Base	No
ER	Tone Remote Encode	Base	No
ES	Tone Encode Modulation Switch and Level	Base	No
ET	General Sequence Tone Specification	Base	No
EV	Select-V Encode	Base	No
El	Tone A/B Sequence 1 Encode	Base	No
E2	Tone A/B Sequence 2 Encode	Base	No
E3	Tone A/B Sequence 3 Encode	Base	No
E4	Tone A/B Sequence 4 Encode	Base	No
E5	5/6 Tone Encode	Base	No

EA

Tone A

Description: The EA command selects Tone A as the synthesized modulation source and specifies its frequency.

Command Syntax: EA n1

Parameters:

n1

Description:	Tone A Frequency
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	HZ
Resolution:	0.1 Hz
Range:	0 through 19999.9
Reset:	1000.0 Hz

Notes: The ES command sets the Tone A modulation source switch and specifies its level.

EB

Tone B

Description: **The** EB command selects Tone B as the synthesized modulation source and specifies its frequency.

Command Syntax: EB n1

Parameters:

n1

Description:	Tone B frequency
optional:	Yes
Type:	<Decimal Numeric Program Data==
units:	HZ
Resolution:	0.1 Hz
Range:	0 through 19999.9
Reset:	2000.0 Hz

Notes: The ES command sets the Tone B modulation source switch and specifies its level.

ED

DPL Encode

Description: The ED command selects DPL as the synthesized modulation source and specifies its code.

Command Syntax: ED s1

Parameters:

s1
Description: DPL Code
optional: Yes
Type: <String Program Data,
Format: 3 characters, each representing an Octal digit
Reset: "023"

Notes: The EF command sets the DPL modulation source switch and specifies its level.

The following table describes the set of valid DPL codes. The analyzer allows entry of codes other than those defined in the table, generating DPL tones representing "000" through "777".

023	071	134	223	306	411	503	631	734
025	072	143	226	311	412	506	632	743
026	073	152	243	315	413	516	654	754
031	074	153	244	331	423	532	662	
032	114	156	245	343	431	546	664	
043	115	162	251	346	432	565	703	
047	116	165	261	351	445	606	712	
051	125	172	263	364	464	612	723	
054	131	174	265	365	465	624	731	
065	132	205	271	371	466	627	732	

Description: **The** EF command sets the DPL Encode modulation source switch and specifies its modulation level. If the synthesizer is not selected to DPL, the Invalid Mode Error (09) is generated.

Command Syntax: EF nl ,n2

Parameters:

nl

Description:	DPL Encode Modulation Switch
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Continuous 1: off 2: Start Disconnect tone 3: Stop Disconnect tone
Reset:	1

n2

Description:	DPL Encode Modulation Level
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	Mode dependent, see notes
Resolution:	Mode dependent, see notes
Range:	Mode dependent, see notes
Reset:	0.000 v

Notes: **The** following table describes the Units, Resolution, and Range values for the Modulation Level based upon the RF-Control mode of the analyzer.

RF-Control Mode	Units	Resolution	Range
Monitor/Narrow-Band	V	0.005 v	0.000 -0.795
Monitor/Wide-Band	V	0.05 v	0.00 - 7.95
Generate/AM	%	1 %	0 -99
Generate/FM/Narrow-Band	kHz	0.05 kHz	0.00 - 9.95
Generate/FM/Narrow-Band	kHz	0.05 kHz	0.00 - 9.95
Generate/PM/Wide-Band	rad	0.01 rad	0.50 - 2.00
Generate/PM/Wide-Band	rad	0.1 rad	2.0 - 10.0

Description: The EG command selects General Sequence as the synthesized modulation source and specifies a sequence of twenty tones and durations.

Command Syntax: EG sl,

Parameters:

s1

Description:	General Sequence Tone Codes
optional:	Yes
Type:	&ring Program Data>
Format:	20 character suing with the following constraints: • "0" through "9" • "–" (representing a null tone)
Reset:	"0123456789"

Notes: Tone frequencies and durations are specified with the General Sequence Tone Specification (ET) command. The ES command sets the General Sequence modulation source switch and specifies its level.

Description: **The** EG command selects General Sequence as the synthesized modulation source and specifies a sequence of twenty tones and durations.

Command Syntax: **EG** s1,s2

Parameters:

s1

Description:	General Sequence Tone Codes
optional:	Yes
Type:	&ring Program Data>
Format:	20 character string with the following constraints: · "0" through "9" • "A" through "J" • "–" (representing a null tone)
Reset:	"0123456789ABCDEFGHIJ"

s2

Description:	General Sequence Duration Codes
optional:	Yes
Type:	&ring Program Data>
Format:	20 character string with the following constraints: · "0" through "9" • "A" through "J" • "–" (representing a null tone)
Reset:	"0123456789ABCDEFGHIJ"

Notes: Tone frequencies and durations are specified with the General Sequence Tone Specification (ET) command. The ES command sets the General Sequence modulation source switch and specifies its level.

Description: The EN command selects PL as the synthesized modulation source and specifies its code.

Command Syntax: EN s1

Parameters:

s1
Description: Two Digit PL Code
optional: Yes
Type: <String Program Data>
Format: 2 characters, constrained from selectionsintable below
Reset: "3B"

Notes: The EQ command sets the PL modulation source switch and specifies its level.

The set of valid PL codes are giveninthefollowing table. The corresponding frequencies are also specified.

Motorola Code	Frequency (Hz)	Motorola Code	Frequency (Hz)
xz	67.0	3B	131.8
wz	69.3	4z	136.5
XA	71.9	4A	141.3
WA	74.4	4B	146.2
XB	77.0	5z	151.4
WB	79.7	5A	156.7
YZ	82.5	5B	162.2
YA	85.4	6z	167.9
YB	88.5	6A	173.8
zz	91.5	6B	179.9
ZA	94.8	7z	186.2
ZB	97.0	7A	192.8
1z	100.0	Ml	203.5
1A	103.5	8z	206.5
1B	107.2	M2	210.7
2z	110.9	M3	218.1
2A	114.8	M4	225.7
		9z	229.1
2B	118.8	M5	233.6
3z	123.0	M6	241.8
3A	127.3	M7	250.3

EP

PL Frequency Encode

Description: **The** EP command selects PL as the synthesized modulation source and specifies its frequency.

Command Syntax: EP nl

Parameters:

nl

Description:	PL Frequency
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	HZ
Resolution:	0.1 Hz
Range:	0 through 300.0
Reset:	**131.8 Hz**

Notes: The EQ command sets the PL modulation source switch and specifies its level.

Description: The EQ command sets the PL Encode modulation source switch and specifies its modulation level. If the synthesizer is not selected to PL, the Invalid Mode En-or (09) is generated.

Command Syntax: EQ n1,n2

Parameters:

n1

Description:	PL Modulation Switch
optional:	Yes
Type:	<Decimal Numeric Program Data,
units:	None
Resolution:	N/A
Range:	0: Continuous
	1: Off
Reset:	0

n2

Description:	PL Modulation Level
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	Mode dependent, see notes
Resolution:	Mode dependent, see notes
Range:	Mode dependent, see notes
Reset:	0.000 v

Notes: The following table describes the Units, Resolution, and Range values for the Modulation Level based upon the RF-Control mode of the analyzer.

RF-Control Mode	Units	Resolution	Ranae
Monitor/Narrow-Band	V	0.005 v	0.000 - 0.795
Monitor/Wide-Band	V	0.05 v	0.00 - 7.95
Generate/AM	%	1 %	0 - 99
Generate/FM/Narrow-Band	kHz	0.05 kHz	0.00 - 0 9.95
Generate/FM/Narrow-Band	kHz	0.05 kHz	0.00 - 9.95
Generate/PM/Wide-Band	rad	0.01 rad	0.50 - 2.00
Generate/PM/Wide-Band	rad	0.1 rad	2.0 - 10.0

Description: The ER command selects Tone Remote as the synthesized modulation source.

Command Syntax: E R

Notes: **The** ES command sets the Tone Remote modulation source switch and specifies its level.

The **ER** command is not available on the R-2550.

Description: The ES command sets the Tone Encode modulation source switch and specifies its modulation level. If the synthesizer selection is not Tone A, Tone B, Tone A/B Sequence, General Sequence, Tone Remote, 5/6 Tone, or Select V Tone the Invalid Mode Error (09) is generated.

Command Syntax: ES n1,n2

Parameters:

n1

Description:	Tone Modulation Switch
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Continuous 1: Off 2: Burst
Reset:	1

n2

Description:	Tone Modulation Level
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	Mode dependent, see notes
Resolution:	Mode dependent, see notes
Range:	Mode dependent, see notes
Reset:	0.000 v

Notes: The following table describes the Units, Resolution, and Range values for the Modulation Level based upon the RF-Control mode of the analyzer.

RF-Control Mode	Units	Resolution	Range
Monitor/Narrow-Band	V	0.005 v	0.000 - 0.795
Monitor/Wide-Band	V	0.05 v	0.00 - 7.95
Generate/AM	%	1 %	0 - 99
Generate/FM/Narrow-Band	kHz	0.05 kHz	0.00 - 9.95
Generate/FM/Narrow-Band	kHz	0.05 kHz	0.00 - 9.95
Generate/PM/Wide-Band	rad	0.01 rad	0.50 - 2.00
Generate/PM/Wide-Band	rad	0.1 rad	2.0 - 10.0

Description: **The** ET command selects General Sequence as the synthesized modulation source, and specifies the frequency and duration for a single general sequence tone.

Command Syntax: ET n1,n2,n3

Parameters:

n1

Description	General Sequence Tone Identification Code
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 through 9
Reset:	0

n2

Description:	General Sequence Tone Frequency
Optional:	Yes
Type:	<Decimal Numeric Program Data,
units:	HZ
Resolution:	0.1 Hz
Range:	0 through 19999.9
Reset:	See notes

n3

Description:	General Sequence tone duration
optional:	yes
Type:	<Decimal Numeric Program Data>
units:	mS
Resolution:	1 mS
Range:	0 through 9999
Reset:	See notes

Notes: The ES command sets the General Sequence modulation source switch and specifies its level.

The following table specifies the reset values for the 10 General Sequence Tones.

Tone Code	Tone Frequency	Tone Duration
0	19000.0 Hz	1.000 s
1	18000.0	0.990
2	17000.0	0.800
3	16000.0	0.700
4	15000.0	0.600
5	14000.0	0.500
6	13000.0	0.400
7	12000.0	0.300
8	11000.0	0.200
9	10000.0	0.100

Description: **The** ET command selects General Sequence as the synthesized modulation source, and specifies the frequency and duration for a single general sequence tone.

Command Syntax: ET n1,n2,n3

Parameters:

n1

Description:	General Sequence Tone Identification Code
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 through 19, values 10 through 19 correspond to codes A through J
Reset:	0

n2

Description:	General Sequence Tone Frequency
optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	Hz
Resolution:	0.1 Hz
Range:	0 through 19999.9
Reset:	See notes

n3

Description:	General Sequence tone duration
optional:	yes
Type:	<Decimal Numeric Program Data>
units:	mS
Resolution:	1 mS
Range:	0 through 9999
Reset:	See notes

Notes: **The ES** command sets the General Sequence modulation source switch and specifies its level.

The following table specifies the reset values for the 20 General Sequence Tones.

Tone Code	Tone Frequency	Tone Duration
0	19000.0 Hz	1.000 s
1	18000.0	0.990
2	17000.0	0.800
3	16000.0	0.700
4	15000.0	0.600
5	14000.0	0.500
6	13000.0	0.400
7	12000.0	0.300
8	11000.0	0.200
9	10000.0	0.100
A	9000.0	0.090
B	8000.0	0.080
C	7000.0	0.070
D	6000.0	0.060
E	5000.0	0.050
F	4000.0	0.040
G	3000.0	0.030
H	2000.0	0.020
I	1000.0	0.010
J	0.0	0.000

EV

Select-V Encode

Description: **The** EV command selects Select-V as the synthesized modulation source and specifies its type and code sequence.

Command Syntax: EV n1,s1

Parameters:

n1

Description:	Select-V Type
optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: ZVEI 1: ZVEI MOD 2: ZVEI FRENCH 3: CCIR STD 4: CCIR 70 5: EEA
Reset:	0

s2

Description:	Select-V Code
optional:	Yes
Type:	&ring Program Data>
Format:	5 character suing with the following consuaints: · "0" through "9" • "B," "C," "D," "F," "G," "R" • "N" (representing a null tone N_T)
Reset:	"12345"

Notes:

The ES command sets the Select-V modulation source switch and specifies its level.

The following table specifies the Select-V frequencies.

Code	**ZVEI** Std (Hz)	**ZVEI** Mod (Hz)	**ZVEI** Frch (Hz)	**CCIR** Std (Hz)	**CCIR** 7omS (Hz)	**EEAA** (Hz)
0	2400	2200	2400	1981	1981	1981
1	1060	970	1060	1124	1124	1124
2	1160	1060	1160	1197	1197	1197
3	1270	1160	1270	1275	1275	1275
4	1400	1270	1400	1358	1358	1358
5	1530	1400	1530	1446	1446	1446
6	1670	1530	1670	1540	1540	1540
7	1830	1670	1830	1640	1640	1640
8	2000	1830	2000	1747	1747	1747
9	2200	2000	2200	1860	1860	1860
G	2800	885	885	2400	2400	1055
B	810	810	810	930	930	930
C	970	2600	2600	2247	2247	2247
D	885	2800	2800	991	991	991
F	930	930	930	873	873	873
R	2600	2400	970	2110	2110	2110
N	0	0	0	0	0	0
Length	70 mS	70 mS	70 mS	100 mS	70 mS	40 mS

Note:

The **EV** command is not available on the R-2.550.

E1

Tone A/B Sequence 1

Description: The E1 command selects Tone A/B Sequence 1 as the synthesized modulation source, and specifies the Tone A and Tone B frequencies.

Command Syntax: E1 n1,n2

Parameters:

n1

Description:	Tone A Frequency
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	HZ
Resolution:	0.1 Hz
Range:	0 through 19999.9
Reset:	1000.0 Hz

n2

Description:	Tone B Frequency
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	Hz
Resolution:	0.1 Hz
Range:	0 through 19999.9
Reset:	2000.0 Hz

Notes: The ES command sets the Tone MB Sequence 1 modulation source switch and specifies its level.

The **E1** command is not available on the R-2550.

E2

Tone A/B Sequence 2

Description: The E2 command selects Tone A/B Sequence 2 as the synthesized modulation source, and specifies the Tone A and Tone B frequencies.

Command Syntax: **E2** nl ,n2

Parameters:

n1

Description:	Tone A Frequency
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	Hz
Resolution:	0.1 Hz
Range:	0 through 19999.9
Reset:	1000.0 Hz

n2

Description:	Tone B Frequency
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	Hz
Resolution-	0.1 Hz
Range:	0 through 19999.9
Reset:	2000.0 Hz

Notes: The ES command sets the Tone A/B Sequence 2 modulation source switch and specifies its level.

The E2 command is not available on the R-2550.

Description: The E3 command selects Tone A/B Sequence 3 as the synthesized modulation source, and specifies the Tone A and Tone B frequencies, durations and delays.

Command Syntax: **E3** nl ,n2,n3,n4,n5,n6

Parameters:

n1
Description: Tone A Frequency
optional: Yes
Type: <Decimal Numeric Program Data>
units: HZ
Resolution: 0.1 Hz
Range: 0 through 19999.9
Reset: 1000.0 Hz

n2
Description: Tone A Duration
optional: Yes
Type: <Decimal Numeric Program Data,
Units: S
Resolution: 0.01 s
Range: 0 through 9.99
Reser 0.20 s

n3
Description: Tone A Delay
optional: Yes
Type: <Decimal Numeric Program Data>
units: S
Resolution: 0.01 s
Range: 0 through 9.99
Reset: 0.10 s

n4
Description- Tone B Frequency
optional: Yes
Type: <Decimal Numeric Program Data>
units: Hz
Resolution: 0.1 Hz
Range: 0 through 19999.9
Reset: 2000.0 Hz

n5

Description:	Tone B Duration
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	S
Resolution:	0.01 s
Range:	0 through 9.99
Reset:	0.20 s

n6

Description:	Tone B Delay
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	S
Resolution:	0.01 s
Range:	0 through 9.99
Reset:	0.10 s

Notes:

The ES command sets the Tone A/B Sequence 3 modulation source switch and specifies its level.

The E3 command is not available on the R-2550.

Description: **The E4** command selects Tone A/B Sequence 4 as the synthesized modulation source, and specifies the Tone A and Tone B frequencies, durations and delays.

Command Syntax: E4 n1,n2,n3,n4,n5,n6

Parameters:

n1
Description: Tone A Frequency
optional: Yes
Type: <Decimal Numeric Program Data>
units: Hz
Resolution: 0.1 Hz
Range: 0 through 19999.9
Reset: 1000.0 Hz

n2
Description: Tone A Duration
optional: Yes
Type: <Decimal Numeric Program Data>
units: S
Resolution: 0.01 s
Range: 0 through 9.99
Reset: 0.99 s

n3
Description: Tone A Delay
Optional: Yes
Type: <Decimal Numeric Program Data>
units: S
Resolution: 0.01 s
Range: 0 through 9.99
Reset: 5.01 s

n4
Description: Tone B Frequency
optional: Yes
Type: <Decimal Numeric Program Data>
units: Hz
Resolution: 0.1 Hz
Range: 0 through 19999.9
Reset: 2000.0 Hz

n5

Description:	Tone B Duration
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	S
Resolution:	0.01 s
Range:	0 through 9.99
Reset:	9.00 s

n6

Description:	Tone B Delay
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	S
Resolution:	0.01 s
Range:	0 through 9.99
Reset:	0.00 s

Notes:

The ES command sets the Tone A/B Sequence **4** modulation source switch and specifies its level.

The E4 command is not available on the R-2550.

Description: **The** E5 command selects 5/6 Tone as the synthesized modulation source and specifies its code sequence.

Command Syntax: E5 s1,s2,s3

Parameters:

s1
Description: 5/6 Preamble Tone
optional: Yes
Type: <String Program Data>
Format: 1 character with the following constraints:
• "0" through "9"
· "R"
Reset: "0"

s2
Description: 5/6 Tone Paging Message
Optional: Yes
Type: <String Program Data>
Format: 5 characters with the following constraints:
· "0" through "9"
• "R"
Reset: "12345"

s3
Description: 5/6 Tone Format Select
Optional: Yes
Type: &ring Program Data>
Format: 1 character with the following constraints:
• "–" (representing 5 Tone Format)
• "X" (representing 6 Tone Format)
Reset: " "

Notes: **The ES** command sets the 5/6 Tone modulation source switch and specifies its level.

The following table specifies the 5/6 Tone codes.

Digit	Frequency (Hz)
0	600
1	741
2	882
3	1023
4	1164
5	1305
6	1446
7	1587
8	1728
9	1869
R	459
X	2010

The **ES** command is not available on the R-2550.

11. Special Functions

The following table describes the Special Functions commands and queries implemented by the **R-2550.**

Mnemonic	Description	Window Level	Transparent
FC	Save Current State	Base	No
FG	Generate Mode Speaker	Base	No
FI	Decode Input Source	Base	No
FO	<reserved for internal use>	Base	No
FP	Set NVM to Factory Presets	Base	No
FR	Reset all Control Functions	Base	No
FS	RS-232 Serial Port Setup	Base	No
FV[?]	Software Version Query	All	Yes

The following table describes the **Special Functions** commands and queries implemented by the **R-2600.**

Mnemonic	Description	Window Level	Transparent
FA	Audio Filter/600 Ohm Input Load	Base	No
FC	Save Current State	Base	No
FD	Set Deviation Alarm Level	Base	No
FF	Filter Selections	Base	No
FG	Generate Mode Speaker	Base	No
FI	Decode Input Source	Base	No
FO	<reserved for internal use>	Base	No
FP	Set NVM to Factory Presets	Base	No
FR	Reset all Control Functions	Base	No
FS	RS-232 Serial Port Setup	Base	No
FV[?]	Software Version Query	All	Yes

FA

Audio Filter/600 Ohm Input Load

Description: **The** FA command selects the audio filtering between value of none, C-Msg, or CCITT. The command controls the input load at the DVM port between 600 Ohms or 1 MegaOhm.

Command Syntax: FA nl, n2

Parameters:

n1

Description:	Input Load
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 : 600 Ohms 1: 1 MegaOhm
Reset:	1

n2

Description:	Audio Filter
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: no filtering 1: C-Msg Filter 2: CCITT Filter
Reset:	0

Notes: The FA command is only available if the C-Msg/600 Ohm Input Load or the CCITT/600 Ohm Input Load Options are installed.

If the C-Msg/600 ohm Input Load Option is installed and the CCIIT/600 ohm Input Load Option is not installed, the analyzer will return an Invalid Input Error (Error 08) if input parameter n2 is selected to CCI'IT.

If the CCITT/600 Ohm Input Option is installed and the C-Msg/600 Ohm Input Load Option is not installed, the analyzer will return an Invalid Input Error (Error 08) if input parameter n2 is selected to C-Msg.

Description: The FC command sets the current state of the analyzer be the powerup state.

Command Syntax: F C

FD

Set Deviation Alarm Level

Description: The FD command specifies the FM deviation level which will trigger the deviation alarm.

Command Syntax: **FD** n1

Parameters:

n1

Description:	Deviation Alarm Level
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	kHz
Resolution:	0.1 kHz
Range:	0 to 99.9
Reset:	0.0 kHz

Notes: The FD Command is not available on the R-2550

Description: **The FF** command specifies bandwidth and post detection filter settings.

Command Syntax: FF n1,n2

Parameters:

n1

Description:	High-pass Filter Selection
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: 5 Hz
	1: 300 Hz
	2: 3 kHz
Reset:	0

n2

Description:	Low-pass Filter Selection
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: 300 Hz
	1: 3 kHz
	2: 20 kHz
Reset:	2

Notes: The **FF** Command is not available on the R-2550.

Description: **The** FG command enables or disables the speaker while the analyzer is in the generate mode.

Command Syntax: FG n1

Parameters:

n1

Description:	Generate Mode Speaker Enable Selection
optional:	Yes
Type:	<Decimal Numeric Program Data,
units:	None
Resolution:	N/A
Range:	0: Enable 1: Disable
Reset:	0

FI

Decode Input Source

Description: **The FI** command specifies tone decoding from the demodulated signal or from an externally input baseband signal.

Command Syntax: FI nl

Parameters:

nl

Description:	Decode Source Select
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Demodulated signal (off-the-air) 1: External input
Reset:	0

Description: **The FP** command sets the operating parameters of the analyzer to the factory preset values.

Command Syntax: FP

Notes: Each individual command entry describes the reset of power-on values for the parameters of the analyzer.

Description: The **FR** command resets all **RS-232** conuol functions of the analyzer to the factory preset values.

Command Syntax: FR

Description: **The** FS command specifies parameters for the RS-232 port hardware.

Command Syntax: FS n1,n2,n3,n4,n5

Parameters:

n1
Description: Baud Rate Selection
optional: Yes
Type: <Decimal Numeric Program Data>
Units: None
Resolution: N/A
Range: 0: 150
1: 300
2: 1200
3: 2400
4: 4800
5: 9600
Reset: 4

n2
Description: Stop Bit Selection
optional: Yes
Type: <Decimal Numeric Program Data>
units: None
Resolution: N/A
Range: 0: 1
1: 1.5
2: 2
Reset: 0

n3
Description: Parity Selection
Optional: Yes
Type: <Decimal Numeric Program Data>
units: None
Resolution: N/A
Range: 0: None
1: Even
2: Odd
Reset: 0

n4

Description:	Character Size Selection
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: 5 bits 1: 6 bits 2: 7 bits 3: 8 bits
Reset:	3

n5

Description:	Automatic Line Feed Selection
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Yes 1: No
Reset:	0

Notes: Parameter n5 is only used for printer results.

Description: **The FV** query returns the analyzer software version and checksum over the system interface.

Query Syntax: FV[?]

Standard RS-232 Response Syntax: s1 <CR-LF>

IEEE 488.2 Response Syntax: s1<LF>

Parameters: s1

Description:	Software Version
Type:	<String Response Data>
Format:	42 characters, fixed to the following: "V3.01.LXX (NNNNNNNN)COPYRIGHT MOTOROLA INC."

Notes: NNNNNNNN represents the checksum number and XX represents the minor revision number.

FV?(R-2600)

Software Version Query

Description: The FV query returns the analyzer software version and checksum over the system interface.

Query Syntax: FV[?]

Standard RS-232 Response Syntax: s 1 <CR-LF>

IEEE 488.2 Response Syntax: s1<LF>

Parameters:

s1

Description:	Software Version
Type:	&ring Response Data>
Format:	48 characters, fixed to the following: "V3.01.SXX(NNNNNNNN)COPYRIGHT MOTOROLA INC."

Notes: NNNNNNNN represents the checksum number and XX represents the minor revision number

12. General Remote Functions

The following table describes the General Remote commands and queries as implemented by the **analyzer.**

Mnemonic	Description	Window Level	Transparent
GB	Enter Terminal Mode with Blank Screen	All	NO
GC	Terminal Mode Character Write	Terminal	No
GK	Generate Simulated Key Press	All	Yes
GL	Go To Local Control State	All	Yes
GM	Local Lockout	All	Yes
GS	Normal Screen (Leave Terminal Mode)	Terminal	No
GZ	Go To Cursor Zone	Base	No
G2	Force IEEE 488.2 Status Reporting	All	Yes

GB

Enter Terminal Mode with Blank Screen

Description: The GB command sets the analyzer to operate in the Terminal Mode and blanks the CRT Screen_ The conuoller can use this command as a screen saver and must use this command prior to writing characters to the analyzer's CRT screen with the GC command. This command disables the automatic screen timeout feature of the analyzer and enables local lockout.

Command Syntax: G B

Description: The GC command is used to write a character to the analyzer display. The column and row values are automatically incremented after if character write to the next position.

Command Syntax: **GC** n1,n2,n3,n4

Parameters:

n1

Description:	Decimal Value of ASCII Character
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 through 209 (see notes)
Power-On:	202

n2

Description:	X coordinate of display (column)
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution	N/A
Range:	0 through 63 (from me left)
Power-On:	0

n3

Description:	Y coordinate of display (row)
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Power-On	0 through 23 (from the top)
Reset:	0

n4

Description:	Character Color
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Black 1: Blue 2: Green 3: cyan 4: Red 5: Magenta 6: Brown 7: White 8: Gray 9: Bright Blue 10: Bright Green 11: Bright Cyan 12: Bright Red 13: Bright Magenta 14: Yellow 15: Bright White
Power-on:	15

Notes; A table defining the specialized characters that are different from the ASCII character set is included in the Appendix.

Description: The GK command simulates a front panel keystroke in accordance with the following table.

ROW \ COLUMN	0	1	2	3	4	5	6
0	0	1	2	3	4	5	6
1	7	8	9	±			
2	SK1	SK2	SK3	SK4	SK5	SK6	SK7
3	SK8	RF	AUD	DISP			
4	^	v	<	>	TAB	ALT	
5	HELP	MEM	SPF	F1			
6	CAL	PRT					

command Syntax: **GK** n1,n2

Parameters:

n1
Description: Key Row Identifier
optional: No
Type: <Decimal Numeric Program Data>
units: None
Resolution N/A
Range: 0 through 6

n2
Description: Key Column Identifier
optional: No
Type: <Decimal Numeric Program Data>
units: None
Resolution: N/A
Range: 0 through 6

Notes: SKn refers to the row of softkeys, numbered 1 through 8, beginning from the left. Combinations of Row and Column parameters not defined within the table will generate an error message.

Selection of a blank softkey will not generate an error and will cause no action to take place. Additionally, selecting key presses that would be invalid in local mode will not generate an error and will cause no action to take place.

Description: The GL command returns the analyzer to local control.

Command Syntax: GL

Notes: **Use** of this command to "go-to-local" control overrides local lockout.

Description: **The** GM command either locks out or enables local control of the analyzer. In the local lockout state, all front panel keys are disabled, so that the F1 key cannot be used to return to the local control state.

Command Syntax: GM nl

Parameters:

nl

Description:	Local Lockout Control
optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution	N/A
Range:	0: Enable local lockout 1: Disable local lockout
Reset:	0

Description: The GS command returns the analyzer from the Terminal Mode to normal operation and restores the saved screen display. This command enables the automatic screen timeout feature of the analyzer and disables local lockout.

Command Syntax: **GS**

Description: The GZ command moves the cursor to a specified location in the identified cursor zone.

Command Syntax: GZ n1

Parameters:

n1

Description:	Cursor Zone Identifier
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution	N/A
Range:	0: Display Zone (Meter) 1: RF-Control Zone (RF-Control) 2: Audio Zone (Synthesizer Format Select)
Reset:	0

Description: **The** G2 command forces the RS-232 hardware interface to operate in the Extended RS-232 communications Mode. Refer to the Extended RS-232 Mode section of the Introduction for a description.

Command Syntax G2

Notes: After using this command, the analyzer continues to operate in the Extended RS-232 Mode until powered down.

13. KHz Modulation Source

The following table describes the 1 kHz Modulation Source commands and queries as implemented by the analyzer.

Mnemonic	Description	Window Level	Transparent
KS	1 KHz Modulation Switch and Level	Base	No

Description: **The** KS command sets the 1kHz modulation source switch and specifies its modulation level.

Command Syntax: KS n1,n2

Parameters:

n1
Description: 1kHz Modulation Switch
optional: Yes
Type: <Decimal Numeric Program Data>
units: None
Resolution N/A
Range: 0: continuous
1: off
Reset: 1

n2
Description: 1 kHz Modulation Level
optional: Yes
Type: <Decimal Numeric Program Data>
units: Mode dependent., see notes
Resolution Mode dependent see notes
Range: Mode dependent, see notes
Reset: 0.000 v

Notes: The following table describes the Units, Resolution, and Range values for the Modulation Level based upon the RF-Control mode of the analyzer.

RF-Control Mode	Units	Resolution	Range
Monitor/Narrow-Band	V	0.005 v	0.000 - 0.795
Monitor/Wide-Band	V	0.05 v	0.00 - 7.95
Generate/AM	%	1 %	0 - 99
Generate/FM/Narrow-Band	kHz	0.05 kHz	0.00 - 9.95
Generate/FM/Wide-Band	kHz	0.5 kHz	0.0 - 99.5
Generate/PM/Narrow-Band	rad	0.01 rad	0.50 - 2.00
Generate/PM/Wide-Band	rad	0.1 rad	2.0 - 10.0

14. Metering

The set of Metering commands configure the analyzer into a measurement mode. After this configuration, the M?, ?, or *TRG queries can be used to return the measurements.

The following table describes the Metering commands and queries as implemented by the **R-2550.**

Mnemonic	Description	Window Level	Transparent
MA	AC Voltmeter	Base	No
MD	DC Voltmeter	Base	No
MP	Preset Frequency Scan	Base	No
MR	RF Metering	Base	No
MS	Sinad Meter	Base	No
MX	External Distortion Meter	Base	No

The following table describes the Metering commands and queries as implemented by the R-2600.

Mnemonic	Description	Window Level	Transparent
MA	AC Voltmeter	Base	No
MD	DC Voltmeter	Base	No
MF	Frequency Counter	Base	No
MR	RF Metering	Base	No
MS	Sinad Meter	Base	No
MX	External Distortion Meter	Base	No
MZ	RF Scan	Base	No

Description: The MA command selects and controls the AC voltmeter.

Command Syntax: MA nl

Standard RS-232 Response Syntax: AC,n2<CR-LF>

IEEE 488.2 Response Syntax: AC n2<LF>

Parameters:

n1

Description:	AC Voltmeter Range
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Automatic (R-2600 uses modes l-3 as necessary) 1: 1 V 2: 10 V 3: 7 o v
Reset:	0

n2

Description:	AC Voltmeter Measurement
Type:	<NR2 Numeric Response Data>
units:	V
Resolution:	nl = 1: 0.001 v nl = 2: 0.01 V nl = 3: 0.1 V
Range:	nl = 1: Othrough 1.000 V nl = 2: 0 through 10.00 V nl = 3: 0 through 70.0 V

Notes: The M?, ?, or *TRG queries will return the given response following the issuance of the MA command

The "Automatic Range" selection of the nl parameter is not available on the R-2550

Description: The MD command selects and controls the DC voltmeter.

Command Syntax: MD n1

Standard RS-232 Response Syntax: DC,n2<CR-LF>

IEEE 488.2 Response Syntax: DC n2<LF>

Parameters:

n1

Description:	DC Voltmeter Range
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Automatic (R-2600 uses modes 1-3 as necessary)
	1: 1 V
	2: 10 V
	3: 100 V
	4: Battery
Reset:	0

n2

Description:	DC Voltmeter Measurement
Type:	<NR2 Numeric Response Data>
units:	V
Resolution:	n1 = 1: 0.001 V
	n1 = 2: 0.01 V
	n1 = 3: 0.1 V
	n1 = 4: 0.1 V
Range:	n1 = 1: 0 through 1.000 V
	n1 = 2: 0 through 10.00 V
	n1 = 3: 0 through 100.0 V
	n1 = 4: 0 through 100.0 V

Notes: The M?, ?, or *TRG queries will return the given response following the issuance of the MD command.

The "Automatic Range" selection of the n1 parameter is not available on the R-2550.

Description: The MF command selects and controls the Frequency Counter metering function.

Command Syntax: MF n1,n2

Standard RS-232 Response Syntax: FC,n3<CR-LF>

IEEE 488.2 Response Syntax: FC n3<LF>

Parameters:

n1

Description:	Sensitivity
optional:	Yes
Type:	<Decimal Numeric Program Data,
units:	None
Resolution:	N/A
Range:	0: Minimum 1: Maximum
Reset:	1

n2

Description:	Frequency Counter Resolution
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: automatic (R-2600 uses modes l-3 as necessary) 1: 0.1 Hz 2: 1 Hz 3: 10 Hz
Reset:	3

n3

Description:	Frequency Counter frequency	
Type:	<NR2 Numeric Response Data>	
units:	kHz	
Resolution:	n2 = 1:	0.1 Hz
	n2 = 2:	1 Hz
	n2 = 3:	10 Hz
Range:	n2 = 1:	0 through 999.9999 kHz
	n2 = 2:	0 through 999.999 kHz
	n2 = 3:	0 through 999.99 kHz

Notes: The M?, ?, or *TRG queries will return the given response following the issuance of the MD command.

The **MF** Command is not available on the R-2550.

Description: The MP command selects and controls the Preset Scan metering function.

Command Syntax: MP n1,n2

Standard RS-232 Response Syntax:
PSF,n3<CR-LF>
PSN,n4<CR-LF>

Extended RS-232 Response Syntax:
PSF,n3<LF>
PSN,n4<LF>

Parameters:

n1

Description:	Lower Preset Scan Limit
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 through 19.
Reset:	0

n2

Description:	Upper Preset Scan Limit
Type:	<Decimal Numeric Response Data>
units:	None
Resolution:	N/A
Range:	0 through 19.
Reset:	19.

n3

Description:	Preset Scan Frequency Result
Type:	<NR2 Numeric Response Data,
units:	MHZ
Resolution:	0.000100 MHz (100 Hz)
Range:	0 through 999.9999

n4

Description:	Preset Number
Type:	<NR2 Numeric Response Data>
Units:	None
Resolution:	N/A
Range:	0 through 19

Notes:

The M?, ?, or *TRG queries will return the given response following the issuance of the MP command.

The MP Command is only available on the R-2550.

Description: The MR command selects and controls the RF metering function.

Command Syntax: MR n1

Standard RS-232 Response Syntax:

n1 = 0
FE,n2 kHz<CR-LF>IP,n3 W<CR-LF>MM+n4 kHz,<CR-LF>MM-,n5 kHz<CR-LF>

n1 = 1
FE,n2 kHz<CR-LF>IP,n3 dBm<CR-LF>MM+n4 kHz,<CR-LF>MM-,n5 kHz<CR-LF>

IEEE 488.2 Response Syntax: FE n2;IP n3;MMP n4;MMN n5<LF>

Parameters:

n1

Description:	Received Signal Level Units
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: w 1: dBm
Reset:	1

n2

Description:	Received Frequency error
Type:	<NR2 Numeric Response Data>
units:	kHz
Resolution:	0.001 kHz
Range:	-99.5 through +99.5

n3

Description:	Received Signal Level
Type:	<NR2 Numeric Response Data>
units:	n1 = 0: W n1 = 1: dBm
Resolution:	n1 = 0: 0.001 w n1 = 1: 0.1 dBm
Range:	n1 = 0: 0.0 through 125.0 n1 = 1: -100.0 through +51.0

n4

Description:	Positive Modulation Level of Received Signal
Type:	<NR2 Numeric Response Data>
Units:	AM: %
	PM: kHz
Resolution:	AM: 1%
	FM:0.01 kHz
Range:	AM: 0 through 100
	PM NB: 0 through 10
	FM WB: 0 through 100

n5

Description:	Negative Modulation Level of Received Signal
Type:	<NR2 Numeric Response Data>
units:	AM: %
	FM:kHz
Resolution:	AM: 1%
	FM:0.01 kHz
Range:	AM: 0 through -100
	FM NB: 0 through-10
	FM WB: 0 through -100

Notes: The M?, ?, or *TRG queries will return the given response following the issuance of the MR command. The response will only be returned in the monitor or duplex modes.

Description: The MS command selects the Sinad metering function.

Command Syntax: MS

Standard RS-232 Response Syntax: SI,n1<CR-LF>

IEEE 488.2 Response Syntax: SI nl <LF>

Parameters:

n1

Description:	Sinad Measurement
Type:	<NR2 Numeric Response Data>
Units:	dB
Resolution:	0.1 dB
Range:	-30.0 through 0.0

Notes: The M?, ?, or *TRG queries will return the given response following the issuance of the MS command.

Description: The MX command selects the Distortion metering function.

Command Syntax: Mx

Standard RS-232 Response Syntax: DI,n1<CR-LF>

IEEE 488.2 Response Syntax: DI n1<LF>

Parameters:

n1

Description:	External Distortion Measurement
Type:	<NR2 Numeric Response Data>
units:	%
Resolution:	0.1 %
Range:	0 through 99.9

Notes: The M?, ?, or *TRG queries will return the given response following the issuance of the MX command.

Description: The MZ command selects and controls the RF Scan metering function.

Command Syntax: MZ n1,n2

Standard RS-232 Response Syntax: SF,n3<CR-LF>

IEEE 488.2 Response Syntax: SF n3<LF>

Parameters:

n1

Description:	Lower Scan Limit
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	MHz
Resolution:	100 MHZ
Range:	0 through 900

n2

Description:	Upper Scan Limit
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	MHZ
Resolution:	100 MHz
Range:	0 through 1000

n3

Description:	RF Scan Frequency Result
Type:	<NR2 Numeric Response Data>
units:	MHz
Resolution:	0.000001 MHz (1 Hz)
Range:	0 through 999.999999

Notes: The M?, ?, or *TRG queries will return the given response following the issuance of the MZ command.

The MZ Command is not available on the R-2550.

15. Non-Sequence Decode

The following table describes the Non-Sequence Decode commands and queries as implemented by the analyzer.

Mnemonic	Description	Window Level	Transparent
ND	DPL Decode	Base	No
NP	PL Decode	Base	No
NQ[?]	Non-Sequence Decode Status Query	Base	No
NT	DTMF Decode	Base	No

Description: The ND command selects and controls the DPL Decode function.

Command Syntax: ND n1

Standard RS-232
Response Syntax: DP,s2<CR-LF>

IEEE 488.2
Response Syntax: DP s2<LF>

Parameters:

n1

Description:	Sensitivity Selection
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Minimum 1: Maximum
Reset:	1

s2

Description:	Decoded DPL Code
Type:	<String Response Data>
Format:	3 character string

Notes: Refer to the ED command for a list of valid DPL codes. If no code is available, the response Decoded DPL Code parameter consists of three dash characters ("---").

The M?, ?, or *TRG queries will return the given response following the issuance of the ND command.

NP

PL Decode

Description: **The NP** command selects and controls the **PL** Decode function.

Command Syntax: NP n1

Standard RS-232 Response Syntax: PL1,n2<CR-LF>PL2,s3<CR-LF>

IEEE 488.2 Response Syntax: PL1, n2;PL2 s3<LF>

Parameters:

n1

Description:	Sensitivity Selection
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Minimum 1: Maximum
Reset:	1

n2

Description:	Period Counter Frequency
Type:	<NR2 Numeric Response Data>
units:	Hz
Resolution:	0.1 Hz
Range:	5.0 through 20000.0

s3

Description:	Decoded PL code
Type:	-&ring Response Data,
Format:	2 character suing

Notes: Refer to the EN and EP commands for a list of valid PL frequencies and codes. If no frequency can be decoded, an error message will be returned. If no code is available, the response Decoded PL Code parameter consists of two dash characters ("---").

The M?, ?, or *TRG queries will return the given response following the issuance of the NP command.

NQ?

Non-Sequence Decode Status Query

Description: **The NQ** query returns the current status of the Non-Sequence Decode. This command is only valid if the current measurement mode is a non-sequence decode (if one of the following commands has been used: ND, NP, or NT).

Query Syntax: NQ[?]

Standard RS-232 Response Syntax: s 1 <CR-LF>

IEEE 488.2 Response Syntax: s1<LF>

Parameters: s1

Description:	Current Decode Status	
Type:	<Arbitrary ASCII Response Data>	
Format:	STATUS 00:	Decode active
	STATUS 02:	No signal
	STATUS 04:	Decode reset

Description: The NT command selects and controls the DTMF Decode function.

Command Syntax: NT n1

Standard RS-232 Response Syntax: DT,s2<CR-LF>

IEEE 488.2 Response Syntax: DT s2<LF>

Parameters:

n1

Description:	Sensitivity Selection
optional:	Yes
Type:	<Decimal Numeric Program Data,
Units:	None
Resolution:	N/A
Range:	0: Minimum 1: Maximum
Reset:	1

s2

Description:	Decoded DTMF Codes
Type:	<String Response Data>
Format:	16 character siring

Notes: Refer to the DE command for a description of the valid DTMF codes. If fewer than 16 tones have been decoded each remaining position in the string shall be filled with a dash character (-).

The M?, ?, or *TRG queries will return the given response following the issuance of the DT command.

Note

The OT **command** *is only available when the analyzer is equipped with the Tracking Generator Option. Use of this command without the option will cause the Invalid Mode Error (Error 09).*

Thefollowingtabledescribesthe DisplaycommandsandqueriesasimplementedbytheR-2550.

Mnemonic	Description	Window Level	Transparent
OB	Bar Graphs	Base	No
OE	External Oscilloscope	Base	No
OM	Modulation Oscilloscope	Base	No
OS	Spectrum Analyzer	Base	No
OT	Track Generator Oscilloscope	Base	No

ThefollowingtabledescribestheDisplaycomrnandsandqueriesasimplementedbytheR-2600.

Mnemonic	Description	Window Level	Transparent
OB	Bar Graphs	Base	No
OE	External oscilloscope	Base	No
OG	Sweep Generator Oscilloscope	Base	No
OM	Modulation Oscilloscope	Base	No
OS	Spectrum Analyzer	Base	No
OT	Track Generator Oscilloscope	Base	No

OB

Description: The OB command selects the Bar Graph display.

Command Syntax: O B

Description: The OE command selects and controls the External Oscilloscope display.

Command Syntax: OE n1,n2,n3,n4,n5,n6,n7

Parameters:

n1

Description:	Oscilloscope Horizontal Range Selection
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: 20 uS/div
	1: 50 uS/div
	2: 100 uS/div
	3: 200 uS/div
	4: 500 uS/div
	5: 1 mS/div
	6: 2 mS/div
	7: 5 mS/div
	8: 10 mS/div
	9: 20 mS/div
	10: 50 mS/div
	11: 100 mS/div
	12: 200 mS/div
	13: 500 mS/div
	14: 1 S/div
Reset:	1

n2

Description:	Oscilloscope AC/DC Coupling Selection
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: DC
	1: AC
Reset:	0

n3

Description:	Oscilloscope Trigger Level
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 through 999 (relative level)
Reset:	500

n4

Description:	Oscilloscope Triggering Mode Selection
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: Automatic 1: Normal 2: Single sweep
Reset:	0

n5

Description:	Oscilloscope Vertical Range Selection
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: 10 mV/div 1: 20 mV/div 2: 50 mV/div 3: 100 mV/div 4: 200 mV/div 5: 500 mV/div 6: 1 V/div 7: 2 V/div 8: 5 V/div 9: 10 V/div
Reset:	0

n6

Description:	Oscilloscope Horizontal Position
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 through 250 (125 will center the trace)
Reset:	125

n7

Description:	Oscilloscope Vertical Position
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 through 250 (125 will center the trace)
Reset:	125

Description: **The OG** command selects and controls the Sweep Generator Oscilloscope display.

Command Syntax: **OG** n1,n2,n3,n4

Parameters:

n1

Description:	Oscilloscope AC/DC Coupling Selection
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: DC 1: AC
Reset:	0

n2

Description:	Oscilloscope Vertical Range Selection
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: 10 mV/div 1: 20 mV/div 2: 50 mV/div 3: 100 mV/div 4: 250 mV/div 5: 500 mV/div 6: 1 Vldiv 7: 2 V/div 8: 5 V/div 9: 10 V/div
Reset:	0

n3

Description:	Oscilloscope Horizontal Position
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	NIA
Range:	0 through 250 (125 will center the trace)
Reset:	12.5

n4

Description:	Oscilloscope Vertical Position
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	**0** through 250 (12.5 will center the trace)
Reset:	125

Notes: The OG command is not available on the R-2.550.

Description: **The** OM command selects and controls the Modulation Oscilloscope display.

Command Syntax: OM n1,n2,n3,n4,n5,n6,n7

Parameters:

n1

Description:	Oscilloscope Horizontal Range Selection
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: 20 uS/div 1: 50 uS/div 2: 100 uS/div 3: 200 uS/div 4: 500 uS/div 5: 1 mS/div 6: 2 mS/div 7: 5 mS/div 8: 10 mS/div 9: 20 mS/div 10: 50 mS/div 11: 100 mS/div 12: 200 mS/div 13: 500 mS/div 14: 1 S/div
Reset:	1

n2

Description:	Oscilloscope Trigger Level
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 through 999 (relative level)
Reset:	500

n3

Description:	Oscilloscope Triggering Mode Selection
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Automatic 1: Normal 2: Single sweep
Reset:	0

n4

Description:	Oscilloscope Vertical Range Selection
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	Mode dependent, see notes

n5

Description:	Oscilloscope Horizontal Position
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 through 250 (125 will center the trace)
Reset:	125

n6

Description	Oscilloscope Vertical Position
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 through 250 (125 will center the trace)
Reset:	125

n7

Description:	Duplex Selection
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Mon 1: Gen
Reset:	0

Notes: The following table describes the possible Vertical range selections. Blank entries are invalid and will generate an error.

n4	AM	Monitor/FM	Generate/NB	Generate/WB
0	1%	100 Hz	100 Hz	
1	2%	200 Hz	200 Hz	
2	5%	500 Hz	500 Hz	
3	10%	1 kHz	1 kHz	1 kHz
4	20%	2 kHz	2 kHz	2 kHz
5	50%	5 kHz	5 kHz	5 kHz
6		10 kHz		10 kHz
7		20 kHz		20 kHz
8		50 kHz		50 kHz

Description: The OS command selects and conuols the **Spectrum** Analyzer display.

Command Syntax: **OS** n1,n2,n3,n4,n5

Standard RS-232 Response Syntax: PF,n6<CR-LF>PP,n7<CR-LF>

IEEE 488.2 Response Syntax: PF n6;PP n7<LF>

Parameters:

n1

Description:	Spectrum Analyzer Dispersion Selection
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: 20 kHz/div 1: 50 kHz/div 2: 100 kHz/div 3: 200 kHz/div 4: 500 kHz/div 5: 1 MHz/div 6: 2 MHz/div 7: 5 MHz/div 8: 10 MHz/div
Reset:	0

n2

Description:	Spectrum Analyzer sensitivity select code
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Minimum 1: Maximum
Reset:	1

n3

Description:	Enhanced Spectrum Analyzer Display View
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Normal 1: Freeze 2: Max Hold 3: Peak Hold 4: Average
Reset:	0

n4

Description:	Enhanced Spectrum Analyzer Marker Function
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: Off 1: Delta 2: Absolute
Reset:	0

n5

Description:	Enhanced Spectrum Analyzer Marker Movement
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Toggle Markers 1: Reference Left Peak 2: Reference Right Peak 3: Reference Maximum Peak 4: Reference Next Peak 5: Reference Center Frequency

n6

Description:	Current Delta Frequency, or Absolute Marker Frequency Result	
Type:	<NR2 Numeric Response Data>	
units:	MHz	
Resolution:	0.1 MHz	
Range:	Delta Measurement:	0 through 100.0 MHz
	Absolute Measurement:	0 through 1000.0 MHz

n7

Description:	Current Delta Power, or Absolute Marker Power Level Result	
Type:	<NR2 Numeric Response Data,	
units:	dBm	
Resolution:	0.1 dBm	
Range:	Delta Measurement	-60 through +60
	Absolute Measurement	-60 through +50

Notes:

The M?, ?, or *TRG queries will return the given response following the issuance of the OS Command. Each query returns the next peak measurement.

Selection of 2, 5, or 10 MHz for the n1 parameter is not available on the R-2550. Selection for parameters n3, n4, n5 will result in an Error 08 being returned by the R-2550.

Selection of 2, 5, or 10 MHz for the n1 parameter is available on the R-2600 only if ***the Enhanced Spectrum Analyzer Option is installed. Zf the option is not installed, the analyzer will return an Znvalid Input Error (Error 08).***

Selection for parameters n3, n4, n5, and responses for parameters n6 and n7 are valid on the R-2600 only if ***the Enhanced Spectrum Analyzer Option is installed. Zf the option is not installed, the analyzer will return an Invalid Input Error (Error 08).***

Description: **The** OT command selects and controls the Track Generator Oscilloscope display.

Command Syntax: OT

Notes: The **OT** Command is available only if the Tracking Generator Option is installed.

17. Memory Presets

The R-2550 can save 20 unique sets of presets in nonvolatile memory. These presets save Monitor and Generate Frequencies of the R-2550. Commands are provided to save the current configuration into any of the 20 presets and to recall a saved preset back from memory.

The following table describes the Memory Presets commands and queries as implemented by the R-2550.

Mnemonic	Description	Window Level	Transparent
PM	Save Selected Preset to Memory	Base	no
PS	Restore Selected Preset From Memory	Base	no

The R-2600 can save 30 unique sets of operating parameter presets in nonvolatile memory. These presets save information related to the basic operating configuration of the R-2600. Commands are provided to save the current configuration into any of the 30 presets and to recall a saved preset back from memory.

The following table describes the Memory Presets commands and queries as implemented by the R-2600.

Mnemonic	Description	Window Level	Transparent
PM	Save Selected Preset to Memory	Base	no
PS	Restore Selected Preset From Memory	Base	no

PM(R-2550)

Save Selected Preset to Memory

Description:

The PM command saves selected parameters of the current state of the R-2550 into the specified preset. The set of operating parameters saved by this command are:

Monitor Frequency
Generate Frequency

Command Syntax:

PM nl

Parameters:

nl

Description:	Preset Selection
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 through 19
Reset:	0

Description: **The** PM command saves selected parameters of the current state of the **R-2600** into the specified preset. The set of operating parameters saved by this command are:

Monitor Frequency
Monitor Modularion Type
Generate Frequency
Generate Modulation Type
Bandwidth
Duplex Offset
Synthesizer Format Selection
DTMF Code

Command Syntax: PM nl

Parameters:

nl

Description:	Preset Selection
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 through 29
Reset:	0

PS(R-2550)

Restore Selected Preset From Memory

Description:

The PS command restores the operating values saved in the selected preset. The set **of** operating parameters restored by this command are:

Monitor Frequency
Generate Frequency

Command Syntax

PS n1

Parameters:

n1

Description:	Preset Selection
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 through 19
Reset:	0

PS(R-2600)

Restore Selected Preset From Memory

Description:

The PS command restores the operating values saved in the selected preset. The set of operating parameters restored by this command are:

Monitor Frequency
Monitor Modulation Type
Generate Frequency
Generate Modulation Type
Bandwidth
Duplex Offset
Synthesizer Format Selection
DTMF Code

Command Syntax:

PS n1

Parameters:

n1

Description:	Preset Selection
optional:	Yes
Type:	Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 through 29
Reset:	0

The primary operating mode of the analyzer is configured in the RF-Control zone. A set of commands are providedto selectbetweenthese modes. The commands also allow selection oftheparameters that form the basis ofthesemodes.

Note

The RT command is only available when the analyzer is equipped with the Tracking Generator Option. Use of this command without the option will cause the Invalid Mode Error (Error 09).

The followingtabledescribestheRFControlcommandsandqueriesasimplementedbytheR-2550.

Mnemonic	Description	Window Level	Transparent
RD	Duplex Mode	Base	no
RG	Generate Mode	Base	no
RM	Monitor Mode	Base	no
RT	Track Generator Mode	Base	no

ThefollowingtabledescribestheRFConuolcommandsandqueriesasimplementedbytheR-2600.

Mnemonic	Description	Window Level	Transparent
RD	Duplex Mode	Base	no
RG	Generate Mode	Base	no
RM	Monitor Mode	Base	no
RS	Sweep Generator Mode	Base	no
RT	Track Generator Mode	Base	no

Description: **The** RD command selects and controls the Duplex RF mode. FM modulation is automatically selected for generate mode and AM or FM modulation is selected based upon the previous Monitor Mode modulation for monitor mode.

Command Syntax: RD n1,n2,n3,n4,n5,n6,n7

Parameters:

n1
Description: Monitor Frequency
optional: Yes
Type: <Decimal Numeric Program Data>
units: MHZ
Resolution: 100 Hz
Range: 0.4 through 999.9999
Reset: 101.5000 MHz

n2
Description: Duplex Offset Frequency
optional: Yes
Type: <Decimal Numeric Program Data>
units: MHZ
Resolution: 5 kHz
Range: -55.000 through +55.000
Reset: 0.00 MHz

n3
Description: Monitor Attenuation Value Selection
optional: Yes
Type: <Decimal Numeric Program Data,
units: None
Resolution: N/A
Range: 0: 0 dB
1: 20 dB
2: 40 dB
Reset: 0

n4
Description: Monitor Port Selection
optional: Yes
Type: <Decimal Numeric Program Data>
units: None
Resolution: N/A
Range: 0: Antenna
1: Transceiver
Reset: 1

n5

Description:	Generate Port
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Generate port 1: Transceiver port
Reset:	1

n6

Description:	Generator Output Level
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	dBm
Resolution:	0.1 dBm
Range:	n5 = 0: -80.0 through 0.0 dBm n5 = 1: -130.0 through -50.0 dBm
Reset:	-50.0 dBm

n7

Description:	Bandwidth Selection
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Wide 1: Narrow
Reset:	0

Description: **The** RG command selects and controls the Generate RF mode.

Command Syntax: RG n1,n2,n3,n4,n5

Parameters:

n1
Description: Generate Frequency
Optional: Yes
Type: <Decimal Numeric Program Data>
units: MHz
Resolution: 100 Hz
Range: 0.4 through 999.9999
Reset: 800.0000 MHz

n2
Description: Generate Port
optional: Yes
Type: <Decimal Numeric Program Data>
units: None
Resolution: N/A
Range: 0: Generate port
1: Transceiver port
Reset: 1

n3
Description: Generator Output Level
Optional: Yes
Type: <Decimal Numeric Program Data>
units: dBm
Resolution: 0.1 dBm
Range: n2 = 0: -80.0 through 0.0 dBm
n2 = 1: -130.0 through-50.0 dBm
Reset: -50.0 dBm

n4
Description: Modulation Type Selection
optional: Yes
Type: <Decimal Numeric Program Data>
units: None
Resolution: N/A
Range: 0: AM
1: FM
2: PM
Reset: 1

n5

Description:	Bandwidth Selection
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Wide 1: Narrow

Note: Selection of PM for the n4 parameter is available on the R-2600 only if the Phase Modulation Option is installed. If the option is not installed, the analyzer will return an Invalid Input Error (Error 08)

Description: **The** RM command selects and controls the Monitor RF mode.

Command Syntax: **RM** nl ,n2,n3,n4,n5

Parameters:

n1
Description: Monitor Frequency
optional: Yes
Type: <Decimal Numeric Program Data>
units: MHZ
Resolution: 100 Hz
Range: 0.4 through 999.9999
Reset: 101.5000 MHz

n2
Description: Monitor Attenuation **Value**
optional: **Yes**
Type: <Decimal Numeric Program Data>
units: None
Resolution: N/A
Range: 0: 0 dB
1: 20 dB
2: 40 dB
Reset: 0

n3
Description: Monitor Port
optional: Yes
Type: <Decimal Numeric Program Data>
units: None
Resolution: N/A
Range: 0: Antenna
1: Transceiver
Reset: 1

n4

Description:	Modulation Type Selection
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: AM 1: FM 2: PM
Reset:	1

n5

Description:	Bandwidth Selection
optional:	Yes
Type:	<Decimal Numeric Program Data,
units:	None
Resolution:	N/A
Range:	0: Wide 1: Narrow
Reset:	0

Description: The RS command selects and controls the Sweep Generator RF mode. The modulation currently selected will be present at the mod out port but not present at the RF generate output port.

Command Syntax: RS nl ,n2,n3,n4,n5

Parameters:

n1

Description:	Sweep Generator Range
Optional:	Yes
Type:	<Decimal Numeric F'rogram Data>
units:	None
Resolution:	N/A
Range:	0: 10 kHz 1: 25 kHz 2: 50 kHz 3: 100 kHz 4: 250 kHz 5: 500 kHz 6: 1 MHz 7: 2.5 MHz 8: 5 MHz
Reset:	8

n2

Description:	Sweep Generator Rate
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: 100 mS 1: 50 mS 2: 20 mS
Reset:	0

n3

Description:	Center Frequency
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	MHZ
Resolution:	100 Hz
Range:	0.4 through 999.9999
Reset:	800.0000 MHz

n4

Description:	Generate Port
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Generate port 1: Transceiver port
Reset:	0

n5

Description:	Generator Output Level
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	dBm
Resolution:	0.1 dBm
Range:	n4 = 0: -80.0 through 0.0 n4 = 1: -130.0 through -50.0
Reset:	-50.0 dBm

Notes: The **RS** command is not available on the R-2550.

Description: **The** RT command selects and controls the Tracking Generator RF mode. The modulation currently selected will be present at the mod out port but not present at the RF generate output port.

Command Syntax: RT n1,n2,n3,n4

Parameters:

n1

Description:	Track Generator Range
Optional:	Yes
Type:	<Decimal Numeric Program Data,
Units:	None
Resolution:	N/A
Range:	0: 100 kHz/div 1: 250 kHz/div 2: 500 kHz/div 3: 1 MHz/div 4: 2.5 MHz/div 5: 5 MHz/div 6: 10 MHz/div 7: 2.5 MHz/div
Reset:	5

n2

Description:	Center Frequency
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	MHZ
Resolution:	0.0001 MHz
Range:	0.4 through 999.9999 MHz
Reset:	800.0000 MHz

n3

Description:	Output Level
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	dBm
Resolution:	0.1 dBm
Range:	-80.0 through 0.0
Reset:	0.0 dBm

n4

Description:	Monitor Attenuation Level
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: 0 dBm 1: 20dBm 2: 40dBm
Reset:	0

Notes: The **RT** Command is available only if the Tracking Generator Option is installed.

19. Sequence Decode

The following table describes the Sequence Decode commands and queries as implemented by the R-2600.

Mnemonic	Description	Window Level	Transparent
SG	General Sequence Decode	Base	No
SQ[?]	Sequence Decode Status Query	Base	No
ss	Start Sequence Decode	Base	No
SV	Select-V Decode	Base	No
sx	Stop Sequence Decode	Base	No
s5	5/6 Decode	Base	No

Note:Decode functionality is not available on the R-2550.

Description: The SG command selects and controls the General Sequence Decode function. The tone frequency and duration will be decoded for up to twenty tones.

Command Syntax: SG nl

Standard RS-232 Response Syntax:
GS1A,n2 Hz<CR-LF>GS1B,n3 Sec<CR-LF>...
GS20A,n2 Hz<CRLF>GS20B,n3 Sec<CR-LF>

IEEE 488.2 Response Syntax: GS IA n2;GS1B n3;GS2A n2;GS2B n3; . . . . GS20A n2;GS20B n3<LF>

Parameters:

n1

Description:	Sensitivity Selection
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Minimum 1: Maximum
Reset:	1

n2

Description:	Decoded Tone Frequency
Type:	<NR1 Numeric Response Data>
Units:	Hz
Resolution:	1 Hz
Range:	0 through 19999

n3

Description:	Decoded Tone Duration
Type:	<NR2 Numeric Response Data>
units:	S
Resolution:	0.001 s
Range:	0 through 9.999

Notes:

Tone Frequency response headers are of the form GSxA and Tone Duration response headers are of the form GSxB, where x will take on values from 1 through 20 to designate the 1st through 20th tones decoded.

The M?, ?, or *TRG queries will return the given response following the issuance of the SG command.

The SG Command is not available on the R-2550.

SQ?

Sequence Decode Status Query

Description: **The SQ query** returns the current status of the Sequence Decode. Note that no "?" is required to retnm decode status. This command is only valid if the current measurement mode is a sequence decode (if one of the following commands has been used: SG, SV, or S5).

Query Syntax: SQ[?]

Standard RS-232 Response Syntax: s 1 <CR-LF>

IEEE 488.2 Response Syntax: s1<LF>

Parameters: s1

Description:	Current Decode Status
Type:	<Arbitrary ASCII Response Data>
Format:	9 character string of the following format:
	STATUS 00: Decode active
	STATUS 01: Decode complete
	STATUS 02: No signal
	STATUS 03: Decode auto stopped
	STATUS 04: Decode reset

Notes: The SQ? command is not available on the R-2550.

SS

Start Sequence Decode

Description: **The SS** command starts the sequence decode. This command is only valid if the current measurement mode is a sequence decode (if one of the following commands has been used: SG, SV, or SS).

Command Syntax: SS

Notes: The SS command is not available on the R-2550.

Description: The SV command selects and controls the Select V Decode function.

Command Syntax: SV n1,n2

Standard RS-232 Response Syntax:
SV1A,n3 Hz<CR-LF>SV1B,n4 Sec<CR-LF>SV1C,s5<CR-LF>
SV5A,n3 Hz<CR-LF>SV5B,n4 Sec<CR-LF>SV5C,s5<CR-LF>

IEEE 488.2 Response Syntax:
SV1A n3;SV1B n4;SV1C s5;
SV5A n3;SV5B n4;SV5Cs5<LF>

Parameters:

n1

Description:	Sensitivity Selection
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Minimum 1: Maximum
Reset:	1

n2

Description:	Select-V type Selection
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: ZVEI 1: ZVEI MOD 2: ZVEI FRENCH 3: CCIR STD 4: CCIR 70 5: EEA
Reset:	0

n3

Description:	Decoded Tone Frequency
Type:	<NR1 Numeric Response Data>
units:	HZ
Resolution:	1 Hz
Range:	0 through 19999 Hz

n4

Description:	Decoded Tone Duration
Type:	<NR2 Numeric Response Data>
units:	S
Resolution:	0.001 s
Range:	0 through 9.999 S

s5

Description:	Decoded Select-V Code
Type:	&ring Response Data>
Format:	1 character string with the following constraints: . "0" through "9" · "B", "C", "D", "F", "G", "R" • "N" (representing a null tone)

Notes:

Tone Frequency response headers are of the form SVxA, Tone Duration response headers are of the form SVxB, and Select V Code response headers are of the form SVxC, where x will take on values from 1 through 5 to designate the 1st through 5th tones decoded.

Unrecognizable tones are indicated with a question mark character ("?"). A null tone is indicated with a dash character ("-").

The M?, ?, or *TRG queries will return the given response following the issuance of the SV command.

The **SV** Command is not available on the R-2550.

Description: The SX command stops the sequence &code. This command is only valid if the current measurement mode is a sequence decode (ii one of the following commands has been used: SG, SV, or S5).

Command Syntax: SX

Notes: The SX command is not available on the R-2550.

Description: **The S5** command selects and controls the 5/6 Tone Decode function.

Command Syntax: **S5** nl

Standard RS-232 Response Syntax:
561A,n2 Hz<CR-LF>561B Sec,n3<CR-LF>561C,s4<CR-LF>...
567A,n2 Hz<CR-LF>567B Sec,n3<CR-LF>567C,s4<CR-LF>

IEEE 488.2 Response Syntax: 561A n2;561B n3;561C s4;.... 567A n2;567B n3;567C s4<LF>

Parameters:

n1
Description: Sensitivity Selection
Optional: Yes
Type: <Decimal Numeric Program Data>
units: None
Resolution: N/A
Range: 0: Minimum
1: Maximum
Reset: 1

n2
Description: Decoded Tone Frequency
Type: <NR1 Numeric Response Data>
Units: HZ
Resolution: 1 Hz
Range: 0 through 19999 Hz

n3
Description: Decoded Tone Duration
Type: <NR2 Numeric Response Data>
Units: S
Resolution: 0.001 s
Range: 0 through 9.999

s4

Description:	Decoded CAP Code
Type:	<String Response Data>
Format:	1 character string with the following constraints: . "0" through "9" · "R", "-", or "X"

Notes:

Tone Frequency response headers are of the form 56xA, Tone Duration response headers are of the form 56xB, and Decoded CAP Code response headers are of the form 56xC, where x will take on values from 1 through 7 to designate the 1st through 7th tones decoded.

Unrecognizable tones are indicated with a question mark character ("?"). A null tone is indicated with a dash character ("-").

The M?, ?, or *TRG queries will return the given response following the issuance of the S5 command.

The S5 Command is not available on the R-2550.

20. External Modulation

The following table describes the External Modulation commands and queries as implemented by the analyzer.

Mnemonic	Description	Window Level	Transparent
XS	External Modulation Switch and Level	Base	No

Description: **The XS** command sets the external modulation source switch and specifies its modulation level.

Command Syntax: **XS** n1,n2

Parameters:

n1

Description:	External Modulation Switch
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: continuous 1: off
Reset:	1

n2

Description:	External Modulation Level
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	Mode dependent, see notes
Resolution:	Mode dependent, see notes
Range:	Mode dependent, see notes
Reset:	o.ooo v

Notes: The following table describes the Units, Resolution, and Range values for the Modulation Level based upon the RF-Control mode of the analyzer.

RF-Control Mode	Units	Resolution	Range
Monitor/Narrow-Band	V	0.005 v	0.000 - 0.795
Monitor/Wide-Band	V	0.05 v	0.00 - 7.95
Generate/AM	%	1 %	0 - 99
Generate/FM/Narrow-Band	kHz	0.05 kHz	0.00 - 9.95
Generate/FM/Narrow-Band	kHz	0.05 kHz	0.00 - 9.95
Generate/PM/Wide-Band	rad	0.01 rad	0.50 - 2.00
Generate/PM/Wide-Band	rad	0.1 rad	2.0 - 10.0

21. Inquiry

The following table describes the Inquiry queries as implemented by the analyzer.

Mnemonic	Description	Window Level	Transparent
C?	Calibration Warning Inquiry	All	No
E?	Error Inquiry	All	No
[M]?	Measurement Inquiry	Base	No
S?	Status Inquiry	All	No

C?

Calibration Inquiry

Description: The C? query returns the calibration status of the analyzer.

Query **Syntax:** C?

Response Syntax: n1

Parameters:

n1

Description:	Calibration Status
Type:	<NR1 Numeric Response Data>
units:	None
Resolution:	N/A
Range:	0: Analyzer calibrated
	1: Analyzer not calibrated

Description: The E? query returns the next error message from the error queue and clears the Error *Event Status Register.*

Error	Description
00	Inquiry without measurement command
01	Invalid command or query mnemonic (prefix)
02	Invalid command or query mnemonic (suffix)
03	Numeric data too large
04	Numeric data too small
05	string data field too large
06	String data field too small
07	Invalid string field
08	Invalid input data
09	Invalid command or query for R-2600 mode
10	Invalid exponent format
11	Exponent out of range
12	Invalid mantissa format
13	Transmission error (RS-232 only)
14	Input Buffer overflow (RS-232 only)
15	Empty command
16	Output Buffer overflow
17	Voltmeter out of range
18	No input signal
19	Frequency counter measurement invalid
20	Frequency error measurement out of range
21	Monitor modulation measurement out of range
22	Input signal too high
23	Input signal too low
24	Invalid measurement reading
25	Reserved
26	Thermal Power too high (LPA Option only)
27	Thermal Power too low (LPA Option Only)
28	Thermal Power Meter not zeroed (LPA Option Only)
29	Unable to zero Thermal Power Meter (LPA Option only)
98	Error queue overflow
99	Error queue empty

Query Syntax: E?

Response Syntax: sl

Parameters: sl

Description: Error Number
Type: <Arbitrary ASCII Response Data>
Format: 8 character string of the form "ERROR XX"

Description: **The** M? query returns the response for the last measurement command. The query may be repeated multiple times when making a sequence of measurements.

Query Syntax: [M]? n1

Response Syntax: Refer to the command that initiates the measurement for a detailed description of the response syntax.

Parameters:

n1

Description:	Response Parameter Number
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	1: Return the first response parameter 2: Return the second response parameter n: Return the nth response parameter
Default:	return ail parameters

Notes: If **the** last executed command as stated above is a control command, an error response string reflecting this condition shall be generated.

Description: The S? query returns the next status message from the status queue and clears the *Status Event Status Register*.

Status	Description
05	RF overtemp
06	RF overload
07	600-Ohm input load overload
98	Status queue overflow
99	Status queue empty

Query Syntax: S?

Response Syntax: s1

Parameters: s1

Description: Status Number
Type: <Arbitrary ASCII Response Data>
Format: 9 character string of the form "STATUS XX"

Programming Reference

Motorola R-2600
Communications System Analyzer
Cellular Option

MOTOROLA

Communications Test Equipment

Publication 68-P30972C-1.00

Printed in the U.S.A. 10 March 95

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1. Introduction

This manual documents the unique Cellular Option control and measurement commands used by the remote interface to the R-2600 Communications System Analyzer. Along with publication 68-80309E55, Programming Reference, Motorola R-2550 and R-2600 Communications System Analyzer Series (found behind the General Operation tab in the 3-ring binder), this manual is intended to provide the information necessary to develop application programs that remotely control the analyzer for use in testing Cellular equipment.

This manual includes a Command Set Quick Reference in Section 2. In Section 3, individual command and query pages give detailed descriptions of each command (including syntax, parameters, responses, and special notes) for the cellular option.

Refer to publication 68-80309E55, Programming Reference Motorola R-2550 and R-2600 Communications System Analyzer Series for the following.

Section 1
Introduction discusses configuration requirements, the layer model provided by the remote interface, and the three modes of operation: Standard RS-232, Extended RS-232, and IEEE 488.2.

Section 2
Interface Functions discusses remote and local operations, RS-232 and IEEE 488.1 protocols, and print functions.

Section 3
Syntax Overview discusses the Talker and Listener syntax provided by the R-2600. Differences between the syntax of the Standard RS-232 mode and the Extended RS-232 and IEEE 488.2 modes are explained.

Section 4
Status Reporting discusses the control and status data structures provided by the IEEE 488.2 model. The capabilities of the model that are provided when operating under RS-232 control are described.

Section 5
Programming Conventions discusses optional command parameters and optional response parameters.

Section 6
Command Set Organization presents an overall description of the command set; describing command groupings and manual entries for the commands. A quick reference to the command set is also provided.

Section 7 and on
The individual command and query pages give detailed descriptions of each command, including syntax, parameters, responses, and special notes.

2. Command Set Quick Reference

The set of commands and queries in this manual are only available when the analyzer is in the standard mode.

Refer to the Programming Reference Motorola R-2600 Communications System Analyzer Series (publication 94990-68-80309E55) for more information on the basic command set.

NOTE

The set of cellular commands are only available when the analyzer is equipped with the Cellular Option. Use of these commands without the option will cause the Invalid Mode Error (Error 09).

The following table provides a quick reference to the cellular commands and queries implemented by the analyzer.

Mnemonic	Description	Window Level	Transparent
BC	DSAT Decode	Base	no
BD[?]	DSAT Code Query	Base	no
BE[?]	Electronic Serial Number Query	Base	no
BF	Cellular Format Setup	Base	no
BH[?]	Handoff Confirmation Query	Base	no
BL	Cellular Modulation Switch and Level	Base	no
BN[?]	Called Number Query	Base	no
BO	Cellular Encode	Base	no
BQ[?]	Test Status Query	Base	no
BS[?]	SAT Code Query	Base	no
BT[?]	Thermometer Status Query	Base	no
BV[?]	Voice Channel Number Query	Base	no

Refer to Section 6, Command Set Organization, of the General Operation Section (publication 94990-68-80309E55) for an explanation of 'Window Level" and 'Transparent."

3. Commands

BC

DSAT Decode

Description: The BC command selects and controls the DSAT decode metering function.

Command Syntax: BC

Standard RS-232 Response Syntax: DD 1 ,s1<CR-LF>DD2,s2<CR-LF>

IEEE 488.2 Response Syntax: DD1 s1;DD2 s2<LF>

Parameters:

s1
Description: DSAT Code
Type: <String Response Data>
Format: 1 character string, constrained to the following range "0" through "7"

s2
Description: Decoded DSAT Sequence
Type: <String Response Data>
Format: 6 character string, constrained as follows:

s1 = "0":	2556CB
s1 = "1":	255B2B
s1 = "2":	256A9B
s1 = "3":	25AD4D
s1 = "4":	26AB2B
s1 = "5":	26B2AD
s1 = "6":	2969AB
s1 = "7":	cccccc

Notes: The M?, ?, or *TRG queries will return the given response following the issuance of the BC command. The response parameter sl and s2 will consist of "-" characters if no DSAT signal can be decoded. The BC command is not available on the R-2550.

Description: **The** BD query returns the DSAT Code of the unit-under test.

Query Syntax: BD[?]

Standard RS-232 Response Syntax: n1<CR-LF>

IEEE 488.2 Response Syntax: n1<LF>

Parameters:

n1

Description:	Current DSAT Code
Type:	<NR1 Numeric Response Data>
Units:	None
Resolution:	N/A
Range:	0 through 6: DSAT code -1: Format Selection not DSAT or Voice Channel not yet assigned

Notes: This command is only valid if the Audio Zone Format Selection is DSAT, and after a voice channel has been assigned during the cellular test. The BD? command is not available on the R-2550.

Description: The BE query returns the Electronic Serial Number (ESN) of the unit-under test.

Query Syntax: BE[?]

Standard RS-232 Response Syntax: s 1 <CR-LF>

IEEE 488.2 Response Syntax: s1<LF>

Parameters:

s1
Description: ESN
Type: <String **Response** Data>
Format: **8** character string representing hexadecimal ESN digits

Notes: **The BE? command** is not available on the **R-2550.**

Description: **The** BF command selects and controls the Cellular RF mode.

Command Syntax: **BF** nl ,n2,n3

Parameters:

n1

Description:	Radio Format Selection
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: EAMF'S 1: ETACS 2: JTACS 3: NAMPS 4: NTACS
Reset:	0 if EAMPS installed; otherwise 1 if ETACS installed; otherwise 2 if JTACS installed; otherwise 3 if NAMPS installed; otherwise 4 if NTACS installed

n2

Description:	System ID
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 through 99999
Reset:	05349

n3

Description:	Control Channel
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	1 through2160
Reset:	0334

Notes: The BF command is not available on the R-2550.

Description: **The** BH? query returns a confirmation of the last voice channel handoff.

Query Syntax: BH[?]

Standard RS-232 Response Syntax: nl <CR-LF>

IEEE 488.2 Response Syntax: nl <LF>

Parameters:

nl

Description:	Last Handoff Confirmation Code
Type:	<NR1 Numeric Response Data>
Units:	None
Resolution:	N/A
Range:	0: Handoff incomplete 1: Handoff complete 2: Handoff not yet attempted 3: Handoff in progress

Notes: This query is only valid if cellular test type is either inbound or outbound. The response 2 will be returned in this case. The BH? command is not available on the R-2550.

Description: The BL command sets the Cellular Encode modulation source switch and specifies the modulation level of the SAT Encode source. If the synthesizer source is not SAT, the Invalid Mode Error (Error 09) is generated.

Command Syntax: BL n1,n2

Parameters:

n1

Description:	Cellular Modulation Switch
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Continuous 1: off
Reset:	1

n2

Description:	SAT Modulation Level
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	Mode dependent, see notes
Resolution:	Mode dependent, see notes
Range:	Mode dependent, see notes
Reset:	0.000 v

Notes: The value of n2 sets the modulation level for SAT, but has no effect on DSAT and DST modulation levels. The following table describes the Units, Resolution, and Range values for the Modulation Level based upon the RF-Control mode of the R-2600.

RF-Control Mode	Units	Resolution	Range
Monitor/Narrow-Band	V	0.005 v	0.000 - 0.795
Monitor/Wide-Band	V	0.05 v	0.00 - 7.95
Generate/AM	%	1%	o-99
Generate/FM/Narrow-Band	kHz	0.05 kHz	0.00 - 9.95
Generate/FM/Wide-Band	kHz	0.5 kHz	0.0 - 99.5

The BL command is not available on the R-2550.

Description: The BN? query returns the unit-under test called number.

Query Syntax: BN[?]

Standard RS-232 Response Syntax: s1 <CR-LF>

IEEE 488.2 Response Syntax: s1<LF>

Parameters: s1

Description:	Called Number
Type:	&ring Response Data>
Format:	10 characters

Notes: The BN? command is not available on the R-2550.

Description: **The** BO command selects Cellular as the synthesized modulation source and specifies its format.

Command Syntax: **BO** n1,n2

Parameters:

n1

Description:	Cellular Encode Format Selection
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: SAT 1: DSAT 2: DST
Reset:	0

n2

Description:	Cellular Code Selection
optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	n1 = 0: 0 through 2 n2 = 1: Othrough7 n3 = 2: 0 through 6
Reset:	0

Notes: DSAT and DST are available only when NAMPS and/or NTACS is installed. The BO command is not available on the R-2550.

Description: The BQ? query returns the current Cellular test status.

Query Syntax: BQ[?]

Standard RS-232 Response Syntax: n1<CR-LF>

IEEE 488.2 Response Syntax: n1 <LF>

Parameters: n1

Description:	Cellular Test Status
Type:	<NR1 Numeric Response Data,
units:	None
Resolution:	N/A
Range:	0: Test not running 1: Test running 2: Test failed

Notes: The BQ? command is not available on the R-2550.

BS?

Description: **The** BS? query returns the SAT Code of the Unit Under Test. This command is only valid if the Audio Zone Format Selection is SAT, and after a voice channel has been assigned during the Cellular Test.

Query Syntax: BS[?]

Standard RS-232 Response Syntax: n1<CR-LF>

IEEE 488.2 Response Syntax: n1<LF>

Parameters:

n1

Description:	Current SAT Code
Type:	<NR1 Numeric Response Data>
units:	None
Resolution:	N/A
Range:	0: 5070 Hz
	1: 6000 Hz
	2: 6030 Hz
	-1: Format Selection not SAT or Voice Channel not yet assigned.

Notes: The BS? command is not available on the R-2550.

BT?

Thermometer Status Query

Description: The BT? query returns the current Thermometer Status.

Query Syntax: BT[?]

Standard RS-232 Response Syntax: nl <CR-LF>n2<CR-LF>

IEEE 488.2 Response Syntax: n1;n2<LF>

Parameters:

n1

Description:	Thermometer Type
Type:	<NR1 Numeric Response Data>
units:	None
Resolution:	N/A
Range:	0: Inbound 1: Outbound 2: Autotest -1: None of these tests selected

n2

Description:	Thermometer Value
Type:	<NR1 Numeric Response Data>
units:	None
Resolution:	N/A
Range:	nl =0: Othrough8 nl = 1: Othrough 11 nl = 2: 0 nl = -1: -1

Notes: The BT? command is not available on the R-2550.

Description: **The** BV? query returns the Voice Channel Number of the Unit Under Test.

Query Syntax: BV[?]

Standard RS-232 Response Syntax: nl <CR-LF>n2<CR-LF>

IEEE 488.2 Response Syntax: n1;n2<LF>

Parameters:

n1

Description:	Voice Channel Number	
Type:	<NR1 Numeric Response Data>	
units:	None	
Resolution:	N/A	
Range:	JTACS:	2 through 798 (even channels)
	NTACS:	1 through 799
	RAMPS:	1 through 799 and 991 through 1023
	NAMPS:	1 through 799 and 991 through 1023
	AMPS:	1 through666
	TACS	1 through 600 and 1329 through 2047
	Channel unassigned:	-1

n2

Description:	Voice Channel Type
Type:	<NR1 Numeric Response Data>
units:	None
Resolution:	N/A
Range:	0: Wide
	1: Low (Narrow for NTACS)
	2: Middle
	3: High
	-1: Voice Channel not yet assigned

Notes: The BV? command is not available on the R-2550.

Programming Reference

Motorola R-2600
Communications System Analyzer
Cellular/CBS/LPA Option

MOTOROLA

Communications Test Equipment

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1. Introduction

This manual documents the unique LPA-Thermal Wattmeter Option control and measurement commands used by the remote interface to the R-2600 Communications System Analyzer. Along with publication 68-80309E55, Programming Reference, Motorola R-2550 and R-2600 Communications System Analyzer Series (found behind the General Operation tab in the 3-ring binder), this manual is intended to provide the information necessary to develop application programs that remotely control the analyzer for use in testing Cellular equipment.

In Section 2, individual command and query pages give detailed descriptions of each command (including syntax, parameters, responses, and special notes) for the LPA-Thermal Wattmeter option.

Refer to publication 68-80309E55, Programming Reference Motorola R-2550 and R-2600 Communications System Analyzer Series for the following.

Section 1
Introduction discusses configuration requirements, the layer model provided by the remote interface, and the three modes of operation: Standard RS-232, Extended RS-232, and IEEE 488.2.

Section 2
Interface Functions discusses remote and local operations, RS-232 and IEEE 488.1 protocols, and print functions.

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Syntax Overview discusses the Talker and Listener syntax provided by the R-2600. Differences between the syntax of the Standard RS-232 mode and the Extended RS-232 and IEEE 488.2 modes are explained.

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The individual command and query pages give detailed descriptions of each command, including syntax, parameters, responses, and special notes.

2 Thermal Power Meter Remote Commands

MT (R-2600) (LPA **option only)** Thermal Power Meter

Description: The MT command selects and controls the Thermal Power meter.

Command Syntax: MT n1

Standard RS-232 Response Syntax:
TP1,n2 dBm<CR-LF>
TP2,n3 mW<CR-LF>

IEEE 488.2 Response Syntax:
TP1 n2;TP2 n3<LF>

Parameters:

n1
Description: Thermal Power Meter Range
Optional: Yes
Type: <Decimal Numeric Program Data>
units: None
Resolution: N/A
Range: 0: Automatic
1: Low (-15.0 through 0.0 dBm)
2: High (-5.0 through +lO.O dBm)
Reset: 0

n2
Description: Thermal Power Measurement
Type: <NR2 Numeric Response Data>
units: dBm
Resolution: 0.01 dBm
Range: nl = 1: -15.0 through +0.0
nl = 2: -5.0 through +lO.O

n3
Description: Thermal Power Measurement
Type: <NR2 Numeric Response Data>
units: mW
Resolution: nl = 1: 0.0001 mW
nl = 2: 0.001 mW
Range: nl = 1: 0.0316 through 1.00
nl = 2: 0.316 through 10.000

Notes: The M?, ?, or *TRG queries will return the given response following the issuance of the MT command.

Description: The MZO command Zeroizes the Thermal Power meter.

Command Syntax: MZO

Caution: Before zeroing the Thermal Power Meter, be sure the power head is attached to the connector at the left rear of the analyzer, and that no RF power is applied to the head.

Description: The E? query returns the next error message from the error queue and clears the Error Event Status Register.

Error	Description
01	Invalid command or query mnemonic (prefix)
02	Invalid command or query mnemonic (suffix)
03	Numeric data too large
04	Numeric data too small
05	String data field too large
00	Inquiry without measurement command
06	String date field too small
07	Invalid string field
08	Invalid input data
09	Invalid command or query for R-2600 mode
10	Invalid exponent format
11	Exponent out of range
12	Invalid mantissa format
13	Transmission error (RS-232 only)
14	Input Buffer overflow (RS-232 only)
15	Empty command
16	Output Buffer overflow
17	Voltmeter out of range
18	No input signal
19	Frequency counter measurement invalid
20	Frequency error measurement out of range
21	Monitor modulation measurement out of range
22	Input signal too high
23	Input signal too low
24	Invalid measurement reading
25	In-line Wattmeter error
26	Thermal Power too high (LPA Option only)
27	Thermal Power too low (LPA Option only)
28	Thermal Power Meter not zeroed (LPA Option only)
29	Unable to zero Thermal Power Meter (LPA Option only)
98	Error queue overflow
99	Error queue empty

Query Syntax: E?

Response Syntax: ERROR XX

Programming Reference

Motorola R-2670
Communications System Analyzer
Motorola Analog Trunking Option

MOTOROLA

Communications Test Equipment

Publication 94990-68-P30065C-1.00

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1 Introduction

This manual documents the unique Motorola Analog Trunking control and measurement commands used by the remote interface to the R-2670 Communications System Analyzer. Along with publication 68-80309E55, Programming Reference, Motorola R-2550 and R-2600 Communications System Analyzer Series (found behind the General Operation tab in the 3-ring binder), this manual is intended to provide the information necessary to develop application programs that remotely control the analyzer for use in testing Motorola Analog Trunking equipment.

This manual includes a Command Set Quick Reference in Section 2. In Sections 3 and 4, individual command and query pages give detailed descriptions of each command (including syntax, parameters, responses, and special notes), for the option covered in this manual.

Refer to publication 68-80309E55, Programming Reference Motorola R-2550 and R-2600 Communications System Analyzer Series for the following.

Section 1
Introduction discusses configuration requirements, the layer model provided by the remote interface, and the three modes of operation: Standard RS-232, Extended RS-232, and IEEE 488.2.

Section 2
Interface Functions discusses remote and local operations, RS-232 and IEEE 488.1 protocols, and print functions.

Section 3
Syntax Overview discusses the Talker and Listener syntax provided by the R-2600. Differences between the syntax of the Standard RS-232 mode and the Extended RS-232 and IEEE 488.2 modes are explained.

Section 4
Status **Reporting** discusses the control and status data structures provided by the IEEE 488.2 model. The capabilities of me model that are provided when operating under RS-232 control are described.

Section 5
Programming Conventions discusses optional command parameters and optional response parameters.

Section 6
Command Set Organization presents an overall description of the command set; describing command groupings and manual entries for the commands. A quick reference to the command set is also provided.

Section 7 and beyond
The individual command and query pages give detailed descriptions of each command, including syntax, parameters, responses, and special notes.

2 Command Set Quick Reference

The following set of commands and queries are **not** available when the analyzer is in the trunking mode. Refer to the R-2600 Programming Reference (publication 94990-68-80309E55) for more information on the basic command set.

Mnemonic	Description	Group
BC	DSAT Decode	Cellular
BD[?]	DSAT Decode Query	
BE[?]	Electronic Serial Number Query	
BF	Cellular Format Setup	
BH[?]	Handoff Confirmation Query	
BL	Cellular Modulation and Switch Level	
BN[?]	Called Number Query	
BO[?]	Cellular Encode	
BQ[?]	Test Status Query	
BS[?]	SAT Code Query	
BT[?]	Thermometer Status Query	
BV[?]	Voice Channel Number Query	
MZ	RF Scan	Metering
ND	DPL Decode	Non-Sequence Decode
NP	PL Decode	
OG	Sweep Generator Oscilloscope	
OT	Tracking Generator Oscilloscope	
RD	Duplex Mode	RF Control
RG	Generate Mode	
RM	Monitor Mode	
RS	Sweep Generator	
RT	Tracking Generator	
SG	General Sequence Decode	Sequence Decode
SQ[?]	Sequence Decode Status Query	
SS	Start Sequence Decode	
SV	Select-V Decode	
SX	Stop Sequence Decode	
S5	5/6 Decode	

The following commands are specific to the R-2670 Trunking Option or have different functionality when the analyzer is in the trunking mode.

Mnemonic	Description	Group
*IDN?	Identification Query	Common
*OPT?	Option Identification Query	Common
FV[?]	Software Version Query	Special Functions
MODE	Mode Select	
OS	Spectrum Analyzer	Display Function
PM	Preset Memory	Memory Presets
PS	Select Memory Preset	Memory Presets
T1ID[?]	Trunking Trunk I ISW Data	Trunking
T2ID[?]	Trunking Trunk II ISW Data	Trunking
T1SID	Trunking Dispatch Trunk I System Init	Trunking
T2SID	Trunking Dispatch Trunk II System Init	Trunking
T2TDA	Trunking Auto-Affiliation (Trunk II)	Trunking
TAF	Trunking Auto Affiliation Control	Trunking
TFBC	Trunking Frequency Band (Channel)	Trunking
TFBF	Trunking Frequency Band (Frequency)	Trunking
TFMC	Trunking Fleet Map Configuration	Trunking
TRIT	Trunking Radio Init Test	Trunking
TSIT	Trunking System Init Test	Trunking
TTSP	Trunking Test Stop	Trunking
TTSS[?]	Trunking Test Status	Trunking
TTST	Trunking Test Start	Trunking

3 Commands

Refer to publication 94990-68-80309E55.

The following common commands are specific to the R-2670 Trunking Option or have different functionality when the analyzer is in the tnmking mode.

*IDN?

Identification Query

Description: The *IDN? query uniquely identifies the analyzer over the system interface.

Query Syntax: *IDN?

Standard RS-232
Response Syntax: s 1 <CR-LF>

IEEE 488.2
Response syntax: s1<LF>

Parameters:

s1
Description: Identification Suing
Type: <Arbitrary ASCII Response Data>
Format: 27 characters, encoded as;
"MOTOROLA,R-2670,0,V3.03.TXX"

Note: XX represents minor revisions to the software

Description: The *OPT? query identifies the reportable analyzer options. The response string is encoded using one of the following tables. Suing positions are encoded with a "0" if the option is not installed. String positions are encoded with a "1" if the option is installed.

R-2670 Option Table

Position	Option Slice	Option
1		Tracking Generator
2		Cable Fault
3		C-Msg Filter/600-ohm load
4	Cellular	Cellular Testing
5	Cellular	EAMPS Signaling
6	Cellular	ETACS Signaling
7	Cellular	NAMPS Signaling
8	Cellular	NTACS Signaling
9	Cellular	JTACS Signaling
10	Cellular	IEEE 488 GPIB
11		CCITT Filter/600 Ohm load
12		Phase Modulation
13		Graphics Printout
14		Enhances SA/Markers
15		Full Test Setup
16	Cellular	Thermal Power Meter
17		IEEE-488 GPIB
18	Trunk	Motorola Analog Trunking

Query Syntax: *OPT?

Standard RS-232
Response Syntax: s 1 <CR-LF>

IEEE 488.2
Response Syntax: s1<LF>

Parameters: s1
Description: Reportable Options
Type: <Arbitrary ASCII Response String>
Format: 35 characters encoded as;
"1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18"

Notes: Each option is represented by the character "1" if the option is present. The character "0" is used when the option is not present.

Description: The FV query returns the analyzer software version and checksum over the system interface.

Query Syntax: FV[?]

Standard RS-232 Response Syntax: s1 <CR-LF>

IEEE 488.2 **Response Syntax:** s1<LF>

Parameters:

s1
Description: Software Version
Type: &ring Response Data>
Format: 42 characters, fixed to the following:
"V3.03.TXX(NNNNNNNN)COPYRIGHT MOTOROLA INC."

Notes: NNNNNNNN represents the checksum number and XX represents the minor revision number.

MODE

Mode Select

Description: **The** MODE command selects the mode of the R-2670.

Query Syntax: MODE nl

Parameters:

nl

Description:	System Mode	
optional:	NO	
Type:	<Decimal Numeric Program Data>	
units:	None	
Resolution:	N/A	
Range:	0:	Standard Mode
	1:	Reserved
	2:	Reserved
	3:	Reserved
	4:	Reserved
	5:	Reserved
	6:	Trunking Mode
Reset:	0	

Note: Selection of a mode without the installation of the corresponding hardware option will cause the Invalid Mode Error (Error 09).

Description: The OS command selects and controls the Spectrum Analyzer display.

Command Syntax: **OS** n1,n2,n3,n4,n5

Standard RS-232 Response Syntax: PF,n6<CR-LF>PP,n7<CR-LF>

IEEE 488.2 Response Syntax: PF n6;PP n7<LF>

Parameters:

n1

Description:	Spectrum Analyzer Dispersion Selection		
optional:	Yes		
Type:	<Decimal Numeric Program Data>		
Units:	None		
Resolution:	N/A		
Range:	0:	20	kHz/div
	1:	50	kHz/div
	2:	100	kHz/div
	3:	200	kHz/div
	4:	500	kHz/div
	5:	1	MHz/div
	6:	2	MHz/div
	7:	5	MHz/div
	8:	10	MHz/div
Reset:	0		

n2

Description:	Spectrum Analyzer sensitivity select code	
optional:	Yes	
Type:	<Decimal Numeric Program Data>	
units:	None	
Resolution:	NIA	
Range:	0:	Minirnurn
	1:	Maximum
Reset:	1	

n3

Description:	Enhanced Spectrum Analyzer Display View	
optional:	Yes	
Type:	<Decimal Numeric Program Data>	
units:	None	
Resolution:	N/A	
Range:	0:	Normal
	1:	Freeze
	2:	Max Hold
	3:	Peak Hold
Reset:	0	

n4

Description:	Enhanced Spectrum Analyzer Marker Function	
Type:	<Decimal Numeric Program Data>	
units:	None	
Resolution:	N/A	
Range:	0:	off
	1:	Delta
	2:	Absolute
Reset:	0	

n5

Description:	Enhanced Specaum Analyzer Marker Movement	
Type:	<Decimal Numeric Program Data>	
Units:	None	
Resolution:	N/A	
Range:	0:	Toggle Markers
	1:	Reference Left Peak
	2:	Reference Right Peak
	3:	Reference Maximum Peak
	4:	Reference Next Peak
	5:	Reference Center Frequency

n6

Description:	Current Delta Frequency, or Absolute Marker Frequency Result	
Type:	<NR2 Numeric Response Data>	
units:	MHz	
Resolution:	0.1 MHZ	
Range:	Delta Measurement:	0 through 100.0 MHz
	Absolute Measurement:	0 throuth 1 000.0 MHz

n7

Description:	Current Delta Power, or Absolute Marker Power Level Result	
Type:	<NR2 Numeric Response Data>	
units:	dBm	
Resolution:	0.1 dBM	
Range:	Delta Measurement	-60 through +60
	Absolute Measurement	-60 through +50

Notes:

The M?, ?, or *TRG queries will return the given response following the issuance of the OS Command. Each query returns the next peak measurement.

Selection of 2, 5, or IO MHz for the n1 parameter is not available on the R-2670 when TRUNK is selected as the Mode of the analyzer.

Selection of 2, 5, or IO MHz for the n1 parameter is not available on the R-2550.

Selection for parameters n3, n4, n5 will result in an Error 08 being returned by the R-2550.

Selection of 2, 5, or IO MHz for the n1 parameter is available on the R-2600 only if the Enhanced Spectrum Analyzer Option is installed. If the option is not installed, the analyzer will return an invalid Input Error (Error 08).

Selection for parameters n3, n4, n5, and responses for parameters n6 and n7 are valid on the R-2600 only if the Enhanced Spectrum Analyzer Option is installed. If the option is not installed, the analyzer will return an Invalid Input Error (Error 08).

Description: The PM command saves selected parameters of the current state of the analyzer into the specified preset. The set of operating parameters saved by this command are:

Monitor Frequency
Generate Frequency
Modulation Type
Bandwidth
Duplex Offset
Synthesizer Format Selection

DTMF Code

Command Syntax: **PM** nl

Parameters:

nl

Description:	Preset Selection
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 through 44
Reset:	0

Notes: *Preset selections 0 through 29 are not available when the R-2670 mode is selected to be Trunk*
Reset selections *30* through 44 will save the entire state of the analyzer.

Description: The PS command restores the operating values saved in the selected preset. The set of operating parameters restored by this command are:

Monitor Frequency
Generate Frequency
Modulation Type
Bandwidth
Duplex Offset
Synthesizer Format Selection
DTMF Code

Command Syntax: PS nl

Parameters:

nl

Description:	Preset Selection
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 through 44
Reset:	0

Notes: ***Preset selections 0 through 29 are not available when the R-2670 mode is selected to be Trunk***
Preset selections 30 through 44 will save the entire state of the analyzer.

4 Trunking

The Trunking Option provides a set of commands and queries that are designed to specifically support the functionality provided by the option.

Note

*The set **of** Trunking commands are only available when the analyzer is equipped with the Trunking Option. Use of these commands without the option will cause the Invalid Mode Error (Error 09).*

The following table describes the Trunking commands and queries as implemented by the analyzer.

Mnemonic	Description	Window Level	Transparent
T1ID[?]	Trunking Trunk I ISW Data	Base	No
T2ID[?]	Trunking Trunk II ISW Data	Base	No
T1SID	Trunking Dispatch Trunk I System Init	Base	No
T2SID	Trunking Dispatch Trunk II System Init	Base	No
T2TDA	Trunking Auto-Affiliation (Trunk II)	Level 1	No
TAF	Trunking Auto Affiliation Control	Base	No
TFBC	Trunking Frequency Band (Channel)	Base	No
TFBF	Trunking Frequency Band (Frequency)	Base	No
TFMC	Trunking Fleet Map Configuration	Level 1	No
TRIT	Trunking Radio Init Test	Base	No
TSIT	Trunking System Init Test	Base	No
TTSP	Trunking Test Stop	Base	No
TTSS[?]	Trunking Test Status	Base	No
TTST	Trunking Test Start	Base	No

Note:

Trunking Commands are not available on the R-2550. Use of these commands will cause the Invalid Mode Error (Error 09).

Description: The T1 ID command outputs the Trunk I/Trunk I EP II decoded ISW data.

Command Syntax: T1ID[?]

Standard RS-232
Response Syntax: FL,n1<CR-LF>SF,n2<CR-LF>,CU,n3<CR-LF>CT,n4<CR-LF>
TN,n5<CR-LF>,SC,n6<CR-LF>

IEEE 488.2
Response Syntax: PR n1,FL n2;SF n3;CU n4;CT n5,SC n6<LF>

Parameters:

n1
Description: Fleet
Type: <NR1 Decimal Numeric Response Data>
units: N/A
Resolution: 1
Range: 0000 through 2047

n2
Description: Subfleet
Type: <NR1 Decimal Numeric Response Data>
units: N/A
Resolution: 1
Range: 00 through 3 1

n3
Description: unit
Type: <NR1 Decimal Numeric Response Data>
units: N/A
Resolution: 1
Range: OOOOOOthrough999999

n4

Description:	Call Type
Type:	<Arbitrary ASCII Response Data>
units:	N/A
Resolution:	N/A
Range:	N/A

n5

Description:	Size Code
Type:	<NR1 Decimal Numeric Response Data>
units:	N/A
Resolution:	N/A
Range:	0 through 16

Notes: Call Types are defined in the table on the following page.

Trunk I ISW Call Types

Code	Description
G1	5 Channel Subfleet Call Request
I1	20 Channel Level 1 Private Call Request
G2	20 Channel Subfleet Call Request
P2	Consolette Interconnect Request for Subfleet Call
P3	Centralized Phone Interconnect Request for Subfleet Call
Z1	Reserved for Data Channel Request
Z2	Reserved for SECURENET Channel request
E2	20 Channel Emergency Call Request
X	1st word code for Dual ISW Format
I2	Private Call Level II Request: 2nd word of Dual ISW
Y1	Dynamic Regrouping Request Command: 2nd word of Dual ISW
Y2	Reserved for additional messages: 2nd word of Dual ISW
P1	Individual Interconnect Request or Response
S	System Wide Request
Z3	Res. - Sys. Definable Call Type
R	Interconnect Reject Request
M0	Status or Message 0
M1	Status or Message 1
M2	Status or Message 2
M3	Status or Message 3
M4	Status or Message 4
M5	Status or Message 5
M6	Status or Message 6
M7	Status or Message 7
A	Individual Call Alert Command or Acknowledge
E1	Emergency Alarm Message or Acknowledge
M10	Status or Message 10
M11	Status or Message 11
M12	Status or Message 12
M13	Status or Message 13
M14	Status or Message 14
M15	Status or Message 15

Description: The T2ID command outputs the Trunk II decoded ISW data.

Command Syntax: T2ID[?]

Standard **RS-232** Response Syntax: TG,n1<CR-LF>CU,n2<CR-LF>,CT,n3<CR-LF>TU,n4<CR-LF>

IEEE 488.2 Response Syntax: TG n1;CU n2;CT n3;TU n4<LF>

Parameters:

n1

Description:	Talkgroup
Type:	<NR1 Decimal Numeric Response Data> or
units:	N/A
Resolution:	N/A
Range:	0000 through 4095

n2

Description:	Calling Unit
Type:	<NR1 Decimal Numeric Response Data> or
units:	N/A
Resolution:	N/A
Range:	000000 through 065535

n3

Description:	Call Type
Type:	<Arbitrary ASCII Response Data>
units:	N/A
Resolution:	N/A
Range:	N/A

Notes: Call Types are defined in the table.

Trunk 2 IS W Call Types

Code	Description
G1	Steered Call Request (Reserved)
P1	Individual Interconnect Request
G2	20 Channel (affiliated) Group Call Request
P2	Centralized Interconnect Request For: Group_To_Land Call (reserved)
P3	Centralized Interconnect Request for: Subfleet Call
P4	Individual Interconnect; Mobile_Transpond Response
R	Interconnect Reject Request
Z7	2nd FIRST WORD CODE FOR DUAL ISWS Will be used to Multiplex Existing $08 Dual Words
X1	First Word Code for Dual ISW Format
I2	Private Call II Channel Request: 2nd word of Dual ISW
Y1	Dynamic Regrouping Command: 2nd word of Dual ISW
X2	Extended Function Command: 2nd word of Dual ISW
G3	Un-affiliated Group Call Request: 2nd word of Dual ISW
X3	Talk Group Association for Emergency Alarm
S1	DVP Enhanced PCII: 2nd word of Dual ISW
P5	Mobile_To_Land Subfleet Interconnect: 2nd word of Dual ISW
M1	Automatic Unit Affiliation; 2nd word of Dual ISW
Z2	Type II Messages
S2	DVP Individual Interconnect
S3	DVP (SBLT) Lant-to-Mobile Interconnect (ICU comm.) (reserved)
S4	DVP Secure (SBLT) (affiliated): single word request
S5	DVP PC-II Enhanced Ring: 2nd word of Dual ISW
S6	Not Assigned
I1	PC II Enhanced Ring: 2nd word of Dual ISW
I3	PC II Enhanced Ring Acknowledge: 2nd word of Dual ISW
A1	Call Alert II - Enhanced Ring: 2nd word of Dual ISW
A2	Call Alert II - Enhanced Ring Acknowledge: 2nd word of Dual ISW
Z4	LINKNET Radio Registration: 2nd word of Dual ISW
Z5	Dispatcher Interrupt Ring: 2nd word of Dual ISW
Z6	Not Assigned
Z1	Super Word Identifier (used for variable id info): 2nd word of Dual ISW
Z3	Variable ID Registration: 2nd word of Dual ISW

Trunk 2 ISW Call Types

Code	Description
TSI	status 1
TS2	Status 2
TS3	Status 3
TS4	Status 4
TS5	Status 5
TS6	Status 6
TS7	Status 7
TS8	Status 8
TE1	Emergency Alarm
TDR	Dynamic reprogram request
TDI	ACK Dynamic ID assignment
X2	ACK Announcement talkgroup assignment.
TAA	Talkgroup dumped because of announcement call/busy OSW (console use)
XXX	Not Assigned
XXX	Not Assigned
XXX	Not Assigned
CM	Clear-Voice Message Trunked Talkgroups
CA	Clear-VoiceAnnouncement Talkgroups (Multi-Group) talkgroup
CE	Clear-Voice Emergency Talkgroup
CP1	Clear-Voice Patched Talkgroups
CD	Unused (Use to be Clear Data Talk Groups)
CEA	Clear-Voice Emergency Announcement Group
CP2	Clear-Voice Paging or AVL group
CVM	Clear-Voice MSEL group
SM	Coded Message Trunked Talkgroups
SA	Coded Announcement Talkgroups
SE	Coded Emergency
SP1	Coded Patched Talkgroups
SD	Unused (Use to be Secure-Voice Data)
SEA	Coded Emergency Announcment Group
SP2	Reserved for Coded Pagine or AVL group
SVM	Coded MSEL group

Description: The T1 SID command allows for entry of the Target Fleet, Target Subfleet, Target Unit ID data necessary for the Trunk I System Initiated Dispatch Test Sequence

Command Syntax: TlSID n1,n2,n3,n4

Parameters:

n1
Description: Fleet
Type: <Decimal Numeric Program Data>
units: N/AResolution: N/A
Range: 0000 through 2047

n2
Description: Subfleet
Type: <Decimal Numeric Program Data>
Units: N/A
Resolution: N/A
Range: 00 through 31

n3
Description: Unit
Type: <Decimal Numeric Program Data>
units: N/A
Resolution: N/A
Range: 000000 through 999999

n4
Description: Call Type
optional: Yes
Type: <Decimal Numeric Program Data>
units: None
Resolution: N/A
Range: 0: Fleet
1: Subfleet
Reset: 0

Description: The T2SID command allows for entry of the Talk Group Unit, and Call Type data necessary for the Trunk II System Initiated Call Alert Test Sequence

Command Syntax: T2SID nl ,n2,n3

Parameters:

n1

Description	Talk Group
Type:	<Decimal Numeric Program Data>
units:	N/A
Resolution:	N/A
Range:	0000 through 4095

n2

	Unit
Type:	<Non Decimal Numeric Program Data> or <Decimal Numeric Program Data>
units:	N/A
Resolution:	N/A
Range:	000000 through 065535

n3

Description:	Call Type
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Announcement 1: Talkgroup
Reset:	0

Description: **The T2TDA** command selects the Trunking Configuration Screen parameters unique to Trunk II Signalling.

Command Syntax: T2TDA n1 ,n2

Parameters:

n1

Description:	Generated Transmit Deviation
optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: Wide
	1: Medium
	2: Narrow
Reset:	**0**

n2

Description:	SMARTZONE Connect Tone Selection
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	Hertz
Resolution:	N/A
Range:	0: 105
	1: **76**
	2: 83
	3: 90
	4. 97
	5. 116
	6 128
	7. 138
Reset:	**0**

Description: The TAF command selects the auto affiliation sequence to be included in the test sequence.

Command Syntax: TAF n1

Parameters:

n1

Description:	Auto Affiliation
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Disabled
	1: SMARTZONE
Reset:	0

Notes: This command is only valid when the Signaling Type is Type II.

Description: **The TFBC** command allows for entry of the Frequency Band, Channel Plan (by channel), and RF port selections.

Command Syntax: TFBC n1,n2,n3,n4,n5,n6,n7,n8,n9

n1

Description:	Frequency Band
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: 800 MHz (US) 1: <reserved> 2: <reserved> 3: 900 MHz 4: <reserved>
Reset:	0

n2

Description:	Control Channel Transmit Channel
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	N/A
Resolution:	1
Range:	0000 through 9999
Reset:	

n3

Description:	Control Channel Receive Channel
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	N/A
Resolution:	1
Range:	0000 through 9999
Reset:	--------

n4

Description:	Voice Channel Transmit Channel
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	N/A
Resolution:	1
Range:	0000 through 9999
Reset:	--------

n5

Description:	Voice Channel Receive Channel
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	N/A
Resolution:	1
Range:	0000 through 9999
Reset:	--------

n6

Description:	Monitor Attenuation Value Selection
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: 0 dB 1: 20 dB 2: 40 dB
Reset:	0

n7

Description:	Monitor Port Selection
optional:	Yes
Type:	<Decimal Numeric Program Data=-
units:	None
Resolution:	NIA
Range:	0: Antenna 1: Transceiver
Reset:	

n8

Description:	Generate Port	
Optional:	Yes	
Type:	<Decimal Numeric Program Data,	
Units:	None	
Resolution:	N/A	
Range:	0:	Generate port
	1:	Transceiver port
Reset:	1	

n9

Description:	Generator Output Level
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	dBm
Resolution:	0.1 dBm
Range:	n8 = 0: -80.0 through 0.0 dBm
	n8 = 1: -130.0 through -50.0 dBm
Reset:	-50.0 dBm

(n1) Selection of Frequency Band that is incompatable with the Signalling Type will cause an Invalid Mode Error (Error 9)

Description: **The** TFBF command allows for entry of the Frequency Band, Channel Plan (by frequency), and RF port selections.

Command Syntax: TFBF n1,n2,n3,n4,n5,n6,n7,n8,n9

n1

Description:	Frequency Band
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: 800 MHz (US) 1: <reserved> 2: <reserved> 3: 900 MHz 4: <reserved>
Reset:	0

n2

Description:	Control Channel Transmit Frequency
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	MHz
Resolution:	100 Hz
Range:	004.00000 through 999.99999
Reset:	

n3

Description:	Control Channel Receive Frequency
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	MHZ
Resolution:	100 Hz
Range:	004.00000 through 999.99999
Reset:	

n4

Description:	Control Channel Transmit Frequency
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	MHz
Resolution:	100 Hz
Range:	004.00000 through 999.99999
Reset:	--------

n5

Description:	Control Channel Receive Frequency
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	MHz
Resolution:	100 Hz
Range:	004.00000 through 999.99999
Reset:	--------

n6

Description:	Monitor Attenuation Value Selection
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: 0 dB
	1: 20 dB
	2: 40 dB
Reset:	0

n7

Description:	Monitor Port Selection
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0:Antenna
	1 :Transceiver
Reset:	1

n8

Description:	Generate Port
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Generate port
	1: Transceiver port
Reset:	1

n9

Description:	Generator Output Level
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	dBm
Resolution:	0.1 dBm
Range:	n8 = 0: -80.0 through 0.0 dBm
	n8 = 1: -130.0 through -50.0 dBm
Reset:	-50.0 dBm

(n1) Selection of Frequency Band that is incompatable with the Signalling Type will cause an Invalid Mode Error (Error 9)

Description: **The TFMC** command selects the Trunking Fleet Map Configuration parameters unique to Trunk I and Trunk I EP II Signalling.

Command Syntax: TFMC n1,n2,n3,n4,n5,n6,n7,n8,n9,n10,n11

Parameters:

n1

Description:	Generated Transmit Deviation
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Wide
	1: Medium
	2: Narrow
Reset:	0

n2

Description:	System Index
Optional:	No
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: System 1
	1: System 2
	2: System 3
	3: System 4
	4: System 5
	5: System 6
	6: System 7
	7: System 8
	8: System 9
	9: System 10
Reset:	0

Parameters:

n3

Description:	System ID
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	000000 through 065535
Reset:	0

n4

Description:	Fleet Map Prefix Position 0
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 through 16 (See Notes)
Reset:	0

n5

Description:	Fleet Map Prefix Position 1
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 through 14 (See Notes)
Reset:	0

n6

Description:	Fleet Map Prefix Position 2
optional:	Yes
Type:	<Decimal Numeric Program Data,
units:	None
Resolution:	N/A
Range:	1 through 12 (See Notes)
Reset:	0

n7

Description:	Fleet Map Prefix Position 3
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	1 through 12 (See Notes)
Reset:	0

Parameters:

n8
Description: Fleet Map Prefix Position 4
optional: Yes
Type: <Decimal Numeric Program Data>
units: None
Resolution: N/A
Range: 1 through 10 (See Notes)
Reseo 0

n9
Description: Fleet Map Prefix Position 5
optional: Yes
Type: <Decimal Numeric Program Data>
units: None
Resolution: N/A
Range: 1 through 10 (See Notes)
Reset: 0

n10
Description: Fleet Map Prefix Position 6
Optional: Yes
Type: <Decimal Numeric Program Data>
units: None
Resolution: N/A
Range: 1 through 10 (See Notes)
Reset: 0

n11
Description: Fleet Map Prefix Position 7
optional: Yes
Type: <Decimal Numeric Program Data>
units: None
Resolution: N/A
Range: 1 through 10 (See Notes)
Reset: 0

Notes:

O - A
1 = B
2 = C
3 - D
4 = E
5 = F
6 = G
7 = H
8 = I
9 = J
10 = K
11 =L
12 = M
13 = N
14 = O
15 = P
16 = Q

Description: The TRIT command configures the analyzer for a Radio-Mated test.

Command Syntax: TRIT nl ,n2,n3,n4

Parameters:

n1

Description:	Signalling Type
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Trunk1
	1: Trunk I EP II
	2: Trunk II
Reset:	0

n2

Description:	ID Display
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Hex
	1: Dec
Reset:	0

n3

Description:	Call Sequence
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	MHz
Resolution:	None
Range:	0: Dispatch
Reset:	0

n4

Description:	System ID
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	000000 through 065535
Reset:	000000

Description: **The TSIT** command configures the analyzer for a **System-Initated** test.

Command Syntax: TSIT nl ,n2,n3,n4

Parameters:

n1

Description:	Signalling Type
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Trunk I
	1: Trunk I EP II
	2: Trunk II
Reset:	0

n2

Description:	ID Display
optional:	Yes
Type:	<Decimal Numeric Program Da&-
units:	None
Resolution:	N/A
Range:	0: Hex
	1: Dec
Reset:	0

n3

Description:	Call Sequence
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	MHz
Resolution:	None
Range:	0: Dispatch
Reset:	0

n4

Description:	System ID
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	000000 through 065535
Reset:	000000

TTSP

Trunking Test Stop

Description: The TTSP command ends any Trunking Test which requires a stop test key press to end.

Command Syntax: TTSP

Notes: Only valid if system mode is Trunk.

Only has an effect if trunking test is already started. Otherwise the command is ignored.

Description: The TTSS command outputs the Trunking Test status.

Command Syntax: TTSS[?]

Standard RS-232 Response Syntax: TS,nl <CR-LF>TT,n2<CR-LF>

LEEE 488.2 Response Syntax: TS nl; TT n2<LF>

Parameters:

nl

Description:	Thermometer Status Indication
Type:	<NR1 Numeric Response Data,
units:	N/A
Resolution:	N/A
Range:	

0	A: Control Channel Idle
3	D: Affiliate ISW Received
4	E: Affiliate OSW Sent
5	F: Control Channel Idle
6	G: Transpond OSW Sent
7	H: Transpond ISW Received
8	I: RING OSW Sent
9	J: ISW Received
10	K: Talkgroup OSW Sent
11	L: Dual ISW Received
12	M: Call Alert Ring OSW
13	N: Call Alert Ring ACK ISW
14	O: Call Alert Ring ACK OSW
15	P: Call Alert ACK OSW
16	Q: Channel Grand OSW Sent
17	R: HS Data Sent on VC
18	S: HS ACK Received on VC
19	T: LC Word Sent on VC
20	U: LS Word Sent on VC
21	V: Connect Tone Received on V
22	W: Disconnect Tone Received on V
23	X: Disconnect Sent
24	Y: Hangup Received

n2

Description:	Trunking Test Status	
Type:	<NR1 Numeric Response Data>	
units:	None	
Resolution:	N/A	
Range:	0:	Test not running
	1:	Test running
	2:	Test failed

Description: **The** TTST command initiates any Trunking Test which requires a start key press to begin.

Command Syntax: TTST

Notes: **Only** valid if system mode is Trunk.

Only has an effect if trunking test is not already started. Otherwise the command is ignored.

Programming Reference

Motorola R-2660
Communications System Analyzer
MIRS Option

MOTOROLA

Communications Test Equipment

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1. Introduction

This manual documents the unique MIRS MODE control and measurement commands used by the remote interface to the R-2660 Communications System Analyzer. Along with publication 68-80309E55, Programming

Reference, Motorola R-2550 and R-2600 Communications System Analyzer Series (found behind the General Operation tab in the 3-ring binder), this manual is intended to provide the information necessary to develop application programs that remotely control the analyzer for use in testing MIRS equipment.

This manual includes a Command Set Quick Reference in Section 2. In Section 3, individual command and query pages give detailed descriptions of each command (including syntax, parameters, responses, and special notes) for the option covered in this manual.

This manual documents the control and measurement functions provided by the remote interface to the R-2660 Communications System Analyzer MIRS option. This reference is intended to be used as an addendum to the R-2600 Programming Reference. These two documents should provide all the information necessary to develop application programs that remotely control MIRS operation in a R-2660 unit. General usage of the R-2600 analyzer is described in the appropriate Operator's Manual, publication 68-P80386B72.

The MIRS R-2600 Programming Reference details the specific commands needed for MIRS mode operation. Refer to the R-2600 Programming Reference for general information about utilizing the remote interface of the R-2660.

The specific commands entailed in this document overlay the set of standard commands detailed in the R-2600 Programming Reference. Many of the commands allowed in standard mode are still allowed while the R-2660 is configured for MIRS operation. However, several of the MIRS remote commands are intended to replace the standard command. For example, the user should not use the standard remote command to set RF-Control to Monitor (RM). Rather, use the appropriate MIRS command to set the RF-Control to monitor (MTM or MBM depending on the Mode).

Refer to publication 68-80309E55, Programming Reference Motorola R-2550 and R-2600 Communications System Analyzer Series for the following.

Section 1
Introduction discusses configuration requirements, the layer model provided by the remote interface, and the three modes of operation: Standard RS-232, Extended RS-232, and IEEE 488.2.

Section 2
Interface Functions discusses remote and local operations, RS-232 and IEEE 488.1 protocols, and print functions.

Section 3
Syntax Overview discusses the Talker and Listener syntax provided by the R-2600. Differences between the syntax of the Standard RS-232 mode and the Extended RS-232 and IEEE 488.2 modes are explained.

Section 4
Status Reporting discusses the control and status data structures provided by the IEEE 488.2 model. The capabilities of the model that are provided when operating under RS-232 control are described.

Section 5
Programming Conventions discusses optional command parameters and optional response parameters.

Section 6
Command Set Organization presents an overall description of the command set; describing command groupings and manual entries for the commands. A quick reference to the command set is also provided.

Section 7 and on
The individual command and query pages give detailed descriptions of each command, including syntax, parameters, responses, and special notes.

2. Quick Overview

1 'Quick Overview "

The following table lists all MIRS commands and queries implemented in the R-2660. Note that if the description does not list a specific MIRS mode, the command may be used for any of the MIRS modes. For example, the MTW (MIRS Average Wattmeter) command is valid for all three modes (MIRS BER Test, MIRS Mobile, and MIRS Base).

Mnemonic	Description	Group
MODE	Mode	MIRS Mode
MMBC	MIRS Mobile BCCH Setup	MIRS Metering
MMCP?	MIRS Mobile Called Party Query	
MMDS	MIRS Mobile Dispatch	
MMI	MIRS Mobile Interconnect	
MMII?	MIRS Mobile IMEI Query	
MMMK?	MIRS Mobile Classmark Ouerv	
MMDK?	MIRS Mobile Dispatch Classmark Query	
MMRF	MTRS Mobile RF Metering	
MMRG	MIRS Mobile Registration	
MMSS?	MIRS Mobile Rcvd Signal Strength Query	
MMTH?	MIRS Mobile Thermometer Query	
MTB	MIRS BER Test BER Metering	
MTRF	MIRS BER Test and Base RF Metering	
MTW	MIRS Average Wattmeter	
MMIS	MIRS Mobile Internal Audio Scone	MIRS Displav
MBM	MIRS Base Monitor	MIRS RF Control
MMD	MIRS Mobile Duplex	
MTD	MIRS BER Test Duplex	
MTG	MIRS BER Test Generate	
MTM	MIRS BER Test Monitor	

3. MIRS Mode

MODE

Mode Select

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Description: **The** MODE command selects the mode of the R2660

Command Syntax: MODE n1

Parameters:

n1

Description:	System Mode	
Optional:	NO	
Type:	<Decimal Numeric Program Data>	
units:	None	
Resolution:	N/A	
Range:	0:	Standard Mode
	1:	Astro Mode
	2:	SecureCom Mode
	3:	MIRS BER Test Mode
	4:	MIRS Base
	5:	MIRS Mobile
	6:	Motorola Analog Tnmking Mode
Reset:	0	

MMBC

BCCH Setup

Description: The MMBC command specifies the BCCH parameters to be used in the Mobile call scenario tests.

Command Syntax: MMBC n1,n2,s3,s4,s5,n6,n7

Parameters:

n1

Description	Mobile Country Code
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	1 digit
Range:	000 - 999
Reset:	316

n2

Description	National Domain Code
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	1 digit
Range:	00-99
Reset:	01

s3

Description:	Local LAI
optional:	Yes
Type:	<String Program Data>
Format:	5 character suing representing 4 hexadecimal digits with a period (XX.XX)
Reset:	"FF.FF"

s4

Description:	Regional Network Code
optional:	Yes
Type:	<String Program Data>
Format:	8 character string representing 6 hexadecimal digits with 2 periods (XX.XX.XX)
Reset	"FF.FF.FF"

s5

Description:	Service Provider Code
Optional:	Yes
Type:	&ring Program Data>
Format:	5 character suing representing 4 hexadecimal digits with a period (XX.XX)
Reset:	"FF.FF"

n6

Description:	Power Control Constant
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	dBm
Resolution:	1 dBm
Range:	-127 through +128
Reset:	128 dBm

n7

Description:	Maximum Transmit Power
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	dBm
Resolution:	N/A
Range:	0: 43 dBm 1: 40 dBm 2: 37 dBm 3: 33 dBm 4: 30dBm 5: 27 dBm
Reset:	40 dBm

Description: The MMCP query returns the Called Party BCD number of the unit under test.

Command Syntax: MMCP?

Standard **RS-232**
Response Syntax: BCD,s1 <CR-LF>

IEEE 488.2
Response Syntax: BCD s1<LF>

Parameters:

s1
Description: Called Party BCD
Type: &ring Response Data>
Format: 15 character suing representing 15 decimal digits

Description: The MMDS command selects and controls the Dispatch Call Test in MIRS Mobile mode.

Command Syntax: MMDS n1,n2

Standard RS-232 Response Syntax:

n1=0
SQ,n3 dB<CR-LF>IP,n4 W<CR-LF>

n1=1
SQ,n3 dB<CR-LF>IP,n4 dBm<CR-LF>

IEEE 488.2 Response Syntax: SQ n3;IP n4<LF>

Parameters:

n1

Description:	Received Signal Level Units
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: w 1: dBm
Reset:	I

n2

Description:	Slots
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: 4 Slots 1: 16 Slots 2: 80 Slots
Reset:	1

n3

Description:	Received SQE
Type.:	<NR2 Numeric Response Data>
units:	dB
Resolution:	0.1 dB
Range:	0.0 through 99.9

n4

Description:	Received Signal Level	
Type:	<NR2 Numeric Response Data>	
units:	n1 = 0:	W
	n l = l :	dBm
Resolution:	n1 = 0:	0.001 w
	n1 = 1:	0.1 dBm
Range:	nl = 0:	0.0 through 125.0
	n1 = 1:	-100.0 through +51.0

Notes: The M?, ?, or *TRG queries will return the given response following the issuance of the MMDS command.

Description: The MMI command selects and controls the Interconnect Call Test in MIRS Mobile mode.

Command Syntax: MMI n1,n2

Standard RS-232 Response Syntax:

n1=0
SQ,n3 dB<CR-LF>IP,n4 W<CR-LF>

n1=1
SQ,n3 dB<CR-LF>IP,n4 dBm<CR-LF>

IEEE 488.2 Response Syntax: SQ n3;IP n4<LF>

Parameters:

n1

Description:	Received Signal Level Units
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: W 1: dBm
Reset:	1

n2

Description:	Slots
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: 4 slots 1: 16 slots 2: 80 slots
Reset:	1

n3

Description:	Received SQE
Type:	<NR2 Numeric Response Data>
units:	dB
Resolution:	0.1 dB
Range:	0.0 through 99.9

n4

Description:	Received Signal Level	
Type:	<NR2 Numeric Response Data>	
units:	n1 = 0:	W
	n1 = 1:	dBm
Resolution:	n1 = 0:	0.001 w
	n1 = 1:	0.1 dBm
Range:	n1 = 0:	0.0 through 125.0
	n1 = 1:	-100.0 through +51.0

Notes: The M?, ?, or *TRG queries will return the given response following the issuance of the MMI command.

Description: The MMII query returns the IMEI of the unit under test.

Command Syntax: MMII?

Standard RS-232 Response Syntax: EMC,n1<CR-LF>MSN,n2<CR-LF>ECL,n3<CR-LF>EXT,n4<CR-LF>

IEEE 488.2 Response Syntax: EMC nl;MSN n2;ECL n3;EXT n4<LF>

Parameters:

n1
Description: Equipment Manufacturer Code
Type: <NR1 Numeric Response Data>
units: None
Resolution: N/A
Range: 0000 through 9999

n2
Description: Manufacturer Serial Number
Type: <NR1 Numeric Response Data>
units: None
Resolution: N/A
Range: 00000000 through 99999999

n3
Description: Equipment Class
Type: <NR1 Numeric Response Data>
units: None
Resolution: N/A
Range: 00 through 99

n4
Description: EXT
Type: <NR1 Numeric Response Data>
units: None
Resolution: N/A
Range: 0 through 9

Description: The MMMK query returns the Classmark Information of the unit under test while in an Interconnect call scenario. Use the MMDK query for Classmark Information in the Dispatch call scenario.

Command Syntax: MMMK?

Standard RS-232 Response Syntax: REV,n1<CR-LF>PWR,n2<CR-LF>SMS,n3<CR-LF>

IEEE 488.2 Response Syntax: REV n1;PWR n2;SMS n3<LF>

Parameters:

n1
Description: Revision
Type: <NR1 Numeric Response Data>
units: None
Resolution- N/A
Range: 0 through 7

n2
Description: RF Power Capability
Type: <NR1 Numeric Response Data>
units: None
Resolution: N/A
Range:
0: 43 dBm
1: 40dBm
2: 37dBm
3: 33 dBm
4: 30dBm
5: 27 dBm

n3
Description: Short Message Service Capability
Type: <NR1 Numeric Response Data>
units: None
Resolution: N/A
Range:
0: Not capable of SMS
1: Capable of SMS

Description: The MMDK query returns the Classmark Information of the unit under test while in a Dispatch call scenario. Use the MMMK query for Classmark Information in the Interconnect call scenario.

Command Syntax: MMDK?

Standard RS-232 Response Syntax: REV,n1<CR-LF>PWR,n2<CR-LF>

IEEE 488.2 Response Syntax: REV n1;PWR n2<LF>

Parameters:

n1

Description:	Revision
Type:	<NR1 Numeric Response Data>
units:	None
Resolution:	N/A
Range:	0 through 7

n2

Description:	RF Power Capability
Type:	<NR1 Numeric Response Data>
units:	None
Resolution:	N/A
Range	0: 43 dBm
	1: 40 dBm
	2: 37 dBm
	3: 33 dBm
	4: 30dBm
	5: 27 dBm

Description: The MMRF command selects and controls the RF metering function when the box is in MIRS Mobile mode. Use the MTRF command in MIRS BER Test and MIRS Base modes.

Command Syntax: MMRF n1,n2

Standard RS-232
Response Syntax: nl=O
SQ,n3 dB<CR-LF>IP,n4 W<CR-LF>

n1=1
SQ,n3 dB<CR-LF>IP,n4 dBm<CR-LF>

IEEE 488.2
Response Syntax: SQ n3;IP n4<LF>

Parameters:

n1

Description:	Received Signal Level Units
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: w 1: dBm
Reset:	1

n2

Description:	Slots
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: 4 slots 1: 16 slots 2: 80 slots
Reset:	1

n3

Description:	Received SQE
Type:	<NR2 Numeric Response Data>
units:	dB
Resolution:	0.1 dB
Range:	0.0 through 99.9

n4

Description:	Received Signal Level	
Type:	<NR2 Numeric Response Data>	
units:	n1 = 0:	W
	n1 = 1:	dBm
Resolution:	n1 = 0:	0.001 w
	n1 = 1:	0.1 dBm
Range:	n1 = 0:	0.0 through 125.0
	n1 = 1:	-100.0 through +51.0

Notes: The M?, ?, or *TRG queries will return the given response following the issuance of the MMRF command. The response will only be returned in the monitor or duplex modes.

Description: **The MMRG** command selects and controls the Registration procedure in MIRS Mobile mode.

Command Syntax: **MMRG** n1

Parameters:

n1

Description:	Registration Type
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Interconnect 1: Dispatch
Reset:	0

Description: The MMSS query returns the Mobile Received Signal Strength of the unit under test.

Command Syntax: MMSS?

Standard RS-232 Response Syntax: RSS,nl dBm<CR-LF>

IEEE 488.2 Response Syntax: RSS nl<LF>

Parameters:

nl

Description:	Mobile Detected Signal Strength
Type:	<NR1 Numeric Response Data>
units:	None
Resolution:	N/A
Range:	-127 through +128

MMTH?

MIRS Mobile Thermometer Status Query

U2 "MMTH?"

Description: The MMTH query returns the current Thermometer status in MIRS Mobile mode for the Registration, Interconnect and Dispatch meter selections.

Command Syntax: MMTH?

Standard RS-232 Response Syntax: n1<CR-LF>n2<CR-LF>

IEEE 488.2 Response Syntax: n1;n2<LF>

Parameters:

n1

Description:	Thermometer Type
Type:	<NR1 Numeric Response Data>
Units:	None
Resolution:	N/A
Range:	0: Registration 1: Interconnect 2: Dispatch -1: None of these tests selected

n2

Description:	Thermometer Value
Type:	<NR1 Numeric Response Data>
Units:	None
Resolution:	N/A
Range:	n1 = 0: 1 through 6 n1 = 1: 1 through 9 n1 = 2: 1 through 6

Description: The MTB command selects and controls the MIRS BER Test BER metering function.

Command Syntax: MTE? n1,n2,n3

Standard RS-232 Response Syntax:

n1=0
SQ,n4 dB<CR-LF>FE,n5 Hz<CR-LF>IP,n6 W<CR-LF>ERR,n7<CR-LF>BIT,n8<CR-LF>BER,n9<CR-LF>

n1=1
SQ,n4 dB<CR-LF>FE,n5 Hz<CR-LF>IP,n6 dBm<CR-LF>ERR,n7<CR-LF>BIT,n8<CR-LF>BER,n9<CR-LF>

IEEE 48.2 Response Syntax: SQ n4;FE n5;IP n6;ERR n7;BIT n8;BER n9<LF>

Parameters:

n1

Description:	Received Signal Level Units
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: w 1: dBm
Reset:	1

n2

Description:	Slots
optional:	Yes
Type:	<Decimal Numeric Program Data=-
units:	None
Resolution:	N/A
Range:	0: 4 slots 1: 16 slots 2: 80 slots 3: 960 slots
Reset:	1

n3

Description:	BER Meter Triggering
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Auto 1: Single
Reset:	Auto

n4

Description:	Received SQE
Type:	<NR2 Numeric Response Data>
units:	dB
Resolution:	0.1 dB
Range:	0.0 through 99.9

n5

Description:	Received Frequency Error
Type:	<NR1 Numeric Response Data>
units:	Hz
Resolution:	1 Hz
Range:	-9999 through +9999

n6

Description:	Received Signal Level
Type.:	<NR2 Numeric Response Data>
units:	n1 = 0: W n1 = 1: dBm
Resolution:	nl = 0: 0.001 W nl = 1: 0.1 dBm
Range:	n1=O: 0.0 through 125.0 n1 = 1: -100.0 through +51.0

n7

Description:	Number of Received Bit Errors
Type:	<NR1 Numeric Response Data>
units:	None
Resolution:	1 error
Range:	0 through 999999

n8

Description:	Number of Received Bits
Type:	<NR1 Numeric Response Data>
units:	None
Resolution:	1 bit
Range:	0 through 999999

n9

Description:	Measured Bit Error Rate
Type:	<NR2 Numeric Response Data>
units:	%
Resolution:	0.0001%
Range:	0.0000 through 99.9999

Notes: The M?, ?, or *TRG queries will return the given response following the issuance of the MTB command. The response will only be returned in the monitor or duplex modes.

Description: The MTRF command selects and controls the RF metering function when the box is in MIRS BER Test and MIRS Base modes. Use the MMRF command in MIRS Mobile mode.

Command Syntax: MTRF n1,n2

Standard RS-232 Response Syntax:

nl=O
SQ,n3 dB<CR-LF>FE,n4 Hz<CR-LF>IP,n5 W<CR-LF>

nl=1
SQ,n3 dB<CR-LF>FE,n4 Hz<CR-LF>IP,n5 dBm<CR-LF>

IEEE 488.2 Response Syntax: SQ n3;FE n4;IP n5<LF>

Parameters:

n1

Description:	Received Signal Level Units
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: w 1: dBm
Reset:	1

n2

Description:	Slots
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: 4 slots 1: 16 slots 2: 80 slots
Reset:	16

n3

Description:	Received SQE
Type:	<NR2 Numeric Response Data>
units:	dB
Resolution:	0.1 dB
Range:	0.0 through 99.9

n4

Description:	Received Frequency Error
Type:	<NR1 Numeric Response Data>
units:	HZ
Resolution:	1 Hz
Range:	-9999 through +9999

n5

Description:	Received Signal Level	
Type:	<NR2 Numeric Response Data>	
units:	nl = 0:	W
	nl = 1:	dBm
Resolution:	nl = 0:	0.001 w
	nl = 1:	0.1 dBm
Range:	nl = 0:	0.0 through 125.0
	nl = 1:	- 100.0 through +51.0

Notes: The M?, ?, or *TRG queries will return the given response following the issuance of the MTRF command. The response will only be returned in the monitor or duplex modes.

Description: The MTW command selects, controls, and starts the Average Wattmeter in any of the MIRS modes.

Command Syntax: MTW n1,n2

Standard RS-232 Response Syntax:
Input Level Units = W
IP,n3 W<CR-LF>
Input Level Units = dBm
IP,n3 dBm<CR-LF>

IEEE 488.2 Response Syntax: IP n3<LF>

Parameters:

n1

Description:	Received Signal Level Units
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: w 1: dBm
Reset:	I

n2

Description:	Power Measurement Period
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	Seconds
Resolution:	0.09 s
Range:	0.09 through 4.32
Reset:	1.44 S

n3

Description:	Received Signal Level
Type:	<NR2 Numeric Response Data>
units:	n1 = 0: W n1 = 1: dBm
Resolutios	n1 = 0: 0.001 W n1 = 1: 0.1 dBm
Range:	n1=O: 0.0 through 125.0 n1 = 1: -100.0 through +51.0

Notes:

The MTW command will cause the Avg Wattmeter to perform differently than it does when it is used under local control. The MTW command will start the meter. It will stop after one measurement is completed. The user will be required to resend the MTW command to start another measurement. In addition, the user is required to wait until the measurement is complete before issuing a query. Due to the intensive processing demands of the Average Wattmeter, any query issued before the measurement is complete will not be answered, and a transmission error may result for the next command which is attempted. The M?, ?, or *TRG queries will return the given response following the issuance of the MTW command. The response will only be returned in the monitor or duplex modes.

5. MIRS Display

MMIS

MIRS Mobile Clear Scope

\I2 "MMIS"

Description: **The MMIS** command selects and controls the Internal Audio Scope display in MIRS Mobile mode.

Command Syntax: **MMIS** nl ,n2,n3,n4,n5,n6,n7

Parameters:

n1

Description:	Oscilloscope Horizontal Range Selection
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: 20 uS/div
	1: 50 uS/div
	2: 100 uS/div
	3: 200 uS/div
	4: 500 uS/div
	5: 1 mS/div
	6: 2 mS/div
	7: 5 mS/div
	8: 10 mS/div
	9: 20 mS/div
	10: 50 mS/div
	11: 100 mS/div
	12: 200 mS/div
	13: 500 mS/div
	14: 1 S/div
Reset:	1

n2

Description:	Duplex Selection
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Mon
	1: Gen
Reset:	0

n3

Description:	Oscilloscope Trigger Level
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 through 999 (relative level)
Reset:	500

n4

Description:	Oscilloscope Triggering Mode Selection
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Automatic 1: Normal 2: Single Sweep
Reset:	0

n5

Description:	Oscilloscope Vertical Range Selection
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: 10 mV/div 1: 20 mV/div 2: 50 mV/div 3: loo mV/div 4: 200 mV/div 5: 500 mV/div 6: 1 Vldiv 7: 2 Vldiv 8: 5 Vldiv 9: 10 Vldiv
Reset:	0

n6

Description:	Oscilloscope Horizontal Position
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 through 250 (125 will center the trace)
Reset:	125

n7

Description:	Oscilloscope Vertical Position
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 through 250 (125 will center the trace)
Reset:	125

MBM — MIRS Base Monitor Mode

Description: The MBM command selects and controls the Monitor RF mode while in MIRS Base mode.

Command Syntax: MBM n1,n2,n3,n4,n5

Parameters:

n1

Description:	Monitor Carrier Number
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	N o n e
Resolution:	1 digit
Range:	0000 through 1199
Reset:	0000

n2

Description:	Monitor Frequency
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	MHz
Resolution:	100 Hz
Range:	0.4 through 999.9999
Reset:	101.5000 MHz

n3

Description-	Format
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: MIRS
Reset:	0

n4

Description:	Monitor Attenuation Value
optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: 0 dB 1: 20 dB 2: 40dB
Reset:	0

n5

Description:	Monitor Port
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Antenna 1: Transceiver
Reset:	1

Description: **The** MMD command selects and controls the Duplex RF mode while in MIRS Mobile mode.

Command Syntax: MMD n1,n2,n3,n4,n5,n6,n7,n8

Parameters:

n1
Description: Monitor Carrier Number
Optional: Yes
Type: <Decimal Numeric Program Data>
units: None
Resolution: 1 digit
Range: 0000 through 1199
Reset: 0000

n2
Description: Monitor Frequency
optional: Yes
Type: <Decimal Numeric Program Data>
units: MHz
Resolution: 100 Hz
Range: 0.4 through 999.9999
Reset: 101.5000 MHZ

n3
Description: Duplex Offset
optional: Yes
Type: <Decimal Numeric Program Data>
units: None
Resolution: N/A
Range: 0: +45.0000 MHz
Reset: 0

n4
Description- Format
optional: Yes
Type: =<Decimal Numeric Program Data>
units: None
Resolution: N/A
Range: 0: MIRS
Reset: 0

n5

Description:	Monitor Attenuation Value
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: 0 dB 1: 2odB 2: 40 dB
Reset:	0

n6

Description:	Monitor Port
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Antenna 1: Transceiver
Reset:	1

n7

Description:	Generate Port
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Generate Port 1: Transceiver Port
Reset:	1

n8

Description:	Generator Output Level
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	dBm
Resolution:	0.1 dBm
Range:	n7 = 0: -80.0 through 0.0 dBm n7 = 1: -130.0 through -50.0 dBm
Reset:	-50.0 dBm

Description: **The** MTD command selects and controls the Duplex RF mode while in MIRS BER Test mode.

Command Syntax: MTD n1,n2,n3,n4,n5,n6,n7,n8,n9,n10

Parameters:

n1

Description:	Monitor Carrier Number
optional:	Yes
Type:	<Decimal Numeric Program Data
units:	None
Resolution:	1 digit
Range:	0000 through 1199
Reset:	0000

Carrier Number entry is invalid if the Format is DJSMR or DMCA or the user selects +/-48 MHz for the Duplex Offset.

n2

Description:	Monitor Frequency
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	MHz
Resolution:	100 Hz
Range:	0.4 through 999.9999
Reset:	101.5000 MHZ

n3

Description:	Duplex Offset
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	MHz
Resolution:	N/A
Range:	0: -48.0000 MHz
	1: -45.0000 MHZ
	2: +45.0000 MHz
	3: +48.0000 MHz
Reset:	2

n4

Description:	Format
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: MIRS 1: DJSMR 2: DMCA
Reset:	0

n5

Description:	Generate Channel Type/Duty Cycle
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Outbound 1/6 1: Outbound 4/4 2: Outbound 6/6 3: Inbound 1/6
Reset:	0

The channel type will actually be determined by the duplex offset. If a positive duplex offset is chosen, then only the outbound duty cycle selections will be valid enuies. If a negative duplex offset is chosen, then only the inbound duty cycle selection will be valid.

n6

Description:	Window Clipping
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Window Clipping Off 1: Window Clipping On
Reset:	0

n7

Description:	Monitor Attenuation Value
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: 0 dB 1: 2odB 2: 40 dB
Reset:	0

n8

Description:	Monitor Port
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	NIA
Range:	0: Antenna 1: Transceiver
Reset:	1

n9

Description:	Generate Port
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Generate Port 1: Transceiver Port
Reset:	1

n10

Description:	Generator Output Level
optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	dBm
Resolution:	0.1 dBm
Range:	n10 = 0: -80.0 through 0.0 dBm n10 = 1: -130.0 through -50.0 dBm
Reset:	-50.0 dBm

Description: **The MTG** command selects and controls the Generate RF mode while in MIRS BER Test mode.

Command Syntax: **MTG** nl ,n2,n3,n4,n5,n6,n7

Parameters:

n1

Description:	Generate Carrier Number
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	1 digit
Range:	0000 through 1199
Reset:	0000

Carrier Number entry is invalid if the Format is DJSMR or DMCA.

n2

Description:	Window Clipping
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Window Clipping Off 1: Window Clipping On
Reset:	0

n3

Description:	Generate Frequency
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	MHz
Resolution:	100 Hz
Range:	0.4 through 999.9999
Reset:	800.0000 MHz

n4

Description:	Channel Type/Duty Cycle
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Outbound 1/6 1: Outbound 4/4 2: Outbound 6/6 3: Inbound 1/6
Reset:	0

n5

Description:	Format
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: MIRS 1: DJSMR 2: DMCA
Reset:	0

n6

Description:	Generate Port
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Generate Port 1: Transceiver Port
Reset:	1

n7

Description:	Generator Output Level
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	dBm
Resolution:	0.1 dBm
Range:	n7 = 0: -80.0 through 0.0 dBm n7 = 1: -130.0 through -50.0 dBm
Reset:	-50.0 dBm

Description: The MTM command selects and controls the Monitor RF mode while in MIRS BER Test mode.

Command Syntax: MTM n1,n2,n3,n4,n5,n6

Parameters:

n1

Description:	Monitor Carrier Number
optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	1 digit
Range:	0000 through 1199
Reset:	0000

Carrier Number entry is invalid if the Format is DJSMR or DMCA.

n2

Description:	Monitor Frequency
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	MHZ
Resolution:	100 Hz
Range:	0.4 through 999.9999
Reset:	101.5000 MHz

n3

Description:	Channel Type/Duty Cycle
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Outbound 1/6 1: Inbound 1/6
Reset:	0

n4

Description:	Format
optional:	Yes
Type:	<Decimal Numeric Program Data
units:	None
Resolution:	N/A
Range:	0 : MIRS 1: DJSMR 2: DMCA
Reset:	0

n5

Description:	Monitor Attenuation Value
optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: 0 dB 1: 20 dB 2: 40 dB
Reset:	0

n6

Description:	Monitor Port
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Antenna 1: Transceiver
Reset:	1

Programming Reference

Motorola R-2680
Communications System Analyser
MPT1327 Option

MOTOROLA

Communications Test Equipment

Publication 68-P30985C

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About this Reference

This manual documents the control and measurement functions provided for the remote interface to R-2680 Communications System Analyser with the MPT1327 option. This reference is intended to be used as an addendum to the R-2600 Programming Reference. These two documents should provide all the information necessary to develop application programs to remotely control MPT 1327 operations in an R-2680 unit. General usage of the R-2680 analyser is described in the ***Operator's Manual,*** publication 68-P80386B72.

The MPT13.27 Programming Reference details specific commands needed for the MPT1327 option. Refer to the R-2600 Programming Reference for general information about utilising the remote interface of the R-2600.

A unique feature of the R-2680 is the capability, under remote control, of modifying user selections without seeing the selections change ***on the*** R-2680 screen. This scenario occurs whenever' **the** remote user modifies a parameter when in a screen that does not display that parameter. This will only be allowed to happen when the remote user is in the MPT Test Mode.

Also note that the "Non-Numeric Program Data" and the "Hexadecimal Response Data" are not to the IEEE488.2 spec. No leading **"#H"** is used. Thus all program and response data with these headings must be in hexadecimal values, not decimal.

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1. MPT Mode

MODE — Mode Select

Description: The MODE command selects the mode type of the R2680.

Command Syntax: **MODE** n1

Parameters:

n1

Description:	System Mode
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Standard Mode 4: MPT Test Mode
Reset:	0

2. MPT DISPLAY

WAUTOTST

Auto Test Setup

Description: **The** WAUTOTST command selects the following parameters needed for an Auto Test: Headers, Halt on Error, SINAD Gen Level, SINAD Gen Level Units, Modulation Level, Radio ID2 Format, Radio ID2, Traffic Channel values, Channel Tests, 12dB Sinad limit, Frequency Error limit, RF Power Units, and RF Power limit.

Command Syntax: **WAUTOTST** s1,s2,n3,n4,n5,n6,n7,n8,n9,n10,n11,n12,n13,n14,n15,n16, n17,n18,n19,n20,n21

Parameters:

s1

Description:	Header for line 1
optional:	Yes
Type:	<String Program Data>
Format:	Any 24 character alphanumeric string
Reset:	" "

s2

Description:	Header for line 2
optional:	Yes
Type:	<String Program Data>
Format:	Any 24 character alphanumeric string
Reset:	" "

n3

Description:	Halt on Error
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: No 1: Yes
Reset:	1

n4

Description:	SINAD Generate Level Format
optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: µV 1: mV 2: dBu 3: dBm
Reset:	3

n5

Description:	SINAD Generate Level
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	See n4 and notes
Resolution:	0.01 µV or 0.01 mV or 0.1 dBu or 0.1 dBm
Range:	RF I/o: 0.07 µV <= SINAD Gen Level <= 707.6 µV GEN : 22.36 µV <= SINAD Gen Level <= 999.99 µV GEN : 0.02 mV <= SINAD Gen Level <= 223.87 mV RF I/o: -23 dBu <= SINAD Gen Level c= 57 dBu GEN : 27 dBu <= SINAD Gen Level <= 107 dBu RF I/O: -130dBm <= SINAD Gen Level <= -50 dBm GEN : -80 dBm <= SINAD Gen Level <= 0 dBm
Reset:	0 dBm

n6

Description:	Modulation Level
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	Volts
Resolution:	0.001 v
Range:	0 <= Mod Lvl <= 795 mV
Reset:	o v

n7

Description:	MPT format for Radio ID2
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: MPT1343
	1: MPT1327
Reset:	1

n8

Description:	Radio Identification - Number Prefix
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	MPT1343: 2 0 0 <= Number Refix <= 327
	MPT1327: 0 <= Prefix <= 127
Reser	0

n9

Description:	Radio Identification - Fleet Ind. Number / Ident
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	MPT1343: 2001 <= Fleet Ind. Numb <= 6050
	MPT1327: 2 <= Ident <= 8100
Reset:	0

n10

Description:	Radio Identification - Unit Number
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	MPT1343: 20 <= Unit Number <= 89
	or 200 <= Unit Number <= 899
Reset:	0

n11

Description:	Traffic Channel 1
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n12

Description:	Test Traffic Channel 1
optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: No 1: Yes
Reset:	1

n13

Description:	Traffic Channel 2
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n14

Description:	Test Traffic Channel 2
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: No 1: Yes
Reset:	1

n15

Description:	Traffic Channel 3
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	NIA
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n16

Description:	Test Traffic Channel 3
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: No 1: Yes
Reset:	1

n17

Description:	SINAD Limit
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	dB
Resolution:	0.01 dB
Range:	-30.00 dB <= SINAD <= 0.00 dB
Reset:	0.00 dB

n18

Description:	Frequency Error Limit
optional:	Yes
Type	<Decimal Numeric Program Data>
units:	Hz
Resolution:	1 Hz
Range:	0 Hz <= Freq. Error <= 9999 Hz
Reset:	0 Hz

n19

Description:	Frequency Deviation Limit
optional:	Yes
Type:	<Decimal Numeric Response Data>
units:	kHz
Resolution:	0.01 kHz
Range:	0 kHz <= Freq. Deviation <= 9.99 kHz
Reset:	0.00 kHz

n20

Description:	RF Power Units
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Watt 1: dBm
Reset:	0

n21

Description:	RF Power Limit
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	Watts or dBm -- see Notes
Resolution:	0.01 Watt or 0.1 dBm
Range:	00.00 <= RF Power <= 125.00 Watts -130.0 <= RF Power <= 50.9 dBm
Reset:	0.00 w

Notes: **The RF** Power limits are dependent upon the RF Power Units. The Sinad Generate level limits are dependent upon whether the RF/IO port is selected or the GEN port is selected.

WAUTOTS?

Auto Test Query

Description: The WAUTOTST? query retums the following parameters for the selected traffic channel: Test Pass/Fail result, SINAD, Frequency Error, Frequency Deviation, and RF Power Measurement.

Query Syntax: WAUTOTST? n1

Standard RS-232 Response syntax:
TSTR,s2<CR-LF>SINAD,n3<CR-LF>FRQERR,n4<CR-LF>
FRQDEV,n5<CR-LF>RFPOWR,n6<CR-LF>

IEEE 488.2 Response Syntax:
TSTR s2;SINAD n3;FRQERR n4;FRQDEV n5;RFPOWR n6<LF>

Parameters:

n1

Description:	Traffic Channel
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	1: Traffic Channel 1 2: Traffic Channel 2 3: Traffic Channel 3
Reset:	N/A

s2

Description:	Auto Test Pass/Fail Result
Type:	&ring Response Data>
Format:	1 character suing with two possible values: • "F" Test Failed • "P" Test Passed

n3

Description:	SINAD measurement
Type:	<NR2 Numeric Response Data>
Units:	dB
Resolution:	0.01 dB
Range:	-30.00 dB <= SINAD <= 0.00 dB

n4

Description:	Frequency Error measurement
Type:	<NR1 Numeric Response Data>
Units:	Hz
Resolution:	1 Hz
Range:	-9999 Hz <= Freq. Error <= +9999 Hz

n5

Description:	Frequency Deviation measurement
Type:	<NR2 Numeric Response Data>
units:	kHz
Resolution:	0.01 kHz
Range:	-9.99 kHz <= Freq. Deviation <= +9.99 kHz

n6

Description:	RF Power measurement
Type:	<NR2 Numeric Response Data>
units:	Watts or dBm -- see Notes
Resolution:	0.01 Watt or 0.01 dBm
Range:	0.00 c= RF Power <= 125.0 Watts

Notes: Units are dependent upon the selectable RF Power Unit command. If no traffic channel parameter is sent, a default of 1 is assumed.

Description: The WCALL command defines if the System Group Call scenario is a broadcast call or conference call.

Command Syntax: WCALL nl

Parameters:

nl

Description:	Call Type
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Broadcast Call 1: Conference Call
Reset:	0

Description: **The** WCALLSQ command specifies which Call Sequence is to be used.

Command Syntax: WCALLSQ n1

Parameters:

n1

Description:	Call Sequence
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Individual Call
	1: Group Call
	2: All Call
	3: PABX Call
	4: PSTN Call
	5: Status Message
	6: Short Data Message
Reset:	0

Description: The WCALLSU command specifies which Call Setup type is used.

Command Syntax: WCALLSU n1

Parameters:

n1

Description:	Call Setup scenario
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	**None**
Resolution:	N/A
Range:	0: Off Air Call Setup (OACSU) 1: Full Off Air Call Setup (FOACSU)
Reset:	0

Description: **The WCHSTAT? query** returns the status of the channel indicator - i.e. whether the active channel is the control channel or the traffic channel.

Query Syntax: **WCHSTAT?**

Standard RS-232 Response Syntax: **CHSTAT,** nl <CR-LF>

IEEE 488.2 Response Syntax: **CHSTAT** nl <LF>

Parameters: **nl**

Description:	Channel Status Indicator
Type:	<NR1 Numeric Response Data>
Units:	None
Resolution:	N/A
Range:	0: Control Channel 1: Traffic Channel

Note: Most MPT1327 commands cannot be executed while on the traffic channel. However, available Standard R2600 commands may be executed on the traffic channel for measurement purposes.

Description: **The** WDCW command defines up to 4 Data Code Words (DCW) to be transmitted to a radio.

Command Syntax: WDCW n1,n2,n3,n4,n5,n6,n7,n8,n9,n10,n11,n12,n13

Parameters:

n1

Description:	Number of Data Codewords to be transmitted
optional:	No
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	1 <= # Data Codewords <= 4
Reset:	1

n2

Description:	Reserved Slot Access bit for DCW 1
optional:	No
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= RSA <= 1
Reset:	0

n3

Description:	Upper 24 bit Data Codeword 1
optional:	No
Type:	<Non-Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 <= Upper Co&word <= 3FFFFF
Reset:	0

n4

Description:	Lower 24 bit Data Codeword 1
Optional:	No
Type:	<Non-Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 <= Co&word <= FFFFFF
Reset:	0

n5

Description:	Reserved Slot Access bit for DCW 2
optional:	YesrType: <Decimal Numeric Program Data
Units:	None
Resolution:	N/A
Range:	0 <= RSA <= 1
Reset:	0

n6

Description:	Upper 24 bit Data Codeword 2
optional:	Yes
Type:	<Non-Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 <= Codeword <= 3FFFFF
Reset:	0

n7

Description:	Lower 24 bit Data Codeword 2
optional:	Yes
Type:	<Non-Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 <= Codeword <= FFFFFF
Reset:	0

n8

Description:	Reserved Slot Access bit for DCW 3
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 <= RSA <= 1
Reset:	0

n9

Description:	Upper 24 bit Data Co&word 3
optional:	Yes
Type:	<Non-Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 <= Codeword <= 3FFFFF
Reset:	0

n10

Description:	Lower 24 bit Data Codeword 3
optional:	Yes
Type:	<Non-Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 <= Codeword <= FFFFFF
Reset:	0

n11

Description:	Reserved Slot Access bit for DCW 4
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 <= RSA <= 1
Reset:	0

n12

Description:	Upper 24 bit Data Codeword 4
optional:	Yes
Type:	<Non-Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 <= Codeword <= 3FFFFF
Reset:	0

n13

Description:	Lower 24 bit Data Codeword 4
optional:	Yes
Type:	<Non-Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 <= Codeword <= FFFFFF
Reset:	0

Description: The WEMERG command defines whether the priority of the call scenario is an emergency.

Command Syntax: WEMERG n1

Parameters:

n1

Description:	Emergency Call
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: No 1: Yes
Reset:	0

Description: The WFRQDEV command selects the limit of the Frequency Deviation for the selected traffic channels.

Command Syntax: WFRQDEV n1

Parameters:

n1
Description: Frequency Deviation Limit
Optional: Yes
Type: <Decimal Numeric Response Data>
Units: kHz
Resolution: 0.01 kHz
Range: 0 kHz <= Freq. Deviation <= 9.99 kHz
Reset: 0.00 kHz

WFRQERR

Frequency Error Limit Selection

Description: The WFRQERR commands selects the Frequency Error Limit for the selected traffic channels.

Command Syntax: WFRQERR n1

Parameters:

n1

Description:	Frequency Error Limit
optional:	Yes
	Type: <Decimal Numeric Response Data>
	Units: Hz
	Resoiution: 1 Hz
Range:	0 Hz <= Freq. Error <= 9999 Hz
	Reset: 0 Hz

Description: The WGRPID command specifies the Group Identification of the calling radio in either the MPTl343 format of Number Prefix : Fleet Individual Number : Unit Number or MPT132.7 format of Prefix : Identification.

Command Syntax: WGRPID n1,n2,n3,n4

Parameters:

n1

Description:	MPT format
optional:	No
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: MPT1343 1: MPT1327
Reset:	1

n2

Description:	Group Identification - Number Prefix
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range	MPT1343: 2 0 0 <= Number Prefix <= 327 MPT1327: 0 <= Prefix <= 127
Reset:	0

n3

Description:	Group Identification - Fleet Ind. Number / Ident
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	MPT1343: 2001 <= Fleet Ind. Numb <= 6050 MPT1327: 2 <= Ident <= 8100
Reset:	0

n4

Description:	Group Identification - Unit Number
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	MPT1343: 9 0 <= Unit Number c= 99 or 900 <= Unit Number <= 998
Reset:	0

Description: **The** WHALTER command defines whether the MPT Auto Test should halt when an error is present.

Command Syntax: WHALTER nl

Parameters:

nl

Description:	Halt on Error
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: No 1: Yes
Reset:	1

WHEADER

Print Header Selection

Description: The WHEADER command specifies two Headers that are used when Auto Test results are printed.

Command Syntax: WHEADER s1,s2

Parameters:

s1

Description:	Header for line 1
optional:	Yes
Type:	<String Program Data>
Format:	Any 24 character alphanumeric string
Reset:	" "

s2

Description:	Header for line 2
Optional:	Yes
Type:	<String Program Data>
Format:	Any 24 character alphanumeric string
Reset:	" "

Description: The WIDII command specifies the Radio ID of the radio under test in either the MPT1343 format of Number Prefix : Fleet Individual Number : Unit Number or MPT1327 format of Prefix : Identification.

Command Syntax: WIDII n1,n2,n3,n4

Parameters:

n1

Description:	MPT format for Radio ID2
optional:	No
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: MPT1343 1: MPT1327
Reset:	1

n2

Description:	Radio Identification - Number Prefix
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolutios	N/A
Range:	MPT1343: 200 <= Number Prefix <= 327 MPT1327: 0 c= Prefix <= 127
Reset:	0

n3

Description:	Radio Identification - Fleet Ind. Number / Ident
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	MPT1343: 2001 <= Fleet Ind. Numb <= 6050 MPT1327: 2 <= Ident <= 8100
Reset:	0

n4

Description:	Radio Identification - Unit Number
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	MPT1343: 2 0 <= Unit Number <= 89 or 200 <= Unit Number <= 899
Reset:	0

Description: The WMETER command selects one of the following meter screens: Radio Call, System Call, or MPT Auto Test

Command Syntax: WMETER n1

Parameters:

n1

Description:	Meter Selection
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	27: Radio Call 28: System Call 29: MPT Auto Test
Reset:	27

WMODLVL

Modulation Level Selection

Description: The WMODLVL command selects modulation level during an MPT Auto Test.

Command Syntax: WMODLVL n1

Parameters:

n1

Description:	Modulation Level
Optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	Volts
Resolution:	0.001 v
Range:	0 <= Mod Lvl <= 795 mV
Reset:	o v

Description: The WNUMTEL? query returns the number of telegrams in the telegram buffer.

Query Syntax: WNUMTEL?

Standard RS-232
Response Syntax: NUMTEL, n 1 <CR-LF>

IEEE 488.2
Response Syntax: NUMTEL n1 <LF>

Parameters:

n1
Description: Number of Telegrams
Type: <NR1 Numeric Response Data>
Units: None
Resolution: N/A
Range: 0 <= NUMTEL <= 99

Description: **The** WRADCAL command selects the following parameters needed for any of the Radio Call Test scenarios: Call Sequence, Control Channels, Traffic Channels, and Call-Setup.

Command Syntax: WRADCAL n1,n2,n3,n4,n5,n6,n7,n8

Parameters:

n1

Description:	Call Sequence
optional:	Yes
Type:	<Decimal Numeric Program Data,
units:	None
Resolution:	N/A
Range:	0: Individual Call 1: Group Call 2: All Call 3: PABX Call 4: PSTN Call 5: Status Message 6: Short Data Message
Reset:	0

n2

Description:	Control Channel 1
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n3

Description:	Control Channel 2
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 c= Logical Channel # <= 1023
Reset:	0

n4

Description:	Control Channel 3
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n5

Description:	Traffic Channel 1
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n6

Description:	Traffic Channel 2
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n7

Description:	Traffic Channel 3
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n8

Description:	Call Setup scenario
optional:	Yes
Type:	<Decimal Numeric Program Data>
units:	None
Resolution:	N/A
Range:	0: Off Air Call Setup (OACSU) 1: Full Off Air Call Setup (FOACSU)
Reset:	0

WRADESN?

Radio ESN Query

Description: The WRADESN? query returns the Radio's Electronic Serial Number.

Query Syntax: WRADESN?

Standard RS-232 Response Syntax: ESN,s1 <CR-LF>

IEEE 488.2 Response Syntax: ESN s1<LF>

Parameters:

s1

Description: Radio Ekctronic Serial Number
Type: &ring Response Data>
Format: 13 character suing representing a decimal format of "xxx-xx-xxxxxx" as follows:

Char(s)	Description	Range
1 - 3	Manf. Code	0<= Manf Code <= 255
4	Dash Separator	
5 - 6	Model #	0<= Model # <= 15
7	Dash Separator	
8 -13	Serial #	0<= Serial # <= 262143

WRADID?

Radio Identification Query

Description: The WRADID? query returns the Radio Identification number.

Query Syntax: WRADID?

Standard RS-232 Response Syntax: ID, s 1 <CR-LF>

IEEE 488.2 Response Syntax: ID s1<LF>

Parameters:

s1

Description: Radio Identification
Type: <String Response Data>
Format: 8 character string representing a decimal Prefix:Ident format of "xxx-xxxx" as follows:

Char(s)	Description	Range
1 -3	Prefix	0<= Prefix <= 127
4	Dash Separator	
5 - 8	Ident	2<= Ident <= 8100

Description: The WRDALL? command returns the Emergency result for a Radio - All Call Test scenario.

Query Syntax: WRDALL?

Standard RS-232
Response Syntax: EMERG,s1 <CR-LF>

IEEE 488.2
Response Syntax: EMERG s1 <LF>

Parameters: **s1**
Description: Emergency Call
Type: &ring Response Data>
Format: 1character string with two possible values:
- "Y" Yes
- "N" No

Description: **The WRDGRP?** command returns the following results for a Radio - Group Call Test scenario: the Group ID, Emergency result, and the Call Request type.

Query Syntax: WRDGRP?

Standard RS-232
Response Syntax: GRPID,s1<CR-LF>EMERG,s2<CR-LF>CALL,s3<CR-LF>

IEEE 4882
Response Syntax GRPID s1;EMERG s2;CALL s3<LF>

Parameters:

s1
Description: Group Identification or Address
Type: <String Response Data>
Format: 8 character string representing a decimal Prefix:Ident format of "xxx-xxxx" as follows:

Char(s)	Description	Range
1 - 3	Prefix	0<= Prefix <= 127
4	Dash Separator	
5 - 8	Ident	2<= Ident <= 8100

s2
Description: Emergency Call
Type: <String Response Data>
Format: 1 character string with two possible values:
- "Y" Yes
- "N" No

s3
Description: Call Request Type
Type: <String Response Data>
Format: 10 character string with two possible values:
- "Broadcast "
- "Conference"

Description: **The** WRDINDV? command returns the following results for a Radio -Individual Call Test scenario: the Radio ID of the called Radio and the Emergency result.

Query Syntax: WRDINDV?

Standard RS-232 Response Syntax: ID2,s1<CR-LF>EMERG,s2<CR-LF>

IEEE 488.2 Response Syntax: **ID2** s1;EMERG s2<LF>

Parameters:

s1

Description: Radio Identification of Called Radio
Type:. <String Response Data>
Format: 8 character string representing a decimal Prefix:Ident format of "xxx-xxxx" as follows:

Char(s)	Description	Range
1 - 3	Prefix	0<= Prefix <= 127
4	Dash Separator	
5 - 8	Ident	2<= Ident <= 8100

s2

Description: Emergency Call
Type: <Suing Response Data>
Format: 1 character suing with two possible values:

- "Y" Yes
- "N" NO

Description: The WRDPABX? command returns the following results for a Radio -PABX Call Test scenario: the Emergency result and the PABX Call Number.

Query Syntax: WRDPABX?

Standard RS-232 Response Syntax: EMERG,s1<CR-LF>PABX,n2<CR-LF>

IEEE 488.2 Response Syntax: EMERG s1;PABX n2<LF>

Parameters:

s1

Description: Emergency Call
Type: <String Response Data>
Format: 1 character string with two possible values:
- "Y" Yes
- "N" No

n2

Description: PABX Call Number
Type: <NR1 Numeric Response Data>
units: None
Resolution: N/A
Range: 1 <= PABX <= 999999999

Description: **The** WRDPSTN? command retums the following results for a Radio -PSTN Call Test scenario: the Emergency result, the Dialing Method, and the PSTN Call sequence.

Query Syntax: WRDPSTN

Standard RS-232 Response Syntax: EMERG,s1<CR-LF>DIAL,s2<CR-LF>PSTN,s3<CR-LF>

IEEE 488.2 Response Syntax: EMERG s1;DIAL s2;PSTN s3<LF>

Parameters:

s1

Description: Emergency Call
Type: &ring Response Data>
Format: 1 character string with two possible values:
- "Y" Yes
- "N" No

s2

Description: Dialing Method used to invoke call scenario
Type: &ring Response Data>
Format: 8 character suing with one possible value:
- "LNG-FORM"

s3

Description: PSTN Call Number
Type: <String Response Data>
Format: Long Form: 31 characters

WRDSHRT?

Radio - Short Data Call Test Result Query

Description: **The WRDSHRT?** command returns the following results for a Radio -Short Data Call Test scenario: the Radio ID of the called Radio, the Number of Data Codewords, the RSA values. and the Data Codewords.

Query Syntax: WRDSHRT?

Standard RS-232 Response Syntax:

ID2,s1<CR-LF>NUMCW,n2<CR-LF>RSA1,n3<CR-LF>
UDCW1,n4<CR-LF>LDCW1,n5<CR-LF>RSA2,n6<CR-LF>
UDCW2,n7<CR-LF>LDCW2,n8<CR-LF>RSA3,n9<CR-LF>
UDCW3,n10<CR-LF>LDCW3,n11<CR-LF>RSA4,n12<CR-LF>
UDC W4,n13<CR-LF>LDCW4,n14<CR-LF>

IEEE 488.2 Response Syntax:

ID2 s1;NUMCW n2;RSA1 n3;UDCW1 n4;LDCW1 n5;RSA2 n6;
UDCW2 n7;LDCW2 n8;RSA3 n9;UDCW3 n10;LDCW3 n11;RSA4 n12;
UDCW4 n13;LDCW4 n14<LF>

Parameters:

s1

Description: Radio Identification of Called Radio
Type: &ring Response Data>
Format: 8 character suing representing a decimal Prefix:Ident format of "xxx-xxxx" as follows:

Char(s)	Description	Range
1 -3		Refix 0<= Prefix <= 127
4		Dash Separator
5 - 8		Ident 2<= Ident <= 8 100

n2

Description: Number of Data Codewords transmitted
Type: <NR1 Numeric Response Data>
Units: None
Resolution: N/A
Range: 1 <= # Data Codewords <= 4

n3

Description:	Reserved Access Slot bit for Data Codeword 1
Type:	<NR1 Numeric Response Data>
units:	None
Resolution:	N/A
Range:	0 or 1

n4

Description:	Upper 24 bit Data Codeword 1
Type:	<Hexadecimal Numeric Response Data>
units:	None
Resolution:	N/A
Range:	0 <= Codeword <= 3FFFFF

n5

Description:	Lower 24 bit Data Codeword 1
Type:	<Hexadecimal Numeric Response Data>
units:	None
Resolution:	N/A
Range:	0 <= Codeword <= FFFFFF

n6

Description:	Reserved Access Slot bit for Data Co&word 2
Type:	<NR1 Numeric Response Data>
units:	None
Resolution:	N/A
Range:	0 or 1

n7

Description:	Upper 24 bit Data Codeword 2
Type:	<Hexadecimal Numeric Response Data>
Units:	None
Resolution:	N/A
Range:	0 <= Codeword <= 3FFFFF

n8

Description:	Lower 24 bit Data Codeword 2
Type:	<Hexadecimal Numeric Response Data>
units:	None
Resolution:	N/A
Range:	0 <= Codeword <= FFFFFF

n9

Description:	Reserved Access Slot bit for Data Codeword 3
Type:	<NR1 Numeric Response Data5
units:	None
Resolution:	N/A
Range:	Oor 1

n10

Description:	Upper 24 bit Data Codeword 3
Type:	<Hexadecimal Numeric Response Data>
units:	None
Resolution:	N/A
Range:	0 <= codeword <= 3FFFFF

n11

Description:	Lower 24 bit Data Codeword 3
Type:	<Hexadecimal Numeric Response Data>
units:	None
Resolution:	N/A
Range:	0 <= codeword <= FFFFFF

n12

Description:	Reserved Access Slot bit for Data Codeword 4
Type:	<NR1 Numeric Response Data>
Units:	None
Resolution:	N/A
Range:	0 or 1

n13

Description:	Upper 24 bit Data Co&word 4
Type:	<Hexadecimal Numeric Response Data>
units:	None
Resolution:	N/A
Range:	0 <= Codeword <= 3FFFFF

n14

Description	Lower 24 bit Data Codeword 4
Type:	<Hexadecimal Numeric Response Data>
units:	None
Resolution:	N/A
Range:	0 <= Codeword <= FFFFFF

Description: The WRDSTAT? command returns the following results for a Radio -Status Message Call Test scenario: the Radio ID called Radio and the Status Code.

Query Syntax: WRDSTAT?

Standard RS-232
Response Syntax: ID2,s1<CR-LF>STAT,n2<CR-LF>

IEEE 488.2
Response Syntax: ID2 s1;STAT n2<LF>

Parameters:

s1
Description: Radio Identification of Called Radio
Type: <String Response Data>
Format: 8 character string representing a decimal Prefix:Ident format of "xxx-xxxx" as follows:

Char(s)	Description	Range
1 - 3		Prefix 0<= Prefix <= 127
4		Dash Separator
5 - 8		Ident 2<= Ident <= 8100

n2
Description: Status Code
Type: <NR1 Numeric Response Data>
units: None
Resolution: N/A
Range: 1 <= Status Co& <= 3 1

Description: The WRFPOWR command selects the limit and units for the RF Power measurements.

Command Syntax: WRFPOWR n1,n2

Parameters:

n1

Description:	RF Power Units
Optional:	Yes
	Type: <Decimal Numeric Program Data>
	Units: None
Resolution:	N/A
Range:	0: Watt
	1: dBm
Reset:	0

n2

Description:	RF Power Limit
Optional:	Yes
	Type: <Decimal Numeric Program Data>
	Units: Watts or dBm -- see Notes
	Resolution: 0.01 Watt or 0.1 dBm
Range:	00.00 <= RF Power <= 125.00 Watts
	-130.0 <= RF Power <= 50.9 dBm
Reset:	0.00 W

Notes: Units are dependent upon n1, the RF Power Units.

Description: The WSCALL command selects the following parameters needed for a System Call - All Call scenario: Radio ID2 Format, Radio ID2, Emergency priority, Control Channel values, and Traffic Channel values.

Command Syntax: WSCALL n1,n2,n3,n4,n5,n6,n7,n8,n9,n10,n11

Parameters:

n1

Description:	MPT format for Radio ID2
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: MPT1343
	1: MPT1327
Reset:	1

n2

Description:	Radio Identification - Number Prefix			
Optional:	Yes			
Type:	<Decimal Numeric Program Data>			
Units:	None			
Resolution:	N/A			
Range:	MPT1343:	200	<= Number Prefix	<= 327
	MPT1327:	0	<= Prefix	<= 127
Reset:	0			

n3

Description:	Radio Identification - Fleet Ind. Number / Ident			
Optional:	Yes			
Type:	<Decimal Numeric Program Data>			
Units:	None			
Resolution:	N/A			
Range:	MPT1343:	2001	<= Fleet Ind. Numb	<= 6050
	MPT1327:	2	<= Ident	<= 8100
Reset:	0			

n4

Description:	Radio Identification - Unit Number			
Optional:	Yes			
Type:	<Decimal Numeric Program Data>			
Units:	None			
Resolution:	N/A			
Range:	MPT1343:	20	<= Unit Number	<= 89
	or	200	<= Unit Number	<= 899
Reset:	0			

n5

Description:	Emergency Priority
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: No 1: Yes
Reset:	0

n6

Description:	Control Channel 1
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n7

Description:	Control Channel 2
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n8

Description:	Control Channel 3
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n9

Description:	Traffic Channel 1
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n10

Description:	Traffic Channel 2
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n11

Description:	Traffic Channel 3
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

Description: The WSCGRP command selects the following parameters needed for a System Call - Group Call scenario: Radio ID2 Format, Radio ID2, Group ID Format, Group ID, Emergency priority, Call Type, Control Channel values, and Traffic Channel values.

Command Syntax: WSCGRP n1,n2,n3,n4,n5,n6,n7,n8,n9,n10,n11,n12,n13,n14,n15,n16

Parameters:

n1

Description:	MPT format for Radio ID2
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: MPT1343 1: MPT1327
Reset:	1

n2

Description:	Radio Identification - Number Prefix			
Optional:	Yes			
Type:	<Decimal Numeric Program Data>			
Units:	None			
Resolution:	N/A			
Range:	MPT1343:	200	<= Number Prefix	<= 327
	MPT1327:	0	<= Prefix	<= 127
Reset:	0			

n3

Description:	Radio Identification - Fleet Ind. Number / Ident			
Optional:	Yes			
Type:	<Decimal Numeric Program Data>			
Units:	None			
Resolution:	N/A			
Range:	MPT1343:	2001	<= Fleet Ind. Numb	<= 6050
	MPT1327:	2	<= Ident	<= 8100
Reset:	0			

n4

Description:	Radio Identification - Unit Number			
Optional:	Yes			
Type:	<Decimal Numeric Program Data>			
Units:	None			
Resolution:	N/A			
Range:	MPT1343:	20	<= Unit Number	<= 89
	or	200	<= Unit Number	<= 899
Reset:	0			

n5

Description:	MPT format for Group ID
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: MPT1343
	1: MPT1327
Reset:	1

n6

Description:	Group Identification - Number Prefix			
Optional:	Yes			
Type:	<Decimal Numeric Program Data>			
Units:	None			
Resolution:	N/A			
Range:	MPT1343:	200	<= Number Prefix	<= 327
	MPT1327:	0	<= Prefix	<= 127
Reset:	0			

n7

Description:	Group Identification - Fleet Ind. Number / Ident			
Optional:	Yes			
Type:	<Decimal Numeric Program Data>			
Units:	None			
Resolution:	N/A			
Range:	MPT1343:	2001	<= Fleet Ind. Numb	<= 6050
	MPT1327:	2	<= Ident	<= 8100
Reset:	0			

n8

Description:	Group Identification - Unit Number			
Optional:	Yes			
Type:	<Decimal Numeric Program Data>			
Units:	None			
Resolution:	N/A			
Range:	MPT1343:	90	<= Unit Number	<= 99
	or	900	<= Unit Number	<= 998
Reset:	0			

n9

Description:	Emergency Priority
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: No 1: Yes
Reset:	0

n10

Description:	Call Type
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: Broadcast Call 1: Conference Call
Reset:	0

n11

Description:	Control Channel 1
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n12

Description:	Control Channel 2
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n13

Description:	Control Channel 3
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n14

Description:	Traffic Channel 1
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n15

Description:	Traffic Channel 2
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n16

Description:	Traffic Channel 3
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

Description: The WSCINDV command selects the following parameters needed for a System Call - Individual Call scenario: Radio ID2 Format, Radio ID2, Emergency priority, Control Channel values, Traffic Channel values, and Call Setup type.

Command Syntax: WSCINDV n1,n2,n3,n4,n5,n6,n7,n8,n9,n10,n11,n12

Parameters:

n1

Description:	MPT format for Radio ID2
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: MPT1343 1: MPT1327
Reset:	1

n2

Description:	Radio Identification - Number Prefix
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	MPT1343: 200 <= Number Prefix <= 327 MPT1327: 0 <= Prefix <= 127
Reset:	0

n3

Description:	Radio Identification - Fleet Ind. Number / Ident
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	MPT1343: 2001 <= Fleet Ind. Numb <= 6050 MPT1327: 2 <= Ident <= 8100
Reset:	0

n4

Description:	Radio Identification - Unit Number
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	MPT1343: 20 <= Unit Number <= 89 or 200 <= Unit Number <= 899
Reset:	0

n5

Description:	Emergency Priority
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: No 1: Yes
Reset:	0

n6

Description:	Control Channel 1
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n7

Description:	Control Channel 2
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n8

Description:	Control Channel 3
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n9

Description:	Traffic Channel 1
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n10

Description:	Traffic Channel 2
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n11

Description:	Traffic Channel 3
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n12

Description:	Call Setup scenario
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: Off Air Call Setup (OACSU) 1: Full Off Air Call Setup (FOACSU)
Reset:	0

Description: The WSCPABX command selects the following parameters needed for a System Call - PABX Call scenario: Emergency priority, Control Channel values, Traffic Channel values, and Call Setup type.

Command Syntax: WSCPABX n1,n2,n3,n4,n5,n6,n7,n8

Parameters:

n1
Description: Emergency Priority
Optional: Yes
Type: <Decimal Numeric Program Data>
Units: None
Resolution: N/A
Range: 0: No
1: Yes
Reset: 0

n2
Description: Control Channel 1
Optional: Yes
Type: <Decimal Numeric Program Data>
Units: None
Resolution: N/A
Range: 0 <= Logical Channel # <= 1023
Reset: 0

n3
Description: Control Channel 2
Optional: Yes
Type: <Decimal Numeric Program Data>
Units: None
Resolution: N/A
Range: 0 <= Logical Channel # <= 1023
Reset: 0

n4
Description: Control Channel 3
Optional: Yes
Type: <Decimal Numeric Program Data>
Units: None
Resolution: N/A
Range: 0 <= Logical Channel # <= 1023
Reset: 0

n5

Description:	Traffic Channel 1
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n6

Description:	Traffic Channel 2
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n7

Description:	Traffic Channel 3
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n8

Description:	Call Setup scenario
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: Off Air Call Setup (OACSU) 1: Full Off Air Call Setup (FOACSU)
Reset:	0

Description: The WSCPSTN command selects the following parameters needed for a System Call - PSTN Call scenario: Emergency priority, Control Channel values, Traffic Channel values, and Call Setup type.

Command Syntax: WSCPSTN n1,n2,n3,n4,n5,n6,n7,n8

Parameters:

n1

Description:	Emergency Priority
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: No 1: Yes
Reset:	0

n2

Description:	Control Channel 1
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n3

Description:	Control Channel 2
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n4

Description:	Control Channel 3
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n5

Description:	Traffic Channel 1
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n6

Description:	Traffic Channel 2
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n7

Description:	Traffic Channel 3
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n8

Description:	Call Setup scenario
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: Off Air Call Setup (OACSU) 1: Full Off Air Call Setup (FOACSU)
Reset:	0

Description: The WSCSHORT command selects the following parameters needed for a System Call - Short Data Message Call scenario: Radio ID2 Format, Radio ID2, Number of Data Codewords, Data Codeword RSA values, Data Codewords and Control Channel values.

Command Syntax: WSCSHORT n1,n2,n3,n4,n5,n6,n7,n8,n9,n10,n11,n12,n13,n14,n15,16, n17,n18,n19,n20

Parameters:

n1

Description:	MPT format for Radio ID2
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: MPT1343 1: MPT1327
Reset:	1

n2

Description:	Radio Identification - Number Prefix			
Optional:	Yes			
Type:	<Decimal Numeric Program Data>			
Units:	None			
Resolution:	N/A			
Range:	MPT1343:	200	<= Number Prefix	<= 327
	MPT1327:	0	<= Prefix	<= 127
Reset:	0			

n3

Description:	Radio Identification - Fleet Ind. Number / Ident			
Optional:	Yes			
Type:	<Decimal Numeric Program Data>			
Units:	None			
Resolution:	N/A			
Range:	MPT1343:	2001	<= Fleet Ind. Numb	<= 6050
	MPT1327:	2	<= Ident	<= 8100
Reset:	0			

n4

Description:	Radio Identification - Unit Number			
Optional:	Yes			
Type:	<Decimal Numeric Program Data>			
Units:	None			
Resolution:	N/A			
Range:	MPT1343:	20	<= Unit Number	<= 89
	or	200	<= Unit Number	<= 899
Reset:	0			

n5

Description:	Number of Data Codewords to be sent
Optional:	No
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	1 <= # Data Codewords <= 4
Reset:	1

n6

Description:	Reserved Slot Access bit for DCW 1
Optional:	No
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= RSA <= 1
Reset:	0

n7

Description:	Upper 24 bit Data Codeword 1
Optional:	No
Type:	<Non-Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Codeword <= 3FFFFF
Reset:	0

n8

Description:	Lower 24 bit Data Codeword 1
Optional:	No
Type:	<Non-Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Codeword <= FFFFFF
Reset:	0

n9

Description:	Reserved Slot Access bit for DCW 2
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= RSA <= 1
Reset:	0

n10
Description: Upper 24 bit Data Codeword 2
Optional: Yes
Type: <Non-Decimal Numeric Program Data>
Units: None
Resolution: N/A
Range: 0 <= Codeword <= 3FFFFF
Reset: 0

n11
Description: Lower 24 bit Data Codeword 2
Optional: Yes
Type: <Non-Decimal Numeric Program Data>
Units: None
Resolution: N/A
Range: 0 <= Codeword <= FFFFFF
Reset: 0

n12
Description: Reserved Slot Access bit for DCW 3
Optional: Yes
Type: <Decimal Numeric Program Data>
Units: None
Resolution: N/A
Range: 0 <= RSA <= 1
Reset: 0

n13
Description: Upper 24 bit Data Codeword 3
Optional: Yes
Type: <Non-Decimal Numeric Program Data>
Units: None
Resolution: N/A
Range: 0 <= Codeword <= 3FFFFF
Reset: 0

n14
Description: Lower Data Codeword 3
Optional: Yes
Type: <Non-Decimal Numeric Program Data>
Units: None
Resolution: N/A
Range: 0 <= Codeword <= FFFFFF
Reset: 0

n15
Description: Reserved Slot Access bit for DCW 4
Optional: Yes
Type: <Decimal Numeric Program Data>
Units: None
Resolution: N/A
Range: 0 <= RSA <= 1
Reset: 0

n16
Description: Upper Data Codeword 4
Optional: Yes
Type: <Non-Decimal Numeric Program Data>
Units: None
Resolution: N/A
Range: 0 <= Codeword <= 3FFFFF
Reset: 0

n17
Description: Lower Data Codeword 4
Optional: Yes
Type: <Non-Decimal Numeric Program Data>
Units: None
Resolution: N/A
Range: 0 <= Codeword <= FFFFFF
Reset: 0

n18
Description: Control Channel 1
Optional: Yes
Type: <Decimal Numeric Program Data>
Units: None
Resolution: N/A
Range: 0 <= Logical Channel # <= 1023
Reset: 0

n19
Description: Control Channel 2
Optional: Yes
Type: <Decimal Numeric Program Data>
Units: None
Resolution: N/A
Range: 0 <= Logical Channel # <= 1023
Reset: 0

A3. List of Response Mnemonics

Mnemonic	Description
CALL	Call Request Type
CALLSU	Call Setup Scenario
CCFRQ	Test Control Channel Frequency
CCN	Corresponding Channel Number to LBBF
CC1	Control Channel 1
CC2	Control Channel 2
CC3	Control Channel 3
CHAN	Channel Number Offset
CHSTAT	Channel Status Indicator
CNC	Channel Number Count
CSPACE	Channel Spacing
DDEV	Data Deviation
DIALM	Dialing Method used to invoke call scenario
DUPLEX	Duplex Offset
EMERG	Emergency Call Request
ESN	Radio's Electronic Serial Number
FRQDEV	Frequency Deviation
FRQERR	Frequency Error
GRPID	Group Identification
HPFS	High Pass Filter setting
ID	Radio Identification
ID2	Radio Identification of Called Radio
LBBF	Low Band Base Frequency
LDCW1	Lower Data Codeword 1
LDCW2	Lower Data Codeword 2
LDCW3	Lower Data Codeword 3
LDCW4	Lower Data Codeword 4
LPFS	Low Pass Filter setting
NAME	Telegram Name
NUMCW	Number of Data Codewords transmitted
NUMTEL	Number of Telegrams in Telegram buffer
PABX	PABX Call Number
PSTN	PSTN Call Number
RECBND	Receive Band
RFPOWR	RF Power Measurement
RSA1	Reserved Access Slot bit for Data Codeword 1
RSA2	Reserved Access Slot bit for Data Codeword 2
RSA3	Reserved Access Slot bit for Data Codeword 3
RSA4	Reserved Access Slot bit for Data Codeword 4

A3. List of Response Mnemonics (continued)

Mnemonic	Description
SINAD	SINAD Measurement
SNAME	System Name
SPATT	SYNC/SYNT Pattern
STAT	Status Code
SYSID	System Identification
TCFRQ	Test Traffic Channel Frequency
TC1	Traffic Channel 1
TC2	Traffic Channel 2
TC3	Traffic Channel 3
UTELE	Upper Telegram Data
LTELE	Lower Telegram Data
TIME	Telegram Time Stamp
TSTR	Auto Test Pass/Fail result
TXRX	Telegram Transmitted/Received Indicator
UDCW1	Upper Data Codeword 1
UDCW2	Upper Data Codeword 2
UDCW3	Upper Data Codeword 3
UDCW4	Upper Data Codeword 4

n20

Description:	Control Channel 3
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

Description: The WSCSTAT command selects the following parameters needed for a System Call - Status Message Call scenario: Radio ID2 Format, Radio ID2, Status Code, and Control Channel values.

Command Syntax: WSCSTAT n1,n2,n3,n4,n5,n6,n7,n8

Parameters:

n1

Description:	MPT format for Radio ID2
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: MPT1343
	1: MPT1327
Reset:	1

n2

Description:	Radio Identification - Number Prefix			
Optional:	Yes			
Type:	<Decimal Numeric Program Data>			
Units:	None			
Resolution:	N/A			
Range:	MPT1343:	200	<= Number Prefix	<= 327
	MPT1327:	0	<= Prefix	<= 127
Reset:	0			

n3

Description:	Radio Identification - Fleet Ind. Number / Ident			
Optional:	Yes			
Type:	<Decimal Numeric Program Data>			
Units:	None			
Resolution:	N/A			
Range:	MPT1343:	2001	<= Fleet Ind. Numb	<= 6050
	MPT1327:	2	<= Ident	<= 8100
Reset:	0			

n4

Description:	Radio Identification - Unit Number			
Optional:	Yes			
Type:	<Decimal Numeric Program Data>			
Units:	None			
Resolution:	N/A			
Range:	MPT1343:	20	<= Unit Number	<= 89
	or	200	<= Unit Number	<= 899
Reset:	0			

n5

Description:	Status Code
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Status Code <= 31
Reset:	0

n6

Description:	Control Channel 1
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n7

Description:	Control Channel 2
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n8

Description:	Control Channel 3
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

Description: The WSINAD command selects the limit for the SINAD measurements for the selected traffic channels.

Command Syntax: WSINAD n1

Parameters:

n1

Description:	SINAD Limit
Optional:	Yes
	Type: <Decimal Numeric Program Data>
	Units: dB
Resolution:	0.01 dB
Range:	-30.00 dB <= SINAD <= 0.00 dB
Reset:	0.00 dB

Description: The WSINAD command selects the SINAD Generation Level.

Command Syntax: WSINGEN n1,n2

Parameters:

n1

Description:	SINAD Generate Level Format
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: µV 1: mV 2: dBu 3: dBm
Reset:	3

n2

Description:	SINAD Generate Level
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	See n2 and notes
Resolution:	0.01 µV or 0.01 mV or 0.1 dBu or 0.1 dBm
Range:	RF I/O: 0.07 µV <= SINAD Gen Level <= 707.6 µV GEN : 22.36 µV <= SINAD Gen Level <= 999.99 µV GEN : 0.02 mV <= SINAD Gen Level <= 223.87 mV RF I/O: -23 dBu <= SINAD Gen Level <= 57 dBu GEN : 27 dBu <= SINAD Gen Level <= 107 dBu RF I/O: -130 dBm <= SINAD Gen Level <= -50 dBm GEN : -80 dBm <= SINAD Gen Level <= 0 dBm
Reset:	0 dBm

Notes: The limits are dependent upon whether the RF/IO port is selected or the GEN port.

Description: The WSTATC command specifies the code transmitted to the radio during a status message call scenario.

Command Syntax: WSTATC n1

Parameters:

n1

Description:	Status Code
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Status Code <= 31
Reset:	0

Description: The WTELEG? query returns the following information for a Telegram: Name, Time Stamp, TX-RX type, and Data.

Query Syntax: WTELEG? n1

Standard RS-232 Response Syntax:
NAME,s2<CR-LF>TIME.n3<CR-LF>TXRX,s4<CR-LF>
UTELE,n5<CR-LF>LTELE,n6<CR-LF>

IEEE 488.2 Response Syntax:
NAME s2;TIME n3;TXRX s4;UTELE n5;LTELE n6<LF>

Parameters:

n1
Description: Telegram Number
Optional: No
Type: <Decimal Numeric Program Data>
Units: None
Resolution: N/A
Range: 1 <= Telegram Number <= 99
Reset: N/A

s2
Description: Telegram Name
Type: <String Response Data>
Format: 5 character string

n3
Description: Telegram Time Stamp
Type: <NR2 Numeric Response Data>
Units: Seconds
Resolution: 0.1 s
Range: 0.0 s <= Time Stamp <= 999.0 s

s4
Description: Telegram Transmitted/Received indicator
Type: <String Response Data>
Format: 2 character string with two possible values:
- "Tx" for Transmitted
- "Rx" for Received

n5

Description:	Upper 24 bit Telegram Data
Type:	<Hexadecimal Numeric Response Data>
Units:	None
Resolution:	N/A
Range:	0 <= Telegram <= FFFFFF

n6

Description:	Lower 24 bit Telegram Data
Type:	<Hexadecimal Numeric Response Data>
Units:	None
Resolution:	N/A
Range:	0 <= Telegram <= FFFFFF

Description: The WTSTCHN command specifies which Traffic Channels to test.

Command Syntax: WTSTCHN n1,n2,n3

Parameters:

n1

Description:	Test Traffic Channel 1
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: No 1: Yes
Reset:	1

n2

Description:	Test Traffic Channel 2
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: No 1: Yes
Reset:	1

n3

Description:	Test Traffic Channel 3
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: No 1: Yes
Reset:	1

WRFCNTRL — RF Control Selection

Description: The WRFCNTRL command specifies the following parameters needed for RF Control: Bandwidth, Monitor Attenuation, Monitor Port, Generate Port, and Generate Output Level.

Command Syntax: WRFCNTRL n1,n2,n3,n4,n5

Parameters:

n1

Description:	Bandwidth
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: Wide 1: Narrow
Reset:	0

n2

Description:	Monitor Attenuation
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: 0 dB 1: 20 dB 2: 40 dB
Reset:	0

n3

Description:	Monitor Port
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: Antenna 1: RF I/O
Reset:	1

n4

Description:	Generate Port
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: Gen 1: RF I/O
Reset:	1

n5

Description:	Generate Output Level
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	dBm
Resolution:	0.1 dBm
Range:	-130.0 dBm <= Gen Output <= -50.0 dBm -- if Gen Port = RF I/O -80.0 dBm <= Gen Output <= 0.0 dBm -- if Gen Port = Gen
Reset:	-50.0 dBm

WRFFREQ?

RF Frequency Query

Description: The WRFFREQ? command returns the Test Control Channel Frequency and the Test Traffic Channel Frequency.

Query Syntax: WRFFREQ?

Standard RS-232 Response Syntax: CCFRQ,n1<CR-LF>TCFRQ,n2<CR-LF>

IEEE 488.2 Response Syntax: CCFRQ n1;TCFRQ n2<LF>

Parameters:

n1

Description:	Test Control Channel Frequency
Type:	<NR2 Numeric Response Data>
Units:	Hz
Resolution:	1 kHz
Range:	400 kHz <= CCFRQ <= 999.999 MHz

n2

Description:	Test Traffic Channel Frequency
Type:	<NR2 Numeric Response Data>
Units:	Hz
Resolution:	1 kHz
Range:	400 kHz <= TCFRQ <= 999.999 MHz

Description: The WRFSETUP command specifies the following parameters needed for the MPT RF zone: Signalling System Type, System Identification, valid Control Channel, valid Traffic Channel, Bandwidth, Monitor Attenuation, Monitor Port, Generate Port, and Generate Output Level.

Command Syntax: WRFCNTR n1,n2,n3,n4,n5,n6,n7,n8,n9

Parameters:

n1

Description: Signaling System Type
Optional: Yes
Type: <Decimal Numeric Program Data>
Units: None
Resolution: N/A
Range:
0: Germany Regionet 43 Sub-band D1
1: Germany Regionet 43 Sub-band D2
2: UK MPT1327 Band III Sub-band I
3: UK MPT1327 Band III Sub-band II
4: Dutch Actionet
5: Italian Privatex
6: New Zealand PTC 253
7: French PAA 2424 VHF
8: French PAA 2424 UFH
9: Finnish Autonet
10: User System Setup 1
11: User System Setup 2
12: User System Setup 3
13: User System Setup 4
14: User System Setup 5
15: User System Setup 6
16: User System Setup 7
17: User System Setup 8
18: User System Setup 9
19: User System Setup 10
Reset: 0

n2

Description: System Identification - Hexadecimal
Optional: Yes
Type: <Non-Decimal Numeric Program Data>
Units: None
Resolution: N/A
Range: 0 <= System ID <= 7FFF
Reset: 0

n3

Description:	Control Channel Selection
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	1: Control Channel 1
	2: Control Channel 2
	3: Control Channel 3
Reset:	1

n4

Description:	Traffic Channel Selection
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	1: Traffic Channel 1
	2: Traffic Channel 2
	3: Traffic Channel 3
Reset:	1

n5

Description:	Bandwidth
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: Wide
	1: Narrow
Reset:	0

n6

Description:	Monitor Attenuation
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: 0 dB
	1: 20 dB
	2: 40 dB
Reset:	0

n7

Description:	Monitor Port
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: Antenna
	1: Transceiver
Reset:	1

n8

Description:	Generate Port
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: Gen
	1: Transceiver
Reset:	1

n9

Description:	Generate Output Level
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	dBm
Resolution:	0.1 dBm
Range:	-130.0 dBm<= Gen Output <= -50.0 dBm-- if Gen Port = Transceiver
	-80.0 dBm <= Gen Output <= 0.0 dBm -- if Gen Port = Gen
Reset:	-50 dBm

Description: The WSYSID command specifies the System ID used by radios in Hexadecimal form.

Command Syntax: WSYSID n1

Parameters:

n1

Description:	System Identification - Hexadecimal
Optional:	Yes
Type:	<Non-Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= System ID <= 7FFF
Reset:	0

Description: The WSYSTYP command specifies the Signaling System Type.

Command Syntax: WSYSTYP n1

Parameters:

n1

Description: Signaling System Type
Optional: Yes
Type: <Decimal Numeric Program Data>
Units: None
Resolution: N/A
Range:
0: Germany Regionet 43 Sub-band D1
1: Germany Regionet 43 Sub-band D2
2: UK MPT1327 Band III Sub-band I
3: UK MPT1327 Band III Sub-band II
4: Dutch Actionet
5: Italian Privatex
6: New Zealand PTC 253
7: French PAA 2424 VHF
8: French PAA 2424 UFH
9: Finnish Autonet
10: User System Setup 1
11: User System Setup 2
12: User System Setup 3
13: User System Setup 4
14: User System Setup 5
15: User System Setup 6
16: User System Setup 7
17: User System Setup 8
18: User System Setup 9
19: User System Setup 10
Reset: 0

WCC — Control Channel Selections

Description: The WCC command specifies which Control Channel is valid and the Logical Channel Number for any of the three Control Channels.

Command Syntax: WCC n1,n2,n3,n4

Parameters:

n1

Description:	Control Channel Selection
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	1: Control Channel 1 2: Control Channel 2 3: Control Channel 3
Reset:	1

n2

Description:	Control Channel 1
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n3

Description:	Control Channel 2
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n4

Description:	Control Channel 3
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

Description: The WSTART command initiates the start of any MPT test specified.

Command Syntax: WSTART

Notes: Only one test can be running at any time.

WSTOP

Stop Test Selection

Description: The WSTOP command stops any MPT test that is currently running.

Command Syntax: WSTOP

Parameters: N/A

Description: The WSYSSU command specifies the following parameters for any of the 10 Non-User System Setups: Sync/Synt Pattern, Low Band Base Frequency (LBBF), Corresponding Channel Number to LBBF, Duplex Offset, Channel Number Offset, Channel Spacing, Radio Receive Band, and Channel Number Count.

Command Syntax: WSYSTYP n1,n2,n3,n4,n5,n6,n7,n8,n9

Parameters:

n1

Description:	Signaling System Type
Optional:	No
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: Germany Regionet 43 Sub-band D1 1: Germany Regionet 43 Sub-band D2 2: UK MPT1327 Band III Sub-band I 3: UK MPT1327 Band III Sub-band II 4: Dutch Actionet 5: Italian Privatex 6: New Zealand PTC 253 7: French PAA 2424 VHF 8: French PAA 2424 UFH 9: Finnish Autonet
Reset:	0

n2

Description:	SYNC/SYNT Pattern
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: MPT 1327 1: PAA 2424
Reset:	0

n3

Description:	Low Band Base Frequency
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	Hz
Resolution:	500 MHz
Range:	400 kHz <= LBBF <= 999.999 MHz
Reset:	400 kHz

n4

Description:	Corresponding Channel Number to LBBF
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Channel Number <= 1023
Reset:	0

n5

Description:	Duplex Offset
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	MHz
Resolution:	500 Hz
Range:	12.5 Hz <= Duplex Offset <= 65 MHz
Reset:	10 MHz

n6

Description:	Channel Number Offset
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	-1023 <= Offset <= 1023
Reset:	0

n7

Description:	Channel Spacing
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: 12.5 kHz 1: 20 kHz 2: 25 kHz
Reset:	0

n8

Description:	Radio Receive Band
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: High 1: Low
Reset:	0

n9

Description:	Channel Number Count
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: Up
	1: Down
Reset:	0

Description: The WTC command specifies which Traffic Channel is valid and the Logical Channel Number for any of three Traffic Channels.

Command Syntax: WTC n1,n2,n3,n4

Parameters:

n1

Description:	Traffic Channel Selection
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	1: Traffic Channel 1 2: Traffic Channel 2 3: Traffic Channel 3
Reset:	1

n2

Description:	Traffic Channel 1
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n3

Description:	Traffic Channel 2
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n4

Description:	Traffic Channel 3
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

Description: The WUSYSSU command specifies the following parameters for any of 10 User System Setups: System Name, Signaling Parameters, System Type, SYNC/SYNT Pattern, Low Band Base Frequency (LBBF), Corresponding channel number to LBBF, Duplex Offset, Channel Number offset, Channel Spacing, Receive Band, Channel Number count, Data Deviation, Low Pass Filter setting, High Pass Filter setting, Control Channels, Traffic Channels, System ID Format, System ID, and Call Setup.

Command Syntax: WUSYSSU n1,s2,n3,n4,n5,n6,n7,n8,n9,n10,n11,n12,n13,n14,n15, n16,n17,n18,n19,n20,n21

Parameters:

n1

Description:	Signaling System Type
Optional:	No
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	10: User System Setup 1 11: User System Setup 2 12: User System Setup 3 13: User System Setup 4 14: User System Setup 5 15: User System Setup 6 16: User System Setup 7 17: User System Setup 8 18: User System Setup 9 19: User System Setup 10
Reset:	10

s2

Description:	System Name
Optional:	Yes
Type:	<String Program Data>
Format:	Any 20 character alphanumeric string
Reset:	" "

n3

Description:	SYNC/SYNT Pattern
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: MPT 1327 1: PAA 2424
Reset:	0

n4

Description:	Low Band Base Frequency
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	MHz
Resolution:	500 Hz
Range:	400 kHz <= LBBF <= 999.999 MHz
Reset:	400 kHz

n5

Description:	Corresponding Channel Number to LBBF
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Channel Number <= 1023
Reset:	0

n6

Description:	Duplex Offset
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	MHz
Resolution:	500 Hz
Range:	12.5 kHz <= Duplex Offset <= 55 MHz
Reset:	10 MHz

n7

Description:	Channel Number Offset
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	-1023 <= Offset <= 1023
Reset:	0

n8

Description:	Channel Spacing
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: 12.5 kHz 1: 20 kHz 2: 25 kHz
Reset:	0

n9

Description:	Radio Receive Band
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: High
	1: Low
Reset:	0

n10

Description:	Channel Number Count
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: Up
	1: Down
Reset:	0

n11

Description:	Data Deviation
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	kHz
Resolution:	100 Hz
Range:	1.5 kHz <= Data Deviation <= 1.5 kHz
Reset:	1.5kHz

n12

Description:	Low Pass Filter
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: 300 Hz
	1: 3 kHz
	2: 20 kHz
Reset:	2

n13

Description:	High Pass Filter
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: 5 Hz 1: 300 Hz 2: 3 kHz
Reset:	0

n14

Description:	Control Channel 1
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n15

Description:	Control Channel 2
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n16

Description:	Control Channel 3
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n17

Description:	Traffic Channel 1
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n18

Description:	Traffic Channel 2
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n19

Description:	Traffic Channel 3
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023
Reset:	0

n20

Description:	System Identification - Hexadecimal
Optional:	Yes
Type:	<Non-Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0 <= System ID <= 7FFF
Reset:	0

n21

Description:	Call Setup scenario
Optional:	Yes
Type:	<Decimal Numeric Program Data>
Units:	None
Resolution:	N/A
Range:	0: Off Air Call Setup (OACSU) 1: Full Off Air Call Setup (FOACSU)
Reset:	0

Description: The WUSYSSU? query returns the following parameters for any of 10 User System Setups: System Name, SYNC/SYNT Pattern, Low Band Base Frequency (LBBF), Corresponding channel number to LBBF, Duplex Offset, Channel Number offset, Channel Spacing, Receive Band, Channel Number count, Data Deviation, Low Pass Filter setting, High Pass Filter setting, Control Channels, Traffic Channels, System ID, and Call Setup.

Command Syntax: WUSYSSU? n1

Standard RS-232 Response Syntax:

SNAME,s2<CR-LF>SPATT,n3<CR-LF>LBBF,n4<CR-LF>
CCN,n5<CR-LF>DUPLEX ,n6<CR-LF>CHAN,n7<CR-LF>
CSPACE,n8<CR-LF>RECBND,n9<CR-LF>CNC,n10<CR-LF>
DDEV,n11<CR-LF>LPFS,n12<CR-LF>HPFS,n13<CR-LF>
CC1,n14<CR-LF>CC2,n15<CR-LF>CC3,n16<CR-LF>
TC1,n17<CR-LF>TC2,n18<CR-LF>TC3,n19<CR-LF>
SYSID,n20<CR-LF>CALLSU,n21<CR-LF>

IEEE 488.2 Response Syntax:

SNAME s2;SPATT n3;LBBF n4;CCN n5;DUPLEX n6;CHAN n7;
CSPACE n8;RECBND n9;CNC n10;DDEV n11;LPFS n12;
HPFS n13;CC1 n14;CC2 n15;CC3 n16;TC1 n17;TC2 n18;TC3 n19;
SYSID n20; CALLSU n21<LF>

Parameters:

n1

Description:	Signaling System Type
Type:	<NR1 Numeric Response Data>
Units:	None
Resolution:	N/A
Range:	10: User System Setup 1
	11: User System Setup 2
	12: User System Setup 3
	13: User System Setup 4
	14: User System Setup 5
	15: User System Setup 6
	16: User System Setup 7
	17: User System Setup 8
	18: User System Setup 9
	19: User System Setup 10

s2
Description: System Name
Type: <String Response Data>
Format: Any 20 character alphanumeric string

n3
Description: SYNC/SYNT Pattern
Type: <NR1 Numeric Response Data>
Units: None
Resolution: N/A
Range: 0: MPT 1327
1: PAA 2424

n4
Description: Low Base Band Frequency
Type: <NR2 Numeric Response Data>
Units: MHz
Resolution: 500 Hz
Range: 400 kHz <= LBBF <= 999.999 MHz

n5
Description: Corresponding Channel Number to LBBF
Type: <NR1 Numeric Response Data>
Units: None
Resolution: N/A
Range: 0 <= Channel Number <= 1023

n6
Description: Duplex Offset
Type: <NR2 Numeric Response Data>
Units: Hz
Resolution: 500 Hz
Range: 12.5 kHz <= Duplex Offset <= 55 MHz

n7
Description: Channel Number Offset
Type: <NR1 Numeric Response Data>
Units: None
Resolution: N/A
Range: -1023 <= Offset <= 1023

n8

Description:	Channel Spacing
Type:	<NR1 Numeric Response Data>
Units:	None
Resolution:	N/A
Range:	1: 12.5 kHz 2: 20 kHz 3: 25 kHz

n9

Description:	Radio Receive Band
Type:	<NR1 Numeric Response Data>
Units:	None
Resolution:	N/A
Range:	0: High 1: Low

n10

Description:	Channel Number Count
Type:	<NR1 Numeric Response Data>
Units:	None
Resolution:	N/A
Range:	0: Up 1: Down

n11

Description:	Data Deviation
Type:	<NR2 Numeric Response Data>
Units:	kHz
Resolution:	100 Hz
Range:	1.5 kHz <= Data Deviation <= 1.5 kHz

n12

Description:	Low Pass Filter
Type:	<NR1 Numeric Response Data>
Units:	None
Resolution:	N/A
Range:	0: 300 Hz 1: 3 kHz 2: 20 kHz

n13

Description:	High Pass Filter
Type:	<NR1 Numeric Response Data>
Units:	None
Resolution:	N/A
Range:	0: 5 Hz 1: 300 Hz 2: 3 kHz

n14

Description:	Control Channel 1
Type:	<NR1 Numeric Response Data>
Units:	None
Resolution:	N/A
	Range: 0 <= Logical Channel # <= 1023

n15

Description:	Control Channel 2
Type:	<NR1 Numeric Response Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023

n16

Description:	Control Channel 3
Type:	<NR1 Numeric Response Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023

n17

Description:	Traffic Channel 1
Type:	<NR1 Numeric Response Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023

n18

Description:	Traffic Channel 2
Type:	<NR1 Numeric Response Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023

n19

Description:	Traffic Channel 3
Type:	<NR1 Numeric Response Data>
Units:	None
Resolution:	N/A
Range:	0 <= Logical Channel # <= 1023

n20

Description:	System Identification - Hexadecimal
Type:	<Hexadecimal Numeric Response Data>
Units:	None
Resolution:	N/A
Range:	0 <= System ID <= 7FFF

n21

Description:	Call Setup scenario
Type:	<NR1 Numeric Response Data>
Units:	None
Resolution:	N/A
Range:	0: Off Air Call Setup (OACSU) 1: Full Off Air Call Setup (FOACSU)

APPENDIX

A1. List of MPT Commands

Mnemonic	Description	Group
MODE	Mode Select	MPT Mode
WAUTOTS	Auto Test Setup	MPT Display
WCALL	Call Type Selection	
WCALLSQ	Call Sequence Selection	
WCALLSU	Call Setup Selection	
WDCW	Data Code Word Selection	
WEMERG	Emergency Priority Selection	
WFRQDEV	Frequency Deviation Limit Selection	
WFRQERR	Frequency Error Limit Selection	
WGRPID	Group ID Selection	
WHALTER	Halt On Error Selection	
WHEADER	Printer Header Selection	
WIDII	Radio ID of Radio Under Test	
WMETER	MPT Meter Selection	
WRADCAL	Radio Call Test Setup	
WRFPOWR	RF Power Selection	
WSCALL	System Call - All Call Setup	
WSCGRP	System Call - Group Call Setup	
WSCINDV	System Call - Individual Call Setup	
WSCPABX	System Call - PABX Call Setup	
WSCPSTN	System Call - PSTN Call Setup	
WSCSHORT	System Call - Short Data Message Call Setup	
WSCSTAT	System Call - Status Message Call Setup	
WSINAD	SINAD Selection	
WSINGEN	SINAD Generate Selection	
WSTATC	Status Code Selection	
WTSTCHN	Test Channel Selections	
WRFCNTRL	RF Control Selections	MPT RF Control
WRFSETUP	RF Setup Selections	
WSYSID	System ID Selection	
WSYSTYPE	Signaling System Type Selection	
WCC	Control Channel Selections	MPT MISC
WSTART	Start MPT Test	
WSTOP	Stop MPT Test	
WSYSSU	Prestored System Setups	
WTC	Traffic Channel Selections	
WUSYSSU	User System Setup Selection	

A2. List of MPT Queries

Mnemonic	Description	Group
WAUTOTST?	Auto Test Query	MPT Display
NUMTEL?	Number of Telegrams in Telegram buffer Query	
WRADESN?	Radio ESN Query	
WRADID?	Radio Identification Query	
WRDALL?	Radio - All Call Result Query	
WRDGRP?	Radio - Group Call Result Query	
WRDINDV?	Radio - Individual Call Result Query	
WRDPABX?	Radio - PABX Call Result Query	
WRDPSTN?	Radio - PSTN Call Result Query	
WRDSHRT?	Radio - Short Data Message Call Result Query	
WRDSTAT?	Radio - Status Message Call Result Query	
WTELEG?	Telegram Information Query	
WRFFREQ?	RF Frequency Query	MPT RF Control
WUSYSU?	User System Setup Query	MPT MISC