QUINTECH®

The Source for RF Reliability

OPERATING MANUAL

SRR 1000/16x1
SWITCHING SYSTEM

US PATENTS 4,935,709 AND 5,481,073

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SRR Series Switch

1.0 INTRODUCTION

Thank you for purchasing an SRR Series Switch. The SRR was developed to address the increasing need for RF switching in telecommunication network signal processing centers. This operating manual attempt to familiarize you with the different capabilities and features of SRR units.

The SRR series switches are based on Quintech's SRM Series Modular Programmable RF Switches. The unit provides broadband switching for Cable and L-Band frequencies. The SRR is equally suitable for audio/video, baseband, data IF, or RF switching requirements. The switch allows you to switch a smaller number of signals with an easy to use interface. This unit provides similar RF performance in a smaller, more economical package, housed in a one RU enclosure. The switch is controlled by one of three ways:

- Locally via front panel keypad and LCD
- Remotely via serial port (RS-232 or RS-422/485)
- Remotely via Ethernet port

Each SRR is equipped with a D-9 connector and an Ethernet port on the rear panel, and all unused ports are terminated with 75 ohm terminations.

Please read all instructions before installing or operating.

2.0 INSTALLATION

The SRR is very easy to install. Each module is 1 RU (1.75") in height and is easily installed in any standard rack, using four screws.

RF Connections

All RF connections are made by connecting source(s) to the input(s) and destination(s) to the output(s). When connecting, be sure the pin is inserted into the F-connector on the units. A bent pin will not pass the RF signal correctly.

NOTE: All inputs and outputs are DC blocked. You cannot send power through the SRR to power other devices, such as LNBs.

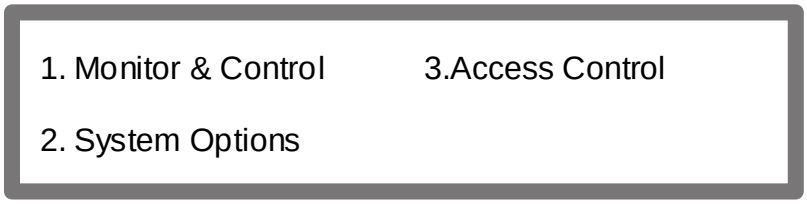
Power Connections

To power up the unit, connect it to an appropriate AC source. Most units will be equipped with a 2 amp slow-blow AC fuse. The AC-DC power supplies used in the SRR are extremely reliable, and provide short circuit protection. The SRR power supplies will not supply LNB power. If LNB power is desired, please contact a Quintech representative for information on our RPS series products.

3.0 OPERATION

The SRR Series Matrix Switching System can be controlled locally via the front panel keypad/LCD, or remotely through the serial port or Ethernet port using the software provided with all standard SRR models. If desired, all three methods can be used simultaneously. Firmware updates can be downloaded via the Serial and Ethernet ports.

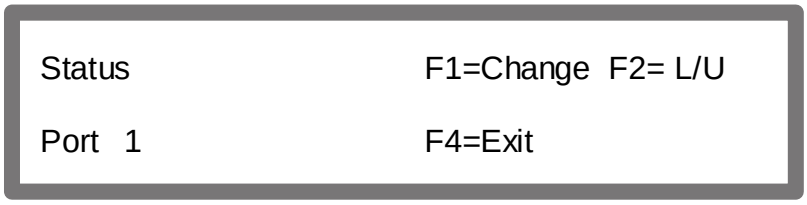
The front panel keypad and LCD screen are used to set various operating parameters and to monitor and control switch settings. The Main Menu has three choices: 1. Monitor & Control, 2. System Options, and 3. Access Control.



Main Menu

3.1 Monitor and Control Screen

Press 1 to choose local monitor and control. The current switch settings will be displayed as illustrated below.

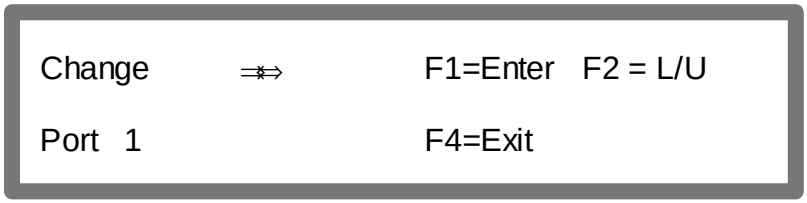


Monitor & Control Screen

Press F4 to exit back to the main menu or F1 to change the input connected to the currently displayed output.

3.1.1 Changing a Crosspoint

To change the current input (or output) port, press F1 to enter the Change Port Screen. The menu heading will revert to “Change” and the cursor will move to the Port field. Select the new input (or output) port by either scrolling or by typing in the desired port number.



Change Port Screen

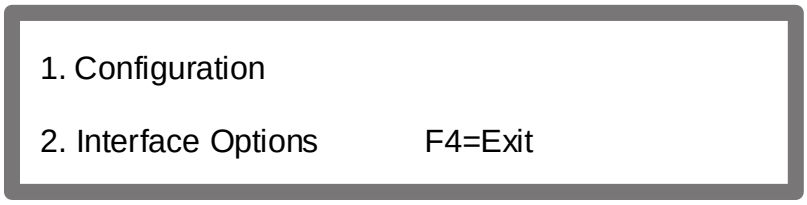
Press F1 to enter the change. To return to the main menu without making any changes, press F4.

3.1.2 Locking/Unlocking a Crosspoint

Pressing F2 while the Monitor & Control Screen is displayed, locks/unlocks the connection status of the currently displayed input (or output) output. The F2 button operates as a toggle. Pressing it once, “locks-in” the connection as currently specified. Pressing it again disables the lock thereby allowing changes to be made. The F1 button will have no effect upon the output’s connection status while the lock is enabled. When an connection status is locked the word “Locked” will appear to the right of the “Status" label.

3.2 Configuring System Options

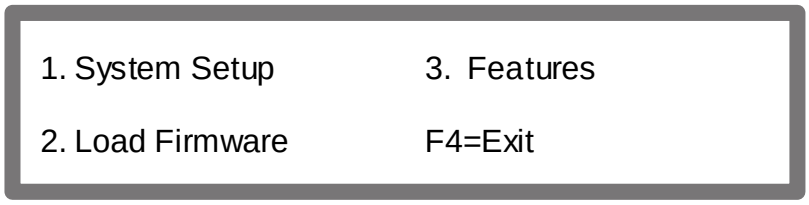
From the Main Menu, press 2 to access the System Options Menu. The System Options Menu enables you to set and modify system configuration parameters. It also enables you to configure the SRR’s communications interface.



System Options Menu

From here you can choose to change the system configuration settings (only with Quintech technical support) or you can change communication settings in the interface options menu.

Pressing 1 will display the Configuration Menu. To prevent unintentional changes to the SRR's configuration, the Configuration Menu is password protected. You must enter the correct 3-digit password and press F1 before access to the Configuration Menu is granted. The code for SRR series units is 732.



Configuration Menu

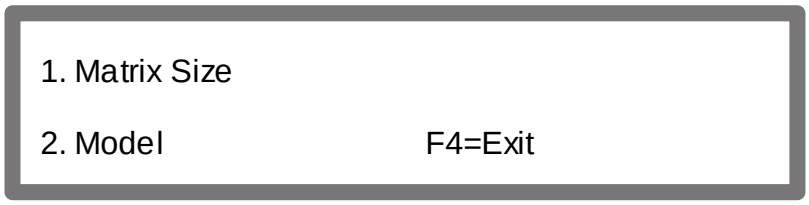
NOTE: <u>DO NOT</u> alter any of the configuration menu items unless directed by Quintech.

3.2.1 Configuring Controller Parameters

The Configuration Menu enables you to set various controller configuration parameters or upgrade the unit's firmware via the serial port. A Features menu is also available but the options under this menu are not installed with the SRR unit with the 1.56 version of the firmware. **No settings under the Features menu selection should ever be changed.**

3.2.1.1 Setting Up the System

The system setup options parameters consist of the matrix size, model number and model type. The model number and model type can ve changed to any value/name with no effect on system opeation, but the matrix sixe affects system operation and should no be changed without Quintech support and assistance.



System Setup Menu

Matrix Size

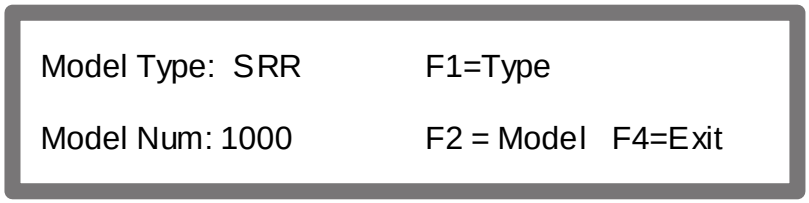
Altering the configuration can prevent the SRR from operating correctly. This is only included for system changes with Quintech assistance. Press 1 to go to the matrix size screen.

Matrix Size Screen

The Matrix Size Screen allows the specified size of the SRR to be changed. Enter a number between 1 and 8 or between 1 and 16 to indicate the number of SRR input (or output) ports. Press F1 to enter the change. To return to the previous menu without making any changes, press F4.

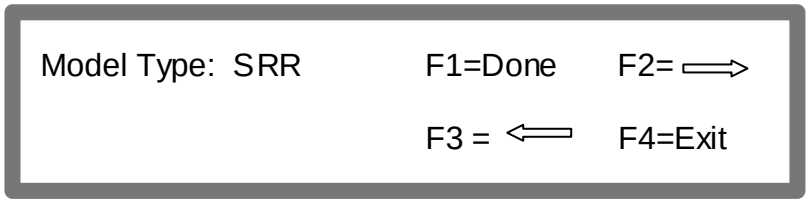
Model

Option 2 of the system setup menu will allow you to change the model number and model type.



Model Number/Type Screen

The model number and model type are included as part of the SRR's firmware identification in accordance with the protocol outlined in Appendix A. The control system is not affected by these settings. These numbers are for identication only and have no effect on functionality. Press F1 to change the model type.



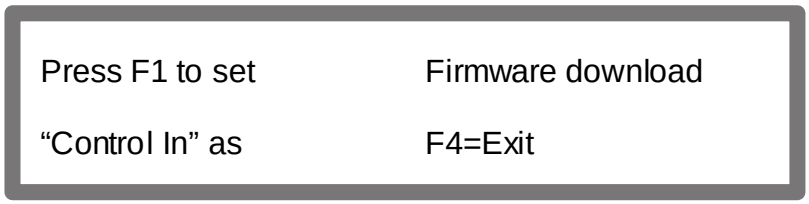
Model Type Screen

To change the model type use the scroll keys to select the letter (upper case or lower case) or even number you want to represent your unit. Press F2 or F3 to move the cursor right or left. Once the new name is entered, Press F1 again to enter the new type name or press F4 to exit without making any changes.

Press F2 to change the model number and the cursor will move from the right of the screen where the model number is displayed. The cursor will wait for an input. Press F4 to exit with no changes or type in a new number. The number can consist of 1 to 4 digits in any combination from 1 to 9. For example, the unit model number could be assigned 1, or 0301, or 524, or 24 or 030. After the number is entered, a delay of three second will occur and the number will be automatically entered into memory.

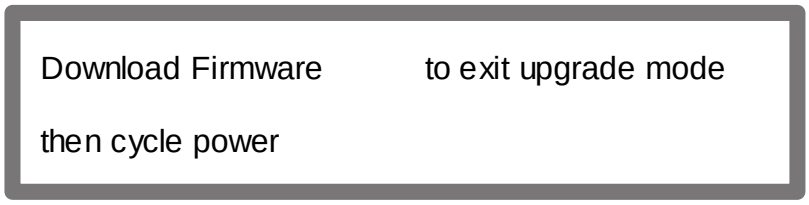
3.2.1.2 Upgrading the SRR's Firmware

Pressing 2 from the Configuration Menu displays the Load Firmware Screen. The Load Firmware Screen enables you to upgrade the internal firmware level of the SRR unit.



Load Firmware Screen

This option should only be entered with Quintech technical support authorization. This menu item is only included for technical support and system upgrades. Instructions and programming required to download firmware are supplied by Quintech technical support. A firmware download will change all system settings to Quintech defaults and the entire system will have to be set up again. If F1 is pressed the unit will go into serial port firmware download mode.



Download mode screen

Once in this mode the unit has to be downloaded with firmware or power cycled to reboot the system. If the unit is power cycled from this mode there are no changes and the system will reboot and operate exactly as before.

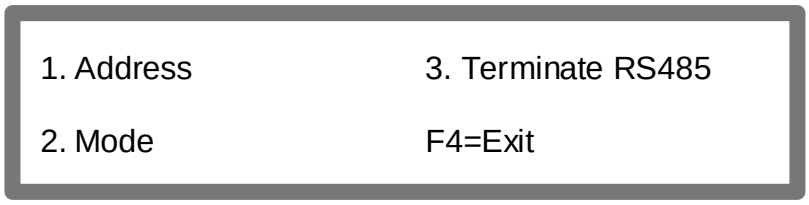
3.2.2 Configuring Interface Options

Pressing 2 from the system options menu will display the Interface Options Menu. The Interface Options Menu allows you to configure either serial communication or Ethernet settings.

Interface Options Menu

3.2.2.1 Serial Configuration

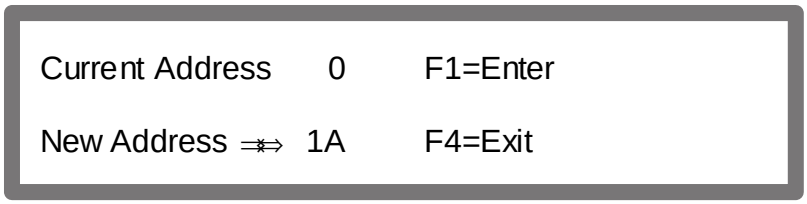
Whenever "Serial" is selected, you will be able to configure the address of the SRR, the type of serial interface (RS-232, RS-485 or RS-422), and the RS422/485 termination settings.



Address Menu

Address

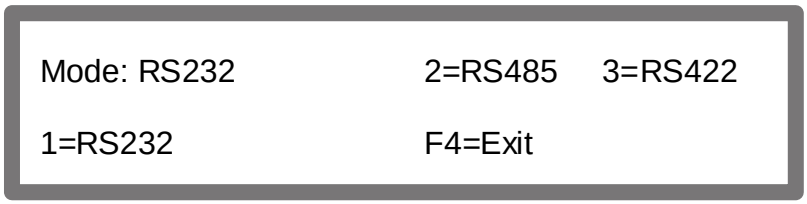
The Address Screen allows you to set a 2-byte hexadecimal address for the SRR. Addresses can be set from 00 to FF hexadecimal. The unit only responds to commands sent over the serial bus that contain a matching address. The only exception is the address "FF" which is a broadcast address. Any unit will respond to a command containing FF as the address regardless of its current address. For this reason FF should not normally be used as a unit address. To change the address, use the up and down scroll arrows until the desired address is displayed, then press F1 to select the new address.



Address Screen

Mode

The Mode screen enables you to specify whether an RS-232, RS-485, or RS-422 serial interface will be used to control the serial communications.



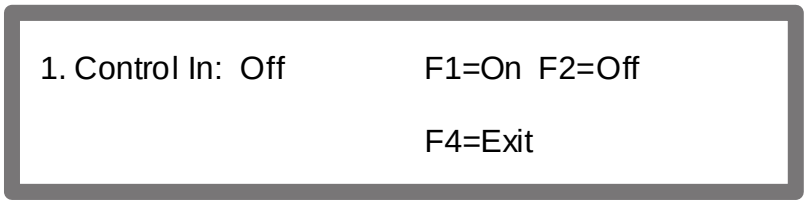
Mode Screen

Set this to match the communication settings on your equipment that is controlling the system from the control in port.

Terminate RS485

The Terminate RS-485 screen allows you to enable or disable termination on the Control In port. Selecting termination will add a 120 q termination resistor and 1.5k q bias resistors to the appropriate RS-485 signal lines.

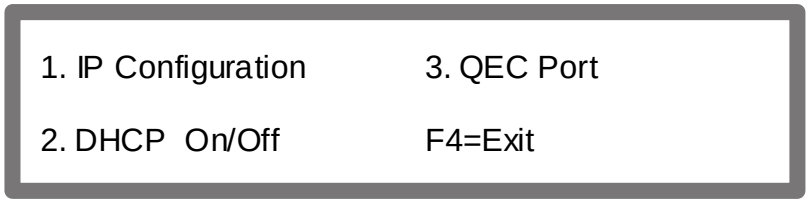
Control In termination should be On if this port is connected to an RS-485 line and the unit is the last unit on the bus.



Terminate RS485 Screen

3.2.2.2 Ethernet Configuration

The Ethernet configuration screen controls the static IP configuration for Telnet (port 23) and the auxiliary QEC port. The QEC port allows you to send STX/ETX formatted packets to the SRR. Whenever "Ethernet" is selected in the Interface Options menu, you will be able to set the IP configuration (option 1), enable/disable the DHCP server (option 2), and configure the Ethernet port (option 3). You will also be able to reset the access password (option 3).



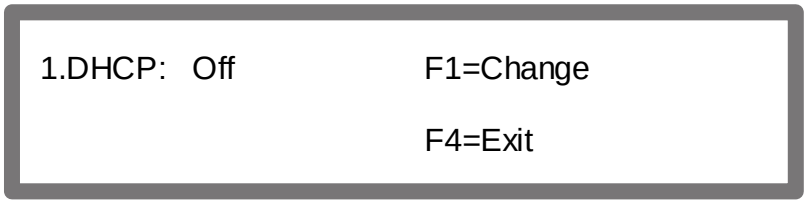
Static IP Configuration

The IP Configuration screen allows you to set the IP address, network, and default gateway address for the SRR. Contact your network administrator for the correct values to use for these parameters. Note that if DHCP is on, the settings obtained from the DHCP server will override the static IP configuration. Note that this screen only shows the static IP configuration.

IP Configuration Screen

DHCP

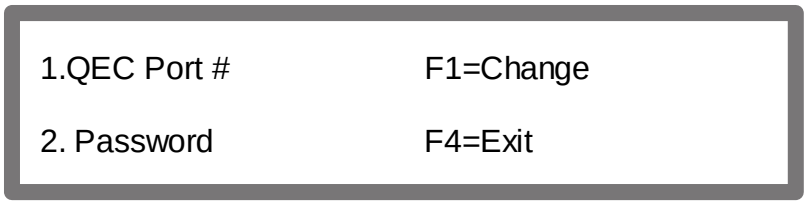
The DHCP Screen enables you to enable or disable the use of a DHCP server for obtaining IP address information. When set to ON, the IP address of the SRR is dynamically assigned by the DHCP server. Note that the IP address assigned in this manner will override any IP address that may have been specified via the IP Configuration Screen. When set to OFF, the static IP address that is specified in the IP Configuration Screen will be used.



DHCP Screen

QEC Port

QEC port option brings up the QEC port # Password menu.

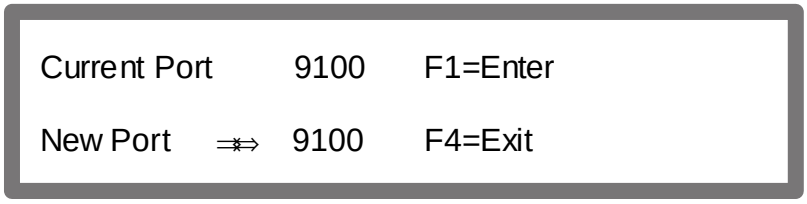


QEC port #/Password Menu Screen

From the screen you can select to change the QEC port number or reset the Ethernet password.

QEC Port #

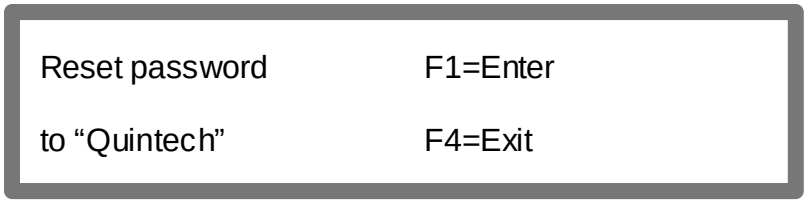
The port screen allows you to configure the port number for the QEC port access. Contact your network administrator for the correct values to use for this parameter. Use the scroll keys to scroll the port number up or down until the desired port number is displayed. You can also type the number in directly . Press F4 to exit or F1 to change the port number.



Port Screen

Password

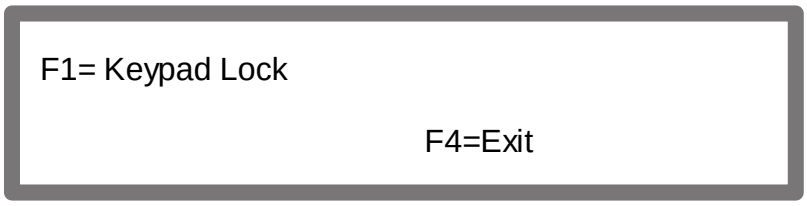
The Password Screen enables you to reset the QEC port access password to the Quintech-specified default. Press F4 to exit or F1 to reset the password.



Password Screen

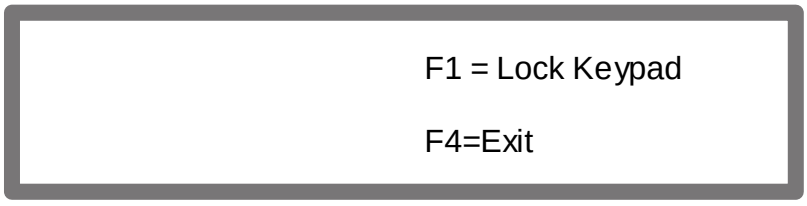
3.2.3 Access Control

From the Main Menu, press 3 to display the Access control menu.



Access Control Menu

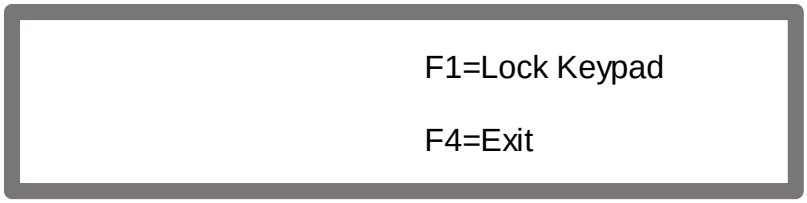
For this SRR vesion there is only one option (keypad lock) under this menu. Pressing 1 displays the Keypad Lock Screen that allows you to lock or unlock access to the front panel keypad. Pressing F4 returns you back to the previous screen.



Access Control Menu

3.2.3.1 Locking/Unlocking the Keypad

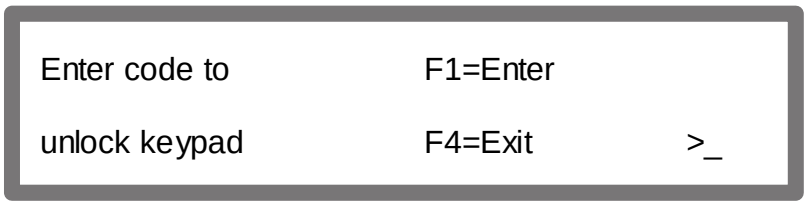
From the Keypad Lock Screen, press F1 to activate the keypad lock or press F4 to return to the previous screen.



Keypad Lock Screen

When enabled, the phrase "Keypad Locked" will be displayed on the screen to indicate that the lock is in effect. While the keypad lock is in effect,

To remove the keypad lock, press any key on the keypad. The Unlock Keypad Screen will be displayed.



Unlock Keypad Screen

Enter the numeric sequence "857". After a few seconds, you will be returned to the Keypad Lock Screen. The numeric sequence equates to the letters "UKP" on a telephone keypad. This acronym stands for Unlock Key Pad. Entering an invalid code or pressing the F4 key will redisplay the Keypad Locked message.

3.3 Telnet Login

The SRR requires the user to log in as “Admin” before it will allow any communications using Telnet. When connected to Telnet the SRR will first ask for a user name and pasword. At the login prompt type in the word “Admin” and hit enter. Then at the password promt type in “1”. This will log you into the unit and the Telnaet commands will then be available for use.

3.4 Ethernet Control

The SRR has a 10BaseT Ethernet port and supports TCP/IP. All commands are sent to the set IP address and port. The command protocol for controlling the switch is provided in Appendix A.

The same command protocol is used for control over Ethernet and the serial port. Since the same command formats are used, the command packet will contain a serial address. This address must match the serial address of the SRR or the packet will be rejected, even though the address is unnecessary when the command is sent over TCP/IP. To avoid any problems, commands sent over TCP/IP should use the broadcast address “FF” hexadecimal. Please note that SNMP is not currently implemented.

Connecting the SRR via Telnet opens a Telnet console window. From the console window, you can change the configuration or issue commands. The commands issued through the Telnet window do not use a serial address or STX/ETX packet formatting.

3.5 Serial Port Control

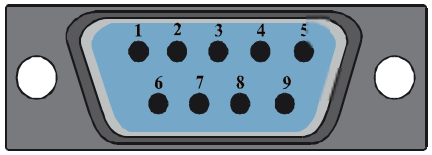
The SRR has a standard DB-9 serial connector on the back panel. This connector is shared for RS-232, RS-422 and RS-485 interfaces. The serial port parameters are fixed at 9600 baud, 8 data bits, no parity, and 1 stop bit (8N1). No null modem or crossover cable is required on this port. The command protocol for controlling the switch is provided in Appendix A.

The RS-232 pin out is as follows:

1 – GND
2 - TXD (transmit data)
3 - RXD (receive data)
4 – DTR (data terminal ready)
5 - GND (signal ground)
6 – DSR (data set ready)
7 – RTS (request to send)
8 – CTS (clear to send)
9 – not used

The RS-422 and RS-485 pin out is as follows:

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



Male D-9 Connector

4.0 Troubleshooting

This section has been written to help eliminate operator error. It does not describe how to repair damaged equipment.

The control connections are properly connected, yet the system is not communicating.

It is possible that the system needs to be biased or terminated. Refer to Appendix B.

The front panel LED/LCD is not lit.

This indicates the unit is not receiving power. Check to see if the power switch is in ON. Make sure that the AC cables are properly connected. Check the fuse located just above the power cord. Verify that the AC source is available.

The power supply LED is on but the LCD is not.

Contact Quintech for service.

No signal is passing at all. The connection is shown as being made but no switch occurred.

First, be certain that all coaxial cables are properly connected, and that all control cables are connected and in good working conditioning. Make sure that the unit is set to "Main" control mode. Type in the desired path again.

Type in a different path to verify that the units are switching. For example, if you cannot route Input 7 to Output 7, try routing Input 8 to Output 7. Try this for several different inputs. If the units are switching, verify that the signal you requested is actually there (the matrix switching system is DC blocked and will not allow receivers to power LNBs). It is useful to monitor the system with some type of analyzer.

The unit does not remember the previous switch settings/switch size after power has been removed and restored.

Contact Quintech for service.

The SRR will not respond to protocol commands on the Serial Port.

Make sure that the address in the commands being sent matches the serial address set for the SRR. Check that the serial interface mode (RS-232, RS-485 or RS-422) is correct and that the serial cable from the computer is connected to the CONTROL IN DB-9 connector port on the back panel. If you are using RS-232, make sure that no null modem is being used in the control path.

The SRR will not respond to protocol commands on the Ethernet QEC Port.

Make sure that the serial address in the commands being sent is either set as "FF" or matches the serial address set for the SRR. Make sure that the SRR IP address matches the target address used by the control computer. Make sure that the control computer is sending the commands to port 9100. Make sure that the netmask and/or gateway are correctly set for your network. If the SRR is connected directly to the network port of another computer, make sure that a crossover cable is being used. If the SRR is connected to a router, make sure that a standard cable is being used, that the router detects the connection to the SRR, and that the router is connected to the same network as the control computer.

The signal is passing at a low level.

Using appropriate equipment, check the signal level. If it is below specifications, contact the factory.

The SRR will not connect using Telnet.

Make sure that another Telnet session is not currently open. Only one Telnet session at a time is allowed

I am a qualified technician and would like to try to fix a problem myself.

A warranty covers all units. Quintech or a representative of Quintech should make any repairs. Removing any part of the chassis will void the warranty. Additionally, attempting to repair a unit could be dangerous.

There is a lot of crosstalk between the signals.

It may be necessary to "balance" your signal levels. Leveling the signals (attenuating stronger signals, amplifying weaker signals) ensures that all signals will be passing at approximately the same level. If more isolation is required, Quintech offers a high isolation version of the SRR Switching System.

For additional information or technical support please contact Quintech.

Toll Free: (800) 839-3658
Fax: (724) 349-1412
Email: info@qecinc.com

REV	C.O. #
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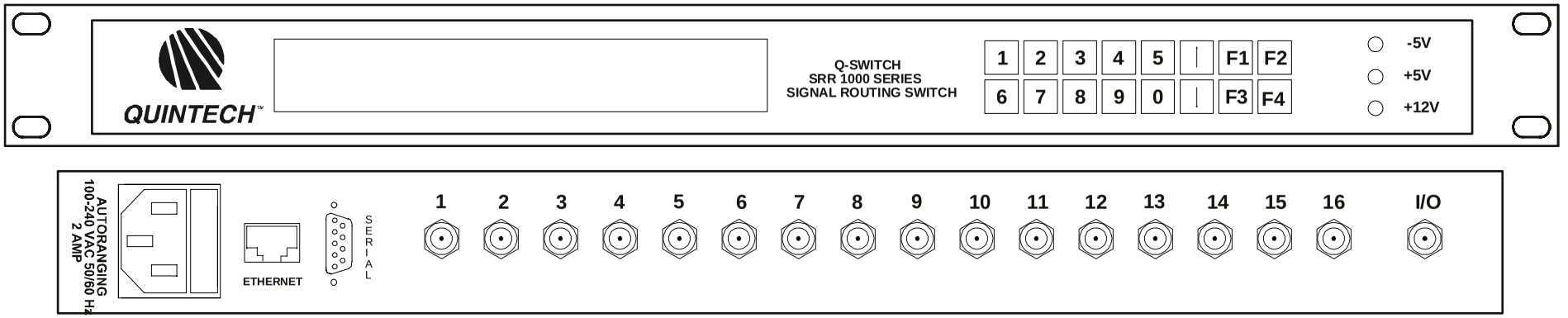

SRR 1000 MATRIX SWITCHING SYSTEM
UNIT ARCHITECTURE

SIZE	SCALE	DWG NO.	REV
A	NTS	— — — —	A

DR. BY:		PAGE
CK. BY:		1 OF 1

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SRR 1000

RF Routing Switch (5-1000 MHz)

General Description:

The **SRR 1000** is a unidirectional, programmable RF switch that provides signal routing capability for broadband cable frequencies (5-1000 MHz). It is available in configurations of 1x8, 8x1, 1x16, or 16x1. Controllable either locally via the front panel keypad or remotely through a computer interface, the SRR 1000 greatly enhances system reliability by eliminating patch panels and repetitive mechanical connections. The design of the rear panel facilitates structured cable routing, thereby eliminating confusing tangles and bundles of cables.

Specifications:

Frequency:	5-1000 MHz
Impedance:	75 T
Max. Total Operating Input Power:	+8 dBm (16x1, 8x1) 0 dBm (1x16, 1x8)
Insertion Loss:	0 ± 2 dB
Frequency Response:	± 2 dB
Isolation:	50 dB
Return Loss:	12 dB
Inputs/Outputs:	1x8, 8x1, 1x16, or 16x1
RF Connectors:	Type "F", 75 T #(BNC, SMA optional)
Power Consumption:	5W
Power Requirements:	100-240 VAC, 60/50 Hz
Local Control:	Front panel keypad with LCD display
Computer Control:	RS-232, RS422/485, or TCP/IP via customer-supplied PC
Mechanical:	1 RU (1.75"H x 19"W x 18"D)
Software:	Basic IBM-compatible operating software and system protocol included with system

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Quintech SRR Series Protocol v1.21

This document specifies a common command protocol that can be used to control a Quintech SRR Series Switch from a computer.

Command Summary

This list gives the commands defined in Protocol 1.21.

E Ethernet. Various commands to set Ethernet parameters and control access.

K Keypad. Various commands to control access to the front panel keypad.

Q Query Path. Polls for the current path.

S Set a Crosspoint. Connect an input to an output.

U Unit ID. Identifies the series and parameters (size) of the SRR.

Other commands are reserved for future use.

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 Databyte(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.** Otherwise a non-matching serial address could cause the command to be rejected even though the IP address was 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

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 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 = 010.000.000.001)
```

Positive response:

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

Note:

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

EI: Set Ethernet IP Address

This command sets the 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 = 010.000.000.234)
```

Positive response:

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

Note:

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

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 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  03  XX
STX ADR ADR  E   L   D  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.

ELE: Ethernet Lock Enable

This command enables the 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.

ELP: Set Ethernet Lock Password

This command sets a new 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 “xyzzy”)
```

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.

EP: Set Ethernet Port

This command sets the Ethernet port that is monitored for 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 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  32  33  34  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.

KL: Keypad Lock

This command locks the front panel keypad. 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.

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. To lock the keypad use the KL command.

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.

Q: Query Path

This command polls for the current path. The response contains three ASCII data bytes.

Command sent:

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

Example of a positive response:

```
06    XX   XX   51  31   35    03    XXO   (Path 15 is selected)
ACK  ADR   ADR   Q   1    5     ETX   CHK
```

RH: Hard Reset

This command resets all parameters to the factory specified defaults. Note that the matrix and SRM module sizes are reset to 16x16 and the SRO to 4. 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:	16x16
Module Size:	16x16
SRO 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 Path

This command makes path changes remotely. The command contains two ASCII databytes to indicate the path.

Command sent:

02	XX	XX	53	30	31	03	53
STX	ADR	ADR	S	0	1	ETX	CHK

U: Unit ID

This command makes path changes remotely. The command contains two ASCII databytes to indicate the path.

Command sent:

02	XX	XX	55	03	47
STX	ADR	ADR	U	ETX	CHK

Reply Sent:

06	XX	XX	55	76	31	2E	32	31	…03	XX
ACK	ADR	ADR	U	v	1	.	2	1	…ETX	CHK

The exact syntax of this message (without the header, address, checksum, and end bytes) is:

```
Uv1.21/2.21 REVA SRR SERIES NNX1/1XNN
```

Negative Responses:

Occasionally, the SRR 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 SRR 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 SRR. This message would indicate that data has been corrupted during transmission, for example:

```
15  XX  XX  78  03  6E
NAK ADR ADR  x  ETX CHK
```

c: Command Unrecognized

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

Command Sent:

```
02  XX  XX  42  03  43
STX ADR ADR  B  ETX CHK
```

Reply Sent:

```
15  XX  XX  63  03  75
NAK ADR ADR  c  ETX CHK
```

i: Improper Data

This reply is sent if improper amounts of data is contained in the protocol wrapper. For example, if a set path is sent containing four (4) ASCII digits, the unit will respond with the following message:

```
15  XX  XX  69  03  7F
NAK ADR ADR  i  ETX CHK
```

This message may also be seen if too many data bytes are sent. It can be sent in reply to any command including those not containing data bytes (if data bytes are included with a query path command, for example).

d: Data out of Range

This message will be sent if the data bytes sent are outside the parameters of your switch. If the module is commanded to set path 16 and you have only eight paths, you will receive this message:

```
15  XX  XX  64  03  72
NAK ADR ADR  d  ETX CHK
```

Please Note:

If a message contains multiple errors, the SRR will send a NAK to the first detected error. The unit will check for errors in this order:

1. Checksum error
2. Command unrecognized
3. Improper data
4. Data out of range

The only exception to this condition is when the quantity of total number of data bytes sent exceeds 2. Under this condition, the unit will detect improper data (an overflow of information) before it detects an unrecognized command. The SRR will accept an infinitely long (number of bytes) command, so long as none of those bytes is an ETX byte.

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 SRR before sending another command.

Serial Pinouts:

RS-232	RS-422/485
1 – DCD (Data Carrier Detected)	1 - GND
2 – RXD (Receive Data)	2 - NC
3 – TXD (Transmit Data)	3 – Non-Inverting Transmit
4 – DTR (Data Terminal Ready)	4 – Non-Inverting Receive
5 – GND	5 - GND
6 – DSR (Data Set Ready)	6 – Inverting Transmit
7 – RTS (Request To Send)	7 - NC
8 – CTS (Clear To Send)	8 - NC
9 – NC	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 SRR uses a 4-wire RS-485 interface.

SRR Series Switching System Test Procedure

NECESSARY EQUIPMENT

- Hewlett Packard Network Analyzer – Models 8714C (75 q), 8714ET (50 q), or equivalent
- 75 q coaxial cables (N – to – N type), 50 q if using the 8714ET
- Connectors and adapters

CALIBRATION & SETTINGS

1. Turn on the Network Analyzer and allow it to complete its warm-up procedure.
2. Set the frequency to correspond to your system.
3. Select Channel 1 as Transmission and Channel 2 as Reflection.
4. Channel 1 – Reference 0.50 dB, 1.0 dB/division.
5. Channel 2 – Reference -10 dB, 5.0 dB/division.
6. Power: +10 dBm.
7. Display: Data.
8. Calibrate Channel 1 for “Transmission” and Channel 2 for “Response”, respectively.
9. Ensure that all cables and power cords are properly connected.
10. Attach DC blocks in case DC is transmitted on RF lines.
11. Turn on the SRR unit.

TESTING PROCEDURE

1. Connect the Reflection (RF out) line of the network analyzer to the SRR’s input. Connect the transmission (RF in) line to output 1.
2. Using either the local control unit, or the computer control port, select output 1 to input 1.
3. Compare measured data with desired specifications. If desired, repeat procedure for other inputs/outputs.
4. If a problem is encountered, check the control selection, and ensure that all cables are properly connected. If the problem persists, consult the factory for assistance.

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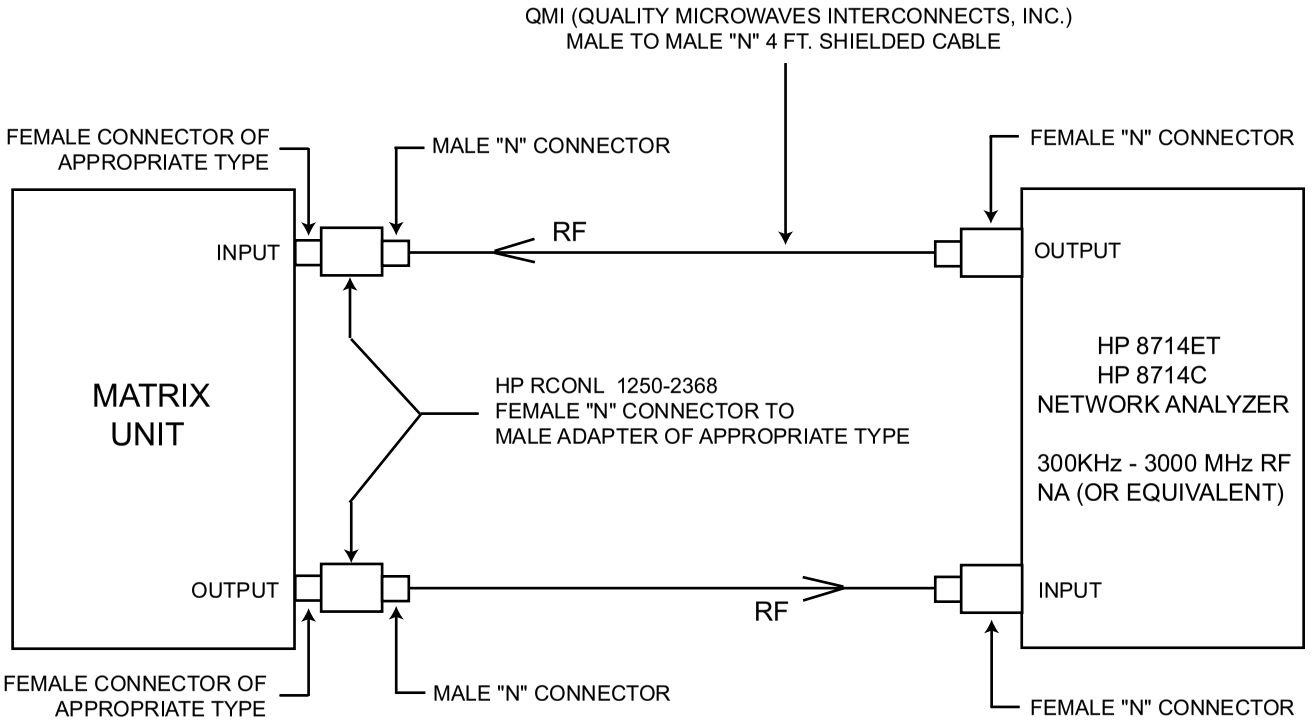
REV	C.O. #
– – –	– – – – –



TYPICAL TEST SETUP

SIZE	SCALE	DWG NO.	REV
A	NTS	— — — —	A

DR. BY: TOM LONG	06/05/03	PAGE
CK. BY:		1 OF 1

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Date Received: _____ Date Installed: _____

Serial Number: _____

NOTES:

For sales and service, please contact:

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