SC-1000 System Controller

User Manual

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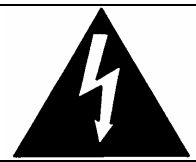
IMPORTANT SAFETY INSTRUCTIONS

	The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated “Dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.
	The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (Servicing) instructions in the literature accompanying the product.

- Read and keep these instructions
- Heed all warnings.
- Follow all instructions.
- Do not use this apparatus near water
- Clean only with dry cloth.
- Do not block any ventilation openings. Install in accordance with the manufacturer’s instructions.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles and the point where they exit from the apparatus.
- Only use attachments/accessories specified by the manufacturer
- Unplug this apparatus during lightning storms or when unused for long periods of time.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

WARNING:
TO REDUCE THE RISK OF FIRE OR ELECTRICAL SHOCK, DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE. DO NOT EXPOSE THIS EQUIPMENT TO DRIPPING OR SPLASHING AND ENSURE THAT NO OBJECTS FILLED WITH LIQUIDS ARE PLACED ON THE EQUIPMENT

WARNING:
THIS EQUIPMENT USES POWER/MAINS CONNECTORS FITTED WITH SAFETY GROUND PINS. TO REDUCE THE RISK OF ELECTRIC SHOCK, GROUNDING OF THE GROUND PIN OF THE MAINS PLUG MUST BE MAINTAINED. IN ADDITION GROUNDING OF GROUND TERMINAL ON THE MAIN EQUIPMENT CHASSIS MUST BE MAINTAINED.

WARNING:
DANGEROUSLY HIGH VOLTAGES ARE PRESENT INSIDE THE POWER SUPPLY FRAME.

WARNING:
TO COMPLETELY DISCONNECT THIS EQUIPMENT FROM THE AC MAINS, DISCONNECT THE POWER SUPPLY CORD PLUG FROM THE AC RECEPTACLE THIS EQUIPMENT MAY HAVE MORE THAN ONE POWER SUPPLY CORD. TO REDUCE THE RISK OF ELECTRIC SHOCK, DISCONNECT ALL POWER SUPPLY CORDS BEFORE SERVICING.

CAUTION: These servicing instructions are for use by qualified personnel only. To reduce the risk of electric shock, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified personnel.

CAUTION: To reduce the risk of electric shock, plug each power supply cord into separate branch circuits employing separate service grounds.

NEVER use flammable or combustible chemicals for cleaning components.
NEVER operate this product with any covers removed.
NEVER wet the inside of this product with any liquid.
NEVER bypass any fuse or replace any fuse with a value or type other than those specified.
NEVER operate this product in an explosive atmosphere.
NEVER block the airflow through ventilation slots.
NEVER expose this product to extremely low or high temperatures.

This product complies with the requirements of the product family standards for video, audio, audio-visual entertainment, and lighting control apparatus for professional use as mentioned below.

INFORMATION TO USERS IN EUROPE

NOTE

This equipment with the CE marking complies with bother the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community.

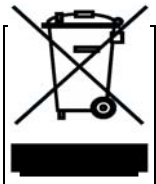
Compliance with these directives implies conformity to the following European standards:

- EN60065 Product Safety
- EN55103-1 Electromagnetic Interference Class A (Emission)
- EN55103-2 Electromagnetic Susceptibility (Immunity)

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to the European Union EMC directive. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CE

EN60065	Safety
EN55103-1: 1996	Emission
EN55103-2: 1996	Immunity



EN504192 2005
Waste electrical products should not be disposed of with household waste. Contact your Local Authority for recycling advice

INFORMATION TO USERS IN THE U.S.A.

NOTE

FCC CLASS A DIGITAL DEVICE OR PERIPHERAL

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

WARNING

Changes or Modifications not expressly approved by Evertz Microsystems Ltd. could void the user's authority to operate the equipment.

Use of unshielded plugs or cables may cause radiation interference. Properly shielded interface cables with the shield connected to the chassis ground of the device must be used.

Evertz Microsystems Ltd FC For Home or Office Use	Tested to comply with FCC Standards	This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: This device may cause harmful interference, and this device must accept any interference received, including interference that may cause undesired operation.

REVISION HISTORY

REVISION	DESCRIPTION	DATE
1.0	First Evertz Release	Feb 08

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1. OVERVIEW

The SC-1000 System Controller manages and controls routers, while providing additional redundancy features. With its Ethernet networking and comprehensive interface connections, the SC-1000 provides an expandable platform to manage future communication and interface requirements for very large routing systems.

The 2RU design of the SC-1000 System Controller provides an additional level of redundancy. It is equipped with a single controller module and power supply as standard, but has the option of an additional controller module and power supply for full redundancy. Each controller and power supply is individually accessible from the front of the frame and supports hot swapping with no disturbance to the controller that is operating. By using a real-time operating system the SC-1000 has been specifically designed to avoid slow operation normally associated with PC based solutions.

Storage: The basic unit contains non-volatile memory for the storage of crosspoint settings and a 'flash disk' for the storage of configuration data files. A 3½" diskette drive for each controller allows WinSetup configurations to be easily transferred while a networked PC may be connected to the system for virtually unlimited storage.

User Interface: Via the front panels, users may manually switch between controllers, review system status, or select a configuration file stored internally or on a 3½" diskette.

Timecode: A Timecode input card is available as an option enabling accurate switching according to a real-time schedule. Both LTC and VITC are supported.

SNMP: The SC-1000 enables SNMP support allowing remote monitoring of the SC-1000 core features over an Ethernet link by an external device.

Figure 1-1: SC-1000 System Controller

Features:

- Single controller module, or two for redundancy, with automatic and manual changeover
- Supports hot swap and changeover with total transparency
- Single PSU module, or two for redundancy with power sharing for maximum reliability. Supports hot swap
- Supports up to 8 independent routing levels each of 2048 x 2048
- Supports up to 160 control panels
- Fast boot-up time
- Panels can be re-configured without disturbing the rest of the system
- NVRAM for crosspoint status storage
- Flash disk and 3 1/2 " Diskette drive for configuration storage
- Two Q-Link ports as standard, with the option for up to 9 more, allows for small groups of panels on each link providing protection against one link being damaged and maintaining high speed
- Four serial ports as standard:
    - Maintenance port - RS232/422 used for downloading configurations and for other engineering functions
    - Modem port - RS232 only, but not solely restricted to modem use
    - 2 ports for general purpose use, RS232/422
    - Option for up to 3 more ports, RS232/422
    - WinSetup can be used to configure for RS232 or RS422 and choose the protocol type on a port-by-port basis
- Ethernet port supporting TCP/IP protocol for configuration file downloading and router control
- A separate port for each controller can be connected providing the ultimate in protection if one controller fails
- Fully supports Quartz WinSetup, WinControl and WinQueue software
- Support of the SNMP remote monitoring protocol

2. GENERAL DESCRIPTION

The SC-1000 System Controller (see Figure 2-1 and Figure 2-2) is an external controller used on large and often more complex routing systems providing a more powerful control solution than the standard internal control processor (FU-0003) installed in most Quartz routers.

Figure 2-1: SC-1000 Front View

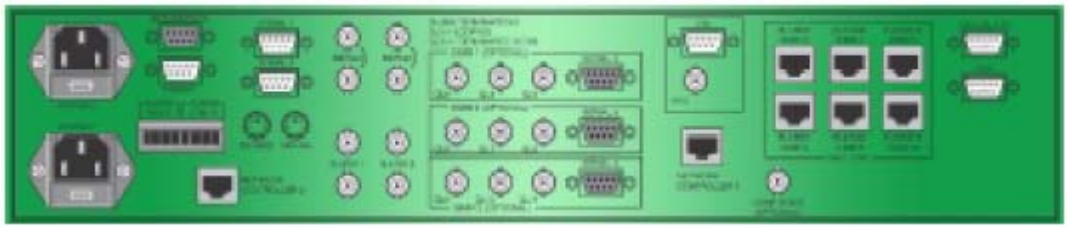


Figure 2-2: SC-1000 Rear View

2.1. KEY FEATURES

The SC-1000 System Controller also provides a number of additional features not available with the standard control processor. The key features are listed below.

NOTE: The SC-1000 System Controller is required for systems that:

1. The total number of Sources and Destinations exceeds more than 250.
2. A Q256 is included within the system. This applies to any type/signal format.

- The SC-1000 System Controller has an increased storage capacity allowing it to handle a larger system setup or configuration database. It also has the ability to store multiple databases. The SC-1000 has over 5M bytes of storage.
- The SC-1000 System Controller supports multiple Q-Links which can be used for system expansion and/or additional system redundancy. It can support up to eleven Q-Links, each with a maximum of sixteen connected devices.

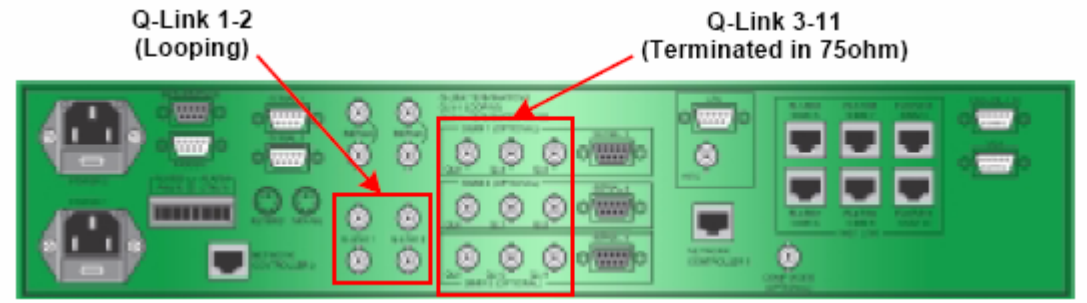


Figure 2-3: SC-1000 Q-Links

The SC-1000 System Controller has sufficient processing power to deal with communications down each of the Q-Links simultaneously.

Note: The standard router control processor (FU-0003) can support up to four Q-Links when fitted with the CI-0004 module. Although these are physically separate links the processor is only able to deal with a single Q-Link message at any one time.

- The SC-1000 System Controller supports multiple serial devices. It has one setup/maintenance port, one modem port, and 5 general purpose serial ports.

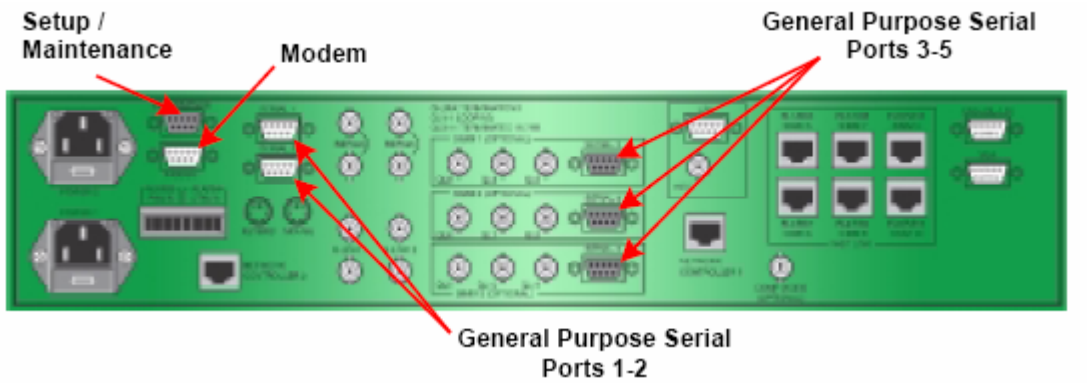


Figure 2-4: SC-1000 Serial Ports

The standard control processor (FU-0003) can support two serial links when fitted with the CI-0004 module.

- The SC-1000 System Controller chassis has the option of being fitted with dual controllers and power supplies providing comprehensive system protection.

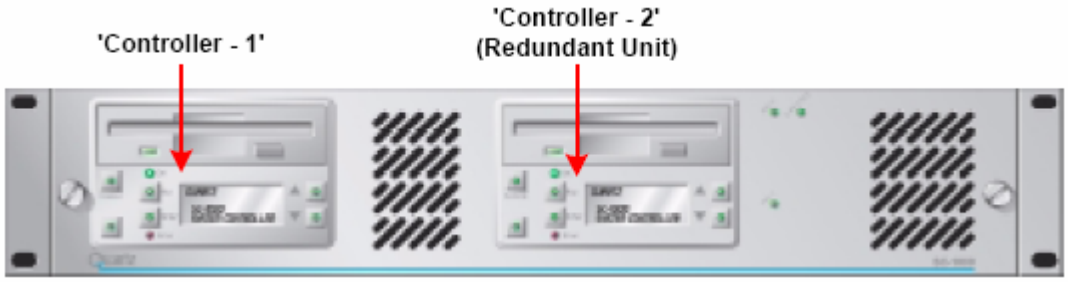


Figure 2-5: SC-1000 Redundant Controller

The two controllers support an 'auto changeover' facility which allows the secondary unit to take over in the event of a failure. The faulty controller can then be hot swapped with a spare. The standard control processor (FU-0003) is only a single processor with no redundancy options.

The SC-1000 System Controller supports Ethernet based networks (10-base-T on RJ45).

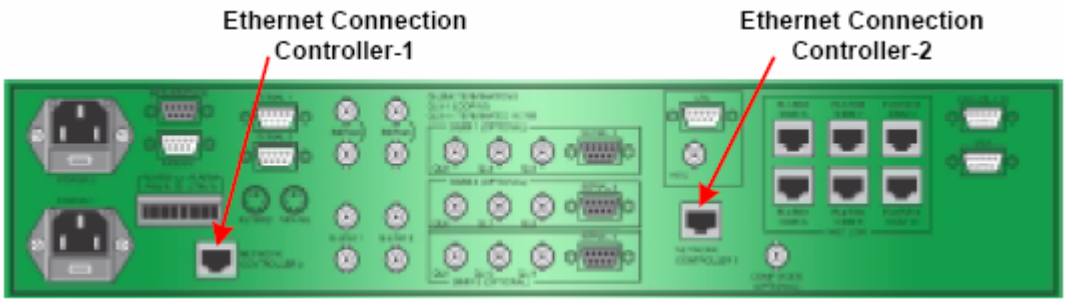


Figure 2-6: SC-1000 Ethernet Connection

It has a dedicated Ethernet port for each processor module. The standard control processor (FU-0003) based system can only interface to Ethernet via a PC running WinControl software.

- The SC-1000 System Controller has a much faster system boot time. A system based on the standard control processor (FU-0003) works by sharing parts of its setup database with each device in the system. This allows the workload to be shared out once the system has booted up. On a large database this downloading can take up to 3 seconds per device, and with many panels on the Q-Link the total boot time becomes unacceptably long.

- The SC-1000 has sufficient processing power to handle all system operations and does not need to share its database. This gives a boot time of approximately 300mS per device.

- As the SC-1000 System Controller does not share its database there is no disruption or delay when control panels are added to a 'live' system. When a control panel is added ‘live’ to a standard router control processor (FU-0003) system all the other panels see a small delay before they will respond to any button presses.

- The SC-1000 System Controller has sufficient RAM to allow multiple databases to be stored. This enables the down time during re-configuration to be kept to a minimum because the system must only be halted momentarily as an internal database swap is performed. A system based on the standard control processor (FU-0003) has limited RAM memory available and can only store one setup database at any one time. To download a new database the current database has to be overwritten and the system must be halted to prevent corrupted data being used.

The SC-1000 System Controller consists of a chassis that can hold two processor cards and two power supplies.

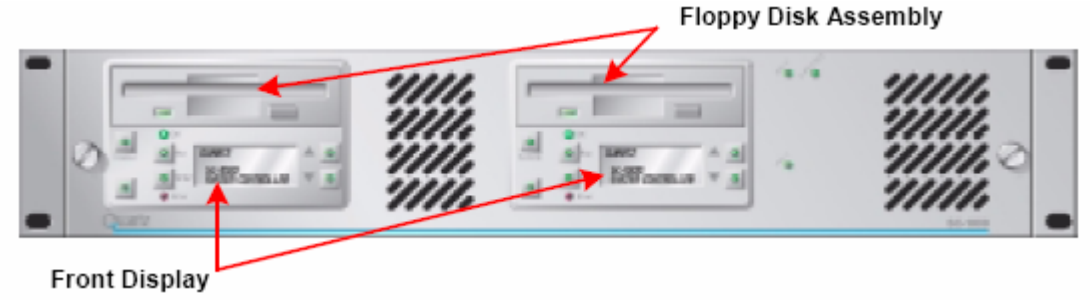


Figure 2-7: SC-1000 Display and Floppy Disk

Each processor card consists of a main carrier circuit board, an industrial processor sub-module, and a front display and floppy disc assembly.

The SC-1000 includes its own mains power supply that generates 5v for internal use. A second power supply can be fitted for redundancy. Each power supply has its own mains IEC inlet that is fitted with a fuse holder. The power supply is auto-ranging and will work on any supply in the 90-264 volt range.

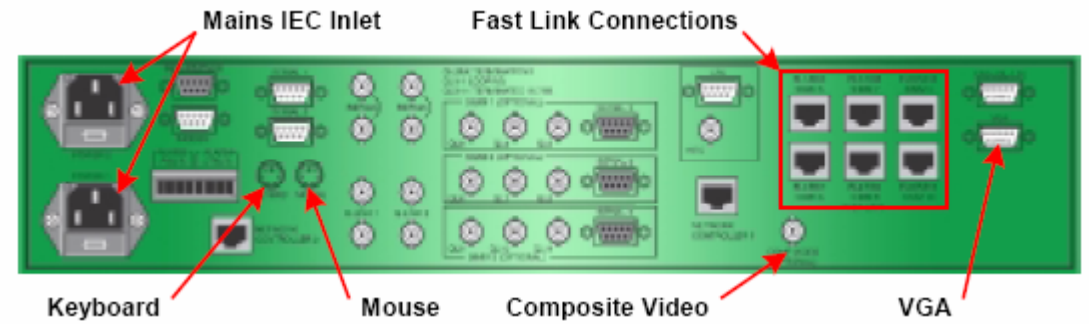


Figure 2-8: SC-1000 Connections

The Keyboard, Mouse, VGA, Fast Link, and Composite Video connectors on the rear of the SC-1000 System Controller are currently reserved for future use.

3. INSTALLATION

3.1. PHYSICAL INSTALLATION

The SC-1000 System Controller is designed to fit into standard 19" equipment racks.

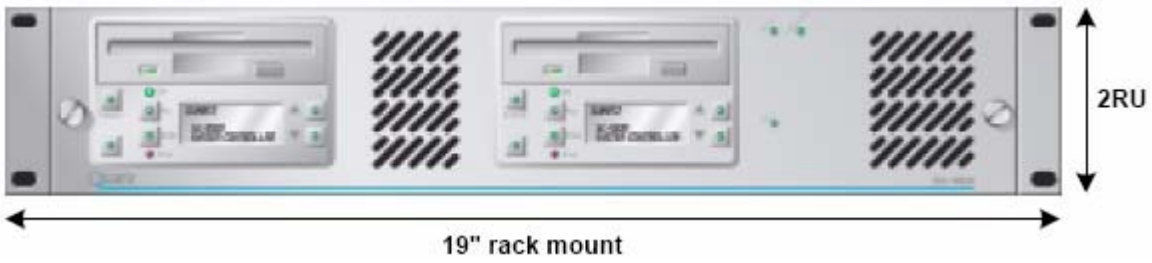


Figure 3-1: SC-1000 Front Dimensions

Installation in a 19" rack is simple. Guide the unit through the aperture in the front of the rack until the rack-mounting flanges are flush against the side member of the rack and bolt in place with fixing screws (not supplied). Behind the unit, you should allow for a depth of 485mm plus provision for the connection of external cables.

3.2. SETTING THE POWER LINE VOLTAGE

It is **NOT** required to set the power line voltage as the SC-1000 System Controller uses auto-ranging power supplies. The rear panel IEC inlet contains a fuse holder. Fuses should only be replaced with fuses of the correct type and rating.

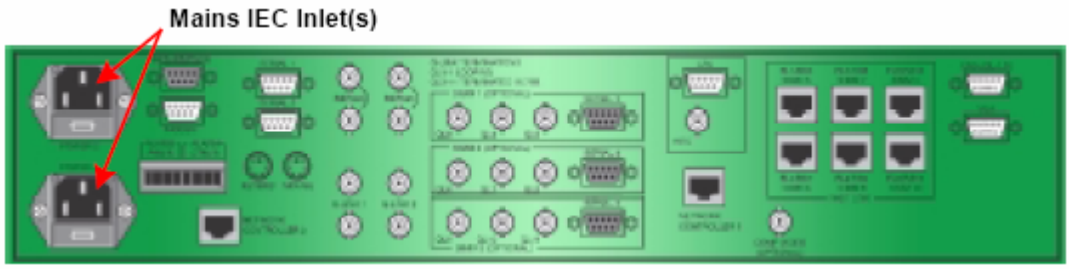


Figure 3-2: Mains IEC Inlets

3.3. POWER UP DIAGNOSTICS

At power up or reset the SC-1000 System Controller performs a self-test sequence. The status LED's on the front panel will light in sequence and the POST LED's on the processor module will also light in sequence. The front panel display will then show "Booting……." as the operational software is started.

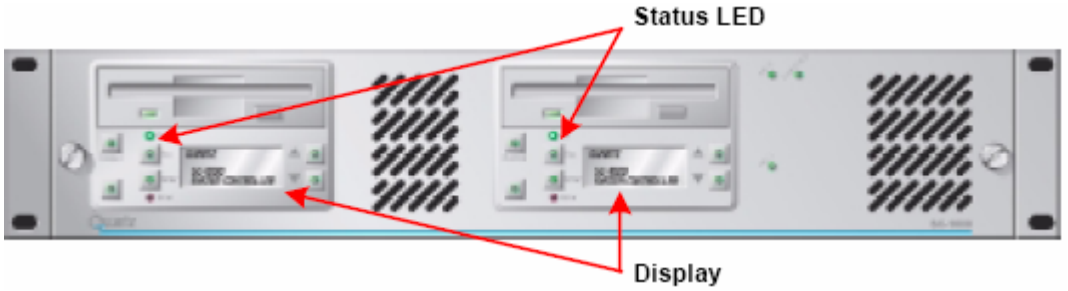


Figure 3-3: Status LED and Display

The current setup database will then be loaded and all routers and panels brought 'online'. The whole process will typically take less that 30 seconds.

3.4. SETTING UP THE CONTROL SYSTEM

Do not change any DIP switches or rotary switch settings at this stage as these should have been correctly set at the factory before the system was shipped.

Locate and install the master router, which will have DIP-3 in the up position. When running, the SC-1000 should display a green flashing LED, and a steady yellow LED. All other LED's should be off.

Locate one panel close to the router and connect the AC power. The panel will be flashing a pattern of LED's or a "No Q-Link' message, which is normal before the Q-Link is connected. Connect the Q-Link of the router to the panel using a T-Piece and standard video cable. Add two 75Ω terminations to the Q-Link, one at the panel and one at the router. After a short delay of up to 8 seconds the panel should clear and come "On-Line" displaying the current router status. If this does not happen, please refer to section 13.1.

Connect the Q-Link to any other routers that are part of this system structure. As each router is connected to the Q-Link check that it's red 'No Q-Link' LED goes off after a short delay.

Add the remainder of the panels to the system. Lastly, connect any other Serial or Parallel interfaces that are to be used with the system.

3.5. CONFIGURING THE SC-1000 SYSTEM CONTROLLER

3.5.1. New Quartz Router Installation

This section describes how to configure the SC-1000 to work with a typical Quartz routing system. A typical system diagram is shown in Figure 3-4.

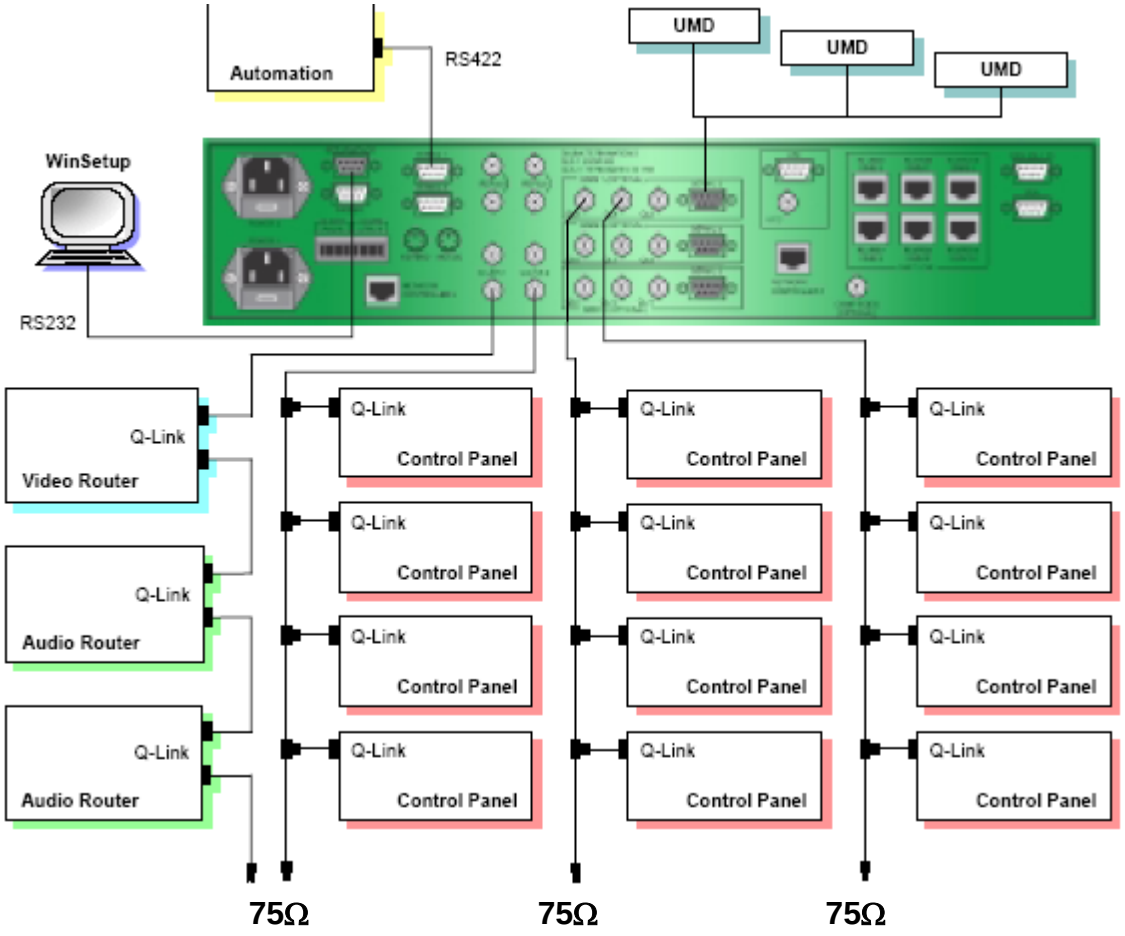


Figure 3-4: Typical System Design

The SC-1000 System Controller is always the master of the system in which it operates. For superior system performance, all frames should be on one Q-Link, and panels evenly distributed across the remaining Q-Links. Any unused Q-Links must be fitted with a 75Ω termination. Quartz recommends the following Q-Link use:

Q-Link	Priority	Recommended Use
1	High	Routers in a central equipment room located close to the SC-1000 with a short cable run, therefore unlikely to be accidentally disconnected or damaged.
2	High	Essential panels e.g. transmission control. Keep cable run as short as possible, therefore unlikely to be accidentally disconnected or damaged.
3 to 11	Medium/Low	All normal panels. It is beneficial to group each functional area onto one Q-Link e.g. Studio 5 uses Q-Link 3, as this can make upgrades and fault location easier.

Table 3-1: Q-Link System Design

If any panels are located in different buildings, in electrically noisy areas, or locations that will be disconnected or powered up/down frequently, then use one of the dedicated Q-Links for these locations.

Any panel or frame, with a unique address may be attached to the SC-1000 System Controller. The single Q-Link ports have an internal 75Ω termination within the SC-1000 System Controller. These links should be set before installation. The SC-1000 System Controller allows up to 16 routers and 160 control panels to be controlled.

The number of Q-Links and Serial ports available depends on the CI-0006 SIMM options installed inside the SC-1000 System Controller. The rear panel of the unit is clearly labelled.

SIMM Fitted	Ports Enabled	
	Q-Link	Serial
SIMM 1	3, 4 and 5	3
SIMM 2	6, 7 and 8	4
SIMM 3	9, 10 and 11	5

Table 3-2: Q-Link and Serial Ports

For configuration of the system over a serial link, the SETUP/MTNCE port is available and is used in conjunction with WinSetup. The setup can also be loaded over the Ethernet network.

For dual redundant operation a crossover network cable must be connected between the two network RJ-45 connectors.

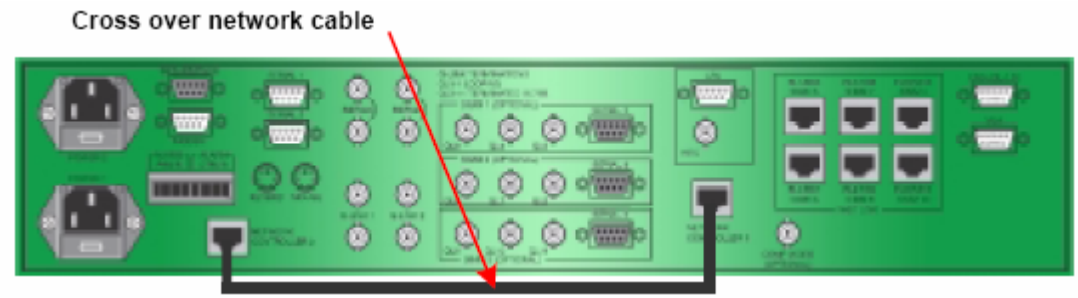


Figure 3-5: Cross Over Network Cable

Time code in either LTC or VITC format can be connected to the SC-1000 to support timed crosspoint settings. The time code option requires a time code SIMM to be installed, CI-0008. Using Winsetup32, it is then possible to set up a simple list of routes that are to be made at specific times. The SC-1000 uses the timecode input and switches the routes at the specified time.

3.5.2. Loading WinSetup

Copy the WinSetup program to a PC from the 3.5" floppy disc or CD ROM, provided. Run the WinSetup program and load the setup file for your system (for example, 0123.QRS). You will need to select the PC's COM port, either COM1 or COM2. Connect the PC to the SC-1000 with CAB-PC1 (the D9-to-D9 cable), provided, using the connector on the labelled 'Computer' or 'Serial1'. PC's use RS232, therefore be sure to check that the router is also in RS232 mode and has the –1 protocol fitted. Use the 'System => Compare Router Configuration' to check that the computer setup is the same as the one installed in the router.

You will now be able to make changes to the router setup, but any changes you make will need to be downloaded to the router before they take effect. The router panels will go 'off-line' for a short while but will then come back on.

You must save the QRS file on your computer as it CANNOT be uploaded from the router.

3.5.3. Using the SC-1000 with an Existing Quartz Routing System

If the SC-1000 System Controller is to be used with an existing Quartz routing system then the following installation instructions should be followed.

1. Make a note of your current system configuration (make particular note of the addresses of the remote control panels). This information can be retrieved from the existing WinSetup configuration. Use the WinSetup menu 'System' –'Compare Router Configuration' to double check that the setup in the existing router is the same as the WinSetup QRS file.

2. Load WinSetup (requires Win95 or later). Read in your existing configuration, the QRS file, and then immediately save with a later version number. For example, if the current file number is 0123-12 then it should be saved as 0123-13. If a problem occurs with the upgrade this will allow you to drop back to the earlier version. WinSetup will have converted the file to the latest format. Under the System drop down menu, select the *SC-1000 Config* option to configure the ports. Under the General drop down menu, select the system version in order to set the system version of the SC-1000. The ports then need to be configured and the system version needs to be set to SC-1000. Select 'Download' and WinSetup will send the file to the SC-1000 System Controller.

3. Upgrade all control panels to V5.40 or V6.40 or later firmware. If the panels are fitted with flash memory this is best achieved using the Firmware Manager to download the new firmware. If flash is not fitted but the panels use the processor module M-PU-0006 (PC-223) then this is best achieved by fitting flash memory.

4. Upgrade all routers to PC215 V5.40 or V6.40. If the routers use M-FU-0003-0001 then this is best achieved by fitting flash memory. If an older M-FU-0003-0000 or M-FU-0001-0000 processor were in use then it would be beneficial to upgrade at this time, as the older processors do not support in circuit re-programming of the flash memory.

5. Use WinSetup to read your configuration and the QRS file, then select Download and WinSetup will send the file to the SC-1000 System Controller.

6. Connect your existing routers to Q-Link 1. Connect your existing control panels to Q-Links 2, 3, and 4, but remember that Q-Links 3-11 are optional and depend on the number of CI-0006 modules installed.

3.6. TIMECODE

Timecode in either LTC or VITC format can be connected to the SC-1000 System Controller to support timed crosspoint settings. The timecode option requires a timecode SIMM CI-0008 to be installed. Using WinSetup it is then possible to set up a simple list of routes that are to be made at specific times. The SC-1000 System Controller uses the timecode input and switches the routes at the specified time.

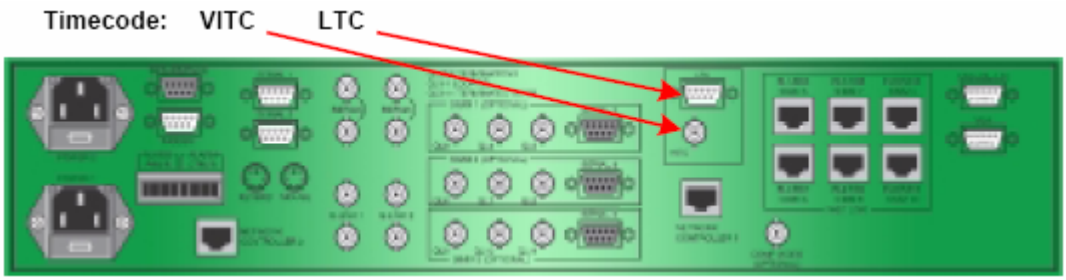


Figure 3-6: Timecode Connections

3.7. CONNECTING THE WINSETUP COMPUTER

Once installed and powered up, the WinSetup computer should be connected to the SC-1000 System Controller, either using the front panel D9 connector or the rear panel Setup/Maintenance connector. Use the WinSetup menu PC Comms window or *Options* > *Communications* to select the correct COM port for your computer and ensure that the baud rate is set to 38400, no parity, 8 data bits, and one stop bit.

If a serial connection is being used then either the front panel D9 connector or the rear panel Setup/Maintenance connector can be used. Use the WinSetup menu Comms to select the correct COM port for your computer and check the baud rate is set to 38400, no parity, 8 data bits, and one stop bit.

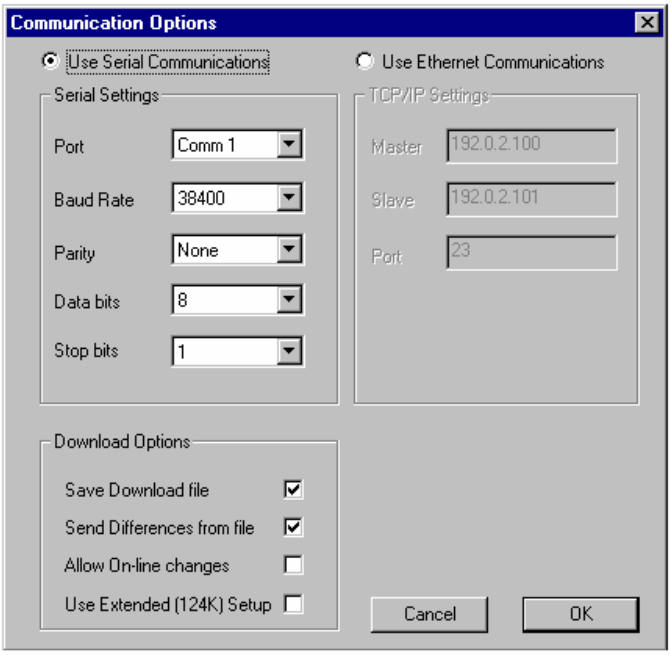


Figure 3-7: Selecting the "Use Serial Communications" Option

If a network connection is being used then connect to either the rear panel Net connector or via a network hub. Use the WinSetup menu Comms to select the correct TCP/IP addresses for the Master controller and Slave (if dual redundant). The Port is set to 23 for Quartz standard protocol operation.

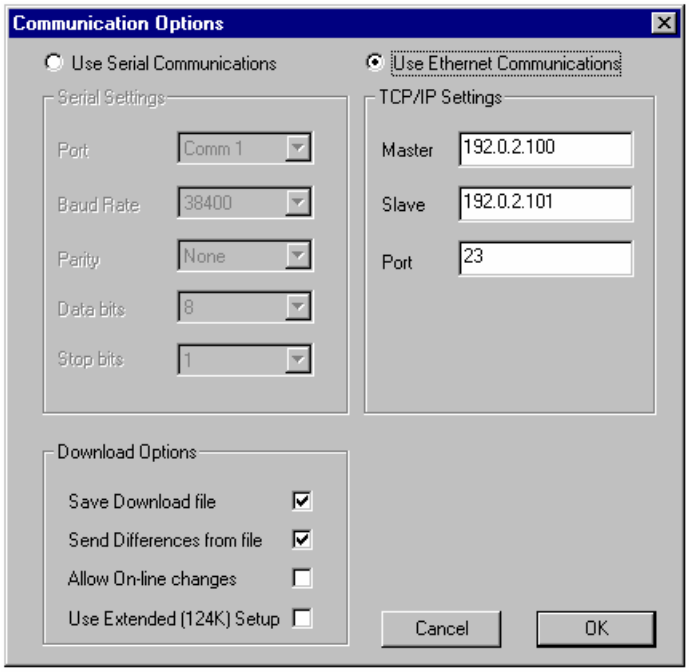


Figure 3-8: Selecting the "Use Ethernet Communications" Option

Use the WinSetup menu 'System', 'PC Comms Window' to open a communication dialog for the controller. Press the 'Acknowledge' button a few times and the SC-1000 System Controller should reply with '.A', which confirms that the cable, baud rate, etc are all OK.

The RJ45 Ethernet connector can also be used to download setup files from WinSetup.

3.8. CONNECTING A NETWORK

Each SC-1000 System Controller has its own RJ-45 network connection that supports TCP/IP protocol. In single controller installations this can be used to communicate with the controller. In dual redundant controller applications the network is also used to pass setup and route change status between them. There are three basic connection strategies that can be used: (1) Single Controller, Single PC, (2) Dual Controller, No PC, or (3) Dual Controller, Multiple PC's or other devices.

3.8.1. Single Controller, Single PC

This is the simplest method and would be used to download setup files or send basic engineering level commands to the controller.

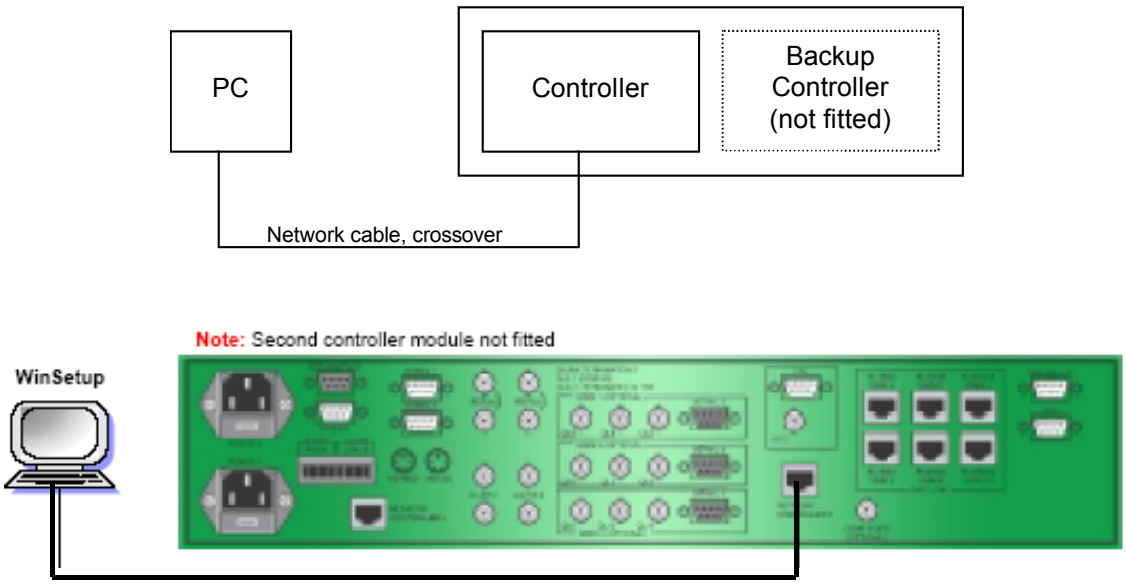


Figure 3-9: Networked File Downloaded

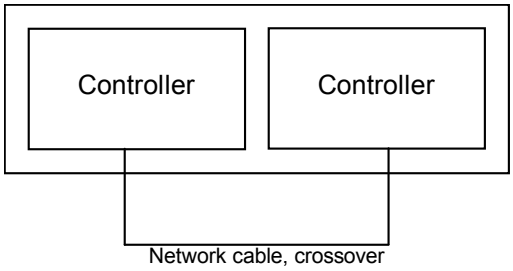
Use the *ping* command to test the network link. Assuming that the factory set TCP/IP address has not been changed, type the DOS command prompt:

Ping 192.0.2.100

The command will display a reply if the link is OK. Alternatively the Telnet window can be used. From the Windows task bar select 'Run' and type 'Telnet 192.0.2.100'. A communication window will be displayed and typing a carriage return several times should give an ‘E’ response from the SC-1000 controller.

3.8.2. Dual Controller, No PC

This method must be used in dual controller installations to allow the controllers to exchange setup and route status information. When the cable is correctly installed the reserve controller’s OK LED and control button LED will be flashing in sync with each other.



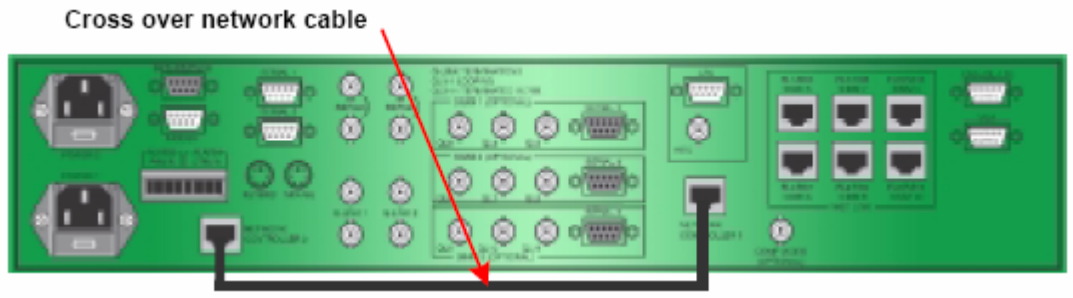


Figure 3-10: Networked Dual Controllers

3.8.3. Dual Controller, Multiple PC's or Other Devices

This method can be used in dual controller installations to allow the controllers to exchange setup and route status information. This method is also used when other devices need to connect to the SC-1000 System Controller. When the cables and hub are correctly installed the reserve controller's OK LED and control button LED will be flashing in sync with each other.

Figure 3-11: Networked Dual Controllers with PC Download

The TCP/IP protocol requires each device to have an address specified as a 4 byte number, e.g 192.0.2.100. Connections between devices are established by opening a 'Socket' for each connection.

To better describe this process, the functionality of a public telephone network will be used as an example. To make a telephone call, you ring the number required (the TCP/IP address). The telephone system checks that there is a phone at that number and if the call is answered, allocates a dedicated connection through the network (a Socket) for the duration of your call. In a TCP/IP system one device is designed to be a server for a particular application.

With the SC-1000 System Controller, the left hand controller acts as a server for the right hand controller. At power-up the main controller allocates a Socket for initial communications with any reserve controllers. The reserve controller will open a connection with the main controller and a second socket will be allocated, dedicated to the reserve controller. The same process is used for any further connections.

The SC-1000 System Controller is designed to support 20 Sockets at any one time. One of these is immediately allocated to the inter-controller server function, and a second will be allocated to the reserve controller in a dual controller installation. Further sockets are internally allocated which leaves 18 Sockets for other devices to connect to.

3.9. CHANGING THE TCP/IP ADDRESS

Each SC-1000 System controller is supplied with a factory default TCP/IP address. This can be changed by a special command issued from WinSetup32 using the PC Comms Window.

The factory default addresses are:

Main (left-hand) controller	TCP/IP address = **192.0.2.100**
	Sub-net mask = **255.255.255.0**
Reserve (right-hand) controller	TCP/IP address = **192.0.2.101**
	Sub-net mask = **255.255.255.0**

The following examples assume that the addresses will be changed to:

Main (left-hand) controller	TCP/IP address = **192.168.27.200**
Reserve (right-hand) controller	TCP/IP address = **192.168.27.201**

First check that WinSetup32 is connected to the Setup serial port on the back of the SC-1000 System Controller.

Check that the Main (left-hand) controller is in the controlling state with its Control LED on. From the PC Comms Window type a carriage return a few times and the SC-1000 System Controller will reply with an '.E' response, which confirms that the serial link is good.

Type the command: .&LOCALTCPIP,192.168.27.200<CR>
The SC-1000 will reply: .&LOCALTCPIP,192.168.27.200
Type the command: .&REMOTETCPIP,192.168.27.201<CR>
The SC-1000 will reply: .&REMOTETCPIP,192.168.27.201

Note the use of the comma after TCP/IP and the dot between address numbers.

Now change control to the reserve (right-hand) controller by pressing and holding the Control button. After a few seconds the Control LED will change to the On state. From the PC Comms Window type the carriage return a few times and the SC-1000 System Controller will reply with an 'E' response.

Type the command: .&REMOTETCPIP,192.168.27.200<CR>
The SC-1000 will reply: .&REMOTETCPIP,192.168.27.200
Type the command: .&LOCALTCPIP,192.168.27.201<CR>
The SC-1000 will reply: .&LOCALTCPIP,192.168.27.201

To change the Sub-net mask:

Type the command: .&TCPNETMASK,255.255.0.0
The SC-1000 will reply: .&TCPNETMASK,255.255.0.0

To change the default gateway:

Type the command: .&TCPGATE,192.0.2.55
The SC-1000 will reply: .&TCPGATE,192.0.2.55

Note that **a reboot is required before any of the above commands take effect**. Also note that any of the above commands can be used without an address when they will return the current setting. For example:

Type the command: .&LOCALTCPIP
The SC-1000 will reply: .&LOCALTCPIP,192.168.27.201

3.10. PIN OUTS FOR A PC RS232 CABLE

The following cable interconnection charts show the pin outs for wiring the serial communication cable that run between the router and the PC. The charts below show the pin outs of both a D9-to-D9 cable and a D25-to-D9 cable.

3.10.1. PC D9 Cable (RS-232)

PC D9 Socket		Quartz D9 Plug
Pin 3 (TX)	-----to-----	Pin 3 (RX)
Pin 2 (Rx)	-----to-----	Pin 7 (Tx)
Pin 5 (0v)	-----to-----	Pin 6 (0v)

3.10.2. PC D25 Cable (RS-232)

PC D25 Socket		Quartz D9 Plug
Pin 2 (Tx)	-----to-----	Pin 3 (Rx)
Pin 3 (Rx)	-----to-----	Pin 7 (Tx)
Pin 7 (0v)	-----to-----	Pin 6 (0v)

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4. SYSTEM DESIGN – OVERVIEW

4.1. Q-LINK – ROUTER AND CONTROL PANEL NETWORK

Q-Link is the network that interconnects the Quartz routers and the Quartz remote control panels. It is a standard 75Ω video cable that daisy-chains from frame-to-frame and panel-to-panel with each end of the Q-Link terminated with a 75Ω terminator.

Fitted to each router frame is a pair of BNC connectors that the Q-Link loops through. The larger frames, 2RU and the above have several Q-Link connectors. The ones labelled “Q-Link-1” or “Q-Link 1a/1b” are the primary connectors and are always available.

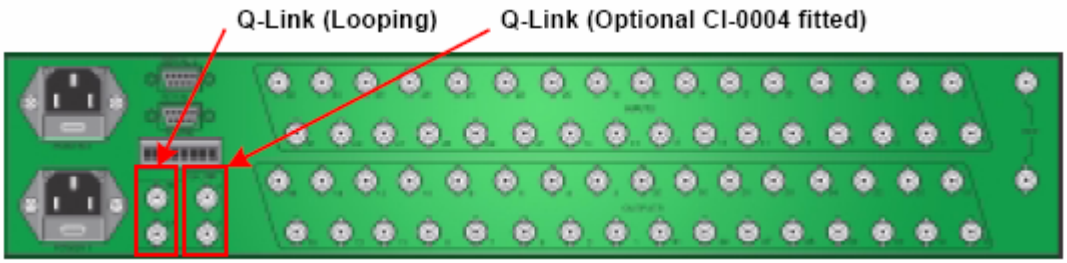

Figure 4-1: Example Router Frame – Rear View

The extra Q-Link connectors on the rear of the router frame are only enabled when the optional CI-0004 module is installed in the control processor.

Only one Q-Link connector is fitted on the remote control panels. A 'T-piece' is required to connect the control panel to the Q-Link network.

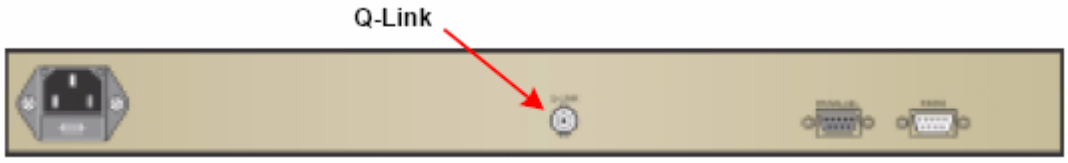

Figure 4-2: Example Rear Panel View

This allows the control panel to be removed from service and replaced without disrupting the Q-Link. This daisy chain method ensures the best transmission quality of the control signals down the cable.

A total of 64 devices can be supported, normally organized as 16 frames and 48 panels. Each unit connected to the Q-Link router and control panel has its own address, which is set via two rotary address switches.

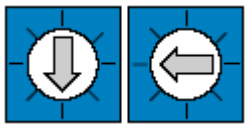

Figure 4-3: Router and Control Panel Address Switches

4.2. SMALL SYSTEM DESIGN

In this example of a router system all of the router frames and remote control panels are connected by a single Q-Link. The Q-Link uses standard 75Ω video cables that are daisy-chained from frame-to-frame and panel-to-panel. Each end of the Q-Link is terminated in 75Ω.

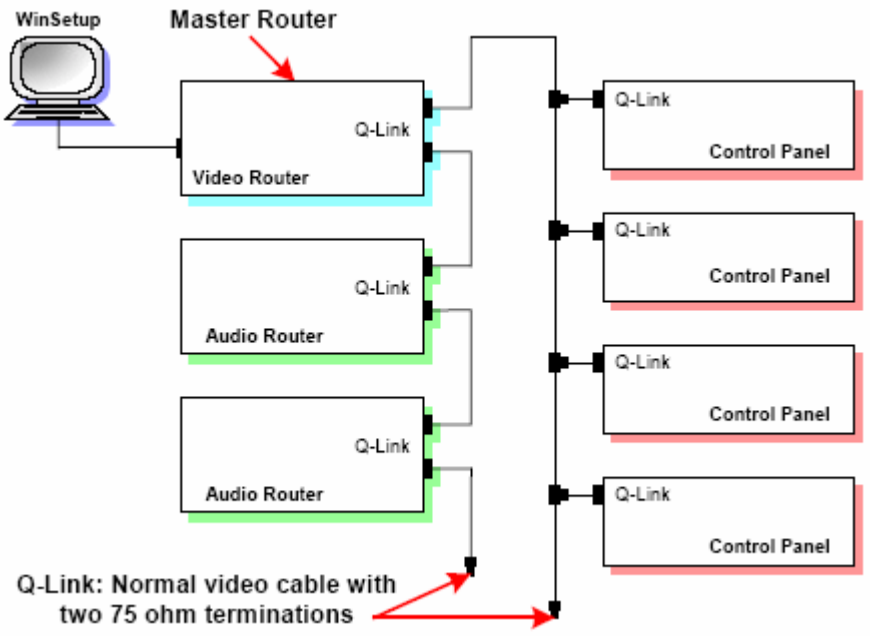

Figure 4-4: Small System Design

A pair of connectors is fitted to the frame and the link looped through them. On frames with several Q-Link connectors the “Q-Link-1” or “Q-Link 1a/1b” are always available. The extra Q-Link connectors are only supported when a CI-0004 module is installed into the FU-0003 processor. Only one connector is fitted on the panels and a T-piece needed to tap off the **Q-Link**. In this way a panel can be removed from service and replaced, even temporarily, without disrupting the link.

This daisy chain method ensures the best transmission quality of the control signals down the cable. Shortcuts such as running stubs to some panels are not recommended as this may cause data errors.

A total of 64 devices can be supported, normally organized as 16 frames and 48 panels. Each unit connected to the Q-Link has its own *address* switch that is set up as part of the system setup.

4.3. MEDIUM SYSTEM DESIGN

In medium sized systems it may be more suitable to have several Q-Links on the master frame and to wire off the Q-Link in different directions. This requires a CI-0004 module in the master router. Only router frames that are 2RU or higher have the extra BNC connectors required to support the installation of the optional CI-0004 module.

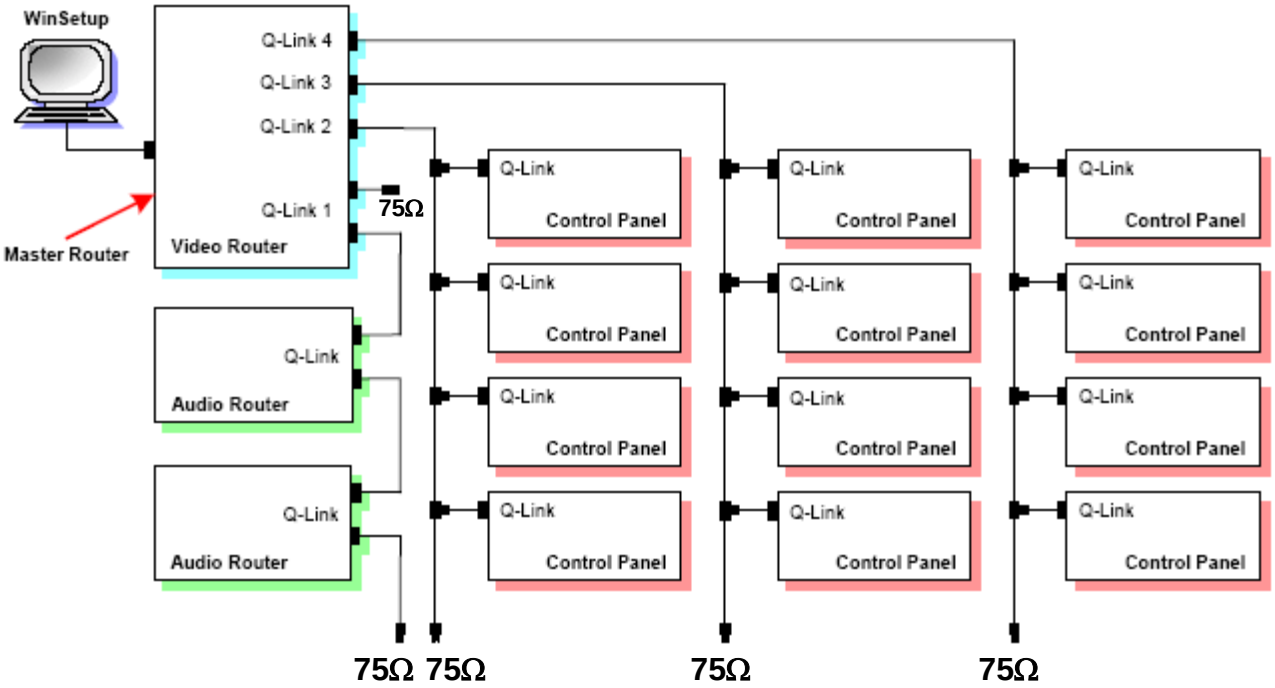

Figure 4-5: Medium System Design

Note: Q-Link 1 requires termination at 75 ohms on both ends of the chain. Q-Link 2, 3 and 4 only requires termination at 75 ohms on one end of the chain.

4.4. LARGE SYSTEM DESIGN

This section describes how the SC-1000 System Controller can be integrated into a large Quartz routing system.

A typical SC-1000 System Controller is shown in Figure 4-6. This example also shows the connection of a third party automation system and the support of a number of UMDs.

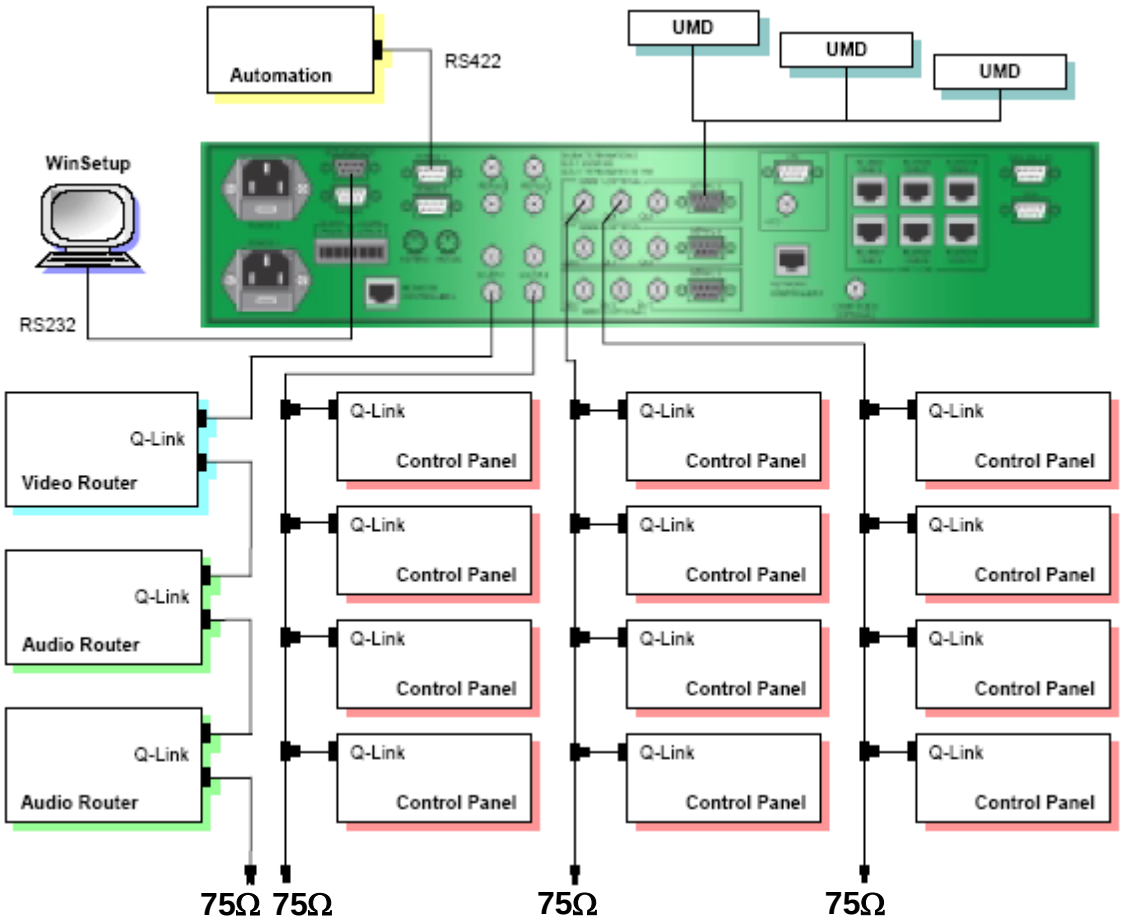

Figure 4-6: Large System Design

The SC-1000 System Controller is always the master of the system in which it operates rather than one of the routers.

For good system performance, all frames should be connected to one Q-Link, and the remote control panels evenly distributed across the remaining Q-Links. Any Q-Links connected to the SC-1000 System Controller that are not used must be fitted with a 75Ω termination.

4.5. PROTECTING AND ISOLATING THE Q-LINK

In large buildings or outside broadcast vehicles (OB trucks) the Q-Link system can be affected by mains earth differences between physically remote areas. This can cause currents to flow in the outer shield of the Q-Link cable, which can disrupt the Q-Link communications. To prevent this problem Quartz can supply a SI-0004 Q-Link opto-isolator unit, as shown in Figure 4-7.

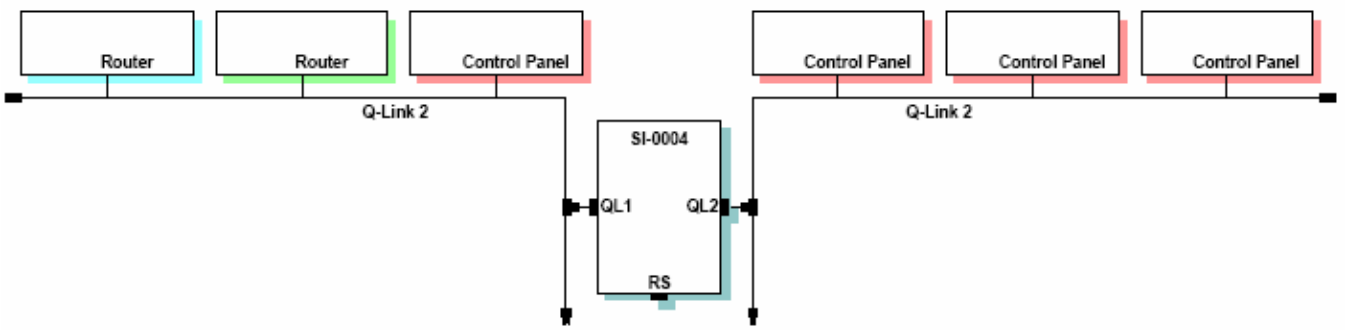

Figure 4-7: Q-Link Opto-Isolator

In large buildings the SI-0004 only needs to be installed once a problem has been identified. In OB trucks it is good practice to install an SI-0004 between the internal Q-Link and any external 'tail gate' or bulk head patch panels. Multiple SI-0004 units can be used where several external Q-Links are required.

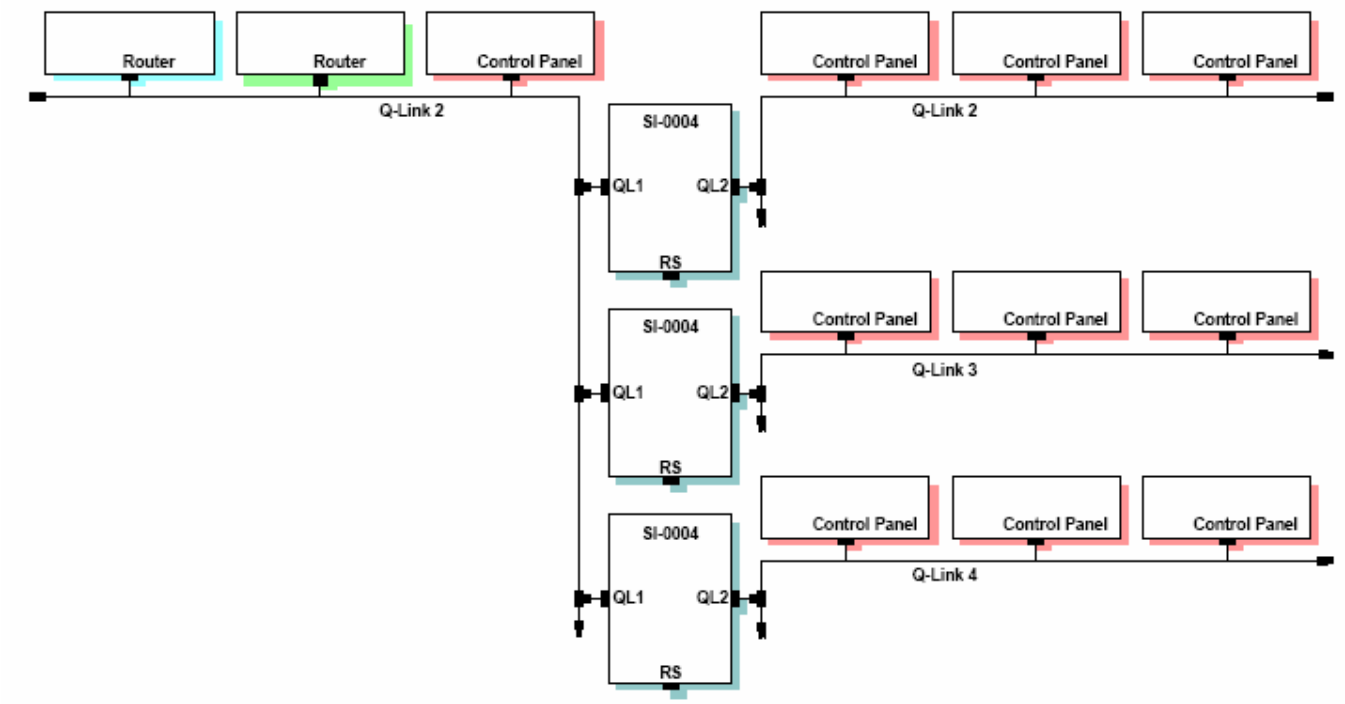

Figure 4-8: Q-Link Protection

Refer to Application Note AN-0016 for further information on the SI-0004 interface.

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5. SYSTEM COMPATIBILITY

The SC-1000 System Controller is compatible with existing Quartz control systems, however, the remote control panel and router firmware will usually need to be updated.

Remote control panels updated to work with the SC-1000 can still be used with systems operating with the standard embedded control processor (FU-0003).

5.1. WINSETUP

The WinSetup program defines the precise operation of the routing system and allows the user to edit the system configuration that is stored as a file on a PC. This file is then to be downloaded to the routing system. When the system powers up the configuration data is used to initialize each router and control panel as it comes online.

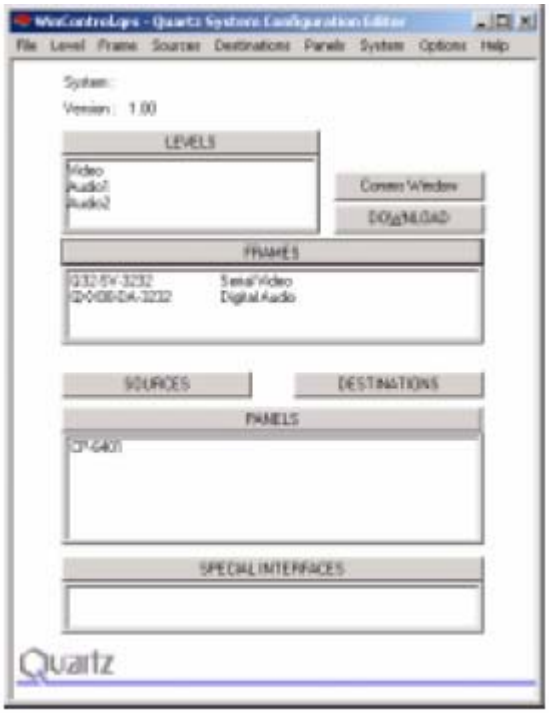

Figure 5-1: WinSetup Application

Note: Systems using WinSetup (16 bit application) can be easily upgraded to the new WinSetup V2 (32 bit application, Win95 or later) as existing WinSetup QRS files are read into WinSetup V2 without any changes being required.

The SC-1000 System Controller can store multiple downloaded setup files in non-volatile disk-on-chip or on floppy disc.

5.2. FIRMWARE

5.2.1. SC-1000 System Controller

The SC-1000 System Controller's operational firmware is compatible with all current Quartz routers and remote control panels. All of the devices connected to the SC-1000 System Controller must be running V5.40, V6.40, or later.

The SC-1000 System Controllers operational firmware is stored in non-volatile disk-on-chip and can be updated from the floppy disc.

The SC-1000 System Controller can be supplied with many different serial port protocols pre-installed.

5.2.2. Routers

All Quartz routers controlled from the SC-1000 System Controller over Q-Link must be fitted with V5.40, or V6.40, or a later issue. These versions are a superset of the existing software and have extra Q-Link commands to support the SC-1000 System Controller.

5.2.3. Control Panels

All Quartz remote control panels controlled from the SC-1000 System Controller over Q-Link must be fitted with V5.40, or V6.40, or a later issue. These versions are a superset of the existing software and have extra Q-Link commands to support the SC-1000 System Controller.

6. CONFIGURATION

6.1. SETUP SERIAL PORT

The setup serial port is used to download new setup files from WinSetup, or to investigate error status information.

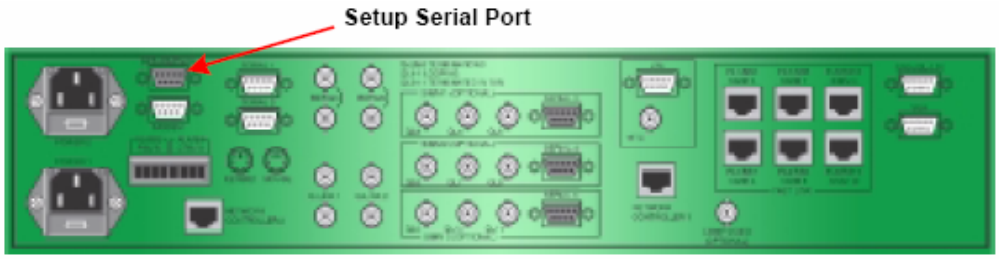

Figure 6-1: Computer Port

The Setup Serial Port connector, a D-Type 9 way socket, uses the following pin-out.

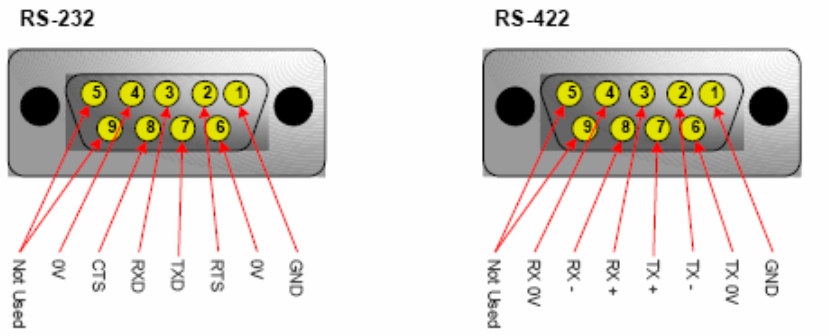

Figure 6-2: Computer Port

6.2. RESET SWITCH AND CARD EJECTOR SWITCH

Removing the front door reveals the processor module(s), the ejector handle and switch, and the reset switch.

Pressing the small reset switch located behind the front door can reset the processor module. Reset is normally only used after loading new software. Reset will not cause any video routes to change.

The card ejector handle has a built in red switch that must be pressed before the card can be removed. When pressed this switch causes an immediate disconnect of the processor modules external I/O circuitry (except the network port) thus preventing any disturbance to external communications as the module is removed.

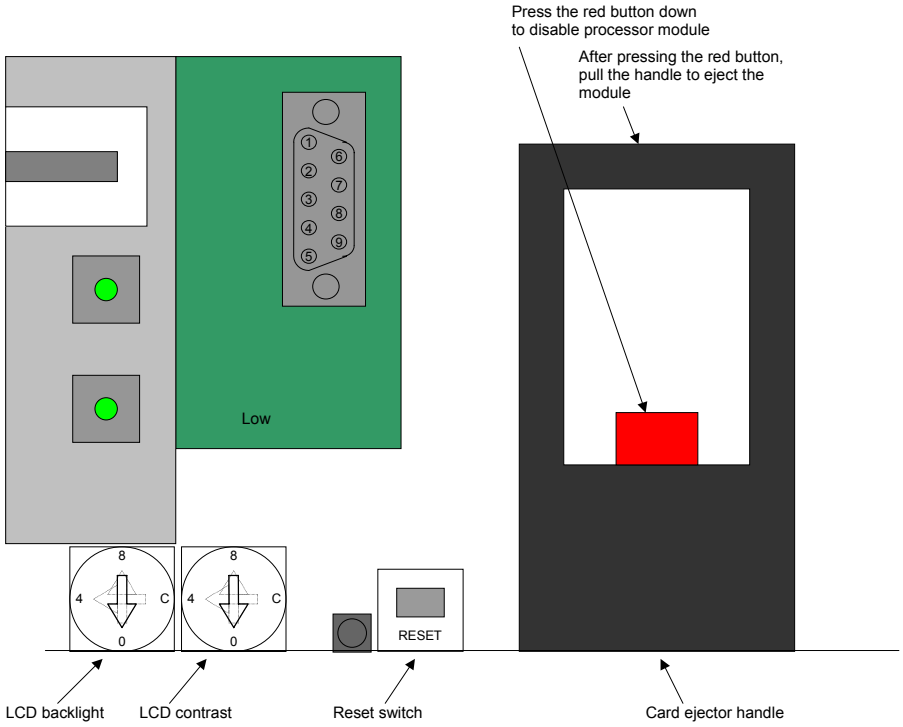

Figure 6-3: Reset and Card Ejector Switch

6.3. SETTING SC-1000 LINKS AND SWITCHES

The processor module has a number of links, which will all have been factory set.

7. OPERATION

7.1. FRONT PANEL OPERATION

The SC-1000 System Controller is fitted with a front panel LCD display, which displays the menu structure. Buttons are provided for menu navigation and control.

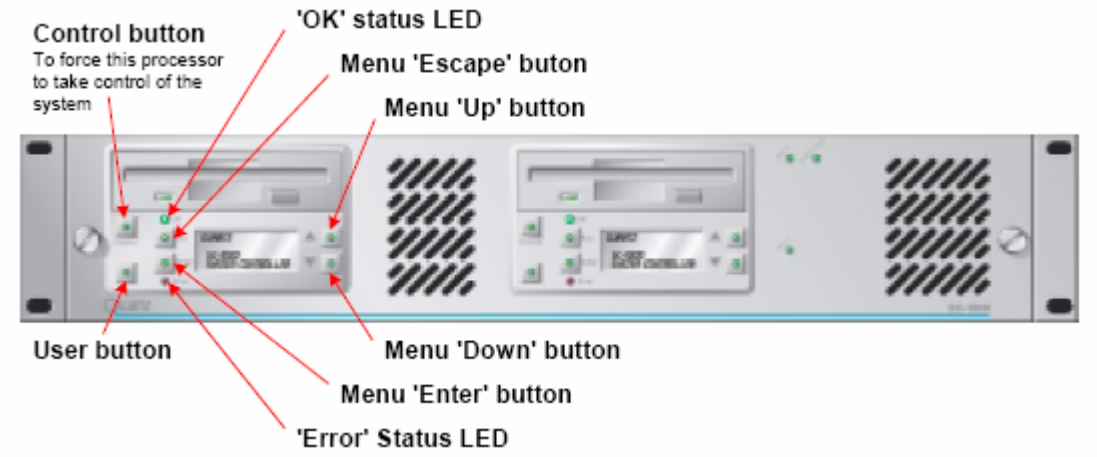

Figure 7-1: Controller Module

7.1.1. OK Status LED

The OK Status LED flashes at approximately 1Hz to indicate that the processor is running. In dual controller installations the reserve controller OK LED will flash in sync with the Control LED when the external Ethernet link is working correctly between the z controllers.

7.1.2. Error Status LED

The Error Status LED is normally off. It will come on for various error conditions such as:

1. Flashing - When software has detected an internal error.
2. Flashing - Setup error detected, such as defining more Q-Links than exist. This will trigger a jump to a Setup Recovery menu.
3. Flashing - Important messages
4. On - Alarms such as front door, PSU temperatures etc.

7.1.3. Control Button

The Control button is On to indicate that this processor is controlling the system. A flashing state indicates that the other (dual redundant) processor is controlling the system. To changeover, the flashing button must be pressed and held for a few seconds. In dual controller installations the reserve controller Control LED will flash in sync with the OK LED when the external Ethernet link is working correctly.

7.1.4. Enter Button

The enter button causes the currently selected menu item to take action. Each menu item has an *action* icon to indicate the common effects.

→ This menu item leads to another menu
• This menu item causes something to change e.g. the configuration
s This menu item causes a new setup to be loaded
θ This menu item steps through options
! This menu item will impact on the system e.g. re-boot

7.1.5. Escape Button

The Escape button forces a sub-menu to exit to the menu above. Holding the *Esc* button during boot up starts the SC-1000 but does not load the current setup.

7.1.6. Up/Down Arrow Button

The Up and Down arrow buttons cause the menu cursor to scroll up or down. The LED will light up to indicate that menu items exist off the top or bottom of the screen.

7.1.7. User Button

The User button enables short cuts to errors.

7.2. THE MENU STRUCTURE

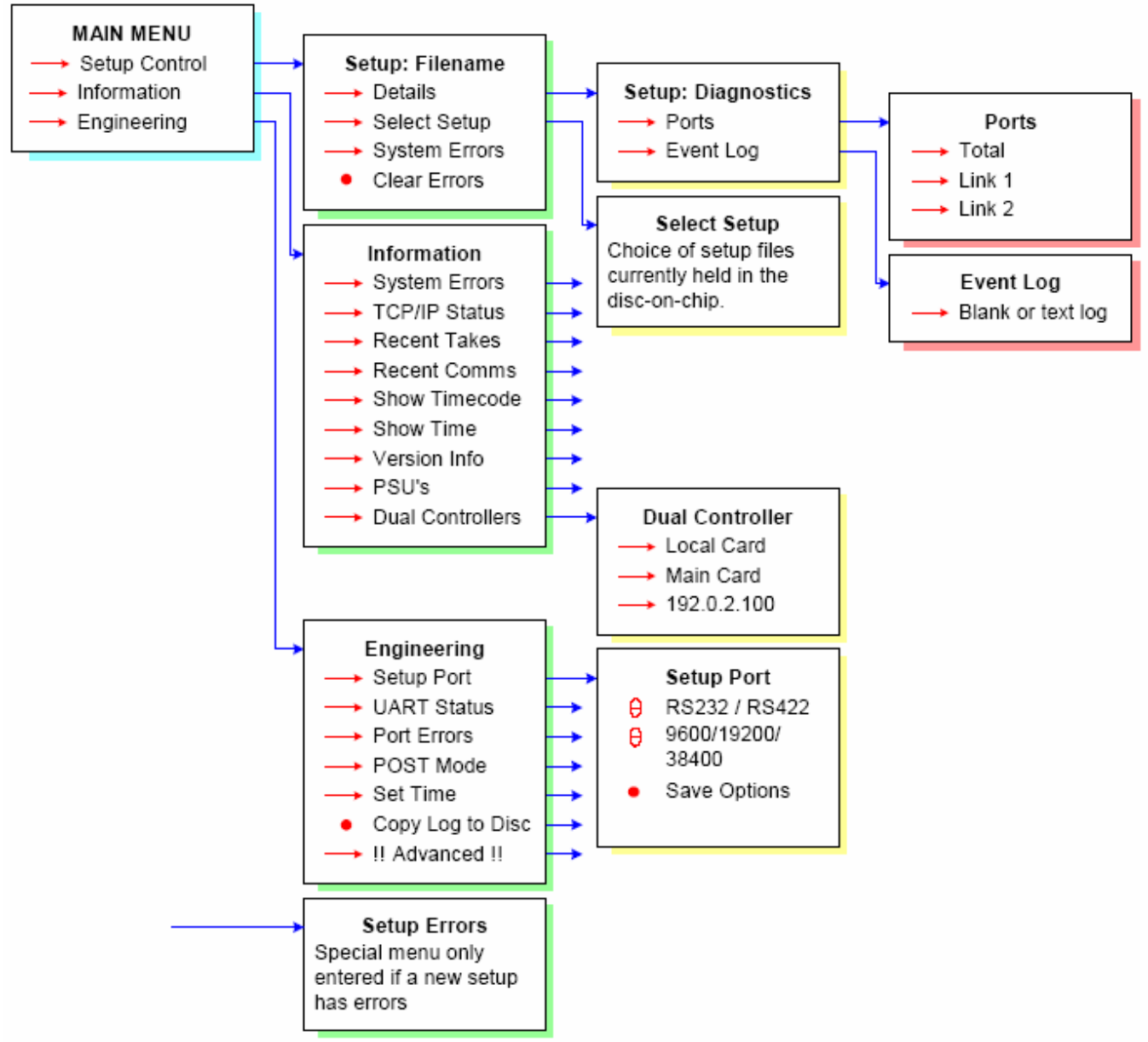

Table 7-1: Menu Structure

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8. DUAL REDUNDANT CONTROLLERS

The SC-1000 System Controller chassis will support two controllers working in a dual redundant configuration.

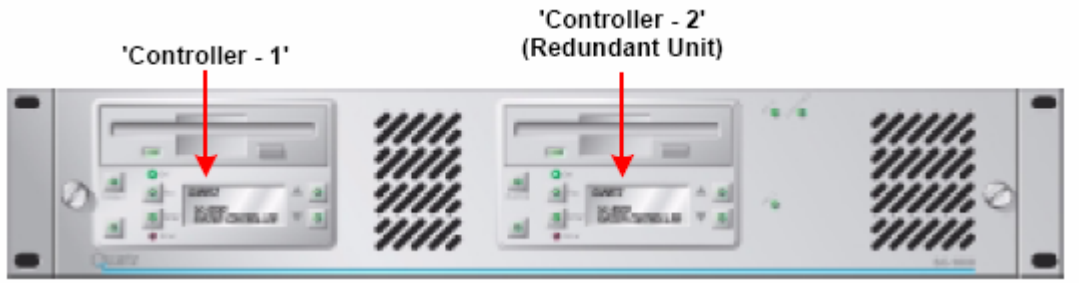

Figure 8-1: Dual Redundant Controller

The processors share connections on the motherboard such that one processor will be controlling the rear panel connectors while the other is in standby mode. The controlling processor has its Control LED on and the standby controller shows a flashing LED.

To transfer control over to the redundant controller the user must press and hold the flashing Control button for a few seconds, after which control will be transferred.

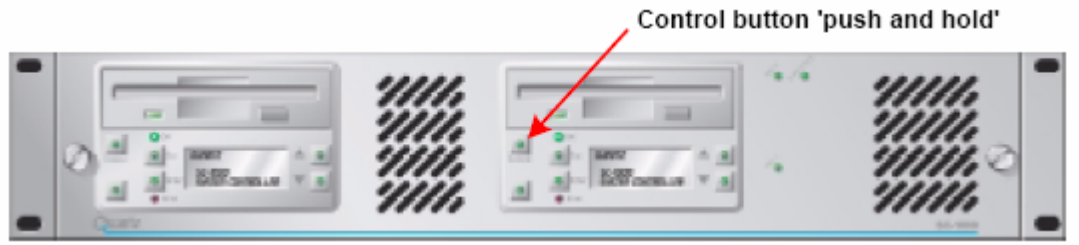

Figure 8-2: Control Button

After transferring control one-way, it cannot be transferred back until a period of approximately 20 seconds has passed. The LED in the center of the control button indicates the current status of the controller module.

'ON' – Currently in control
'OFF' – Not available, cannot take control
'FLASHING' – Available, can take control
'SLOW FLASHING' – Not in sync with primary controller

A crossover network cable connecting the two RJ-45 network connectors must link the controllers. The controllers have an internal link that is used for low level communication but they require the network cable to transfer high-level data such as a route status and configuration files.

Each SC-1000 System Controller has a TCP/IP address to allow network communication. This address is built into the operating system kernel and is initially factory set to either:

192.0.2.100 Normal address for left hand controller
192.0.2.101 Normal address for right hand controller

See section 3.9 for details on how to change the TCP/IP address.

If a controller has to be removed from service in a 'live' installation then the following procedure should be followed.

1. Transfer control away from the controller to be removed by pressing and holding the Control button on the other controller. The controller to be removed should then have a flashing Control LED.

2. Press the red ejector handle switch down. This will electrically remove the controller from the back-plane by tri-stating all the Q-Link and RS232/422 drivers. The network is not disconnected at this stage.

3. Use the ejector handle to lever the controller out of the SC-1000 System Controller chassis.

To re-install the controller, re-insert the module and use the ejector handle to lever the card fully into the SC-1000 System Controller chassis. The red ejector switch will automatically engage. Wait for the controller to boot and display the normal operational menu. After a short period the *Control* and *OK* buttons will start to flash sync indicating that the external network connection has been re-established.

After a further period the controller should indicate that it is loading the setup file from the currently active controller. The system is then back in full dual redundant operating mode.

9. THIRD PARTY INTERFACING

The SC-1000 System Controller can be connected to many third party devices to support typical broadcast system requirements. A general guide to the interfaces supported by Quartz can be found in application note AN-0006.

As the SC-1000 has to connect to a diverse range of products, it includes a feature to allow the internal level destination, and source to be translated before being used by a remote control protocol. This might be used, for example, to convert an update on Level 1, destination 257 to an update on Level 2, destination 1 to support a device that does not cope with numbers larger than 256.

Below is a summary list giving the common interfaces or those that are more specific to the SC-1000 System Controller.

1. ABIT Automation
The SC-1000 can be controlled by an ABIT automation system. This uses Quartz native (-1) protocol operating at 38400,N,8,1.

2. BBC Broadcast Network Control System (BNCS)
The SC-1000 can be controlled by the BBC BNCS networked computer system. This uses Quartz native (-1) protocol operating at 38400,N,8,1.

3. DAL Automation
The SC-1000 can be controlled by a DAL automation system. This uses Quartz native (-1) protocol operating at 38400,N,8,1.

4. GVG SMS-7000 Emulation
The SC-1000 supports GVG SMS-7000 router emulation to allow connection of network devices such as the M2100 vision mixer.

This is configured from WinSetup32 using the *System -> SC-1000 Configuration -> Port Options* menu. Press *Add* and then select the TCP/IP Port. Change the Port and Protocol settings to SMS-7000 Protocol, TCP/IP Server, and in the adjacent box enter 12345 (the port number).

5. GVG M2100 Control Panel Aux Bus
The SC-1000 can accept information from an M2100 control panel (tub) to trigger salvos when the M2100 changes between channels.

This is configured from WinSetup32 using the *System -> SC-1000 Configuration -> Port Options* menu. Press *Add* and then select the serial port to be used. Change the Port and Protocol settings to M2100 CP Protocol with baud rate settings at 9600,N,8,1 and RS422. In the extra protocol Information box add the salvo numbers and the channel names. For example:

1=”FCM1 “
2=”FCM2 “
3=”MCR1 “
4=””

Note that the names are padded out to 8 characters with spaces.

When the M2100 tub selects channel FCM1 it will output the text string FCM1 on its Aux-2 connector. This is received by the SC-1000, which then triggers salvo 1. If the M2100 deselects all channels then a null string is output and this will trigger salvo 4 in the above example.

6. Harris/Louth Automation

The SC-1000 can be controlled by a Harris/Louth automation system. This uses Quartz native (-1) protocol operating at 9600,N,8,1.

7. Image Video TSI-1000

The SC-1000 can connect to an Image Video TSI-1000 UMD system to allow route status to be gathered by the UMD system. The UMD system can also request source and destination names. This uses Quartz native (-1) protocol operating at 38400,N,8,1.

8. Odetics Automation (Airo & Roswell)

The SC-1000 can be controlled by an Odetics automation system. This uses Quartz native (-1) protocol operating at 38400,N,8,1.

9. Omnibus Control System

The SC-1000 can be controlled by the Omnibus networked computer system. This uses Quartz native (-1) protocol operating at 38400,N,8,1.

10. TSL SC-1

The SC-1000 can connect to a TSL SC-1 UMD System Controller to allow route status to be gathered by the UMD system. The UMD system can also request source and destination names. This uses Quartz native (-1) protocol operating at 38400,N,8,1.

11. Utah

The SC-1000 will control a Utah router. This uses Utah RCP-1 protocol.

This is configured from WinSetup32 using the *System -> SC-1000 Configuration -> Port Options* menu. Press *Add* and then select the serial port to be used. Change the Port and Protocol settings to Utah SC3 Protocol with baud rate settings that match Utah settings.

10. TECHNICAL DESCRIPTION

10.1. SPECIFICATIONS

10.1.1. User Interface

Front Panel: 20 characters x 4 lines LCD display with back-light. Used with navigation and enter buttons for control of options and viewing diagnostics.

10.1.2. Storage

Non-Volatile Memory: Used to store route settings, 5 years
Flash Disk: 8MB as standard, used to store configuration files. Can be upgraded to 144MB or more
Diskette: 3 1/2" drive for loading or saving configurations and status information

10.1.3. Connections

Q-link: 2 as standard, options for 9 more by installing CI-0006 sub-modules, used for connecting to remote panels and Quartz routers, 75Ω video cable, 500m (1600ft) max. length
Setup / Maintenance: RS232/422 selectable, wired to Quartz standard
Modem: RS232 wired to PC D9 standard (can be used as a serial port)
Serial: 2 as standard, option for 3 more ports; RS232/422 selectable
Network: Ethernet 10BaseT, TCP/IP protocol, RJ45
ENG: Special engineering connection for Quartz use, can also be used to interface to a fiber optic converter for long haul connections
Alarm: Relay contact pairs from processors and power supplies
Timecode: Special engineering connection for Quartz use, can also be used to interface to a fiber optic converter for long haul connections

10.1.4. Electrical

Supply: Auto ranging 100-240V AC, 50/60Hz

10.1.5. Power Consumption

Single Processor: 30 Watts
Dual Processor: 60 Watts

10.1.6. Physical

Height: 2RU, 88mm (3.5" nom.)
Width: 19" rack mount
Depth: 485mm (19" nom.)
Weight: 9kg
Operating Temperature: 0 - 40°C
Ventilation: Fan cooled, air drawn from front. Exhaust at rear and sides

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11. ROUTINE MAINTENANCE

There is very little routine maintenance for the SC-1000 System Controller apart from ensuring a constant air-flow through the frame. The front door of the SC-1000 is fitted with fan filters. As these will become blocked with dust during use they should be removed and cleaned periodically.

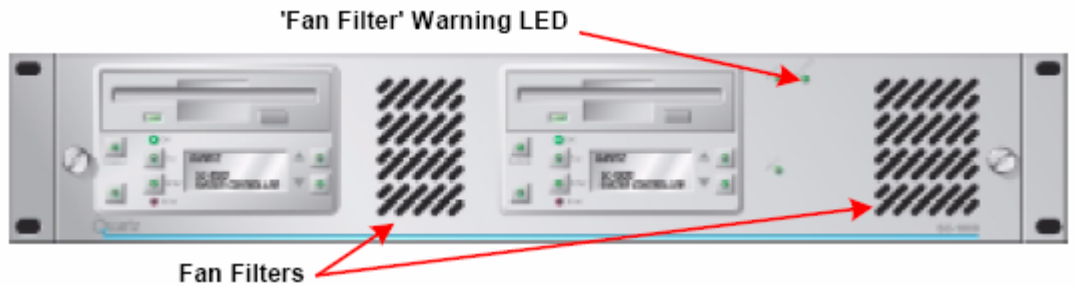

Figure 11-1: Fan Filters

A Fan Filter warning LED on the front door indicates that the SC-1000 System Controllers internal temperature is excessive, normally caused by blocked fan filters.

Note: Removing the front door also creates an error that will be cleared once the door is re-fitted.

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12. SOFTWARE UPGRADES

12.1. LOADING NEW SOFTWARE

New software can be installed directly to the SC-1000 from the floppy disc. New software is supplied by Quartz/Evertz as a DOS 'boot' disc. If you have a dual controller system then it is good practice to install the software to the reserve controller and test its operation before upgrading the second controller. It is also good practice to have the current version available on a disc in case problems arise.

There are two basic methods for upgrading the software on the SC-1000.

An Off-Air upgrade is the quickest and simplest method, however it requires turning off power to both cards resulting in the system being unusable while the upgrade takes place (the upgrade takes about 2 minutes).

An On-Air upgrade involves more steps and takes longer but does not require turning off the power to both units. Therefore, one unit is always being actively in control.

12.1.1. Off-Air Upgrade

1. Remove the front blanking plate from the SC-1000.
2. Turn off the power to the SC-1000 (on both power supplies, if two are fitted).
3. Insert the supplied disks into the SC-1000's two floppy drives.
4. Turn on the power.

The SC-1000 will boot up and copy over all the relevant files. This process should take approximately one minute. Ensure that both floppy drive lights are no longer illuminated before proceeding to the next stage.

5. Turn off the power.
6. Remove both floppy disks.
7. Turn on the power.

The SC-1000 will now boot running the upgraded software.

Both cards have now been upgraded. To verify, choose the 'Information' menu, followed by 'Version Info' option. The display should show the following information:

Software: V1.05
Hardware: V2.00

8. Replace the front blanking plate.

12.1.2. On-Air Upgrade

1. Remove the front blanking plate from the SC-1000.
2. Insert one of the floppy disks into the reserve controller.

The reserve controller can be identified by the status of the Control LED. If the LED is flashing or is not lit then it is acting as the reserve.

3. Press the reset switch on the reserve controller. The reset switch is located to the left of the red ejector handle button.

The SC-1000 will boot up and copy over all the relevant files. This process should take approximately one minute. Ensure that both floppy drive lights are no longer illuminated before proceeding to the next stage.

4. Remove the floppy disk and press the reset switch on the reserve controller again.

The SC-1000 will now boot running the upgraded software.

Wait for the Control LED to start flashing in time with the OK LED. This signifies that the reserve controller is communicating with the main controller. To ensure that all the route status data is copied to the reserve controller, wait until you see the reserve controller *reload* the current setup.

5. Press and hold the control button on the reserve controller for 4 seconds.

The reserve card should now have taken control, as signified by the Control LED remaining consistently ON.

6. Repeat steps 2 to 5 for the other controller.

Both cards have now been upgraded. If you would like to check the upgrade, choose the 'Information' menu, followed by 'Version Info'. The display should show the following information:

Software: V1.05
Hardware: V2.00

7. Replace the front blanking plate.

12.2. EMERGENCY RECOVERY

There is a small possibility that the setup file could become corrupted or be otherwise unreadable due to software incompatibility. As the setup file is read and processed at power up, this could cause a situation where the SC-1000 would not boot up. If this ever occurs the Esc key can be held in during boot up and the corrupted setup will be ignored. Select a new setup from the front panel or download a new setup and then re-boot the SC-1000 to commence normal operation.

12.3. SNMP REMOTE DIAGNOSTICS

The SNMP is a network protocol that allows a 'manager' computer to gather information about remote devices. It also allows a basic level of control to the remote device. An SNMP device can be polled for information or have 'Traps' set that cause a message to be issued when a particular condition occurs. The SNMP standard also supports 'Community Names', which are synonymous with passwords and provide a level of security against inadvertent changes. The manager software is generic and, therefore, must have some information about the device it is connecting to. MIB files provide this information and are text files supplied by the equipment manufacturer (Quartz in this case).

The SC-1000 uses SNMP version 1. Traps and Community Names are supported. These are configured via the SC-1000's main serial port. Trap messages are sent whenever the SC-1000 would normally display the message on its local display. This means that conditions like a router falling off line can be flagged on a remote PC running an SNMP management program. Since the SC-1000 can log a wide variety of messages they are sent as plain text.

The SC-1000 also keeps a database of the status of all connected devices (panels, routers, etc). Although this is not currently available via SNMP, it can be remotely queried via a TCP/IP connection from WinSetup.

The basic tree of commands contained in the MIB file are as follows:

*** control**	* command	Setting this key is the same as sending a command via the serial port (to make a take etc).
	* setup	This key can be read to obtain the name of the active setup/configuration.
	* controlstate	This key defines the current control state (master/reserve).
*** settings**	* localtcpip	The TCP/IP address of the controller.
	* remotetcpip	This key determines the address of a second controller when used in a dual-redundant system.
	* traptcpip	The TCP/IP address that trap messages are sent to.
*** information**	* version	The software version/revision number.
	* memory	The current used/free memory of the controller.
	* simms	The number of SIMMS installed (such as additional serial comm modules).
	* diskusage	The amount of used/free solid state disk storage.
	* upperpsu	The temperature of the upper PSU (if present).
	* lowerpsu	The temperature of the lower PSU (if present).
*** routestatus**	* startdestination	The first destination to show the status for, via SNMP.
	* enddestination	The last destination to show the status for, via SNMP.
	* destinationtable	A 'table' type key that gives the route status for a range of destinations/levels.
	* destinationentry	Each entry can show up to 8 levels of route status.
*** history**	* lasterror	The last recorded system error (that was sent as a trap).
	* lastwarning	The last recorded system warning (that was sent as a trap).
	* lastmessage	The last recorded system message (that was sent as a trap).
*** traps**		* traps are sent for a wide variety of conditions, generally a trap is sent whenever a message would appear on the controller module itself.

Table 12-1: Tree of Commands in MIB File

12.4. ERROR LOGGING

The front panel menu allows various logging functions to be enabled. This is intended for Quartz engineers to locate the cause of problems. All history logging should be maintained in factory settings.

12.5. STATUS LED'S

There are status LED's on the SC-1000 main processor PCB that give engineering status information.

Global En	LD-15	
Done	LD-10	
Test	LD-14	
POST	LD1-8	
The following LEDs are only visible with the top cover removed.		
B2 En	LD-18	
B1 Add En	LD-17	
B1 En	LD-16	
Done FT	LD-11	
Pwr Rst	LD-13	

Table 12-2: Status LEDs

12.6. MAIN MODULE LINKS

The processor module has a number of links. The following is a list of factory set links:

Link	Function	Factory Setting
LK-4	CTP2, RS422 or RS232	
LK-5		
LK-6	RS1 Term	
LK-7	RS1, RS232 or RS422	
LK-8	RS2 Term	
LK-9		
LK-10	RS2, RS232 or RS422	
LK-11	Keyboard Enable	Sw Ctrl
LK-14	Eng or PROM	Eng
LK-21		
LK-22		
LK-24		
LK-25	Setup/Term	
LK-26	SA13 or BCLK	SA13
LK-27	CLK8M or BCLK	CLK8M
LK-28	Init	
LK-29		Towards front
LK-30		
LK-31	FT Module SIMM5 fitted or not fitted	
LK-32	FT Module SIMM6 fitted or not fitted	
LK-33	FT Module SIMM7 fitted or not fitted	
LK-34	FT Module SIMM8 fitted or not fitted	
LK-35	SIMM Use, FT or CI-0006	
LK-36	SIMM Use, FT or CI-0006	
LK-37	SIMM Use, FT or CI-0006	
LK-38	SIMM Use, FT or CI-0006	
LK-39	SIMM Use, FT or CI-0006	
LK-40	SIMM Use, FT or CI-0006	

Table 12-3: Factory Set Links

13. TROUBLESHOOTING

13.1. PANELS DO NOT COME 'ON-LINE'

As you connect each panel to the Q-Link, the panel will initially show 'No Q-Link' or a flashing pattern of LED's. After about 8 seconds the panel will clear and then display the current route assignments. If the panel shows 'Panel type error' or 'PR Error' then the panels Q-Link address does not match the information in the setup or the panel does not have a unique address, set by the rotary hex switch and DIP switches DIP-3 and DIP-4. Use the WinSetup '*File => Print System Setup*' to get a list of all the routers and panels on your system. Each of your panels should have a unique Q-Link address.

If the panel address is set correctly then check the router setup using WinSetup. If the setup provided on the disc looks correct but is different to the one in the router, then download the setup and re-check the panel to see if it has now come 'On-Line'.

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