

Quintech XRM/SRM/MRF/MRM Series Protocol v2.15 – Release 07

Rev U, 11/30/2006

This document specifies a common command protocol that can be used to control a Quintech matrix controller from a computer. This protocol is for a full fan-out matrix.

Protocol 2.15 release 07 (2.15.07) is backward compatible with all previous 2.15 protocols.

Command Summary

This list gives the commands defined in Protocol 2.15.07

- C** Check Change Flag / Unit Status. Contains system change flags that indicate whether crosspoints, messages, names, or access control settings have changed.
- E** Ethernet. Various commands to set Ethernet parameters and control access.
- F** Firmware version. Identifies the model, protocol and firmware version, and size of the matrix as set on the controller.
- K** Keypad. Various commands to control access to the front panel keypad.
- L** Lock a crosspoint.
- M** Messages. Retrieve message log.
- N** Name. Commands to manage naming of inputs, outputs, and other parameters.
- O** Output query. Various commands to get information on the specified output.
- Q** Check crosspoint queue. The queue stores up to 8 local crosspoint changes made since the last “C” check.
- R** Reset. Soft reset equivalent to a reboot or a hard reset back to factory defaults.
- S** Set a crosspoint. Connect an input to an output.
- U** Unlock a crosspoint.
- X** XRM. Various commands to support the XRM advanced feature set.
- Z** Access Control. Various commands to support control access and manage accounts.

Other commands are reserved for future use.

Command Availability

The table gives the availability of various commands for different protocol releases.

Command	2.15.00	2.15.01	2.15.02	2.15.03	2.15.04	2.15.05	2.15.06	2.15.07
C	x	x	x	x	x	x	x	x
ED				x	x	x	x	x
EG			x	x	x	x	x	x
EI			x	x	x	x	x	x
ELD			x	x	x	x	x	x
ELE			x	x	x	x	x	x
ELP			x	x	x	x	x	x
EP			x	x	x	x	x	x
ES			x	x	x	x	x	x
F	x	x	x	x	x	x	x	x
FX								x
KL					x	x	x	x
KS					x	x	x	x
KU					x	x	x	x
L		x	x	x	x	x	x	x
M								x
NI								x
NO								x
NRI								x
NRO								x
NSI								x
NSO								x
NQ								x
O	x	x	x	x	x	x	x	x
OS						x	x	x
Q	x	x	x	x	x	x	x	x
RH				x	x	x	x	x
RS				x	x	x	x	x
S	x	x	x	x	x	x	x	x
U		x	x	x	x	x	x	x
XA								x
XC								x
XF								x
XP								x
XRB								x
XRC								x
XRI								x
XRO								x
XT								x
XWI								x
ZA							x	x
ZC							x	x
ZG								
ZI							x	x
ZL							x	x
ZO							x	x
ZP							x	x
ZU							x	x
ZX							x	x

Note 1: Some firmware versions implementing releases 2.15.01 – 2.15.03 allowed an “L” lock command to change a locked output to a different input without first using the “U” unlock command to remove the lock. In order to maintain compatibility over all 2.15 releases, this type of operation is no longer supported.

Note 2: Some commands such as M and N were available earlier in custom firmware versions. Check the command format to determine compatibility between an earlier custom command and the standard command.

Note 3: Release 7 is currently only available on XRM products.

Firmware Releases

The table below gives the firmware releases to date along with which protocol release is implemented.

Firmware	Date	Protocol	Field Update Capability	Control Board	Notes
SRM					
2.56	4/11/03	2.15.02	Serial	1433-F or later	Support for serial firmware upgrade
2.59	10/30/03	2.15.03	Serial/Ethernet	"	Upgrade to 2.6x recommended
2.60	12/2/03	"	"	"	
2.61	12/2/03	"	Ethernet	1433-E only	
2.62	2/4/04	2.15.05	Serial/Ethernet	1433-F or later	
2.63	3/11/04	"	"	"	
2.64	4/28/04	"	"	"	Support for LNB option
2.66	5/12/04	2.15.06	"	"	Support for access control. Command ZG is not implemented. 8 Users, each user set to fixed GID
2.67	6/3/04	"	"	"	SNMP dynamic viewing and main/remote moved under configuration program model type
2.68	6/23/04	"	"	"	Fixes DHCP function
2.69	12/09/04	"	"	"	Fixes SNMP function
2.71	6/14/05	"	"	"	Includes 15 Second screen refresh
2.73	7/5/06	"	"	"	Support for BAE 32x2 system only
XRM					
7.00	10/25/05	2.15.07	Serial/Ethernet	1514-D or later	Support for XRM features and I/O naming. . No remote UCM support.
7.01	11/07/05	2.15.07	"	1514-D or later	Fixes messages command. Messages are generated for all RF levels if threshold is set larger than -77dBm. Fixes RS-485 on control in serial port . . No remote UCM support.
7.02		2.15.07	"	1514-D or later	Internal Release
7.03	1/9/06	2.15.07	Serial	1514-D or later	Internal Release
7.04	1/26/06	2.15.07	Serial	1514-D or later	Uses "CAN" bus communication between Processor and PIC. . No remote UCM support.
7.05	4/25/06	2.15.07	Serial	1514-D or later	Firmware supports only 32x64 size with 2 XRM units with 1514s and 1 XRD unit. Internal XRM reading of RF dBm values not supported. . No remote UCM support.
7.06	5/15/06	2.15.07	Serial	1514-D or later	Firmware supports only 32x32 size and a remote UCM.
7.07	6/12/06	2.15.07	Serial	1550-D or later	Firmware supports only 32x32 size. System communications based on interrupts, not polling as before. . No remote UCM support.
7.08	6/12/06	2.15.07	Serial	1514-D or later	Firmware supports only 32x32 size. Increased timeout length between XRM and remote UCM.
7.09	8/21/06	2.15.07	Serial	1550-D or later	Supports hot swappable 1550 control card. No support for XRB or XRC commands. Supports XRDs and XROs for systems up to 512x512. No remote UCM support.
7.10	10/2/06	2.15.07	Serial/Ethernet	1550-D or later	No support for XRB or XRC commands. Improved communications interface with memory enhanced 1530 on/off card. No remote UCM support.

Firmware	Date	Protocol	Field Update Capability	Control Board	Notes
Special Builds					
7.11	10/12/06	2.15.07	Serial/Ethernet	1550-D or later	No support for XRB or XRC commands. Improved communications interface with memory enhanced 1530 on/off card. . No remote UCM support.
7.12	10/12/06	2.15.07	Serial/Ethernet	1550-D or later	No support for XRB or XRC commands. Improved communications interface with memory enhanced 1530 on/off card. . Limited remote UCM supported. See note
7.13	10/26/06	2.15.07	Serial/Ethernet	1550-D or later	No support for XRB or XRC commands. Fixes accidental 1530 on/off card memory re-initialization. Limited remote UCM supported. See note.
7.14	11/19/06	2.15.07	Serial/Ethernet	1550-D or later	No support for XRB or XRC commands. See note. Fixes incorrect backup memory writing. Fan PRM read timing change. Support for 512x512. Access control bug fix.
8.00	2/23/06	2.15.06	Serial/Ethernet	1433-F or later	Unique build for 2x24 substitution switch.
8.10	4/18/06	2.15.06	Serial/Ethernet	1433-F or later	Unique build for TXS/RXS fiber optic redundancy switch. Used for TXS215008FFC000-ASI and RXS215008FFC000-ASI.
8.20	11/30/06	2.15.06	Serial/Ethernet	1433-F or later	Unique build for TXS/RXS fiber optic redundancy switch. Used for TXS00700BFC000 and RXS007008BFC000.

Note: 7.12 - 7.14 firmware has limited support for the XRM remote 1RU controller. Commands XC, XF, XP, XT XRI, and XRO return error code 'u' for unavailable. Remote also can not front panel read fan, temperature, In/Out RF levels, and PS status.

Using QEC Commands

This document provides a list of commands which can be used to control a Quintech matrix. No hardware flow control is supported. After a controlling program issues a command, it must wait until it receives a response before issuing the next command.

QEC Telnet Console Command Structure

There are three interfaces to send commands to the matrix controller: a Telnet console, a QEC Ethernet port, and a serial port. When sending commands over the serial or Ethernet ports, a STX/ETX bounded command packet is used. This is described in the next section. The packet structure is not used with the Telnet console interface. The same commands are used but no address, checksum, or ETX/STX packet boundaries are required. For example, to issue the Firmware Version command "F", you simply enter command mode on the console, type F and hit the Enter key.

QEC Protocol Message Structure

Commands packets can be sent over the Ethernet and serial ports (if available) and use a standard STX/ETX protocol wrapper. Each packet includes a header byte, a two-byte address field, a command byte, necessary data bytes, end byte, and a checksum byte. The bytes are transmitted using an 8-bit word, with 1 stop bit and no parity. The general form for commands and messages is:

Header Address Command Data byte(s) End Checksum

Control Bytes

Control bytes are transmitted as hexadecimal values.

Command Header Byte = STX (0x02)

Command End Byte = ETX (0x03)

Response Header Byte = ACK (0x06) for accepted commands.

Response Header Byte = NAK (0x15) for rejected commands.

Response End Byte = ETX (0x03)

The Header Byte (STX) is also used to reset the command receive buffer. If this byte is received, it will be accepted as the beginning of a new message. The previous message will be discarded. The only exception to this is if the byte (0x02) is a checksum byte. When the buffer is reset, the checksum byte is also reset. There is a 32-byte limit on command length. Any command longer than this will automatically generate an error response if or when an ETX end byte is received. If a new STX is received before an ETX, it will reset the command receive buffer and no error message will be sent.

If a break in communication occurs while a message is being transmitted (i.e., before the unit receives the ETX and CHK byte), the buffer will clear and the command will be lost (no response will be sent). This condition will occur if there is a delay of about 200 milliseconds between bytes.

Address Field

The address field consists of two ASCII digits. The address for a control unit is normally set using the front panel keypad. Each unit will only respond to a command with a matching address. This allows multiple control units to be connected on a shared RS-422/485 control bus. The address can be set from 00 to FF on units with front panel configuration.

Address FF is a serial broadcast address. Any unit will respond to a command with an address of FF regardless of the actual serial address set for the unit. **Commands being sent to units over Ethernet must contain an address of FF for proper operation.** If you use a serial address other than FF in your Ethernet command packet, that serial address must match the serial address set for the target unit or the command will be rejected even if the IP address is correct.

Command

The command is one or more ASCII characters from A to Z. A list of available commands is in the next section.

Data Bytes

Each command has a fixed number of data bytes. A response to a command may have a variable number of data bytes. In that case one of the data bytes will signify how many data bytes are contained in the message.

Checksum

The checksum byte is a bit wise Exclusive OR (XOR) of all the bytes, inclusively, from the header to the ETX. For example:

```
02h 30h 30h 51h 03h 50h  
STX 0 0 Q ETX CHK
```

Command Descriptions

C: Check Change Flag and Unit Status

Each control port for the system maintains a change flag and several change queues that allow changes throughout the system to be tracked. The change flag contains an eight bit flag to indicate the various changes. The flag bits are defined as follows:

Bit	Flag	Change Indication	Action Indicated	Cleared By:
0	Crosspoint	One of the following has changed: -Crosspoint (input to output connection) -Crosspoint lock status -Access Control setting for input or output The affected crosspoint is entered in to the crosspoint queue.	Q command, then up to eight O or OS commands as indicated.	Q
1	Alarm	-An error or fault has been detected. The associated message is entered in the message queue.	M	M
2	Access Control	-Access Control has been turned on or off for the port. -A user's group ID setting has changed.	ZX; ZC or ZL	Q
3	Overflow	The crosspoint change queue has overflowed.	Q; multiple O or OS	Q
4	Name	-An input or output name has changed. -The privilege level of the NS command has changed. The affected input or output is entered in the name queue.	NQ	NQ
5	Reserved			
6	Reserved			
7	Reserved	None. Always set to "1".		

The C command is typically sent periodically to check if any changes have been made or if any alarms have occurred. There are three different crosspoint, message, and name change queues for each control port (serial, Ethernet, etc.). Each queue will store up to eight changes made anywhere in the system. Once the queue overflows the contents are no longer valid and different actions will have to be taken to recover the system state.

If any changes have occurred since the last Q command the crosspoint flag bit will be set. Changes include a crosspoint change, Access Control setting, or crosspoint lock status change. If eight or fewer changes have been made then all the affected crosspoints can be read from the crosspoint queue. If more than eight changes occur before the queue is read and cleared the overflow flag will be set. If the queue has overflowed then all crosspoints in the matrix will have to be queried. The Q command clears the queue and both the crosspoint flag and the overflow flag.

The alarm bit indicates that an error or fault has been detected and an associated message indicating the problem has been stored in the message queue. If the message queue is full, a new message will cause the queue contents to be sent in an SNMP TRAP message to the set SNMP trap IP address. The message queue is then cleared and the new message entered to the queue. The M command provides a log of messages and clears the queue and the alarm flag. Messages not read via the M command or SNMP are lost when the queue overflows. If the alarm condition is still present after the M command clears the queue it will be re-entered to the queue.

The name flag indicates that an input or output name has been set or changed. The affected input or output is put in the name queue. The NQ command will read the queue and clear the name flag. The NQ response contains an overflow flag. If the name queue has overflowed then all input and output names should be checked.

Command Format:

02 XX XX 43 03 XX
STX ADR ADR C ETX CHK

Positive Responses:

06 XX XX 43 80 03 XX
ACK ADR ADR C 80 ETX CHK (No changes have occurred)

06 XX XX 43 81 03 XX
ACK ADR ADR C 81 ETX CHK (Crosspoint changes have occurred)

06 XX XX 43 82 03 XX
ACK ADR ADR C 82 ETX CHK (An alarm has occurred)

06 XX XX 43 84 03 XX
ACK ADR ADR C 84 ETX CHK (Access Control changes have occurred)

06 XX XX 43 89 03 XX
ACK ADR ADR C 89 ETX CHK (The crosspoint queue has overflowed)

06 XX XX 43 90 03 XX
ACK ADR ADR C 90 ETX CHK (A name has been changed)

06 XX XX 43 83 03 XX
ACK ADR ADR C 83 ETX CHK (Alarm & crosspoint changes have occurred)

06 XX XX 43 85 03 XX
ACK ADR ADR C 85 ETX CHK (Access control & crosspoint changes have occurred)

06 XX XX 43 91 03 XX
ACK ADR ADR C 91 ETX CHK (Name & crosspoint changes have occurred)

06 XX XX 43 8B 03 XX
ACK ADR ADR C 8B ETX CHK (The crosspoint queue has overflowed plus an alarm)

06 XX XX 43 9F 03 XX
ACK ADR ADR C 9F ETX CHK (Crosspoint, alarm, Access Control, and name changes
have occurred, plus the crosspoint queue has
overflowed)

Note: This command will be accepted regardless of whether a user is logged in.

ED: Set DHCP On/Off

This command turns DHCP on or off.

Command Format:

```
02 XX XX 45 44 30 03 XX  
STX ADR ADR E D 0 ETX CHK
```

```
02 XX XX 45 44 31 03 XX  
STX ADR ADR E D 1 ETX CHK
```

Example Command:

```
02 XX XX 45 44 30 03 XX  
STX ADR ADR E D 0 ETX CHK  
(Turn DHCP Off)
```

```
02 XX XX 45 44 31 03 XX  
STX ADR ADR E D 1 ETX CHK  
(Turn DHCP on)
```

Positive Response:

```
06 XX XX 45 44 03 XX  
ACK ADR ADR E D ETX CHK
```

Note:

DHCP will immediately be set as on or off. If DHCP is turned on the unit will not ask for new IP parameters from the DHCP server until the unit is reset or the power is cycled.

EG: Set Ethernet Default Gateway

This command sets the static default Ethernet gateway.

Command Format:

```
02 XX XX 45 47 XX XX XX 2E XX XX XX 2E
STX ADR ADR E G nn nn nn . nn nn nn .

XX XX XX 2E XX XX XX 03 XX
nn nn nn . nn nn nn ETX CHK
```

Example Command:

```
02 46 46 45 47 30 31 30 2E 30 30 30 2E
STX F F E G 0 1 0 . 0 0 0 .

30 30 30 2E 30 30 31 03 2D
0 0 0 . 0 0 1 ETX CHK
(Set Gateway = 10.0.0.001)
```

Positive Response:

```
06 46 46 45 47 03 07
ACK F F E G ETX CHK
```

Note:

The change will take place in ten seconds. If DHCP is enabled the static gateway value will not be used until DHCP is turned off and the unit has been reset.

EI: Set Ethernet IP Address

This command sets the static Ethernet IP Address.

Command Format:

```
02  XX  XX  45  49  XX  XX  XX  2E  XX  XX  XX  2E
STX  ADR  ADR  E   I  nn  nn  nn   .  nn  nn  nn   .

XX  XX  XX  2E  XX  XX  XX  03  XX
nn  nn  nn   .  nn  nn  nn  ETX  CHK
```

Example Command:

```
02  46  46  45  49  30  31  30  2E  30  30  30  2E
STX  F   F   E   I   0   1   0   .   0   0   0   .

30  30  30  2E  32  33  34  03  27
 0   0   0   .   2   3   4  ETX  CHK
(Set IP Address = 10.0.0.234)
```

Positive Response:

```
06  46  46  45  49  03  09
ACK  F   F   E   I   ETX  CHK
```

Note:

The change will take place in ten seconds. If DHCP is enabled the static IP address will not be used until DHCP is turned off and the unit has been reset.

ELD: Ethernet Lock Disable

This command disables the Ethernet lock. If the lock has been enabled (using the ELE command), command packets input from the QEC Ethernet port are received but ignored except for the ELD command. This provides an additional level of control over the switch and the Ethernet port. The ELD command is used to disable the lock and enable the processing of command packets.

The ELD command must contain a password value that matches the current password in order for the Ethernet lock to be disabled. The default value for the password is "Quintech". The value of the password can be changed using the ELP command.

Command Format:

```
02 XX XX 45 4C 44 XX . . . . XX 03 75
STX ADR ADR E L D [ PASSWORD ] ETX CHK
```

Example Command:

```
02 46 46 45 4C 44 51 75 69 6E 74 65 63 68 03 75
STX F F E L D Q u i n t e c h ETX CHK
(Disable Ethernet Command Lock)
```

Positive Response:

```
06 46 46 45 4C 03 0C
ACK F F E L ETX CHK
```

Note:

The password may be reset to the default "Quintech" from the front panel LCD and keypad.

An ELD command with an incorrect password value will return a NAK response.

The switch is shipped from the factory with the Ethernet lock disabled so it will accept and process command packets. If the ELE command is never issued, the Ethernet lock will never be enabled and the ELD, ELE, and ELP commands can be ignored.

This command has been superceded by the access control features available with Protocol 2.15 release 6. It is included for backward compatibility.

ELE: Ethernet Lock Enable

This command enables the QEC Ethernet command lock. When the lock is enabled, command packets input from the Ethernet port are received but ignored except for the ELD command. The ELD command is used to disable the lock and enable the processing of command packets.

Command Format:

```
02 XX XX 45 4C 45 03 XX
STX ADR ADR E L E ETX CHK
```

Example Command:

```
02 46 46 45 4C 45 03 4D
STX F F E L E ETX CHK
(Enable Ethernet Command Lock)
```

Positive Response:

```
06 46 46 45 4C 03 0C
ACK F F E L ETX CHK
```

Note:

The switch is shipped from the factory with the Ethernet lock disabled so it will accept and process command packets. If the ELE command is never issued, the Ethernet lock will never be enabled and the ELD, ELE, and ELP commands can be ignored.

If the Ethernet lock is on, valid command packets sent over the Ethernet will return a NAK message with the issued command, indicating that it was rejected because of the lock. Valid packets sent over the serial port will still be accepted.

This command has been superseded by the access control features available with Protocol 2.15 release 6. It is included for backward compatibility.

ELP: Set Ethernet Lock Password

This command sets a new QEC Ethernet Lock Password. The password is an alpha-numeric value from 1 to 10 characters. A null password (no password) is also allowed.

Command Format:

```
02 XX XX 45 4C 50 XX ... XX 03 XX
STX ADR ADR E L P [Password] ETX CHK
```

Example Command:

```
02 46 46 45 4C 50 78 79 7A 7A 79 03 20
STX F F E L P x y z z y ETX CHK
(Set password to "xyzzzy")
```

Example Command:

```
02 46 46 45 4C 50 31 2B 52 61 4C 70 48 21 32 03 16
STX F F E L P 1 + R a L p H ! 2 ETX CHK
(Set password to "1+RaLpH!2")
```

Example Command:

```
02 46 46 45 4C 50 03 58
STX F F E L P ETX CHK
(Set password to no password)
```

Positive Response:

```
06 46 46 45 4C 03 0C
ACK F F E L ETX CHK
```

Note:

Although almost any hex value or ASCII character can be used in the password, users would be wise not to use the hex values 00 – 1F or 7F – FF since these are not associated with keys on a standard keyboard. They may also cause undesirable side effects. In particular hex 02 (STX) and 03 (ETX) are used to delineate the command packet and should never be used in the password. If the password is set to some unknown value, it can be reset to the default "Quintech" from the front panel LCD and keypad.

This command has been superceded by the access control features available with Protocol 2.15 release 6. It is included for backward compatibility.

EP: Set Ethernet Port

This command sets the QEC Ethernet port that is monitored for STX/ETX command packets. The default port set at the factory is 9100. There is no need to change this unless it conflicts with another network device.

Command Format:

```
02  XX  XX  45  50  XX  XX  XX  XX  03  XX
STX ADR ADR  E   P  nn  nn  nn  nn  ETX CHK
```

Example Command:

```
02  46  46  45  50  39  31  30  30  03  1C
STX  F   F   E   P   9   1   0   0  ETX  CHK
(Set Port = 9100)
```

Positive Response:

```
06  46  46  45  50  03  10
ACK  F   F   E   P   ETX  CHK
```

Note:

The change will take place after the current Ethernet session ends and the connection is released.

ES: Set Ethernet Subnet Mask

This command sets the static Ethernet Subnet Mask.

Command Format:

```
02 XX XX 45 53 XX XX XX 2E XX XX XX 2E
STX ADR ADR E S nn nn nn . nn nn nn .

XX XX XX 2E XX XX XX 03 XX
nn nn nn . nn nn nn ETX CHK
```

Example Command:

```
02 46 46 45 53 32 35 35 2E 32 35 35 2E
STX F F E S 2 5 5 . 2 5 5 .

32 35 35 2E 30 30 30 03 3B
2 5 5 . 0 0 0 ETX CHK
(Set Netmask = 255.255.255.000)
```

Positive Response:

```
06 46 46 45 53 03 13
ACK F F E S ETX CHK
```

Note:

The change will take place after the current Ethernet session ends and the connection is released. If DHCP is enabled this will not take effect until DHCP is turned off.

F: Firmware Version / Unit ID

This command will return a message with the protocol and firmware versions, the series and model number, and the size of the matrix. The fields will be returned as follows: "Firmware version" "Protocol version" "Model Number"/ "Matrix Size". For example, a 32x64 SRM would give a response of the form "Fv2.69 Pv2.15 XRM2250/032X032".

Command Format:

```
02 XX XX 46 03 XX
STX ADR ADR F ETX CHK
```

Example Command:

```
02 46 46 46 03 47
STX F F F ETX CHK
```

Positive Response:

```
06 XX XX 46 76 37 2E 30 30 20 50 76 32 2E 31 35 20...
ACK ADR ADR F v 7 . 0 0 P v 2 . 1 5 ...
```

```
...58 52 4D 32 32 35 30 2F 30 33 32 58 30 33 32 3 XX
... X R M 2 2 5 0 / 0 3 2 X 0 3 2 ETX CHK
```

Note: This command will be accepted regardless of whether a user is logged in.

FX: Extended Firmware Version / Unit ID

This command will return a more detailed version of the information returned by the F command.

Response structure:

FX:<FV>:<PV>:<M#>:<I#>:<O#>:<RES>:<RES>:<RES>:<RES>

FV = A four digit firmware number in the format n.nn

PV = An eight digit protocol number in the format nn.nn.nn

M# = A seven digit alphanumeric model number

I# = Number of inputs, 1 to 3 digits

O# = Number of outputs, 1 to 3 digits

RES = A reserved field for future expansion

Command Format:

```
02 XX XX 46 58 03 XX
STX ADR ADR F X ETX CHK
```

Example Command:

```
02 46 46 46 03 47
STX F F F ETX CHK
```

Positive Response:

```
06 XX XX 46 58 3A 37 2E 30 30 3A 32 2E 31 35 2E 30 37...
ACK ADR ADR F X : 7 . 0 0 : 2 . 1 5 . 0 7...
```

```
...3A 58 52 4D 32 32 35 30 3A 33 32 3A 33 32 3A 3A 3A 3A...
... : X R M 2 2 5 0 : 3 2 : 3 2 : : : :...
```

```
...3 XX
...ETX CHK
```

Note: This command will be accepted regardless of whether a user is logged in.

KL: Keypad Lock

This command locks the front panel keypad as a convenience feature to prevent accidental keystrokes. To unlock the keypad use the KU command.

Command Sent:

```
02 XX XX 4B 4C 03 XX  
STX ADR ADR K L ETX CHK
```

Positive Response:

```
06 XX XX 4B 4C 03 XX  
ACK ADR ADR K L ETX CHK
```

Note: The front panel will display "Keypad Locked". The keypad can be unlocked from the front panel by entering the 3-digit password 857.

Note: To secure against unauthorized changes from the front panel keypad use Access Control features. See the user's manual and the "Z" commands for more information.

KS: Keypad State

This command gives the locked/unlocked state of the front panel keypad.

Command Sent:

```
02 XX XX 4B 53 03 XX  
STX ADR ADR K S ETX CHK
```

Positive Responses:

```
06 XX XX 4B 53 4C 03 XX  
ACK ADR ADR K S L ETX CHK  
(keypad locked)
```

```
06 XX XX 4B 53 55 03 XX  
ACK ADR ADR K S U ETX CHK  
(keypad unlocked)
```

Note: This command will be accepted regardless of whether a user is logged in.

KU: Keypad Unlock

This command unlocks the front panel keypad. The front panel keypad can be locked as a convenience feature to prevent accidental keystrokes. Use the KL command to lock the keypad.

Command Sent:

```
02 XX XX 4B 55 03 XX  
STX ADR ADR K U ETX CHK
```

Positive Response:

```
06 XX XX 4B 55 03 XX  
ACK ADR ADR K U ETX CHK
```

Note: The front panel will display "Keypad Locked". The keypad can be unlocked from the front panel by entering the 3-digit password 857.

Note: To secure against unauthorized changes from the front panel keypad use Access Control features. See the user's manual and the "Z" commands for more information.

L: Lock Crosspoint

This command sets a crosspoint and then “locks” it so that output may not be rerouted to any other input until it is unlocked using the “U” command.

Command Sent:

```
02 XX XX 4C 30 30 31 30 30 35 03 XX  
STX ADR ADR L 0 0 1 0 0 5 ETX CHK  
(Lock output 1 to input 5)
```

Positive Response:

```
06 XX XX 4C 03 XX  
ACK ADR ADR L ETX CHK
```

M: Messages

This command will return the contents of the message queue. The message queue contains up to four alarm or information messages concerning the health of the system. System monitoring is only implemented on the XRM unless otherwise noted. The following events will cause a message to be put in the message queue:

1. Power supply failure.
2. Cooling fan failure.
3. Fault detected in RF signal path.
4. RF input level out of set bounds.
5. UCM LCD not responding.

The M command response also contains an overflow flag. If the message queue is full, a new message will cause the queue contents to be sent in an SNMP TRAP message to the set IP address. The message queue is then cleared and the new message entered to the queue. Messages not read via the M command or SNMP are lost when the queue overflows. When the M command is next executed, the response will have the overflow flag set. Issuing an M command clears the message queue overflow flag and also resets the alarm bit in the change flag. See the C command for more information.

The response to the M command contains the standard response header of an acknowledge, serial address, and the command echo, followed by a flag bit and the message count. Messages are placed in the queue in the order that they occur and are separated by a colon. Messages are variable in length. The maximum size of the queue is 128 characters including separating colons between messages.

Example Command Sent:

```
02 XX XX 4D 03 XX
STX ADR ADR M ETX CHK
(Query the message queue)
```

Example Positive Response:

```
06 XX XX 4D 30 30 3A 03 XX
ACK ADR ADR M 0 0 : ETX CHK
(The queue did not overflow and there are no alarms or messages)
```

Example Positive Response:

```
06 XX XX 4D 30 32 3A 50 53 32 40 58 52 44 30 30 33
ACK ADR ADR M 0 2 : P S 2 @ X R D 0 0 3
```

```
46 61 69 6C 75 72 65 3A 49 6E 32 30 52 45 4C 65 76
F a i l u r e : I n 2 0 R F L e v
```

```
65 6C 40 58 52 4D 30 30 30 57 61 72 6E 69 6E 67
e l @ X R M 0 0 0 W a r n i n g
```

```
03 XX
ETX CHK
```

(The queue did not overflow and there are two alarms/messages)

Power Supply # 2 at an XRD unit at address 003 has failed

The input RF minimum dBm level has been set and the monitored input level has dropped below that set level. The error occurred at XRM unit at address 000 on input 20.

Note: This command will be accepted regardless of whether a user is logged in.

Types of Messages Received:

Type 1 Power supply message:

```
06 XX XX 3A 50 53 XX 40 58 52 XX XX XX XX
ACK ADR ADR : P S NUM @ X R TYPE XADR XADR XADR

46 61 69 6C 75 72 65 03 XX
F a i l u r e ETX CHK
```

NUM = Power Supply number 1 or 2.

TYPE = M, O, or D to represent XRM unit, XRO output module or XRD distribution module.

XADR = Address of individual unit in an XRM system. XRM is 000 to 255. An XRO and XRD unit is 000 to 015.

Failed = Power supply is not operating. Power supply may have failed, it may be unplugged, or it may be not installed in the slot.

Type 2 Fan message:

```
06 XX XX 3A 46 61 6E XX 40 58 52 XX XX XX XX
ACK ADR ADR : F a n NUM @ X R TYPE XADR XADR XADR

46 61 69 6c 65 64 03 XX
F a i l e d ETX CHK
```

NUM = Fan number 1, 2, 3, or 4.

TYPE = M, O, or D to represent XRM unit, XRO output module or XRD distribution module.

XADR = Address of individual unit in an XRM system. XRM is 000 to 255. An XRO and XRD unit is 000 to 015.

Failed = Fan should be replaced. The fan is not rotating at all or so slow that it cannot keep the unit at optimum operating temperature.

Type 3 Temperature Message:

```
06 XX XX 3A 54 65 6D 70 40 58 52 XX XX
ACK ADR ADR : T e m p @ X R UTYPE XADR

XX XX 57 61 72 6E 69 6E 67 3 xx
XADR XADR W a r n i n g EXT CHK
```

UTYPE = M, O, or D to represent XRM unit, XRO output module or XRD distribution module.

XADR = Address of individual unit in an XRM system. XRM is 000 to 255. An XRO and XRD unit is 000 to 015.

Warning = The temperature inside the unit has exceeded 50 degrees Celsius. Immediate servicing is required.

Type 4 Keypad/LCD Message:

```
06 XX XX 3A 4B 50 2F 4C 43 44 40 58 52 XX XX
ACK ADR ADR : K P / L C D @ X R UTYPE XADD

XX XX 57 61 72 6E 69 6E 67 3 xx
XADD XADD W a r n i n g EXT CHK
```

XADR = Address of individual unit in an XRM system. XRM is 000 to 255. An XRO and XRD unit is 000 to 015.

UTYPE = M, O, or D to represent XRM unit, XRO output module or XRD distribution module.

Warning = The keypad and LCD are not responding. This typically indicates the cable that connects the front panel to the unit has been disconnected.

Type 5 RF Unbalanced Level Message:

```
06 XX XX 3A 4F 75 74 XX XX XX 52 46 4C 65 76
ACK ADR ADR : O u t NUM NUM NUM R F L e v
```

```
65 6C 40 58 52 XX XX XX XX 46 61 69 6C 75 72
e l @ X R UTYPE XADR XADR XADR F a i l u r
```

```
65 3 xx
e EXT CHK
```

NUM = Output number.

UTYPE = M, O, or D to represent XRM unit, XRO output module, or XRD distribution module.

XADR = Address of individual unit in an XRM system. XRM is 000 to 255. An XRO and XRD unit is 000 to 015.

Failure = The XRM monitors all routed paths. The XRM examines each output, and the connected input. If the RF level at the output does not closely match the RF level at the input then this message will be generated.

Type 6 RF Input Threshold Level Message:

06 XX XX XX 49 6E XX XX 52 46 4C 65 76
ACK ADR ADR CTYPE I n NUM NUM R F L e v

65 6C 40 58 52 XX XX XX XX 57 61 72 6E 69 6E
e l @ X R UTYPE XADD XADD XADD W a r n i n

67 3 xx
g EXT CHK

NUM = Input number. This value is not preceded by zeros.
If the input number is 1 - 9 then only one character is output. If the input number is 10 - 32 then two characters are output

XADR = Address of individual unit in an XRM system. XRM is 000 to 255. An XRO and XRD unit is 000 to 015.

UTYPE = M, O, or D to represent XRM unit, XRO output module or XRD distribution module.

Warning = The XRM has the ability to monitor the RF levels of each input and determine if the dBm level has dropped below a set threshold value. This message is generated if a dBm value has been set for an input and the RF level has dropped below that set level.

N: Name I/O

NOTE: This command is included for backward compatibility. It is recommended that new users use the NS command to change a name. This command limits the name to 4 characters. The NS command has a variable name length from 0 to 7 characters and also accepts lower case letters.

This command sets a new name for an input or output. This name is displayed on the front panel LCD of the matrix UCM for convenience when operating the unit manually. Each name is limited to only 4 characters. The only acceptable entries are ASCII SPACE (20h), 0-9 (30-39h), and A-Z (41-5A).

Command structure:

N<I/O><nnn><xxxx>

I/O = I for input and O for output.

nnn = Input or output number.

xxx = 4 ASCII characters

Example Command Sent:

```
02 XX XX 4E 4F 30 30 31 03 XX
STX ADR ADR N O 0 0 1 R C V 2 ETX CHK
(Assign output 1 the name "RCV2")
```

Positive Response:

```
06 XX XX 4E 4F 30 30 31 03 XX
ACK ADR ADR N O 0 0 1 ETX CHK
(Output 1 is named "RCV2")
```

Note: This command will be accepted regardless of whether a user is logged in.

NR: Name Read

This command reads the convenience name for an input or output. This name is displayed on the front panel LCD of the matrix UCM for convenience when operating the unit manually. Each name can be up to seven characters long and can consist of any standard keyboard character. If the name is less than seven characters the response is not padded.

Command structure:

NR<I/O><nnn>

I/O = I for input and O for output.

nnn = Input or output number.

Example Command Sent:

```
02 XX XX 4E 52 4F 30 31 36 03 XX
STX ADR ADR N R O 0 1 6 ETX CHK
(Read the name of output 16)
```

Positive Response:

```
06 XX XX 4E 52 4F 30 31 36 52 65 63 76 72 32 03 XX
ACK ADR ADR N R O 0 1 6 R e c v r 2 ETX CHK
(Output 16 is named "Recvr2")
```

Note: This command will be accepted regardless of whether a user is logged in.

NS: Name Set

This command sets a new name for an input or output. This name is displayed on the front panel LCD of the matrix UCM for convenience when operating the unit manually. Any remote commands to set crosspoints must still use input and output numbers.

Names can consist of any standard keyboard character when set using the N or NS command. Each name can be up to seven characters long. Names can also be set manually from the front panel of the UCM but are limited to using the characters a-z, A-Z, 0-9, and space since there is a simple keypad for entry.

Command structure:

NS<I/O><nnn><aaaaaaa>

I/O = I for input and O for output.

nnn = Input or output number.

aaaaaaa = Up to 7 alphanumeric characters.

Example Command Sent:

```
02 XX XX 4E 53 49 30 30 37 53 61 74 31 56 03 XX
STX ADR ADR N S I 0 0 7 S a t 1 V ETX CHK
(Set the name of input 7 to Sat1V)
```

Positive Response:

```
06 XX XX 4E 53 49 30 30 37 03 XX
ACK ADR ADR N S I 0 0 7 ETX CHK
```

Note: An alternate version of the NS command will be accepted to maintain compatibility with a previous custom version of the command. This version is the N command which is identical to the NS command except that names are a fixed 4 characters long. The response is also different with only the "N" returned.

NQ: Name Change Queue

This command reads the name queue which holds up to eight input or output numbers that have had their convenience names changed. Issuing the NQ command clears the name queue, the change count, and the name bit in the C command change flag.

Command structure:

NQ

Response structure:

NQ<Status Flag><Change Count><I/O number><I/O number>...

Status Flag = 1 for name queue overflow.

Change Count = Number of name changes in queue.

I/O number = An I or O to indicate input or output plus the associated 3 digit number.

Example Command Sent:

```
02 XX XX 4E 51 03 XX
STX ADR ADR N Q ETX CHK
```

Positive Response:

```
06 XX XX 4E 51 30 31 63 76 72 32 03 XX
ACK ADR ADR N Q 0 1 I 0 0 2 ETX CHK
(No overflow, one change; input 2)
```

Note: This command will be accepted regardless of whether a user is logged in.

O: Query Output Channel

This command queries for the input connected to the specified output.

Example Command Sent:

```
02 XX XX 4F 30 30 31 03 XX  
STX ADR ADR 0 0 0 1 ETX CHK  
(Query the status of output 1)
```

Example Positive Response:

```
06 XX XX 4F 30 30 32 03 XX  
ACK ADR ADR 0 0 0 2 ETX CHK  
(Output 1 is connected to input 2)
```

Note: This command will be accepted regardless of whether a user is logged in.

OS: Query Output State

This command queries for the input connected to the specified output along with the locked/unlocked state and access control parameters.

The access control parameters are given by the last two characters in the response. They give numbers that represent an access control bitmap table:

Bit	7	6	5	4	3	2	1	0
Group	8	7	6	5	4	3	2	1
Hex	Response character 1				Response character 2			

If a particular bit is set, then that group is allowed to change a particular crosspoint with the L, S, and U commands. If the bit is clear then the corresponding group is not allowed access.

Character	Response 1: Groups allowed access	Response 2: Groups allowed access
0	none	none
1	5	1
2	6	2
3	5, 6	1, 2
4	7	3
5	5, 7	1, 3
6	6, 7	2, 3
7	5, 6, 7	1, 2, 3
8	8	4
9	5, 8	1, 4
A	6, 8	2, 4
B	5, 6, 8	1, 2, 4
C	7, 8	3, 4
D	5, 7, 8	1, 3, 4
E	6, 7, 8	2, 3, 4
F	5, 6, 7, 8	1, 2, 3, 4

Example Command Sent:

```
02 XX XX 4F 53 30 30 31 03 XX
STX ADR ADR O S 0 0 1 ETX CHK
(Query the state of output 1)
```

Examples of Positive Responses:

```
06 XX XX 4F 53 30 30 32 4C 30 31 03 XX
ACK ADR ADR O S 0 0 2 L 0 1 ETX CHK
(Output 1 is connected to input 2, is locked, and only users in group 1 are
allowed to change the crosspoint)
```

```
06 XX XX 4F 53 30 30 37 55 36 46 03 XX
ACK ADR ADR O S 0 0 7 U 6 F ETX CHK
(Output 1 is connected to input 7, is unlocked, and users in group 1, 2, 3,
4, 6 and 7 are allowed to change the crosspoint)
```

Note: This command will be accepted regardless of whether a user is logged in.

Q: Check Queue

This command will read the change queue. Each control port for the system maintains a change queue that allows changes throughout the system to be tracked. The change queue contains up to 8 crosspoint changes executed since the last Q command. This includes changes to the lock state of a crosspoint. All crosspoint changes are put in the queue regardless of the source. If more than one change is executed for a given output, only the last change will be stored in the queue.

The ASCII number after Q in the response is the number of changes that the queue contains and ranges from 0 to 8. If no crosspoint changes are stored in the queue this number will be zero. If more than 8 changes occurred since the last Q command, this number will not be valid and bit 3 of the queue change flag (see command C) will be set to signal that an overflow has occurred. After the queue is checked the queue and the queue change flag are cleared, including the crosspoint, queue overflow, and access control change bits.

Command Sent:

```
02 XX XX 51 03 XX
STX ADR ADR Q ETX CHK
```

Example Positive Responses:

```
06 XX XX 51 30 03 XX
ACK ADR ADR Q 0 ETX CHK
(No changes have occurred)
```

```
06 XX XX 51 32 30 30 35 30 31 35 30 31 36 30 30 31 03 XX
ACK ADR ADR Q 2 0 0 5 0 1 5 0 1 6 0 0 1 ETX CHK
(Two changes have occurred: output 5 was connected to input 15, and output
16 was connected to input 1)
```

Note: This command will be accepted regardless of whether a user is logged in.

RH: Hard Reset

This command resets all parameters to the factory specified defaults. Note that the matrix and module sizes are reset as well as the output module size. If these are not correct, your matrix will no longer operate correctly. Other parameters are also changed that might make it difficult to access the controller to reconfigure the matrix.

WARNING! DO NOT USE this command unless you are absolutely sure you want the following configuration:

DHCP:	Off
Default Static IP:	192.168.0.249
Default Static Netmask:	255.255.255.0
Default Static Gateway:	192.168.0.1
Telnet Port:	23
QEC Ethernet Port:	9100
Serial Port:	RS232, 9600 baud, 8N1
RS485 Terminations:	Off
Matrix Size:	32x32
Module Size:	32x32
XRO Size:	4

Example Command Sent:

```
02 XX XX 52 48 03 XX  
STX ADR ADR R H ETX CHK
```

Example Positive Response:

```
06 XX XX 52 48 03 XX  
ACK ADR ADR R H ETX CHK
```

RS: Soft Reset

This command reboots the control program and is the equivalent of a power cycle.

Example Command Sent:

```
02 XX XX 52 53 03 XX  
STX ADR ADR R S ETX CHK
```

Example Positive Response:

```
06 XX XX 52 53 03 XX  
ACK ADR ADR R S ETX CHK
```

S: Set Crosspoint

This command will connect one input to an output. The command byte is followed by three bytes giving the output, then three bytes giving the input.

Example Command Sent:

```
02 XX XX 53 30 30 31 30 30 32 03 XX  
STX ADR ADR S 0 0 1 0 0 2 ETX CHK  
(Connect output 1 to input 2)
```

Positive Response:

```
06 XX XX 53 03 XX  
ACK ADR ADR S ETX CHK
```

U: Unlock Crosspoint

This command will unlock a locked crosspoint.

Command Sent:

```
02 XX XX 55 30 30 31 30 30 35 03 XX  
STX ADR ADR U 0 0 1 0 0 5 ETX CHK  
(Unlock output 1 to input 5)
```

Positive Response:

```
06 XX XX 55 03 XX  
ACK ADR ADR U ETX CHK
```

XA: Attenuate Input

This command will attenuate an input of a XRD or XRM unit in a XRM system. The attenuation of an input is in 0.5dB steps from 0.0 dB attenuation up to a maximum of 15.5dB of attenuation. Check your user's manual to see if this feature is available on your system.

Command Format:

```

02  XX  XX  58    41    2    XX    XX    XX    XX    XX
STX ADR ADR  X    A    MSDXADR  XADR  XADR  XADR  INPUT  INPUT

   XX    XX    XX    XX    XX
TENS   ONES  TENTHS  ETX   CHK
  
```

MSDXADR = Most significant digit of the XRM address. This determines what type of unit will respond in an XRM system. Currently only the XRD and XRM units support input attenuation so this value should be ASCII 0 = 30 Hex or ASCII 2 = 32 Hex.

```

MSDXADR = 0    XRM unit
MSDXADR = 2    XRD unit
  
```

XADR = Address of individual unit in an XRM system. Must be between 000 and 015 for an XRD and range from 0 to 255 for an XRM unit.

INPUT = Input number of the individual unit you want to attenuate. Must be between 01 and 32.

TENS ONES and TENTHS = Number of dB of attenuation from 00.0 to 15.5. The tens and ones value can range from 0 to 15. The tenths always have to be 5 or 0. Attenuation is only in 0.5 increments so any other tenth value will be rejected as an invalid data range. Any value larger than 15.5 will also be rejected as invalid data range.

Positive Response:

```

06  XX  XX  58  41  XX  XX
ACK ADR ADR  X   A  ETX  CHK
  
```

Example Command:

```

02  XX  XX  58  41  32  32  33  35  30  35  30  37  35  03  XX
STX ADR ADR  X  A   2   2   3   5   0   5   0   7   5  ETX  CHK
(Attenuate XRD unit at address 235 Input #5 a total of 7.5 dB)
  
```

Example Command:

```

02  XX  XX  58  41  32  30  31  36  31  37  31  34  30  03  XX
STX ADR ADR  X  A   0   0   1   6   1   7   1   4   5  ETX  CHK
(Attenuate XRM unit at address 16 Input #17 a total of 14.5 dB)
  
```

XC: Check for XRM Cards Installed

This command will report any cards not installed in an XRM unit. This command applies to input, bridge, and output cards.

The bridge card is a special case. Each bridge card has two separate addresses. The addressing is as follows:

Bridge card 1 = cards 1 & 2

Bridge card 2 = cards 3 & 4

Bridge card 3 = cards 5 & 6

Bridge card 4 = cards 7 & 8

It is possible in a fault condition for only half of a bridge card to respond to a check command. If for example no response is read from bridge card 3, then half of the second bridge card is not responding and will be reported as not installed.

Command Format:

```
02 XX XX 58 46 XX XX XX XX 03 XX
STX ADR ADR X C MSXADR XADR XADR XADR ETX CHK
```

MSDXADR = Most significant digit of the XRM address. This determines what type of unit will respond in an XRM system.

MSDXADR = 0 XRM unit only. Always 0. Included for future expandability.

XADR = Address of individual box in an XRM system. Decimal between 000 and 255 for an XRM.

Example Command Sent:

```
02 XX XX 58 43 30 32 36 03 XX
STX ADR ADR X C 0 2 6 ETX CHK
(Report Cards installed on XRM unit address 026)
```

Response Format:

```
06    XX    XX    58    43    3A    49    XX    2C    XX    . . .  
ACK  ADR  ADR  X    C    :    I    nn    ,    nn    . . .
```

```
3A   42   XX   2C   XX   . . .   3A   4F   XX   2C   XX  
:    B    nn   ,    nn   . . .   :    O    nn   ,    nn   . . .
```

```
3      XX  
ETX   CHK
```

Response Example:

```
06    XX    XX    58    43    3A    49    35    2C    38    3A    42    31  
ACK  ADR  ADR  X    C    :    I    5    ,    8    :    B    1
```

```
3A   30   33   2C   36   ETX   CHK  
:    O    3    ,    6    03   XX
```

(Input card # 5 not responding, 1st half of bridge card 1 not responding,
Output cards #3 and # 6 not responding)

Response Example:

```
06    XX    XX    58    43    3A    49    3A    42    3A    4F  
ACK  ADR  ADR  X    C    :    I    :    B    :    O
```

(All cards installed and responding)

XF: Check Fan

This command will report the speed and condition of an individual cooling fan in an XRM system.

Command Format:

```
02 XX XX 58 46 XX XX XX XX XX 03 XX
STX ADR ADR X F NUM MSDXADR XADR XADR XADR ETX CHK
```

NUM = Fan number 1 through 4. XRM2250 units only have two fans. If a fan 3 or 4 is polled that does not exist a "fail" condition will be returned.

MSDXADR = Most significant digit of the XRM address. This determines what type of unit will respond in an XRM system.

```
MSDXADR = 0 XRM unit
MSDXADR = 1 XRO unit
MSDXADR = 2 XRD unit
```

XADR = Address of individual box in an XRM system. Decimal between 000 and 255 for an XRM unit. Decimal between 000 and 015 for an XRD or XRO unit.

Example Command Sent:

```
02 XX XX 58 46 31 30 32 31 33 03 XX
STX ADR ADR X F 1 0 2 1 3 ETX CHK
(Report Fan 1 condition on XRM unit at address 213)
```

Response Format:

```
06 XX XX 58 46 20 46 61 6E 20 FanNumber 20
ACK ADR ADR X F Space F a n Space X Space
```

```
52 50 4D XX XX XX XX 61 74 20 RPM RPM RPM RPM
R P M "condition" a t Space X X X X
Condition = "Good", or "Slow", or "Fail"
```

Example Response:

```
06 XX XX 58 46 20 46 61 6E 20 32 20 52 50
ACK ADR ADR X F ' ' F a n ' ' 2 ' ' R P

4D 20 47 6F 6F 64 20 61 74 20 32 34 37 35 03 XX
M ' ' G o o d ' ' a t ' ' 2 4 7 5 ETX CHX
(XF Fan 2 RPM Good at 2475)
```

XP: Check Power Supply and LCD Status

This command will report the condition of the power supplies and LCD in an XRM system. If a degrade or failure condition is indicated the power supply requires servicing or is unplugged. The power supply current capacity will begin to degrade at temperatures over 50 degrees Celsius. The degrade signal will be asserted when the power supply temperature reaches 40 degrees Celsius.

Command Format:

```
02  XX  XX  58  50  XX  XX  XX  XX  03  XX
STX ADR ADR X  P  MSDXADR  XADR  XADR  XADR  ETX  CHK
```

MSDXADR = Most significant digit of the XRM address. This determines what type of unit will respond in an XRM system.

```
MSDXADR = 0  XRM unit
MSDXADR = 1  XRO unit
MSDXADR = 2  XRD unit
```

XADR = Address of individual box in an XRM system. Must be between 000 and 255.

Response Format:

```
06  XX  XX  58  50  XX  XX  XX  XX  XX
ACK ADR ADR X  P  PS1-Degrade  PS1-Fail  PS2-Degrade  PS2-Fail  LED1
```

```
XX  XX  03  XX
LED2  LCD  ETX  CHK
```

```
PS1-Degrade  0 = no Degrade, 1 = Danger condition on power supply 1
PS1-Fail     0 = no Failure, 1 = Failure on Power supply 1
PS2-Degrade  0 = no Degrade, 1 = Danger condition on power supply 2
PS2-Fail     0 = no Failure, 1 = Failure on Power supply 2
PS1-LED      0 = LED on      1 = LED off
PS2-LED      0 = LED on      1 = LED off
LCD          0 = LCD OK      1 = Not responding
```

Example Command:

```
02  XX  XX  58  50  31  32  33  35  03  XX
STX ADR ADR X  P  1  2  3  5  ETX  CHK
```

(Check status of power supplies and LCD on XRO unit at address 235)

Example Response:

```
06  XX  XX  58  50  30  30  31  30  30  30  30  03  XX
ACK ADR ADR X  P  0  0  1  0  0  0  0  ETX  CHK
```

(Power supply 2 running in degrade mode. Power supply 1 normal, LCD OK)

XRB: RF Signal Level Check at PC Board Level

This command will report the RF level (in dBm) at internal and external points in a XRM system. This command was included to aid in diagnostics of an RF path failure. RF level sensing is currently available on:

XRD inputs

XRO outputs

XRM inputs

XRM outputs

Command Format:

```
02      XX   XX   58  52  42      XX   XX   XX   XX   XX
STX    ADR  ADR   X   R   B   MSDXADR  XADR  XADR  XADR  I/O/B

   XX   XX   XX   XX   XX   3   XX
CNUM0  CNUM1  I/O  NUM0  NUM1  ETX  CHK
```

MSDXADR = Most significant digit of the XRM address. This determines what type of unit will respond in an XRM system.

MSDXADR = 0 XRM unit

MSDXADR = 1 XRO unit

MSDXADR = 2 XRD unit

XADR = Address of individual unit in an XRM system. Must be between 000 and 255 for an XRM. Must be between 000 and 015 for an XRO and XRD unit.

- CARD = This can be an "I" or "O". Stands for Input card or Output card.
- CNUM0 = This is the card number to be read. Currently this value will be 0 because current systems only have 8 maximum cards. This value is included for future system expansion.
- CNUM1 = This is the card number to be read. Currently 1 - 8 for the input, output , or bridge cards.
- I/O = This can be "I" for input or "O" for output of the selected card.
- NUM0 = This is the card input or output number. 10s place. Currently this value is always 0. It is included for future system design.
- NUM1 = This is the card input or output number.

Response Format:

```
06 XX XX 58 52 42 XX XX XX 2E XX 03 XX
ACK ADR ADR X R B +/- TENS ONES . 1/10 ETX CHK
```

Example Command:

```
02 XX XX 58 52 42 31 32 33 35 42 30 32 49 34 03 XX
STX ADR ADR X R B 0 2 3 5 I 0 2 I 4 ETX CHK
(Check RF level on XRM unit at address 235 input card #2 Input #4)
```

Example Response:

```
06 XX XX 58 52 42 2D 31 32 2E 36 03 XX
ACK ADR ADR X R B - 1 2 . 6 ETX CHK
(RF level read = -12.6 dBm)
```

NOTE:Some firmware releases do not support this command. Refer to the firmware release notes at the beginning of this document for details.

XRC: RF Crosspoint Signal Level Check

This command will report the RF level (in dBm) along an entire path through a XRM matrix system. The XRD and XRO fields will report no signal for matrices consisting of a single XRM.

Command format:

XRC<output nnn>

Response structure:

XRC:<XRD input +/-nn.n>:<XRM input +/- nn.n>:<XRM output +/- nn.n>:<XRO output +/-nn.n>

Example Command:

```
02 XX XX 58 52 43 30 30 35 03 XX
STX ADR ADR X R C 0 0 5 ETX CHK
(Check RF level on matrix input 5)
```

Example Response:

```
06 XX XX 58 52 43 3A 3A 2D 31 32 2E 36 3A
ACK ADR ADR X R C : : - 1 2 . 6 :
```

```
2D 31 31 2E 30 3A 3A 03 XX
- 1 1 . 0 : : ETX CHK
```

(No XRD)

(XRM input RF level read = -12.6 dBm)

(XRM output RF level read = -11.0 dBm)

(No XRO)

Example Response:

```
06 XX XX 58 52 43 3A 2D 31 31 2E 32 3A 2D 31 32 2E 36
ACK ADR ADR X R C : - 1 1 . 2 : - 1 2 . 6
```

```
3A 2D 31 33 2E 30 3A 2D 31 32 2E 35 3A 03 XX
: - 1 3 . 0 : - 1 2 . 5 : ETX CHK
```

(XRD input RF level read = -11.2 dBm)

(XRM input RF level read = -12.6 dBm)

(XRM output RF level read = -13.0 dBm)

(XRO output RF level read = -12.5 dBm)

NOTE:Some firmware releases do not support this command. Refer to the firmware release notes at the beginning of this document for details.

XRI: RF Input Signal Level Check

This command will report the RF level (in dBm) at a particular XRM matrix system input. This will give the RF level at the XRM input for matrices consisting of a single XRM, or the XRD for larger matrices.

Command Format:

```
02 XX XX 58 52 49 XX XX XX 03 XX
STX ADR ADR X R I n n n ETX CHK
```

nnn = Input number of matrix.

Response Format:

```
06 XX XX 58 52 49 XX XX XX 2E XX 03 XX
ACK ADR ADR X R I +/- TENS ONES . 1/10 ETX CHK
```

Example Command:

```
02 XX XX 58 52 49 30 30 35 03 XX
STX ADR ADR X R I 0 0 5 ETX CHK
(Check RF level on matrix input 5)
```

Example Response:

```
06 XX XX 58 52 49 2D 31 32 2E 36 03 XX
ACK ADR ADR X R I - 1 2 . 6 ETX CHK
(RF level read = -12.6 dBm)
```

XRO: RF Output Signal Level Check

This command will report the RF level (in dBm) at a particular XRM matrix system output. This will give the RF level at the XRM output for matrices consisting of a single XRM, or the XRO for larger matrices.

Command Format:

```
02 XX XX 58 52 4F XX XX XX 03 XX
STX ADR ADR X R O n n n ETX CHK
```

nnn = Output number of matrix.

Response Format:

```
06 XX XX 58 52 4F XX XX XX 2E XX 03 XX
ACK ADR ADR X R O +/- TENS ONES . 1/10 ETX CHK
```

Example Command:

```
02 XX XX 58 52 4F 31 31 32 03 XX
STX ADR ADR X R O 1 1 2 ETX CHK
(Check RF level on matrix output 112)
```

Example Response:

```
06 XX XX 58 52 4F 2D 31 32 2E 36 03 XX
ACK ADR ADR X R O - 1 2 . 6 ETX CHK
(RF level read = -12.6 dBm)
```

XWI: Set RF Input Signal Warning Level

RF signal monitoring is done on the XRM system inputs. This level can be set differently for every input. The signal is compared to this level and if the signal level is below this threshold level then a message is generated and placed in the message queue and an SNMP trap will also be generated. This trap is sent to the assigned trap IP address. This command will set the RF dBm level that will generate this error message. **Note that the XRD and XRM inputs can be attenuated. This warning level is compared directly at the system inputs before any attenuation is applied to the signal.** (see XA command) This command will only accept values from -10 to -50 dBm and -99. To turn RF monitoring on set the level from -10 to -50. To turn monitoring off set the level to -99dBm

Command Format:

```

02      XX  XX  58  57  49      XX      XX  XX  XX  XX
STX    ADR  ADR  X   W   I      MSDXADR  XADR  XADR  XADR  TENS

      XX      XX      XX  03  XX
ONES   dBTENS dBONES  ETX  CHK
  
```

MSDXADR = Most significant digit of the XRM address. This determines what type of unit will respond in an XRM system.

```

MSDXADR = 0      XRM unit
MSDXADR = 2      XRD unit
  
```

XADR = Address of individual unit in an XRM system. Must be between 000 and 255 for an XRM. Must be between 000 and 015 for an XRD unit.

TENS/ONES The input or output number. Must range from 1 to 32.

dBTENS/dBONES The dBm value that the signal is compared to. Range from -10 to -50 and -99 turns monitoring off. Other values will be rejected as out of range

Response Format:

```

06  XX  XX  58  57  49  03  XX
ACK ADR ADR X   W   I   ETX  CHK
  
```

Example Command:

```

02  XX  XX  58  52  49  31  30  30  33  30  35  34  30  03  XX
STX ADR ADR X   W   I   1   0   0   3   1   5   4   0   ETX  CHK
(Set RF dB threshold level for XRO at address 003 input 15 to -40dBm)
  
```

XT: Check CPU Temperature

This command will report the temperature of the local control CPU card in the module with the specified address. The temperature is reported in degrees Celsius. This command is useful for making sure that the module is receiving adequate cooling. If the temperature begins to raise it can indicate that the air intake filters are becoming blocked with dust and need to be cleaned.

Command Format:

```
02 XX XX 58 54 XX XX XX XX 03 XX
STX ADR ADR X T MSDXADR XADR XADR XADR ETX CHK
```

MSDXADR = Most significant digit of the XRM address. This determines what type of unit will respond in an XRM system.

```
MSDXADR = 0 XRM unit
MSDXADR = 1 XRO unit
MSDXADR = 2 XRD unit
```

XADR = Address of individual box in an XRM system. Must be between 000 and 255 for an XRM. Must be between 000 and 015 for an XRD or XRO.

Response Format:

```
06 XX XX 58 54 XX XX XX XX 43 03 XX
ACK ADR ADR X T +/- 100'S 10'S 1'S C ETX CHK
```

Example Command:

```
02 XX XX 58 54 32 30 31 32 03 XX
STX ADR ADR X T 2 0 1 2 ETX CHK
(Check temperature of XRD unit at address 012)
```

Example Response:

```
06 XX XX 58 54 2B 30 35 36 43 03 XX
ACK ADR ADR X T + 0 4 1 C ETX CHK
(temperature on CPU card reads 41 degrees Celcius)
```

ZA: Set Group Access for Output

This command can only be executed by the Admin.

This command sets the privilege for a group to change an output.

Command structure:

ZA:<GID>:<access>:<output>

GID = Group ID. Can be 1-8, with 1 being Admin.

Access = Access Control. 1 = Allow, 0 = Deny.

Output = Matrix output number. Can be 1 to the size of the matrix.

If access is allowed for that output, then any user in that group can issue an L, S, or U command for that output.

Example Command Sent:

```
02 XX XX 5A 41 3A 32 3A 30 3A 30 30 35 03 XX
STX ADR ADR Z A : 2 : 0 : 0 0 5 ETX CHK
(Deny group 2 access to output 5)
```

Positive Response:

```
06 XX XX A5 41 03 XX
ACK ADR ADR Z A ETX CHK
```

ZC: Current User

This returns the user ID, group ID, and username of the current logged in user.

Example Command Sent:

```
02 XX XX 5A 43 03 XX  
STX ADR ADR Z C ETX CHK
```

Example Response:

```
06 XX XX 5A 43 3A 31 3A 31 3A 41 64 6d 69 6E 03 XX  
ACK ADR ADR Z C : 1 : 1 : A d m i n ETX CHK  
(User 1, group 1, username = Admin)
```

ZG: Set User Group

This command can only be executed by the Admin.

This command sets a new group for a user.

Command structure:

ZG:<username/UID>:<GID>

Username = The username that will be assigned a new password.

UID = User ID. Alternatively the user ID can be specified.

GID = Group ID.

The username must start with a character, not a number.

Example Command Sent:

```
02 XX XX 5A 47 3A 41 64 6d 69 6E 3A 31 03 XX
STX ADR ADR Z G : A d m i n : 1 ETX CHK
(Set the Admin user to be in group 1)
```

Example Command Sent:

```
02 XX XX 5A 47 3A 31 3A 31 03 XX
STX ADR ADR Z G : 1 : 1 ETX CHK
(Set the Admin user to be in group 1)
```

Positive Response:

```
06 XX XX A5 47 03 XX
ACK ADR ADR Z G ETX CHK
```

Note: This command will set a flag in the Change “C” command response.

Note: Some firmware versions do not implement this command. For those firmware releases, the group ID is set to be the same as the user ID and can't be changed. For example, User 1 (UID = 1 = Admin) is in group 1, UID 2 is in group 2, and so on.

ZI: Login

This command is used to login to a particular control port. (A different user may be logged in to each available command port on a controller.) The command is sent with the username and password. The user ID and group ID are returned in response to a successful login.

Example Command Sent:

```
02 XX XX 5A 49 3A 41 64 6d 69 6E 3A 31 03 XX
STX ADR ADR Z I : A d m i n : 1 ETX CHK
```

Example Response:

```
06 XX XX 5A 49 3A 31 3A 31 03 XX
ACK ADR ADR Z I : 1 : 1 ETX CHK
(User 1, group 1)
```

ZL: List user by User ID (UID)

This command can only be executed by the Admin.

This command shows the current group ID, username, and password for a given user ID (UID).

Command:

ZL:<UID>

Response structure:

ZL:<GID>:<username>:<password>

Example Command Sent:

```
02 XX XX 5A 4C 3A 31 03 XX
STX ADR ADR Z L : 1 ETX CHK
```

Example Response:

```
06 XX XX 5A 4C 3A 31 3A 41 64 6d 69 6E 3A 31 03 XX
ACK ADR ADR Z L : 1 : A d m i n : 1 ETX CHK
(User ID 1 is in group 1, has a username of Admin and password = 1)
```

ZO: Logoff System

This command will logoff the current user.

Example Command Sent:

```
02 XX XX 5A 4F 03 XX  
STX ADR ADR Z O ETX CHK
```

Positive Response:

```
06 XX XX A5 4F 03 XX  
ACK ADR ADR Z O ETX CHK
```

ZP: Set User Password

This command can only be executed by the Admin.

This command sets a new password for a user.

Command structure:

ZP:<username/UID>:<password>

Username = The username that will be assigned a new password.

UID = User ID. Alternatively the user ID can be specified.

Password = Up to 14 alphanumeric characters.

Example Command Sent:

```
02 XX XX 5A 50 3A 41 64 6d 69 6E 3A 32 41 62 03 XX
STX ADR ADR Z P : A d m i n : 2 A b ETX CHK
(Set the Admin password to 2Ab)
```

Example Command Sent:

```
02 XX XX 5A 50 3A 31 3A 32 41 62 03 XX
STX ADR ADR Z P : 1 : 2 A b ETX CHK
(Set the Admin password to 2Ab)
```

Positive Response:

```
06 XX XX A5 50 03 XX
ACK ADR ADR Z P ETX CHK
```

ZU: Set Username

This command can only be executed by the Admin.

This command sets a new username for a user.

Command structure:

ZP:<username/UID>:<new username>

Username = The username that will be assigned a new password.

UID = User ID. Alternatively the user ID can be specified.

New Username = Up to 14 alphanumeric characters.

The username must start with a character, not a number.

Example Command Sent:

```
02 XX XX 5A 55 3A 41 64 6d 69 6E 3A 55 31 03 XX
STX ADR ADR Z U : A d m i n : U 1 ETX CHK
(Set the Admin username to U1)
```

Example Command Sent:

```
02 XX XX 5A 55 3A 31 3A 55 31 03 XX
STX ADR ADR Z U : 1 : U 1 ETX CHK
(Set the Admin username to U1)
```

Positive Response:

```
06 XX XX A5 55 03 XX
ACK ADR ADR Z U ETX CHK
```

ZX: Show Access Control On/Off

This command shows the current port number and whether access control is on or off for the port.

Command:

ZX:<PID> where PID = Port ID.

Response structure:

ZX:<PID>:<access on/off>

Port IDs:

- 0: Current port (whatever port is receiving the command)
- 1: Local (Keypad)
- 2: Quintech UCM (Remote Panel)
- 3: PC Control In (Serial)
- 4: QEC Ethernet Port
- 5: Telnet Ethernet Console Window

Example Command Sent:

```
02 XX XX 5A 58 3A 31 03 XX
STX ADR ADR Z X : 0 ETX CHK
```

Example Response:

```
06 XX XX 5A 58 3A 34 3A 31 03 XX
ACK ADR ADR Z X : 4 : 1 ETX CHK
(The current port is 4 = QEC port and access control is on.)
```

Negative Responses:

Occasionally, the matrix will be unable to carry out a command due to various reasons. The NAK reply set is provided to help determine where the error occurred. A NAK reply will be sent after the matrix has received the CHK byte.

x: Checksum Incorrect

This reply is sent when the checksum sent by the computer controller is different from the one calculated by the matrix controller. This message would indicate data has been corrupted during transmission.

Negative response sent:

```
15 XX XX 78 03 XX  
NAK ADR ADR x ETX CHK
```

c: Command Unrecognized

This type of error message occurs when the matrix receives an unspecified command. The unit will respond as specified below.

Negative response sent:

```
15 XX XX 63 03 XX  
NAK ADR ADR c ETX CHK
```

u: Command Unavailable

This type of error message occurs when the matrix receives command that is not implemented or can't be done on a particular system or at a particular time. The unit will respond as specified below.

Negative response sent:

```
15 XX XX 75 03 XX  
NAK ADR ADR u ETX CHK
```

i: Improper Data

This reply is sent if an improper number of data bytes are contained in the protocol wrapper. For example, if an "S" command is sent with only an output number and no input number. This error will also be sent for any command that contains too many or too few bytes, even if the command does not have any data bytes.

Negative response sent:

```
15 XX XX 69 03 XX  
NAK ADR ADR i ETX CHK
```

d: Data out of Range

This message will be sent if the data bytes sent are outside the parameters of your matrix. If the SRM is polled for the status of output 17 and you only have 16 outputs, you will receive this message.

Negative response sent:

```
15 XX XX 64 03 XX  
NAK ADR ADR d ETX CHK
```

f: XRM Command Failed

This message will be sent if there was no response or an unexpected response from the XRM system. If the XRM system receives a correctly formatted valid command but was unable to execute the command, you will receive this message.

Negative response sent:

```
15 XX XX 66 03 XX  
NAK ADR ADR f ETX CHK
```

Serial Interface

A new command can be sent to the matrix as soon as a response to the previous command is received. If a break in communication occurs while a message is being transmitted the input buffer will automatically clear and no error response will be given.

Serial Parameters:

Baud Rate: 9600

Data Bits: 8

Stop Bits: 1

Parity: None

Protocol: STX/ETX

Flow Control: None. The program sending commands must wait until a response is received from the matrix controller before sending another command.

SRM "Control In" Serial Pinouts:

RS-232

1 - GND

2 - TXD

3 - RXD

4 - DTR

5 - GND

6 - DSR

7 - RTS

8 - CTS

9 - Not Used

RS-422/485

1 - GND

2 - Not Used

3 - Non-Inverting Transmit (+)

4 - Non-Inverting Receive (+)

5 - GND

6 - Inverting Transmit (-)

7 - Not Used

8 - Not Used

9 - Inverting Receive (-)

Note on the RS-232 port:

No null modem or crossover cable is needed on the serial port.

Note on RS-485 mode:

RS-485 is compatible with RS-422. RS-485 allows multiple devices on a single shared serial bus. The matrix unit uses a 4-wire RS-485 interface.