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SERIES

MG369XB

SYNTHESIZED SIGNAL GENERATORS

GPIB PROGRAMMING MANUAL

Anritsu

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Chapter 1
General GPIB Information

1-1 Scope of Manual

This manual provides information for remote operation of the Series MG369XB Synthesized Signal Generator using commands sent from an external controller via the IEEE-488 General Purpose Interface Bus (GPIB). It includes the following:

- A general description of the GPIB and the bus data transfer and control functions
- A listing of the IEEE-488 Interface Function Messages recognized by the signal generator with a description of its response
- A complete listing and description of all MG369XB GPIB commands (i.e., Product Specific Commands) that can be used to control signal generator operation with programming examples

This manual is intended to be used in conjunction with the Series MG369XB Synthesized Signal Generator Operation Manual, P/N: 10370-10365. Refer to that manual for general information about the MG369XB, including equipment set up and front panel (manual mode) operating instructions.

1-2 Introduction

This chapter provides a general description of the GPIB and the bus data transfer and control functions. It also contains a listing of the MG369XB's GPIB interface function subset capability and response to IEEE-488 interface function messages.

The GPIB information presented in this chapter is general in nature. For complete and specific information, refer to the following documents: ANSI/IEEE Std 488.1-1987 *IEEE Standard Digital Interface for Programmable Instrumentation* and ANSI/IEEE Std 488.2-1987 *IEEE Standard Codes, Formats, Protocols and Common Commands.* These documents precisely define the total specification of the mechanical and electrical interface, and of the data transfer and control protocols.

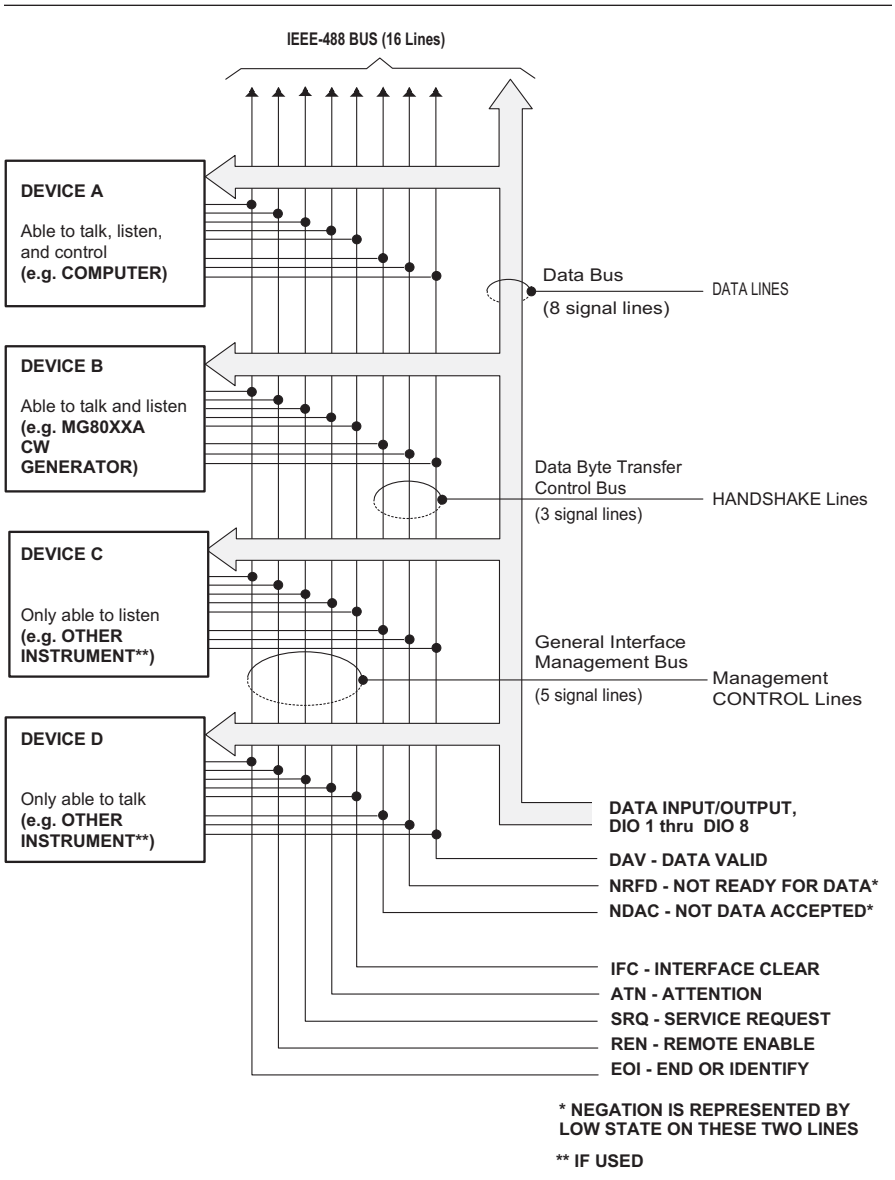

Figure 1-1. *Interface Connections and GPIB Bus Structure*

1-3 IEEE-488 Interface Bus Description

The IEEE-488 General Purpose Interface Bus (GPIB) is an instrumentation interface for integrating instruments, computers, printers, plotters, and other measurement devices into systems. The GPIB uses 16 signal lines to effect transfer of information between all devices connected on the bus.

The following requirements and restrictions apply to the GPIB.

- No more than 15 devices can be interconnected by one contiguous bus; however, an instrumentation system may contain more than one interface bus
- The maximum total cumulative cable length for one interface bus may not exceed twice the number of devices connected (in meters), or 20 meters—whichever is less
- A maximum data rate of 1 Mb/s across the interface on any signal line
- Each device on the interface bus must have a unique address, ranging from 00 to 30

The devices on the GPIB are connected in parallel, as shown in Figure 1-1. The interface consists of 16 signal lines and 8 ground lines in a shielded cable. Eight of the signal lines are the data lines, DIO 1 through DIO 8. These data lines carry messages (data and commands), one byte at a time, among the GPIB devices. Three of the remaining lines are the handshake lines that control the transfer of message bytes between devices. The five remaining signal lines are referred to as interface management lines.

The following paragraphs provide an overview of the GPIB including a description of the functional elements, bus structure, bus data transfer process, interface management bus, device interface function requirements, and message types.

Functional Elements

Effective communications between devices on the GPIB requires three functional elements; a *talker*, a *listener*, and a *controller*. Each device on the GPIB is categorized as one of these elements depending on its current interface function and capabilities.

Talker
A talker is a device capable of sending device-dependent data to another device on the bus when addressed to talk. Only one GPIB device at a time can be an active talker.

Listener
A listener is a device capable of receiving device-dependent data from another device on the bus when addressed to listen. Any number of GPIB devices can be listeners simultaneously.

Controller
A controller is a device, usually a computer, capable of managing the operation of the GPIB. Only one GPIB device at a time can be an active controller. The active controller manages the transfer of device--dependent data between GPIB devices by designating who will talk and who will listen.

System Controller
The system controller is the device that always retains ultimate control of the GPIB. When the system is first powered-up, the system controller is the active controller and manages the GPIB. The system controller can pass control to a device, making it the new active controller. The new active controller, in turn, may pass control on to yet another device. Even if it is not the active controller, the system controller maintains control of the Interface Clear (IFC) and Remote Enable (REN) interface management lines and can thus take control of the GPIB at anytime.

Bus Structure

The GPIB uses 16 signal lines to carry data and commands between the devices connected to the bus. The interface signal lines are organized into three functional groups.

- Data Bus (8 lines)
- Data Byte Transfer Control Bus (3 lines)
- General Interface Management Bus (5 lines)

The signal lines in each of the three groups are designated according to function. Table 1-1 lists these designations.

Table 1-1. *Interface Bus Signal Line Designations*

Bus Type	Signal Line Name	Function
Data Bus	DIO1–DIO8	Data Input/Output, 1 thru 8
Data Byte Transfer Control Bus	DAV	Data Available
	NRFD	Not Ready For Data
	NDAC	Not Data Accepted
General Interface Management Bus	ATN	Attention
	IFC	Interface Clear
	SRQ	Service Request
	REN	Remote Enable
	EOI	End Or Identify

Data Bus Description

The data bus is the conduit for the transfer of data and commands between the devices on the GPIB. It contains eight bi-directional, active-low signal lines —DIO 1 through DIO 8. Data and commands are transferred over the data bus in byte-serial, bit--parallel form. This means that one byte of data (eight bits) is transferred over the bus at a time. DIO 1 represents the least-significant bit (LSB) in this byte and DIO 8 represents the most-significant bit (MSB). Bytes of data are normally formatted in seven-bit ASCII (American Standard Code for Information Interchange) code. The eighth (parity) bit is not used.

Each byte placed on the data bus represents either a command or a data byte. If the Attention (ATN) interface management line is TRUE while the data is transferred, then the data bus is carrying a bus command which is to be received by every GPIB device. If ATN is FALSE, then a data byte is being transferred and only the active listeners will receive that byte.

Data Byte Transfer Control Bus Description

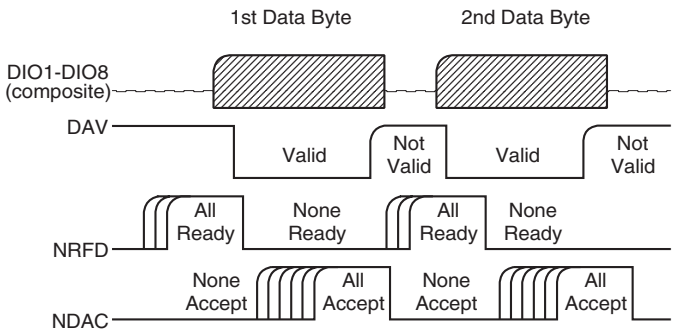

Figure 1-2. *Typical GPIB Handshake Operation*

Control of the transfer of each byte of data on the data bus is accomplished by a technique called the "three-wire handshake", which involves the three signal lines of the Data Byte Transfer Control Bus. This technique forces data transfers at the speed of the slowest listener, which ensures data integrity in multiple listener transfers. One line (DAV) is controlled by the talker, while the other two (NRFD and NDAC) are wired-OR lines shared by all active listeners. The handshake lines, like the other GPIB lines, are active low. The technique is described briefly in the following paragraphs and is depicted in Figure 1-2. For further information, refer to ANSI/IEEE Std 488.1.

DAV (Data Valid)
This line is controlled by the active talker. Before sending any data, the talker verifies that NDAC is TRUE (active low) which indicates that all listeners have accepted the previous data byte. The talker then places a byte on the data lines and waits until NRFD is FALSE (high) which indicates that all addressed listeners are ready to accept the information. When both NRFD and NDAC are in the proper state, the talker sets the DAV line TRUE (active low) to indicate that the data on the bus is valid (stable).

NRFD (Not Ready For Data)
This line is used by the listeners to inform the talker when they are ready to accept new data. The talker must wait for each listener to set the NRFD line FALSE (high) which they will do at their own rate. This assures that all devices that are to accept the data are ready to receive it.

NDAC (Not Data Accepted)
This line is also controlled by the listeners and is used to inform the talker that each device addressed to listen has accepted the data. Each device releases NDAC at its own rate, but NDAC will not go FALSE (high) until the slowest listener has accepted the data byte.

General Interface Management Bus Description

The general interface management bus is a group of five signal lines used to manage the flow of information across the GPIB. A description of the function of each of the individual control lines is provided below.

ATN (Attention)
The active controller uses the ATN line to define whether the information on the data bus is a command or is data. When ATN is TRUE (low), the bus is in the command mode and the data lines carry bus commands. When ATN is FALSE (high), the bus is in the data mode and the data lines carry device-dependent instructions or data.

EOI (End or Identify)
The EOI line is used to indicate the last byte of a multibyte data transfer. The talker sets the EOI line TRUE during the last data byte.

The active controller also uses the EOI line in conjunction with the ATN line to initiate a parallel poll sequence.

IFC (Interface Clear)
Only the system controller uses this line. When IFC is TRUE (low), all devices on the bus are placed in a known, quiescent state (unaddressed to talk, unaddressed to listen, and service request idle).

REN (Remote Enable)
Only the system controller uses this line. When REN is set TRUE (low), the bus is in the remote mode and devices are addressed either to listen or to talk. When the bus is in remote and a device is addressed, it receives instructions from the GPIB rather than from its front panel. When REN is set FALSE (high), the bus and all devices return to local operation.

SRQ (Service Request)
The SRQ line is set TRUE (low) by any device requesting service by the active controller.

Device Interface Function Capability

An interface function is the GPIB system element which provides the basic operational facility through which a device can receive, process, and send messages. Each specific interface function may only send or receive a limited set of messages within particular classes of messages. As a result, a set of interface functions is necessary to achieve complete communications among devices on the GPIB. ANSI/IEEE Std 488.1 defines each of the interface functions along with its specific protocol.

ANSI/IEEE Std 488.2 specifies the minimum set of IEEE 488.1 interface capabilities that each GPIB device must have. This minimum set of interface functions assures that the device is able to send and receive data, request service, and respond to a device clear message. Table 1-2 lists the interface function capability of the series MG369XB signal generator.

Table 1-2. *MG369XB Interface Function Capability*

Function Identifier	Function	MG369XB Capability
AH1	Acceptor Handshake	Complete Capability
SH1	Source Handshake	Complete Capability
T6	Talker	No Talk Only (TON)
L4	Listener	No Listen Only (LON)
SR1	Service Request	Complete Capability
RL1	Remote/Local	Complete Capability
PP1	Parallel Poll	Complete Capability
DC1	Device Clear	Complete Capability
DT1	Device Trigger	Complete Capability
C0, C1, C2, C3, C28	Controller Capability Options	C0, No Capability; C1, System Controller; C2, Send IFC and Take Charge; C3, Send REN; C28, Send IF Messages
E2	Tri--State Drivers	Three-state bus drivers

Message Types

There are three types of information transmitted over the GPIB—interface function messages, device--specific commands, and data and instrument status messages.

Interface Function Messages
The controller manages the flow of information on the GPIB using interface function messages, usually called *commands* or *command messages*. Interface function messages perform such functions as initializing the bus, addressing and unaddressing devices, and setting device modes for remote or local operation.

There are two types of commands—multiline and uniline. Multiline commands are bytes sent by the active controller over the data bus (DIO1-DIO8) with ATN set TRUE. Uniline commands are signals carried by the individual interface management lines.

The user generally has control over these commands; however, the extent of user control depends on the implementation and varies with the specific GPIB interface hardware and software used with the external controller.

Device-Specific Commands
These commands are keywords or mnemonic codes sent by the external controller to control the setup and operation of the addressed device or instrument. The commands are normally unique to a particular instrument or class of instruments and are described in its documentation.

Device-specific commands are transmitted over the data bus of the GPIB to the device in the form of ASCII strings containing one or more keywords or codes. They are decoded by the device's *internal controller* and cause the various instrument functions to be performed.

Data and Instrument Status Messages
These messages are sent by the device to the external controller via the GPIB. They contain measurement results, instrument status, or data files that the device transmits over the data bus in response to specific requests from the external controller. The contents of these messages are instrument specific and may be in the form of ASCII strings or binary data.

In some cases data messages will be transmitted from the external controller to the device. For example, messages to load calibration data.

An SRQ (service request) is an interface function message sent *from the device* to the external controller to request service from the controller, usually due to some predetermined status condition or error. To send this message, the device sets the SRQ line of the General Interface Management Bus true, then sends a status byte on the data bus lines.

An SRQ interface function message is also sent by the device in response to a serial poll message from the controller, or upon receiving an Output Status Byte(s) command from the controller. The protocols associated with the SRQ functions are defined in the ANSI/IEEE Std 488.2 document.

The manner in which interface function messages and device-specific commands are invoked in programs is implementation specific for the GPIB interface used with the external controller. Even though both message types are represented by mnemonics, they are implemented and used in different ways.

Normally, the interface function messages are sent automatically by the GPIB driver software in response to invocation of a software function. For example, to send the IFC (Interface Clear) interface function message, one would call the ibsic function of the National Instruments software driver. On the other hand, the command ∗RST (Reset) is sent in a command string to the addressed device. In the case of the National Instruments example, this would be done by using the ibwrt function call.

1-4 MG369XB GPIB Operation

All Series MG369XB Synthesized Signal Generator functions, settings, and operating modes (except for power on/standby) are controllable using commands sent from an external controller via the GPIB. When in the remote (GPIB) mode, the signal generator functions both as a listener and a talker. The GPIB interface function capability of the MG369XB is listed in Table 1-2 (page 1-10).

Setting GPIB Operating Parameters

The MG369XB leaves the factory with the GPIB address value set to 5 and the data delimiting terminator set to carriage return and line feed (CR/LF). A different address value can be entered from the front panel using the Configure GPIB menu. Using this same menu, the data delimiting terminator can be changed to carriage return (CR) only. Refer to Chapter 2 of the Series MG369XB Synthesized Signal Generator Operation Manual for the procedure.

Interface Language

Series MG369XB Synthesized Signal Generators can be remotely operated using an external interface language—Native. The Native interface language uses a set of MG369XB GPIB Product-Specific commands to control the instrument.

Response to GPIB Interface Function Messages

Table 1-3 (page 1-14) lists the GPIB Interface Function Messages that the MG369XB will recognize and respond to. With the exception of the Device Clear and Selected Device Clear messages, these messages affect only the operation of the MG369XB GPIB interface. The MG369XB response for each message is indicated.

Interface function messages are transmitted on the GPIB data lines and interface management lines as either unaddressed or addressed commands. The manner in which these messages are invoked in programs is implementation dependent. For programming information, refer to the documentation included with the GPIB Interface for the external controller used.

Table 1-3. *MG369XB Response to GPIB Interface Function Messages*

Interface Function Message	Addressed Command	MG369XB Response
Device Clear (DCL) Selected Device Clear (SDC)	No Yes	Resets the MG369XB to its default state. (Equivalent to sending the ∗RST command.)
Go To Local (GTL)	Yes	Returns the MG369XB to local (front panel) control.
Group Execute Trigger (GET)	Yes	Executes a string of commands, if programmed.
Interface Clear (IFC)	No	Stops the MG369XB GPIB interface from listening or talking. (The front panel controls are not cleared.)
Local Lockout (LLO)	No	Disables the front panel menu RETURN TO LOCAL soft-key.
Remote Enable (REN)	No	Places the MG369XB under remote (GPIB) control when it has been addressed to listen.
Serial-Poll Enable (SPE)	No	Outputs the serial-poll status byte.
Serial-Poll Disable (SPD)	No	Disables the serial-poll function.
Parallel-Poll Configure (PPC)	Yes	Responds to a parallel-poll message (PPOLL) by setting assigned data bus line to the logical state (1,0) that indicates its correct SRQ status.
Parallel-Poll Unconfigure (PPU)	No	Disables the parallel-poll function.

Chapter 2
Programming with GPIB Commands

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Chapter 2 Programming with GPIB Commands

2-1 Introduction

This chapter provides information for remote operation of MG369XB Synthesized Signal Generator via the GPIB using MG369XB GPIB commands. All GPIB product-specific commands that are accepted and implemented by the MG369XB are listed and described by function. Sample programs showing usage of the commands are also included. Throughout this book, MG369XB will be used to reference all of the covered models.

2-2 Command Codes

There are over 460 GPIB product-specific commands that are accepted and implemented by the MG369XB. These GPIB commands allow the user to program all front panel and menu functions (except for power on/standby). Each GPIB command is a two- or three-character mnemonic code that represents an instrument command or parameter; for example: RST (reset).

Table 2-1, beginning on page 2-4, is a listing of all MG369XB GPIB command mnemonic codes grouped into functional categories. The listing for each category includes references to the paragraph and page number in this chapter where a complete description of that group of commands can be found.

NOTES

A quick way to determine the function of any of the GPIB command codes listed in Table 2-1 is to look up the command code of interest in Chapter 3 of this manual. Chapter 3 is a command dictionary providing alphabetically-ordered listings and descriptions of all MG369XB command mnemonic codes.

Appendix A, GPIB Quick Reference, also presents the GPIB commands alphabetically and grouped into functional categories. These groups list all the commands associated with a particular MG369XB function. A brief description of the function of each command is also included.

Table 2-1. *MG369XB GPIB Command Codes Listed by Function (1 of 2)*

GPIB Command Group Function	Command Codes	Sect.	Page
Parameter Entry Commands	ADP1, ADP2, AMR, AMS, ASD, CLO, D1, D2, D3, D4, DFF, DFM, DLF, DN, EGI, F0, F1, F2, F3, F4, F5, F6, F7, F8, F9, FDV, FMR, FMS, LOS, M0, M1, M2, M3, M4, M5, M6, M7, M8, M9, PDT, PDY, PER, PHD, PHR, PHS, PNS, PR, PSO, PVT, PW, SDD, SDE, SDL, SDS, SDT, SLDF, SLF0, SLF1, SLF2, SLF3, SLF4, SLF5, SLF6, SLF7, SLF8, SLF9, SLL1, SLL2, SLM0, SLM1, SLM2, SLM3, SLM4, SLM5, SLM6, SLM7, SLM8, SLM9, SLV, SNS, SOF, SWT, SYZ, UP, W1, W2, W3, W4, XL0, XL1, XL2, XL3, XL4, XL5, XL6, XL7, XL8, XL9	2-4	2-7
Data Entry/ DataTerminator Commands	0 thru 9, –, ., ADR, CLR, DB, DG, DM, DV, GH, GV, HZ, KH, KV, MH, MS, MV, NS, PCT, PCV, RD, RV, SEC, SPS, TMS, US, VT	2-4	2-7
CW Frequency Commands	ACW, CF0, CF1, CF2, CF3, CF4, CF5, CF6, CF7, CF8, CF9, CM0, CM1, CM2, CM3, CM4, CM5, CM6, CM7, CM8, CM9, SQD, SQF, SQU	2-5	2-20
Analog and Step Sweep Commands	AD1, AD5, AD6, AF1, AF3, AFU, AUT, DF0, DF1, DF5, DF6, DU0, DU1, EXT, FUL, HWT, LGS, LIS, MAN, MNT, RSS, SF1, SF3, SP0, SP1, SSP, SWP, TEX, TRG, TRS, TSS	2-6	2-22
Marker Commands	IM1, ME0, ME1, MKO, MPN, MPP, VM1	2-7	2-28
Power Leveling Commands	AL0, AL1, AL2, AL3, AL4, AL5, AL6, AL7, AL8, AL9, AT0, AT1, ATT(xx), DL1, EGO, IL1, L0, L1, L2, L3, L4, L5, L6, L7, L8, L9, LIN, LO0, LO1, LOG, LSP, LV0, LV1, LVP, PL1, PU0, PU1, PU2, RF0, RF1, SL0, SL1, SLP	2-8	2-29
Modulation Commands	AM0, AM1, AM2, AM7, AM8, AMO, AMW(x), DPT, EP0, EP1, FM0, FM1, FM2, FM7, FM8, FM9, FML, FMN, FMU, FMW, FWV(x), GP, IM1, IP, P0, PC1, PC4, PH0, PH1, PH2, PH7, PH8, PHN, PHV(x), PHW, PMD(x), PTF, PTG(x), PTR, SC0, SC1, SD0, SD1, SQP, SW0, SW1, SW2, SW3, SW4, XP	2-9	2-33
Measure Function	AMI, FMD, MOM, PM0, PM1	2-10	2-40

Table 2-1. *MG369XB GPIB Command Codes Listed by Function (2 of 2)*

GPIB Command Group Function	Command Codes	Sect.	Page
Output Commands	*IDN?, OAB, OAD1, OAD2, OAR, OAS, OAW, OD1, OD2, OD3, OD4, ODD, ODE, ODF, ODL, ODP, ODS, OEBW, OEM, OES, OF0, OF1, OF2, OF3, OF4, OF5, OF6, OF7, OF8, OF9, OFD, OFH, OFK, OFL, OFM, OFR, OFS, OFW, OI, OL0, OL1, OL2, OL3, OL4, OL5, OL6, OL7, OL8, OL9, OLO, OM0, OM1, OM2, OM3, OM4, OM5, OM6, OM7, OM8, OM9, OMD, OMM, OO, OP5, OPC, OPD, OPHD, OPHI, OPHM, OPHR, OPHS, OPHW, OPM, OPO, OPP, OPR, OPS, OPT, OPW, OSB, OSD, OSE, OSM, OSR, OSS, OST, OVN, OW1, OW2, OW3, OW4, OWT	2-11	2-41
Stored Setup Commands	RCF, RCM, RSN(m), SAF, SAM, SM, SSN(m)	2-12	2-45
Service Request and Status Byte Commands	CSB, EL0, EL1, ES0, ES1, FB0, FB1, II0, II1, LA0, LA1, LE0, LE1, LS0, LS1, MB0, MB1, MB2, PE0, PE1, SB0, SB1, SE0, SE1, SQ0, SQ1, UL0, UL1	2-13	2-47
Configuration Commands	BPN, BPP, EBW0, EBW1, EBW2, EBW3, FRS, PPC, PPO, RC0, RC1, RO0, RO1, RT0, RT1, TR0, TR1	2-14	2-51
Group Execute Trigger (GET) Commands	GTC, GTD, GTF, GTL, GTO, GTS, GTT, GTU, Y	2-15	2-52
List Sweep Commands	CTL, ELI(xxxx), ELN(x), LDT, LEA, LF, LIB(xxxx), LIE(xxxx), LP, LST	2-16	2-53
Fast-Frequency-Switching Commands	ZEL, ZL(x), ZPN(bbbb), ZS(x), ZTL(bbbbnnnnD8D8D8…D8)	2-17	2-56
Power-Offset-Table Commands	PT0, PT1, PTC, PTL	2-18	2-60
User Level Calibration Commands	LU0, LU1, LU2, LU3, LU4, LU5, LUS, LUR	2-19	2-63
Master-Slave Operation Commands	S0, S1	2-20	2-71
Self Test Commands	TST	2-21	2-72
Miscellaneous Commands	ADD, CS0, CS1, DS0, DS1, MR, PS0, PS1, PSZ, RL, RST, SNR	2-22	2-74

2-3 Data Input Restrictions

The MG369XB signal generator does ***not*** accept parameter or data entries in an exponential or scientific notation format. The accepted data formats are as follows:

- A decimal or integer format for entering parameters and data
- A binary-byte format for entering the status byte mask commands (Section 2-13), the RCF and RCM stored-setup commands (Section 2-12), the ZTL fast-frequency-switching command (Section 2-17), the power-offset-table commands (Section 2-18), and the LUR user level calibration command (Section 2-19)

Programming Note: The signal generator only recognizes the following 65 characters:

- The 52 upper- and lower-case alphabetic characters. (The MG369XB accepts both upper- and lower-case characters without distinguishing between the cases)
- The minus sign (–)
- The comma (,)
- The decimal point (.)
- The numerals between 0 and 9

All characters other than the 65 listed above are ignored and can be interspersed between meaningful characters without ill effect. This use of other characters can improve readability. For example, the two command strings below are valid and interchangeable.

"**F12.754GHF27.792GHSF1SWPMK0L12DM**"

"**F1=2.754 GH, F2=7.792 GH, SF1, SWP, MK0, L1=2 DM**"

2-4 Parameter and Data Entry Commands

Table 2-2 lists the command mnemonic codes that open parameters for data entry. The table also provides the range of values permitted for each parameter and the data terminator mnemonic codes for each. Tables 2-3 and 2-4 (pages 2-16 and 2-17) list the data entry and data terminator command mnemonic codes.

Opening a Parameter

All of the commands listed in Table 2-2 open a parameter for data entry. Once opened, a parameter remains open until one of the following occurs:

- Another parameter is opened
- A function other than video markers or output power leveling is commanded
- The CLO (close open parameter) command is received

Data Entry

When a parameter is open for data entry, its value can be changed as follows:

- By sending a numeric value followed by the appropriate terminator code
- By incrementing or decrementing its value using an associated step size

> **NOTE**
> An appropriate data terminator *must* be used to terminate a numeric-parameter entry, and it *must* immediately follow the numeric value. If it does not, a parameter entry error will result. For example, data terminators do not change the mode of operation from log to linear.

The parameter and data entry commands do not affect the signal generator's output unless the parameter being changed is also the current output parameter. The commands, therefore, may be used to change the preset values of parameters without altering the MG369XB's output.

Example: Assume that the MG369XB is executing an F3-F4 sweep from 3 GHz to 10 GHz. Changing the value of F1 to 3 GHz with the command string "**`F1 3 GH`**" does not affect the current output of the signal generator. However, changing the value of F4 with the command string "**`F4 16.01 GH`**" alters the output of the MG369XB because it changes the end point of the F3-F4 sweep to 16.01 GHz.

NOTE

40 MHz pulse clock rates are only available with Option 24; 100 MHz pulse clock rates are only available with Option 26.

Table 2-2. *Parameter Entry Commands (1 of 10)*

Mnemonic Code	Parameter	Values	Units
ADP1	Opens the internal AM % depth parameter.	0% to 100%	PCT
ADP2	Opens the internal AM dB depth parameter.	0 dB to 25 dB	DB
AMR	Opens the internal AM rate parameter.	0.1 Hz to 1 MHz for sine wave; 0.1 Hz to 100 kHz for square, triangle, and ramp waveforms	MH KH HZ
AMS	Opens the external AM %/V sensitivity parameter.	0 %/V to 100 %/V	PCV
ASD	Opens the external AM dB/V sensitivity parameter.	0 dB/V to 25 dB/V	DV
CLO	Closes the previously opened parameter.		
D1	Opens the internal pulse delay1 parameter.	30 ns to 167 ms at 100 MHz pulse clock rate; 100 ns to 419 ms at 40 MHz pulse clock rate; 300 ns to 1.6s at 10 MHz pulse clock rate	SEC MS US NS
D2	Opens the internal pulse delay2 parameter.	30 ns to 167 ms at 100 MHz pulse clock rate; 100 ns to 419 ms at 40 MHz pulse clock rate; 300 ns to 1.6s at 10 MHz pulse clock rate	SEC MS US NS
D3	Opens the internal pulse delay3 parameter.	30 ns to 167 ms at 100 MHz pulse clock rate; 100 ns to 419 ms at 40 MHz pulse clock rate; 300 ns to 1.6s at 10 MHz pulse clock rate	SEC MS US NS
D4	Opens the internal pulse delay4 parameter.	30 ns to 167 ms at 100 MHz pulse clock rate; 100 ns to 419 ms at 40 MHz pulse clock rate; 300 ns to 1.6s at 10 MHz pulse clock rate	SEC MS US NS

Table 2-2. *Parameter Entry Commands (2 of 10)*

Mnemonic Code	Parameter	Values	Units
DFF	Opens the delta frequency parameter.	Frequency range of the MG369XB model	GH MH KH HZ
DFM	Opens the delta frequency parameter.	Frequency range of the MG369XB model	GH MH KH HZ
DLF	Opens the delta frequency parameter.	Frequency range of the MG369XB model	GH MH KH HZ
DN	Decrements the open parameter by the step size.		
EGI	Opens the reference level DAC setting parameter.	0 to 255	SPS
F0	Opens the F0 parameter.	Frequency range of the MG369XB model	GH MH KH HZ
F1	Opens the F1 parameter.	Frequency range of the MG369XB model	GH MH KH HZ
F2	Opens the F2 parameter.	Frequency range of the MG369XB model	GH MH KH HZ
F3	Opens the F3 parameter.	Frequency range of the MG369XB model	GH MH KH HZ
F4	Opens the F4 parameter.	Frequency range of the MG369XB model	GH MH KH HZ
F5	Opens the F5 parameter.	Frequency range of the MG369XB model	GH MH KH HZ

Table 2-2. *Parameter Entry Commands (3 of 10)*

Mnemonic Code	Parameter	Values	Units
F6	Opens the F6 parameter.	Frequency range of the MG369XB model	GH MH KH HZ
F7	Opens the F7 parameter.	Frequency range of the MG369XB model	GH MH KH HZ
F8	Opens the F8 parameter.	Frequency range of the MG369XB model	GH MH KH HZ
F9	Opens the F9 parameter.	Frequency range of the MG369XB model	GH MH KH HZ
FDV	Opens the internal FM deviation parameter.	10 kHz to 20 MHz in Locked, Locked Low-Noise, and Unlocked Narrow FM; 100 kHz to 100 MHz in Unlocked Wide FM	MH KH
FMR	Opens the internal FM rate parameter.	0.1 Hz to 1 MHz for sine wave; 0.1 Hz to 100 kHz for square, triangle, and ramp waveforms	MH KH HZ
FMS	Opens the external FM sensitivity parameter.	±10 kHz/V to ±20 MHz/V in Locked, Locked Low-Noise, and Unlocked Narrow FM; ±100 kHz/V to ±100 MHz/V in Unlocked Wide FM	KV MV
LOS	Opens the level offset parameter.	+100dB to 100dB (logarithmic); +xxx mV to xxx mV (linear)	DB (log) VT (linear)
M0	Opens the M0 parameter.	Frequency range of the MG369XB model	GH MH KH HZ
M1	Opens the M1 parameter.	Frequency range of the MG369XB model	GH MH KH HZ

Table 2-2. *Parameter Entry Commands (4 of 10)*

Mnemonic Code	Parameter	Values	Units
M2	Opens the M2 parameter.	Frequency range of the MG369XB model	GH MH KH HZ
M3	Opens the M3 parameter.	Frequency range of the MG369XB model	GH MH KH HZ
M4	Opens the M4 parameter.	Frequency range of the MG369XB model	GH MH KH HZ
M5	Opens the M5 parameter.	Frequency range of the MG369XB model	GH MH KH HZ
M6	Opens the M6 parameter.	Frequency range of the MG369XB model	GH MH KH HZ
M7	Opens the M7 parameter.	Frequency range of the MG369XB model	GH MH KH HZ
M8	Opens the M8 parameter.	Frequency range of the MG369XB model	GH MH KH HZ
M9	Opens the M9 parameter.	Frequency range of the MG369XB model	GH MH KH HZ
PDT	Opens the power sweep dwell time parameter.	1ms to 99s	MS SEC
PDY	Opens the internal pulse delay1 parameter (Same as D1).	30 ns to 167 ms at 100 MHz pulse clock rate; 100 ns to 419 ms at 40 MHz pulse clock rate; 300 ns to 1.6s at 10 MHz pulse clock rate	SEC MS US NS

Table 2-2. *Parameter Entry Commands (5 of 10)*

Mnemonic Code	Parameter	Values	Units
PER	Opens the internal pulse period parameter.	40 ns to 167 ms at 100 MHz pulse clock rate; 250 ns to 419 ms at 40 MHz pulse clock rate; 600 ns to 1.6s at 10 MHz pulse clock rate	SEC MS US NS
PHD	Opens the internal ΦM deviation parameter.	0.0025 to 5 radians in Phase Modulation Narrow mode; 0.25 to 500 radians in Phase Modulation Wide mode	RD
PHR	Opens the internal ΦM rate parameter.	0.1 Hz to 1 MHz for sine wave; 0.1 Hz to 100 kHz for square, triangle, and ramp waveforms	MH KH HZ
PHS	Opens the external ΦM sensitivity parameter.	±0.0025 radians/V to ±5 radians/V in FM Narrow mode; ±0.25 radians/V to ±500 radians/V in FM Wide mode	RV
PNS	Opens the power sweep number of steps parameter.	1 to 10,000	SPS
PR	Opens the internal pulse frequency parameter.	5.96 Hz to 25 MHz at 100 MHz pulse clock rate; 2.385 Hz to 4 MHz at 40 MHz pulse clock rate; 0.597 Hz to 1.66 MHz at 10 MHz pulse clock rate	MH KH HZ
PSO	Opens the phase offset parameter.	-360 to +360	DG
PVT	Opens the ALC power slope pivot point frequency parameter.	Frequency range of the MG369XB model	GH MH KH HZ
PW	Opens the internal pulse width1 parameter (Same as W1).	30 ns to 167 ms at 100 MHz pulse clock rate; 25 ns to 419 ms at 40 MHz pulse clock rate; 100 ns to 1.6s at 10 MHz pulse clock rate	SEC MS US NS

Table 2-2. *Parameter Entry Commands (6 of 10)*

Mnemonic Code	Parameter	Values	Units
SDD	Opens the internal pulse stepped delay mode step size parameter.	0 ms to 167 ms at 100 MHz pulse clock rate; 0 ms to 419 ms at 40 MHz pulse clock rate; 0s to 1.6s at 10 MHz pulse clock rate	SEC MS US NS
SDE	Opens the internal pulse stepped delay mode delay 1 stop parameter.	0 ms to 167 ms at 100 MHz pulse clock rate; 0 ms to 419 ms at 40 MHz pulse clock rate; 0s to 1.6s at 10 MHz pulse clock rate	SEC MS US NS
SDL	Opens the internal pulse stepped delay mode dwell-time-per-step parameter.	100 microseconds to 10s	SEC MS US
SDS	Opens the internal pulse stepped delay mode delay 1 start parameter.	0 ms to 167 ms at 100 MHz pulse clock rate; 0 ms to 419 ms at 40 MHz pulse clock rate; 0s to 1.6s at 10 MHz pulse clock rate	SEC MS US NS
SDT	Opens the step sweep dwell time parameter.	1ms to 99s	MS SEC
SLDF	Opens the ΔF parameter of the slave unit.	Frequency range of the slave MG369XB model	GH MH KH HZ
SLF0	Opens the F0 parameter of the slave unit.	Frequency range of the Slave MG369XB model	GH MH KH HZ
SLF1	Opens the F1 parameter of the slave unit.	Frequency range of the Slave MG369XB model	GH MH KH HZ
SLF2	Opens the F2 parameter of the slave unit.	Frequency range of the Slave MG369XB model	GH MH KH HZ
SLF3	Opens the F3 parameter of the slave unit.	Frequency range of the Slave MG369XB model	GH MH KH HZ

Table 2-2. *Parameter Entry Commands (7 of 10)*

Mnemonic Code	Parameter	Values	Units
SLF4	Opens the F4 parameter of the slave unit.	Frequency range of the Slave MG369XB model	GH MH KH HZ
SLF5	Opens the F5 parameter of the slave unit.	Frequency range of the Slave MG369XB model	GH MH KH HZ
SLF6	Opens the F6 parameter of the slave unit.	Frequency range of the Slave MG369XB model	GH MH KH HZ
SLF7	Opens the F7 parameter of the slave unit.	Frequency range of the Slave MG369XB model	GH MH KH HZ
SLF8	Opens the F8 parameter of the slave unit.	Frequency range of the Slave MG369XB model	GH MH KH HZ
SLF9	Opens the F9 parameter of the slave unit.	Frequency range of the Slave MG369XB model	GH MH KH HZ
SLL1	Opens the main power level parameter (L1) of the slave unit.	Power level range of the Slave MG369XB model	DM (Log) VT (Linear)
SLL2	Opens the alternate sweep power level parameter (L2) of the slave unit.	Power level range of the Slave MG369XB model	DM (Log) VT (Linear)
SLM0	Opens the M0 parameter of the slave unit.	Frequency range of the Slave MG369XB model	GH MH KH HZ
SLM1	Opens the M1 parameter of the slave unit.	Frequency range of the Slave MG369XB model	GH MH KH HZ
SLM2	Opens the M2 parameter of the slave unit.	Frequency range of the Slave MG369XB model	GH MH KH HZ

Table 2-2. *Parameter Entry Commands (8 of 10)*

Mnemonic Code	Parameter	Values	Units
SLM3	Opens the M3 parameter of the slave unit.	Frequency range of the Slave MG369XB model	GH MH KH HZ
SLM4	Opens the M4 parameter of the slave unit.	Frequency range of the Slave MG369XB model	GH MH KH HZ
SLM5	Opens the M5 parameter of the slave unit.	Frequency range of the Slave MG369XB model	GH MH KH HZ
SLM6	Opens the M6 parameter of the slave unit.	Frequency range of the Slave MG369XB model	GH MH KH HZ
SLM7	Opens the M7 parameter of the slave unit.	Frequency range of the Slave MG369XB model	GH MH KH HZ
SLM8	Opens the M8 parameter of the slave unit.	Frequency range of the Slave MG369XB model	GH MH KH HZ
SLM9	Opens the M9 parameter of the slave unit.	Frequency range of the Slave MG369XB model	GH MH KH HZ
SLV	Opens the power level parameter (L1) of the slave unit.	Power level range of the Slave MG369XB model	DM (Log) VT (Linear)
SNS	Opens the step sweep number of steps parameter.	1 to 10,000	SPS
SOF	Opens the frequency offset parameter of the slave unit.	Frequency range of the MG369XB model	GH MH KH HZ
SWT	Opens the step sweep time parameter.	30ms to 99s	MS SEC
SYZ	Opens the increment/decrement step size parameter.	Dependent on the open parameter	

Table 2-2. *Parameter Entry Commands (9 of 10)*

Mnemonic Code	Parameter	Values	Units
UP	Increments the open parameter by the step size.		
W1	Opens the internal pulse width 1 parameter.	30 ns to 167 ms at 100 MHz pulse clock rate; 25 ns to 419 ms at 40 MHz pulse clock rate; 100 ns to 1.6s at 10 MHz pulse clock rate	SEC MS US NS
W2	Opens the internal pulse width 2 parameter.	30 ns to 167 ms at 100 MHz pulse clock rate; 25 ns to 419 ms at 40 MHz pulse clock rate; 100 ns to 1.6s at 10 MHz pulse clock rate	SEC MS US NS
W3	Opens the internal pulse width 3 parameter.	30 ns to 167 ms at 100 MHz pulse clock rate; 25 ns to 419 ms at 40 MHz pulse clock rate; 100 ns to 1.6s at 10 MHz pulse clock rate	SEC MS US NS
W4	Opens the internal pulse width 4 parameter.	30 ns to 167 ms at 100 MHz pulse clock rate; 25 ns to 419 ms at 40 MHz pulse clock rate; 100 ns to 1.6s at 10 MHz pulse clock rate	SEC MS US NS
XL0	Opens the L0 parameter.	Power level range of the MG369XB model	DM (log) VT (linear)
XL1	Opens the L1 parameter.	Power level range of the MG369XB model	DM (log) VT (linear)
XL2	Opens the L2 parameter.	Power level range of the MG369XB model	DM (log) VT (linear)
XL3	Opens the L3 parameter.	Power level range of the MG369XB model	DM (log) VT (linear)
XL4	Opens the L4 parameter.	Power level range of the MG369XB model	DM (log) VT (linear)
XL5	Opens the L5 parameter.	Power level range of the MG369XB model	DM (log) VT (linear)
XL6	Opens the L6 parameter.	Power level range of the MG369XB model	DM (log) VT (linear)

Table 2-2. *Parameter Entry Commands (10 of 10)*

Mnemonic Code	Parameter	Values	Units
XL7	Opens the L7 parameter.	Power level range of the MG369XB model	DM (log) VT (linear)
XL8	Opens the L8 parameter.	Power level range of the MG369XB model	DM (log) VT (linear)
XL9	Opens the L9 parameter.	Power level range of the MG369XB model	DM (log) VT (linear)

Table 2-3. *Data Entry Commands*

MNEMONIC CODE	DESCRIPTION
0, 1, 2, 3, 4, 5, 6, 7, 8, 9	Numerals for parameter value entries
–	Change sign of input
.	Decimal point
CLR	Clear data entry

Table 2-4. *Data Terminator Codes*

Mnemonic Code	Description
ADR	GPIB address terminator.
DB	Decibel (dB) data terminator.
DG	Degree data terminator.
DM	dBm data terminator.
DV	Decibel per volt (dB/V) data terminator.
GH	GHz data terminator.
GV	GHz per volt (GHz/V) data terminator.
HZ	Hz data terminator.
KH	kHz data terminator.
KV	kHz per volt (kHz/V) data terminator.
MH	MHz data terminator.
MS	Milliseconds (ms) data terminator.
MV	MHz per volt (MHz/V) data terminator.
NS	Nanoseconds (ns) data terminator.
PCT	Percent (%) data terminator.
PCV	Percent per volt (%/V) data terminator.
RD	Radians data terminator
RV	Radians per volt data terminator
SEC	Seconds data terminator.
SPS	Steps data terminator.
TMS	Times data terminator.
US	Microsecond (ms) data terminator.
VT	Volts data terminator.

Using the SYZ Command

Each MG369XB parameter has an associated step size that can be used to increment or decrement its value. Parameters that have common units share a common step size. For example, the frequency parameters (F0-F9, M0-M9, and ΔF) have a common step size as do the power level parameters (XL0-XL9, L0-L9, and Level Offset). Other parameters, such as step sweep dwell time, have individual step sizes.

To set the step size for a parameter, first send the command code to open the parameter, then send the SYZ command. Now set the step size by sending a numeric string with the proper terminator. When the terminator is received, the step size is accepted and the original parameter is again open for entry.

Figure 2-1 shows how the SYZ command can be used to increment a parameter. In this example, the F1 frequency parameter is set to 4 GHz, the step size is set to 10 MHz, and F1 frequency is incremented three times by the value of the step size.

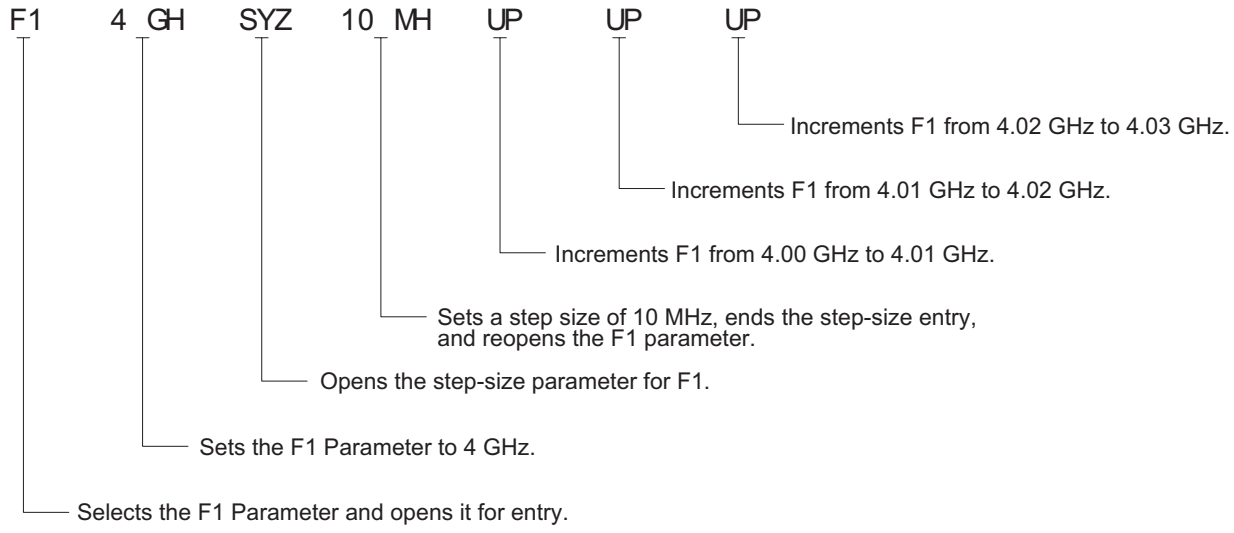


Figure 2-1. *Using the SYZ (Step Size) Command*

2-5 CW Frequency Commands

Table 2-5 lists the CW frequency command mnemonic codes. These commands call up each of the 20 preset (or previously set) CW frequencies. Each command causes its associated CW frequency to be output and opens that frequency's parameter for data entry.

The command, SQF, accesses the preset frequencies in sequential order—that is, F0 to F9 and M0 to M9.

Table 2-5. *CW Frequency Commands*

Mnemonic	Description
ACW	Activates the currently scanned frequency as CW.
CF0	Set CW mode at F0, Opens F0 parameter.
CF1	Set CW mode at F1, Opens F1 parameter.
CF2	Set CW mode at F2, Opens F2 parameter.
CF3	Set CW mode at F3, Opens F3 parameter.
CF4	Set CW mode at F4, Opens F4 parameter.
CF5	Set CW mode at F5, Opens F5 parameter.
CF6	Set CW mode at F6, Opens F6 parameter.
CF7	Set CW mode at F7, Opens F7 parameter.
CF8	Set CW mode at F8, Opens F8 parameter.
CF9	Set CW mode at F9, Opens F9 parameter.
CM0	Set CW mode at M0, Opens M0 parameter.
CM1	Set CW mode at M1, Opens M1 parameter.
CM2	Set CW mode at M2, Opens M2 parameter.
CM3	Set CW mode at M3, Opens M3 parameter.
CM4	Set CW mode at M4, Opens M4 parameter.
CM5	Set CW mode at M5, Opens M5 parameter.
CM6	Set CW mode at M6, Opens M6 parameter.
CM7	Set CW mode at M7, Opens M7 parameter.
CM8	Set CW mode at M8, Opens M8 parameter.
CM9	Set CW mode at M9, Opens M9 parameter.
SQD	Scan down to the next lower preset CW frequency.
SQF	Scan to the next higher preset CW frequency.
SQU	Scan up to the next higher preset CW frequency.

Programming Note: Signal generator response to a SQF command depends on the state the instrument is in at the time the command is received. For example, if the MG369XB is in a CW mode of operation with the current output frequency open for entry, the SQF command (1) causes the output to change to the next sequential frequency and (2) opens that frequency's parameter for data entry. However, if the instrument is in any other mode of operation, the SQF command causes it to switch to the last CW frequency that was output and opens that parameter for data entry.

Figure 2-2 shows an example of a CW frequency command string.

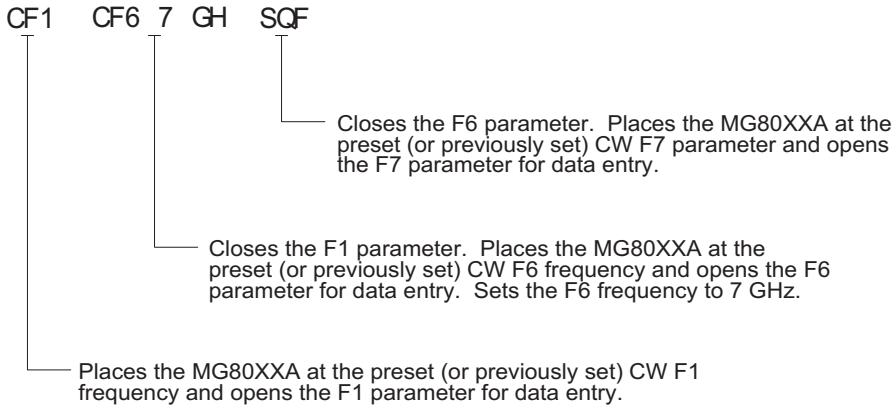


Figure 2-2. *Example of a CW Frequency Command String*

2-6 Analog and Step Sweep Commands

Table 2-6 (page 2-23) lists the analog and step sweep command mnemonic codes. These commands are divided into five subclasses and are described in the following paragraphs.

Sweep Range

Seven sweep ranges are available. The SF1 and SF3 commands select the sweep ranges of F1-F2 and F3-F4, respectively; the FUL command selects a full band sweep from the signal generator's low frequency limit to its high frequency limit.

The DF0, DF1, DF5, and DF6 commands each select a symmetrical frequency sweep around F0, F1, F5, and F6 respectively. The width of the sweep is determined by the ΔF frequency parameter.

Programming Examples:
Programming "**`F1 2 GH F2 8 GH SF1`**" sets F1 to 2 GHz, F2 to 8 GHz, and implements a F1-F2 frequency sweep.

Programming "**`DLF 6 GH F5 7 GH DF5`**" sets ΔF to 6 GHz, F5 to 7 GHz, and implements a F5-ΔF frequency sweep.

Programming Note:
If the commanded step sweep range is invalid, a parameter error (Section 2-23) will be generated and the output of the signal generator will not be altered.

Alternate Sweep

Six alternate step sweep commands are available. If the MG369XB is sweeping when the alternate sweep command is received, the signal generator's output will alternate between the commanded sweep and the sweep then being executed.

Programming Example:
Assume that the MG369XB had been previously programmed and was then executing an F1-F2 sweep. Programming "**`AF3`**" would then activate the F3-F4 sweep and cause it to alternate with the F1-F2 sweep.

Programming Note:
An alternate step sweep command will only be recognized when the MG369XB has been programmed to sweep. It will be ignored at all other times.

Sweep Triggering

Three modes of sweep triggering are available over the bus—Automatic, External, and Single. The AUT command selects automatic sweep triggering; the HWT command selects external triggering; and the EXT command selects single sweep triggering.

When automatic sweep triggering is selected, the sweep continually sweeps from its start frequency (or power level) to its stop frequency (or power level) with optimal retrace time.

When external sweep triggering is selected, a single sweep occurs when triggered by an external TTL-compatible clock pulse to the rear panel AUX I/O connector.

When single sweep triggering is selected, a single sweep starts when the TRG or TRS command is received. The RSS command resets the sweep to its start frequency (or power level), whenever the command is received while a single sweep is in progress.

Table 2-6. *Analog and Step Sweep Commands*

MNEMONIC CODE	FUNCTION	OPENS FOR ENTRY
	Sweep Range	
SF1	Selects the F1-F2 sweep mode	None
SF3	Selects the F3-F4 sweep mode	None
FUL	Selects the Full Range sweep mode	None
DF0	Selects the F0-ΔF sweep mode	None
DF1	Selects the F1-ΔF sweep mode	None
DF5	Selects the F5-ΔF sweep mode	None
DF6	Selects the F6-ΔF sweep mode	None
	Alternate Step Sweep	
AFU	Selects Full Range alternate sweep	None
AF1	Selects F1-F2 alternate sweep	None
AF3	Selects F3-F4 alternate sweep	None
AD1	Selects F1-ΔF alternate sweep	None
AD5	Selects F5-ΔF alternate sweep	None
AD6	Selects F6-ΔF alternate sweep	None
	Sweep Triggering	
MNT	*Selects Manual Trigger*	None
AUT	Selects Auto Trigger	None
HWT	Selects External Trigger	None
EXT	Selects Single Trigger	None
TRG	Triggers a Single Sweep	None
TRS	Triggers a Single Sweep	None
RSS	Resets a Sweep if in progress	None
TEX	Sets sweep trigger to external	None
	Analog/Step Sweep Select	
SSP	Selects Step Sweep (Linear)	None
LIS	Selects Linear Step Sweep (Default Mode)	None
LGS	Selects Logarithmic Step Sweep	None
MAN	Selects Manual (Step) Sweep	None
DU1	Selects Dual Step Sweep mode	None
DU0	Deselects Dual Step Sweep mode	None
TSS	Steps to next point in DU1 mode	None
SWP	Selects Analog Sweep	None
	Special Step Sweep (Steps Not Equally Spaced)	
SP1	Selects non-equally spaced step sweep	None
SP0	Deselects non-equally spaced step sweep	None

Analog/Step Sweep Select

Five commands are available—SWP selects an analog sweep, SSP and LIS select a linear step sweep, LGS selects a logarithmic step sweep, and MAN selects a manual (step) sweep. The selected sweep mode applies to all sweep ranges. Figure 2-3 shows an example of a sweep command string.

Programming Notes:
Commanding either SWP or SSP does not, by itself, provide a swept-frequency output. It only determines whether the swept-frequency output will be an analog or step sweep. If, on the other hand, a frequency sweep is being output by the signal generator when one of these commands is received, that sweep will assume the commanded sweep mode.

The MAN command only provides for setting up the MG369XB for a manual sweep. It must be accompanied by the RL command to return the instrument to local (front panel) control in order for the operator to perform the manual sweep.

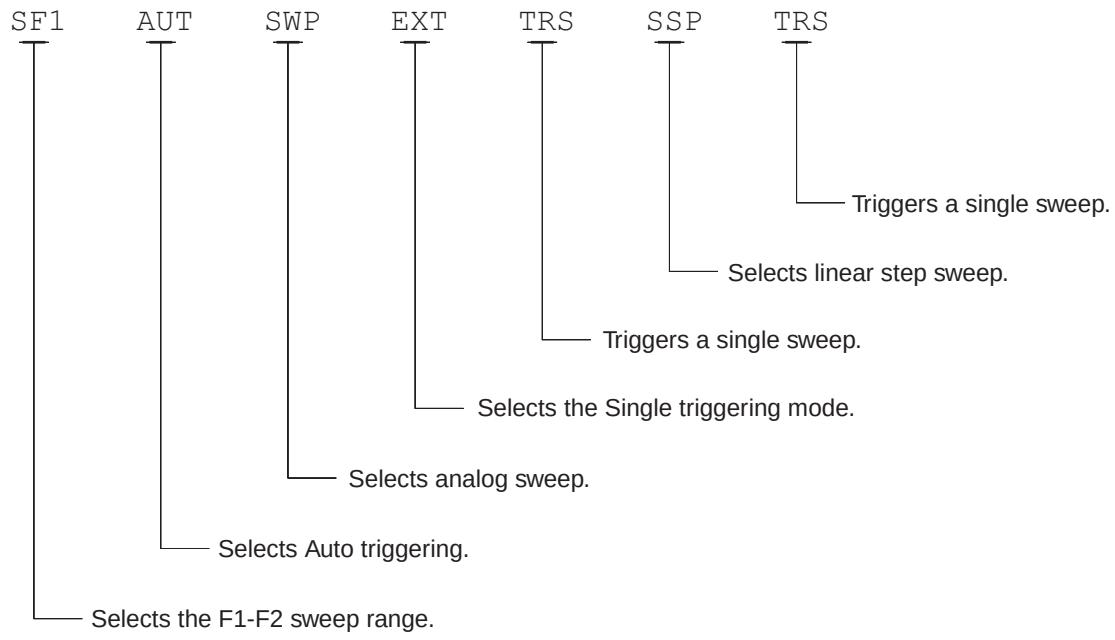


Figure 2-3. *Example of a Sweep Command String*

Dual Step Sweep Mode
The dual step sweep mode provides for generating synchronized, step sweep outputs from two MG369XBs at a frequency offset. Figure 2-4 shows an example of dual step sweep programming.

```
 10 !     "DUAL"
 20 CLEAR
 30 DISP "ENTER # OF STEPS"
 40 INPUT S
 50 DISP "ENTER WAIT TIME [mS]
 60 INPUT W
 70 WAIT 100
 80 DISP "ENTER 'LO' START FREQ [GHz]"
 90 INPUT F1
100 DISP "ENTER 'LO' STOP FREQ [GHz]
110 INPUT F2
120 DISP "ENTER OFFSET [GHz]
130 INPUT F3
140 !
150 ! Initialize both MG369XB's
160 !
170 OUTPUT 705 ;"CF1F1";F1;"GHF2";F2;
    "GHSNS";S;"SPSSSPEXTCLO"
180 OUTPUT 706 ;"CF1F1";F1+F3;"GHF2";
    F2+F3;"GHSNS";S;"SPSSSPEXTCLO"
190 WAIT 1000
200 !
210 ! Set both to dual mode and enable
    GET to end DWELL
220 !
230 SEND 7 ; CMD "%&" DATA "GTLDU1SF1"
    EOL
240 WAIT 100
250 ! Trigger the sweep and wait for
    retrace to finish
260 SEND 7 ; CMD "%&" DATA "TRS" EOL
270 WAIT 100
280 ! Listen address both MG369XB's
290 SEND 7 ; CMD "%&"
300 FOR C+1 TO S+1
310 WAIT W
320 ! Trigger both to next point
330 TRIGGER 7
340 NEXT C
350 GOTO 260
```

Figure 2-4. *Dual Step Sweep Programming Example*

Special Step Sweep

This special step sweep provides for a step sweep that has non-equally spaced steps. It can be used in any of the available sweep ranges (F1-F2, F3-F4, Full, F0-ΔF, F1-ΔF, F5-ΔF, and F6-ΔF). The start frequency in this sweep must be equal to the first frequency programmed with the ZL(x) command (Section 2-17). The intermediate steps can be programmed to be any frequency within the range of the programmed sweep.

Programming Note:
The SP1 command can be used with the dual step sweep mode.

Figure 2-5 shows an example of special step sweep programming.

For this example, assume a frequency sweep of 3 GHz to 10 GHz, with steps at 3, 6, 8, 9, and 10 GHz.

Sample Coding in BASIC

```
10 OUTPUT 705; "ZL000 3GH 6GH 8GH 9GH 10GH ZEL"
20 OUTPUT 705; "F1 3GH F2 10GH SNS 4SPS"
30 OUTPUT 705; "SP1 SSP SF1"
```

Explanation of Code

Line 10 sets up the step frequencies.
Line 20 sets start and stop frequencies and number of steps (frequency points – 1).
Line 30 set the signal generator to SP1, Step Sweep, and F1-F2 sweep range.

Figure 2-5. *Special Step Sweep Programming Example*

2-7 Frequency Marker Commands

Table 2-7 lists the frequency marker command mnemonic codes. These commands provide for (1) selecting a CW frequency as a potential marker, (2) selecting a potential marker as an active marker, and (3) individually turning markers on and off.

The ME1 command will enable a marker at the current frequency that is open for update; the ME0 command will disable the same marker. If a frequency parameter is not open, no action will be taken. The VM1 command will turn on video markers. The MK0 command will turn all markers off. Figure 2-6 shows an example of a frequency marker command string.

Table 2-7. *Frequency Marker Commands*

Mnemonic Code	Function
IM1	Turns on the Intensity marker mode.
ME0	Disables the marker at the active frequency.
ME1	Enables a marker at the active frequency.
MKO	Turns off markers.
MPN	Sets the rear panel marker polarity negative.
MPP	Sets the rear panel marker polarity positive.
VM1	Turns on the video marker mode.

Programming Note: Only one marker mode can be active. Consequently, if the intensity marker mode is active and the video marker mode is programmed, the displayed markers will change to video markers. Either mode can be turned off with the MK0 command.

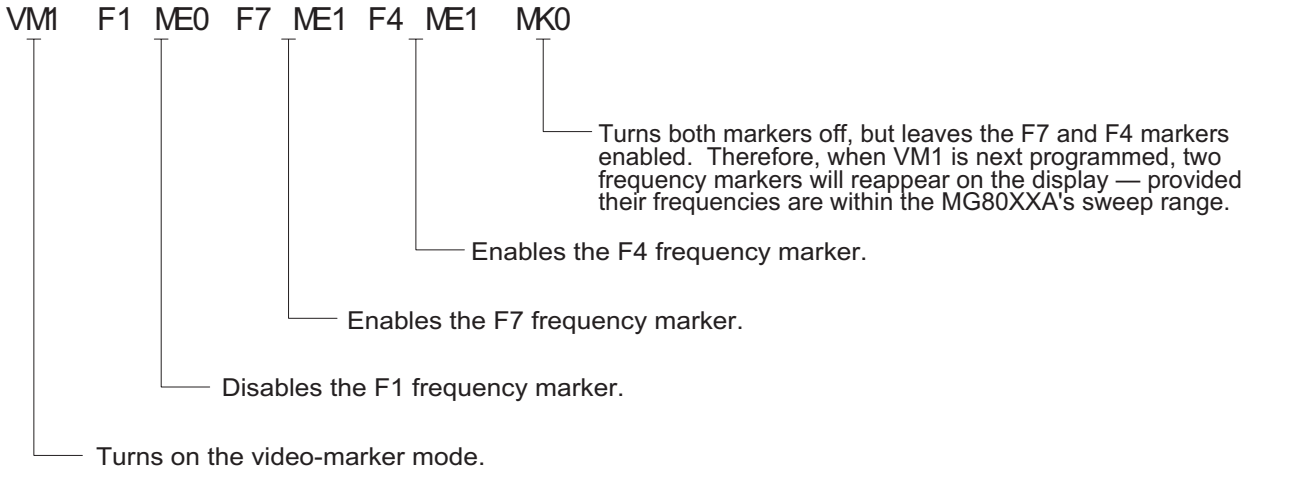


Figure 2-6. *Example of a Frequency Marker Command String*

2-8 Output Power Leveling Commands

Table 2-8 lists the output power leveling command mnemonic codes. These commands provide for (1) selecting linear or logarithmic power level operation, (2) selecting an RF output power level, (3) leveling the output power, and (4) turning the output power leveling off. In addition, commands are provided for the level offset, power level sweep, ALC power slope, and step attenuator decoupling functions. Figure 2-7 (page 2-30) shows an example of an output power level command string.

Linear or Logarithmic Power Level Selection

Power level operations can be linear or logarithmic. The commands LOG, PU0, and PU2 select logarithmic power level operation. In logarithmic mode, power level entries and outputs are in dBm and power level sweeps are logarithmic. This is the default mode.

The commands LIN and PU2 select linear power level operation. In linear mode, power level entries and outputs are in mV and power level sweeps are linear.

RF Output Power Level Selection

The commands, L0 thru L9, call up each of the preset (or previously set) output power levels. Each command causes its associated RF power level to be output and opens that power level's parameter for data entry. Each command will also deselect any other previously programmed power level and will turn off a power level sweep, if active.

Alternate Sweep RF Output Power Level Selection

In the alternate sweep mode, the commands, AL0 thru AL9, call up each of the preset (or previously set) L0 to L9 output power levels. Each command causes its associated RF power level to be output during the alternate sweep. Each command will also deselect any other previously programmed alternate sweep power level. The commands do ***not*** open the L1 to L9 power level parameters for data entry. Use the commands, XL0 thru XL9 or L0 thru L9, to enter new power level values.

Output Power Leveling

There are three output power leveling modes of operation—internal, external (detector or power meter), and fixed gain (leveling off). The IL1 command selects the internal leveling mode. In this mode, a signal from an internal level detector is used to level the output power. This is the default mode.

The DL1 command selects the external (detector) leveling mode; the PL1 command selects the external (power meter) leveling mode. In this mode, the output power is leveled using a signal from an external detector (power meter) connected to the EXTERNAL ALC IN connector. In the external power leveling mode, the EGI command provides for entering a setting for the Reference Level DAC to control the ALC gain. The LVO command selects the fixed gain (leveling off) mode. Each command will also deselect any other previously programmed output power leveling mode.

Programming Example:
Programming "**`PL1 EGI 140 SPS`**" selects external leveling of the output power using a signal from an external power meter and sets the Reference Level DAC to 140.

Table 2-8. *Power Leveling Commands (1 of 2)*

Mnemonic Code	Function
AL0	Sets the alternate frequency sweep RF output to L0.
AL1	Sets the alternate frequency sweep RF output to L1.
AL2	Sets the alternate frequency sweep RF output to L2.
AL3	Sets the alternate frequency sweep RF output to L3.
AL4	Sets the alternate frequency sweep RF output to L4.
AL5	Sets the alternate frequency sweep RF output to L5.
AL6	Sets the alternate frequency sweep RF output to L6.
AL7	Sets the alternate frequency sweep RF output to L7.
AL8	Sets the alternate frequency sweep RF output to L8.
AL9	Sets the alternate frequency sweep RF output to L9.
AT0	Deselects ALC step attenuator decoupling.
AT1	Selects ALC step attenuator decoupling.
ATT(xx)	Sets the step attenuator value to xx (10dB).
DL1	Selects external detector leveling of output power.
EGO	Outputs the value of the Reference Level DAC setting.
IL1	Selects internal leveling of output power.

Table 2-8. *Power Leveling Commands (2 of 2)*

Mnemonic Code	Function
L0	Sets RF output power level to L0. Opens L0 parameter.
L1	Sets RF output power level to L1. Opens L1 parameter.
L2	Sets RF output power level to L2. Opens L2 parameter.
L3	Sets RF output power level to L3. Opens L3 parameter.
L4	Sets RF output power level to L4. Opens L4 parameter.
L5	Sets RF output power level to L5. Opens L5 parameter.
L6	Sets RF output power level to L6. Opens L6 parameter.
L7	Sets RF output power level to L7. Opens L7 parameter.
L8	Sets RF output power level to L8. Opens L8 parameter.
L9	Sets RF output power level to L9. Opens L9 parameter.
LIN	Selects linear power level operation in mV.
LO0	Turns off the Level Offset function.
LO1	Turns on the Level Offset function.
LOG	Selects logarithmic power level operation in dBm.
LSP	Selects the Power Level Sweep mode.
LV0	Turns off leveling of the output power.
LV1	Turns off leveling of the output power.
LVP	Sets the instrument power level to 1 dB below peak leveled power.
PL1	Selects external power meter leveling of the output power.
PU0	Selects logarithmic power level operation in dBm.
PU1	Selects linear power level operation in mV.
PU2	Selects logarithmic power level operation in dBμV.
RF0	Turns off the RF output.
RF1	Turns on the RF output.
SL0	Turns off the ALC power slope function.
SL1	Turns on the ALC power slope function.
SLP	Opens the ALC power slope value parameter.

ALC Power Slope

The ALC power slope function provides for linearly increasing or decreasing output power as the frequency increases to compensate for system, cable, and waveguide variations due to changes in frequency. The SL1 command turns on the ALC power slope function. The power slope value and the pivot point frequency are changed using the SLP and PVT parameter entry commands. The SL0 command turns off the ALC power slope function.

Programming Example:
Programming "**`SL1 SLP 128 SPS PVT 2.0 GH`**" turns on the ALC power slope function and sets the power slope value to 128 and the pivot point frequency to 2 GHz.

Attenuator Decoupling

The attenuator decoupling function provides for decoupling of the step attenuator (if equipped) from the ALC system. The AT1 command decouples the step attenuator, the ATT(xx) command provides for setting the step attenuator value for 0 to 110 dB in 10 dB increments, and the AT0 command deselects the attenuator decoupling function.

Programming Example:
Programming "**`AT1 ATT08`**" decouples the step attenuator from the ALC system and sets the step attenuator value to 80 dB.

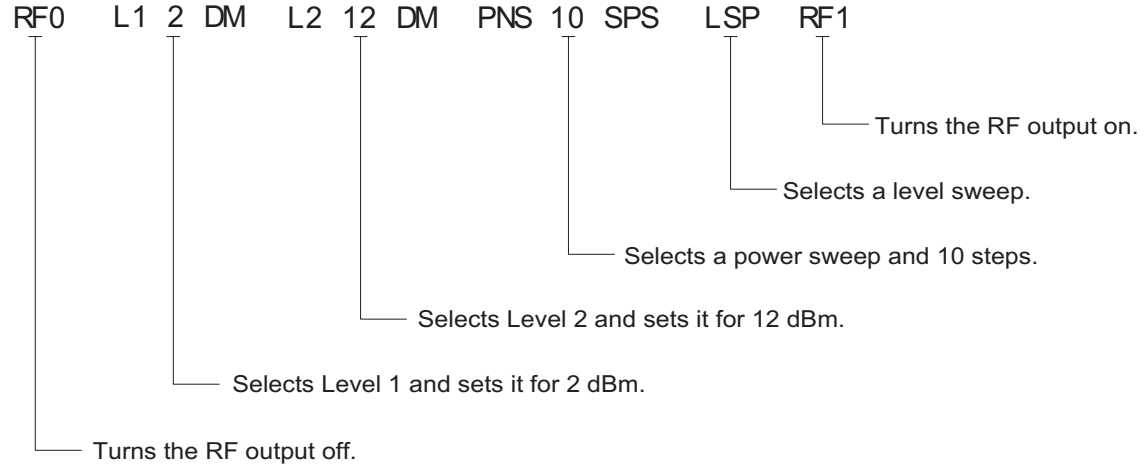


Figure 2-7. *Example of an Output Power Level Command String*

2-9 Modulation Commands

Table 2-9 (page 2-38) lists the modulation command mnemonic codes. These commands provide for AM, FM, ΦM, and pulse modulation of the signal generator's output signal using modulating signals from either the internal AM, FM, ΦM, and pulse generators or an external source.

Amplitude Modulation

Two AM modes are available—Linear and Log. In Linear AM mode, sensitivity is variable from 0 %/V to 100 %/V and the amplitude of the RF output changes linearly as the AM input changes. In Log mode, sensitivity is variable from 0 dB/V to 25 dB/V and the amplitude of the RF output changes exponentially as the AM input changes.

Internal AM Function
The AM7 command turns on the internal AM function in Linear mode. The AM8 command turns on the internal AM function in Log mode. In Linear mode, the AM depth value is changed using the ADP1 parameter entry command. In Log mode, the AM depth value is changed using the ADP2 parameter entry command. The modulating waveform is selected using the AMW(x) command and the AM rate is set with the AMR command. The AM0 command turns off the AM function.

Programming Example:
Programming "**AM8 ADP2 20 DB AMW7 AMR 10 KH**" turns on the internal AM function in Log mode, sets the AM depth to 20 dB, selects a triangle wave as the modulating waveform, and sets the AM rate to 10 kHz.

External AM Function
The AM1 command turns on the external AM function in Linear mode. The AM2 command turns on the external AM function in Log mode. In Linear mode, the external AM sensitivity value is changed using the AMS parameter entry command. In Log mode, the external AM sensitivity value is changed using the ASD parameter entry command. The AM0 command turns off the AM function.

Programming Example:
Programming "**AM1 AMS 90 PCV**" turns on the external AM function in Linear mode and sets the external AM sensitivity to 90 %/V.

Frequency Modulation

Four FM modes are available—Locked, Locked Low-Noise, Unlocked Narrow, and Unlocked Wide.

In the Locked and Locked Low-Noise FM modes, frequency modulation of the output signal is accomplished by summing the modulating signal into the FM control path of the YIG phase-lock loop. In Locked FM mode, the maximum FM deviation is the lesser of ±10 MHz or rate × 300 for 1 kHz to 8 MHz rates; in Locked Low-Noise FM mode, the maximum FM deviation is the lesser of ±10 MHz or rate × 3 for 50 kHz to 8 MHz rates.

In the Unlocked FM modes, the YIG phase-lock loop is disabled to allow for peak FM deviations of up to 100 MHz. In the Unlocked Narrow FM mode, frequency modulation is obtained by applying the modulating signal to the fine tuning coil of the YIG-tuned oscillator. Unlocked Narrow FM mode allows maximum deviations of ±10 MHz for DC to 8 MHz rates.

In the Unlocked Wide FM mode, frequency modulation is accomplished by applying the modulating signal to the main tuning coil of the YIG-tuned oscillator. Unlocked Wide FM mode allows maximum deviations of ±100 MHz for DC to 100 Hz rates.

Internal FM Function
The FM7 command turns on the internal FM function in Unlocked Narrow mode, the FM8 command turns it on in Unlocked Wide mode, the FM9 command turns it on in Locked mode, and the FMN command turns it on in Locked Low-Noise mode. The FM deviation value is changed using the FDV parameter entry command. The modulating waveform is selected using the FWV(x) command and the internal FM rate is set using the FMR parameter entry command. The FM0 command turns off the FM function.

Programming Example:
Programming "**`FM9 FDV 20 MH FWV1 FMR 100 KH`**" turns on the internal FM function in Locked mode, sets the FM deviation to 20 MHz, selects a sine wave as the modulating waveform, and sets the FM rate to 100 kHz.

External FM Function
The FM1 (or FMU) command turns on the external FM function in Unlocked Narrow mode, the FMW command turns it on in Unlocked Wide mode, the FML command turns it on in Locked mode, and the FM2 command turns it on in Locked Low-Noise mode. The external FM sensitivity value is changed using the FMS parameter entry command. The FM0 command turns off the FM function.

Programming Example:
Programming "**`FMW FMS 50 MV`**" turns on the external FM function in Unlocked Wide mode, selects the rear panel FM input, and sets the external FM sensitivity to 50 MHz/V.

Phase Modulation

Two ΦM modes are available—Narrow and Wide. In Narrow ΦM mode, the maximum ΦM deviation is the lesser of ±3 radians or ±5 MHz/rate for DC to 8 MHz rates. In Wide ΦM mode, the maximum ΦM deviation is the lesser of ±400 radians or ±10 MHz/rate for DC to 1 MHz rates.

NOTE

If the ΦM function is not installed in the signal generator, the ΦM function commands produce syntax errors.

Internal ΦM Function
The PH7 command turns on the internal ΦM function in Narrow mode and the PH8 command turns it on in Wide mode. The PHD parameter entry command is used to change the ΦM deviation value. The modulating waveform is selected with the PHV(x) command and the ΦM rate is set using the PHR parameter entry command. The PH0 command turns off the ΦM function.

Programming Example:
Programming "**`PH7 PHD 3 RD PHV1 PHR 200 KH`**" turns on the internal ΦM function in Narrow mode, sets the ΦM deviation to 3 radians, selects a sine wave as the modulating waveform, and sets the ΦM rate to 200 kHz.

External ΦM Function
The PH1 (or PHN) command turns on the external ΦM function in Narrow mode and the PH2 (or PHW) command turns it on Wide mode. The external ΦM sensitivity value is changed using the PHS parameter entry command.

Programming Example
Programming "**PH2 PHS 50 RV**" turns on the external ΦM function in Wide mode and sets the external ΦM sensitivity to 50 radians/V.

Pulse Modulation

Two pulse modulation modes are available—Internal and External. In Internal mode, pulse modulation of the output signal is accomplished by using a modulating signal from the internal pulse generator. In External mode, pulse modulation of the output signal is achieved using a modulating signal from an external source.

The internal pulse generator has four pulse modes —single, doublet (double pulse), triplet (triple pulse), and quadruplet (quadruple pulse). Individual pulse widths and delays can be set for each of the pulses in a mode. The pulse generator has two clock rates—100 MHz (or 40 MHz with Option 24) and 10 MHz. The 100 MHz clock rate produces higher resolution pulses and allows higher PRFs; the 10 MHz clock rate produces lower resolution pulses and lower PRFs.

The internal pulse generator can be internally triggered, externally triggered, internally and externally triggered with delay, and gated. There is also a composite trigger mode in which an external pulse is summed with the internal pulse to pulse modulate the output signal. (Refer to Chapter 3 of the Operation Manual for a description of each trigger mode.)

NOTE

At a 100 MHz pulse clock rate, the pulse period must be 50 ns longer than the pulse widths + delays; at a 40 MHz pulse clock rate, the pulse period must be 125 ns longer than the pulse widths + delays; at a 10 MHz pulse clock rate, the pulse period must be 500 ns longer than the pulse widths + delays.

Internal Pulse Modulation Function
The IP command turns on the internal pulse modulation function. The internal pulse mode is selected using the PMD(x) command and the internal pulse trigger is selected using the PTG(x) command. The pulse period can be set using the PER parameter entry command; the pulse frequency can be set using the PR parameter entry command. Individual pulse widths can be set using the W1 (or PW), W2, W3, and W4 parameter entry commands. Individual pulse delays can be set using the D1 (or PDY), D2, D3, and D4 parameter entry commands. The P0 (or SW0) command turns off the pulse modulation function.

Square wave pulse modulation of the output signal by one of four internal modulating signals is available using the following commands:

- SW1 turns on square wave pulse modulation at 400 Hz
- SW2 (or SQP) turns on square wave pulse modulation at 1 kHz
- SW3 turns on square wave pulse modulation at 7.8125 kHz
- SW4 turns on square wave pulse modulation at 27.8 kHz

Programming Example:
Programming "**`IP PC4 PMD2 PTG1 PER 1 MS W1 2.5 US D2 10 US W2 2 US`**" turns on the internal pulse modulation function; selects the 100 MHz (40 MHz with Option 24) pulse clock rate, doublet pulse mode, and free run trigger mode; and sets the pulse period to 1 ms, pulse width1 to 2.5 μs, delay2 to 10 μs, and pulse width2 to 2 μs.

NOTE

Use the EP0 and EP1 commands to select the polarity of the signal (TTL-low or TTL-high) that turns the RF on during pulse modulation.

Stepped Delay Mode
The stepped delay mode automatically increments or decrements the pulse delay 1 value according to step delay parameters. Stepped delay mode is only available when the triggering commands PTG3 (delayed) or PTG5 (triggered with delay) are specified. The SD1 command turns on the stepped delay mode. The pulse delay 1 start time can be set using the SDS parameter entry command; the delay 1 stop time can be set using the SDE parameter entry command. Use the SDD parameter entry command to set the step size and the SDL parameter entry command to set the dwell-time-per-step. The SD0 command turns off the stepped delay mode.

Programming Notes:
Use the PTR and PTF commands in conjunction with the pulse trigger commands PTG2 (gated), PTG4 (triggered), and PTG5 (triggered with delay) to specify whether the pulse generator is triggered by the rising or falling edge of the external trigger pulse.

External Pulse Modulation Function
The XP command turns on the external pulse modulation function. The PO (or SW0) command turns off the pulse modulation function.

Table 2-9. Modulation Commands (1 of 3)

Mnemonic Code	Function
AM0	Turns off the internal or external AM function.
AM1	Turns on the external AM function in Linear mode.
AM2	Turns on the external AM function in Log mode.
AM7	Turns on the internal AM function in Linear mode.
AM8	Turns on the internal AM function in Log mode.
AMO	Turns off the internal AM function generator if it is on.
AMW(x)	Selects the internal AM waveform, where x = 1-sine wave, 2-square wave, 3-positive ramp, 4-negative ramp, 5-Gaussian noise, 6-uniform noise, 7-triangle wave.
DPT	Internal triggered pulse with delay.
EP0	Selects TTL-low to turn RF on during pulse modulation.
EP1	Selects TTL-high to turn RF on during pulse modulation.
FM0	Turns off the internal or external FM function.
FM1	Turns on the external FM function in Unlocked Narrow mode.
FM2	Turns on the external FM function in Locked Low-Noise mode.
FM7	Turns on the internal FM function in Unlocked Narrow mode.
FM8	Turns on the internal FM function in Unlocked Wide mode.
FM9	Turns on the internal FM function in Locked mode.
FML	Turns on the external FM function in Locked mode.
FMN	Turns on the internal FM function in Locked Low-Noise mode.
FMU	Turns on the external FM function in Unlocked Narrow mode (Same as FM1).
FMW	Turns on the external FM function in Unlocked Wide mode.
FWV(x)	Selects the internal FM waveform, where x = 1-sine wave, 2-square wave, 3-positive ramp, 4-negative ramp, 5-Guassian noise, 6-uniform noise, 7-triangle wave.
GP	Internal gated pulse on.

Table 2-9. *Modulation Commands (2 of 3)*

Mnemonic Code	Function
IP	Turns on internal pulse modulation.
P0	Turns off the internal or external pulse modulation function (This is the default mode).
PC1	Selects the 10 MHz internal pulse clock rate.
PC4	Selects the 40 MHz internal pulse clock rate (Option 24); Selects the 100 MHz internal pulse clock rate (Option 26).
PH0	Turns off the internal or external FM function.
PH1	Turns on the external FM function in Narrow mode.
PH2	Turns on the external FM function in Wide mode.
PH7	Turns on the internal FM function in Narrow mode.
PH8	Turns on the internal FM function in Wide mode.
PHN	Turns on the external FM function in Narrow mode (Same as PH1).
PHV(x)	Selects the internal FM waveform, where x = 1-sine wave, 2-square wave, 3-positive ramp, 4-negative ramp, 5-Guassian noise, 6-uniform noise, 7-triangle wave.
PHW	Turns on the external FM function in Wide mode (Same as PH2).
PMD(x)	Selects the internal pulse mode, where x = 1-single, 2-doublet, 3-triplet, 4-quadruplet.
PTF	Selects internal pulse triggering on the falling edge of an external input. Active only when pulse trigger is gated, triggered, or triggered with delay.
PTG(x)	Selects the internal pulse trigger, where x = 1-free run, 2-gated, 3-delayed, 4-triggered, 5-triggered with delay, 6-composite.
PTR	Selects internal pulse triggering on the rising edge of an external input. Active only when pulse trigger is gated, triggered, or triggered with delay.
SC0	Turns off the SCAN modulation function.
SC1	Turns on the SCAN modulation function.
SD0	Turns off the internal pulse stepped delay mode.
SD1	Turns on the internal pulse stepped delay mode.
SQP	Turns on internal 1 kHz square wave pulse modulation.
SW0	Turns off the internal or external pulse modulation function (Same as P0).
SW1	Turns on internal 400 Hz square wave pulse modulation.

Table 2-9. *Modulation Commands (3 of 3)*

Mnemonic Code	Function
SW2	Turns on internal 1 kHz square wave pulse modulation (Same as SQP).
SW3	Turns on internal 7.8125 kHz square wave pulse modulation.
SW4	Turns on internal 27.8 kHz square wave pulse modulation.
XP	Turns on the external pulse modulation function. Disables the internal pulse modulation function, if previously programmed.

2-10 Measure Function Commands

Table 2-10 lists the measure function commands. These commands provide for measuring the following:

- The actual modulation depth of the RF output signal, as caused by an external AM signal connected to the rear panel AM IN connector
- The actual frequency deviation of the RF output signal, as caused by an external FM signal connected to the rear panel FM IN connector
- The actual RF power of an external source, via a 560-7, 5400-71, or 6400-71 series detector connected to the rear panel POWER METER connector (Option 8 is required)

Table 2-10. *Measure Function Commands*

Mnemonic Code	Function
AMI	Turns on the AM Measurement mode.
FMD	Turns on the FM Measurement mode.
MOM	Turns off the AM and FM measurement modes.
PM0	Turns off the Power Meter measurement mode.
PM1	Turns on the Power Measurement mode (Option 8), whereby RF power can be measured at an external source by a 560-7, 5400-71, or 4600-71 series detector connected to the rear panel POWER METER connector. The measurement results will be sent to the controller upon receipt of the OPM command (Table 2-11). Power measurements can be taken simultaneously with modulation measurements.

2-11 Output Commands

Table 2-11 lists the output command mnemonic codes. These commands provide for the output of data from the CW generator to the controller. Figure 2-8 (page 2-44) shows examples of output command programming.

Table 2-11. *Output Commands (1 of 4)*

Mnemonic Code	Function
*IDN?	Requests device identification.
OAB	Returns the external AM sensitivity value (in dB/V) to the controller.
OAD1	Returns the internal AM depth value (in %) to the controller.
OAD2	Returns the internal AM depth value (in dB) to the controller.
OAR	Returns the internal AM rate (in Hz) to the controller.
OAS	Returns the external AM sensitivity value (in %/V) to the controller.
OAW	Returns the name of the internal AM waveform (“SINE”, “SQUARE WAVE”, “RAMP UP”, “RAMP DOWN”, “GAUSSIAN NOISE”, “UNIFORM NOISE”, “TRIANGLE”) to the controller.
OD1	Returns the internal pulse delay1 value (in ms) to the controller.
OD2	Returns the internal pulse delay2 value (in ms) to the controller.
OD3	Returns the internal pulse delay3 value (in ms) to the controller.
OD4	Returns the internal pulse delay4 value (in ms) to the controller.
ODD	Returns the internal pulse stepped delay mode step size value (in ms) to the controller.
ODE	Returns the internal pulse stepped delay mode delay 1 stop value (in ms) to the controller.
ODF	Returns the DF frequency value (in MHz) to the controller.
ODL	Returns the internal pulse stepped delay mode dwell-time-per-step value (in ms) to the controller.
ODP	Returns the internal pulse delay1 value (in ms) to the controller (Same as OD1).
ODS	Returns the internal pulse stepped delay mode delay 1 start value (in ms) to the controller.
OEBW	Returns the external reference loop bandwidth to the controller.
OEM	Returns the Extended SRQ Mask bytes (3 binary bytes) to the controller.
OES	Returns the GPIB Status bytes (3 binary bytes) to the controller.
OF0	Returns the F0 frequency value (in MHz) to the controller.
OF1	Returns the F1 frequency value (in MHz) to the controller.

Table 2-11. *Output Commands (2 of 4)*

Mnemonic Code	Function
OF2	Returns the F2 frequency value (in MHz) to the controller.
OF3	Returns the F3 frequency value (in MHz) to the controller.
OF4	Returns the F4 frequency value (in MHz) to the controller.
OF5	Returns the F5 frequency value (in MHz) to the controller.
OF6	Returns the F6 frequency value (in MHz) to the controller.
OF7	Returns the F7 frequency value (in MHz) to the controller.
OF8	Returns the F8 frequency value (in MHz) to the controller.
OF9	Returns the F9 frequency value (in MHz) to the controller.
OFD	Returns the internal FM deviation value (in Hz) to the controller.
OFH	Returns the high-end frequency value (in MHz) to the controller.
OFK	Returns the internal or external FM lock status, “UNLOCKED NARROW”, “UNLOCKED WIDE”, “LOCKED” to the controller.
OFL	Returns the low-end frequency value (in MHz) to the controller.
OFM	Returns the frequency multiplier parameter.
OFR	Returns the internal FM rate (in Hz) to the controller.
OFS	Returns the external FM sensitivity value (in MHz/V) to the controller.
OFW	Returns the name of the internal FM waveform (“SINE”, “SQUARE WAVE”, “RAMP UP”, “RAMP DOWN”, “GAUSSIAN NOISE”, “UNIFORM NOISE”, “TRIANGLE”) to the controller.
OI	Returns the instrument identification string to the controller.
OL0	Returns the L0 power level value to the controller.
OL1	Returns the L1 power level value to the controller.
OL2	Returns the L2 power level value to the controller.
OL3	Returns the L3 power level value to the controller.
OL4	Returns the L4 power level value to the controller.
OL5	Returns the L5 power level value to the controller.
OL6	Returns the L6 power level value to the controller.
OL7	Returns the L7 power level value to the controller.
OL8	Returns the L8 power level value to the controller.
OL9	Returns the L9 power level value to the controller.
OLO	Returns the Level Offset power value to the controller.
OM0	Returns the M0 frequency value (in MHz) to the controller.

Table 2-11. *Output Commands (3 of 4)*

Mnemonic Code	Function
OM1	Returns the M1 frequency value (in MHz) to the controller.
OM2	Returns the M2 frequency value (in MHz) to the controller.
OM3	Returns the M3 frequency value (in MHz) to the controller.
OM4	Returns the M4 frequency value (in MHz) to the controller.
OM5	Returns the M5 frequency value (in MHz) to the controller.
OM6	Returns the M6 frequency value (in MHz) to the controller.
OM7	Returns the M7 frequency value (in MHz) to the controller.
OM8	Returns the M8 frequency value (in MHz) to the controller.
OM9	Returns the M9 frequency value (in MHz) to the controller.
OMD	Returns the name of the internal pulse mode (“SINGLE”, “DOUBLET”, “TRIPLET”, “QUADRUPLET”) to the controller.
OMM	1. Returns the AM depth measurement value (in %) to the controller when the AMI command either has been or is also programmed. 2. Returns the FM deviation measurement value (in MHz) to the controller when the FMD command either has been or is also programmed.
OO	Returns the instrument option string to the controller.
OP5	Returns the internal or external pulse polarity (“HIGH”, “LOW”) to the controller.
OPC	Returns the internal pulse clock rate (in MHz) to the controller.
OPD	Returns the power sweep dwell time (in ms) to the controller.
OPHD	Returns the internal FM deviation value (in radians) to the controller.
OPHI	Returns the external FM impedance value (in W) to the controller.
OPHM	Returns the name of the FM mode (“NARROW”, “WIDE”) to the controller.
OPHR	Returns the internal FM rate (in Hz) to the controller.
OPHS	Returns the external FM sensitivity value (in radians/V) to the controller.
OPHW	Returns the name of the internal FM waveform (“SINE”, “SQUARE WAVE”, “RAMP UP”, “RAMP DOWN”, “GAUSSIAN NOISE”, “UNIFORM NOISE”, “TRIANGLE”) to the controller.
OPM	Returns the internal power meter measurement (in dBm) to the controller.
OPO	Returns the phase offset value (in degrees) to the controller.
OPP	Returns the internal pulse period value (in ms) to the controller.

Table 2-11. *Output Commands (4 of 4)*

Mnemonic Code	Function
OPR	Returns the internal pulse frequency (in MHz) to the controller.
OPS	Returns the power sweep number-of-steps to the controller.
OPT	Returns the name of the internal pulse trigger (“FREE RUN”, “GATED”, “DELAYED”, “TRIGGERED”, “TRIG WITH DELAY”, “COMPOSITE”) to the controller.
OPW	Returns the internal pulse width1 value (in ms) to the controller (Same as OW1).
OSB	Returns the Primary GPIB Status byte to the controller.
OSD	Returns the step sweep dwell time (in ms) to the controller.
OSE	Returns the last GPIB syntax error to the continueroller.
OSM	Returns the Primary SRQ Mask byte to the controller.
OSR	Returns the self-test results (6 binary bytes) to the controller.
OSS	Returns the step sweep number-of-steps to the controller.
OST	Returns the step sweep time value (in ms) to the controller.
OVN	Returns the ROM version number to the controller.
OW1	Returns the internal pulse width1 value (in ms) to the controller.
OW2	Returns the internal pulse width2 value (in ms) to the controller.
OW3	Returns the internal pulse width3 value (in ms) to the controller.
OW4	Returns the internal pulse width4 value (in ms) to the controller.
OWT	Returns the GPIB termination status to the controller.

```
760 OUTPUT 705;"OF1"
770 ENTER 705;A
780 PRINT “F1 is set at ”;A;" MHz"



1050 OUTPUT 705;"OSS"
1060 ENTER 705;A
1070 PRINT “Step Sweep has ”;A;" Steps"
```

Figure 2-8. *Output Command Programming Examples*

2-12 Stored Setup Commands

Table 2-12 lists the stored setup command mnemonic codes. These commands provide for saving instrument setups and recalling them for use.

A current instrument setup can be saved to internal setup memory using the SSN(m) command, where m = memory locations 1 to 9. Up to nine instrument setups can be stored in this manner. The command RSN(m) recalls a stored instrument setup from internal setup memory locations 1 to 9.

If more than nine instrument setups are needed, or if it is desirable to store the setups in the controller instead of the CW generator memory, the MG369XB can be commanded to output and accept stored setups over the bus.

The SAF command outputs the current instrument setup to the controller in a 4100-byte (approximately) binary data string. The controller stores the instrument setup. The RCF command readies the CW generator to receive a new instrument setup recalled from the controller. Figure 2-9 shows an example of SAF and RCF command programming.

The SAM and RCM commands perform the same functions as described for the SAF and RCF commands, except that all of the stored instrument setups are included in the binary data string along with the current instrument setup. For these commands, the binary data string is approximately 41000 bytes long.

Table 2-12. *Stored Setup Commands*

MNEMONIC CODE	FUNCTION
SAF	Outputs the current instrument setup to the controller.
SAM	Outputs both the current instrument setup and all stored instrument setups to the controller.
SM	Recalls the next stored instrument setup in sequence.
SSN(m)	Saves the current instrument setup to internal setup memory location m, where m = 1 to 9.
RCF	Readies the MG369XB to receive a new instrument setup recalled from the controller.
RCM	Readies the MG369XB to receive a new instrument setup and new stored setups recalled from the controller.
RSN(m)	Recalls the instrument setup stored in internal setup memory location m, where m = 1 to 9.

Programming Note: The SAF and SAM commands output binary data. The data string is terminated with "EOI" on the last byte sent (no CR or LF is sent).

```
10 DIM A$ [300]
20 OUTPUT 705; "SAF"
30 ENTER 705 USING "#%, #%K"; A$ (Requires EOI
    to be the terminator of the read.)
40 OUTPUT 705; "RCF"; A$ (A$ must follow the SAF.)
```

Figure 2-9. *SAF and RCF Commands Programming Example*

2-13 SRQ and Status Byte Commands

Table 2-13 (page 2-49) lists the Service Request (SRQ) and Status Byte command mnemonic codes. These commands enable the signal generator to request service from the controller when certain, predefined conditions exist.

Status Bytes

The MG369XB has three GPIB status bytes—the primary and two extended status bytes. Figure 2-10 (following page) shows the three status bytes and identifies the status reporting function of each status byte bit.

Each status reporting bit, with the exception of primary status byte bit 6 (SRQ), is set when the condition on which it reports is detected. These changes in status byte bit settings can be read by the controller as follows:

- The contents of the primary status byte is returned to the controller in response to a serial poll or the OSB command
- The contents of the primary status byte and the two extended status bytes are returned to the controller in response to the OES command. Figure 2-11 (page 2-50) shows an example of OES command programming

SRQ Generation

The signal generator can generate GPIB service requests (SRQs) to report instrument status and syntax errors to the controller. The signal generator will generate an SRQ if:

1. The SRQ generation function has been enabled using the SQ1 command *and*,
2. One (or more) of the status reporting functions is true *and*,
3. The primary status byte bit associated with the true status reporting function has been enabled.

Bits in the primary status byte can be enabled by either of two methods. The first uses the FB1/FB0, ES1/ES0, UL1/UL0, LE1/LE0, PE1/PE0, SE1/SE0, and SB1/SB0 commands, described in Table 2-13, to individually enable or disable each bit. The second method uses a single 8-bit status byte mask (MB0) to enable any or all of the primary status byte bits.

Figure 2-12 (page 2-50) shows examples of status byte mask programming.

NOTE

All status byte bits are latched except for those indicated with the "*". Once set, an OES or OSB command must be received before the condition will be reset. The primary status byte bit 6 (SRQ) is cleared by a serial poll only.

Primary Status Byte

Extended Status Byte 2	SRQ	Syntax Error	Parameter Range Error	Lock Error	RF Unleveled	End of Sweep	Extended Status Byte 1
Bit 7 (128)	*Bit 6* (64)	*Bit 5* (32)	*Bit 4* (16)	*Bit 3* (8)	*Bit 2* (4)	*Bit 1* (2)	*Bit 0* (1)

Primary status byte bit 0 is set whenever one of the status conditions reported by an extended status byte 1 is true and the associated status bit is enabled. This bit is cleared when the controller sends the OES command.

Primary status byte bit 7 is set whenever one of the status conditions reported by an extended status byte 2 is true and the associated status bit is enabled. This bit is cleared when the controller sends the OES command.

Primary status byte bit 6 (SRQ) is not maskable. This bit is set by the SQ1 command and cleared by a serial poll.

Extended Status Byte 1

RF* Leveled	Not Used	Not Used	Not Used	RF* Locked	Self Test Completed	Not Used	Self Test Failed
Bit 7 (128)	*Bit 6* (64)	*Bit 5* (32)	*Bit 4* (16)	*Bit 3* (8)	*Bit 2* (4)	*Bit 1* (2)	*Bit 0* (1)

Extended status byte 1 bits are enabled by the extended status byte 1 mask command, MB1.

Extended status byte 1 bit 0 (Self-Test Failed) and bit 2 (Self Test Complete) should not be unmasked at the same time.

Extended status byte 1 bit 3 (RF Locked) is only used with the Model 360B interface. The setting of this bit is blocked or unblocked by the commands, LS0 and LS1 (See Table 2-13).

The setting of extended status byte 1 bit 7 (RF Leveled) is blocked or unblocked by the commands LA0 and LA1 (See Table 2-13).

Extended Status Byte 2

Parameter* Changed	Calibrate Function Finished	Not Used	RF* Unlocked	Crystal Oven Failure	Calibrate Function Failed	Not Used	Not Used
Bit 7 (128)	*Bit 6* (64)	*Bit 5* (32)	*Bit 4* (16)	*Bit 3* (8)	*Bit 2* (4)	*Bit 1* (2)	*Bit 0* (1)

Extended status byte 2 bits are enabled by the extended status byte 2 mask command, MB2.

The setting of extended status byte 2 bit 4 (RF Unlocked) is blocked or unblocked by the commands, EL0 and EL1 (See Table 2-13).

Figure 2-10. *Primary and Extended Status Bytes*

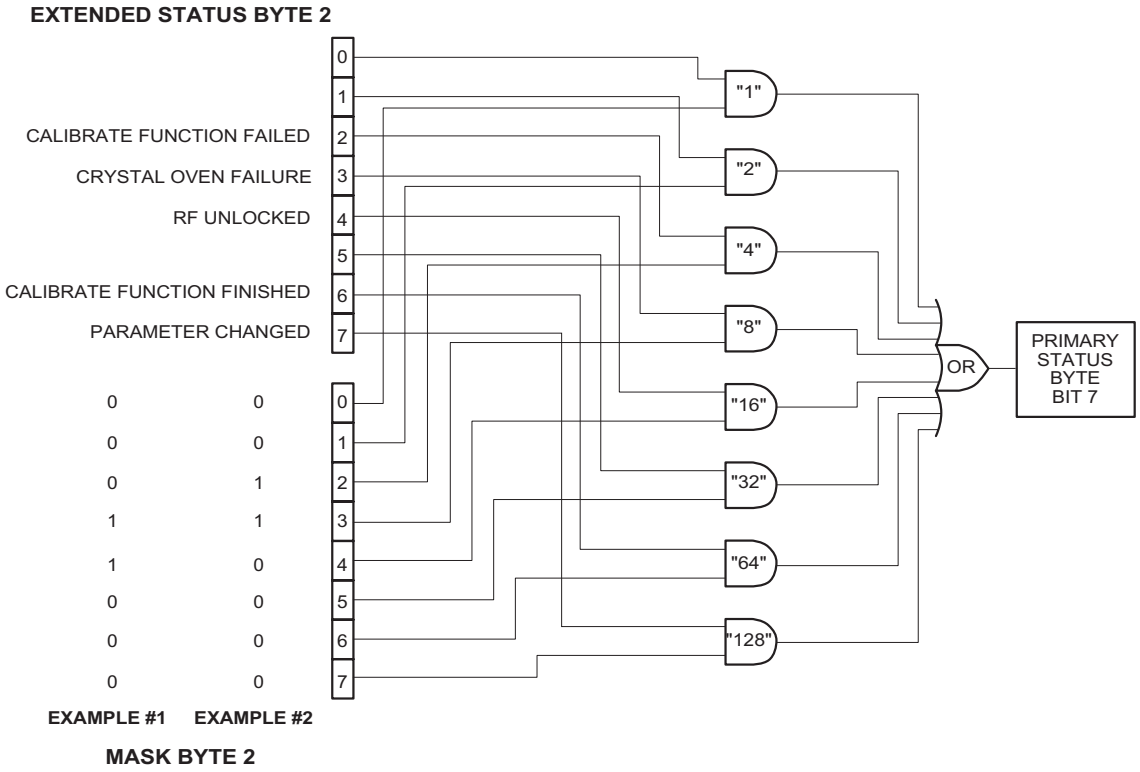
Table 2-13. *SRQ and Status Byte Commands*

Mnemonic Code	Function
CSB	Clears all GPIB status bytes.
EL0	Inhibits updating of the ESB2 bit 4.
EL1	Enables updating of the ESB2 bit 4.
ES0	Inhibits End-of-Sweep SRQ generation.
ES1	Enables End-of-Sweep SRQ generation.
FB0	Inhibits Extended Status Byte 1 SRQ generation.
FB1	Enables Extended Status Byte 1 SRQ generation.
II0	Inhibits updating of the ESB2 bit 7.
II1	Enables updating of the ESB2 bit 7.
LA0	Inhibits updating of ESB1 bit 7.
LA1	Enables updating of ESB1 bit 7.
LE0	Inhibits Lock Error SRQ generation.
LE1	Enables Lock Error SRQ generation.
LS0	Inhibits updating of the ESB1 bit 3.
LS1	Enables updating of the ESB1 bit 3.
MB0	Sets the enable mask byte for the Primary Status Byte.
MB1	Sets the enable mask byte for Extended Status Byte 1.
MB2	Sets the enable mask byte for Extended Status Byte 2.
PE0	Inhibits Parameter Range Error SRQ generation.
PE1	Enables Parameter Range Error SRQ generation.
SB0	Inhibits Extended Status Byte 2 SRQ generation.
SB1	Enables Extended Status Byte 2 SRQ generation.
SE0	Inhibits Syntax Error SRQ generation.
SE1	Enables Syntax Error SRQ generation.
SQ0	Disables the SRQ generation function.
SQ1	Enables the SRQ generation function.
UL0	Inhibits RF Unleveled SRQ generation.
UL1	Enables RF Unleveled SRQ generation.

```
OUTPUT 705; "OES"
ENTER 705 USING "#, B"; A, B, C
MAIN = A
1 EXT = B
2 EXT = C
```

Figure 2-11. *OES Command Programming Example*

The MG369XB has a software mask that permits manipulation of the three status bytes over the bus. This manipulation is accomplished by sending the command codes MB0, MB1, MB2, or all three at once, followed by an argument that assigns an on/off condition for each bit in the byte. Two examples are shown below:



EXAMPLE #1: **"MB2" (CHR $(24))**

Sets bits 3 and 4 in Mask Byte 2 to 1 and all other bits to 0, thus enabling bits 3 and 4 in Extended Status Byte 2 to be read from the bit 7 position of the Primary Status Byte.

EXAMPLE #2: **"MB2" (CHR $(12))**

Sets bits 2 and 3 in Mask Byte 2 to 1 and all other bits to 0, thus enabling bits 2 and 3 in Extended Status Byte 2 to be read from the bit 7 position of the Primary Status Byte.

Figure 2-12. *Status Byte Mask Programming Examples*

2-14 Configuration Commands

Table 2-14 lists the configuration command mnemonic codes. These commands permit selection/setting of the following system configuration items via the bus:

- A +5V or –5V level for the rear panel retrace and bandswitch blanking outputs
- Setting the frequency scaling reference multiplier value
- Normally-open or normally-closed contacts on the internal penlift relay
- RF on or RF off during frequency switching in CW, step sweep, and list sweep modes
- RF on or RF off during sweep retrace
- RF on or RF off at reset
- 40 dB or 0 dB of attenuation when RF is switched off in units with a step attenuator (Option 2)

The system configuration selections made with GPIB commands remain in effect when the instrument is returned to local control.

Table 2-14. *Configuration Commands*

Mnemonic Code	Function
BPN	Selects +5V for retrace and bandswitch blanking outputs.
BPP	Selects +5V for retrace and bandswitch blanking outputs.
EBW0	Selects the external reference loop bandwidth of 10 Hz.
EBW1	Selects the external reference loop bandwidth of 30 Hz.
EBW2	Selects the external reference loop bandwidth of 100 Hz.
EBW3	Selects the external reference loop bandwidth of 300 Hz.
FRS	Opens the frequency scaling reference multiplier parameter.
PPC	Selects normally-closed contacts on the internal penlift relay.
PPO	Selects normally-open contacts on the internal penlift relay.
RC0	Selects RF to be off during frequency switching in CW, step sweep, and list sweep modes.
RC1	Selects RF to be on during frequency switching in CW, step sweep, and list sweep modes.
RO0	Selects RF to be on at reset.
RO1	Selects RF to be off at reset.
RT0	Selects RF to be off during retrace.
RT1	Selects RF to be on during retrace.
TR0	Sets 0 dB of attenuation when RF is switched off.
TR1	Sets 40 dB of attenuation when RF is switched off.

2-15 Group Execute Trigger Commands

Table 2-15 lists the group execute trigger (GET) command mnemonic codes. These commands let a GET bus message (Table 1-3) be used to trigger certain signal generator functions and thus speed up bus operations.

In the default state, the MG369XB responds to a GET message by triggering a single sweep.

Table 2-15. *Group Execute Trigger Commands*

MNEMONIC CODE	FUNCTION
GTC	Configures the MG369XB to execute an SQF command (scan to the next higher preset CW frequency) each time a GET message is received.
GTD	Configures the MG369XB to execute a DN command (steps the open parameter down by the step size) each time a GET message is received.
GTF	Configures the MG369XB to execute a fast-frequency-switching step (Table 2-17) each time a GET message is received.
GTL	Configures the MG369XB to execute a TSS command (steps to the next point in a dual step sweep mode) each time a GET message is received.
GTO	Disables the GET functions.
GTS	Configures the MG369XB to execute a TRS command (trigger a single sweep) each time a GET message is received. This is the default mode.
GTT	Configures the MG369XB to execute a TST command (execute a complete signal generator self test) each time a GET message is received.
GTU	Configures the MG369XB to execute a UP command (steps the open parameter up by the step size) each time a GET message is received.
Y	Sending a “Y” is equivalent to sending a GET.

2-16 List Sweep Commands

Table 2-16 (following page) lists the list sweep command mnemonic codes. These commands provide for (1) placing the signal generator in list sweep mode, (2) accessing up to four lists of 2000 frequency/power level sets, and (3) generating a phase-locked step sweep of the list frequency/power level sets.

In list sweep mode, up to four lists of 2000 non-sequential frequency/power level sets can be stored and accessed. A list index (0 thru 1999) identifies each frequency/power level set in a list. When commanded, the signal generator generates a phase-locked step sweep between the specified list start index and list stop index.

Accessing and Editing a List

The command, LST, places the signal generator in list sweep mode. The ELN(x) command is used to select which of the four lists is to be accessed. The first list (list number 0) is the same list that is available via local (front panel) control. This list is stored in non-volatile RAM to preserve any settings after the instrument is powered off. The other three lists (list numbers 1, 2, and 3) are all stored in volatile RAM and all settings are lost when power to the signal generator is turned off. At power up, list numbers 1, 2, and 3 are set to their default state of 2000 index entries of 5 GHz at 0 dBm.

The ELI(xxxx) command sets the list index for the current list. Use the LF command to set the list frequencies starting at the list index and the LP command to set the list power levels starting at the list index. Any number of frequencies and power levels can follow these commands.

Another method of entering frequency and power level information into the current list index is to use the command, CTL, which copies the current CW frequency and power level to the current list index.

Programming Example:
Programming "**`LST ELN1 ELI1234 LF 2 GH, 5 GH, 1 GH, 8 GH LP 2 DM, 9 DM, –3 DM, –10 DM`**" places the signal generator in list sweep mode, selects list number 1, and sets the list index to 1234. List index 1234 is set to 2 GHz at 2 dBm, list index 1235 is set to 5 GHz at 9 dBm, list index 1236 is set to 1 GHz at –3 dBm, and list index 1237 is set to 8 GHz at –10 dBm

Table 2-16. *List Sweep Commands*

Mnemonic Code	Function
CTL	Copy current CW frequency and power level to current list index.
ELI(xxxx)	Sets list index to xxxx.
ELN(x)	Sets the list number to x.
LDT	Opens the list sweep dwell time parameter.
LEA	Learn List (in List Sweep mode).
LF	Sets list frequencies starting at the list index.
LIB(xxxx)	Sets the list start index to xxxx.
LIE(xxxx)	Sets the list stop index to xxxx.
LP	Sets list power levels starting at the list index.
LST	Places the MG369XB in list sweep mode.

List Sweep Triggering

Four different modes of triggering are available in list sweep mode—automatic, external, single, and manual. When automatic, external, or single trigger mode is selected, the output sweeps between the specified list start and stop indexes, dwelling at each list index for the specified dwell time. When manual trigger mode is selected, the list start index, list stop index, and dwell time parameter are not used. Instead, the list index is incremented using the UP command or an external TTL trigger and is decremented using the DN command.

The AUT command selects automatic sweep triggering and the HWT command selects external sweep triggering. When external sweep trigger mode is selected, the output sweep recurs when triggered by an external TTL-compatible clock pulse to the rear panel AUX I/O connector. The EXT command selects single list sweep triggering. When single sweep trigger mode is selected, a single list sweep starts when the TRG command is received.

The MNT command selects the manual trigger mode. In manual trigger mode, the list index is incremented by one each time the UP command is received or each time an external TTL trigger is received. The list index is decremented by one each time the DN command is received.

Generating a List Sweep

Generating a list sweep involves selecting a sweep range, a dwell-time-per-step, and a sweep trigger. The sweep range is defined by a list start index and a list stop index. Use the LIB(xxxx) command to set the list start index and the LIE(xxxx) command to set the list stop index. The dwell-time-per-step of the list sweep is changed using the LDT parameter entry command. Select a trigger for the list sweep using the list sweep trigger commands previously described.

Programming Example:
Programming "**`LIB1234 LIE1237 EXT LDT 10 MS TRG`**" implements a list sweep from the current list index 1234 to index 1237 in single trigger mode with a 10 ms dwell-time-per-step, then triggers a single sweep.

List Calculations
During the initial sweep, the signal generator performs calculations to set the frequency and power levels. This causes the initial list sweep to take longer than each subsequent sweep. The command, LEA, initiates a process that examines every index in the current list and performs all the calculations necessary to set the frequency and power levels. This lets the initial list sweep be as fast as each subsequent sweep.

The list calculations are for the current list only. Any changes to the current list or selection of another list requires the calculations to be performed again. The calculations are stored only in volatile RAM and are lost when power to the signal generator is turned off.

2-17 Fast-Frequency-Switching Commands

Table 2-17 lists the fast-frequency-switching command mnemonic codes. These commands provide for reducing the time that it takes to switch between CW frequencies.

In the fast-frequency-switching mode, up to 3202 frequencies can be loaded into a table. A table pointer can then be set to point to a specific frequency in the table and the signal generator commanded to switch from that frequency through the following frequencies to the bottom of the table.

Loading the Frequency Table

To load the frequency table, use the command ZTLbbbbnnnnD8D8D8.....D8, where "bbbb" is the table location where the frequency points are to start loading, "nnnn" is the number of frequency points to be loaded, and "D8" is the frequency of the frequency point. Both "bbbb" and "nnnn" are 4 binary byte integers and "D8" is 8 binary bytes of an IEEE-754 double precision floating point number. The order of the bytes in each field is most significant byte first.

> **NOTE**
> Use of the commands ZL(x), ZEL, and ZS(x) limits the number of frequency points in the table to 1000.

Figures 2-13 thru 2-13b show an example of fast-frequency-switching mode programming.

Table 2-17. *Fast-Frequency-Switching Commands*

MNEMONIC CODE	FUNCTION
ZPN(bbb)	Sets the table pointer (bbbb), where bbbb is the location the pointer is to point to.
ZTL (bbbnnnD8D8D8... D8)	Loads the frequency table (bbbbnnnnD8D8D8.....D8), where bbbb is the table location where the frequency points are to start loading, nnnn is the number of frequencies to be loaded, and D8 is the frequency of the frequency point.
ZL(x)	Loads a CW frequency into the stack at location x. The location is a number from 000 to 999.
ZEL	Ends frequency loading.
ZS(x)	Sets the stack pointer to point to location x. The location is a number from 000 to 999.

The following is an example of fast-frequency-switching mode programming. This is a IBM-PC based program using the National Instruments NI-488.2 C language interface library (mcib.lib) and header (decl.h).

```
#include <stdio.h>
#include "decl.h"

#define BOARD_ID        0

void main()
{
Addr4882_t      source_addr = 5,
                device_addr[2] = {5, NOADDR};
double          freq_list[2] = {600e6, 8e9},
                *double_ptr;
int             start_index,
                num_freqs = 2,
                *integer_ptr;
char            command_str[50];

/** Clear the bus and take control.
**/
SendIFC(BOARD_ID);
if (ibsta & ERR)
    {
    exit (-1);
    }

/** Set the remote enable line.
**/
EnableRemote(BOARD_ID, device_addr);
if (ibsta & ERR)
    {
    exit (-1);
    }

/** Set the start index to an arbitrary starting point.
**/
start_index = 12;

/** Begin constructing the command.
**/
command_str[0] = 'Z';                                   /** Start with the ZTL command. **/
command_str[1] = 'T';
command_str[2] = 'L';

integer_ptr = &start_index;                             /** Point to the start index. **/
command_str[3] = (char)(*(integer_ptr + 3));            /** Get the value of the fourth byte. **/
                                                        /** Data is LSB first on Intel based PCs. **/
command_str[4] = (char)(*(integer_ptr + 2));            /** Get the value of the third byte. **/
command_str[5] = (char)(*(integer_ptr + 1));            /** Get the value of the second byte. **/
command_str[6] = (char)(*integer_ptr);                  /** Get the value of the first byte. **/
```

NOTE: This program is continued in Figure 2-13a.

Figure 2-13. *Fast-Frequency-Switching Programming Example (1 of 3)*

```
integer_ptr = &num_freqs;                          /** Point to the number of frequencies. **/
command_str[7] = (char)(*(integer_ptr + 3));       /** Get the value of the fourth byte. **/
command_str[8] = (char)(*(integer_ptr + 2));       /** Get the value of the third byte. **/
command_str[9] = (char)(*(integer_ptr + 1));       /** Get the value of the second byte. **/
command_str[10] = (char)(*integer_ptr);            /** Get the value of the first byte. **/

double_ptr = &(freq_list[0])                       /** Point to the first frequency. **/
command_str[11] = (char)(*(double_ptr + 7));       /** Get the value of byte 7. **/
                                                   /** Data is LSB first on Intel based PCs. **/
command_str[12] = (char)(*(double_ptr + 6));       /** Byte 6. **/
command_str[13] = (char)(*(double_ptr + 5));       /** Byte 5. **/
command_str[14] = (char)(*(double_ptr + 4));       /** Byte 4. **/
command_str[15] = (char)(*(double_ptr + 3));       /** Byte 3. **/
command_str[16] = (char)(*(double_ptr + 2));       /** Byte 2. **/
command_str[17] = (char)(*(double_ptr + 1));       /** Byte 1. **/
command_str[18] = (char)(*double_ptr );            /** Byte 0. **/

double_ptr = &(freq_list[1])                       /** Point to the second frequency. **/
command_str[19] = (char)(*(double_ptr + 7));       /** Get the value of byte 7. **/
command_str[20] = (char)(*(double_ptr + 6));       /** Byte 6. **/
command_str[21] = (char)(*(double_ptr + 5));       /** Byte 5. **/
command_str[22] = (char)(*(double_ptr + 4));       /** Byte 4. **/
command_str[23] = (char)(*(double_ptr + 3));       /** Byte 3. **/
command_str[24] = (char)(*(double_ptr + 2));       /** Byte 2. **/
command_str[25] = (char)(*(double_ptr + 1));       /** Byte 1. **/
command_str[26] = (char)(*double_ptr );            /** Byte 0. **/

/** Send the command.
**/
Send(BOARD_ID, source_addr, command_str, 27, DABend);
if (ibsta & ERR)
    {
    exit (-1);
    }

/** Set the pointer back to the start index.
**/
command_str[0] = 'Z';                              /** ZPN command. **/
command_str[1] = 'P';
command_str[2] = 'N';

integer_ptr = &start_index;                        /** Point to the start index. **/
command_str[3] = (char)(*(integer_ptr + 3));       /** Get the value of the fourth byte. **/
command_str[4] = (char)(*(integer_ptr + 2));       /** Get the value of the third byte. **/
command_str[5] = (char)(*(integer_ptr + 1));       /** Get the value of the second byte. **/
command_str[6] = (char)(*integer_ptr);             /** Get the value of the first byte. **/

/** Send the command.
**/
Send(BOARD_ID, source_addr, command_str, 7, DABend);
if (ibsta & ERR)
    {
    exit (-1);
    }
```

NOTE: This program is continued in Figure 2-13b.

Figure 2-13a. *Fast-Frequency-Switching Programming Example (2 of 3)*

```
/** Send a trigger.
**/
Trigger(BOARD_ID, source_addr);
if (ibsta & ERR)
    {
    exit (-1);
    }

/** Source is now outputting 600 MHz. **/

/** Send a trigger.
**/
Trigger(BOARD_ID, source_addr);
if (ibsta & ERR)
    {
    exit (-1);
    }

/** Source is now outputting 8 GHz. **/

exit(0);

} /** End of main **/
```

Figure 2-13b. *Fast-Frequency-Switching Programming Example (3 of 3)*

2-18 Power-Offset-Table Commands

Table 2-18 lists the power-offset-table command mnemonic codes. These commands provide for maintaining a consistent power level at a point within a test setup across the measurement frequencies. This "flattening" of the test point power level is accomplished by summing a power offset word (from the power offset table) with the signal generator's normal power level DAC word at each frequency point.

The power-offset mode works in conjunction with the fast-frequency-switching mode (Section 2-17). The frequency stack must be loaded before loading the power-offset table because the frequency loading sets the upper limit for the number of entries in the power-offset table. The same pointer is used for both the frequency stack and the power-offset table. Once the power-offset table is loaded, the PT1 command turns on the power-offset mode; the PT0 command turns it off.

Loading the Power-Offset Table

To load the power-offset table, use the command, PTL clch dldh..., where "clch" is the number of power-offset words and "dldh" is a power-offset word. Both "clch" and "dldh" are two-byte binary words sent LOW byte first and HIGH byte second. The power-offset word is in hundredths of a dB. Negative power offsets use 2's complement representation.

To change a power-offset word in the table, use the PTC dldh command, where "dldh" is the new power-offset word for the current power level setting.

Programming Note:
Care must be taken to send the exact number of power-offset words specified in the word count, "clch". If to few words are sent, the GPIB interface may not respond properly.

Figures 2-14 and 2-14a (following page) show an example of power-offset mode programming.

Table 2-18. *Power-Offset-Table Commands*

MNEMONIC CODE	FUNCTION
PT0	Disable the Power Offset Table.
PT1	Enable the Power Offset Table.
PTC	Change a Power Offset Table entry (PTC dldh), where dldh is the new offset word for the current table entry.
PTL	Load a Power Offset Table (PTL clch dldh ...), where clch is the data word count and dldh is the data word.

The following is an example of power-offset mode programming. This program is written for use with an IBM-PC type computer/controller containing an IOtech GPIB interface.

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>

/* IOtech Driver488/LIB Subroutine Interface definitions... */
#include "\ieee488\iotlib.h"
#include "\ieee488\iot_main.h"

/* Define the device handles */
DevHandleT Synth,ieee;

void main()
{
  char CmdString[10], DataString[40], String[40];
  unsigned char XString[160];

  int  next_step,i,j;

  /*************************************************************************/
  /* Initialize the IOtech interface board and */
  /* obtain the interface's handle.            */

  #define  ADDRESS 5

  if((ieee=InitIeee488(btMP488CT, 21, -1, 0x02el, 7, 5, 1, 10000,0))==-1)
     {
     printf("Cannot initialize IEEE 488 system.\n")
     exit(1);
     }

  if(( Synth=CreateDevice( ADDRESS, -1 ) )==-1)
     {
     printf("Cannot create Synth device.\n");
     exit(1);

  /* Set the device timeout so you don't wait forever if there's a problem */
  TimeOut(Synth, 2000);

  /* Handle the errors in the program */
  Error(Synth,OFF);

  /*************************************************************************/

  /* Address the Synthesizer to listen */
```

NOTE: This program is continued in Figure 2-14a.

Figure 2-14. *Power-Offset Mode Programming Example (1 of 2)*

```
    strcpy(XString,"_?U%");
    SendCmd(Synth,XString,strlen(XString));

    Output(Synth,"RST");
    Output(Synth,"GTF");
    Output(Synth,"ZL000");
    Output(Synth,"1 GH 2 GH 3 GH 4 GH 5 GH 6 GH 7 GH 8 GH 9 GH 10 GH");
    Output(Synth,"ZEL");

    /* Make a data array with the PTL command, the word count */
    /* and the binary data in low-byte, high-byte order.      */
    DataString[0]='P';
    DataString[1]='T';
    DataString[2]='L';
    DataString[3]=10;       /* Low byte  --  ten words */
    DataString[4]=0;        /* High byte --            */
    DataString[5]=0;        /* 0 */
    DataString[6]=0;
    DataString[7]=20;       /* 276 */
    DataString[8]=1;
    DataString[9]=30;       /* 542 */
    DataString[10]=2;
    DataString[11]=40;      /* 808 */
    DataString[12]=3;
    DataString[13]=50;      /* 1074 */
    DataString[14]=4;
    DataString[15]=60;      /* 1340 */
    DataString[16]=5;
    DataString[17]=70;      /* 1606 */
    DataString[18]=6;
    DataString[19]=80;      /* 1872 */
    DataString[20]=7;
    DataString[21]=90;      /* 2138 */
    DataString[22]=8;
    DataString[23]=100;     /* 2404 */
    DataString[24]=9;

    /* Send the data with an EOI on the last byte */
    SendEoi(Synth,DataString,25);

    Output(Synth,"PT1");
    Output(Synth,"ZS000");

    for(next_step=0;next_step<10;next_step++)
      {
        Output(Synth,"Y");
        printf("Press Enter for Next Frequency");
        getchar();
      }

} /* End of main() */
```

Figure 2-14a. *Power-Offset Mode Programming Example (2 of 2)*

2-19 User Level Calibration Commands

Table 2-19 lists the user level calibration commands. These commands provide for (1) activating individual user level calibration tables, (2) sending the tables to the controller, and (3) recalling the tables from the controller.

The user level (flatness correction) calibration function provides for calibrating out path variations in a test setup. This is accomplished by means of an entered power-offset table from a GPIB power meter or calculated data. When the user level calibration table is activated, the set power level is delivered to the point in the test setup where the calibration was performed. Up to five user level calibration tables from 2 to 801 frequency points/table can be created and stored in MG369XB memory for recall. (Refer to "Leveling Operations" in Chapter 3 of the MG369XB Operation Manual for user level calibration procedures.)

The commands, LU1 thru LU5, each activate an individual user level calibration table (#1 thru #5). The LU0 command turns off the active user level calibration table. The LUS command sends all five tables of user level calibration data to the controller where they are stored in a binary data file. While stored in the file, the data can be edited. The LUR command readies the MG369XB to receive the five tables of user level calibration data from the controller. Figures 2-15 through 2-15b (page 2-66) show an example program for saving and recalling user level calibration tables.

Table 2-19. *User Level Calibration Commands.*

MNEMONIC CODE	FUNCTION
LU0	Turns off the active user level calibration table.
LU1	Activates user level calibration table #1. Turns off any other active user level calibration table.
LU2	Activates user level calibration table #2. Turns off any other active user level calibration table.
LU3	Activates user level calibration table #3. Turns off any other active user level calibration table.
LU4	Activates user level calibration table #4. Turns off any other active user level calibration table.
LU5	Activates user level calibration table #5. Turns off any other active user level calibration table.
LUR	Readies the MG369XB to receive five tables of user level calibration data from the controller.
LUS	Sends all five tables of user level calibration data to the controller.

The following is an example program for saving and recalling user level calibration tables. This program uses the National Instruments NI-288.2 C language interface library (mcib.lib) and header (decl.h).

```
#include <stdio.h>
#include "decl.h"

void gpiberr(char *);

#define BOARD_ID        0
#define USER_LVL_SAVE       1
#define USER_LVL_RECALL     2
#define USER_LVL_NUM_BYTES  8232

void main()
{

Addr4882_t     source_addr = 5
               device_addr[2] = {5, NOADDR};
unsigned char  user_lvl_tables[USER_LVL_NUM_BYTES];
init           user_lvl_received,
              user_input;
FILE           *fp_user_lvl_data:


/** Clear the bus and take control.
 **/
SendIFC(BOARD_ID);
if(ibsta & ERR)
     gpiberr("SendIFC error");


/** Set the remote enable line.
 **/
EnableRemote(BOARD_ID, device_addr);
if(ibsta & ERR)
     gpiberr("EnableRemote error");


/** Prompt the user to save or recall the data.
 **/
printf("1. Save the data from the source\n");
printf("2. Recall the data to the source\n");
printf("Option: ");

scanf("%d",&user_input);

if(user_input == USER_LVL_SAVE)
     {
```

NOTE: This program is continued in Figure 2-15a.

Figure 2-15. *Programming Example of Saving and Recalling User Level Calibration Tables (1 of 3)*

```
        /** The LUS command tells the source to send the user level
          ** table data over the bus.
         **/
        Send(BOARD_ID, source_addr, "LUS\r\n", 5L, DABend);
        if(ibsta & ERR)
             gpiberr("Send error");

        /** Receive the user level table data.
         **/
        printf("Receiving data from the source\n");
        Receive(BOARD_ID, source_addr, user_lvl_tables,
                  (long)USER_LVL_NUM_BYTES, STOPend);
        if(ibsta & ERR)
             gpiberr("Receive error");

        user_lvl_received = ibcntl;
        printf("Received %d bytes of user level data\n",
                 user_lvl_received);

        /** Open binary data file and output the data.
         **/
        if((fp_user_lvl_data = fopen("userlvl.dat","w+b")) == NULL)
             {
             printf("Can't open the userlvl.dat data file\n");
             }
        else
             {
             printf("Outputting to userlvl.dat in the current
                       directory\n");
             fwrite(user_lvl_tables, sizeof(user_lvl_tables[0]),
                       USER_LVL_NUM_BYTES, fp_user_lvl_data);
             }
        }
   else
        {
        /** Open the binary data file and read the data.
         **/
        if((fp_user_lvl_data = fopen("userlvl.dat","rb")) == NULL)
             {
             printf("Can't open the userlvl.dat data file\n");
             }
        else
             {
             printf("Inputting from userlvl.dat in the current
                       directory\n");
             fread(user_lvl_tables, sizeof(user_lvl_tables[0]),
                       USER_LVL_NUM_BYTES, fp_user_lvl_data);
             }
```

NOTE: This program is continued in Figure 2-15b.

Figure 2-15a. *Programming Example of Saving and Recalling User Level Calibration Tables (2 of 3)*

```
      /** The LUR command readies the source to receive the user
        ** level table data. Notice that there is no carriage
        ** return, line feed, or EOI sent with the LUR command.
       **/
      Send(BOARD_ID, source_addr, "LUR", 3L, NULLend);
      if(ibsta & ERR)
           gpiberr("Send error; LUR");

      /** The data is sent to the source immediately following the
        ** LUR command.
       **/
      printf("Sending %d bytes of data to the source\n",
               USER_LVL_NUM_BYTES);
      Send(BOARD_ID, source_addr, user_lvl_tables,
           (long)USER_LVL_NUM_BYTES, DABend);
      if(ibsta & ERR)
           gpiberr("Send error; data");
      }

fclose(fp_user_lvl_data);
exit(0);
}/** end of main **/



/*****************************************************************************
***Name: gpiberr
**Desc: Display error code and message for all GPIB operation
**Receives: errsta - the error string to display
**Returns: nothing
**/
void gpiberr(char *errstr)
{
printf("\n%s\nError code = %d\n",errstr,iberr);
}/** end of gpiberr **/
```

Figure 2-15b. *Programming Example of Saving and Recalling User Level Calibration Tables (3 of 3)*

Editing the Table Data

While stored in the binary data file of the controller, the data of the five user level calibration tables can be edited. An editor that can display the data file in hexadecimal will be needed to perform the edit.

Types of Data Storage Methods
There are three types of data storage methods used for user level calibration data. Each is described in the following paragraphs. (The data item descriptions will refer back to these data types.)

Double:
8 bytes. Most significant byte first.
ANSI/IEEE-754 64-bit floating point format.

where:
S (1 bit) = sign bit, 0 positive, 1 negative
E (11 bits) = exponent, biased by 1023 base 10
F (52 bits) = fraction, 0 ≤F <1

value = [(–1) raised to the S power] ×
[2 raised to the (E – 1023) power] ×
[1 + F]

Example:
801 is stored as 40 89 08 00 00 00 00 00, base 16.
S = 0
E = 408 base 16 = 1032 base 10
F = .908 base 16 = .564453125 base 10
801 = 1 × 512 × 1.564453125

Integer:
4 bytes. Most significant byte first.
Stored as a signed integer. The sign bit is the most significant bit. Negative numbers are stored in 2's complement form.

Example:
7025 is stored as 00 00 1B 71, base 16.
–7025 is stored as FF FF D4 8F, base 16 2's complement.

Short:
2 bytes. Most significant byte first.
Stored as a signed short. The sign bit is the most significant bit. Negative numbers are stored in 2's complement form.

Example:
350 is stored as 01 5E, base 16.
–350 is stored as FE A2, base 16.

Data Item Descriptions
Each data item contained in the binary data file is described below with the following information:

- Data name
- Description
- Type of data storage
- Offset into the data file for each user level calibration table
- Data units

Figure 2-16 (page 2-68) shows a printout of a section of the data file that contains each of these data items for user level calibration table #2.

Name: Start Frequency
Description: The starting frequency for each user level calibration.
Type: Double
Offsets (base 16): Table #1 **0006**
Table #2 **0684**
Table #3 **0D02**
Table #4 **1380**
Table #5 **19FE**
Units: mHz (millihertz)

Name: Stop Frequency
Description: The ending frequency for each user level calibration.
Type: Double
Offsets (base 16): Table #1 **000E**
Table #2 **068C**
Table #3 **0D0A**
Table #4 **1388**
Table #5 **1A06**
Units: mHz (millihertz)

Name: Frequency Increment
Description: The frequency increment for 1 point. This value = (stop frequency – start frequency) divided by the number of points.
Type: Double
Offsets (base 16): Table #1 **0026**
Table #2 **06A4**
Table #3 **0D22**
Table #4 **13A0**
Table #5 **1A1E**
Units: mHz (millihertz)

Name: Number of Points
Description: The number of frequency points.
Type: Double
Offsets (base 16): Table #1 **002E**
Table #2 **06AC**
Table #3 **0D2A**
Table #4 **13A8**
Table #5 **1A26**
Units: a value of 1 = 1 point

Name: Level Correction Offset
Description: This is the power level that is added to the front panel power before the level correction point table power levels are subtracted. It represents the maximum power deviations read during the calibration.
Type: Integer
Offsets (base 16): Table #1 **0036**
Table #2 **06B4**
Table #3 **0D32**
Table #4 **13B0**
Table #5 **1A2E**
Units: mdB (milli-dB)

Name: Level Correction Point Table
Description: These are the power level correction values with respect to the maximum power deviation read during the calibration.
Type: Short (Array of 801 Points)
Offsets (base 16): Table #1 **003A**
Table #2 **06B8**
Table #3 **0D36**
Table #4 **13B4**
Table #5 **1A32**
Units: mdB (milli-dB)

Name: Power Meter Frequency Offset Table
Description: This is the frequency offset added to the synthesizer's frequency before sending it to the power meter for the sensor correction factor.
Type: Double
Offsets (base 16): Table #1 **0016**
Table #2 **0694**
Table #3 **0D12**
Table #4 **1390**
Table #5 **1AE0**
Units: mHz (millihertz)

Name: Power Meter Frequency Scale Table
Description: This is the scale factor applied to the synthesizer's frequency before sending it to the power meter for the sensor correction factor.
Type: Double
Offsets (base 16): Table #1 **001E**
Table #2 **069C**
Table #3 **0D1A**
Table #4 **1398**
Table #5 **1A16**
Units: mHz (millihertz)

```
000640   00 00 00 00  00 00 00 00  00 00 00 00  00 00 00 00
000650   00 00 00 00  00 00 00 00  00 00 00 00  00 00 00 00
000660   00 00 00 00  00 00 00 00  00 00 00 00  00 00 BA BE
000670   00 00 DA BE  42 7D 1A 94  A2 00 00 00  42 A2 30 9C
000680   E5 40 00 00  42 6D 1A 94  A2 00 00 00  40 22 00 00
000690   00 00 00 00  00 00 17 83  FF 11 FF 56  FF 56 FF 74
0006A0   FF 93 FF 9C  FF F6 00 00  FF C4 D1 21  E8 37 00 00
0006B0   00 00 00 00  00 00 00 00  00 00 00 00  00 00 00 00
0006C0   00 00 00 00  00 00 00 00  00 00 00 00  00 00 00 00
0006D0   00 00 00 00  00 00 00 00  00 00 00 00  00 00 00 00
```

Printout Explanation

The printout shows a section of the user level calibration data file, in hexadecimal, that contains each of the data items for user level calibration table #2. The offset into the data file is shown at the left in the printout.

Offset **0674**: Start Frequency
42 7D 1A 94 A2 00 00 00 = 2 GHz

Offset **067C**: Stop Frequency
42 A2 30 9C E5 40 00 00 = 10 GHz

Offset **0684**: Frequency Increment
42 6D 1A 94 A2 00 00 00 = 1 GHz

Offset **068C**: Number of Points
40 22 00 00 00 00 00 00 = 9 points

Offset **0694**: Level Correction Offset
00 00 17 83 = 6.016 dB

Offset **0698**: Level Correction Point Table (9 points)
FF 11 = –.239 dB
FF 56 = –.170 dB
FF 56 = –.170 dB
FF 74 = –.140 dB
FF 93 = –.109 dB
FF 9C = –.100 dB
FF F6 = –.010 dB
00 00 = 0 dB
FF C4 = –.060 dB

Figure 2-16. *Printout of a Section of the User Level Calibration Binary Data File*

2-20 Master-Slave Operation Commands

Table 2-20 lists the master-slave operation command mnemonic codes. These commands provide for enabling two instruments that are connected in a master-slave configuration to produce CW and synchronized, swept output signals at a frequency offset.

In a master-slave configuration, one instrument (the Master) controls the other (the Slave) via interface cables between their rear panel AUX I/O and SERIAL I/O connectors. The two units are phase-locked together by connecting them to the same 10 MHz reference time base. (Refer to the MG369XB Operation Manual, Chapter 7—Use With Other Instruments, for master-slave interconnection and operating instructions.)

The parameter entry commands, SLF0 - SLF9 and SLM0 - SLM9, are used to set the F0 - F9 and M0 - M9 frequencies for the Slave unit; the SLDF parameter entry command is used to set the ΔF parameter for the Slave unit. The main output power level (L1) for the Slave unit is set using the SLV or SLL1 parameter entry command; the alternate sweep power level (L2) for the Slave unit is set using the SLL2 parameter entry command. The S1 command turns on the master-slave mode of operation; the S0 command turns off the Master-Slave mode of operation.

Programming Example:
Programming "**`SLF1 5 GH SLF2 8 GH SLL1 3 DM S1`**" sets the Slave unit F1 frequency to 5 GHz, its F2 frequency to 8 GHz, and its output power level to 3 dBm and turns on the master-slave mode of operation. Now, when the Master unit is programmed to perform a F1 to F2 sweep, the Slave unit will produce a synchronous 5 GHz to 8 GHz frequency sweep that has an output power level of 3 dBm.

Programming Note:
Use the SOF parameter entry command *only* to set the frequency offset for a Slave unit that is (1) slave to a Master unit that is connected to a 360B VNA in a source or dual-source configuration or (2) slave to a Master unit that is programmed to perform non-sequential frequency step sweeps (refer to Special Step Sweep on page 2-27).

Table 2-20. *Master-Slave Operation Commands*

MNEMONIC CODE	FUNCTION
S0	Turns off the Master-Slave mode of operation.
S1	Turns on the Master-Slave mode of operation.

2-21 Self Test Command

Table 2-21 lists the self test command mnemonic code. This command provides for executing a signal generator self test.

When a TST command is received, the signal generator performs a self test, then places a "P" (for pass) or a "F" (for fail) on the bus. It also generates six self test results bytes. Figure 2-18 (page 2-71) shows the six self test results bytes and identifies the reporting function of each bit.

When self test is completed, bit 7 of Self Test Results Byte 6 and bit 2 of Extended Status Byte 1 are both set. If a failure(s) occurs during self test, the Self Test Results Byte bit(s) reporting the failure(s) and bit 0 of Extended Status Byte 1 are set.

The OSR command returns the six self test results bytes to the controller. Figure 2-17 provides an example of self test command programming.

Programming Note: The "P or "F" character placed on the bus by the signal generator self test must be cleared from the output buffer (read by the controller) before another output command, such as OSR, is sent. If it is not cleared, the first character of the next output will be missing. Line 30 (Figure 2-17) shows clearing of the "P" or "F" character.

Table 2-21. *Self Test Command*

MNEMONIC CODE	FUNCTION
TST	Executes a signal generator self test. Extended Status Byte 1 bit 0 is set if self test fails; bit 2 is set when self test is complete.

```
10 OUTPUT 705; "CSB"
20 OUTPUT 705; "TST"
30 ENTER 705; D$
40 DISP D$
50 OUTPUT 705; "OSR"
60 ENTER 705 USING "#,B"; A, B, C, D, E, F
70 DISP A; B; C; D; E; F
80 END
```

Figure 2-17. *Self Test Command Programming Example*

Self Test Results Byte 1

Sweep Time Circuitry Failed	Not Used	Power Supply Voltage(s) are Out of Reg	Internal AM Failed	AM Meter Failed	DVM –10 Volt Reference Check Failed	DVM +10 Volt Reference Check Failed	DVM Ground Offset Check Failed
Bit 7 (128)	*Bit 6* (64)	*Bit 5* (32)	*Bit 4* (16)	*Bit 3* (8)	*Bit 2* (4)	*Bit 1* (2)	*Bit 0* (1)

Self Test Results Byte 2

Not Locked Indicator Check Failed	Down Converter is Not Locked	YIG Loop Circuitry is Not Locked	Coarse Loop Circuitry is Not Locked	Not Used	High Stability Crystal is Not Locked	Ext 10 MHz is Not Locked	Oven is Not Ready
Bit 7 (128)	*Bit 6* (64)	*Bit 5* (32)	*Bit 4* (16)	*Bit 3* (8)	*Bit 2* (4)	*Bit 1* (2)	*Bit 0* (1)

Self Test Results Byte 3

Detector Log Amp Circuitry Failed	Level Reference Circuitry Failed	Not Leveled Detector Circuitry Failed	Delta-F Ramp Circuitry Failed	Center Frequency Circuitry Failed	Marker Switch Point Circuitry Failed	Delta-F Ramp Circuitry Failed	FM Loop Gain Circuitry Failed
Bit 7 (128)	*Bit 6* (64)	*Bit 5* (32)	*Bit 4* (16)	*Bit 3* (8)	*Bit 2* (4)	*Bit 1* (2)	*Bit 0* (1)

Self Test Results Byte 4

3.3 - 5.5 GHz Switch Filter Section or Level Detector Circuitry Failed	2-3.3 GHz Switch Filter Section or Level Detector Circuitry Failed	Switch Filter or Level Detector Circuitry Failed	0.01 - 2 GHz Range Unleveled	Level Detector Input Circuitry Failed	2 - 8.4 GHz Range Unleveled and Not Locked	8.4 - 20 GHz Range Unleveled and Not Locked	2 - 20 GHz Range Unleveled and Not Locked
Bit 7 (128)	*Bit 6* (64)	*Bit 5* (32)	*Bit 4* (16)	*Bit 3* (8)	*Bit 2* (4)	*Bit 1* (2)	*Bit 0* (1)

Self Test Results Byte 5

32 - 40 GHz Section of Switched Doubler Module Failed	Switched Doubler Module or Driver Circuitry Failed	Not Used	Source Quadrupler Module or Driver Circuitry Failed	Modulator or Driver Circuitry Failed	13.25 - 20 GHz Switch Filter Section or Level Detector Circuitry Failed	8.4 - 13.25 GHz Switch Filter Section or Level Detector Circuitry Failed	5.5 - 8.4 GHz Switch Filter Section or Level Detector Circuitry Failed
Bit 7 (128)	*Bit 6* (64)	*Bit 5* (32)	*Bit 4* (16)	*Bit 3* (8)	*Bit 2* (4)	*Bit 1* (2)	*Bit 0* (1)

Self Test Results Byte 6

Self Test is Complete	Internal Pulse Reference Failed	Internal FM Failed	RF Was Off When Self Test Started	Slope DAC or Associated Circuitry Failed	Sample and Hold Circuitry Failed	20 - 25 GHz Section of Switched Doubler Module Failed	25 - 32 GHz Section of Switched Doubler Module Failed
Bit 7 (128)	*Bit 6* (64)	*Bit 5* (32)	*Bit 4* (16)	*Bit 3* (8)	*Bit 2* (4)	*Bit 1* (2)	*Bit 0* (1)

Figure 2-18. *Self Test Results Bytes*

2-22 Miscellaneous Commands

Table 2-22 is a list of miscellaneous command mnemonic codes that do not fit into any of the other classifications. These commands provide the following operations:

- GPIB Address Change
- CW Ramp
- Secure Mode
- Returning the MG369XB to local control
- Instrument Reset
- Serial Number Entry
- Phase offset control

Table 2-22. *Miscellaneous Commands*

Mnemonic Code	Function
ADD	Opens the GPIB address parameter. Programming Example: Programming "**`ADD 13 ADR`**" changes the instrument GPIB address to 13.
CS0	Turns off the CW ramp.
CS1	Turns on the CW ramp.
DS0	Turns on the secure mode.
DS1	Turns off the secure mode.
MR	Performs a master reset of the instrument by setting all of the instrument parameters to factory default.
PS0	Turns off the Phase Offset.
PS1	Turns on the Phase Offset.
PSZ	Zeros the Phase Offset display.
RL	Returns the instrument to local (front panel) control.
RST	Resets the MG369XB to its default settings. **NOTE** Sending this command clears the current instrument setup. If this setup is needed for future testing, save it as a stored setup (Section 2 -13) before sending RST.
SNR	Enter the instrument serial number.

2-23 Program Errors

Two types of errors can occur in bus programming—invalid-parameter and syntax. These two error types are described in the following paragraphs.

Invalid Parameter

Invalid-parameter errors are those that cause the signal generator to beep. These errors include:

- Programming an analog frequency sweep where the sweep start frequency is greater than the stop frequency
- Attempting to enter a frequency, time, or power level parameter that exceeds the limits of the signal generator
- Failing to properly end a parameter entry with a suitable terminator such as MH, DB, MS, etc.

Syntax

Syntax errors are those that occur in the formulation of a program statement, such as writing "**EXTTFS**" instead of "**EXTTRS**".

To prevent misinterpretation of command statements, the signal generator ignores all portions of the command statement following the syntax error.

All commands are ignored until the signal generator

receives the Unlisten command (ASCII 63; "?" character) over the bus or until the signal generator is addressed to talk.

2-24 Reset Programming and Default Conditions

Table 2-23 describes the six methods that can be used to reset the signal generator. They provide a means for quickly returning the MG369XB to its default (preprogrammed) operational state.

The default settings for the numeric frequency, sweep time, and power level parameters are the same as those listed in Table 3-1 of the Series MG369XB Synthesized Signal Generator Operation Manual (P/N: 10370-10365).

Figure 2-19 (page 2-76) provides an example of a recommended sequence for programming a reset command. Using this command sequence ensures that all parameters and commands assume their preprogrammed state each time reset is desired.

Table 2-23. *Resetting the MG369XB GPIB Interface Circuits*

Methods of Resetting GPIB Interface Circuits	Functions Affected	Default Conditions
1. Pressing the front panel menu RETURN TO LOCAL soft-key.	Bus Messages	Local
2. Pressing the front panel System menu RESET soft-key.	Service Request Modes	ES0, FB0, PE0, SB0, SE0, SQ0, UL0, SB0 GTS Local and Local Lockout
3. Sending the RST command over the bus.	Same as 2 above	Same as 2 above except that the local bus message is not reset.
4. Sending the MS command over the bus.	Same as 2 above	Same as 2 above.
5. Executing the interface message Device Clear.	Same as 2 above.	Same as 2 above except that the local bus message is not reset.
6. Turning power on and off.	Same as 2 above.	Places the GPIB into the power-on state. Instrument state does not change.

Sample Coding In Basic

```
10 CLEAR 705
20 OUTPUT 705; "FUL IL1 L1 10DM"
```

Explanation of Code

Line 10 sends the Device Clear bus message.This message clears the signal generator GPIB interface.

Line 20 sends new front panel settings: Full Sweep, Internal Leveling, and Output Power Level of 10 dBm.

Figure 2-19. *Reset Programming Example*

2-25 Programming Examples

Figures 2-20 thru 2-22 (following pages) provide three examples of GPIB programming using the MG369XB command codes.

The following subroutine uses the output identify (OI) command to identify the signal generator's model number, serial number, minimum and maximum frequencies, minimum and maximum power level, and software revision level. This subroutine is used in the example programs in Figures 2-21 and 2-22 to read the limits of the signal generator.

```
 10 !   "GET OI"
 20 ! Gets the output id string
 30 ! from a MG80XX Synthesizer
100 OUTPUT 705; "OI"
110 DIM A$[36]
120 ENTER 705; A$
130 M$=A$[1,2] ! Model
140 M1$=A$[3,4] ! Model Number
150 F1$=A$[5,9] ! Freq Low
160 F2$=A$[10,14] ! Freq High
170 L2$=A$[15,20] ! Min Power
180 L1$=A$[21,24] ! Max Power
190 S$=A$[25,28] ! Software Ver
200 S1$=A$[29,34] ! Serial Number
210 P$=A$[35,35] ! Model Prefix
220 S2$=A$[36] ! Series
230 PRINT "Model Number :";M$;S2$;M1$;P$
240 PRINT "Serial Number :";S1$
250 PRINT "Low Freq :";F1$
260 PRINT "High Freq :";F2$
270 PRINT "Max Power :";L1$
280 PRINT "Min Power :";L2$
290 PRINT "Software Ver :";S$
300 END
```

Program Explanation

Line 100: Sends the "OI" command.
Line 110: Dimensions the variable.
Line 120: Gets the "OI" string.
Line 130: Sets M$ to the model (80).
Line 140: Sets M1$ to the model number.
Line 150: Sets F1$ to the signal generator low-end frequency.
Line 160: Sets F2$ to the signal generator high-end frequency.
Line 170: Sets L2$ to the minimum power point.
Line 180: Sets L1$ to the maximum power point.
Line 190: Sets S$ to the software version number.
Line 200: Sets S1$ to the serial number.
Line 210: Sets P$ to the model prefix number (0,1, or 2).
Line 220: Sets S2$ to the model series (A or B).
Lines 230-290: Prints the data obtained.

Figure 2-20. *Using the Output Identify (OI) Command*

The following program (1) receives entries from the keyboard to set intial frequency and step-size parameters, and (2) activates the soft keys on the controller so that they can step the frequency up or down.

```
 20 ! PARAMETER ENTRY, SYZ, UP, AND DN COMMANDS
 30 Address=705
 40 CALL Iddev(Address,Model,Fmin,Fmax,Pmin,Pmax)
 50 OFF KEY
 60 DISP "ENTER FREQUENCY IN GHz";
 70 INPUT Freq
 80 IF Freq>Fmax OR Freq<Fmin THEN
 90   DISP "FREQUENCY OUT OF RANGE - ";
100   GOTO 60
110 END IF
120 DISP "ENTER STEP SIZE IN GHz";
130 INPUT Stepsize
140 IF Stepsize>Fmax-Fmin OR Stepsize<.000001 THEN
150   DISP "ILLEGAL STEP SIZE - ";
160   GOTO 120
170 END IF
180 OUTPUT Address;"CF1";Freq;"GH SYZ";Stepsize;"GH"
190 ON KEY 0 LABEL "STEP" GOTO 300
200 ON KEY 5 LABEL " UP " GOTO 300
210 ON KEY 1 LABEL "STEP" GOTO 320
220 ON KEY 6 LABEL "DOWN" GOTO 320
230 ON KEY 2 LABEL "NEW " GOTO 50
240 ON KEY 7 LABEL "FREQ" GOTO 50
250 GOTO 250
300 OUTPUT Address;"UP"
310 GOTO 250
320 OUTPUT Address;"DN"
330 GOTO 250
340 END
1010 SUB Iddev(Address,Model,Fmin,Fmax,Pmin,Pmax)
1020 DIM Ident$[36]
1030 OUTPUT Address;"OI"
1040 ENTER Address;Ident$
1050 Model=VAL(Ident$[1,2])
1060 Model Number=VAL(Ident$[3,4])
1070 Fmin=VAL(Ident$[5,9])
1080 Fmax=VAL(Ident$[10,14])
1090 Pmin=VAL(Ident$[15,20])
1100 Pmax=VAL(Ident$[21,24])
1110 Model Prefix=Ident$[35,35]
1120 Series=VAL(Ident$[36])
1130 SUBEND
```

Program Explanation

Line 30: Sets the address of the signal generator.
Line 40: Calls the device identification subroutine described in Line 1010.
Line 50: Turns off the key definitions.
Lines 60-110: Accept the starting frequency entry and checks its validity.
Lines 120-170: Accept the step size entry and checks its validity.
Line 180: Sets the signal generator to the starting frequency and step size.
Lines 190-240: Set up keys and key labels.
Line 250: Waits for a key to be pressed.
Line 300: Reports that the STEP UP key was pressed; sends the UP command.
Line 310: Waits for the next key.
Line 320: Reports that the STEP DOWN key was pressed; send the DN command.
Line 330: Waits for the next key.
Line 340: Ends the main program.
Lines 1010-1120: Identify the signal generator address, model, frequency range, and power range.

Figure 2-21. *Controlling CW Frequency/Parameter Entries*

The following program accepts user inputs for (1) power sweep starting and ending levels, (2) number of steps in the sweep, and (3) sweep dwell times. After accepting such imputs, the program then commands the signal generator to obtain a display of the power sweep.

NOTE: The signal generator should be connected to a scalar network analyzer.

```
 30 Address=705
 40 CALL Iddev(Address,Model,Fmin,Fmax,Pmin,Pmax)
 60 DISP "ENTER POWER SWEEP STARTING LEVEL (dBm)";
 70 INPUT Powerstart
 80 IF Powerstart>Pmax OR Powerstart<Pmin THEN
 90   DISP "POWER OUT OF RANGE - ";
100   GOTO 60
110 ENDIF
120 DISP "ENTER POWER SWEEP ENDING LEVEL (dBm)";
130 INPUT Powerstop
140 IF Powerstop>Pmax OR Powerstop<Pmin THEN
150   DISP "POWER OUT OF RANGE - ";
160   GOTO 120
170 END IF
180 DISP "ENTER NUMBER OF STEPS";
190 INPUT Noofsteps
200 IF Noofsteps<1 OR Noofsteps>10000 THEN
210   DISP "NUMBER OF STEPS OUT OF RANGE - ";
220   GOTO 180
230 END IF
240 DISP "ENTER DWELL TIME AT EACH STEP (mS)";
250 INPUT Dwell
260 IF Dwell<1 OR Dwell>99000 THEN
270   DISP "DWELL TIME OUT OF RANGE - ";
280   GOTO 240
290 END IF
300 OUTPUT Address;"L1";Powerstart:"DM L2";Powerstop;
    "DM PNS";Noofsteps;"SPS"
310 OUTPUT Address;"PDT";Dwell;"MS LSP"
340 END
1010 SUB Iddev(Address,Model,Fmin,Fmax,Pmin,Pmax)
1020 DIM Ident$[36]
1030 OUTPUT Address;"OI"
1040 ENTER Address;Ident$
1050 Model=VAL(Ident$[1,2])
1060 Model Number=VAL(Ident$[3,4])
1070 Fmin=VAL(Ident$[5,9])
1080 Fmax=VAL(Ident$[10,14])
1090 Pmin=VAL(Ident$[15,20])
1100 Pmax=VAL(Ident$[21,24])
1110 Model Prefix=Ident$[35,35]
1120 Series=VAL(Ident$[36])
1130 SUBEND
```

Program Explanation

Line 30: Set the address of the signal generator.
Line 40: Call the device identification subroutine described in line 1010.
Lines 60-110: Accept the starting power level entry and checks its validity.
Lines 120-170: Accept the ending power level entry and checks its validity.
Lines 180-230: Accept the power sweep number-of-steps entry and checks it validity.
Lines 240-290: Accept the power sweep dwell time entry and checks its validity.
Lines 300-310: Sets the signal generator to perform the above defined power sweep.
Line 340: Ends the main program.
Lines 1010-1120: Identify the signal generator address, model, frequency range, and power range.

Figure 2-22. *Controlling Power Level and Power Sweep*

Chapter 3
Command Dictionary

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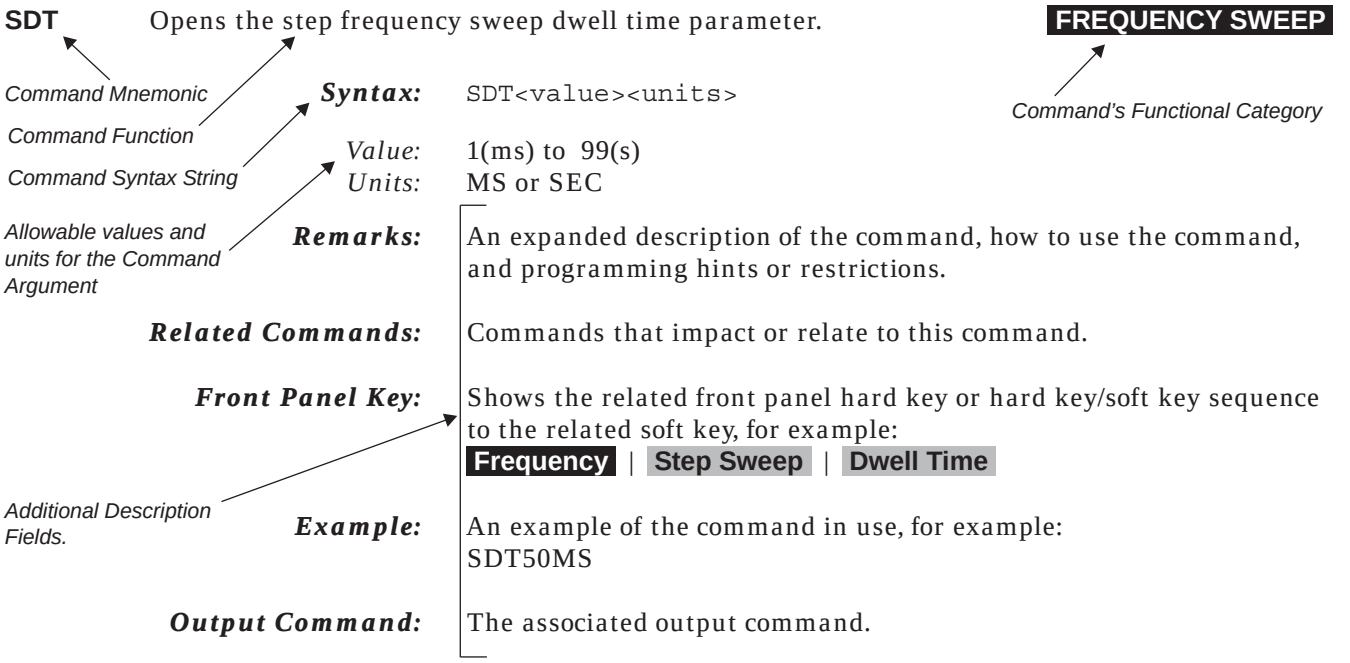

Figure 3-1. *Typographic Conventions for the GPIB Command Listings*

Chapter 3
Command Dictionary

3-1 Introduction

This chapter provides alphabetically-ordered listings and descriptions of all MG369XB GPIB programming commands.

3-2 Typographic Conventions

The typographic conventions, abbreviations, and syntax legend used throughout this chapter to define the GPIB commands are described in Figure 3-1.

3-3 Functional Categories

Throughout this chapter, the distinctive white-on-black text in the upper corner of each command's descriptive area is the functional category to which the command belongs (see Figure 3-1). The MG369XB's GPIB functional categories are described in Chapter 2; they provide descriptive details and tabular data that apply to the category as a whole.

3-4 Commands

The remaining pages in this chapter provide an alphabetical listing of the commands (mnemonics) used to program the series MG369XB Synthesized Signal Generator.

***IDN?** Requests device identification. **OUTPUT**

Syntax: `*IDN?`

Remarks: Returns an identification string in IEEE 488.2 specified <NR1> format (four fields separated by commas). The fields are <manufacturer>, <model>, <serial #>, <firmware version>.

Front Panel Key: N/A

ACW Activates the currently open frequency parameter as CW. **CW FREQUENCY**

Syntax: `ACW`

Remarks: Activates the frequency parameter that is currently open for data entry as CW, switches to CW if not in CW mode.

Related Commands: CF0 to CF9, CM0 to CM9

Front Panel Key: N/A

Example: **`F5 100 MH ACW`**

AD1 Selects F1-ΔF alternate frequency sweep. **SWEEP**

Syntax: `AD1`

Remarks: Selects an alternate symmetrical frequency sweep around F1. The width of the sweep is determined by the DF frequency parameter. If the MG369XB is sweeping when AD1 is received, the instrument's output will alternate between the commanded sweep and the sweep being executed.

Related Commands: F1, DLF, DFF, DFM

Front Panel Key: N/A

Example: **`SSP SF1 F1 5 GH DLF 1 GH AD1`** sets step sweep F1-F2 and alternate step sweep F1-dF.

AD5 Selects F5-ΔF alternate frequency sweep. **SWEEP**

Syntax: AD5

Remarks: Selects an alternate symmetrical frequency sweep around F5. The width of the sweep is determined by the DF frequency parameter. If the MG369XB is sweeping when AD5 is received, the instrument's output will alternate between the commanded sweep and the sweep being executed.

Related Commands: F5, DLF, DFF, DFM

Front Panel Key: **Frequency** | **Step Sweep** | **More >** | **Alternate Sweep >** | **Alternate Range** | **F5-dF**

Example: **SSP SF1 F5 5 GH DLF 1 GH AD5** sets step sweep F1-F2 and alternate step sweep F5-dF.

AD6 Selects F6-ΔF alternate frequency sweep. **SWEEP**

Syntax: AD6

Remarks: Selects an alternate symmetrical frequency sweep around F6. The width of the sweep is determined by the DF frequency parameter. If the MG369XB is sweeping when AD6 is received, the instrument's output will alternate between the commanded sweep and the sweep being executed.

Related Commands: F6, DLF, DFF, DFM

Front Panel Key: **Frequency** | **Step Sweep** | **More >** | **Alternate Sweep >** | **Alternate Range** | **F6-dF**

Example: **SSP SF1 F6 5 GH DLF 1 GH AD5** sets step sweep F1-F2 and alternate step sweep F6-dF.

ADD Opens the GPIB address parameter. **MISCELLANEOUS**

Syntax: `ADD<value><unit>`

Value: 1-30
Units: ADR

Remarks: Permits changing the instruments GPIB address. The address must be between 1 and 30 and must be terminated with ADR. Once the address is changed, the MG369XB will no longer respond to the old address. The signal generators default address is 5.

Front Panel Key: **System** | **Config** | **GPIB >** | **GPIB Address**

Example: **`ADD 6 ADR`** changes the instrument GPIB address to 6.

ADP1 Opens the internal AM % depth parameter. **PARAMETER ENTRY**

Syntax: `ADP1<value><unit>`

Value: 0% to 100%
Units: PCT

Remarks: Changes the AM depth. Applies to internal linear AM.

Related Commands: AM7, ADP2

Front Panel Key: **Modulation** | **AM** (linear) | **Edit Depth**

Example: **`AM7 ADP1 3 PCT`** turns on internal linear AM with a 3% depth.

Output Command: OAD1

ADP2 Opens the internal AM dB depth parameter. **PARAMETER ENTRY**

Syntax: `ADP2<value><unit>`

Value: 0 dB to 25 dB
Units: DB

Remarks: Changes the AM depth. Applies to internal log AM.

Related Commands: AM8, ADP1

Front Panel Key: **Modulation** | **AM** (log) | **Edit Depth**

Example: **`AM8 ADP2 3 DB`** turns on internal log AM with a 3 dB depth.

Output Command: OAD2

ADR GPIB address terminator. **DATA TERMINATOR**

Syntax: ADR

Front Panel Key: N/A

AF1 Selects F1-F2 alternate frequency sweep. **SWEEP**

Syntax: AF1

Remarks: Selects an alternate F1-F2 frequency sweep. If the MG369XB is sweeping when AF1 is received, the instrument's output will alternate between the commanded sweep and the sweep being executed. An alternate sweep command will only be recognized when the MG369XB has been programmed to sweep. It will be ignored at all other times.

Related Commands: F1, F2

Front Panel Key: **Frequency** | **Step Sweep** | **More >** | **Alternate Sweep >** | **Alternate Range** | **F1 - F2**

Example: **SSP SF1 AF1** sets step sweep F1-F2 and alternate step sweep F1-F2.

AF3 Selects F3-F4 alternate frequency sweep. **SWEEP**

Syntax: AF3

Remarks: Selects an alternate F3-F4 frequency sweep. If the MG369XB is sweeping when AF3 is received, the instrument's output will alternate between the commanded sweep and the sweep being executed. An alternate sweep command will only be recognized when the MG369XB has been programmed to sweep. It will be ignored at all other times.

Related Commands: F3, F4

Front Panel Key: **Frequency** | **Step Sweep** | **More >** | **Alternate Sweep >** | **Alternate Range** | **F3 - F4**

Example: **SSP SF1 AF3** sets step sweep F1-F2 and alternate step sweep F3-F4.

AFU Selects full range alternate frequency sweep. **SWEEP**

Syntax: AFU

Remarks: Selects an alternate full range frequency sweep. If the MG369XB is sweeping when AFU is received, the instrument's output will alternate between the commanded sweep and the sweep being executed. An alternate sweep command will only be recognized when the MG369XB has been programmed to sweep. It will be ignored at all other times.

Front Panel Key: **Frequency** | **Step Sweep** | **More >** | **Alternate Sweep >** | **Alternate Range** | **Full**

Example: **SSP SF1 AFU** sets step sweep F1-F2 and full range alternate step sweep.

AL0 Sets the alternate frequency sweep RF output to L0. **POWER LEVELING**

Syntax: AL0

Remarks: Causes the preset (or previously set) L0 RF power level to be output during the alternate frequency sweep. The command will also deselect any other previously programmed alternate sweep power level. The command does not open the L0 power level parameter for data entry. Use the parameter entry commands, XL0 or L0, to enter a new power level.

Related Commands: L0, XL0

Front Panel Key: **Frequency** | **Step Sweep** | **More >** | **Alternate Sweep >** | **Alternate Level >** | **L0**

Example: **SSP SF1 AF3 XL0 2 DB AL0** sets step sweep F1-F2, alternate step sweep F3-F4, and alternate level L0.

AL1 Sets the alternate frequency sweep RF output to L1. **POWER LEVELING**

Syntax: AL1

Remarks: Causes the preset (or previously set) L1 RF power level to be output during the alternate frequency sweep. The command will also deselect any other previously programmed alternate sweep power level. The command does not open the L1 power level parameter for data entry. Use the parameter entry commands, XL1 or L1, to enter a new power level.

Related Commands: L1, XL1

Front Panel Key: **Frequency** | **Step Sweep** | **More >** | **Alternate Sweep >** | **Alternate Level >** | **L1**

Example: **SSP SF1 AF3 XL1 2 DB AL1** sets step sweep F1-F2, alternate step sweep F3-F4, and alternate level L1.

AL2 Sets the alternate frequency sweep RF output to L2. **POWER LEVELING**

Syntax: AL2

Remarks: Causes the preset (or previously set) L2 RF power level to be output during the alternate frequency sweep. The command will also deselect any other previously programmed alternate sweep power level. The command does not open the L2 power level parameter for data entry. Use the parameter entry commands, XL2 or L2, to enter a new power level.

Related Commands: L2, XL2

Front Panel Key: **Frequency** | **Step Sweep** | **More >** | **Alternate Sweep >** | **Alternate Level >** | **L2**

Example: **SSP SF1 AF3 XL2 2 DB AL2** sets step sweep F1-F2, alternate step sweep F3-F4, and alternate level L2.

AL3 Sets the alternate frequency sweep RF output to L3. **POWER LEVELING**

Syntax: AL3

Remarks: Causes the preset (or previously set) L3 RF power level to be output during the alternate frequency sweep. The command will also deselect any other previously programmed alternate sweep power level. The command does not open the L3 power level parameter for data entry. Use the parameter entry commands, XL3 or L3, to enter a new power level.

Related Commands: L3, XL3

Front Panel Key: **Frequency** | **Step Sweep** | **More >** | **Alternate Sweep >** | **Alternate Level >** | **L3**

Example: **SSP SF1 AF3 XL3 2 DB AL3** sets step sweep F1-F2, alternate step sweep F3-F4, and alternate level L3.

AL4 Sets the alternate frequency sweep RF output to L4. **POWER LEVELING**

Syntax: AL4

Remarks: Causes the preset (or previously set) L4 RF power level to be output during the alternate frequency sweep. The command will also deselect any other previously programmed alternate sweep power level. The command does not open the L4 power level parameter for data entry. Use the parameter entry commands, XL4 or L4, to enter a new power level.

Related Commands: L4, XL4

Front Panel Key: **Frequency** | **Step Sweep** | **More >** | **Alternate Sweep >** | **Alternate Level >** | **L4**

Example: **SSP SF1 AF3 XL4 2 DB AL4** sets step sweep F1-F2, alternate step sweep F3-F4, and alternate level L4.

AL5 Sets the alternate frequency sweep RF output to L5. **POWER LEVELING**

Syntax: AL5

Remarks: Causes the preset (or previously set) L5 RF power level to be output during the alternate frequency sweep. The command will also deselect any other previously programmed alternate sweep power level. The command does not open the L5 power level parameter for data entry. Use the parameter entry commands, XL5 or L5, to enter a new power level.

Related Commands: L5, XL5

Front Panel Key: N/A

Example: **SSP SF1 AF3 XL5 2 DB AL5** sets step sweep F1-F2, alternate step sweep F3-F4, and alternate level L5.

AL6 Sets the alternate frequency sweep RF output to L6. **POWER LEVELING**

Syntax: AL6

Remarks: Causes the preset (or previously set) L6 RF power level to be output during the alternate frequency sweep. The command will also deselect any other previously programmed alternate sweep power level. The command does not open the L6 power level parameter for data entry. Use the parameter entry commands, XL6 or L6, to enter a new power level.

Related Commands: L6, XL6

Front Panel Key: N/A

Example: **SSP SF1 AF3 XL6 2 DB AL6** sets step sweep F1-F2, alternate step sweep F3-F4, and alternate level L6.

AL7 Sets the alternate frequency sweep RF output to L7. **POWER LEVELING**

Syntax: AL7

Remarks: Causes the preset (or previously set) L7 RF power level to be output during the alternate frequency sweep. The command will also deselect any other previously programmed alternate sweep power level. The command does not open the L7 power level parameter for data entry. Use the parameter entry commands, XL7 or L7, to enter a new power level.

Related Commands: L7, XL7

Front Panel Key: N/A

Example: **SSP SF1 AF3 XL7 2 DB AL7** sets step sweep F1-F2, alternate step sweep F3-F4, and alternate level L7.

AL8 Sets the alternate frequency sweep RF output to L8. **POWER LEVELING**

Syntax: AL8

Remarks: Causes the preset (or previously set) L8 RF power level to be output during the alternate frequency sweep. The command will also deselect any other previously programmed alternate sweep power level. The command does not open the L8 power level parameter for data entry. Use the parameter entry commands, XL8 or L8, to enter a new power level.

Related Commands: L8, XL8

Front Panel Key: N/A

Example: **SSP SF1 AF3 XL8 2 DB AL8** sets step sweep F1-F2, alternate step sweep F3-F4, and alternate level L8.

AL9 Sets the alternate frequency sweep RF output to L9. **POWER LEVELING**

Syntax: AL9

Remarks: Causes the preset (or previously set) L9 RF power level to be output during the alternate frequency sweep. The command will also deselect any other previously programmed alternate sweep power level. The command does not open the L9 power level parameter for data entry. Use the parameter entry commands, XL9 or L9, to enter a new power level.

Related Commands: L9, XL9

Front Panel Key: N/A

Example: **SSP SF1 AF3 XL9 2 DB AL9** sets step sweep F1-F2, alternate step sweep F3-F4, and alternate level L9.

AM0 Turns off the internal or external AM function. **MODULATION**

Syntax: AM0

Front Panel Key: N/A

AM1 Turns on the external AM function in linear mode. **MODULATION**

Syntax: AM1

Remarks: Disables the internal AM function or the external AM function in Log mode, had either of these modes been previously programmed.

Related Commands: AMS

Front Panel Key: **Modulation** | **AM** (Toggle to External, Linear) | **On**

AM2 Turns on the external AM function in log mode. **MODULATION**

Syntax: AM2

Remarks: Disables the internal AM function or the external AM function in Linear mode, had either of these modes been previously programmed.

Related Commands: ASD

Front Panel Key: **Modulation** | **AM** (Toggle to External, Log) | **On**

AM7 Turns on the internal AM function in linear mode. **MODULATION**

Syntax: AM7

Remarks: Disables the external AM function or the internal AM function in Log mode, had either of these modes been previously programmed.

Related Commands: ADP1, AMR, AMW(x)

Front Panel Key: **Modulation** | **AM** (Toggle to Internal, Linear) | **On**

AM8 Turns on the internal AM function in log mode. **MODULATION**

Syntax: AM8

Remarks: Disables the external AM function or the internal AM function in Linear mode, had either of these modes been previously programmed.

Related Commands: ADP2, AMR, AMW(x)

Front Panel Key: **Modulation** | **AM** (Toggle to Internal, Log) | **On**

AMI Turns on the AM measurement mode. **MEASURE FUNCTION**

Syntax: `AMI`

Remarks: In this mode, the signal generator measures the voltage of the external modulating signal and calculates the modulation depth of the RF output signal. The measurement results will be sent to the controller upon receipt of the OMM command. When the AMI command is received, measurements will continue to be taken until the mode is exited by receipt of the MOM command.

Related Commands: OMM, MOM

Front Panel Key: N/A

Output Command: OMM

AMO Turns off the internal AM function generator if it is on. **MODULATION**

Syntax: `AMO`

Related Commands: AM7, AM8

Front Panel Key: N/A

AMR Opens the internal AM rate parameter. **PARAMETER ENTRY**

Syntax: `AMR<value><unit>`

Value: 0.1 Hz to 1 MHz for sine wave; 0.1 Hz to 100 kHz for square, triangle, and ramp waveforms

Units: MH, KH, HZ

Related Commands: AM7, AM8

Front Panel Key: **Modulation** | **AM** (internal) | **Edit Rate**

Example: **`AM7 AMR 10 KH`** turns on internal linear AM with a 10 kHz rate.

Output Command: OAR (in Hz)

AMS Opens the external AM %/V sensitivity parameter. **PARAMETER ENTRY**

Syntax: `AMS<value><unit>`

Value: 0 %/V to 100 %/V
Units: PCV

Related Commands: AM1

Front Panel Key: **Modulation** | **AM** (external) | **Edit Sensitivity**

Example: **`AM1 AMS 30 PCV`** turns on external linear AM with a sensitivity of 30 percent/Volt.

Output Command: OAS

AMW(x) Selects the internal AM waveform. **MODULATION**

Syntax: `AMW(x)`

Value: x: 1 = Sine Wave, 2 = Square Wave, 3 = Positive Ramp, 4 = Negative Ramp, 5 = Guassian Noise, 6 = Uniform Noise, 7 = Triangle Wave

Related Commands: AM7, AM8

Front Panel Key: **Modulation** | **AM** (internal) | **Select Wave...** | **Select**

Example: **`AM7 AMW2`** turns on internal linear AM square wave.

Output Command: OAW (text)

ASD Opens the external AM dB/V sensitivity parameter. **PARAMETER ENTRY**

Syntax: `ASD<value><unit>`

Value: 0 dB/V to 25 dB/V
Units: DV

Related Commands: AM2

Front Panel Key: **Modulation** | **AM** (external) | **Edit Sensitivity**

Example: **`AM2 ASD 3 DV`** turns on external log AM with a sensitivity of 3 dB/Volt.

Output Command: OAB

AT0 Deselects ALC step attenuator decoupling. **POWER LEVELING**

Syntax: `AT0`

Remarks: Deselects the ALC step attenuator decoupling function. This returns the MG369XB to its normal (coupled) leveling mode. In this mode, when the desired power level is set, the correct combination of ALC level and step attenuator setting is determined by the instrument firmware.

Related Commands: AT1, ATT(xx)

Front Panel Key: **Level** | **ALC Mode** | **Attenuate >** | **Decouple**

AT1 Selects ALC step attenuator decoupling. **POWER LEVELING**

Syntax: `AT1`

Remarks: This function decouples the step attenuator (if equipped) from the ALC system. This permits separate setting the ALC level and step attenuator.

Related Commands: AT0, ATT(xx)

Front Panel Key: **Level** | **ALC Mode** | **Attenuate >** | **Decouple**

ATT(xx) Sets the step attenuator value to xx (times 10 dB). **POWER LEVELING**

Syntax: `ATT(xx)`

Value: xx: unsigned integer between 00 (0 dB attenuation) and 11 (110 dB attenuation)

Remarks: Permits setting the step attenuator value to xx (times 10 dB) in the ALC step attenuator decoupling mode.

Related Commands: AT0, AT1

Front Panel Key: **Level** | **ALC Mode** | **Attenuate >** | **Decouple** | **Increase Attenuation** or **Decrease Attenuation**

Example: **`AT1 ATT08`** decouples the step attenuator from the ALC system and sets the step attenuator value to 80 dB.

AUT Selects automatic sweep triggering. **SWEEP**

Syntax: AUT

Remarks: Selects automatic sweep triggering for frequency, power level, or list sweeps. When automatic sweep triggering is selected, the sweep continually sweeps from its start frequency, power level, or list index to its stop frequency, power level, or list index with optimal retrace time.

Related Commands: EXT, TEX

Front Panel Key: **Frequency** | **Step Sweep** | **More >** | **Trigger >** | **Auto** or **Frequency** | **List** | **Sweep >** | **Trigger >** | **Auto** or **Level** | **Level Sweep** | **Trigger >** | **Auto**

Example: **SSP SF1 AUT** sets step sweep F1-F2 with auto triggering.

BPN Selects -3.3V for retrace and bandswitch blanking outputs. **CONFIGURATION**

Syntax: BPN

Remarks: Selects a -3.3V level for the rear panel retrace and bandswitch blanking outputs. The retrace blanking output signal is available at pin six of the AUX I/O connector. The bandswitch blanking output signal is available at pin 20 of the AUX I/O connector.

Front Panel Key: **System** | **Config** | **Rear Panel >** | **Blanking +/-**

BPP Selects +3.3V for retrace and bandswitch blanking outputs. **CONFIGURATION**

Syntax: BPP

Remarks: Selects a +3.3V level for the rear panel retrace and bandswitch blanking outputs. The retrace blanking output signal is available at pin six of the AUX I/O connector. The bandswitch blanking output signal is available at pin 20 of the AUX I/O connector.

Front Panel Key: **System** | **Config** | **Rear Panel >** | **Blanking +/-**

CF0 Sets CW mode at F0 and opens the F0 parameter. **CW FREQUENCY**

Syntax: `CF0 or CF0<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Places the MG369XB in CW mode at the preset (or previously set) F0 frequency and causes F0 to be output. Also permits setting the F0 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Related Commands: F0, ACW

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | **F0**

Example: **`CF0 5.5 GH`** places the MG369XBA at the preset (or previously set) CW F0 frequency and opens the F0 parameter for data entry. Sets the F0 frequency to 5.5 GHz.

Output Command: OF0

CF1 Sets CW mode at F1 and opens the F1 parameter. **CW FREQUENCY**

Syntax: `CF1 or CF1<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Places the MG369XB in CW mode at the preset (or previously set) F1 frequency and causes F1 to be output. Also permits setting the F1 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Related Commands: F1, ACW

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | **F1**

Output Command: OF1

CF2 Sets CW mode at F2 and opens the F2 parameter. **CW FREQUENCY**

Syntax: `CF2 or CF2<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Places the MG369XB in CW mode at the preset (or previously set) F2 frequency and causes F2 to be output. Also permits setting the F2 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Related Commands: F2, ACW

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | **F2**

Output Command: OF2

CF3 Sets CW mode at F3 and opens the F3 parameter. **CW FREQUENCY**

Syntax: `CF3 or CF3<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Places the MG369XB in CW mode at the preset (or previously set) F3 frequency and causes F3 to be output. Also permits setting the F3 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Related Commands: F3, ACW

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | **Frequency List...** | highlight F3, then press **Edit Selection** or **Output Frequency**

Output Command: OF3

CF4 Sets CW mode at F4 and opens the F4 parameter. **CW FREQUENCY**

Syntax: `CF4 or CF4<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Places the MG369XB in CW mode at the preset (or previously set) F4 frequency and causes F4 to be output. Also permits setting the F4 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Related Commands: F4, ACW

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | **Frequency List...** | highlight F4, then press **Edit Selection** or **Output Frequency**

Output Command: OF4

CF5 Sets CW mode at F5 and opens the F5 parameter. **CW FREQUENCY**

Syntax: `CF5 or CF5<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Places the MG369XB in CW mode at the preset (or previously set) F5 frequency and causes F5 to be output. Also permits setting the F5 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Related Commands: F5, ACW

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | **Frequency List...** | highlight F5, then press **Edit Selection** or **Output Frequency**

Output Command: OF5

CF6 Sets CW mode at F6 and opens the F6 parameter. **CW FREQUENCY**

Syntax: `CF6 or CF6<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Places the MG369XB in CW mode at the preset (or previously set) F6 frequency and causes F6 to be output. Also permits setting the F6 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Related Commands: F6, ACW

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | **Frequency List...** | highlight F6, then press **Edit Selection** or **Output Frequency**

Output Command: OF6

CF7 Sets CW mode at F7 and opens the F7 parameter. **CW FREQUENCY**

Syntax: `CF7 or CF7<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Places the MG369XB in CW mode at the preset (or previously set) F7 frequency and causes F7 to be output. Also permits setting the F7 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Related Commands: F7, ACW

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | **Frequency List...** | highlight F7, then press **Edit Selection** or **Output Frequency**

Output Command: OF7

CF8 Sets CW mode at F8 and opens the F8 parameter. **CW FREQUENCY**

Syntax: `CF8 or CF8<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Places the MG369XB in CW mode at the preset (or previously set) F8 frequency and causes F8 to be output. Also permits setting the F8 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Related Commands: F8, ACW

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | **Frequency List...** | highlight F8, then press **Edit Selection** or **Output Frequency**

Output Command: OF8

CF9 Sets CW mode at F9 and opens the F9 parameter. **CW FREQUENCY**

Syntax: `CF9 or CF9<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Places the MG369XB in CW mode at the preset (or previously set) F9 frequency and causes F9 to be output. Also permits setting the F9 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Related Commands: F9, ACW

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | **Frequency List...** | highlight F9, then press **Edit Selection** or **Output Frequency**

Output Command: OF9

CLO Closes the previously opened parameter. **PARAMETER ENTRY**

Syntax: `CLO`

Front Panel Key: N/A

Example: **`F1 2 GH CLO`**

CLR Clears the data entry. **DATA ENTRY**

Syntax: `CLR`

Front Panel Key: Clear Entry Key

CM0 Sets CW mode at M0 and opens the M0 parameter. **CW FREQUENCY**

Syntax: `CM0 or CM0<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Places the MG369XB in CW mode at the preset (or previously set) M0 frequency and causes M0 to be output. Also permits setting the M0 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Related Commands: M0, ACW

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | **Frequency List...** | highlight M0, then press **Edit Selection** or **Output Frequency**

Example: **`CM0 5.5 GH`** places the MG369XB at the preset (or previously set) CW M0 frequency and opens the M0 parameter for data entry. Sets the M0 frequency to 5.5 GHz.

Output Command: OM0

CM1 Sets CW mode at M1 and opens the M1 parameter. **CW FREQUENCY**

Syntax: `CM1 or CM1<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Places the MG369XB in CW mode at the preset (or previously set) M1 frequency and causes M1 to be output. Also permits setting the M1 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Related Commands: M1, ACW

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | **M1**

Output Command: OM1

CM2 Sets CW mode at M2 and opens the M2 parameter. **CW FREQUENCY**

Syntax: `CM2 or CM2<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Places the MG369XB in CW mode at the preset (or previously set) M2 frequency and causes M2 to be output. Also permits setting the M2 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Related Commands: M2, ACW

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | **M2**

Output Command: OM2

CM3 Sets CW mode at M3 and opens the M3 parameter. **CW FREQUENCY**

Syntax: `CM3 or CM3<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Places the MG369XB in CW mode at the preset (or previously set) M3 frequency and causes M3 to be output. Also permits setting the M3 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Related Commands: M3, ACW

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | **Frequency List...** | highlight M3, then press **Edit Selection** or **Output Frequency**

Output Command: OM3

CM4 Sets CW mode at M4 and opens the M4 parameter. **CW FREQUENCY**

Syntax: `CM4 or CM4<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Places the MG369XB in CW mode at the preset (or previously set) M4 frequency and causes M4 to be output. Also permits setting the M4 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Related Commands: M4, ACW

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | **Frequency List...** | highlight M4, then press **Edit Selection** or **Output Frequency**

Output Command: OM4

CM5 Sets CW mode at M5 and opens the M5 parameter. **CW FREQUENCY**

Syntax: `CM5 or CM5<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Places the MG369XB in CW mode at the preset (or previously set) M5 frequency and causes M5 to be output. Also permits setting the M5 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Related Commands: M5, ACW

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | **Frequency List...** | highlight M5, then press **Edit Selection** or **Output Frequency**

Output Command: OM5

CM6 Sets CW mode at M6 and opens the M6 parameter. **CW FREQUENCY**

Syntax: `CM6 or CM6<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Places the MG369XB in CW mode at the preset (or previously set) M6 frequency and causes M6 to be output. Also permits setting the M6 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Related Commands: M6, ACW

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | **Frequency List...** | highlight M6, then press **Edit Selection** or **Output Frequency**

Output Command: OM6

CM7 Sets CW mode at M7 and opens the M7 parameter. **CW FREQUENCY**

Syntax: `CM7 or CM7<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Places the MG369XB in CW mode at the preset (or previously set) M7 frequency and causes M7 to be output. Also permits setting the M7 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Related Commands: M7, ACW

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | **Frequency List...** | highlight M7, then press **Edit Selection** or **Output Frequency**

Output Command: OM7

CM8 Sets CW mode at M8 and opens the M8 parameter. **CW FREQUENCY**

Syntax: `CM8 or CM8<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Places the MG369XB in CW mode at the preset (or previously set) M8 frequency and causes M8 to be output. Also permits setting the M8 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Related Commands: M8, ACW

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | **Frequency List...** | highlight M8, then press **Edit Selection** or **Output Frequency**

Output Command: OM8

CM9 Sets CW mode at M9 and opens the M9 parameter. **CW FREQUENCY**

Syntax: `CM9 or CM9<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Places the MG369XB in CW mode at the preset (or previously set) M9 frequency and causes M9 to be output. Also permits setting the M9 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Related Commands: M9, ACW

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | **Frequency List...** | highlight M9, then press **Edit Selection** or **Output Frequency**

Output Command: OM9

CS0 Turns off the CW ramp. **MISCELLANEOUS**

Syntax: `CS0`

Related Commands: CS1

Front Panel Key: **Frequency** | **CW** | **CW Ramp >** | **CW Ramp**

CS1 Turns on the CW ramp. **MISCELLANEOUS**

Syntax: `CS1`

Remarks: This command produces a repetitive 0V to 10V ramp output to the rear panel HORIZ OUT connector and pin 1 of the AUX I/O connector. The CW ramp is used to drive a scalar analyzer display.

Related Commands: CS0

Front Panel Key: **Frequency** | **CW** | **CW Ramp >** | **CW Ramp**

CSB Clears all GPIB status bytes. **STATUS**

Syntax: `CSB`

Front Panel Key: N/A

CTL Copy current CW frequency and power level to current list index. **LIST SWEEP**

Syntax: `CTL`

Remarks: The command copies the current CW frequency and power level to the current list index. This is another method of entering frequency and power level information into the current list index. The MG369XB must be list sweep mode and the desired list selected and list index set before invoking this command. The command, LST, places the unit in list sweep mode; the command, ELN(x), is used to select which of the four lists is to be accessed; and the command, ELI(xxxx), sets the list index for the current list.

Related Commands: LST, ELN(x), ELI(xxxx)

Front Panel Key: **Frequency** | **CW** | **Copy to List**

Example: **`LST ELN2 ELI1023 CTL`** places the MG369XB in list sweep mode, selects list number 2, sets the list index to 1023, and copies the current CW frequency and power level to list index 1023.

D1 Opens the internal pulse delay1 parameter. **PARAMETER ENTRY**

Syntax: `D1<value><unit>`

Value: 30 ns to 167 ms at 100 MHz pulse clock rate; 100 ns to 419 ms at 40 MHz pulse clock rate; 300 ns to 1.6s at 10 MHz pulse clock rate
Units: SEC, MS, US, NS

Related Commands: IP, PMD(x), PTG(x)

Front Panel Key: **Modulation** | **Pulse** (internal) | **Wdth/Dly List...** | **Edit Selected**

Example: **`PTG3 D1 100 US IP`** turns on internal pulse trigger delayed by 100 µs.

Output Command: OD1 (µs)

D2 Opens the internal pulse delay2 parameter. **PARAMETER ENTRY**

Syntax: `D2<value><unit>`

Value: 30 ns to 167 ms at 100 MHz pulse clock rate; 100 ns to 419 ms at 40 MHz pulse clock rate; 300 ns to 1.6s at 10 MHz pulse clock rate
Units: SEC, MS, US, NS

Related Commands: IP, PMD(x), PTG(x)

Front Panel Key: **Modulation** | **Pulse** (internal) | **Wdth/Dly List...** | **Edit Selected**

Example: **`PMD2 D2 100 US IP`** turns on internal pulse doublet with a 100 µs delay before the 2nd pulse.

Output Command: OD2 (µs)

D3 Opens the internal pulse delay3 parameter. **PARAMETER ENTRY**

Syntax: `D3<value><unit>`

Value: 30 ns to 167 ms at 100 MHz pulse clock rate; 100 ns to 419 ms at 40 MHz pulse clock rate; 300 ns to 1.6s at 10 MHz pulse clock rate
Units: SEC, MS, US, NS

Related Commands: IP, PMD(x), PTG(x)

Front Panel Key: **Modulation** | **Pulse** (internal) | **Wdth/Dly List...** | **Edit Selected**

Example: **`PMD3 D3 100 US IP`** turns on internal pulse triplet with a 100 µs delay before the 3rd pulse.

Output Command: OD3 (µs)

D4 Opens the internal pulse delay4 parameter. **PARAMETER ENTRY**

Syntax: `D4<value><unit>`

Value: 30 ns to 167 ms at 100 MHz pulse clock rate; 100 ns to 419 ms at 40 MHz pulse clock rate; 300 ns to 1.6s at 10 MHz pulse clock rate
Units: SEC, MS, US, NS

Related Commands: IP, PMD(x), PTG(x)

Front Panel Key: **Modulation** | **Pulse** (internal) | **Wdth/Dly List...** | **Edit Selected**

Example: **`PMD4 D4 100 US IP`** turns on internal pulse quadruplet with a 100 µs delay before the 4th pulse.

Output Command: OD4 (µs)

DB Decibel (dB) data terminator. **DATA TERMINATOR**

Syntax: `DB`

Front Panel Key: N/A

DF0 Selects F0-delta frequency sweep mode. **SWEEP**

Syntax: `DF0`

Remarks: Selects a symmetrical frequency sweep around F0. The width of the sweep is determined by the Delta Frequency parameter.

Related Commands: F0, DLF, DFF, DFM

Front Panel Key: N/A

Example: **`SSP DF0 AUT`** sets step sweep F0-DF with auto triggering.

DF1 Selects F1-delta frequency sweep mode. **SWEEP**

Syntax: `DF1`

Remarks: Selects a symmetrical frequency sweep around F1. The width of the sweep is determined by the Delta Frequency parameter.

Related Commands: F1, DLF, DFF, DFM

Front Panel Key: N/A

Example: **`SSP DF1 AUT`** sets step sweep F1-DF with auto triggering.

DF5 Selects F5-delta frequency sweep mode. **SWEEP**

Syntax: `DF5`

Remarks: Selects a symmetrical frequency sweep around F5. The width of the sweep is determined by the Delta Frequency parameter.

Related Commands: F5, DLF, DFF, DFM

Front Panel Key: **Frequency** | **Step Sweep** | **Frequency Control >** | **F5 - dF**

Example: **`SSP DF5 AUT`** sets step sweep F5-DF with auto triggering.

DF6 Selects F6-delta frequency sweep mode. **SWEEP**

Syntax: DF6

Remarks: Selects a symmetrical frequency sweep around F6. The width of the sweep is determined by the Delta Frequency parameter.

Related Commands: F6, DLF, DFF, DFM

Front Panel Key: **Frequency** | **Step Sweep** | **Frequency Control >** | **F6 - dF**

Example: **SSP DF6 AUT** sets step sweep F6-DF with auto triggering.

DFF Opens the delta frequency parameter. **PARAMETER ENTRY**

Syntax: DFF<value><unit>

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the Delta Frequency parameter. The frequency setting is determined by the frequency range of the particular MG369XB model. The commands, DFM and DLF, are the same as DFF.

Front Panel Key: N/A

Example: **F1 3 GH DFF 100 MH DF1 SSP AUT** sets auto trigger step sweep F1-DF 3 GHz - 50 MHz to 3 GHz + 50 MHz.

Output Command: ODF returns the DF frequency value (in MHz) to the controller.

DFM Opens the delta frequency parameter. **PARAMETER ENTRY**

Syntax: DFM<value><unit>

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the Delta Frequency parameter. The frequency setting is determined by the frequency range of the particular MG369XB model. The commands, DFF and DLF, are the same as DFM.

Front Panel Key: N/A

Example: **F1 3 GH DFM 100 MH DF1 SSP AUT** sets auto trigger step sweep F1-DF 3GHz-50MHz to 3GHz+50MHz.

Output Command: ODF returns the DF frequency value (in MHz) to the controller.

DG Degree data terminator. **DATA TERMINATOR**

Syntax: DG

Front Panel Key: N/A

DL1 Selects external detector leveling of output power. **POWER LEVELING**

Syntax: DL1

Remarks: Selects external leveling of the output power using a signal from an external detector connected to the EXT ALC IN connector. Deselects the internal leveling mode or external leveling mode using a signal from an external power meter, if r previously programmed. In external power leveling mode, use the parameter entry command EGI to enter a setting for the Reference Level DAC to control the ALC gain.

Related Commands: EGI, IL1, PL1, LV0, LV1

Front Panel Key: **Level** | **ALC Mode** | **Leveling >** | **External Detector**

Example: **DL1 EGI 128 SPS** selects external leveling of the output power using a signal from an external detector and sets the reference level DAC to 128.

DLF Opens the delta frequency parameter. **PARAMETER ENTRY**

Syntax: DLF<value><unit>

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the Delta Frequency parameter. The frequency setting is determined by the frequency range of the particular MG369XB model. The commands, DFF and DFM, are the same as DLF.

Front Panel Key: N/A

Example: **F1 3 GH DLF 100 MH DF1 SSP AUT** sets auto trigger step sweep F1-DF 3 GHz - 50 MHz to 3 GHz + 50 MHz.

Output Command: ODF returns the DF frequency value (in MHz) to the controller.

DM dBm data terminator. **DATA TERMINATOR**

Syntax: DM

Front Panel Key: N/A

DN Decrements the open parameter by the step size. **PARAMETER ENTRY**

Syntax: DN

Remarks: Each MG369XB parameter has an associated step size that can be used to increment or decrement its value. The command, SYZ, is used to set the step size for a parameter. The commands, UP and DN, can then be used to increment and decrement the parameter by the step size. In the list sweep mode with manual trigger selected, DN decrements the list index by one.

Related Commands: SYZ, UP

Front Panel Key: Use the keys **System** | **Config** | **Increment >** to access the increment menu. The soft-key **Frequency Increment** sets the frequency increment value, the soft-key **Level Increment** sets the power level increment value, and the soft-key **Time Increment** sets the time increment value. The soft-key **Increment Mode** turns increment mode on. Use the front panel cursor control keys or the rotary data knob to increment or decrement the open frequency, power level, or time parameter by the increment value.

Example: **CF1 2 GH SYZ 10 MH DN** sets CW mode at 2 GHz with a step size of 10 MHz and steps down to 1.990 GHz.

DPT Internal triggered pulse with delay. **MODULATION**

Syntax: DPT

Remarks: Sets the internal pulse mode to single, the internal pulse trigger to triggered with delay, and turns on the internal pulse modulation function. Disables the external pulse modulation function, if previously programmed.

Related Commands: IP, PTG5, PMD1, PTF, W1, D1

Front Panel Key: N/A

Example: W1 50 US D1 200 US DPT (50 μs pulse after 200 μs delay from trigger falling edge)

DS0 Turns on the secure mode. **MISCELLANEOUS**

Syntax: `DS0`

Remarks: In the secure mode, the front panel display of all frequency, power level, and modulation parameters is disabled. The instrument continues to function normally in all other respects.

Front Panel Key: **System** | **Secure Mode**

DS1 Turns off the secure mode. **MISCELLANEOUS**

Syntax: `DS1`

Remarks: Restores the front panel display of all frequency, power level, and modulation parameters.

Front Panel Key: **System** | **Reset**

DU0 Deselects dual step sweep mode. **SWEEP**

Syntax: `DU0`

Related Commands: DU1, TSS

Front Panel Key: N/A

DU1 Selects dual step sweep mode. **SWEEP**

Syntax: `DU1`

Remarks: The dual step sweep mode provides for generating synchronized, step sweep outputs from two MG369XBs at a frequency offset. When operating in the dual step sweep mode, the command, TSS, steps the sweep to the next point.

Related Commands: DU0, TSS

Front Panel Key: N/A

DV Decibel per volt (dB/V) data terminator. **DATA TERMINATOR**

Syntax: DV

Front Panel Key: N/A

EBW0 Selects the external reference loop bandwidth of 10 Hz. **CONFIGURATION**

Syntax: EBW0

Remarks: Selecting a narrower bandwidth provides greater immunity from reference related phase noise; however, reference tracking will not be optimal. Selecting a wider bandwidth increases phase tracking of the external reference; however, it also increases the susceptibility to reference noise.

Related Commands: EBW1, EBW2, EBW3, OEBW

Front Panel Key: System | Config | Rear Panel > | External Ref BW > | 10 Hz

EBW1 Selects the external reference loop bandwidth of 30 Hz. **CONFIGURATION**

Syntax: EBW1

Remarks: Selecting a narrower bandwidth provides greater immunity from reference related phase noise; however, reference tracking will not be optimal. Selecting a wider bandwidth increases phase tracking of the external reference; however, it also increases the susceptibility to reference noise.

Related Commands: EBW0, EBW2, EBW3, OEBW

Front Panel Key: System | Config | Rear Panel > | External Ref BW > | 30 Hz

EBW2 Selects the external reference loop bandwidth of 100 Hz. **CONFIGURATION**

Syntax: `EBW2`

Remarks: Selecting a narrower bandwidth provides greater immunity from reference related phase noise; however, reference tracking will not be optimal. Selecting a wider bandwidth increases phase tracking of the external reference; however, it also increases the susceptibility to reference noise.

Related Commands: EBW0, EBW1, EBW3, OEBW

Front Panel Key: **System** | **Config** | **Rear Panel >** | **External Ref BW >** | **100 Hz**

EBW3 Selects the external reference loop bandwidth of 300 Hz. **CONFIGURATION**

Syntax: `EBW3`

Remarks: Selecting a narrower bandwidth provides greater immunity from reference related phase noise; however, reference tracking will not be optimal. Selecting a wider bandwidth increases phase tracking of the external reference; however, it also increases the susceptibility to reference noise.

Related Commands: EBW0, EBW1, EBW2, OEBW

Front Panel Key: **System** | **Config** | **Rear Panel >** | **External Ref BW >** | **300 Hz**

EGI Opens the reference level DAC setting parameter. **PARAMETER ENTRY**

Syntax: `EGI<value><unit>`

Value: 0 to 255
Units: SPS

Remarks: Permits setting of the Reference Level DAC to control the ALC gain when in external power leveling mode. Use the commands DL1 or PL1 to select the external power leveling mode.

Related Commands: DL1, PL1, EGO

Front Panel Key: **Level** | **ALC Mode** | **Leveling >** | press **External Detector** or **Power Meter** to select the type of external sensor. Press **ALC Loop** | **External ALC Adj** to set the power level.

Example: **`PL1 ELR EGI 140 SPS`** selects external leveling of the output power using a signal from an external power meter, selects the rear panel ALC input, and sets the reference level DAC to 140.

Output Command: EGO returns the value of the Reference Level DAC setting in external power leveling mode to the controller.

EGO Outputs the value of the reference level DAC setting. **POWER LEVELING**

Syntax: `EGO`

Remarks: EGO returns the value of the Reference Level DAC setting in external power leveling mode to the controller.

Related Commands: DL1, PL1, EGI

Front Panel Key: N/A

EL0 Inhibits updating of the ESB2 bit 4. **STATUS**

Syntax: `EL0`

Remarks: Blocks updating of the Extended Status Byte two bit four (RF Unlocked). This is the default setting because it is normal for the RF to be momentarily unlocked during sweeps and sweep retrace.

Related Commands: SB0, SQ0

Front Panel Key: N/A

EL1 Enables updating of the ESB2 bit 4. **STATUS**

Syntax: `EL1`

Remarks: Unblocks updating of the Extended Status Byte bit four (RF Unlocked).

Related Commands: SB1, MB2, SQ1, OES

Front Panel Key: N/A

Example: C code snippet to enable unlocked SRQ:

```
strcpy(buf, "csb sb1 mb2 sq1 el1");
buf[11] = 16; /*mb2 command mask value*/snd(source_addr, buf);
```

Output Command: OES (outputs value of the three status bytes)

ELI(xxxx) Sets list index to xxxx. **LIST SWEEP**

Syntax: `ELI(xxxx)`

Value: xxxx: 4-digit integer between 0000 and 1999

Remarks: In list sweep mode, permits setting the list index for the current list.

Related Commands: LST, ELN(x)

Front Panel Key: **Frequency** | **List** | **Edit List Index**

Example: **`LST ELN3 ELI1263`** places the MG369XB in list sweep mode, selects list number 3, and sets the list index to 1263.

ELN(x) Sets the list number to x. **LIST SWEEP**

Syntax: `ELN(x)`

Value: x: 1-digit integer between 0 and 3

Remarks: In list sweep mode, permits selection of which of the four lists is to be accessed.

Front Panel Key: N/A

EP0 Selects TTL-low to turn RF on during pulse modulation. **MODULATION**

Syntax: `EP0`

Remarks: Permits selection of a TTL-low signal to turn the RF on during pulse modulation. If pulse modulation is not installed, this command produces a syntax error.

Related Commands: EP1, P0, XP

Front Panel Key: **Modulation** | **Pulse** | **L RF On**

EP1 Selects TTL-high to turn RF on during pulse modulation. **MODULATION**

Syntax: `EP1`

Remarks: Permits selection of a TTL-high signal to turn the RF on during pulse modulation. If pulse modulation is not installed, this command produces a syntax error.

Related Commands: EP0, P0, XP

Front Panel Key: **Modulation** | **Pulse** | **H RF On**

ES0 Inhibits end-of-sweep SRQ generation. **STATUS**

Syntax: `ES0`

Remarks: Inhibits an SRQ from being generated when Primary Status Byte one (End of Sweep) is set. This is the default mode.

Related Commands: SQ0, ES1

Front Panel Key: N/A

ES1 Enables end-of-sweep SRQ generation. **STATUS**

Syntax: `ES1`

Remarks: Enables an SRQ to be generated when Primary Status Byte bit one (End of Sweep) is set and SQ1 has been programmed. SQ1 enables the SRQ generation function.

Related Commands: SQ1, ES0

Front Panel Key: N/A

Example: **`SQ1 ES1`** enables an SRQ on the end of a sweep.

Output Command: OSB (output primary status byte)

EXT Selects single sweep triggering. **SWEEP**

Syntax: `EXT`

Remarks: Selects single sweep triggering for frequency, power level, or list sweeps. When single sweep triggering is selected, a single sweep starts when a TRG or TRS command is received. The RSS command resets the sweep to its start frequency, power level, or list index whenever the command is received while a single sweep is in progress.

Related Commands: TRG, TRS, RSS

Front Panel Key: **Frequency** | **Step Sweep** | **More >** | **Trigger >** | **Single** or **Frequency** | **List** | **Sweep >** | **Trigger >** | **Single** or **Level** | **Level Sweep** | **Trigger >** | **Single**

Example: **`SSP SF1 EXT TRG`** turns on step sweep F1-F2, single trigger, and trigger one sweep.

F0 Opens the F0 parameter. **PARAMETER ENTRY**

Syntax: `F0<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the F0 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | **F0** | **Edit F0**

Output Command: OF0 returns the F0 frequency value (in MHz) to the controller.

F1 Opens the F1 parameter. **PARAMETER ENTRY**

Syntax: `F1<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the F1 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Edit F1**

Output Command: OF1 returns the F1 frequency value (in MHz) to the controller.

F2 Opens the F2 parameter. **PARAMETER ENTRY**

Syntax: `F2<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the F2 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | **F2** | **Edit F2**

Output Command: OF2 returns the F2 frequency value (in MHz) to the controller.

F3 Opens the F3 parameter. **PARAMETER ENTRY**

Syntax: `F3<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the F3 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | **Frequency List...** | highlight F3, press **Edit Selected**

Output Command: OF3 returns the F3 frequency value (in MHz) to the controller.

F4 Opens the F4 parameter. **PARAMETER ENTRY**

Syntax: `F4<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the F4 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | **Frequency List...** | highlight F4, press **Edit Selected**

Output Command: OF4 returns the F4 frequency value (in MHz) to the controller.

F5 Opens the F5 parameter. **PARAMETER ENTRY**

Syntax: `F5<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the F5 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | **Frequency List...** | highlight F5, press **Edit Selected**

Output Command: OF5 returns the F5 frequency value (in MHz) to the controller.

F6 Opens the F6 parameter. **PARAMETER ENTRY**

Syntax: `F6<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the F6 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | **Frequency List...** | highlight F6, press **Edit Selected**

Output Command: OF6 returns the F6 frequency value (in MHz) to the controller.

F7 Opens the F7 parameter. **PARAMETER ENTRY**

Syntax: `F7<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the F7 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | **Frequency List...** | highlight F7, press **Edit Selected**

Output Command: OF7 returns the F7 frequency value (in MHz) to the controller.

F8 Opens the F8 parameter. **PARAMETER ENTRY**

Syntax: `F8<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the F8 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | **Frequency List...** | highlight F8, press **Edit Selected**

Output Command: OF8 returns the F8 frequency value (in MHz) to the controller.

F9 Opens the F9 parameter. **PARAMETER ENTRY**

Syntax: `F9<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the F9 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | **Frequency List...** | highlight F9, press **Edit Selected**

Output Command: OF9 returns the F9 frequency value (in MHz) to the controller.

FB0 Inhibits extended status byte 1 SRQ generation. **STATUS**

Syntax: `FB0`

Remarks: Inhibits an SRQ from being generated when the Extended Status Byte one bit is set. This is the default mode.

Related Commands: SQ0, FB1

Front Panel Key: N/A

FB1 Enables extended status byte 1 SRQ generation. **STATUS**

Syntax: `FB1`

Remarks: Enables an SRQ to be generated when Primary Status Byte bit zero (Extended Status Byte one) is set and SQ1 has been programmed. The Extended Status Byte one bit is set whenever one (or more) of the unmasked status reporting functions in Extended Status Byte one is true. SQ1 enables the SRQ generation function.

Related Commands: SQ1, MB1, FB0

Front Panel Key: N/A

Example: C code snippet to enable RF locked SRQ:

```
strcpy(buf, “csb fb1 mb1  sq1 ls1");
buf[11] = 8; /*mb1 command mask value*/snd(source_addr, buf);
```

Output Command: OSB (output primary status byte)

FDV Opens the internal FM deviation parameter. **PARAMETER ENTRY**

Syntax: `FDV<value><unit>`

Value: 10 kHz to 20 MHz in Locked, Locked Low-Noise, and Unlocked Narrow FM; 100 kHz to 100 MHz in Unlocked Wide FM
Units: MH, KH

Remarks: Changes the internal FM deviation value.

Related Commands: FM7, FM8, FM9, FMN

Front Panel Key: **Modulation** | **FM** (internal) | **Edit Deviation**

Example: **`FM9 FDV 500 KH`** turns on FM locked mode with a deviation of 500 kHz.

Output Command: OFD (in Hz)

FM0 Turns off the internal or external FM function. **MODULATION**

Syntax: `FM0`

Front Panel Key: **Modulation** | **FM** (internal or external) | **On/Off**

FM1 Turns on the external FM function in unlocked narrow mode. **MODULATION**

Syntax: `FM1`

Remarks: The signal generator output is not phase-locked. Disables the internal FM function or the external FM function in Unlocked Wide, Locked, or Locked Low-Noise mode, had any of these modes been previously programmed.

Related Commands: FM0, FM2, FML, FMU, FMW

Front Panel Key: **Modulation** | **FM** (external) | **Mode >** | **Unlocked Narrow** then **Modulation** | **FM** (external) | **On**

FM2 Turns on the external FM function in locked low-noise mode. **MODULATION**

Syntax: `FM2`

Remarks: The signal generator output is phase-locked. Disables the internal FM function or the external FM function in Unlocked Narrow, Unlocked Wide, or Locked mode, had any of these modes been previously programmed.

Related Commands: FM0, FM1, FML, FMU, FMW

Front Panel Key: **Modulation** | **FM** (external) | **Mode >** | **Locked Low Noise** then **Modulation** | **FM** (external) | **On**

FM7 Turns on the internal FM function in unlocked narrow mode. **MODULATION**

Syntax: `FM7`

Remarks: The signal generator output is not phase-locked. Disables the external FM function or the internal FM function in Unlocked Wide, Locked, or Locked Low-Noise mode, had any of these modes been previously programmed.

Related Commands: FM0, FM8, FM9, FMN

Front Panel Key: **Modulation** | **FM** (internal) | **Mode >** | **Unlocked Narrow** then **Modulation** | **FM** (internal) | **On**

FM8 Turns on the internal FM function in unlocked wide mode. **MODULATION**

Syntax: `FM8`

Remarks: The signal generator is not phase-locked. Disables the external FM function or the internal FM function in Unlocked Narrow, Locked, or Locked Low-Noise mode, had any of these modes been previously programmed.

Related Commands: FM0, FM7, FM9, FMN

Front Panel Key: **Modulation** | **FM** (internal) | **Mode >** | **Unlocked Wide** then **Modulation** | **FM** (internal) | **On**

FM9 Turns on the internal FM function in locked mode. **MODULATION**

Syntax: FM9

Remarks: The signal generator output is phase-locked. Disables the external FM function or the internal FM function in Unlocked Narrow, Unlocked Wide, or Locked Low-Noise mode, had any of these modes been previously programmed.

Related Commands: FM0, FM7, FM8, FMN

Front Panel Key: **Modulation** | **FM** (internal) | Mode > | **Locked** then **Modulation** | **FM** (internal) | **On**

FMD Turns on the FM measurement mode. **MEASURE FUNCTION**

Syntax: FMD

Remarks: Turns on the FM Measurement mode. In this mode, the signal generator measures the voltage of the external modulating signal and calculates the peak frequency deviation of the RF output signal. The measurement results will be sent to the controller upon receipt of the OMM command. When the FMD command is received, measurements will continue to be taken until the mode is exited by receipt of the MOM command.

Related Commands: OMM, MOM

Front Panel Key: N/A

Output Command: OMM

FML Turns on the external FM function in locked mode. **MODULATION**

Syntax: FML

Remarks: The signal generator output is phase-locked. Disables the internal FM function or the external FM function in Unlocked Narrow, Unlocked Wide, or Locked Low-Noise mode, had any of these modes been previously programmed.

Related Commands: FM0, FM1, FM2, FMU, FMW

Front Panel Key: **Modulation** | **FM** (external) | **Mode >** | **Locked** then **Modulation** | **FM** (external) | **On**

FMN Turns on the internal FM function in locked low-noise mode. **MODULATION**

Syntax: `FMN`

Remarks: The signal generator is phase-locked. Disables the external FM function or the internal FM function in Unlocked Narrow, Unlocked Wide, or Locked mode, had any of these modes been previously programmed.

Related Commands: FM0, FM7, FM8, FM9

Front Panel Key: **Modulation** | **FM** (internal) | **Mode >** | **Locked Low Noise** then **Modulation** | **FM** (internal) | **On**

FMR Opens the internal FM rate parameter. **PARAMETER ENTRY**

Syntax: `FMR<value><unit>`

Value: 0.1 Hz to 1 MHz for sine wave; 0.1 Hz to 100 kHz for square, triangle, and ramp waveforms

Units: MH, KH, HZ

Related Commands: FM7, FM8, FM9, FMN

Front Panel Key: **Modulation** | **FM** (internal) | **Edit Rate**

Example: **`FM9 FMR 1 KH`** turns on FM internal lockedmode with a 1 kHz rate.

Output Command: OFR (in Hz)

FMS Opens the external FM sensitivity parameter. **PARAMETER ENTRY**

Syntax: `FMS<value><unit>`

Value: ±10 kHz/V to ±20 MHz/V in Locked, Locked Low-Noise, and Unlocked Narrow FM; ±100 kHz/V to ±100 MHz/V in Unlocked Wide FM

Units: KV, MV

Related Commands: FM1, FM2, FML, FMU, FMW

Front Panel Key: **Modulation** | **FM** (external) | **Edit Sensitivity**

Example: **`FML FMS 500 KH`** turns on FM external locked with a sensitivity of 500 kHz/Volt.

Output Command: OFS (in Hz)

FMU Turns on the external FM function in unlocked narrow mode (Same as FM1). **MODULATION**

Syntax: FMU

Remarks: The signal generator output is not phase-locked. Disables the internal FM function or the external FM function in Unlocked Wide, Locked, or Locked Low-Noise mode, had any of these modes been previously programmed.

Related Commands: FM0, FM1, FM2, FML, FMW

Front Panel Key: **Modulation** | **FM** (external) | **Mode >** | **Unlocked Narrow** then **Modulation** | **FM** (external) | **On**

FMW Turns on the external FM function in unlocked wide mode. **MODULATION**

Syntax: FMW

Remarks: The signal generator output is not phase-locked. Disables the internal FM function or the external FM function in Unlocked Narrow, Locked, or Locked Low-Noise mode, had any of these modes been previously programmed.

Related Commands: FM0, FM1, FM2, FML, FMU

Front Panel Key: **Modulation** | **FM** (external) | **Mode >** | **Unlocked Wide** then **Modulation** | **FM** (external) | **On**

FRS Opens the frequency scaling reference multiplier parameter. **CONFIGURATION**

Syntax: FRS<value><unit>

Value: 0.1 to 14
Units: TMS

Remarks: Permits setting the frequency scaling reference multiplier value. This command affects all entered and displayed frequencies, but does not affect the output of the instrument.

Front Panel Key: **System** | **Config** | **RF >** | **More >** | **Frequency Scaling**

Example: **FRS 3 TMS** sets the frequency scaling reference multiplier to 3.

FUL Selects the full range sweep mode. **SWEEP**

Syntax: `FUL`

Remarks: Selects a full band frequency sweep from the MG369XBs low frequency limit to its high frequency limit.

Front Panel Key: **Frequency** | **Step Sweep** | **Frequency Control >** | **Full** or **Frequency** | **Manual Sweep** | **Frequency Control >** | **Full**

Example: **`SSP FUL AUT`** turns on auto triggered step sweep, full range.

Output Command: OFL returns the low-end frequency value (in MHz) to the controller; OFH returns the high-end frequency value (in MHz) to the controller.

FWV(x) Selects the internal FM waveform. **MODULATION**

Syntax: `FWV(x)`

Value: x: 1 = Sine Wave, 2 = Square Wave, 3 = Positive Ramp, 4 = Negative Ramp, 5 = Guassian Noise, 6 = Uniform Noise, 7 = Triangle Wave

Related Commands: FM0, FM7, FM8, FM9, FMN

Front Panel Key: **Modulation** | **FM** (internal) | **Select Wave...** | **Select**

Example: **`FM9 FWV2`** turns on square wave FM locked mode.

Output Command: OFW

GH GHz data terminator. **DATA TERMINATOR**

Syntax: `GH`

Front Panel Key: N/A

GP Sets the internal gated pulse on. **MODULATION**

Syntax: GP

Remarks: Sets the internal pulse mode to single, the internal pulse trigger to gated, and turns on the internal pulse modulation function. Disables the external pulse modulation function, if previously programmed.

Related Commands: P0, PTG(x), IP

Front Panel Key: **Modulation** | **Pulse** (internal) | **More >** | **Trigger...** | **Gated** then **Modulation** | **Pulse** (internal) | **On**

GTC Execute a SQF command on receipt of a GET. **GROUP EXECUTE TRIGGER**

Syntax: GTC

Remarks: Configures the MG369XB to execute a SQF command (scan to the next higher preset CW frequency) each time a GET message is received.

Related Commands: GTO

Front Panel Key: N/A

GTD Execute a DN command on receipt of a GET. **GROUP EXECUTE TRIGGER**

Syntax: GTD

Remarks: Configures the MG369XB to execute a DN command (steps the open parameter down by the step size) each time a GET message is received.

Related Commands: GTO

Front Panel Key: N/A

GTF Execute a fast-frequency-switching step on receipt of a GET. **GROUP EXECUTE TRIGGER**

Syntax: GTF

Remarks: Configures the MG369XB to execute a fast-frequency-switching step each time a GET message is received. (See ZPL and ZPN commands).

Related Commands: GTO

Front Panel Key: N/A

GTL Execute a TSS command on receipt of a GET. **GROUP EXECUTE TRIGGER**

Syntax: GTL

Remarks: Configures the MG369XB to execute a TSS command (steps to the next point in a dual step sweep mode) each time a GET message is received.

Related Commands: GTO

Front Panel Key: N/A

GTO Disables the GET functions. **GROUP EXECUTE TRIGGER**

Syntax: GTO

Front Panel Key: N/A

GTS Execute a TRS command on receipt of a GET. **GROUP EXECUTE TRIGGER**

Syntax: GTS

Remarks: Configures the MG369XB to execute a TRS command (trigger a single sweep) each time a GET is received. This is the default mode.

Related Commands: GTO

Front Panel Key: N/A

GTT Execute a TST command on receipt of a GET. **GROUP EXECUTE TRIGGER**

Syntax: GTT

Remarks: Configures the MG369XB to execute a TST command (execute a complete instrument self test) each time a GET message is received.

Related Commands: GTO

Front Panel Key: N/A

GTU Execute a UP command on receipt of a GET. **GROUP EXECUTE TRIGGER**

Syntax: GTU

Remarks: Configures the MG369XB to execute a UP command (steps the open parameter up by the step size) each time a GET message is received.

Related Commands: GTO

Front Panel Key: N/A

GV GHz per volt (GHz/V) data terminator. **DATA TERMINATOR**

Syntax: GV

Front Panel Key: N/A

HWT Selects external sweep trigger. **SWEEP**

Syntax: HWT

Remarks: Selects external sweep triggering for frequency, power level, or list sweeps. When external sweep triggering is selected , a single sweep occurs when triggered by an external TTL-compatible clock pulse to the rear panel AUX I/O connector.

Related Commands: AUT, EXT, TEX

Front Panel Key: **Frequency** | **Step Sweep** | **More >** | **Trigger >** | **External** or **Frequency** | **List** | **Sweep >** | **Trigger >** | **External** or **Level** | **Level Sweep** | **Trigger >** | **External**

HZ Hz data terminator. **DATA TERMINATOR**

Syntax: `HZ`

Front Panel Key: N/A

II0 Inhibits updating of the ESB2 bit 7. **STATUS**

Syntax: `II0`

Remarks: Blocks updating of the Extended Status Byte two bit seven (Parameter Changed). This bit is only used with the 56100A interface. This bit is cleared when the 56100A sends an OCP command (Output Last Parameter Changed). This is the default setting.

Front Panel Key: N/A

II1 Enables updating of the ESB2 bit 7. **STATUS**

Syntax: `II1`

Remarks: Unblocks updating of the Extended Status Byte two bit seven (Parameter Changed).

Front Panel Key: N/A

IL1 Selects internal leveling of output power. **POWER LEVELING**

Syntax: `IL1`

Remarks: Selects internal leveling of the output power using a signal from an internal level detector. This is the default mode. Deselects the external leveling mode using a signal from a power meter or the external leveling mode using a signal from an external detector, if previously programmed.

Related Commands: DL1, PL1, LV0, LV1

Front Panel Key: **Level** | **ALC Mode** | **Leveling >** | **Internal**

IM1 Turns on the intensity marker mode. **MARKER**

Syntax: `IM1`

Related Commands: MK0, VM1

Front Panel Key: **Frequency** | **Frequency Control >** | **Marker List** | **Intensity Markers**

IP Turns on internal pulse modulation. **MODULATION**

Syntax: `IP`

Remarks: Disables the external pulse modulation function, if previously programmed.

Related Commands: P0

Front Panel Key: **Modulation** | **Pulse** (internal) | **On**

KH kHz data terminator. **DATA TERMINATOR**

Syntax: `KH`

Front Panel Key: N/A

KV kHz per volt (kHz/V) data terminator. **DATA TERMINATOR**

Syntax: `KV`

Front Panel Key: N/A

L0 Sets RF output power level to L0. Opens L0 parameter. **POWER LEVELING**

Syntax: `L0 or L0<value><unit>`

Value: Power level range of the MG369XB model
Units: DM (log), VT (linear)

Remarks: Causes the RF output power level to be set to the preset (or previously set) L0 power level. Also permits setting the L0 parameter. The power level setting is determined by the power level range of the particular MG369XB model.

Related Commands: LOG, LIN, PU0, PU1, PU2

Front Panel Key: **Level** | **Level** | **Level Control >** | **L0**

Example: **`L0 5 DM`** places the RF output power level at the preset (or previously set) L0 power level and opens the L0 parameter for data entry. Sets the L0 power level to 5 dBm.

Output Command: OL0 returns the L0 power level (in dBm when in log mode; in mV when in linear mode) to the controller.

L1 Sets RF output power level to L1. Opens L1 parameter. **POWER LEVELING**

Syntax: `L1 or L1<value><unit>`

Value: Power level range of the MG369XB model
Units: DM (log), VT (linear)

Remarks: Causes the RF output power level to be set to the preset (or previously set) L1 power level. Also permits setting the L1 parameter. The power level setting is determined by the power level range of the particular MG369XB model.

Related Commands: LOG, LIN, PU0, PU1, PU2

Front Panel Key: **Level** | **Level** | **Level Control >** | **L1**

Output Command: OL1 returns the L1 power level (in dBm when in log mode; in mV when in linear mode) to the controller.

L2 Sets RF output power level to L2. Opens L2 parameter. **POWER LEVELING**

Syntax: `L2 or L2<value><unit>`

Value: Power level range of the MG369XB model
Units: DM (log), VT (linear)

Remarks: Causes the RF output power level to be set to the preset (or previously set) L2 power level. Also permits setting the L2 parameter. The power level setting is determined by the power level range of the particular MG369XB model.

Related Commands: LOG, LIN, PU0, PU1, PU2

Front Panel Key: **Level** | **Level** | **Level Control >** | **L2**

Output Command: OL2 returns the L2 power level (in dBm when in log mode; in mV when in linear mode) to the controller.

L3 Sets RF output power level to L3. Opens L3 parameter. **POWER LEVELING**

Syntax: `L3 or L3<value><unit>`

Value: Power level range of the MG369XB model
Units: DM (log), VT (linear)

Remarks: Causes the RF output power level to be set to the preset (or previously set) L3 power level. Also permits setting the L3 parameter. The power level setting is determined by the power level range of the particular MG369XB model.

Related Commands: LOG, LIN, PU0, PU1, PU2

Front Panel Key: **Level** | **Level** | **Level Control >** | **L3**

Output Command: OL3 returns the L3 power level (in dBm when in log mode; in mV when in linear mode) to the controller.

L4 Sets RF output power level to L4. Opens L4 parameter. **POWER LEVELING**

Syntax: `L4 or L4<value><unit>`

Value: Power level range of the MG369XB model
Units: DM (log), VT (linear)

Remarks: Causes the RF output power level to be set to the preset (or previously set) L4 power level. Also permits setting the L4 parameter. The power level setting is determined by the power level range of the particular MG369XB model.

Related Commands: LOG, LIN, PU0, PU1, PU2

Front Panel Key: **Level** | **Level** | **Level Control >** | **L4**

Output Command: OL4 returns the L4 power level (in dBm when in log mode; in mV when in linear mode) to the controller.

L5 Sets RF output power level to L5. Opens L5 parameter. **POWER LEVELING**

Syntax: `L5 or L5<value><unit>`

Value: Power level range of the MG369XB model
Units: DM (log), VT (linear)

Remarks: Causes the RF output power level to be set to the preset (or previously set) L5 power level. Also permits setting the L5 parameter. The power level setting is determined by the power level range of the particular MG369XB model.

Related Commands: LOG, LIN, PU0, PU1, PU2

Front Panel Key: **Level** | **Level** | **Level Control >** | **Level List...** | highlight L5, then press **Edit Selected** or **Output Level**

Output Command: OL5 returns the L5 power level (in dBm when in log mode; in mV when in linear mode) to the controller.

L6 Sets RF output power level to L6. Opens L6 parameter. **POWER LEVELING**

Syntax: `L6 or L6<value><unit>`

Value: Power level range of the MG369XB model
Units: DM (log), VT (linear)

Remarks: Causes the RF output power level to be set to the preset (or previously set) L6 power level. Also permits setting the L6 parameter. The power level setting is determined by the power level range of the particular MG369XB model.

Related Commands: LOG, LIN, PU0, PU1, PU2

Front Panel Key: **Level** | **Level** | **Level Control >** | **Level List...** | highlight L6, then press **Edit Selected** or **Output Level**

Output Command: OL6 returns the L6 power level (in dBm when in log mode; in mV when in linear mode) to the controller.

L7 Sets RF output power level to L7. Opens L7 parameter. **POWER LEVELING**

Syntax: `L7 or L7<value><unit>`

Value: Power level range of the MG369XB model
Units: DM (log), VT (linear)

Remarks: Causes the RF output power level to be set to the preset (or previously set) L7 power level. Also permits setting the L7 parameter. The power level setting is determined by the power level range of the particular MG369XB model.

Related Commands: LOG, LIN, PU0, PU1, PU2

Front Panel Key: **Level** | **Level** | **Level Control >** | **Level List...** | highlight L7, then press **Edit Selected** or **Output Level**

Output Command: OL7 returns the L7 power level (in dBm when in log mode; in mV when in linear mode) to the controller.

L8 Sets RF output power level to L8. Opens L8 parameter. **POWER LEVELING**

Syntax: `L8 or L8<value><unit>`

Value: Power level range of the MG369XB model
Units: DM (log), VT (linear)

Remarks: Causes the RF output power level to be set to the preset (or previously set) L8 power level. Also permits setting the L8 parameter. The power level setting is determined by the power level range of the particular MG369XB model.

Related Commands: LOG, LIN, PU0, PU1, PU2

Front Panel Key: **Level** | **Level** | **Level Control >** | **Level List...** | highlight L8, then press **Edit Selected** or **Output Level**

Output Command: OL8 returns the L8 power level (in dBm when in log mode; in mV when in linear mode) to the controller.

L9 Sets RF output power level to L9. Opens L9 parameter. **POWER LEVELING**

Syntax: `L9 or L9<value><unit>`

Value: Power level range of the MG369XB model
Units: DM (log), VT (linear)

Remarks: Causes the RF output power level to be set to the preset (or previously set) L9 power level. Also permits setting the L9 parameter. The power level setting is determined by the power level range of the particular MG369XB model.

Related Commands: LOG, LIN, PU0, PU1, PU2

Front Panel Key: **Level** | **Level** | **Level Control >** | **Level List...** | highlight L9, then press **Edit Selected** or **Output Level**

Output Command: OL9 returns the L9 power level (in dBm when in log mode; in mV when in linear mode) to the controller.

LA0 Inhibits updating of ESB1 bit 7. **STATUS**

Syntax: `LA0`

Remarks: Blocks updating of the Extended Status Byte one bit seven (RF Leveled). This is the default setting.

Front Panel Key: N/A

LA1 Enables updating of ESB1 bit 7. **STATUS**

Syntax: `LA1`

Remarks: Unblocks updating of the Extended Status Byte one bit seven (RF Leveled).

Related Commands: SQ1, MB1, FB1, LA0

Front Panel Key: N/A

Example: C code snippet to enable RF leveled SRQ:

```
strcpy(buf, “csb fb1 mb1  sq1 la1");
buf[11] = 128; /*mb1 command mask value*/snd(source_addr, buf);
```

LDT Opens the list sweep dwell time parameter. **LIST SWEEP**

Syntax: `LDT<value><unit>`

Value: 1ms to 99s
Units: MS, SEC

Remarks: Permits setting the dwell-time-per-step of the list sweep.

Related Commands: LIB(xxxx), LIE(xxxx)

Front Panel Key: **Frequency** | **List** | **Sweep >** | **Dwell Time**

Example: **`LIB1234 LIE1237 EXT LDT 10 MS TRG`** implements a list sweep from current list index 1234 to index 1237 in single trigger mode with a 10 ms dwell-time-per-step, then triggers a single sweep.

LE0 Inhibits lock error SRQ generation. **STATUS**

Syntax: `LE0`

Remarks: Inhibits an SRQ from being generated when the Lock Error bit (Primary Status Byte bit three) is set. This is the default mode.

Front Panel Key: N/A

LE1 Enables lock error SRQ generation. **STATUS**

Syntax: `LE1`

Remarks: Enables an SRQ to be generated when Primary Status Byte bit three (Lock Error) is set and SQ1 has been programmed.

Front Panel Key: N/A

Example: **`CSB SQ1 LE1`** enable an SRQ on lock error.

LEA Learn list (in list sweep mode). **LIST SWEEP**

Syntax: `LEA`

Remarks: During the initial list sweep, the MG369XB performs calculations to set the frequency and power levels. This causes the initial list sweep to take longer than each subsequent sweep. The command LEA initiates a process that examines every index in the current list and performs all the calculations necessary to set the frequency and power levels. This lets the initial list sweep be as fast as each subsequent sweep. The list calculations are for the current list only. Any changes to the current list or selection of another list requires the calculations to be performed again. The calculations are stored only in volatile RAM and are lost when power to the instrument is turned off.

Related Commands: LST, ELN(x)

Front Panel Key: **Frequency** | **List** | **Pre-calc List**

LF Sets list frequencies starting at the list index. **LIST SWEEP**

Syntax: `LF<value><unit>, <value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the list frequencies of the selected list starting at the list index specified by the command ELI(xxxx). Any number of frequencies can follow this command. This command does not change the value of the list index.

Related Commands: LST, ELN(x), ELI(xxxx)

Front Panel Key: **Frequency** | **List** | **Frequency List...** | **Edit Selected**

Example: **`LST ELN1 ELI1234 LF 2 GH, 5 GH, 1 GH, 8 GH LP 2 DM, 9DM, 3DM, 10DM`** places the instrument in list sweep mode, selects list number 1, and sets the list index to 1234. List index 1234 is set to 2 GHz at 2 dBm, list index 1235 is set

LGS Selects logarithmic step sweep. **SWEEP**

Syntax: `LGS`

Remarks: LGS, by itself, does not provide a swept-frequency output. It only determines that the swept-frequency output will be a logarithmic step sweep. However, if a frequency sweep is being output by the instrument when LGS is received, the sweep will become a logarithmic step sweep.

Related Commands: SWP, SSP, LIS, MAN

Front Panel Key: **Frequency** | **Step Sweep** | **More >** | **Log**

Example: **`SDT 3 MS SNS 100 SPS LGS SF1 AUT`** initiates a continuous logarithmic step frequency sweep between F1 and F2. The sweep consists of 100 steps with a dwell-time-per-step of 3 ms.

Output Command: OSD returns the dwell time of the step sweep (in ms) to the controller.
OSS returns the number of steps of the step sweep to the controller.
OST returns the sweep time value (in ms) to the controller.

LIB(xxxx) Sets the list start index to xxxx. **LIST SWEEP**

Syntax: `LIB(xxxx)`

Value: xxxx: 4-digit integer between 0000 and 1999

Remarks: In list sweep mode, permits setting the list start index for a list sweep of the current list.

Related Commands: LST, ELN(x), LIE(xxxx)

Front Panel Key: **Frequency** | **List** | **Sweep >** | **Start Index**

Example: **`LST ELN1 LIB1097 LIE1197 EXT LDT 10 MS TRG`** places the unit in list sweep mode and implements a list sweep from list 1 index 1097 to index 1197 in single trigger mode with a 10 ms dwell-time-per-step, then triggers a single sweep.

LIE(xxxx) Sets the list stop index to xxxx. **LIST SWEEP**

Syntax: `LIE(xxxx)`

Value: xxxx: 4-digit integer between 0000 and 1999

Remarks: In list sweep mode, permits setting the list stop index for a list sweep of the current list.

Related Commands: LST, ELN(x), LIB(xxxx)

Front Panel Key: **Frequency** | **List** | **Sweep >** | **Stop Index**

Example: **`LST ELN1 LIB1097 LIE1197 EXT LDT 10 MS TRG`** places the unit in list sweep mode and implements a list sweep from list 1 index 1097 to index 1197 in single trigger mode with a 10 ms dwell-time-per-step, then triggers a single sweep.

LIN Selects linear power level operation in mV. **POWER LEVELING**

Syntax: `LIN`

Remarks: In linear power level operation, power level entries and outputs are in mV and power level sweeps are linear.

Related Commands: LOG, PU0, PU1, PU2

Front Panel Key: **Level** | **Level** | **Level Control >** | **Units>** | **mV**

LIS Selects linear step sweep. **SWEEP**

Syntax: `LIS`

Remarks: LIS, by itself, does not provide a swept-frequency output. It only determines that the swept-frequency output will be a linear step sweep. However, if a frequency sweep is being output by the instrument when LIS is received, the sweep will become a linear step sweep. This is the default mode.

Related Commands: SWP, SSP, LGS, MAN

Front Panel Key: **Frequency** | **Step Sweep** | **More >** | **Linear**

Example: **`SDT 3 MS SNS 100 SPS LIS SF1 AUT`** initiates a continuous linear step frequency sweep between F1 and F2. The sweep consists of 100 steps with a dwell-time-per-step of 3 ms.

Output Command: OSD returns the dwell time of the step sweep (in ms) to the controller. OSS returns the number of steps of the step sweep to the controller. OST returns the sweep time value (in ms) to the controller.

LO0 Turns off the level offset function. **POWER LEVELING**

Syntax: `LO0`

Related Commands: LO1, LOS

Front Panel Key: **Level** | **Level** | **Offset** to Off

LO1 Turns on the level offset function. **POWER LEVELING**

Syntax: `LO1`

Remarks: The Level Offset function lets you compensate for a device on the MG369XB's output that alters the RF output power level at the point of interest. Using the LOS command, you can apply a constant to the level measured by the internal leveling loop that compensates for this loss or gain. The displayed power level will then reflect the actual power level at the test device.

Related Commands: LO0, LOS

Front Panel Key: **Level** | **Level** | **Offset** to On

Output Command: OLO returns the Level Offset value (in dB when in Log mode; in mV when in Linear mode) to the controller.

LOG Selects logarithmic power level operation in dBm. **POWER LEVELING**

Syntax: `LOG`

Remarks: In logarithmic power level operation, power level entries and outputs are in dBm and power level sweeps are logarithmic. This is the default mode.

Related Commands: LIN, PU0, PU1, PU2

Front Panel Key: **Level** | **Level** | **Level Control >** | **Units>** | **dBm** or **dBμV**

LOS Opens the level offset parameter. **PARAMETER ENTRY**

Syntax: `LOS<value><unit>`

Value: +100dB to 100dB (logarithmic); +xxx mV to xxx mV (linear)
Units: DB (log), VT (linear)

Remarks: Permits setting the Level Offset constant to be applied to the level measured by the internal leveling loop by the LO1 command.

Related Commands: LO0, LO1

Front Panel Key: **Level** | **Level** | **Edit Offset**

Output Command: OLO returns the Level Offset value (in dB when in Log mode; in mV when in Linear mode) to the controller.

LP Sets list power levels starting at the list index. **LIST SWEEP**

Syntax: `LP<value><unit>, <value><unit>`

Value: Power level range of the MG369XB model
Units: DM

Remarks: Permits setting the power levels of the selected list starting at the list index specified by the command ELI(xxxx). Any number of power levels can follow this command. This command does not change the value of the list index.

Related Commands: LST, ELN(x), ELI(xxxx)

Front Panel Key: **Frequency** | **List** | **Power List...** | **Edit Selected**

Example: **`LST ELN1 ELI1234 LF 2 GH, 5 GH, 1 GH, 8 GH LP 2 DM, 9DM, 3DM, 10DM`** places the instrument in list sweep mode, selects list number 1, and sets the list index to 1234. List index 1234 is set to 2 GHz at 2 dBm, list index 1235 is set

LS0 Inhibits updating of the ESB1 bit 3. **STATUS**

Syntax: `LS0`

Remarks: Blocks updating of the Extended Status Byte one bit three (RF Locked). This is the default setting.

Front Panel Key: N/A

LS1 Enables updating of the ESB1 bit 3. **STATUS**

Syntax: `LS1`

Remarks: Unblocks updating of the Extended Status Byte one bit three (RF Locked). This bit is only used with the Model 360B interface.

Related Commands: SQ1, MB1, LS0

Front Panel Key: N/A

Example: C code snippet to enable the RF locked SRQ:

```
strcpy(buf, “csb fb1 mb1  sq1 ls1");
buf[11] = 8; /*mb1 command mask value*/snd(source_addr, buf);
```

LSP Selects the power level sweep mode. **POWER LEVELING**

Syntax: `LSP`

Remarks: In Power Level Sweep mode, the power level will sweep as determined by the preset (or previously set) dwell-time and number-of-steps parameters.

Related Commands: LOG, LIN, PDT, PNS, PU0, PU1, PU2

Front Panel Key: **Level** | **Level Sweep**

LST Places the MG369XB in list sweep mode. **LIST SWEEP**

Syntax: `LST`

Remarks: In list sweep mode, up to four lists of 2000 non-sequential frequency/power level sets can be stored and accessed. A list index (0 through 1999) identifies each frequency/power level set in a list. When commanded, the MG369XB generates a phase-locked step sweep between the specified list start index and list stop index.

Related Commands: ELI(xxxx), ELN(x), LF, LP, LIB(xxxx), LIE(xxxx), LEA

Front Panel Key: **Frequency** | **List**

LU0 Turns off the active user level calibration table. **USER LEVEL CAL**

Syntax: `LU0`

Front Panel Key: **Level** | **User Lvl Cal** | **Off**

LU1 Activates user level calibration table #1. **USER LEVEL CAL**

Syntax: `LU1`

Remarks: Turns off any other active user level calibration table.

Front Panel Key: **Level** | **User Lvl Cal** | **User 1** | **On**

LU2 Activates user level calibration table #2. **USER LEVEL CAL**

Syntax: `LU2`

Remarks: Turns off any other active user level calibration table.

Front Panel Key: **Level** | **User Lvl Cal** | **User 2** | **On**

LU3 Activates user level calibration table #3. **USER LEVEL CAL**

Syntax: `LU3`

Remarks: Turns off any other active user level calibration table.

Front Panel Key: **Level** | **User Lvl Cal** | **User 3** | **On**

LU4 Activates user level calibration table #4. **USER LEVEL CAL**

Syntax: `LU4`

Remarks: Turns off any other active user level calibration table.

Front Panel Key: **Level** | **User Lvl Cal** | **User 4** | **On**

LU5 Activates user level calibration table #5. **USER LEVEL CAL**

Syntax: `LU5`

Remarks: Turns off any other active user level calibration table.

Front Panel Key: **Level** | **User Lvl Cal** | **User 5** | **On**

LUR Prepares the MG369XB to receive 5 tables of user level calibration data from the controller. **USER LEVEL CAL**

Syntax: LUR

Remarks: This commands readies the MG369XB to receive the five tables of user level (flatness correction) calibration data that were stored in the controller by the LUS command.

Related Commands: LUS

Front Panel Key: N/A

LUS Sends all five tables of the user level calibration data to the controller. **USER LEVEL CAL**

Syntax: LUS

Remarks: This command sends all five tables of user level (flatness correction) calibration data to the controller where they are stored in a binary data file. The tables are recalled using the LUR command.

Related Commands: LUR

Front Panel Key: N/A

LV0 Turns off leveling of the output power. **POWER LEVELING**

Syntax: LV0

Remarks: This places the MG369XB in a fixed gain mode. In fixed gain mode, the ALC is disabled. The RF level DAC and step attenuator (if installed) are used to control the relative power level. Power is not detected at any point and the absolute output power level is uncalibrated.

Related Commands: DL1, IL1, LV1, PL1

Front Panel Key: **Level** | **ALC Mode** | **Leveling >** | **Fixed Gain**

LV1 Turns off leveling of the output power. **POWER LEVELING**

Syntax: `LV1`

Remarks: This places the MG369XB in auto fixed gain mode. In auto fixed gain mode, the ALC RF Level DAC voltages are sampled with internal leveling enabled, then the ALC is disabled and the RF Level DAC voltages are applied. Power is not detected again at any point unless a frequency or power level parameter is adjusted.

Related Commands: DL1, IL1, LV0, PL1

Front Panel Key: **Level** / **ALC Mode** / **Leveling >** / **Auto Fixed Gain**

LVP Sets the instrument power level to 1 dB below peak leveled power. **POWER LEVELING**

Syntax: `LVP`

Front Panel Key: In CW mode: **Level** | **Peak Lvld Pwr - 1dB**

M0 Opens the M0 parameter. **PARAMETER ENTRY**

Syntax: `M0<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the M0 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | **Frequency List...** | highlight M0, then press **Edit Selected**

Output Command: OM0 returns the M0 frequency value (in MHz) to the controller.

M1 Opens the M1 parameter. **PARAMETER ENTRY**

Syntax: `M1<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the M1 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | highlight M1, then press **Edit Selected**

Output Command: OM1 returns the M1 frequency value (in MHz) to the controller.

M2 Opens the M2 parameter. **PARAMETER ENTRY**

Syntax: `M2<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the M2 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | highlight M2, then press **Edit Selected**

Output Command: OM2 returns the M2 frequency value (in MHz) to the controller.

M3 Opens the M3 parameter. **PARAMETER ENTRY**

Syntax: `M3<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the M3 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | **Frequency List...** | highlight M3, then press **Edit Selected**

Output Command: OM3 returns the M3 frequency value (in MHz) to the controller.

M4 Opens the M4 parameter. **PARAMETER ENTRY**

Syntax: `M4<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the M4 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | **Frequency List...** | highlight M4, then press **Edit Selected**

Output Command: OM4 returns the M4 frequency value (in MHz) to the controller.

M5 Opens the M5 parameter. **PARAMETER ENTRY**

Syntax: `M5<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the M5 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | **Frequency List...** | highlight M5, then press **Edit Selected**

Output Command: OM5 returns the M5 frequency value (in MHz) to the controller.

M6 Opens the M6 parameter. **PARAMETER ENTRY**

Syntax: `M6<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the M6 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | **Frequency List...** | highlight M6, then press **Edit Selected**

Output Command: OM6 returns the M6 frequency value (in MHz) to the controller.

M7 Opens the M7 parameter. **PARAMETER ENTRY**

Syntax: `M7<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the M7 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | **Frequency List...** | highlight M7, then press **Edit Selected**

Output Command: OM7 returns the M7 frequency value (in MHz) to the controller.

M8 Opens the M8 parameter. **PARAMETER ENTRY**

Syntax: `M8<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the M8 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | **Frequency List...** | highlight M8, then press **Edit Selected**

Output Command: OM8 returns the M8 frequency value (in MHz) to the controller.

M9 Opens the M9 parameter. **PARAMETER ENTRY**

Syntax: `M9<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the M9 parameter. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Frequency Control >** | **Frequency List...** | highlight M9, then press **Edit Selected**

Output Command: OM9 returns the M9 frequency value (in MHz) to the controller.

MAN Selects manual (step) frequency sweep. **SWEEP**

Syntax: MAN

Remarks: The MAN command only provides for setting up the MG369XB for a manual frequency sweep. It must be accompanied by the RL command to return the instrument to local (front panel) control in order for the operator to perform the manual sweep.

Front Panel Key: **Frequency** | **Manual Sweep**

MB0 Sets the enable mask byte for the primary status byte. **STATUS**

Syntax: MB0

Remarks: Sets an eight-bit data mask that is used to enable specific bits of the primary status byte. This enables any or all of the bits (except for bit six) in the primary status byte to generate an SRQ using one eight-bit byte. This command can be equivalent to sending ES1, FB1,LE1,PE1, SE1, SB1, and UL1.

Front Panel Key: N/A

Output Command: OSM returns the Primary SRQ Mask byte to the controller.

MB1 Sets the enable mask byte for extended status byte 1. **STATUS**

Syntax: MB1

Remarks: Sets an eight-bit data mask that is used to enable specific bits of the extended status byte one. This enables any or all of the bits in the extended status byte one to generate an SRQ using one eight-bit byte.

Front Panel Key: N/A

Example: C code snippet to enable RF locked bit:

```
strcpy(buf, “mb1 ”); buf[3] = 8; snd(source_addr, buf);
```

Output Command: OEM returns the Extended SRQ Mask bytes (3 binary bytes) to the controller.

MB2 Sets the enable mask byte for extended status byte 2. **STATUS**

Syntax: `MB2`

Remarks: Sets an eight-bit data mask that is used to enable specific bits of the extended status byte two. This enables any or all of the bits in the extended status byte two to generate an SRQ using one eight-bit byte.

Front Panel Key: N/A

Example: C code snippet to enable the RF unlocked bit:

```
strcpy(buf, “mb2 ”); buf[3] = 16; snd(source_addr, buf);
```

Output Command: OEM returns the Extended SRQ Mask bytes (3 binary bytes) to the controller.

ME0 Disables the marker at the active frequency. **MARKER**

Syntax: `ME0`

Related Commands: ME1

Front Panel Key: **Frequency** | **Step Sweep** | **Frequency Control >** | **Marker List...** | highlight the active marker frequency, then press **Tag Selected**

Example: **`F1 ME0`** disables the F1 frequency marker.

ME1 Enables a marker at the active frequency. **MARKER**

Syntax: `ME1`

Remarks: This command will enable a marker at the current frequency that is open for update (F0-F9 or M0-M9).

Front Panel Key: **Frequency** | **Step Sweep** | **Frequency Control >** | **Marker List...** | highlight the active marker frequency, then press **Tag Selected**

Example: **`F6 ME1`** enables the F6 frequency marker.

MH MHz data terminator. **DATA TERMINATOR**

Syntax: MH

Front Panel Key: N/A

MKO Turns off markers. **MARKER**

Syntax: MKO

Remarks: Enabled markers remain enabled, but are not active.

Front Panel Key: **Frequency** | **Step Sweep** | **Frequency Control >** | **Marker List...** | **Video Markers Off**

MNT Selects manual trigger. **SWEEP**

Syntax: MNT

Remarks: In manual trigger mode, the list index is incremented by one each time the UP command is received or each time an external TTL trigger is received. The list index is decremented by one each time the DN command is received.

Related Commands: DN, UP

Front Panel Key: **Frequency** | **List** | **Sweep >** | **Trigger >** | **Manual**

MOM Turns off the AM and FM measurement modes. **MEASURE FUNCTION**

Syntax: MOM

Related Commands: OMM, AMI, FMD

Front Panel Key: N/A

MPN Sets the rear panel marker polarity negative. **MARKER**

Syntax: MPN

Front Panel Key: N/A

MPP Sets the rear panel marker polarity positive. **MARKER**

Syntax: MPP

Front Panel Key: N/A

MR Performs a master reset of the instrument by setting all of the instrument parameters to factory default. **MISCELLANEOUS**

Syntax: MR

Front Panel Key: Toggle **Output** On/Off key during startup.

MS Milliseconds (ms) data terminator. **DATA TERMINATOR**

Syntax: MS

Front Panel Key: N/A

MV MHz per volt (MHz/V) data terminator. **DATA TERMINATOR**

Syntax: MV

Front Panel Key: N/A

NS Nanoseconds (ns) data terminator. **DATA TERMINATOR**

Syntax: NS

Front Panel Key: N/A

OAB Returns the external AM sensitivity value (in dB/V) to the controller. **OUTPUT**

Syntax: OAB

Front Panel Key: N/A

OAD1 Returns the internal AM depth value (in %) to the controller. **OUTPUT**

Syntax: OAD1

Front Panel Key: N/A

OAD2 Returns the internal AM depth value (in dB) to the controller. **OUTPUT**

Syntax: OAD2

Front Panel Key: N/A

OAR Returns the internal AM rate (in Hz) to the controller. **OUTPUT**

Syntax: OAR

Front Panel Key: N/A

OAS Returns the external AM sensitivity value (in %/V) to the controller. **OUTPUT**

Syntax: OAS

Front Panel Key: N/A

OAW Returns the name of the internal AM waveform to the controller. **OUTPUT**

Syntax: OAW

Remarks: Possible returned values: “SINE”, “SQUARE WAVE”, “RAMP UP”, “RAMP DOWN”, “GAUSSIAN NOISE”, “UNIFORM NOISE”, “TRIANGLE”

Front Panel Key: N/A

OD1 Returns the internal pulse delay1 value (in μs) to the controller. **OUTPUT**

Syntax: OD1

Front Panel Key: N/A

OD2 Returns the internal pulse delay2 value (in µs) to the controller. **OUTPUT**

Syntax: OD2

Front Panel Key: N/A

OD3 Returns the internal pulse delay3 value (in µs) to the controller. **OUTPUT**

Syntax: OD3

Front Panel Key: N/A

OD4 Returns the internal pulse delay4 value (in µs) to the controller. **OUTPUT**

Syntax: OD4

Front Panel Key: N/A

ODD Returns the internal pulse stepped delay mode step size value (in ms) to the controller. **OUTPUT**

Syntax: ODD

Front Panel Key: N/A

ODE Returns the internal pulse stepped delay mode delay 1 stop value (in ms) to the controller. **OUTPUT**

Syntax: ODE

Front Panel Key: N/A

ODF Returns the ΔF frequency value (in MHz) to the controller. **OUTPUT**

Syntax: ODF

Related Commands: DLF, DFF, DFM

Front Panel Key: N/A

ODL Returns the internal pulse stepped delay mode dwell-time-per-step value (in ms) to the controller. **OUTPUT**

Syntax: ODL

Front Panel Key: N/A

ODP Returns the internal pulse delay1 value (in ms) to the controller (Same as OD1). **OUTPUT**

Syntax: ODP

Front Panel Key: N/A

ODS Returns the internal pulse stepped delay mode delay 1 start value (in ms) to the controller. **OUTPUT**

Syntax: ODS

Front Panel Key: N/A

OEBW Returns the external reference loop bandwidth setting. **OUTPUT**

Syntax: OEBW

Related Commands: EBW0, EBW1, EBW2, EBW3

Front Panel Key: **System** | **Config** | **Rear Panel >** | **External Ref BW >**

OEM Returns the Extended SRQ Mask bytes (3 binary bytes) to the controller. **OUTPUT**

Syntax: OEM

Related Commands: MB0, MB1, MB2

Front Panel Key: N/A

OES Returns the GPIB Status bytes (3 binary bytes) to the controller. **OUTPUT**

Syntax: `OES`

Remarks: Returns the contents of the primary status byte and the two extended status bytes to the controller.

Front Panel Key: N/A

OF0 Returns the F0 frequency value (in MHz) to the controller. **OUTPUT**

Syntax: `OF0`

Related Commands: F0

Front Panel Key: N/A

OF1 Returns the F1 frequency value (in MHz) to the controller. **OUTPUT**

Syntax: `OF1`

Related Commands: F1

Front Panel Key: N/A

OF2 Returns the F2 frequency value (in MHz) to the controller. **OUTPUT**

Syntax: `OF2`

Related Commands: F2

Front Panel Key: N/A

OF3 Returns the F3 frequency value (in MHz) to the controller. **OUTPUT**

Syntax: `OF3`

Related Commands: F3

Front Panel Key: N/A

OF4 Returns the F4 frequency value (in MHz) to the controller. **OUTPUT**

Syntax: OF4

Related Commands: F4

Front Panel Key: N/A

OF5 Returns the F5 frequency value (in MHz) to the controller. **OUTPUT**

Syntax: OF5

Related Commands: F5

Front Panel Key: N/A

OF6 Returns the F6 frequency value (in MHz) to the controller. **OUTPUT**

Syntax: OF6

Related Commands: F6

Front Panel Key: N/A

OF7 Returns the F7 frequency value (in MHz) to the controller. **OUTPUT**

Syntax: OF7

Related Commands: F7

Front Panel Key: N/A

OF8 Returns the F8 frequency value (in MHz) to the controller. **OUTPUT**

Syntax: OF8

Related Commands: F8

Front Panel Key: N/A

OF9 Returns the F9 frequency value (in MHz) to the controller. **OUTPUT**

Syntax: `OF9`

Related Commands: F9

Front Panel Key: N/A

OFD Returns the internal FM deviation value (in Hz) to the controller. **OUTPUT**

Syntax: `OFD`

Front Panel Key: N/A

OFH Returns the high-end frequency value (in MHz) to the controller. **OUTPUT**

Syntax: `OFH`

Front Panel Key: N/A

OFK Returns the internal or external FM lock status to the controller. **OUTPUT**

Syntax: `OFK`

Remarks: Possible returned values: “UNLOCKED NARROW”, “UNLOCKED WIDE”, “LOCKED”

Front Panel Key: N/A

OFL Returns the low-end frequency value (in MHz) to the controller. **OUTPUT**

Syntax: `OFL`

Front Panel Key: N/A

OFM Returns the frequency multiplier parameter. **OUTPUT**

Syntax: `OFM`

Front Panel Key: N/A

OFR Returns the internal FM rate (in Hz) to the controller. **OUTPUT**

Syntax: OFR

Front Panel Key: N/A

OFS Returns the external FM sensitivity value (in MHz/V) to the controller. **OUTPUT**

Syntax: OFS

Front Panel Key: N/A

OFW Returns the name of the internal FM waveform to the controller. **OUTPUT**

Syntax: OFW

Remarks: Possible returned values: “SINE”, “SQUARE WAVE”, “RAMP UP”, “RAMP DOWN”, “GAUSSIAN NOISE”, “UNIFORM NOISE”, “TRIANGLE”

Front Panel Key: N/A

OI Returns the instrument identification string to the controller. **OUTPUT**

Syntax: OI

Remarks: The instrument identification string provides the following information: model number, low-end frequency, high-end frequency, minimum output power level, maximum output power level, software revision number, serial number, model prefix, and series. The string is 36 characters long.

Front Panel Key: N/A

Example: The return string “3692 0.0020.00-110.014.02.07000001A” indicates: Model Series 36, Model Number 92, Mininum Frequency 0.00 GHz (0.01 Hz), Maximum Frequency 20 GHz, Min Power -110 dBm, Max Power 14 dBm, Firmware Version 2.07, Serial Number 000001, and

OL0 Returns the L0 power level value to the controller. **OUTPUT**

Syntax: `OL0`

Remarks: Returned power level value is in dBm when in log mode and in mV when in linear mode.

Related Commands: L0, XL0

Front Panel Key: N/A

OL1 Returns the L1 power level value to the controller. **OUTPUT**

Syntax: `OL1`

Remarks: Returned power level value is in dBm when in log mode and in mV when in linear mode.

Related Commands: L1, XL1

Front Panel Key: N/A

OL2 Returns the L2 power level value to the controller. **OUTPUT**

Syntax: `OL2`

Remarks: Returned power level value is in dBm when in log mode and in mV when in linear mode.

Related Commands: L2, XL2

Front Panel Key: N/A

OL3 Returns the L3 power level value to the controller. **OUTPUT**

Syntax: `OL3`

Remarks: Returned power level value is in dBm when in log mode and in mV when in linear mode.

Related Commands: L3, XL3

Front Panel Key: N/A

OL4 Returns the L4 power level value to the controller. **OUTPUT**

Syntax: `OL4`

Remarks: Returned power level value is in dBm when in log mode and in mV when in linear mode.

Related Commands: L4, XL4

Front Panel Key: N/A

OL5 Returns the L5 power level value to the controller. **OUTPUT**

Syntax: `OL5`

Remarks: Returned power level value is in dBm when in log mode and in mV when in linear mode.

Related Commands: L5, XL5

Front Panel Key: N/A

OL6 Returns the L6 power level value to the controller. **OUTPUT**

Syntax: `OL6`

Remarks: Returned power level value is in dBm when in log mode and in mV when in linear mode.

Related Commands: L6, XL6

Front Panel Key: N/A

OL7 Returns the L7 power level value to the controller. **OUTPUT**

Syntax: `OL7`

Remarks: Returned power level value is in dBm when in log mode and in mV when in linear mode.

Related Commands: L7, XL7

Front Panel Key: N/A

OL8 Returns the L8 power level value to the controller. **OUTPUT**

Syntax: `OL8`

Remarks: Returned power level value is in dBm when in log mode and in mV when in linear mode.

Related Commands: L8, XL8

Front Panel Key: N/A

OL9 Returns the L9 power level value to the controller. **OUTPUT**

Syntax: `OL9`

Remarks: Returned power level value is in dBm when in log mode and in mV when in linear mode.

Related Commands: L9, XL9

Front Panel Key: N/A

OLO Returns the level offset power value to the controller. **OUTPUT**

Syntax: `OLO`

Remarks: Returned level offset power value is in dBm when in log mode and in mV when in linear mode.

Related Commands: LOS

Front Panel Key: N/A

OM0 Returns the M0 frequency value (in MHz) to the controller. **OUTPUT**

Syntax: `OM0`

Related Commands: M0

Front Panel Key: N/A

OM1 Returns the M1 frequency value (in MHz) to the controller. **OUTPUT**

Syntax: OM1

Related Commands: M1

Front Panel Key: N/A

OM2 Returns the M2 frequency value (in MHz) to the controller. **OUTPUT**

Syntax: OM2

Related Commands: M2

Front Panel Key: N/A

OM3 Returns the M3 frequency value (in MHz) to the controller. **OUTPUT**

Syntax: OM3

Related Commands: M3

Front Panel Key: N/A

OM4 Returns the M4 frequency value (in MHz) to the controller. **OUTPUT**

Syntax: OM4

Related Commands: M4

Front Panel Key: N/A

OM5 Returns the M5 frequency value (in MHz) to the controller. **OUTPUT**

Syntax: OM5

Related Commands: M5

Front Panel Key: N/A

OM6 Returns the M6 frequency value (in MHz) to the controller. **OUTPUT**

Syntax: OM6

Related Commands: M6

Front Panel Key: N/A

OM7 Returns the M7 frequency value (in MHz) to the controller. **OUTPUT**

Syntax: OM7

Related Commands: M7

Front Panel Key: N/A

OM8 Returns the M8 frequency value (in MHz) to the controller. **OUTPUT**

Syntax: OM8

Related Commands: M8

Front Panel Key: N/A

OM9 Returns the M9 frequency value (in MHz) to the controller. **OUTPUT**

Syntax: OM9

Related Commands: M9

Front Panel Key: N/A

OMD Returns the name of the internal pulse mode to the controller. **OUTPUT**

Syntax: OMD

Remarks: Possible returned values: “SINGLE”, “DOUBLET”, “TRIPLET”, “QUADRUPLET”

Front Panel Key: N/A

OMM 1. Returns the AM depth measurement value (in %) to the controller. **OUTPUT**
2. Returns the FM deviation measurement value (in MHz) to the controller.

Syntax: OMM

Remarks: The AM depth measurement is only returned when the AMI command either has been or is also programmed. The FM deviation measurement is only returned when the FMD command either has been or is also programmed.

Front Panel Key: N/A

OO Returns the instrument option string to the controller. **OUTPUT**

Syntax: OO

Remarks: Options are seperated by commas.

Front Panel Key: N/A

OP5 Returns the internal or external pulse polarity (“HIGH”, “LOW”) to the controller. **OUTPUT**

Syntax: OP5

Front Panel Key: N/A

OPC Returns the internal pulse clock rate (in MHz) to the controller. **OUTPUT**

Syntax: OPC

Front Panel Key: N/A

OPD Returns the power sweep dwell time (in ms) to the controller. **OUTPUT**

Syntax: OPD

Related Commands: PDT

Front Panel Key: N/A

OPHD Returns the internal FM deviation value (in radians) to the controller. **OUTPUT**

Syntax: OPHD

Front Panel Key: N/A

OPHM Returns the name of the FM mode ("NARROW", "WIDE") to the controller. **OUTPUT**

Syntax: OPHM

Front Panel Key: N/A

OPHR Returns the internal FM rate (in Hz) to the controller. **OUTPUT**

Syntax: OPHR

Front Panel Key: N/A

OPHS Returns the external FM sensitivity value (in radians/V) to the controller. **OUTPUT**

Syntax: OPHS

Front Panel Key: N/A

OPHW Returns the name of the internal FM waveform to the controller. **OUTPUT**

Syntax: OPHW

Remarks: Possible returned values: "SINE", "SQUARE WAVE", "RAMP UP", "RAMP DOWN", "GAUSSIAN NOISE", "UNIFORM NOISE", "TRIANGLE"

Front Panel Key: N/A

OPM Returns the internal power meter measurement (in dBm) to the controller. **OUTPUT**

Syntax: OPM

Related Command: PM0, PM1

Front Panel Key: N/A

OPO Returns the phase offset value (in degrees) to the controller. **OUTPUT**

Syntax: OPO

Related Commands: DG, PS0, PS1, PSO, PSZ

Front Panel Key: N/A

OPP Returns the internal pulse period value (in μs) to the controller. **OUTPUT**

Syntax: OPP

Front Panel Key: N/A

OPR Returns the internal pulse frequency (in MHz) to the controller. **OUTPUT**

Syntax: OPR

Front Panel Key: N/A

OPS Returns the power sweep number-of-steps to the controller. **OUTPUT**

Syntax: OPS

Related Commands: PNS

Front Panel Key: N/A

OPT Returns the name of the internal pulse trigger to the controller. **OUTPUT**

Syntax: `OPT`

Remarks: Possible returned values: “FREE RUN”, “GATED”, “DELAYED”, “TRIGGERED”, “TRIG WITH DELAY”, “COMPOSITE”

Front Panel Key: N/A

OPW Returns the internal pulse width1 value (in µs) to the controller (Same as OW1). **OUTPUT**

Syntax: `OPW`

Front Panel Key: N/A

OSB Returns the primary GPIB status byte to the controller. **OUTPUT**

Syntax: `OSB`

Front Panel Key: N/A

OSD Returns the step sweep dwell time (in ms) to the controller. **OUTPUT**

Syntax: `OSD`

Related Commands: SDT

Front Panel Key: N/A

OSE Returns the last GPIB syntax error to the controller. **OUTPUT**

Syntax: `OSE`

Remarks: Syntax errors are those that occur in the formulation of a program statement, such as writing EXTTFS instead of EXTTRS.

Front Panel Key: N/A

OSM Returns the primary SRQ mask byte to the controller. **OUTPUT**

Syntax: OSM

Related Commands: MB0

Front Panel Key: N/A

OSR Returns the self-test results (6 binary bytes) to the controller. **OUTPUT**

Syntax: OSR

Related Commands: TST

Front Panel Key: N/A

OSS Returns the step sweep number-of-steps to the controller. **OUTPUT**

Syntax: OSS

Related Commands: SNS

Front Panel Key: N/A

OST Returns the step sweep time value (in ms) to the controller. **OUTPUT**

Syntax: OST

Related Commands: SWT

Front Panel Key: N/A

OVN Returns the ROM version number to the controller. **OUTPUT**

Syntax: OVN

Front Panel Key: N/A

OW1 Returns the internal pulse width1 value (in µs) to the controller. **OUTPUT**

Syntax: `OW1`

Front Panel Key: N/A

OW2 Returns the internal pulse width2 value (in µs) to the controller. **OUTPUT**

Syntax: `OW2`

Front Panel Key: N/A

OW3 Returns the internal pulse width3 value (in µs) to the controller. **OUTPUT**

Syntax: `OW3`

Front Panel Key: N/A

OW4 Returns the internal pulse width4 value (in µs) to the controller. **OUTPUT**

Syntax: `OW4`

Front Panel Key: N/A

OWT Returns the GPIB termination status to the controller. **OUTPUT**

Syntax: `OWT`

Remarks: Return of zero indicates carriage return (CR); return of one indicates carriage return and line feed (CR/LF).

Front Panel Key: N/A

P0 Turns off the internal or external pulse modulation function (This is the default mode). **MODULATION**

Syntax: `P0`

Related Commands: EP0, EP1, XP

Front Panel Key: **Modulation** | **Pulse** | **On/Off** to Off

PC1 Selects the 10 MHz internal pulse clock rate. **MODULATION**

Syntax: `PC1`

Front Panel Key: **Modulation** | **Pulse** (internal) | **More >** | **Clock 100 / 10** or **Modulation** | **Pulse** (internal) | **More >** | **Clock 40 / 10** (Option 24)

PC4 Selects the 100 MHz internal pulse clock rate (Option 26) or the 40 MHz internal pulse clock rate (Option 24). **MODULATION**

Syntax: `PC4`

Front Panel Key: **Modulation** | **Pulse** (internal) | **More >** | **Clock 100 / 10** or **Modulation** | **Pulse** (internal) | **More >** | **Clock 40 / 10** (Option 24)

PCT Percent (%) data terminator. **DATA TERMINATOR**

Syntax: `PCT`

Front Panel Key: N/A

PCV Percent per volt (%/V) data terminator. **DATA TERMINATOR**

Syntax: `PCV`

Front Panel Key: N/A

PDT Opens the power sweep dwell time parameter. **PARAMETER ENTRY**

Syntax: `PDT<value><unit>`

Value: 1ms to 99s
Units: MS, SEC

Remarks: Permits setting the dwell-time-per-step of the power level sweep.

Front Panel Key: **Level** | **Level Sweep** | **Dwell Time**

Output Command: OPD returns the power sweep dwell time (in ms) to the controller.

PDY Opens the internal pulse delay1 parameter (Same as D1). **PARAMETER ENTRY**

Syntax: `PDY<value><unit>`

Value: 0 ms to 167 ms at 100 MHz pulse clock rate; 0 ms to 419 ms at 40 MHz pulse clock rate; 0s to 1.6s at 10 MHz pulse clock rate

Units: SEC, MS, US, NS

Front Panel Key: **Modulation** | **Pulse** (internal) | **Wdth/Dly List...** | **Edit Selected**

Output Command: OD1

PE0 Inhibits parameter range error SRQ generation. **STATUS**

Syntax: `PE0`

Remarks: Inhibits an SRQ from being generated when the primary status byte bit four (parameter range error) is set. This is the default mode.

Front Panel Key: N/A

PE1 Enables parameter range error SRQ generation. **STATUS**

Syntax: `PE1`

Remarks: Enables an SRQ to be generated when primary status byte bit four (parameter range error) is set and SQ1 has been programmed. SQ1 enables the SRQ generation function.

Related Commands: SQ1, PE0

Front Panel Key: N/A

Example: **`CSB SQ1 PE1`** enables an SRQ on a parameter range error.

PER Opens the internal pulse period parameter. **PARAMETER ENTRY**

Syntax: `PER<value><unit>`

Value: 40 ns to 167 ms at 100 MHz pulse clock rate; 250 ns to 419 ms at 40 MHz pulse clock rate; 600 ns to 1.6s at 10 MHz pulse clock rate

Units: SEC, MS, US, NS

Related Commands: PR

Front Panel Key: **Modulation** | **Pulse** (internal) | **Edit Period**

Example: **`PER 500 US W1 50 US IP`** turns internal pulse on with a period of 500 µs and pulse width of 50 µs.

Output Command: OPP (in µs)

PH0 Turns off the internal or external ΦM function. **MODULATION**

Syntax: `PH0`

Remarks: If the ΦM function is not installed, this command produces a syntax error.

Related Commands: PH1, PH2, PH7, PH8

Front Panel Key: **Modulation** | **PM** | **On/Off**

PH1 Turns on the external ΦM function in narrow mode. **MODULATION**

Syntax: `PH1`

Remarks: Disables the internal ΦM function or the external ΦM function in Wide mode, had either of these modes been previously programmed. If the ΦM function is not installed, this command produces a syntax error.

Related Commands: PH0, PH2

Front Panel Key: **Modulation** | **PM** (external) | **More >** | **Narrow** then **Modulation** | **PM** | **On/Off**

PH2 Turns on the external ΦM function in wide mode. **MODULATION**

Syntax: PH2

Remarks: Disables the internal ΦM function or the external ΦM function in Narrow mode, had either of these modes been previously programmed. If the ΦM function is not installed, this command produces a syntax error.

Related Commands: PH0, PH1

Front Panel Key: **Modulation** | **PM** (external) | **More >** | **Wide** then **Modulation** | **PM** | **On/Off**

PH7 Turns on the internal ΦM function in narrow mode. **MODULATION**

Syntax: PH7

Remarks: Disables the external ΦM function or the internal ΦM function in Wide mode, had either of these modes been previously programmed. If the ΦM function is not installed, this command produces a syntax error.

Related Commands: PH0, PH8

Front Panel Key: **Modulation** | **PM** (internal) | **More >** | **Narrow** then **Modulation** | **PM** | **On/Off**

PH8 Turns on the internal ΦM function in wide mode. **MODULATION**

Syntax: PH8

Remarks: Disables the external ΦM function or the internal ΦM function in Narrow mode, had either of these modes been previously programmed. If the ΦM function is not installed, this command produces a syntax error.

Related Commands: PH0, PH7

Front Panel Key: **Modulation** | **PM** (internal) | **More >** | **Wide** then **Modulation** | **PM** | **On/Off**

PHD Opens the internal ΦM deviation parameter. **PARAMETER ENTRY**

Syntax: PHD<value><unit>

Value: 0.0025 to 5 radians in Phase Modulation Narrow mode; 0.25 to 500 radians in Phase Modulation Wide mode

Units: RD

Front Panel Key: **Modulation** | **PM** (internal) | **Edit Deviation**

Example: **PHD 0.5 RD PH7** turns internal phase modulation narrow on with a phase deviation of 500 mrad.

Output Command: OPHD (in rads)

PHN Turns on the external ΦM function in narrow mode (Same as PH1). **MODULATION**

Syntax: PHN

Remarks: Disables the internal ΦM function or the external ΦM function in Wide mode, had either of these modes been previously programmed. If the ΦM function is not installed, this command produces a syntax error.

Related Commands: PH0, PH2

Front Panel Key: **Modulation** | **PM** (external) | **More >** | **Narrow** then **Modulation** | **PM** | **On/Off**

PHR Opens the internal ΦM rate parameter. **PARAMETER ENTRY**

Syntax: PHR<value><unit>

Value: 0.1 Hz to 1 MHz for sine wave; 0.1 Hz to 100 kHz for square, triangle, and ramp waveforms

Units: MH, KH, HZ

Front Panel Key: **Modulation** | **PM** (internal) | **Edit Rate**

Example: **PHR 10 KH PH7** turns internal phase modulation narrow on with a phase rate 10 kHz.

Output Command: OPHR (in Hz)

PHS Opens the external ΦM sensitivity parameter. **PARAMETER ENTRY**

Syntax: `PHS<value><unit>`

Value: ±0.0025 radians/V to ±5 radians/V in FM Narrow mode; ±0.25 radians/V to ±500 radians/V in FM Wide mode

Units: RV

Front Panel Key: **Modulation** | **PM** (external) | **Edit Sensitivity**

Example: **`PHS 0.5 RV PH1`** turns external phase modulation narrow on with a phase sensitivity of 500 mrad/V.

Output Command: OPHS (in rads/V)

PHV(x) Selects the internal ΦM waveform. **MODULATION**

Syntax: `PHV(x)`

Value: x: 1 = Sine Wave, 2 = Square Wave, 3 = Positive Ramp, 4 = Negative Ramp, 5 = Guassian Noise, 6 = Uniform Noise, 7 = Triangle Wave

Remarks: If the ΦM function is not installed, this command produces a syntax error.

Front Panel Key: **Modulation** | **PM** (internal) | **Select Wave...** | **Select**

Example: **`PHV2 PH7`** turns square wave, internal phase modulation narrow on.

Output Command: OPHW (text)

PHW Turns on the external ΦM function in wide mode (Same as PH2). **MODULATION**

Syntax: `PHW`

Remarks: If the ΦM function is not installed, this command produces a syntax error.

Related Commands: PH0, PH1

Front Panel Key: **Modulation** | **PM** (external) | **More >** | **Wide** then **Modulation** | **PM** | **On/Off**

PL1 Selects external power meter leveling of the output power. **POWER LEVELING**

Syntax: `PL1`

Remarks: Selects external leveling of the output power using a signal from an external power meter connected to the EXTERNAL ALC IN connector. Deselects the internal leveling mode or external leveling mode using a signal from an external detector, if previously programmed. In external power leveling mode, use the parameter entry command EGI to enter a setting for the reference level DAC to control the ALC gain.

Related Commands: EGI, DL1, IL1, LV0, LV1

Front Panel Key: **Level** | **ALC Mode** | **Leveling >** | **Power Meter**

PM0 Turns off the Power Meter measurement mode **MEASURE FUNCTION**

Syntax: `PM0`

Remarks: If the internal power meter option is not installed, this command produces a syntax error.

Related Commands: OPM, PM1

Front Panel Key: **System** | **Meas. Power**

PM1 Turns on the Power Meter measurement mode **MEASURE FUNCTION**

Syntax: `PM1`

Remarks: RF power can be measured at an external source with a 560-7, 5400-71, or 4600-71 series detector connected to the rear panel POWER METER connector. The measurement results are sent to the controller upon receipt of the OPM command. Power measurements can be taken simultaneously with modulation measurements. If the internal power meter option is not installed, this command produces a syntax error.

Related Commands: OPM, PM0

Front Panel Key: **System** | **Meas. Power**

Output Command: OPM

PMD(x) Selects the internal pulse mode. **MODULATION**

Syntax: `PMD(x)`

Value: x: 1 = Single, 2 = Doublet, 3 = Triplet, 4 = Quadruplet

Remarks: Disables the internal ΦM function or the external ΦM function in Narrow mode, had either of these modes been previously programmed. If the ΦM function is not installed, this command produces a syntax error.

Front Panel Key: **Modulation** | **Pulse** (internal) | **More >** | **Mode...** | **Select**

Example: **`PMD2 W1 10 US D2 15 US W2 20 US IP`** turns internal pulse on and sets pulse doublet, 10 μs width, 15 μs delay (from start of first pulse), and 10 μs width.

Output Command: OMD (text)

PNS Opens the power sweep number of steps parameter. **PARAMETER ENTRY**

Syntax: `PNS<value><unit>`

Value: 1 to 10,000
Units: SPS

Related Commands: LSP, PDT

Front Panel Key: **Level** | **Level Sweep** | **Number of Steps**

Output Command: OPS returns the number of steps of the power sweep to the controller.

PR Opens the internal pulse frequency parameter. **PARAMETER ENTRY**

Syntax: `PR<value><unit>`

Value: 5.96 Hz to 25 MHz at 100 MHz pulse clock rate; 2.385 Hz to 4 MHz at 40 MHz pulse clock rate; 0.597 Hz to 1.66 MHz at 10 MHz pulse clock rate
Units: MH, KH, HZ

Related Commands: PER

Front Panel Key: **Modulation** | **Pulse** (internal, PRF) | **Edit PRF**

Example: **`PR 1 KH PMD1 W1 100 US PTG1 IP`** sets a free running 100 μs pulse at a 1 kHz rate.

Output Command: OPR (in MHz)

PS0 Turns off the phase offset. **MISCELLANEOUS**

Syntax: PS0

Related Commands: DG, OPO, PS1, PSO, PSZ

Front Panel Key: **Frequency** | **CW** | **Phase Offset>** | **Phase Offset**

PS1 Turns on the phase offset. **MISCELLANEOUS**

Syntax: PS1

Remarks: This command produces a phase shift in the RF output. The phase shift is determined by the adjustable phase offset setting.

Related Commands: DG, OPO, PS0, PSO, PSZ

Front Panel Key: **Frequency** | **CW** | **Phase Offset>** | **Phase Offset**

PSO Opens the phase offset parameter. **PARAMETER ENTRY**

Syntax: PSO<value><units>

Value: -360 to +360
Units: DG

Remarks: Permits setting the phase offset parameter.

Related Commands: DG, OPO, PS0, PS1, PSZ

Front Panel Key: **Frequency** | **CW** | **Phase Offset>** | **Edit Offset**

PSZ Zeros the phase offset display. **MISCELLANEOUS**

Syntax: PSZ

Remarks: This command is used to normalize the phase offset display. It does not produce a phase shift.

Related Commands: DG, OPO, PS0, PS1, PSO

Front Panel Key: **Frequency** | **CW** | **Phase Offset>** | **Zero Display**

PT0 Disables the power offset table. **POWER-OFFSET-TABLE**

Syntax: `PT0`

Related Commands: PT1, PTC, PTL

Front Panel Key: N/A

PT1 Enables the power offset table. **POWER-OFFSET-TABLE**

Syntax: `PT1`

Remarks: Power-offset-table commands provide for maintaining a consistent power level at a point within a test setup across the measurement frequencies. This "flattening" of the test point power level is accomplished by summing a power offset word (from the power offset table) with the MG369XB's normal power level DAC word at each frequency point. The command PTL is used to load the power offset table with power offset words.

Related Commands: PT0, PTL, PTC

Front Panel Key: N/A

PTC Changes a power offset table entry. **POWER-OFFSET-TABLE**

Syntax: `PTC<dldh>`

Value: dldh: power offset word

Remarks: dldh is the new power offset word for the current table entry. dldh is a two-byte binary word sent LOW byte first and HIGH byte second. The power offset word is in hundredths of a dB. Negative power offsets use twos-complement representation.

Related Commands: PT0, PT1, PTL

Front Panel Key: N/A

PTF Selects internal pulse triggering on the falling edge of an external input. **MODULATION**

Syntax: `PTF`

Remarks: The PTF command is active only when pulse trigger is gated, triggered, or triggered with delay

Related Commands: PTR

Front Panel Key: **Modulation** | **Pulse** (internal) | **More >** | **Trigger...** | **Trigger v**

Example: **`PTG4 PTF IP`** turns internal pulse on and triggeres pulse on the falling edge.

PTG(x) Selects the internal pulse trigger. **MODULATION**

Syntax: `PTG(x)`

Value: x: 1 = Free Run, 2 = Gated, 3 = Delayed, 4 = Triggered, 5 = Triggered with Delay

Front Panel Key: N/A

PTL Loads a power offset table. **POWER-OFFSET-TABLE**

Syntax: `PTL<clch><dldh.....>`

Value: clch: number of power offset words<R>dldh: power offset word

Remarks: The power-offset mode works in conjunction with the fast-frequency-switching mode. The frequency stack must be loaded before loading the power offset table because the frequency loading sets the upper limit for the number of entries in the power offset table. The same pointer is used for both the frequency stack and the power offset table. Both clch and dldh are two-byte binary words sent LOW byte first and HIGH byte second. The power offset word is in hundredths of a dB. Negative power offsets use twos-complement representation.

> **NOTE**
> Care must be taken to send the exact number of power offset words specified in the word count, clch. If too few words are sent, the GPIB interface may not respond properly.

Related Commands: PT0, PT1, PTC

Front Panel Key: **Level** | **ALC Loop** | **Edit Pivot**

PTR Selects internal pulse triggering on the rising edge of an external input. **MODULATION**

Syntax: `PTR`

Remarks: The PTR command is active only when pulse trigger is gated, triggered, or triggered with delay.

Related Commands: PTF

Front Panel Key: **Modulation** | **Pulse** (internal) | **More >** | **Trigger...** | **Trigger ^**

Example: **`PTG4 PTR IP  turns internal pulse on and triggeres pulse on the rising edge.`**

PU0 Selects logarithmic power level operation in dBm. **POWER LEVELING**

Syntax: `PU0`

Related Commands: LIN, LOG, PU1, PU2

Front Panel Key: **Level** | **Level** | **Level Control >** | **Units>** | **dBm**

PU1 Selects linear power level operation in mV. **POWER LEVELING**

Syntax: `PU1`

Related Commands: LIN, LOG, PU0, PU2

Front Panel Key: **Level** | **Level** | **Level Control >** | **Units>** | **mV**

PU2 Selects logarithmic power level operation in dBμV. **POWER LEVELING**

Syntax: `PU2`

Related Commands: LIN, LOG, PU0, PU1

Front Panel Key: **Level** | **Level** | **Level Control >** | **Units>** | **dBμV**

PVT Opens the ALC power slope pivot point frequency parameter. **PARAMETER ENTRY**

Syntax: `PVT<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Front Panel Key: **Level** | **ALC Loop** | **Edit Pivo**

PW Opens the internal pulse width1 parameter (Same as W1). **PARAMETER ENTRY**

Syntax: `PW<value><unit>`

Value: 30 ns to 167 ns at 100 MHz pulse clock rate; 25 ns to 419 ms at 40 MHz pulse clock rate; 100 ns to 1.6s at 10 MHz pulse clock rate
Units: SEC, MS, US, NS

Related Commands: W1

Front Panel Key: **Modulation** | **Pulse** (internal) | **Wdth/Dly List...** | **Edit Selected**

Example: **`PMD1 PTG1 PW 50 US IP turns internal pulse on with a single pulse, free run of width 50 ms.`**

Output Command: OPW (in μs)

RC0 Selects RF to be off during frequency switching in CW, step sweep, and list sweep modes. **CONFIGURATION**

Syntax: `RC0`

Front Panel Key: **System** | **Config** | **RF** | **DeltaF RF** to Off

RC1 Selects RF to be on during frequency switching in CW, step sweep, and list sweep modes. **CONFIGURATION**

Syntax: `RC1`

Front Panel Key: **System** | **Config** | **RF** | **DeltaF RF** to On

RCF Prepares the MG369XB to receive a new instrument setup recalled from the controller. **STORED SETUP**

Syntax: `RCF`

Related Commands: SAF, SAM, RCM

Front Panel Key: N/A

RCM Prepares the MG369XB to receive a new instrument setup and new stored setups recalled from the controller. **STORED SETUP**

Syntax: `RCM`

Related Commands: SAF, SAM, RCF

Front Panel Key: N/A

RD Radians data terminator. **DATA TERMINATOR**

Syntax: `RD`

Front Panel Key: N/A

RF0 Turns off the RF output. **POWER LEVELING**

Syntax: `RF0`

Front Panel Key: Output - Off (red LED on)

RF1 Turns on the RF output. **POWER LEVELING**

Syntax: `RF1`

Remarks: This is the default mode.

Front Panel Key: Output - On (yellow LED on)

RL Returns the instrument to local (front panel) control. **MISCELLANEOUS**

Syntax: `RL`

Front Panel Key: **System** | **Return to Local** or **System** | **Reset**

RO0 Selects RF to be on at reset. **CONFIGURATION**

Syntax: `RO0`

Remarks: This is the default mode.

Front Panel Key: **System** | **Config** | **RF** | **Reset State** to On

RO1 Selects RF to be off at reset. **CONFIGURATION**

Syntax: `RO1`

Front Panel Key: **System** | **Config** | **RF** | **Reset State** to Off

RSN(m) Recalls the instrument setup stored in internal setup memory location M. **STORED SETUP**

Syntax: `RSN(m)`

Value: M: memory locations 1 to 9

Remarks: Recalls a stored instrument setup from the internal setup memory location specified (1 to 9).

Related Commands: SSN(m)

Front Panel Key: **System** | **Setups** | **Recall** (enter setup number to be recalled)

RSS Resets a sweep if in progress. **SWEEP**

Syntax: RSS

Remarks: Resets the sweep to its start frequency (or power level), whenever the command is received while a single sweep is in progress.

Related Commands: TRG, TRS

Front Panel Key: **Frequency** | **Step Sweep** | **More >** | **Trigger >** | Single | Trigger to start single sweep | Trigger to reset sweep or **Frequency** | **List** | **Sweep >** | **Trigger >** | Single | Trigger to start single sweep | Trigger to reset sweep or **Level** | **Level Sweep** | **Trigger >** | **Single** | **Trigger** to start single sweep or **Trigger** to reset sweep

RST Resets the MG369XB to its default settings. **MISCELLANEOUS**

Syntax: RST

Remarks: Sending this command clears the current instrument setup. If this setup is needed for future testing, save it as a stored setup using the command SSN(M1-9) or SAF before sending RST.

Front Panel Key: **System** | **Reset**

RT0 Selects RF to be off during retrace. **CONFIGURATION**

Syntax: RT0

Front Panel Key: **System** | **Config** | **RF** | **Retrace RF** to Off

RT1 Selects RF to be on during retrace. **CONFIGURATION**

Syntax: RT1

Front Panel Key: **System** | **Config** | **RF** | **Retrace RF** to On

RV Radians per volt data terminator. **DATA TERMINATOR**

Syntax: RV

Front Panel Key: N/A

S0 Turns off the master-slave mode of operation. **MASTER-SLAVE OPS**

Syntax: S0

Related Commands: SL1

Front Panel Key: **Frequency** | **CW** | **Master Slave >** | **Enable** to Off

S1 Turns on the master-slave mode of operation. **MASTER-SLAVE OPS**

Syntax: S1

Remarks: Master-slave operation provides for enabling two MG369XBs that are connected in a master-slave configuration to produce CW and synchronized, swept output signals at a frequency offset. In a master-slave configuration, one instrument (the master) controls the other (the slave) via interface cables between their rear panel AUX I/O and SERIAL I/O connectors. The two units are phase-locked together by connecting them to the same 10 MHz reference time base.

Related Commands: SLF0-SLF9, SLM0 to SLM9, SLDF, SLV, SLL1, SLL2, SOF

Front Panel Key: **Frequency** | **CW** | **Master Slave >** | **Enable** to On

SAF Outputs the current instrument setup to the controller. **STORED SETUP**

Syntax: SAF

Remarks: The current instrument setup is output to the controller in a 4100-byte (approximately) binary data string. The controller stores the setup.

Related Commands: RCF, SAM, RCM

Front Panel Key: N/A

SAM Outputs both the current instrument setup and all stored instrument setups to the controller. **STORED SETUP**

Syntax: SAM

Remarks: The current instrument setup and all stored instrument setups are output to the controller in a 41000-byte (approximately) binary data string. The controller stores the data.

Related Commands: RCM, RCF, SAF

Front Panel Key: N/A

SB0 Inhibits extended status byte 2 SRQ generation. **STATUS**

Syntax: SB0

Remarks: Inhibits an SRQ from being generated when the Extended Status Byte two bit is set. This is the default mode.

Front Panel Key: N/A

SB1 Enables extended status byte 2 SRQ generation. **STATUS**

Syntax: SB1

Remarks: Enables an SRQ to be generated when primary status byte bit seven (extended status byte two) is set and SQ1 has been programmed. The extended status byte two bit is set whenever one (or more) of the unmasked status reporting functions in extended status byte two is true.

Related Commands: SQ1, MB2

Front Panel Key: N/A

Example: C code snippet to enable unlocked SRQ:

```
strcpy(buf, “csb sb1 mb2  sq1 el1");
buf[11] = 16; /*mb2 command mask value*/snd(source_addr, buf);
```

SC0 Turns on the SCAN modulation function. **MODULATION**

Syntax: `SC0`

Remarks: If the SCAN Modulator was not installed, this command produces a syntax error.

Front Panel Key: N/A

SC1 Turns off the SCAN modulation function. **MODULATION**

Syntax: `SC1`

Remarks: If the SCAN Modulator was not installed, this command produces a syntax error.

Front Panel Key: N/A

SD0 Turns off the internal pulse stepped delay mode. **MODULATION**

Syntax: `SD0`

Front Panel Key: **Modulation** | **Pulse** (internal, select one of the delay triggers) | **Step Delay >** | **On/Off**

SD1 Turns on the internal pulse stepped delay mode. **MODULATION**

Syntax: `SD1`

Remarks: Available with Delayed and Triggered With Delay trigger settings. Turns on the internal pulse stepped delay mode if internal pulse modulation is on and the pulse trigger is set to “delayed” or “trigger with delay.”

Front Panel Key: **Modulation** | **Pulse** (internal, select one of the delay triggers) | **Step Delay >** | **On/Off**

SDD Opens the internal pulse stepped delay mode step size parameter. **PARAMETER ENTRY**

Syntax: `SDD<value><unit>`

Value: 0 ms to 167 ms at 100 MHz pulse clock rate; 0 ms to 419 ms at 40 MHz pulse clock rate; 0s to 1.6s at 10 MHz pulse clock rate
Units: SEC, MS, US, NS

Front Panel Key: **Modulation** | **Pulse** (internal, select one of the delay triggers) | **Step Delay >** | **Step Size**

Output Command: ODD (in μs)

SDE Opens the internal pulse stepped delay mode delay 1 stop parameter. **PARAMETER ENTRY**

Syntax: `SDE<value><unit>`

Value: 0 ms to 167 ms at 100 MHz pulse clock rate; 0 ms to 419 ms at 40 MHz pulse clock rate; 0s to 1.6s at 10 MHz pulse clock rate
Units: SEC, MS, US, NS

Front Panel Key: **Modulation** | **Pulse** (internal, select one of the delay triggers) | **Step Delay >** | **Stop Delay**

Output Command: ODE (in μs)

SDL Opens the internal pulse stepped delay mode dwell-time-per-step parameter. **PARAMETER ENTRY**

Syntax: `SDL<value><unit>`

Value: 100 microseconds to 10s
Units: SEC, MS, US

Front Panel Key: **Modulation** | **Pulse** (internal, select one of the delay triggers) | **Step Delay >** | **Step Time**

Output Command: ODL (in μs)

SDS Opens the internal pulse stepped delay mode delay 1 start parameter. **PARAMETER ENTRY**

Syntax: `SDS<value><unit>`

Value: 0 ms to 167 ms at 100 MHz pulse clock rate; 0 ms to 419 ms at 40 MHz pulse clock rate; 0s to 1.6s at 10 MHz pulse clock rate
Units: SEC, MS, US, NS

Front Panel Key: **Modulation** | **Pulse** (internal, select one of the delay triggers) | **Step Delay >** | **Start Delay**

Output Command: ODS (in µs)

SDT Opens the step sweep dwell time parameter. **PARAMETER ENTRY**

Syntax: `SDT<value><unit>`

Value: 1ms to 99s
Units: MS, SEC

Remarks: Permits setting the dwell-time-per-step value for the step sweep.

Related Commands: LIS, LGS, SSP, SNS, SWT

Front Panel Key: **Frequency** | **Step Sweep** | **Dwell Time**

Output Command: OSD returns the dwell time of the step sweep (in ms) to the controller.

SE0 Inhibits Syntax Error SRQ generation. **STATUS**

Syntax: `SE0`

Remarks: Inhibits an SRQ from being generated when the Syntax Error bit is set. This is the default mode.

Front Panel Key: N/A

SE1 Enables Syntax Error SRQ generation. **STATUS**

Syntax: SE1

Remarks: Enables an SRQ to be generated when primary status byte bit five (syntax error) is set and SQ1 has been programmed.

Front Panel Key: N/A

Example: **SQ1 SE1** enables an SRQ on a syntax error.

SEC Seconds data terminator. **DATA TERMINATOR**

Syntax: SEC

Front Panel Key: N/A

SF1 Selects the F1-F2 sweep mode. **SWEEP**

Syntax: SF1

Remarks: Selects a frequency sweep between F1 and F2.

Related Commands: F1, F2

Front Panel Key: **Frequency** | **Step Sweep** | **Frequency Control >** | F1-F2 or **Frequency** | **Manual Sweep** | **Frequency Control >** | **F1-F2**

SF3 Selects the F3-F4 sweep mode. **SWEEP**

Syntax: SF3

Remarks: Selects a frequency sweep between F3 and F4.

Related Commands: F3, F4

Front Panel Key: **Frequency** | **Step Sweep** | **Frequency Control >** | **F3-F4** or **Frequency** | **Manual Sweep** | **Frequency Control >** | **F3-F4**

SL0 Turns off the ALC power slope function. **POWER LEVELING**

Syntax: `SL0`

Front Panel Key: **Level** | **ALC Loop** | **Slope On/Off**

SL1 Turns on the ALC power slope function. **POWER LEVELING**

Syntax: `SL1`

Front Panel Key: **Level** | **ALC Loop** | **Slope On/Off**

SLDF Opens the DF parameter of the slave unit. **PARAMETER ENTRY**

Syntax: `SLDF<value><unit>`

Value: Frequency range of the slave MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the ΔF frequency parameter for the slave MG369XB unit. The frequency setting is determined by the frequency range of the particular MG369XB model.

Related Commands: SLF0 to SLF9, S1

Front Panel Key: **Frequency** | **CW** | **Master Slave >** | **Slave Delta Freq**

Example: **`SLF1 4 GH SLDF 2 GH SLL1 3 DM S1`** sets the slave unit F1 frequency to 4 GHz, its ΔF frequency to 2 GHz, and its output power level to 3 dBm and turns on the master-slave mode of operation. Now, when the mas

SLF0 Opens the F0 parameter of the slave unit. **PARAMETER ENTRY**

Syntax: `SLF0<value><unit>`

Value: Frequency range of the Slave MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the F0 parameter of the slave unit. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Master Slave >** | **Slave Freqs...** | highlight F0, then press **Edit Selected**

SLF1 Opens the F1 parameter of the slave unit. **PARAMETER ENTRY**

Syntax: `SLF1<value><unit>`

Value: Frequency range of the Slave MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the F1 parameter of the slave unit. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Master Slave >** | **Slave Freqs...** | highlight F1, then press **Edit Selected**

SLF2 Opens the F2 parameter of the slave unit. **PARAMETER ENTRY**

Syntax: `SLF2<value><unit>`

Value: Frequency range of the Slave MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the F2 parameter of the slave unit. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Master Slave >** | **Slave Freqs...** | highlight F2, then press **Edit Selected**

SLF3 Opens the F3 parameter of the slave unit. **PARAMETER ENTRY**

Syntax: `SLF3<value><unit>`

Value: Frequency range of the Slave MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the F3 parameter of the slave unit. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Master Slave >** | **Slave Freqs...** | highlight F3, then press **Edit Selected**

SLF4 Opens the F4 parameter of the slave unit. **PARAMETER ENTRY**

Syntax: `SLF4<value><unit>`

Value: Frequency range of the Slave MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the F4 parameter of the slave unit. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Master Slave >** | **Slave Freqs...** | highlight F4, then press **Edit Selected**

SLF5 Opens the F5 parameter of the slave unit. **PARAMETER ENTRY**

Syntax: `SLF5<value><unit>`

Value: Frequency range of the Slave MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the F5 parameter of the slave unit. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Master Slave >** | **Slave Freqs...** | highlight F5, then press **Edit Selected**

SLF6 Opens the F6 parameter of the slave unit. **PARAMETER ENTRY**

Syntax: `SLF6<value><unit>`

Value: Frequency range of the Slave MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the F6 parameter of the slave unit. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Master Slave >** | **Slave Freqs...** | highlight F6, then press **Edit Selected**

SLF7 Opens the F7 parameter of the slave unit. **PARAMETER ENTRY**

Syntax: `SLF7<value><unit>`

Value: Frequency range of the Slave MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the F7 parameter of the slave unit. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Master Slave >** | **Slave Freqs...** | highlight F7, then press **Edit Selected**

SLF8 Opens the F8 parameter of the slave unit. **PARAMETER ENTRY**

Syntax: `SLF8<value><unit>`

Value: Frequency range of the Slave MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the F8 parameter of the slave unit. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Master Slave >** | **Slave Freqs...** | highlight F8, then press **Edit Selected**

SLF9 Opens the F9 parameter of the slave unit. **PARAMETER ENTRY**

Syntax: `SLF9<value><unit>`

Value: Frequency range of the Slave MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the F9 parameter of the slave unit. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Master Slave >** | **Slave Freqs...** | highlight F9, then press **Edit Selected**

SLL1 Opens the main power level parameter (L1) of the slave unit. **PARAMETER ENTRY**

Syntax: `SLL1<value><unit>`

Value: Power level range of the Slave MG369XB model
Units: DM (Log), VT (Linear)

Remarks: Same as SLV. Permits setting the L1 parameter for the slave unit. The power level setting is determined by the power level range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Master Slave >** | **Slave L1**

SLL2 Opens the alternate sweep power level parameter (L2) of the slave unit. **PARAMETER ENTRY**

Syntax: `SLL2<value><unit>`

Value: Power level range of the Slave MG369XB model
Units: DM (Log), VT (Linear)

Remarks: Permits setting the L2 parameter for the slave unit. The power level setting is determined by the power level range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Master Slave >** | **Slave L2**

SLM0 Opens the M0 parameter of the slave unit. **PARAMETER ENTRY**

Syntax: `SLM0<value><unit>`

Value: Frequency range of the Slave MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the M0 parameter of the slave unit. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Master Slave >** | **Slave Freqs...** | highlight M0, then press **Edit Selected**

SLM1 Opens the M1 parameter of the slave unit. **PARAMETER ENTRY**

Syntax: `SLM1<value><unit>`

Value: Frequency range of the Slave MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the M1 parameter of the slave unit. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Master Slave >** | **Slave Freqs...** | highlight M1, then press **Edit Selected**

SLM2 Opens the M2 parameter of the slave unit. **PARAMETER ENTRY**

Syntax: `SLM2<value><unit>`

Value: Frequency range of the Slave MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the M2 parameter of the slave unit. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Master Slave >** | **Slave Freqs...** | highlight M2, then press **Edit Selected**

SLM3 Opens the M3 parameter of the slave unit. **PARAMETER ENTRY**

Syntax: `SLM3<value><unit>`

Value: Frequency range of the Slave MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the M3 parameter of the slave unit. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Master Slave >** | **Slave Freqs...** | highlight M3, then press **Edit Selected**

SLM4 Opens the M4 parameter of the slave unit. **PARAMETER ENTRY**

Syntax: `SLM4<value><unit>`

Value: Frequency range of the Slave MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the M4 parameter of the slave unit. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Master Slave >** | **Slave Freqs...** | highlight M4, then press **Edit Selected**

SLM5 Opens the M5 parameter of the slave unit. **PARAMETER ENTRY**

Syntax: `SLM5<value><unit>`

Value: Frequency range of the Slave MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the M5 parameter of the slave unit. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Master Slave >** | **Slave Freqs...** | highlight M5, then press **Edit Selected**

SLM6 Opens the M6 parameter of the slave unit. **PARAMETER ENTRY**

Syntax: `SLM6<value><unit>`

Value: Frequency range of the Slave MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the M6 parameter of the slave unit. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Master Slave >** | **Slave Freqs...** | highlight M6, then press **Edit Selected**

SLM7 Opens the M7 parameter of the slave unit. **PARAMETER ENTRY**

Syntax: `SLM7<value><unit>`

Value: Frequency range of the Slave MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the M7 parameter of the slave unit. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Master Slave >** | **Slave Freqs...** | highlight M7, then press **Edit Selected**

SLM8 Opens the M8 parameter of the slave unit. **PARAMETER ENTRY**

Syntax: `SLM8<value><unit>`

Value: Frequency range of the Slave MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the M8 parameter of the slave unit. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Master Slave >** | **Slave Freqs...** | highlight M8, then press **Edit Selected**

SLM9 Opens the M9 parameter of the slave unit. **PARAMETER ENTRY**

Syntax: `SLM9<value><unit>`

Value: Frequency range of the Slave MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the M9 parameter of the slave unit. The frequency setting is determined by the frequency range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Master Slave >** | **Slave Freqs...** | highlight M9, then press **Edit Selected**

SLP Opens the ALC power slope value parameter. **POWER LEVELING**

Syntax: `SLP`

Front Panel Key: **Level** | **ALC Loop** | **Edit Slope**

SLV Opens the power level parameter (L1) of the slave unit. **PARAMETER ENTRY**

Syntax: `SLV<value><unit>`

Value: Power level range of the Slave MG369XB model
Units: DM (Log), VT (Linear)

Remarks: Same as SL1. Permits setting the L1 parameter for the slave unit. The power level setting is determined by the power level range of the particular MG369XB model.

Front Panel Key: **Frequency** | **CW** | **Master Slave >** | **Slave L1**

SM Recalls the next stored instrument setup in sequence. **STORED SETUP**

Syntax: `SM`

Remarks: Recalls, in sequence, the next instrument setup stored in internal setup memory.

Related Commands: RSN(m), SSN(m)

Front Panel Key: N/A

SNR Enter the instrument serial number. **MISCELLANEOUS**

Syntax: `SNRnnnnnnX`

Value: nnnnnn: the serial number must be six characters in length

Front Panel Key: N/A

Output Command: The commands, *IDN? and OI, return the instrument serial number as part of the identification string sent to the controller.

SNS Opens the step sweep number of steps parameter. **PARAMETER ENTRY**

Syntax: `SNS<value><unit>`

Value: 1 to 10,000
Units: SPS

Remarks: Permits setting the number of steps for the step sweep.

Related Commands: LIS, LGS, SDT, SSP, SWT

Front Panel Key: **Frequency** | **Step Sweep** | **More >** | **Number of Steps**

Output Command: OSS returns the number of steps of the step sweep to the controller.

SOF Opens the frequency offset parameter of the slave unit. **PARAMETER ENTRY**

Syntax: `SOF<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Permits setting the frequency offset parameter for the slave unit. The frequency setting is determined by the frequency range of the particular MG369XB model.

> **NOTE**
> Use the SOF parameter entry command only to set the frequency offset for a slave unit that is (1) slave to a master unit that is connected to a 360B VNA in a source or dual-source configuration or (2) slave to a master unit that is programmed to perform non-sequential frequency step sweeps.

Front Panel Key: **Frequency** | **CW** | **Master Slave >** | **Slave Freqs...** | **VNA >** | **VNA Offset**

SP0 Deselects non-equally spaced step sweep. **SWEEP**

Syntax: `SP0`

Related Commands: SP1

Front Panel Key: N/A

SP1 Selects non-equally spaced step sweep. **SWEEP**

Syntax: `SP1`

Remarks: Provides for a step sweep that has non-equally spaced steps. It can be used in any of the available sweep modes (F1-F2, F3-F4, Full, F0-DF, F1-DF, F5-DF, and F6-DF). The start frequency in the sweep must be equal to the first frequency programmed with the ZL(x) command. The intermediate steps can be programmed to be any frequency within the range of the programmed sweep.

Related Commands: ZEL(x), ZN, SP0

Front Panel Key: N/A

SPS Steps data terminator. **DATA TERMINATOR**

Syntax: `SPS`

Front Panel Key: N/A

SQ0 Disables the SRQ generation function. **STATUS**

Syntax: `SQ0`

Remarks: This is the default mode.

Front Panel Key: N/A

SQ1 Enables the SRQ generation function. **STATUS**

Syntax: `SQ1`

Remarks: This command allow a status reporting function, that is true and enabled, to pull the SRQ line LOW (true) and request service from the controller.

Front Panel Key: N/A

SQD Scan down to the next lower preset CW frequency. **CW FREQUENCY**

Syntax: `SQD<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Scans down to next lower preset CW frequency and opens the frequencys parameter for data entry.

Front Panel Key: N/A

SQF Scan to the next higher preset CW frequency. **CW FREQUENCY**

Syntax: `SQF<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Scans to next higher preset CW frequency and opens the frequencys parameter for data entry.

Front Panel Key: N/A

SQP Turns on internal 1 kHz square wave pulse modulation. **MODULATION**

Syntax: `SQP`

Units: MH

Remarks: Sets the internal pulse width (W1) to 500 ms, PRF to 1 kHz, pulse mode to single, pulse trigger to free run, and turns on the internal pulse modulation function. Disables the external pulse modulation function, if previously programmed.

Related Commands: PMD(x), PTG(x), IP, W1, PER

Front Panel Key: N/A

SQU Scan up to the next higher preset CW frequency. **CW FREQUENCY**

Syntax: `SQU<value><unit>`

Value: Frequency range of the MG369XB model
Units: GH, MH, KH, HZ

Remarks: Scans up to next higher preset CW frequency and opens the frequencys parameter for data entry.

Front Panel Key: N/A

SSN(m) Saves the current instrument setup to internal setup memory location M. **STORED SETUP**

Syntax: `SSN(m)`

Value: M: memory locations 1 to 9

Remarks: Saves the current instrument setup to the internal setup memory location specified (1 to 9).

Related Commands: RSN(m)

Front Panel Key: **System** | **Setups** | Save (enter setup number)

SSP Selects linear step sweep. **SWEEP**

Syntax: `SSP`

Remarks: Same as LIS. SSP, by itself, does not provide a swept-frequency output. It only determines that the swept-frequency output will be a linear step sweep. However, if a frequency sweep is being output by the instrument when SSP is received, the sweep will become a linear step sweep.

Related Commands: LGS, LIS, MAN, SWP

Front Panel Key: **Frequency** | **Step Sweep** | **More >** | **Log/Linear** to Linear

Example: **`SDT 3 MS SNS 100 SPS SSP SF1 AUT`** initiates a continuous linear step frequency sweep between F1 and F2. The sweep consists of 100 steps with a dwell-time-per-step of 3 ms.

Output Command: OSD returns the dwell time of the step sweep (in ms) to the controller.
OSS returns the number of steps of the step sweep to the controller.
OST returns the sweep time value (in ms) to the controller.

SW0 Turns off the internal or external pulse modulation function (Same as P0). **MODULATION**

Syntax: `SW0`

Front Panel Key: N/A

SW1 Turns on internal 400 Hz square wave pulse modulation. **MODULATION**

Syntax: `SW1`

Remarks: Sets the internal pulse width (W1) to 1.25 ms, PRF to 400 Hz, pulse mode to single, trigger to free run, pulse clock rate to 100 MHz (or 40 MHz with Option 24), and turns on the internal pulse modulation function. Disables the external pulse modulation function, if previously programmed.

Front Panel Key: N/A

SW2 Turns on internal 1 kHz square wave pulse modulation (Same as SQP). **MODULATION**

Syntax: `SW2`

Remarks: Sets the internal pulse width (W1) to 500 ms, PRF to 1 kHz, pulse mode to single, pulse trigger to free run, and turns on the internal pulse modulation function. Disables the external pulse modulation function, if previously programmed.

Front Panel Key: N/A

SW3 Turns on internal 7.8125 kHz square wave pulse modulation. **MODULATION**

Syntax: `SW3`

Remarks: Sets the internal pulse width (W1) to 64 ms, PRF to 7.8125 kHz, pulse mode to single, pulse trigger to free run, and turns on the internal pulse modulation function. Disables the external pulse modulation function, if previously programmed.

Front Panel Key: N/A

SW4 Turns on internal 27.8 kHz square wave pulse modulation. **MODULATION**

Syntax: `SW4`

Remarks: Sets the internal pulse width (W1) to 18 ms, PRF to 27.8 kHz, pulse mode to single, pulse trigger to free run, pulse clock rate to 100 MHz (or 40 MHz with Option 24), and turns on the internal pulse modulation function. Disables the external pulse modulation function, if previously programmed.

Front Panel Key: N/A

SWP Selects analog sweep. **SWEEP**

Syntax: `SWP`

Front Panel Key: **Frequency** | **Analog Sweep**

SWT Opens the step sweep time parameter. **PARAMETER ENTRY**

Syntax: `SWT<value><unit>`

Value: 30ms to 99s
Units: MS, SEC

Remarks: Permits setting the time for the step sweep.

Related Commands: LIS, LGS, SSP

Front Panel Key: **Frequency** | **Step Sweep** | **More >** | **Sweep Time**

Output Command: OST returns the sweep time value (in ms) to the controller.

SYZ Opens the increment/decrement step size parameter. **PARAMETER ENTRY**

Syntax: `SYZ<value>`

Value: dependent on the open parameter

Remarks: Each MG369XB parameter has an associated step size that can be used to increment or decrement its value. Parameters that have common units share a common step size. For example, the frequency parameters (F0-F9, M0-M9, and DF) have a common step size as do the power level parameters (XL0-XL9, L0-L9, and level offset). Other parameters, such as analog sweep time, have individual step sizes. To set the step size for a parameter, first send the command code to open the parameter, then send the SYZ command. Now set the step size by sending a numeric string with the proper terminator. When the terminator is received, the step size is accepted and the original parameter is again open for entry.

Related Commands: UP, DN

Front Panel Key: **System** | **Config** | **Increment >** | **Frequency Increment** or **System** | **Config** | **Increment >** | **Level Increment** or **System** | **Config** | **Increment >** | **Time Increment**

Example: **`F1 4 GH SYZ 10 MH UP UP UP`** sets the F1 frequency parameter to 4 GHz, sets the step size to 10 MHz, and increments the F1 frequency three times by the value of the step size to 4.03 GHz.

TEX Sets sweep trigger to external. **SWEEP**

Syntax: `TEX`

Related Commands: EXT, AUT

Front Panel Key: N/A

TMS Times data terminator. **DATA TERMINATOR**

Syntax: `TMS`

Front Panel Key: N/A

TR0 Sets 0dB of attenuation when RF is switched off. **CONFIGURATION**

Syntax: `TR0`

Remarks: Sets 0 dB of attenuation when RF is switched off in units with a step attenuator (Option 2) installed. If Option 2 is not installed, this command produces a syntax error.

Related Commands: TR1

Front Panel Key: **System** | **Config** | **RF** | **More >** | **Term RF Off**

TR1 Sets 40dB of attenuation when RF is switched off. **CONFIGURATION**

Syntax: `TR1`

Remarks: Sets 40 dB of attenuation when RF is switched off in units with a step attenuator (Option 2) installed. This provides a better output source match. If Option 2 is not installed, this command produces a syntax error.

Related Commands: TR0

Front Panel Key: **System** | **Config** | **RF** | **More >** | **Term RF On**

TRG Triggers a single sweep. **SWEEP**

Syntax: `TRG`

Remarks: When single sweep triggering is selected for frequency, power level, or list sweeps, a single sweep starts when the TRG command is received.

Related Commands: EXT, TRS, RSS

Front Panel Key: **Frequency** | **Step Sweep** | **More >** | **Trigger >** | **Single** | **Trigger** or **Frequency** | **List** | **Sweep >** | **Trigger >** | **Single** | **Trigger** or **Level** | **Level Sweep** | **Trigger >** | **Single** | **Trigger**

TRS Triggers a single sweep. **SWEEP**

Syntax: TRS

Remarks: Same as TRG. When single sweep triggering is selected for frequency, power level, or list sweeps, a single sweep starts when the TRS command is received.

Related Commands: EXT, TRG, RSS

Front Panel Key: Same as TRG

TSS Advances sweep to the next step in dual step sweep mode. **SWEEP**

Syntax: TSS

Remarks: The dual step sweep mode provides for generating synchronized, step sweep outputs for two MG369XBs at a frequency offset. When operating in the dual step sweep mode, the command, TSS, steps the sweep to the next point.

Related Commands: DU1

Front Panel Key: N/A

TST Starts an instrument self-test. **SELF TEST**

Syntax: TST

Remarks: When TST is received, the MG369XB performs a self test then places a P (for pass) or a F (for fail) on the bus. It also generates six self test results bytes. Extended Status Byte one bit zero is set if self test fails; bit two is set when self test is complete.

Front Panel Key: **System** | **Self-Test**

Output Command: OSR returns the six self test results bytes to the controller.

UL0 Inhibits RF unleveled SRQ generation. **STATUS**

Syntax: `UL0`

Remarks: Inhibits an SRQ from being generated when the RF Unleveled bit is set. This is the default mode.

Front Panel Key: N/A

UL1 Enables RF unleveled SRQ generation. **STATUS**

Syntax: `UL1`

Remarks: Enables an SRQ to be generated when Primary Status Byte bit two (RF Unleveled) is set and SQ1 has been programmed.

Front Panel Key: N/A

Example: **`SQ1 UL1`** enables an unleveled SRQ generation.

UP Increments the open parameter by the step size. **PARAMETER ENTRY**

Syntax: `UP`

Remarks: Each MG369XB parameter has an associated step size that can be used to increment or decrement its value. The command, SYZ, is used to set the step size for a parameter. The commands, UP and DN, can then be used to increment and decrement the parameter by the step size. In the list sweep mode with manual trigger selected, UP increments the list index by one.

Related Commands: SYZ, DN

Front Panel Key: Use the keys **System** | **Increment >** to access the increment menu. **Frequency Increment** sets the frequency increment value, **Level Increment** sets the power level increment value, and **Time Increment** sets the time increment value. **Increment Mode** turns increment mode on. Use the front panel, cursor control keys, or the rotary knob to increment or decrement the open parameter by the increment value.

US Microsecond (ms) data terminator. **DATA TERMINATOR**

Syntax: `US`

Front Panel Key: N/A

VM1 Turns on the video marker mode. **MARKER**

Syntax: `VM1`

Remarks: When the video marker mode is turned on, the MG369XB generates a pulse output at each marker frequency that can be seen on a CRT display.

Related Commands: MK0, ME1, ME0

Front Panel Key: **Frequency** | **Step Sweep** | **Frequency Control >** | **Marker List...** | **Video Markers** to On

VT Volts data terminator. **DATA TERMINATOR**

Syntax: `VT`

Front Panel Key: N/A

W1 Opens the internal pulse width 1 parameter. **PARAMETER ENTRY**

Syntax: `W1<value><unit>`

Value: 30 ns to 167 ms with 100 MHz pulse clock rate; 25 ns to 419 ms at 40 MHz pulse clock rate; 100 ns to 1.6s at 10 MHz pulse clock rate
Units: SEC, MS, US, NS

Front Panel Key: **Modulation** | **Pulse** (internal) | **Wdth/Dly List...** | **Edit Selected**

Example: **`W1 50 US PER 100 US PMD1 PTG1 IP`** turns internal pulse on with a 50 µs pulse every 100 µs.

Output Command: OW1 (in µs)

W2 Opens the internal pulse width 2 parameter. **PARAMETER ENTRY**

Syntax: `W2<value><unit>`

Value: 30 ns to 167 ms with 100 MHz pulse clock rate; 25 ns to 419 ms at 40 MHz pulse clock rate; 100 ns to 1.6s at 10 MHz pulse clock rate
Units: SEC, MS, US, NS

Front Panel Key: **Modulation** | **Pulse** (internal) | **Wdth/Dly List...** | **Edit Selected**

Output Command: OW2 (in μs)

W3 Opens the internal pulse width 3 parameter. **PARAMETER ENTRY**

Syntax: `W3<value><unit>`

Value: 30 ns to 167 ms with 100 MHz pulse clock rate; 25 ns to 419 ms at 40 MHz pulse clock rate; 100 ns to 1.6s at 10 MHz pulse clock rate
Units: SEC, MS, US, NS

Front Panel Key: **Modulation** | **Pulse** (internal) | **Wdth/Dly List...** | **Edit Selected**

Output Command: OW3 (in μs)

W4 Opens the internal pulse width 4 parameter. **PARAMETER ENTRY**

Syntax: `W4<value><unit>`

Value: 30 ns to 167 ms with 100 MHz pulse clock rate; 25 ns to 419 ms at 40 MHz pulse clock rate; 100 ns to 1.6s at 10 MHz pulse clock rate
Units: SEC, MS, US, NS

Front Panel Key: **Modulation** | **Pulse** (internal) | **Wdth/Dly List...** | **Edit Selected**

Output Command: OW4 (in μs)

XL0 Opens the L0 parameter. **PARAMETER ENTRY**

Syntax: `XL0<value><unit>`

Value: Power level range of the MG369XB model
Units: DM (log), VT (linear)

Remarks: Permits setting the L0 parameter. The power level setting is determined by the power level range of the particular MG369XB model.

Related Commands: LOG, LIN, PU0, PU1, PU2

Front Panel Key: **Level** | **Level** | **Level Control >** | highlight L0, then press **Edit Selected**

Output Command: OL0 returns the L0 power level (in dBm when in log mode; in mV when in linear mode) to the controller.

XL1 Opens the L1 parameter. **PARAMETER ENTRY**

Syntax: `XL1<value><unit>`

Value: Power level range of the MG369XB model
Units: DM (log), VT (linear)

Remarks: Permits setting the L1 parameter. The power level setting is determined by the power level range of the particular MG369XB model.

Related Commands: LOG, LIN, PU0, PU1, PU2

Front Panel Key: **Level** | **Level** | **Level Control >** | highlight L1, then press **Edit Selected**

Output Command: OL1 returns the L1 power level (in dBm when in log mode; in mV when in linear mode) to the controller.

XL2 Opens the L2 parameter. **PARAMETER ENTRY**

Syntax: `XL2<value><unit>`

Value: Power level range of the MG369XB model
Units: DM (log), VT (linear)

Remarks: Permits setting the L2 parameter. The power level setting is determined by the power level range of the particular MG369XB model.

Related Commands: LOG, LIN, PU0, PU1, PU2

Front Panel Key: **Level** | **Level** | **Level Control >** | highlight L2, then press **Edit Selected**

Output Command: OL2 returns the L2 power level (in dBm when in log mode; in mV when in linear mode) to the controller.

XL3 Opens the L3 parameter. **PARAMETER ENTRY**

Syntax: `XL3<value><unit>`

Value: Power level range of the MG369XB model
Units: DM (log), VT (linear)

Remarks: Permits setting the L3 parameter. The power level setting is determined by the power level range of the particular MG369XB model.

Related Commands: LOG, LIN, PU0, PU1, PU2

Front Panel Key: **Level** | **Level** | **Level Control >** | highlight L3, then press **Edit Selected**

Output Command: OL3 returns the L3 power level (in dBm when in log mode; in mV when in linear mode) to the controller.

XL4 Opens the L4 parameter. **PARAMETER ENTRY**

Syntax: `XL4<value><unit>`

Value: Power level range of the MG369XB model
Units: DM (log), VT (linear)

Remarks: Permits setting the L4 parameter. The power level setting is determined by the power level range of the particular MG369XB model.

Related Commands: LOG, LIN, PU0, PU1, PU2

Front Panel Key: **Level** | **Level** | **Level Control >** | highlight L4, then press **Edit Selected**

Output Command: OL4 returns the L4 power level (in dBm when in log mode; in mV when in linear mode) to the controller.

XL5 Opens the L5 parameter. **PARAMETER ENTRY**

Syntax: `XL5<value><unit>`

Value: Power level range of the MG369XB model
Units: DM (log), VT (linear)

Remarks: Permits setting the L5 parameter. The power level setting is determined by the power level range of the particular MG369XB model.

Related Commands: LOG, LIN, PU0, PU1, PU2

Front Panel Key: **Level** | **Level** | **Level Control >** | highlight L5, then press **Edit Selected**

Output Command: OL5 returns the L5 power level (in dBm when in log mode; in mV when in linear mode) to the controller.

XL6 Opens the L6 parameter. **PARAMETER ENTRY**

Syntax: `XL6<value><unit>`

Value: Power level range of the MG369XB model
Units: DM (log), VT (linear)

Remarks: Permits setting the L6 parameter. The power level setting is determined by the power level range of the particular MG369XB model.

Related Commands: LOG, LIN, PU0, PU1, PU2

Front Panel Key: **Level** | **Level** | **Level Control >** | highlight L6, then press **Edit Selected**

Output Command: OL6 returns the L6 power level (in dBm when in log mode; in mV when in linear mode) to the controller.

XL7 Opens the L7 parameter. **PARAMETER ENTRY**

Syntax: `XL7<value><unit>`

Value: Power level range of the MG369XB model
Units: DM (log), VT (linear)

Remarks: Permits setting the L7 parameter. The power level setting is determined by the power level range of the particular MG369XB model.

Related Commands: LOG, LIN, PU0, PU1, PU2

Front Panel Key: **Level** | **Level** | **Level Control >** | highlight L7, then press **Edit Selected**

Output Command: OL7 returns the L7 power level (in dBm when in log mode; in mV when in linear mode) to the controller.

XL8 Opens the L8 parameter. **PARAMETER ENTRY**

Syntax: `XL8<value><unit>`

Value: Power level range of the MG369XB model
Units: DM (log), VT (linear)

Remarks: Permits setting the L8 parameter. The power level setting is determined by the power level range of the particular MG369XB model.

Related Commands: LOG, LIN, PU0, PU1, PU2

Front Panel Key: **Level** | **Level** | **Level Control >** | highlight L8, then press **Edit Selected**

Output Command: OL8 returns the L8 power level (in dBm when in log mode; in mV when in linear mode) to the controller.

XL9 Opens the L9 parameter. **PARAMETER ENTRY**

Syntax: `XL9<value><unit>`

Value: Power level range of the MG369XB model
Units: DM (log), VT (linear)

Remarks: Permits setting the L9 parameter. The power level setting is determined by the power level range of the particular MG369XB model.

Related Commands: LOG, LIN, PU0, PU1, PU2

Front Panel Key: **Level** | **Level** | **Level Control >** | highlight L9, then press **Edit Selected**

Output Command: OL9 returns the L9 power level (in dBm when in log mode; in mV when in linear mode) to the controller.

XP Turns on the external pulse modulation function. Disables the internal pulse modulation function, if previously programmed. **MODULATION**

Syntax: `XP`

Remarks: Turns on the pulse modulation function. If pulse modulation is not installed, this command produces a syntax error.

Related Commands: EP0, EP1, PO

Front Panel Key: **Modulation** | **Pulse** | **On/Off** to On

Y Equivalent to a Group Execute Trigger (GET). **GROUP EXECUTE TRIGGER**

Syntax: Y

Remarks: Sending a Y is equivalent to sending a GET.

Front Panel Key: N/A

ZEL Ends frequency loading. **FAST-FREQUENCY-SWITCHING**

Syntax: ZEL

Front Panel Key: N/A

ZL(x) Loads a CW frequency into a table at location x. **FAST-FREQUENCY-SWITCHING**

Syntax: ZL(x)

Value: x: table location 000 - 999

Remarks: In the fast-frequency-switching mode, up to 1000 frequencies can be loaded into a table using this command. A table pointer can then be set to point to a specific frequency in the table and the MG369XB commanded to switch from that frequency through the following frequencies to the bottom of the table.

Related Commands: ZEL, ZS(x)

Front Panel Key: N/A

ZPN(bbbb) Sets the table pointer to point to location bbbb. **FAST-FREQUENCY-SWITCHING**

Syntax: ZPN<bbbb>

Value: bbbb: table location of specific frequency

Remarks: The command ZTL enables loading of up to 3202 frequencies into a table in the fast-frequency-switching mode. Using this command, the table pointer can then be set to point to a specific frequency in the table and the MG369XB commanded to switch from that frequency through the following frequencies to the bottom of the table.

Front Panel Key: N/A

ZS(x) Sets the table pointer to point to location x. **FAST-FREQUENCY-SWITCHING**

Syntax: ZS(x)

Value: x: table location 000 - 999

Remarks: In the fast-frequency-switching mode, up to 1000 frequencies can be loaded into a table. Using this command, the table pointer can then be set to point to a specific frequency in the table and the MG369XB commanded to switch from that frequency through the following frequencies to the bottom of the table.

Related Commands: ZEL, ZL(x)

Front Panel Key: N/A

ZTL(bbbbnnnnD8D8D8…D8)

Loads the frequency table starting at location bbbb. **FAST-FREQUENCY-SWITCHING**

Syntax: ZTL<bbbb><nnnn><D8D8D8.....D8>

Value: bbbb: table location where the frequency points are to start loading<R>nnnn: number of frequencies to be loaded<R>D8: frequency of the frequency point

Remarks: In the fast-frequency-switching mode, up to 3202 frequencies can be loaded into a table using this command. A table pointer can then be set to point to a specific frequency in the table and the MG369XB commanded to switch from that frequency through the following frequencies to the bottom of the table. Both “bbbb” and “nnnn” are 4 binary byte integers and “D8” is 8 binary bytes of an IEEE-754 double precision floating point number. The order of bytes in each field is most significant byte first.

Related Commands: ZPN

Front Panel Key: N/A

Appendix A
GPIB Quick Reference

A-1 Introduction

This appendix contains quick reference tables of the MG369XB GPIB programming commands, each with a brief description. Section A-2 contains the GPIB commands sorted alphabetically (Table A-1); Section A-3 contains the GPIB commands sorted by functional categories (Tables A-2 through A-21). For general command group descriptions and usage examples, refer to the page references listed. For a comprehensive command description, refer to the command dictionary in Chapter 3.

A-2 Alphabetical Listing

Table A-1. *Alphabetical GPIB Command List (1 of 19)*

Command Code	Function
*IDN?	Requests device identification.
ACW	Activates the currently open frequency parameter as CW.
AD1	Selects F1-ΔF alternate frequency sweep.
AD5	Selects F5-ΔF alternate frequency sweep.
AD6	Selects F6-ΔF alternate frequency sweep.
ADD	Opens the GPIB address parameter.
ADP1	Opens the internal AM % depth parameter.
ADP2	Opens the internal AM dB depth parameter.
ADR	GPIB address terminator.
AF1	Selects F1-F2 alternate frequency sweep.
AF3	Selects F3-F4 alternate frequency sweep.
AFU	Selects full range alternate frequency sweep.
AL0	Sets the alternate frequency sweep RF output to L0.
AL1	Sets the alternate frequency sweep RF output to L1.
AL2	Sets the alternate frequency sweep RF output to L2.

Table A-1. *Alphabetical GPIB Command List (2 of 19)*

Command Code	Function
AL3	Sets the alternate frequency sweep RF output to L3.
AL4	Sets the alternate frequency sweep RF output to L4.
AL5	Sets the alternate frequency sweep RF output to L5.
AL6	Sets the alternate frequency sweep RF output to L6.
AL7	Sets the alternate frequency sweep RF output to L7.
AL8	Sets the alternate frequency sweep RF output to L8.
AL9	Sets the alternate frequency sweep RF output to L9.
AM0	Turns off the internal or external AM function.
AM1	Turns on the external AM function in linear mode.
AM2	Turns on the external AM function in log mode.
AM7	Turns on the internal AM function in linear mode.
AM8	Turns on the internal AM function in log mode.
AMI	Turns on the AM measurement mode.
AMO	Turns off the internal AM function generator if it is on.
AMR	Opens the internal AM rate parameter.
AMS	Opens the external AM %/V sensitivity parameter.
AMW(x)	Selects the internal AM waveform.
ASD	Opens the external AM dB/V sensitivity parameter.
AT0	Deselects ALC step attenuator decoupling.
AT1	Selects ALC step attenuator decoupling.
ATT(xx)	Sets the step attenuator value to xx (times 10 dB).
AUT	Selects automatic sweep triggering.
BPN	Selects -3.3V for retrace and bandswitch blanking outputs.
BPP	Selects +3.3V for retrace and bandswitch blanking outputs.
CF0	Sets CW mode at F0 and opens the F0 parameter.
CF1	Sets CW mode at F1 and opens the F1 parameter.

Table A-1. *Alphabetical GPIB Command List (3 of 19)*

Command Code	Function
CF2	Sets CW mode at F2 and opens the F2 parameter.
CF3	Sets CW mode at F3 and opens the F3 parameter.
CF4	Sets CW mode at F4 and opens the F4 parameter.
CF5	Sets CW mode at F5 and opens the F5 parameter.
CF6	Sets CW mode at F6 and opens the F6 parameter.
CF7	Sets CW mode at F7 and opens the F7 parameter.
CF8	Sets CW mode at F8 and opens the F8 parameter.
CF9	Sets CW mode at F9 and opens the F9 parameter.
CLO	Closes the previously opened parameter.
CLR	Clears the data entry.
CM0	Sets CW mode at M0 and opens the M0 parameter.
CM1	Sets CW mode at M1 and opens the M1 parameter.
CM2	Sets CW mode at M2 and opens the M2 parameter.
CM3	Sets CW mode at M3 and opens the M3 parameter.
CM4	Sets CW mode at M4 and opens the M4 parameter.
CM5	Sets CW mode at M5 and opens the M5 parameter.
CM6	Sets CW mode at M6 and opens the M6 parameter.
CM7	Sets CW mode at M7 and opens the M7 parameter.
CM8	Sets CW mode at M8 and opens the M8 parameter.
CM9	Sets CW mode at M9 and opens the M9 parameter.
CS0	Turns off the CW ramp.
CS1	Turns on the CW ramp.
CSB	Clears all GPIB status bytes.
CTL	Copy current CW frequency and power level to current list index.
D1	Opens the internal pulse delay1 parameter.
D2	Opens the internal pulse delay2 parameter.

Table A-1. *Alphabetical GPIB Command List (4 of 19)*

Command Code	Function
D3	Opens the internal pulse delay3 parameter.
D4	Opens the internal pulse delay4 parameter.
DB	Decibel (dB) data terminator.
DF0	Selects F0-delta frequency sweep mode.
DF1	Selects F1-delta frequency sweep mode.
DF5	Selects F5-delta frequency sweep mode.
DF6	Selects F6-delta frequency sweep mode.
DFF	Opens the delta frequency parameter.
DFM	Opens the delta frequency parameter.
DG	Degree data terminator.
DL1	Selects external detector leveling of output power.
DLF	Opens the delta frequency parameter.
DM	dBm data terminator.
DN	Decrements the open parameter by the step size.
DPT	Internal triggered pulse with delay.
DS0	Turns on the secure mode.
DS1	Turns off the secure mode.
DU0	Deselects dual step sweep mode.
DU1	Selects dual step sweep mode.
DV	Decibel per volt (dB/V) data terminator.
EBW0	Selects the external reference loop bandwidth of 10 Hz.
EBW1	Selects the external reference loop bandwidth of 30 Hz.
EBW2	Selects the external reference loop bandwidth of 100 Hz.
EBW3	Selects the external reference loop bandwidth of 300 Hz.
EGI	Opens the reference level DAC setting parameter.
EGO	Outputs the value of the reference level DAC setting.

Table A-1. *Alphabetical GPIB Command List (5 of 19)*

Command Code	Function
EL0	Inhibits updating of the ESB2 bit 4.
EL1	Enables updating of the ESB2 bit 4.
ELI(xxxx)	Sets list index to xxxx.
ELN(x)	Sets the list number to x.
EP0	Selects TTL-low to turn RF on during pulse modulation.
EP1	Selects TTL-high to turn RF on during pulse modulation.
ES0	Inhibits end-of-sweep SRQ generation.
ES1	Enables end-of-sweep SRQ generation.
EXT	Selects single sweep triggering.
F0	Opens the F0 parameter.
F1	Opens the F1 parameter.
F2	Opens the F2 parameter.
F3	Opens the F3 parameter.
F4	Opens the F4 parameter.
F5	Opens the F5 parameter.
F6	Opens the F6 parameter.
F7	Opens the F7 parameter.
F8	Opens the F8 parameter.
F9	Opens the F9 parameter.
FB0	Inhibits extended status byte 1 SRQ generation.
FB1	Enables extended status byte 1 SRQ generation.
FDV	Opens the internal FM deviation parameter.
FM0	Turns off the internal or external FM function.
FM1	Turns on the external FM function in unlocked narrow mode.
FM2	Turns on the external FM function in locked low-noise mode.
FM7	Turns on the internal FM function in unlocked narrow mode.

Table A-1. *Alphabetical GPIB Command List (6 of 19)*

Command Code	Function
FM8	Turns on the internal FM function in unlocked wide mode.
FM9	Turns on the internal FM function in locked mode.
FMD	Turns on the FM Measurement mode.
FML	Turns on the external FM function in locked mode.
FMN	Turns on the internal FM function in locked low-noise mode.
FMR	Opens the internal FM rate parameter.
FMS	Opens the external FM sensitivity parameter.
FMU	Turns on the external FM function in unlocked narrow mode (Same as FM1).
FMW	Turns on the external FM function in unlocked wide mode.
FRS	Opens the frequency scaling reference multiplier parameter.
FUL	Selects the full range sweep mode.
FWV(x)	Selects the internal FM waveform.
GH	GHz data terminator.
GP	Sets the internal gated pulse on.
GTC	Execute a SQF command on receipt of a GET.
GTD	Execute a DN command on receipt of a GET.
GTF	Execute a fast-frequency-switching step on receipt of a GET.
GTL	Execute a TSS command on receipt of a GET.
GTO	Disables the GET functions.
GTS	Execute a TRS command on receipt of a GET.
GTT	Execute a TST command on receipt of a GET.
GTU	Execute a UP command on receipt of a GET.
GV	GHz per volt (GHz/V) data terminator.
HWT	Selects external sweep trigger.
HZ	Hz data terminator.
II0	Inhibits updating of the ESB2 bit 7.

Table A-1. *Alphabetical GPIB Command List (7 of 19)*

Command Code	Function
II1	Enables updating of the ESB2 bit 7.
IL1	Selects internal leveling of output power.
IM1	Turns on the intensity marker mode.
IP	Turns on internal pulse modulation.
KH	kHz data terminator.
KV	kHz per volt (kHz/V) data terminator.
L0	Sets RF output power level to L0. Opens L0 parameter.
L1	Sets RF output power level to L1. Opens L1 parameter.
L2	Sets RF output power level to L2. Opens L2 parameter.
L3	Sets RF output power level to L3. Opens L3 parameter.
L4	Sets RF output power level to L4. Opens L4 parameter.
L5	Sets RF output power level to L5. Opens L5 parameter.
L6	Sets RF output power level to L6. Opens L6 parameter.
L7	Sets RF output power level to L7. Opens L7 parameter.
L8	Sets RF output power level to L8. Opens L8 parameter.
L9	Sets RF output power level to L9. Opens L9 parameter.
LA0	Inhibits updating of ESB1 bit 7.
LA1	Enables updating of ESB1 bit 7.
LDT	Opens the list sweep dwell time parameter.
LE0	Inhibits lock error SRQ generation.
LE1	Enables lock error SRQ generation.
LEA	Learn list (in list sweep mode).
LF	Sets list frequencies starting at the list index.
LGS	Selects logarithmic step sweep.
LIB(xxxx)	Sets the list start index to xxxx.
LIE(xxxx)	Sets the list stop index to xxxx.

Table A-1. *Alphabetical GPIB Command List (8 of 19)*

Command Code	Function
LIN	Selects linear power level operation in mV.
LIS	Selects linear step sweep.
LO0	Turns off the level offset function.
LO1	Turns on the level offset function.
LOG	Selects logarithmic power level operation in dBm.
LOS	Opens the level offset parameter.
LP	Sets list power levels starting at the list index.
LS0	Inhibits updating of the ESB1 bit 3.
LS1	Enables updating of the ESB1 bit 3.
LSP	Selects the power level sweep mode.
LST	Places the MG369XB in list sweep mode.
LU0	Turns off the active user level calibration table.
LU1	Activates user level calibration table #1.
LU2	Activates user level calibration table #2.
LU3	Activates user level calibration table #3.
LU4	Activates user level calibration table #4.
LU5	Activates user level calibration table #5.
LUR	Prepares the MG369XB to receive 5 tables of user level calibration data from the controller.
LUS	Sends all five tables of the user level calibration data to the controller.
LV0	Turns off leveling of the output power.
LV1	Turns off leveling of the output power.
LVP	Sets the instrument power level to 1 dB below peak leveled power.
M0	Opens the M0 parameter.
M1	Opens the M1 parameter.
M2	Opens the M2 parameter.
M3	Opens the M3 parameter.

Table A-1. *Alphabetical GPIB Command List (9 of 19)*

Command Code	Function
M4	Opens the M4 parameter.
M5	Opens the M5 parameter.
M6	Opens the M6 parameter.
M7	Opens the M7 parameter.
M8	Opens the M8 parameter.
M9	Opens the M9 parameter.
MAN	Selects manual (step) frequency sweep.
MB0	Sets the enable mask byte for the primary status byte.
MB1	Sets the enable mask byte for extended status byte 1.
MB2	Sets the enable mask byte for extended status byte 2.
ME0	Disables the marker at the active frequency.
ME1	Enables a marker at the active frequency.
MH	MHz data terminator.
MKO	Turns off markers.
MNT	Selects manual trigger.
MOM	Turns off the AM and FM measurement modes.
MPN	Sets the rear panel marker polarity negative.
MPP	Sets the rear panel marker polarity positive.
MR	Performs a master reset of the instrument by setting all of the instrument parameters to factory default.
MS	Milliseconds (ms) data terminator.
MV	MHz per volt (MHz/V) data terminator.
NS	Nanoseconds (ns) data terminator.
OAB	Returns the external AM sensitivity value (in dB/V) to the controller.
OAD1	Returns the internal AM depth value (in %) to the controller.
OAD2	Returns the internal AM depth value (in dB) to the controller.
OAR	Returns the internal AM rate (in Hz) to the controller.

Table A-1. *Alphabetical GPIB Command List (10 of 19)*

Command Code	Function
OAS	Returns the external AM sensitivity value (in %/V) to the controller.
OAW	Returns the name of the internal AM waveform to the controller.
OD1	Returns the internal pulse delay1 value (in μs) to the controller.
OD2	Returns the internal pulse delay2 value (in μs) to the controller.
OD3	Returns the internal pulse delay3 value (in μs) to the controller.
OD4	Returns the internal pulse delay4 value (in μs) to the controller.
ODD	Returns the internal pulse stepped delay mode step size value (in ms) to the controller.
ODE	Returns the internal pulse stepped delay mode delay 1 stop value (in ms) to the controller.
ODF	Returns the ΔF frequency value (in MHz) to the controller.
ODL	Returns the internal pulse stepped delay mode dwell-time-per-step value (in ms) to the controller.
ODP	Returns the internal pulse delay1 value (in ms) to the controller (Same as OD1).
ODS	Returns the internal pulse stepped delay mode delay 1 start value (in ms) to the controller.
OEBW	Returns the external reference loop bandwidth to the controller.
OEM	Returns the Extended SRQ Mask bytes (3 binary bytes) to the controller.
OES	Returns the GPIB Status bytes (3 binary bytes) to the controller.
OF0	Returns the F0 frequency value (in MHz) to the controller.
OF1	Returns the F1 frequency value (in MHz) to the controller.
OF2	Returns the F2 frequency value (in MHz) to the controller.
OF3	Returns the F3 frequency value (in MHz) to the controller.
OF4	Returns the F4 frequency value (in MHz) to the controller.
OF5	Returns the F5 frequency value (in MHz) to the controller.
OF6	Returns the F6 frequency value (in MHz) to the controller.
OF7	Returns the F7 frequency value (in MHz) to the controller.
OF8	Returns the F8 frequency value (in MHz) to the controller.
OF9	Returns the F9 frequency value (in MHz) to the controller.
OFD	Returns the internal FM deviation value (in Hz) to the controller.

Table A-1. *Alphabetical GPIB Command List (11 of 19)*

Command Code	Function
OFH	Returns the high-end frequency value (in MHz) to the controller.
OFK	Returns the internal or external FM lock status to the controller.
OFL	Returns the low-end frequency value (in MHz) to the controller.
OFM	Returns the frequency multiplier parameter.
OFR	Returns the internal FM rate (in Hz) to the controller.
OFS	Returns the external FM sensitivity value (in MHz/V) to the controller.
OFW	Returns the name of the internal FM waveform to the controller.
OI	Returns the instrument identification string to the controller.
OL0	Returns the L0 power level value to the controller.
OL1	Returns the L1 power level value to the controller.
OL2	Returns the L2 power level value to the controller.
OL3	Returns the L3 power level value to the controller.
OL4	Returns the L4 power level value to the controller.
OL5	Returns the L5 power level value to the controller.
OL6	Returns the L6 power level value to the controller.
OL7	Returns the L7 power level value to the controller.
OL8	Returns the L8 power level value to the controller.
OL9	Returns the L9 power level value to the controller.
OLO	Returns the level offset power value to the controller.
OM0	Returns the M0 frequency value (in MHz) to the controller.
OM1	Returns the M1 frequency value (in MHz) to the controller.
OM2	Returns the M2 frequency value (in MHz) to the controller.
OM3	Returns the M3 frequency value (in MHz) to the controller.
OM4	Returns the M4 frequency value (in MHz) to the controller.
OM5	Returns the M5 frequency value (in MHz) to the controller.
OM6	Returns the M6 frequency value (in MHz) to the controller.

Table A-1. *Alphabetical GPIB Command List (12 of 19)*

Command Code	Function
OM7	Returns the M7 frequency value (in MHz) to the controller.
OM8	Returns the M8 frequency value (in MHz) to the controller.
OM9	Returns the M9 frequency value (in MHz) to the controller.
OMD	Returns the name of the internal pulse mode to the controller.
OMM	1. Returns the AM depth measurement value (in %) to the controller. 2. Returns the FM deviation measurement value (in MHz) to the controller.
OO	Returns the instrument option string to the controller.
OP5	Returns the internal or external pulse polarity (“HIGH”, “LOW”) to the controller.
OPC	Returns the internal pulse clock rate (in MHz) to the controller.
OPD	Returns the power sweep dwell time (in ms) to the controller.
OPHD	Returns the internal FM deviation value (in radians) to the controller.
OPHM	Returns the name of the FM mode (“NARROW”, “WIDE”) to the controller.
OPHR	Returns the internal FM rate (in Hz) to the controller.
OPHS	Returns the external FM sensitivity value (in radians/V) to the controller.
OPHW	Returns the name of the internal FM waveform to the controller.
OPM	Returns the internal power meter measurement (in dBm) to the controller.
OPO	Returns the phase offset value (in degrees) to the controller.
OPP	Returns the internal pulse period value (in μs) to the controller.
OPR	Returns the internal pulse frequency (in MHz) to the controller.
OPS	Returns the power sweep number-of-steps to the controller.
OPT	Returns the name of the internal pulse trigger to the controller.
OPW	Returns the internal pulse width1 value (in μs) to the controller (Same as OW1).
OSB	Returns the primary GPIB status byte to the controller.
OSD	Returns the step sweep dwell time (in ms) to the controller.
OSE	Returns the last GPIB syntax error to the controller.
OSM	Returns the primary SRQ mask byte to the controller.
OSR	Returns the self-test results (6 binary bytes) to the controller.

Table A-1. *Alphabetical GPIB Command List (13 of 19)*

Command Code	Function
OSS	Returns the step sweep number-of-steps to the controller.
OST	Returns the step sweep time value (in ms) to the controller.
OVN	Returns the ROM version number to the controller.
OW1	Returns the internal pulse width1 value (in μs) to the controller.
OW2	Returns the internal pulse width2 value (in μs) to the controller.
OW3	Returns the internal pulse width3 value (in μs) to the controller.
OW4	Returns the internal pulse width4 value (in μs) to the controller.
OWT	Returns the GPIB termination status to the controller.
P0	Turns off the internal or external pulse modulation function (This is the default mode).
PC1	Selects the 10 MHz internal pulse clock rate.
PC4	Selects the 40 MHz internal pulse clock rate (Option 24); Selects the 100 MHz internal pulse clock rate (Option 26).
PCT	Percent (%) data terminator.
PCV	Percent per volt (%/V) data terminator.
PDT	Opens the power sweep dwell time parameter.
PDY	Opens the internal pulse delay1 parameter (Same as D1).
PE0	Inhibits parameter range error SRQ generation.
PE1	Enables parameter range error SRQ generation.
PER	Opens the internal pulse period parameter.
PH0	Turns off the internal or external ΦM function.
PH1	Turns on the external ΦM function in narrow mode.
PH2	Turns on the external ΦM function in wide mode.
PH7	Turns on the internal ΦM function in narrow mode.
PH8	Turns on the internal ΦM function in wide mode.
PHD	Opens the internal ΦM deviation parameter.
PHN	Turns on the external ΦM function in narrow mode (Same as PH1).

Table A-1. *Alphabetical GPIB Command List (14 of 19)*

Command Code	Function
PHR	Opens the internal ΦM rate parameter.
PHS	Opens the external ΦM sensitivity parameter.
PHV(x)	Selects the internal ΦM waveform.
PHW	Turns on the external ΦM function in wide mode (Same as PH2).
PL1	Selects external power meter leveling of the output power.
PM0	Turns off the Power Meter measurement mode.
PM1	Turns on the Power measurement mode (Option 8).
PMD(x)	Selects the internal pulse mode.
PNS	Opens the power sweep number of steps parameter.
PR	Opens the internal pulse frequency parameter.
PS0	Turns off the phase offset.
PS1	Turns on the phase offset.
PSO	Opens the phase offset parameter.
PSZ	Zeros the phase offset display.
PT0	Disables the power offset table.
PT1	Enables the power offset table.
PTC	Changes a power offset table entry.
PTF	Selects internal pulse triggering on the falling edge of an external input.
PTG(x)	Selects the internal pulse trigger.
PTL	Loads a power offset table.
PTR	Selects internal pulse triggering on the rising edge of an external input.
PU0	Selects logarithmic power level operation in dBm.
PU1	Selects linear power level operation in mV.
PU2	Selects logarithmic power level operation in dBμV.
PVT	Opens the ALC power slope pivot point frequency parameter.
PW	Opens the internal pulse width1 parameter (Same as W1).

Table A-1. *Alphabetical GPIB Command List (15 of 19)*

Command Code	Function
RC0	Selects RF to be off during frequency switching in CW, step sweep, and list sweep modes.
RC1	Selects RF to be on during frequency switching in CW, step sweep, and list sweep modes.
RCF	Prepares the MG369XB to receive a new instrument setup recalled from the controller.
RCM	Prepares the MG369XB to receive a new instrument setup and new stored setups recalled from the controller.
RD	Radians data terminator.
RF0	Turns off the RF output.
RF1	Turns on the RF output.
RL	Returns the instrument to local (front panel) control.
RO0	Selects RF to be on at reset.
RO1	Selects RF to be off at reset.
RSN(m)	Recalls the instrument setup stored in internal setup memory location m.
RSS	Resets a sweep if in progress.
RST	Resets the MG369XB to its default settings.
RT0	Selects RF to be off during retrace.
RT1	Selects RF to be on during retrace.
RV	Radians per volt data terminator.
S0	Turns off the master-slave mode of operation.
S1	Turns on the master-slave mode of operation.
SAF	Outputs the current instrument setup to the controller.
SAM	Outputs both the current instrument setup and all stored instrument setups to the controller.
SB0	Inhibits extended status byte 2 SRQ generation.
SB1	Enables extended status byte 2 SRQ generation.
SC0	Turns SCAN modulation function on.
SC1	Turns SCAN modulation function off.
SD0	Turns off the internal pulse stepped delay mode.

Table A-1. *Alphabetical GPIB Command List (16 of 19)*

Command Code	Function
SD1	Turns on the internal pulse stepped delay mode.
SDD	Opens the internal pulse stepped delay mode step size parameter.
SDE	Opens the internal pulse stepped delay mode delay 1 stop parameter.
SDL	Opens the internal pulse stepped delay mode dwell-time-per-step parameter.
SDS	Opens the internal pulse stepped delay mode delay 1 start parameter.
SDT	Opens the step sweep dwell time parameter.
SE0	Inhibits Syntax Error SRQ generation.
SE1	Enables Syntax Error SRQ generation.
SEC	Seconds data terminator.
SF1	Selects the F1-F2 sweep mode.
SF3	Selects the F3-F4 sweep mode.
SL0	Turns off the ALC power slope function.
SL1	Turns on the ALC power slope function.
SLDF	Opens the ΔF parameter of the slave unit.
SLF0	Opens the F0 parameter of the slave unit.
SLF1	Opens the F1 parameter of the slave unit.
SLF2	Opens the F2 parameter of the slave unit.
SLF3	Opens the F3 parameter of the slave unit.
SLF4	Opens the F4 parameter of the slave unit.
SLF5	Opens the F5 parameter of the slave unit.
SLF6	Opens the F6 parameter of the slave unit.
SLF7	Opens the F7 parameter of the slave unit.
SLF8	Opens the F8 parameter of the slave unit.
SLF9	Opens the F9 parameter of the slave unit.
SLL1	Opens the main power level parameter (L1) of the slave unit.
SLL2	Opens the alternate sweep power level parameter (L2) of the slave unit.

Table A-1. *Alphabetical GPIB Command List (17 of 19)*

Command Code	Function
SLM0	Opens the M0 parameter of the slave unit.
SLM1	Opens the M1 parameter of the slave unit.
SLM2	Opens the M2 parameter of the slave unit.
SLM3	Opens the M3 parameter of the slave unit.
SLM4	Opens the M4 parameter of the slave unit.
SLM5	Opens the M5 parameter of the slave unit.
SLM6	Opens the M6 parameter of the slave unit.
SLM7	Opens the M7 parameter of the slave unit.
SLM8	Opens the M8 parameter of the slave unit.
SLM9	Opens the M9 parameter of the slave unit.
SLP	Opens the ALC power slope value parameter.
SLV	Opens the power level parameter (L1) of the slave unit.
SM	Recalls the next stored instrument setup in sequence.
SNR	Enter the instrument serial number.
SNS	Opens the step sweep number of steps parameter.
SOF	Opens the frequency offset parameter of the slave unit.
SP0	Deselects non-equally spaced step sweep.
SP1	Selects non-equally spaced step sweep.
SPS	Steps data terminator.
SQ0	Disables the SRQ generation function.
SQ1	Enables the SRQ generation function.
SQD	Scan down to the next lower preset CW frequency.
SQF	Scan to the next higher preset CW frequency.
SQP	Turns on internal 1 kHz square wave pulse modulation.
SQU	Scan up to the next higher preset CW frequency.
SSN(m)	Saves the current instrument setup to internal setup memory location m.

Table A-1. *Alphabetical GPIB Command List (18 of 19)*

Command Code	Function
SSP	Selects linear step sweep.
SW0	Turns off the internal or external pulse modulation function (Same as P0).
SW1	Turns on internal 400 Hz square wave pulse modulation.
SW2	Turns on internal 1 kHz square wave pulse modulation (Same as SQP).
SW3	Turns on internal 7.8125 kHz square wave pulse modulation.
SW4	Turns on internal 27.8 kHz square wave pulse modulation.
SWP	Selects analog sweep.
SWT	Opens the step sweep time parameter.
SYZ	Opens the increment/decrement step size parameter.
TEX	Sets sweep trigger to external.
TMS	Times data terminator.
TR0	Sets 0dB of attenuation when RF is switched off.
TR1	Sets 40dB of attenuation when RF is switched off.
TRG	Triggers a single sweep.
TRS	Triggers a single sweep.
TSS	Advances sweep to the next step in dual step sweep mode.
TST	Starts an instrument self-test.
UL0	Inhibits RF unleveled SRQ generation.
UL1	Enables RF unleveled SRQ generation.
UP	Increments the open parameter by the step size.
US	Microsecond (ms) data terminator.
VM1	Turns on the video marker mode.
VT	Volts data terminator.
W1	Opens the internal pulse width 1 parameter.
W2	Opens the internal pulse width 2 parameter.
W3	Opens the internal pulse width 3 parameter.

Table A-1. *Alphabetical GPIB Command List (19 of 19)*

Command Code	Function
W4	Opens the internal pulse width 4 parameter.
XL0	Opens the L0 parameter.
XL1	Opens the L1 parameter.
XL2	Opens the L2 parameter.
XL3	Opens the L3 parameter.
XL4	Opens the L4 parameter.
XL5	Opens the L5 parameter.
XL6	Opens the L6 parameter.
XL7	Opens the L7 parameter.
XL8	Opens the L8 parameter.
XL9	Opens the L9 parameter.
XP	Turns on the external pulse modulation function. Disables the internal pulse modulation function, if previously programmed.
Y	Equivalent to a Group Execute Trigger (GET).
ZEL	Ends frequency loading.
ZL(x)	Loads a CW frequency into a table at location x.
ZPN(bbbb)	Sets the table pointer to point to location bbbb.
ZS(x)	Sets the table pointer to point to location x.
ZTL (bbbbnnnnD8D 8D8…D8)	Loads the frequency table starting at location bbbb.

A-3 Functional Listings

Table A-2. *Configuration GPIB Command List*

Command Code	Function
BPN	Selects -3.3V for retrace and bandswitch blanking outputs.
BPP	Selects +3.3V for retrace and bandswitch blanking outputs.
EBW0	Selects the external reference loop bandwidth of 10 Hz.
EBW1	Selects the external reference loop bandwidth of 30 Hz.
EBW2	Selects the external reference loop bandwidth of 100 Hz.
EBW3	Selects the external reference loop bandwidth of 300 Hz.
FRS	Opens the frequency scaling reference multiplier parameter.
RC0	Selects RF to be off during frequency switching in CW, step sweep, and list sweep modes.
RC1	Selects RF to be on during frequency switching in CW, step sweep, and list sweep modes.
RO0	Selects RF to be on at reset.
RO1	Selects RF to be off at reset.
RT0	Selects RF to be off during retrace.
RT1	Selects RF to be on during retrace.
TR0	Sets 0dB of attenuation when RF is switched off.
TR1	Sets 40dB of attenuation when RF is switched off.

Table A-3. *CW Frequency GPIB Command List*

Command Code	Function
ACW	Activates the currently open frequency parameter as CW.
CF0	Sets CW mode at F0 and opens the F0 parameter.
CF1	Sets CW mode at F1 and opens the F1 parameter.
CF2	Sets CW mode at F2 and opens the F2 parameter.
CF3	Sets CW mode at F3 and opens the F3 parameter.
CF4	Sets CW mode at F4 and opens the F4 parameter.
CF5	Sets CW mode at F5 and opens the F5 parameter.
CF6	Sets CW mode at F6 and opens the F6 parameter.
CF7	Sets CW mode at F7 and opens the F7 parameter.
CF8	Sets CW mode at F8 and opens the F8 parameter.
CF9	Sets CW mode at F9 and opens the F9 parameter.
CM0	Sets CW mode at M0 and opens the M0 parameter.
CM1	Sets CW mode at M1 and opens the M1 parameter.
CM2	Sets CW mode at M2 and opens the M2 parameter.
CM3	Sets CW mode at M3 and opens the M3 parameter.
CM4	Sets CW mode at M4 and opens the M4 parameter.
CM5	Sets CW mode at M5 and opens the M5 parameter.
CM6	Sets CW mode at M6 and opens the M6 parameter.
CM7	Sets CW mode at M7 and opens the M7 parameter.
CM8	Sets CW mode at M8 and opens the M8 parameter.
CM9	Sets CW mode at M9 and opens the M9 parameter.
SQD	Scan down to the next lower preset CW frequency.
SQF	Scan to the next higher preset CW frequency.
SQU	Scan up to the next higher preset CW frequency.

Table A-4. *Data Terminator GPIB Command List*

Command Code	Function
ADR	GPIB address terminator.
DB	Decibel (dB) data terminator.
DG	Degree data terminator.
DM	dBm data terminator.
DV	Decibel per volt (dB/V) data terminator.
GH	GHz data terminator.
GV	GHz per volt (GHz/V) data terminator.
HZ	Hz data terminator.
KH	kHz data terminator.
KV	kHz per volt (kHz/V) data terminator.
MH	MHz data terminator.
MS	Milliseconds (ms) data terminator.
MV	MHz per volt (MHz/V) data terminator.
NS	Nanoseconds (ns) data terminator.
PCT	Percent (%) data terminator.
PCV	Percent per volt (%/V) data terminator.
RD	Radians data terminator.
RV	Radians per volt data terminator.
SEC	Seconds data terminator.
SPS	Steps data terminator.
TMS	Times data terminator.
US	Microsecond (ms) data terminator.
VT	Volts data terminator.

Table A-5. *Fast-Frequency-Switching GPIB Command List*

Command Code	Function
ZEL	Ends frequency loading.
ZL(x)	Loads a CW frequency into a table at location x.
ZPN(bbbb)	Sets the table pointer to point to location bbbb.
ZS(x)	Sets the table pointer to point to location x.
ZTL (bbbbnnnnD8D 8D8…D8)	Loads the frequency table starting at location bbbb.

Table A-6. *Group Execute Trigger GPIB Command List*

Command Code	Function
GTC	Execute a SQF command on receipt of a GET.
GTD	Execute a DN command on receipt of a GET.
GTF	Execute a fast-frequency-switching step on receipt of a GET.
GTL	Execute a TSS command on receipt of a GET.
GTO	Disables the GET functions.
GTS	Execute a TRS command on receipt of a GET.
GTT	Execute a TST command on receipt of a GET.
GTU	Execute a UP command on receipt of a GET.
Y	Equivalent to a Group Execute Trigger (GET).

Table A-7. *List Sweep GPIB Command List*

Command Code	Function
CTL	Copy current CW frequency and power level to current list index.
ELI(xxxx)	Sets list index to xxxx.
ELN(x)	Sets the list number to x.
LDT	Opens the list sweep dwell time parameter.
LEA	Learn list (in list sweep mode).
LF	Sets list frequencies starting at the list index.
LIB(xxxx)	Sets the list start index to xxxx.
LIE(xxxx)	Sets the list stop index to xxxx.
LP	Sets list power levels starting at the list index.
LST	Places the MG369XB in list sweep mode.

Table A-8. *Marker GPIB Command List*

Command Code	Function
IM1	Turns on the intensity marker mode.
ME0	Disables the marker at the active frequency.
ME1	Enables a marker at the active frequency.
MKO	Turns off markers.
MPN	Sets the rear panel marker polarity negative.
MPP	Sets the rear panel marker polarity positive.
VM1	Turns on the video marker mode.

Table A-9. *Master Slave GPIB Command List*

Command Code	Function
S0	Turns off the master-slave mode of operation.
S1	Turns on the master-slave mode of operation.

Table A-10. *Measure Function GPIB Command List*

Command Code	Function
AMI	Turns on the AM measurement mode.
FMD	Turns on the FM Measurement mode.
MOM	Turns off the AM and FM measurement modes.
PM0	Turns off the Power measurement mode.
PM1	Turns on the Power measurement mode (Option 8).

Table A-11. *Miscellaneous GPIB Command List*

Command Code	Function
ADD	Opens the GPIB address parameter.
CS0	Turns off the CW ramp.
CS1	Turns on the CW ramp.
DS0	Turns on the secure mode.
DS1	Turns off the secure mode.
MR	Performs a master reset of the instrument by setting all of the instrument parameters to factory default.
PS0	Turns off the phase offset.
PS1	Turns on the phase offset.
PSZ	Zeros the phase offset display.
RL	Returns the instrument to local (front panel) control.
RST	Resets the MG369XB to its default settings.
SNR	Enter the instrument serial number.

Table A-12. *Modulation GPIB Command List (1 of 2)*

Command Code	Function
AM0	Turns off the internal or external AM function.
AM1	Turns on the external AM function in linear mode.
AM2	Turns on the external AM function in log mode.
AM7	Turns on the internal AM function in linear mode.
AM8	Turns on the internal AM function in log mode.
AMO	Turns off the internal AM function generator if it is on.
AMW(x)	Selects the internal AM waveform.
DPT	Internal triggered pulse with delay.
EP0	Selects TTL-low to turn RF on during pulse modulation.
EP1	Selects TTL-high to turn RF on during pulse modulation.
FM0	Turns off the internal or external FM function.
FM1	Turns on the external FM function in unlocked narrow mode.
FM2	Turns on the external FM function in locked low-noise mode.
FM7	Turns on the internal FM function in unlocked narrow mode.
FM8	Turns on the internal FM function in unlocked wide mode.
FM9	Turns on the internal FM function in locked mode.
FML	Turns on the external FM function in locked mode.
FMN	Turns on the internal FM function in locked low-noise mode.
FMU	Turns on the external FM function in unlocked narrow mode (Same as FM1).
FMW	Turns on the external FM function in unlocked wide mode.
FWV(x)	Selects the internal FM waveform.
GP	Sets the internal gated pulse on.
IP	Turns on internal pulse modulation.
P0	Turns off the internal or external pulse modulation function (This is the default mode).
PC1	Selects the 10 MHz internal pulse clock rate.
PC4	Selects the 40 MHz internal pulse clock rate (Option 24); Selects the 100 MHz internal pulse clock rate (Option 26).

Table A-12. *Modulation GPIB Command List (2 of 2)*

Command Code	Function
PH0	Turns off the internal or external ΦM function.
PH1	Turns on the external ΦM function in narrow mode.
PH2	Turns on the external ΦM function in wide mode.
PH7	Turns on the internal ΦM function in narrow mode.
PH8	Turns on the internal ΦM function in wide mode.
PHN	Turns on the external ΦM function in narrow mode (Same as PH1).
PHV(x)	Selects the internal ΦM waveform.
PHW	Turns on the external ΦM function in wide mode (Same as PH2).
PMD(x)	Selects the internal pulse mode.
PTF	Selects internal pulse triggering on the falling edge of an external input.
PTG(x)	Selects the internal pulse trigger.
PTR	Selects internal pulse triggering on the rising edge of an external input.
SC0	Turns SCAN modulation function on.
SC1	Turns SCAN modulation function off.
SD0	Turns off the internal pulse stepped delay mode.
SD1	Turns on the internal pulse stepped delay mode.
SQP	Turns on internal 1 kHz square wave pulse modulation.
SW0	Turns off the internal or external pulse modulation function (Same as P0).
SW1	Turns on internal 400 Hz square wave pulse modulation.
SW2	Turns on internal 1 kHz square wave pulse modulation (Same as SQP).
SW3	Turns on internal 7.8125 kHz square wave pulse modulation.
SW4	Turns on internal 27.8 kHz square wave pulse modulation.
XP	Turns on the external pulse modulation function. Disables the internal pulse modulation function, if previously programmed.

Table A-13. *Output GPIB Command List (1 of 4)*

Command Code	Function
*IDN?	Requests device identification.
OAB	Returns the external AM sensitivity value (in dB/V) to the controller.
OAD1	Returns the internal AM depth value (in %) to the controller.
OAD2	Returns the internal AM depth value (in dB) to the controller.
OAR	Returns the internal AM rate (in Hz) to the controller.
OAS	Returns the external AM sensitivity value (in %/V) to the controller.
OAW	Returns the name of the internal AM waveform to the controller.
OD1	Returns the internal pulse delay1 value (in μs) to the controller.
OD2	Returns the internal pulse delay2 value (in μs) to the controller.
OD3	Returns the internal pulse delay3 value (in μs) to the controller.
OD4	Returns the internal pulse delay4 value (in μss) to the controller.
ODD	Returns the internal pulse stepped delay mode step size value (in ms) to the controller.
ODE	Returns the internal pulse stepped delay mode delay 1 stop value (in ms) to the controller.
ODF	Returns the ΔF frequency value (in MHz) to the controller.
ODL	Returns the internal pulse stepped delay mode dwell-time-per-step value (in ms) to the controller.
ODP	Returns the internal pulse delay1 value (in ms) to the controller (Same as OD1).
ODS	Returns the internal pulse stepped delay mode delay 1 start value (in ms) to the controller.
OEBW	Returns the external reference loop bandwidth to the controller.
OEM	Returns the Extended SRQ Mask bytes (3 binary bytes) to the controller.
OES	Returns the GPIB Status bytes (3 binary bytes) to the controller.
OF0	Returns the F0 frequency value (in MHz) to the controller.
OF1	Returns the F1 frequency value (in MHz) to the controller.
OF2	Returns the F2 frequency value (in MHz) to the controller.
OF3	Returns the F3 frequency value (in MHz) to the controller.
OF4	Returns the F4 frequency value (in MHz) to the controller.
OF5	Returns the F5 frequency value (in MHz) to the controller.

Table A-13. *Output GPIB Command List (2 of 4)*

Command Code	Function
OF6	Returns the F6 frequency value (in MHz) to the controller.
OF7	Returns the F7 frequency value (in MHz) to the controller.
OF8	Returns the F8 frequency value (in MHz) to the controller.
OF9	Returns the F9 frequency value (in MHz) to the controller.
OFD	Returns the internal FM deviation value (in Hz) to the controller.
OFH	Returns the high-end frequency value (in MHz) to the controller.
OFK	Returns the internal or external FM lock status to the controller.
OFL	Returns the low-end frequency value (in MHz) to the controller.
OFM	Returns the frequency multiplier parameter.
OFR	Returns the internal FM rate (in Hz) to the controller.
OFS	Returns the external FM sensitivity value (in MHz/V) to the controller.
OFW	Returns the name of the internal FM waveform to the controller.
OI	Returns the instrument identification string to the controller.
OL0	Returns the L0 power level value to the controller.
OL1	Returns the L1 power level value to the controller.
OL2	Returns the L2 power level value to the controller.
OL3	Returns the L3 power level value to the controller.
OL4	Returns the L4 power level value to the controller.
OL5	Returns the L5 power level value to the controller.
OL6	Returns the L6 power level value to the controller.
OL7	Returns the L7 power level value to the controller.
OL8	Returns the L8 power level value to the controller.
OL9	Returns the L9 power level value to the controller.
OLO	Returns the level offset power value to the controller.
OM0	Returns the M0 frequency value (in MHz) to the controller.
OM1	Returns the M1 frequency value (in MHz) to the controller.

Table A-13. *Output GPIB Command List (3 of 4)*

Command Code	Function
OM2	Returns the M2 frequency value (in MHz) to the controller.
OM3	Returns the M3 frequency value (in MHz) to the controller.
OM4	Returns the M4 frequency value (in MHz) to the controller.
OM5	Returns the M5 frequency value (in MHz) to the controller.
OM6	Returns the M6 frequency value (in MHz) to the controller.
OM7	Returns the M7 frequency value (in MHz) to the controller.
OM8	Returns the M8 frequency value (in MHz) to the controller.
OM9	Returns the M9 frequency value (in MHz) to the controller.
OMD	Returns the name of the internal pulse mode to the controller.
OMM	1. Returns the AM depth measurement value (in %) to the controller. 2. Returns the FM deviation measurement value (in MHz) to the controller.
OO	Returns the instrument option string to the controller.
OP5	Returns the internal or external pulse polarity (“HIGH”, “LOW”) to the controller.
OPC	Returns the internal pulse clock rate (in MHz) to the controller.
OPD	Returns the power sweep dwell time (in ms) to the controller.
OPHD	Returns the internal FM deviation value (in radians) to the controller.
OPHM	Returns the name of the FM mode (“NARROW”, “WIDE”) to the controller.
OPHR	Returns the internal FM rate (in Hz) to the controller.
OPHS	Returns the external FM sensitivity value (in radians/V) to the controller.
OPHW	Returns the name of the internal FM waveform to the controller.
OPM	Returns the internal power meter measurement (in dBm) to the controller.
OPO	Returns the phase offset value (in degrees) to the controller.
OPP	Returns the internal pulse period value (in μs) to the controller.
OPR	Returns the internal pulse frequency (in MHz) to the controller.
OPS	Returns the power sweep number-of-steps to the controller.
OPT	Returns the name of the internal pulse trigger to the controller.
OPW	Returns the internal pulse width1 value (in μs) to the controller (Same as OW1).

Table A-13. *Output GPIB Command List (4 of 4)*

Command Code	Function
OSB	Returns the primary GPIB status byte to the controller.
OSD	Returns the step sweep dwell time (in ms) to the controller.
OSE	Returns the last GPIB syntax error to the controller.
OSM	Returns the primary SRQ mask byte to the controller.
OSR	Returns the self-test results (6 binary bytes) to the controller.
OSS	Returns the step sweep number-of-steps to the controller.
OST	Returns the step sweep time value (in ms) to the controller.
OVN	Returns the ROM version number to the controller.
OW1	Returns the internal pulse width1 value (in μs) to the controller.
OW2	Returns the internal pulse width2 value (in μs) to the controller.
OW3	Returns the internal pulse width3 value (in μs) to the controller.
OW4	Returns the internal pulse width4 value (in μs) to the controller.
OWT	Returns the GPIB termination status to the controller.

Table A-14. *Parameter Entry GPIB Command List (1 of 4)*

Command Code	Function
ADP1	Opens the internal AM % depth parameter.
ADP2	Opens the internal AM dB depth parameter.
AMR	Opens the internal AM rate parameter.
AMS	Opens the external AM %/V sensitivity parameter.
ASD	Opens the external AM dB/V sensitivity parameter.
CLO	Closes the previously opened parameter.
CLR	Clears the data entry.
D1	Opens the internal pulse delay1 parameter.
D2	Opens the internal pulse delay2 parameter.
D3	Opens the internal pulse delay3 parameter.
D4	Opens the internal pulse delay4 parameter.
DFF	Opens the delta frequency parameter.
DFM	Opens the delta frequency parameter.
DLF	Opens the delta frequency parameter.
DN	Decrements the open parameter by the step size.
EGI	Opens the reference level DAC setting parameter.
F0	Opens the F0 parameter.
F1	Opens the F1 parameter.
F2	Opens the F2 parameter.
F3	Opens the F3 parameter.
F4	Opens the F4 parameter.
F5	Opens the F5 parameter.
F6	Opens the F6 parameter.
F7	Opens the F7 parameter.
F8	Opens the F8 parameter.
F9	Opens the F9 parameter.

Table A-14. *Parameter Entry GPIB Command List (2 of 4)*

Command Code	Function
FDV	Opens the internal FM deviation parameter.
FMR	Opens the internal FM rate parameter.
FMS	Opens the external FM sensitivity parameter.
LOS	Opens the level offset parameter.
M0	Opens the M0 parameter.
M1	Opens the M1 parameter.
M2	Opens the M2 parameter.
M3	Opens the M3 parameter.
M4	Opens the M4 parameter.
M5	Opens the M5 parameter.
M6	Opens the M6 parameter.
M7	Opens the M7 parameter.
M8	Opens the M8 parameter.
M9	Opens the M9 parameter.
PDT	Opens the power sweep dwell time parameter.
PDY	Opens the internal pulse delay1 parameter (Same as D1).
PER	Opens the internal pulse period parameter.
PHD	Opens the internal ΦM deviation parameter.
PHR	Opens the internal ΦM rate parameter.
PHS	Opens the external ΦM sensitivity parameter.
PNS	Opens the power sweep number of steps parameter.
PR	Opens the internal pulse frequency parameter.
PSO	Opens the phase offset parameter.
PVT	Opens the ALC power slope pivot point frequency parameter.
PW	Opens the internal pulse width1 parameter (Same as W1).
SDD	Opens the internal pulse stepped delay mode step size parameter.

Table A-14. *Parameter Entry GPIB Command List (3 of 4)*

Command Code	Function
SDE	Opens the internal pulse stepped delay mode delay 1 stop parameter.
SDL	Opens the internal pulse stepped delay mode dwell-time-per-step parameter.
SDS	Opens the internal pulse stepped delay mode delay 1 start parameter.
SDT	Opens the step sweep dwell time parameter.
SLDF	Opens the ΔF parameter of the slave unit.
SLF0	Opens the F0 parameter of the slave unit.
SLF1	Opens the F1 parameter of the slave unit.
SLF2	Opens the F2 parameter of the slave unit.
SLF3	Opens the F3 parameter of the slave unit.
SLF4	Opens the F4 parameter of the slave unit.
SLF5	Opens the F5 parameter of the slave unit.
SLF6	Opens the F6 parameter of the slave unit.
SLF7	Opens the F7 parameter of the slave unit.
SLF8	Opens the F8 parameter of the slave unit.
SLF9	Opens the F9 parameter of the slave unit.
SLL1	Opens the main power level parameter (L1) of the slave unit.
SLL2	Opens the alternate sweep power level parameter (L2) of the slave unit.
SLM0	Opens the M0 parameter of the slave unit.
SLM1	Opens the M1 parameter of the slave unit.
SLM2	Opens the M2 parameter of the slave unit.
SLM3	Opens the M3 parameter of the slave unit.
SLM4	Opens the M4 parameter of the slave unit.
SLM5	Opens the M5 parameter of the slave unit.
SLM6	Opens the M6 parameter of the slave unit.
SLM7	Opens the M7 parameter of the slave unit.
SLM8	Opens the M8 parameter of the slave unit.

Table A-14. *Parameter Entry GPIB Command List (4 of 4)*

Command Code	Function
SLM9	Opens the M9 parameter of the slave unit.
SLV	Opens the power level parameter (L1) of the slave unit.
SNS	Opens the step sweep number of steps parameter.
SOF	Opens the frequency offset parameter of the slave unit.
SWT	Opens the step sweep time parameter.
SYZ	Opens the increment/decrement step size parameter.
UP	Increments the open parameter by the step size.
W1	Opens the internal pulse width 1 parameter.
W2	Opens the internal pulse width 2 parameter.
W3	Opens the internal pulse width 3 parameter.
W4	Opens the internal pulse width 4 parameter.
XL0	Opens the L0 parameter.
XL1	Opens the L1 parameter.
XL2	Opens the L2 parameter.
XL3	Opens the L3 parameter.
XL4	Opens the L4 parameter.
XL5	Opens the L5 parameter.
XL6	Opens the L6 parameter.
XL7	Opens the L7 parameter.
XL8	Opens the L8 parameter.
XL9	Opens the L9 parameter.

Table A-15. *Power Leveling GPIB Command List (1 of 2)*

Command Code	Function
AL0	Sets the alternate frequency sweep RF output to L0.
AL1	Sets the alternate frequency sweep RF output to L1.
AL2	Sets the alternate frequency sweep RF output to L2.
AL3	Sets the alternate frequency sweep RF output to L3.
AL4	Sets the alternate frequency sweep RF output to L4.
AL5	Sets the alternate frequency sweep RF output to L5.
AL6	Sets the alternate frequency sweep RF output to L6.
AL7	Sets the alternate frequency sweep RF output to L7.
AL8	Sets the alternate frequency sweep RF output to L8.
AL9	Sets the alternate frequency sweep RF output to L9.
AT0	Deselects ALC step attenuator decoupling.
AT1	Selects ALC step attenuator decoupling.
ATT(xx)	Sets the step attenuator value to xx (times 10 dB).
DL1	Selects external detector leveling of output power.
EGO	Outputs the value of the reference level DAC setting.
IL1	Selects internal leveling of output power.
L0	Sets RF output power level to L0. Opens L0 parameter.
L1	Sets RF output power level to L1. Opens L1 parameter.
L2	Sets RF output power level to L2. Opens L2 parameter.
L3	Sets RF output power level to L3. Opens L3 parameter.
L4	Sets RF output power level to L4. Opens L4 parameter.
L5	Sets RF output power level to L5. Opens L5 parameter.
L6	Sets RF output power level to L6. Opens L6 parameter.
L7	Sets RF output power level to L7. Opens L7 parameter.
L8	Sets RF output power level to L8. Opens L8 parameter.
L9	Sets RF output power level to L9. Opens L9 parameter.

Table A-15. *Power Leveling GPIB Command List (2 of 2)*

Command Code	Function
LIN	Selects linear power level operation.
LO0	Turns off the level offset function.
LO1	Turns on the level offset function.
LOG	Selects logarithmic power level operation.
LSP	Selects the power level sweep mode.
LV0	Turns off leveling of the output power.
LV1	Turns off leveling of the output power.
LVP	Sets the instrument power level to 1 dB below peak leveled power.
PL1	Selects external power meter leveling of the output power.
PU0	Selects logarithmic power level operation in dBm.
PU1	Selects logarithmic power level operation in mV.
PU2	Selects logarithmic power level operation in dBμV.
RF0	Turns off the RF output.
RF1	Turns on the RF output.
SL0	Turns off the ALC power slope function.
SL1	Turns on the ALC power slope function.

Table A-16. *Power Offset Table GPIB Command List*

Command Code	Function
PT0	Disables the power offset table.
PT1	Enables the power offset table.
PTC	Changes a power offset table entry.
PTL	Loads a power offset table.

Table A-17. *Self-Test GPIB Command List*

Command Code	Function
TST	Starts an instrument self-test.

Table A-18. *Status GPIB Command List (1 of 2)*

Command Code	Function
CSB	Clears all GPIB status bytes.
EL0	Inhibits updating of the ESB2 bit 4.
EL1	Enables updating of the ESB2 bit 4.
ES0	Inhibits end-of-sweep SRQ generation.
ES1	Enables end-of-sweep SRQ generation.
FB0	Inhibits extended status byte 1 SRQ generation.
FB1	Enables extended status byte 1 SRQ generation.
II0	Inhibits updating of the ESB2 bit 7.
II1	Enables updating of the ESB2 bit 7.
LA0	Inhibits updating of ESB1 bit 7.
LA1	Enables updating of ESB1 bit 7.
LE0	Inhibits lock error SRQ generation.
LE1	Enables lock error SRQ generation.
LS0	Inhibits updating of the ESB1 bit 3.
LS1	Enables updating of the ESB1 bit 3.
MB0	Sets the enable mask byte for the primary status byte.
MB1	Sets the enable mask byte for extended status byte 1.
MB2	Sets the enable mask byte for extended status byte 2.
PE0	Inhibits parameter range error SRQ generation.
PE1	Enables parameter range error SRQ generation.
SB0	Inhibits extended status byte 2 SRQ generation.
SB1	Enables extended status byte 2 SRQ generation.
SE0	Inhibits Syntax Error SRQ generation.
SE1	Enables Syntax Error SRQ generation.
SQ0	Disables the SRQ generation function.
SQ1	Enables the SRQ generation function.

Table A-18. *Status GPIB Command List (2 of 2)*

Command Code	Function
UL0	Inhibits RF unleveled SRQ generation.
UL1	Enables RF unleveled SRQ generation.

Table A-19. *Stored Setup GPIB Command List*

Command Code	Function
RCF	Prepares the MG369XB to receive a new instrument setup recalled from the controller.
RCM	Prepares the MG369XB to receive a new instrument setup and new stored setups recalled from the controller.
RSN(m)	Recalls the instrument setup stored in internal setup memory location m.
SAF	Outputs the current instrument setup to the controller.
SAM	Outputs both the current instrument setup and all stored instrument setups to the controller.
SM	Recalls the next stored instrument setup in sequence.
SSN(m)	Saves the current instrument setup to internal setup memory location m.

Table A-20. *Sweep GPIB Command List (1 of 2)*

Command Code	Function
AD1	Selects F1-ΔF alternate frequency sweep.
AD5	Selects F5-ΔF alternate frequency sweep.
AD6	Selects F6-ΔF alternate frequency sweep.
AF1	Selects F1-F2 alternate frequency sweep.
AF3	Selects F3-F4 alternate frequency sweep.
AFU	Selects full range alternate frequency sweep.
AUT	Selects automatic sweep triggering.
DF0	Selects F0-delta frequency sweep mode.
DF1	Selects F1-delta frequency sweep mode.
DF5	Selects F5-delta frequency sweep mode.
DF6	Selects F6-delta frequency sweep mode.
DU0	Deselects dual step sweep mode.
DU1	Selects dual step sweep mode.
EXT	Selects single sweep triggering.
FUL	Selects the full range sweep mode.
HWT	Selects external sweep trigger.
LGS	Selects logarithmic step sweep.
LIS	Selects linear step sweep.
MAN	Selects manual (step) frequency sweep.
MNT	Selects manual trigger.
RSS	Resets a sweep if in progress.
SF1	Selects the F1-F2 sweep mode.
SF3	Selects the F3-F4 sweep mode.
SP0	Deselects non-equally spaced step sweep.
SP1	Selects non-equally spaced step sweep.
SSP	Selects linear step sweep.

Table A-20. *Sweep GPIB Command List (2 of 2)*

Command Code	Function
SWP	Selects analog sweep.
TEX	Sets sweep trigger to external.
TRG	Triggers a single sweep.
TRS	Triggers a single sweep.
TSS	Advances sweep to the next step in dual step sweep mode.

Table A-21. *User Level Calibration GPIB Command List*

Command Code	Function
LU0	Turns off the active user level calibration table.
LU1	Activates user level calibration table #1.
LU2	Activates user level calibration table #2.
LU3	Activates user level calibration table #3.
LU4	Activates user level calibration table #4.
LU5	Activates user level calibration table #5.
LUR	Prepares the MG369XB to receive 5 tables of user level calibration data from the controller.
LUS	Sends all five tables of the user level calibration data to the controller.