Chapter 4: Remote Monitor and Control Operation

Overview

This chapter details the remote control operation of the CM720M. Complete monitoring and control of the unit is available to the user via a remote serial interface. The serial interface can be either RS-232 or RS-485 compatible, and can operate in either ASCII or PACKET mode.

This chapter is divided into several sections, each of which describes a group of commands. For each group, a summary of the command syntax is given, followed by detailed command descriptions.

Parameters shown in uppercase should be typed exactly as shown. Parameters shown in lowercase italics are numeric parameters. See the "Descriptions" section for information about numeric parameters.

If a parameter is enclosed in square brackets [ ], it is optional; if the parameter is also in italics, it is variable. If multiple choices are available for a parameter, they are separated by a vertical bar |.

Parameter Query

If a command has optional parameters, and you issue the command without supplying the parameter, the software displays the current value of the parameter.

Valid Commands

Command actions are performed if the:

- Command is valid
- Parameter value is within the valid range
- Parameter value or command is compatible with the present system configuration

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Descriptions

Table 4-3 lists system commands and descriptions.

Table 4-3. System Commands and Descriptions

System Command	Description
DEVCON	This command displays device configuration information, such as software version, serial number, etc.
DISPLAY	This command displays the current setting of the system parameters.
HELP	This command displays a list of all available commands. The list shows the full command name, the command name abbreviation, and the command description. If the user types HELP followed by a command name, the usage information for that command is displayed.
TYPE	This command is used to select between RS-232 and RS-485 electrical characteristics for the serial interface.
PROTOCOL	This command is used to select between ASCII protocol and PACKET protocol.
ADDRESS	This command sets the packet address for PACKET protocol. The packet address must be a whole number between 1 and 31. The packet address has no effect in ASCII protocol.
ECHO	This command enables/disables character echo in ASCII protocol. Echo has no effect in PACKET protocol.
BITS	This command set the number of bits per character for the serial interface. The choices are 7 or 8.
PARITY	This command sets the parity mode for the serial interface. The choices are odd, even, or none.
BAUDRATE	This command is used to set the baud rate for the serial interface. Valid baud rates are 300, 600, 1200, 2400, 4800, 9600, and 19200.
FPLOCK	This command is used to enable/disable the front panel lockout. When the front panel lockout is enabled, configuration parameters cannot be changed and commands cannot be issued (except to turn off the lockout) from the front panel.
RESET	This command resets the system. It is equivalent to turning the unit power off and on.
DATE	This command is used to display and set the real-time calendar. The date parameter consists of a month, day, and year separated by periods, (3.23.1993). Spaces are not allowed between the numbers and the periods. To display the date, type DATE without any parameters. The factory default is the date of California, USA.
TIME	This command is used to display and set the real-time clock. The time parameter consists of an hour and minute separated by a period. The time is entered in 24-hour format (23.32). To display the time, type TIME without any parameters. The factory default is set to the time of California, USA (Pacific time).
TEMP	This command queries the estimated ambient temperature.
CONTRAST	This command controls the front panel LCD contrast. The level must be a whole number between 0 (lightest) and 63 (darkest). The factory default is 63.

Invalid Command Error Responses

Commands that do not follow these guidelines will return one of the error messages in Table 4-1.

Table 4-1. Command Error Messages

Error	Action
Unrecognized command	Enter the command "HELP" to get a list of valid commands.
Too many/few arguments	Enter the command "HELP XXXX" (where XXXX represents the command) to see how many arguments are expected.
No match for 1 of *n* parameters	Enter the command "HELP XXXX" to see what are valid parameters for this command.
Parameter out of range	Enter the command "HELP XXXX" to see what the valid parameter range is.

System Commands

Table 4-2 details the system command summary.

Table 4-2. System Command Summary

Mnemonic	Command	Parameters	Description
DC	DEVCON	—	Device Configuration
DP	DISPLAY	[SYSTEM | MOD]	Display parameters
HP	HELP	[cmdname]	Display command names
RT	TYPE	[RS232 | RS485][1]	Remote interface type
RP	PROTOCOL	[ASCII | PACKET]	Remote interface protocol
RA	ADDRESS	[*address*]	Remote packet address
RE	ECHO	[ON | OFF]	Remote echo enable
BT	BITS	[7 | 8]	Remote bits per character
PR	PARITY	[NONE | ODD | EVEN]	Remote parity
RB	BAUDRATE	[*rate*]	Remote baud rate
FPL	FPLOCK	[ON | OFF]	Enable / Disable Lockout
RS	RESET	—	System reset
DT	DATE	[XX.XX.XX]	Display/set current date
TI	TIME	[XX.XX]	Display/set current time
TM	TEMP[2]	—	Display temperature
LC	CONTRAST	[*level*]	LCD contrast control

[1] Bold indicates factory default setting

[2] Query only

Descriptions

Table 4-5 lists each modulator command and explains how the command functions.

Table 4-5. Modulator Commands and Descriptions

Modulator Commands	Description
PWREN	This command is used to enable/disable the output signal. This parameter is set to OFF if a system failure is detected.
PWRLVL	This command is used to set the output signal power level in units of dBmV. Valid parameter range is 20.0 to 42.0, in steps of 0.1.
PWRMON	This command is used to query the measured output signal power level (dBmV).
DATARATE	This command is used to query the data rate. The data rate is displayed in bits per second. Data Rate = Symbol Rate x Code Rate x QAM Rate where: Symbol Rate = 5.06383 Msps Code Rate = 188/204 (encoding enabled), = 1 (encoding bypassed) QAM Rate = 4 (QAM 16) = 6 (QAM 64)
QAM	This command is used to set the QAM mode to 16 (4 bits per symbol) or 64 (6 bits per symbol). Changing the QAM mode will change the data rate.
SYMRATE	This command is used to query the symbol rate.
BYPASS	This command is used to enable/disable various functions within the modulator. The four functions controlled by this command are: • SCRAM—Performs pseudo-random scrambling on the input data. Note: Bypassing this feature may affect the output spectrum. • ENCODE—Performs Reed/Solomon encoding, adding 16 bytes of parity to each 188 bytes of input data. • INTRLV—Interleaves the encoded data. • DIFF—Differential encoder. If BYPASS is typed without any parameters, the state of all four functions is displayed. To toggle the state, type BYPASS followed by a space and the function name. The function names may be abbreviated to one letter.
PURE	This command generates a pure carrier output for testing purposes.
BERT	This feature is used to generate a 2^{23}-1 test pattern for BER testing purposes. It can also be used to generate the "all ones" and the "all zeros" patterns. If BERT mode is enabled (anything but OFF), all signals from the digital input card are ignored, and the system switches over to internal timing. **NOTE:** The MPEG-2 structure is retained, for example, data is not generated during the sync bytes.
DATACLOCK	This command returns the measured frequency of the data input clock.
CLRCHN	This command is used to enable/disable clear channel mode. If disabled, the input data is expected to be formatted per MPEG-2. If enabled, no assumption on data format is made. Sync bytes are automatically inserted, changing the Code Rate to 187/204.
FILTER	This command is used to select different transmit filter types.

Modulator Commands

Summary

Table 4-4 lists a summary of the modulator commands.

Table 4-4. Modulator Commands Summary

Mnemonic	Command	Parameters	Description
PE	PWREN	[ON | OFF][1]	Output power enable
PL	PWRLVL	[level]	Set output power level
PM	PWRMON[2]	—	Displays measured output power level
DR	DATARATE[2]	—	Query data rate
Q	QAM	[16|64]	Set QAM mode
SR	SYMRATE[2]	—	Displays symbol rate
BY	BYPASS	[SCRAM | ENCODE | INTRLV| DIFF]	Enable / disable features
PR	PURE	[ON | OFF]	Pure carrier output enable
BER	BERT	[PN | ONE | ZERO | OFF]	BERT Mode
DCK	DATACLOCK[2]	—	Measured input clock (bytes/sec)
CC	CLRCHN	[ON | OFF]	Clear Channel Enable
FLT	FILTER	[DVB | CUSTOM]	Transmit Filter Type

[1] Bold indicates factory default setting

[2] Query only

Table 4-8 is a summary of the packet mode fault bit maps for remote control.

Table 4-8. Fault Bit Maps

Bit Map	Fault
0x00000001	System Fault
0x00000002	Data In clock too slow
0x00000004	Data In clock too fast
0x00000008	Data In clock gone
0x00000010	Data in parity error
0x00000020	Data in sync loss
0x00000040	Data in frame loss
0x00000080	Input card error
0x00000100	Cooling fan failure
0x00000200	Ambient temperature too hot
0x00000400	Ambient temperature too cold
0x00000800	Loss of power detected
0x00001000	Output power level fault
0x00002000	Not defined
.	.
.	.
0x80000000	Not defined

RS-485 Interface and Packet Protocol

The RS-485 interface may be used to control multiple modulators simultaneously using the ComStream packet protocol.

RS-485 Line Settings

The RS-485 signal levels and electrical characteristics are in accordance with the EIA RS-485 full-duplex, tri-state interface bus standards. This bus is configured as a party-line with a maximum of 32 devices connected to a single bus. The connector pinout is described in Appendix A. A positive differential voltage presented at RCV (the voltage at RCV+ is greater than the voltage at RCV-), also known as space, will be interpreted as a TTL low. This is considered a start bit per EIA specification.

Fault Commands

Summary

Table 4-6. lists a summary of the fault commands.

Table 4-6. Fault Command Summary

Mnemonic	Command	Description
FP	FLTPRES	Display present faults
FH	FLTHIST	Display fault history
FC	FLTCLR	Clear fault history

Descriptions

Table 4-7 lists a summary of the fault commands and how they function.

Table 4-7. Fault Commands Descriptions

Fault Command	Description
FLTPRES	This command displays a list of the currently active faults. In ASCII mode the faults are listed in text. In packet mode a bit map of the faults is returned.
FLTHIST	This command displays a list of faults that have occurred since power-up or since the last FLTCLR command. In ASCII mode the faults are listed in text. In packet mode a bit map of the faults is returned.
FLTCLR	This command clears the fault history.

Byte Count

The byte count represents the total number of characters in the packet, including the STX and ETX. The minimum count is six; the maximum count is 127. The minimum packet has no data field (for example, STX, Byte Count, Address, Control, Checksum, ETX).

Device Address

This field indicates the destination of a packet and is bit mapped as shown in Table 4-9.

Table 4-9. Device Address Bit Map

Bit	Description
Bit 0-4	Signify the slave address
Bit 5	Always 1
Bit 6	Always 0

Control Byte

This byte provides control information to the receiving device and is bit mapped as shown in Table 4-10.

Table 4-10. Control Byte Bit Map

Purpose	Bit	Description
For host-to-slave communications:	Bit 0	Packet Acknowledgment request
	Bit 1-6	Always 0
For slave-to-host communications:	Bit 0-5	Always 0
	Bit 6	Always 1; signifies a response packet