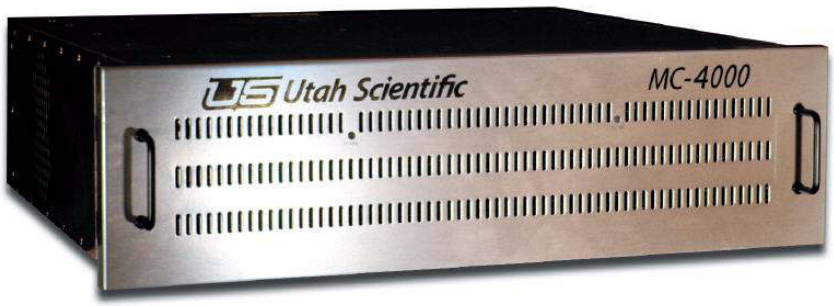
Utah Scientific

MC-4000 System



System Setup and Operations

MC-4000 Operations Guide

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Declaration of Conformity

Utah Scientific, Inc.

4750 Wiley Post Way, Suite 150
Salt Lake City, Utah 84116-2878 U.S.A.

We declare our sole responsibility that the MC-4000 Digital Routing Switcher is in conformance with the following standards:

Emission

- EN55022:1994+A1&A2

Immunity

- EN55024:1998
- EN61000-3-2
- EN61000-3-3

Safety

- IEC 60950-1:2001 /EN 60950-1:2001

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- EMC Directive 89/336/EED
- Low Voltage Electrical Directive 72/23/EEC

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CE

Important Safeguards and Notices

This section provides important safety guidelines for the Operator and Service Personnel. Specific warnings and cautions are found throughout the guide where they apply, but may not appear here. Please read and follow the important safety information, specifically those instructions related to risk of fire, electric shock, or injury to persons.

Safety Symbols

- Hazardous Voltage symbol

- Caution symbol. The product is marked with this symbol when it is necessary to refer to the manual to prevent damage to the product.

Warnings

Please observe the following important warnings:

- Any instructions in this guide that require opening the chassis, changing a power supply, or removing a board, should be performed by qualified personnel only. To reduce the risk of electric shock, do not perform any service unless you are qualified to do so.
- Heed all warnings on the unit and in the operating instructions.
- Do not use this product in or near water. Disconnect AC power before installing any options or servicing the unit unless instructed to do so by this manual.

- This product is grounded through the power cord ground conductor. To avoid electric shock, plug the power cord into a properly wired receptacle before connecting the product inputs or outputs.
- Route power cords and other cables so they won't be damaged.
- The AC receptacle (socket) should be located near the equipment and be easily accessible.
- Disconnect power before cleaning. Do not use any liquid or aerosol cleaner - use only a damp cloth.

- Dangerous voltages exist at several points in this product. To avoid personal injury, do not touch exposed conductors and components while power is on. Do not insert anything into either of the systems two-power supply cavities with power connected.
- Do not wear hand jewelry or watches when troubleshooting high current circuits, such as power supplies. During installation, do not use the door handles or front panels to lift the equipment as they may open abruptly and injure you.
- To avoid fire hazard when replacing fuses, use only the specified correct type, voltage and current rating as referenced in the appropriate parts list for this product. Always refer fuse replacement to qualified service personnel.
- Have qualified personnel perform safety checks after any service.

Cautions

Please observe the following important cautions:

- When installing this equipment do not install power cords to building surfaces. To prevent damage when replacing fuses, locate and correct the problem that caused the fuse to blow, before reconnecting power.
- Use only specified replacement parts

Notices

Company Information

Utah Scientific, Incorporated

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Table of Contents

CHAPTER 3 *Software Operation SCX-400 and MC-4000*

CHAPTER 1

Introduction

System Configurations

Hardware Block Diagrams and System Types

This Chapter contains and introduction to, and operational configurations for the MC-4000I and E Systems.

MC-4000E

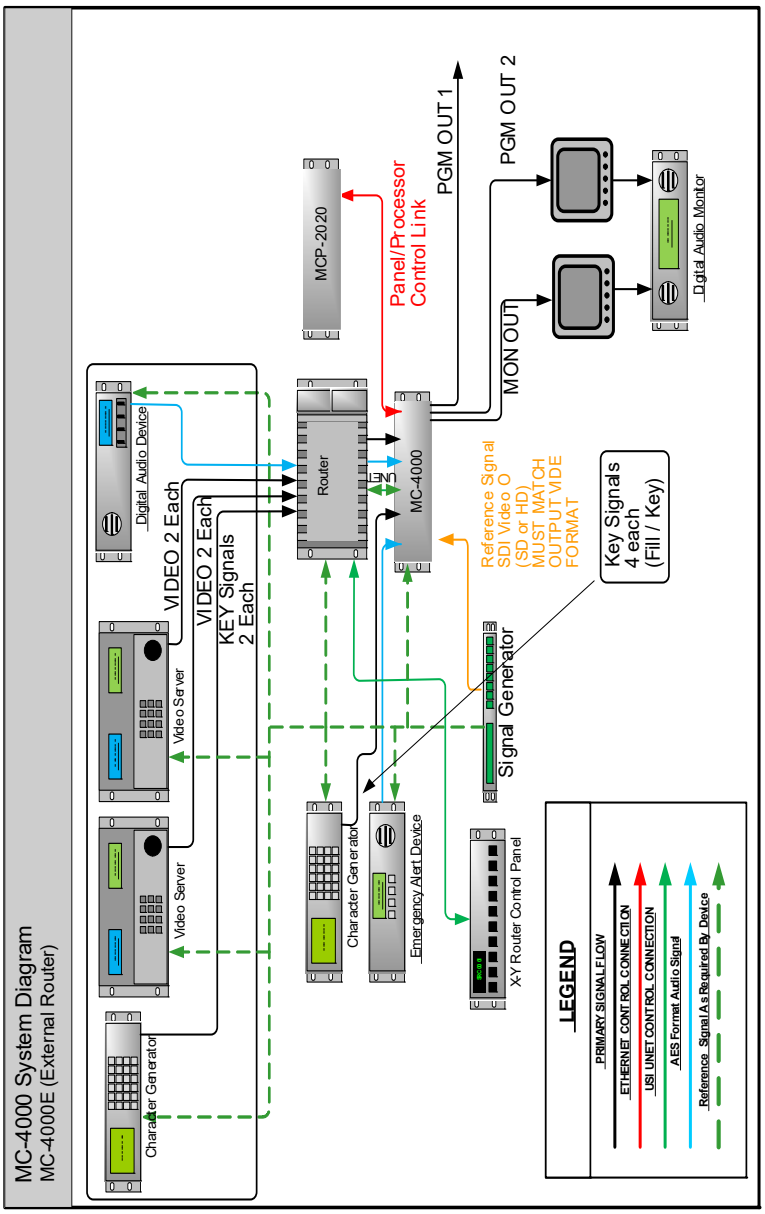

FIGURE 1-1. MC-4000E

MC-4000I

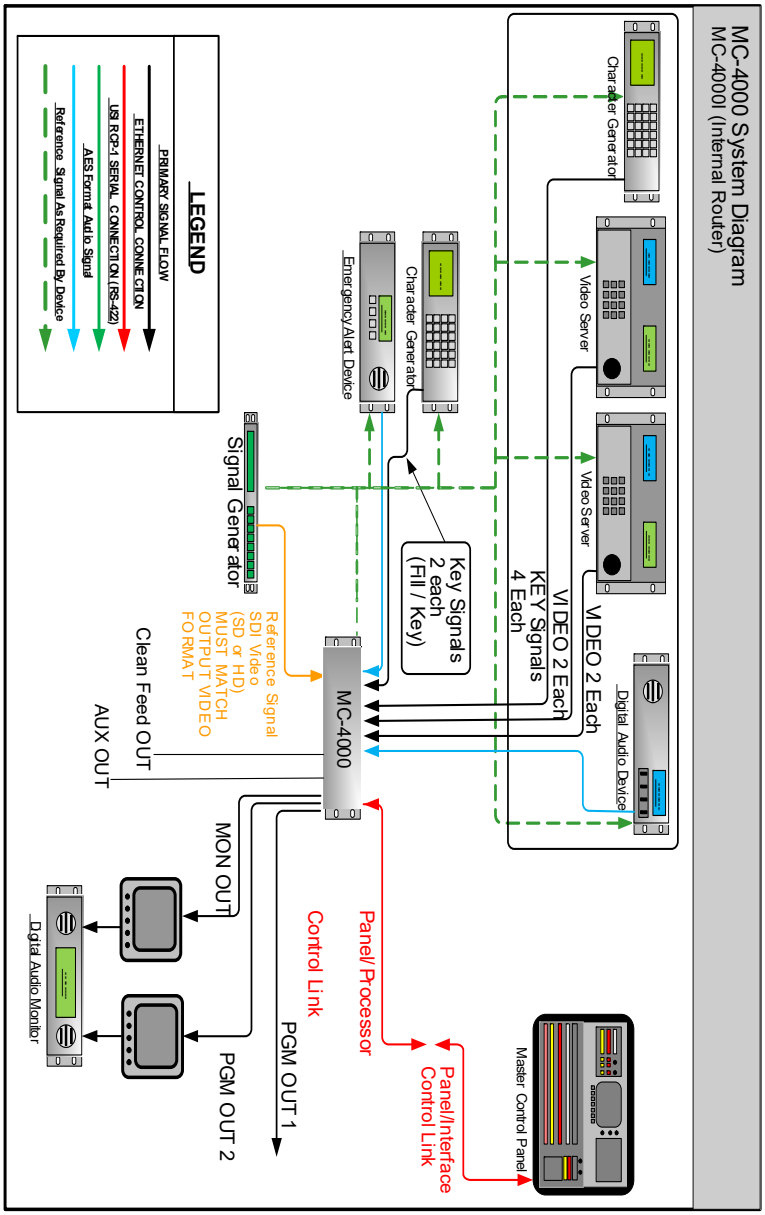

FIGURE 1-2. MC-4000I

MC-4000i Input Connections - Control Card

To be used with an internal SCX-400 control card

The MX Bus is unused unless it is controlled by another router. The sync BNC is also required in this mode, and would use analog black and 75 ohm termination on the second BNC. Serial control could also be used for router automation.

Inputs 0-31 can originate from any device that has the same video format used with that MC-4000. (Possible formats include SD525, SD625 PAL, HD720p, HD720p 50hz PAL, HD1080i0)

If there is only one video format to be used with the MC-4000, any of the 32 inputs “must” be assigned as a dedicated solid video source, such as black or color bars, and must remain on that input connection. This is used for the video reference for that format and can also be used on the PST and PGM busses as a video source.

If there is more than one format that needs to be switched between the MC-4000, any of the 32 inputs “must” be assigned as a dedicated solid video source, such as black or color bars for each of those formats, and must remain on those input connections. This is used for the video reference for that format and can also be used on the PST and PGM busses as a video source.

Any single keyer requires two video inputs per keyer (one for key, and one for fill).

Note the following operational scenario:

- There are four keyers available for each MC-4000 channel.
- All keyers used = 8 inputs per channel, for a maximum of 16 inputs.
- 4 installed input cards with (2) MC-4000 channels = 32 inputs (total)
- Each channel has its own video format, which requires 1 input for each reference
- 4 Keyers are used for each channel
- This equals a total of 18 dedicated inputs

In this scenario, (14) inputs would remain for use.

MC-4000i Input Connections - Router Mode

To be used with an SCX-400 in Router mode and controlled by an external controller SC-4/400. The MX-Bus would be connected to the SC-4/400. The sync and serial ports are unused in this mode.

The MX Bus is required as it is controlled by another router.

Inputs 0-31 can originate from any device that has the same video format used with that MC-4000. (Possible formats include SD525, SD625 PAL, HD720p, HD720p 50hz PAL, HD1080i, and HD1080i 50 Hz PAL)

If there is only one video format to be used with the MC-4000, any of the 32 inputs “must” be assigned as a dedicated solid video source, such as black or color bars, and must remain on that input connection. This is used for the video reference for that format and can also be used on the PST and PGM busses as a video source.

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Any single keyer requires two video inputs per keyer (one for key, and one for fill).

Note the following operational scenario:

- There are four keyers available for each MC-4000 channel.
- All keyers used = 8 inputs per channel, for a maximum of 16 inputs.
- 4 installed input cards with (2) MC-4000 channels = 32 inputs (total)
- Each channel has its own video format, which requires 1 input for each reference
- 4 Keyers are used for each channel
- This equals a total of 18 dedicated inputs

In this scenario, (14) inputs would remain for use. Essentially, fewer keyers allow for a greater number of inputs.

MC-4000 System using an SCX-400 for Internal Control

The following chart is to be used to determine how many available inputs there are after deciding how many keyers and video formats will be needed. The maximum inputs available are 32, which would require 4 input cards. This model type is for internal control or router internal control. Simply choose the quantity of MC4000 channels (1 or 2) in the left column (yellow or green) that will be needed. Next you will use the light blue columns in the chart after counting how many total keyers and video format types will be used. The amount of inputs remaining in the pink column is what is left from the total number of inputs there are depending on the how many input cards are in the system (1-4)

In reverse order of this, if you know how many inputs are needed and how many channels will be used, begin by looking at the pink column for the number of inputs available and work to the left, which will show the number of keyers and video formats available. For example, if you needed 11 inputs and only had 1 channel requirement, by scrolling down to the row with 11 inputs and using 1 MC4000 card, you would see that you could use all 4 keyers for that channel and still have 7 inputs left over. In this case you would only need to have 2 input cards in the system with future expansion of two more input cards.

QTY MC4000	QTY INPUT CARDS	TOTAL AVAIL INPUTS	FORMAT TYPES	QTY of REF INPUTS	QTY KEYERS	QTY of KEY INPUTS	REMAINING AVAIL INPUTS
2	4	32	1	1	0	0	31
2	4	32	1	1	1	2	29
2	4	32	1	1	2	4	27
2	4	32	1	1	3	6	25
2	4	32	1	1	4	8	23
2	4	32	1	1	5	10	21
2	4	32	1	1	6	12	19
2	4	32	1	1	7	14	17
2	4	32	1	1	8	16	15
2	4	32	2	2	0	0	30
2	4	32	2	2	1	2	28
2	4	32	2	2	2	4	26
2	4	32	2	2	3	6	24
2	4	32	2	2	4	8	22
2	4	32	2	2	5	10	20
2	4	32	2	2	6	12	18
2	4	32	2	2	7	14	16
2	4	32	2	2	8	16	14
1	4	32	1	1	0	0	31
1	4	32	1	1	1	2	29
1	4	32	1	1	2	4	27
1	4	32	1	1	3	6	25
1	4	32	1	1	4	8	23
2	3	24	1	1	0	0	23
2	3	24	1	1	1	2	21
2	3	24	1	1	2	4	19
2	3	24	1	1	3	6	17
2	3	24	1	1	4	8	15

FIGURE 1-3. MC-4000 System using an SCX-400 for Internal Control - 1

QTY MC4000	QTY INPUT CARDS	TOTAL AVAIL INPUTS	FORMAT TYPES	QTY of REF INPUTS	QTY KEYERS	QTY of KEY INPUTS	REMAINING AVAIL INPUTS
2	3	24	1	1	5	10	13
2	3	24	1	1	6	12	11
2	3	24	1	1	7	14	9
2	3	24	1	1	8	16	7
2	3	24	2	2	0	0	22
2	3	24	2	2	1	2	20
2	3	24	2	2	2	4	18
2	3	24	2	2	3	6	16
2	3	24	2	2	4	8	14
2	3	24	2	2	5	10	12
2	3	24	2	2	6	12	10
2	3	24	2	2	7	14	8
2	3	24	2	2	8	16	6
1	3	24	1	1	0	0	23
1	3	24	1	1	1	2	21
1	3	24	1	1	2	4	19
1	3	24	1	1	3	6	17
1	3	24	1	1	4	8	15
2	2	16	1	1	0	0	15
2	2	16	1	1	1	2	13
2	2	16	1	1	2	4	11
2	2	16	1	1	3	6	9
2	2	16	1	1	4	8	7
2	2	16	1	1	5	10	5
2	2	16	1	1	6	12	3
2	2	16	2	2	0	0	14

FIGURE 1-4. MC-4000 System using an SCX-400 for Internal Control - 2

QTY MC4000	QTY INPUT CARDS	TOTAL AVAIL INPUTS	FORMAT TYPES	QTY of REF INPUTS	QTY KEYERS	QTY of KEY INPUTS	REMAINING AVAIL INPUTS
2	2	16	2	2	1	2	12
2	2	16	2	2	2	4	10
2	2	16	2	2	3	6	8
2	2	16	2	2	4	8	6
2	2	16	2	2	5	10	4
2	2	16	2	2	6	12	2
1	2	16	1	1	0	0	15
1	2	16	1	1	1	2	13
1	2	16	1	1	2	4	11
1	2	16	1	1	3	6	9
1	2	16	1	1	4	8	7
2	1	8	1	1	0	0	7
2	1	8	1	1	1	2	5
2	1	8	1	1	2	4	3
2	1	8	2	2	0	0	6
2	1	8	2	2	1	2	4
2	1	8	2	2	2	4	2
1	1	8	1	1	0	0	7
1	1	8	1	1	1	2	5
1	1	8	1	1	2	4	3

FIGURE 1-5. MC-4000 System using an SCX-400 for Internal Control - 3

The chart below applies to a system that uses the video pass through cards and may have as many inputs available originating from the router that is feeding this system. In this model type, the inputs are fixed and originate from an external router and control system.

CHANNEL ONE INPUTS	
PORT NAME	PORT NUMBER
PGM	0
PST	1
PVW	2
AUX	3
FILL 1	4
KEY 1	5
FILL 3	6
KEY 3	7
FILL 2	8
KEY 2	9
FILL 4	10
KEY 4	11
BKGND	12
RESIZER 2	13
LOGO FULL	14
REFERENCE	15

CHANNEL TWO INPUTS	
PORT NAME	PORT NUMBER
PGM	16
PST	17
PVW	18
AUX	19
FILL 1	20
KEY 1	21
FILL 3	22
KEY 3	23
FILL 2	24
KEY 2	25
FILL 4	26
KEY 4	27
BKGND	28
RESIZER 2	29
LOGO FULL	30
REFERENCE	31

FIGURE 1-6. Video Pass Thru

MC-4000e External Router Input Connections

Inputs 0-15 are dedicated inputs for Channel 1, which is the top card in the chassis. The system uses video pass through cards only, with no router crosspoint control. A typical system would use an external router that feeds all inputs.

Inputs 16 - 31 are dedicated inputs for Channel 2. As above, the system uses video pass through cards only, with no router crosspoint control. A typical system would use an external router that feeds all inputs.

TABLE 1.

Signal Name	Router Options	
	Channel 1	Channel 2
PGM	0	16
PST	1	17
PVW	2	18
AUX	3	19
FILL 1	4	20
KEY 1	5	21
FILL 3	6	22
KEY 3	7	23
FILL 2	8	24
KEY 2	9	25
FILL 4	10	26
KEY 4	11	27
BKGND	12	28
RESIZER 2	13	29
LOGO FULL	14	30
REF	15	31

Audio Inputs/Outputs

The MC-4000 can use either embedded audio or discreet AES audio of up to 8 channels using a 24 Dbm standard source (see software section for proper setup). Control room audio can be played out from a dedicated port using balanced AES audio.

GPIO Connections

Each MC-4000 channel can use up to 21GPI output relays, or a mix of 16 GPOs and 5 GPIs. Typical uses of these would be to trigger internal macros or external relays associated with sources used.

Automation Control

There are four 9-pin serial ports that are broken out from a 26 pin connector. Each of these ports can be used for automation control or EAS interface.

These RS-422/232 ports can be configured for communication with automation systems, for machine control, and for other communications tasks. Port protocols and settings are configured by the configuration utility.

Video Outputs

There are five video output ports used for PGM output to air, and a PST/PVW monitor port. There is also a dedicated clean feed output available to obtain PGM video out without keys or other graphics.

SMPTE Alarm Port

This connection provides SMPTE alarm for major alarms such as fan and power supply failures within the MC-4000 chassis. An external unit for producing an audible tone is required for use (not provided by UTSCI).

SMPTE Alarm Function

One main SMPTE alarm relay is provided with the MC-4000 Control Processor Board. If, for example, any alarm condition is sensed from the power supply, temperature, or fan, the SMPTE alarm relay contacts will close. This alarm condition is typically indicated by a custom configured LED (and/or audible alarm) in close proximity to the MC-4000.

Monitor Matrix

Monitor Matrix BNC

This allows the user to switch up an additional output that can look at the output of any other output modules present in the system. Monitor Matrix is only functional in the primary crosspoint's slot, when active in the primary slot.

MX Bus (control bus)

All routing switcher chassis in the system must be interconnected with the MX Bus cable, with the two free ends terminated. In the case of a stand-alone system, both connectors must be terminated.

Playback Outputs 1 & 2

In Development

Connections

When an internal SCX-400 control card exists in the MC-4000 mainframe, the UNET port is only used to connect to other MC-4000 mainframes or UCP control panels. In this configuration, the UNET would daisy chain through all the panels and MC-4000's, and there would be a terminator placed at the end of the daisy chain in the last unused UNET port.

If there are no additional devices used on the UNET port, a terminator is to be placed in the UNET port on the MC-4000 mainframe (see the next illustration).

If the MC-4000 is being controlled by an external SC4/400 control system, the UNET port is to be connected between the controller and the MC-4000 mainframe. If the MC--4000 is connected to an SC-4, a direct cable should be run from the SC-4 to the UNET port with no termination. If originating from a SC-400 from a UT-400 64x or MX-lator frame, a UNET hub is required. The UNET hub is a UTSCI product, and not a standard Ethernet (type) switch.

MC-4000 Rear View

Figure 1-1. MC-4000 rear - UNET and Input connections

Ethernet Hub

The Ethernet hub is designed to accommodate a stand-alone operation when a house network is not available. The following devices connect to this central hub:

- SC-4
- MCP-2020
- MC-4000
- Computer control (optional, for configuration software and Telnet operations)

See Figure 1-1, “MC-4000E,” on page 1-2

Default IP Configuration

There is a default IP address assigned to the MC-4000 and MCP-2020. Please refer to the System Installation guide if you need to change this address.

System Parts Listing

The system components you have received (or will already have) may include the following:

- MC-4000 mainframe (processor)
- SCX-400 control card (internal controller)
- MCP-2020 Panel
- MX-Bus Terminators for the Router and SC-4
- Ethernet Hub
- System Installation CD (with NFS Server license)
- CAT 5 to 9-pin serial adapter for diagnostic port
- 1’ serial splitter cable
- MC-4000 Breakout Panel - optional
- Control Card, housed within the SC-4 system (external) - optional

System Set-up - Visual Guide

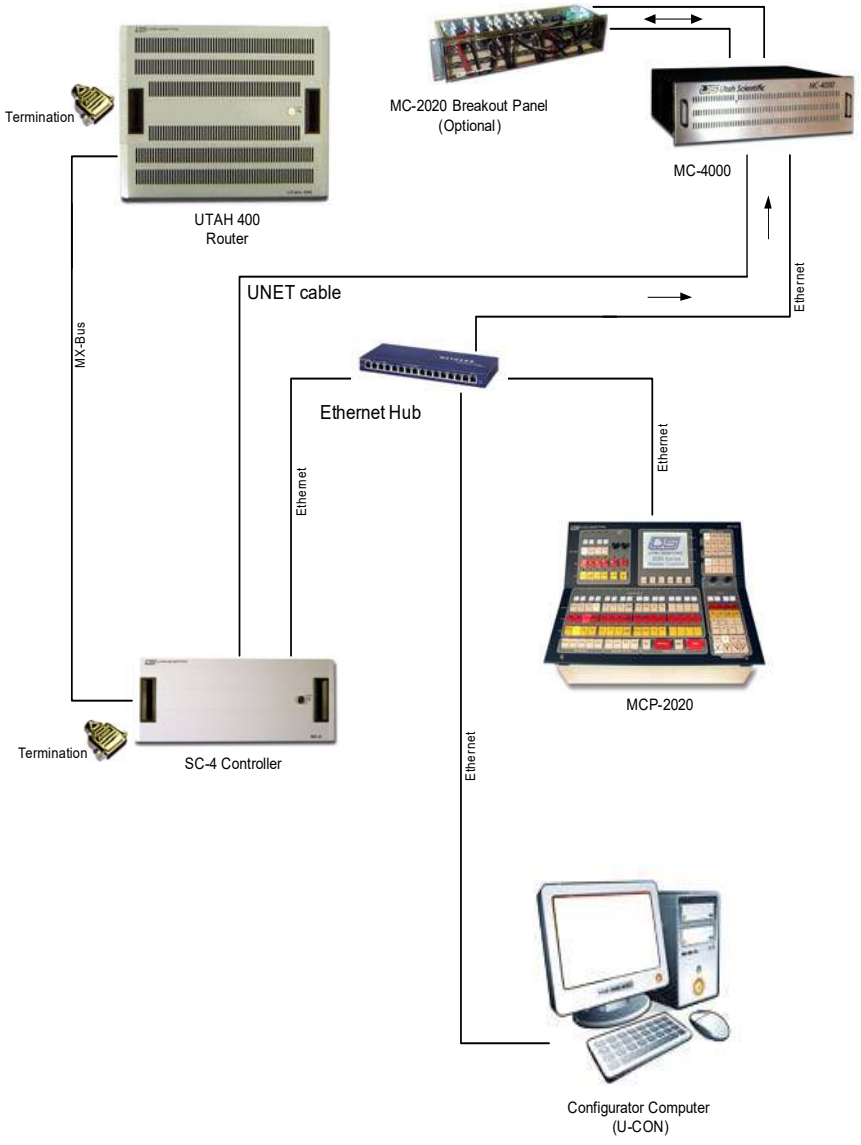


FIGURE 1-7. MC-4000 Basic Setup

CHAPTER 2

Installation

In This Chapter

Unpacking and Inspection

Rear Panel Connections, Pinout Detail, and Ratings

When you receive your MC-4000 system, inspect the shipping carton for signs of damage. Contact your dealer and shipper immediately if you suspect any damage has occurred during shipping. Check the contents against your Utah Scientific order and verify them against the shipping manifest. If any items are missing, contact your dealer or Utah Scientific immediately.

Save the shipping box and material for future use, in case the unit may have to be shipped back to Utah Scientific.

Caution: This MC-4000 router weighs up to fifty pounds with shipping materials and accessories.

Each router is wrapped in anti-static plastic prior to boxing up. The following illustration shows the typical packaging of a single MC-4000 chassis.

Recommended unpacking method:

1. With carton setting upright, open the top.
2. Remove the Styrofoam packing material in the top of the box.
3. Remove the accessories.
4. Remove the Styrofoam Packing from the top of the MC-4000.
5. Grasp the sides of the chassis and gently pull it up and out of the bottom Styrofoam packing material and box.
6. Place the chassis on a stable bench or cart.
7. With the MC-4000 sitting on a bench or cart, remove the anti-static wrap covering the router and save for future use.
8. Move the router to the installation site.

Installing Physical Equipment

Installation of your MC-4000 may require some or all of the following steps:

1. Mounting equipment in rack frames.
2. Installing MX-Bus cables.
3. Connecting the AES Reference.
4. Determining and Setting the Router Signal Level(s).
5. Installing Audio/Video signal cables.
6. Connecting power.
7. Hardware checkout.

Note: Analog black sync is only used when an SC-400 is installed.

Mounting Equipment in Rack Frames

Installing the MC-4000 Master Control Processor

Use the following steps to install the MC-4000 Systems into the rack frames:

1. Determine the vertical layout of your frames before you begin the installation. Please note:
   - You may wish to place blank panels between the systems to increase ventilation and make cabling easier.
   - You may wish to install the systems in a way to reflect the priority of audio and video signal levels.
     - **For example**: If digital video is signal level 1, digital audio is signal level 2 and 3, the digital video may occupy a lower position in the rack frame.

   Note: The following illustration is provided as an example rack frame layout.

2. Once your layout is determined, remove the front cover from the MC-4000 and set it aside.

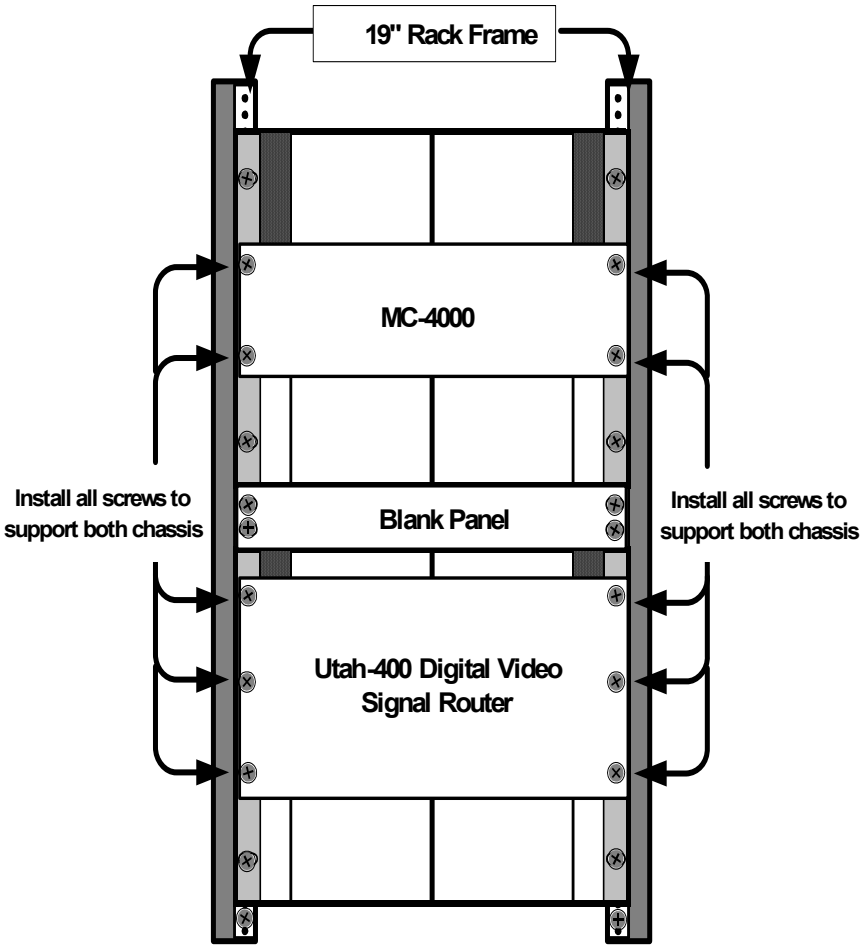


FIGURE 2-1. MC-4000 Chassis Mounted in 19" Rack Frame

3. Install the MC-4000 chassis' in the 19" rack frame.

Note: ***The MC-4000 chassis (with power supplies and PCB's) weighs close to 50 pounds; Utah Scientific recommends a minimum of two persons, preferably three, to install the chassis in the rack frame. Install all mounting screws in the front of the chassis; the entire weight of the router and cables are supported by the chassis side-frames.***

- Determine the height to mount the MC-4000 in the rack frame.
- Install two rack screws into the empty rack frame below the height determined in step a, above. These screws will be used to support the weight of the chassis when it is moved into the rack frame.
- With two persons, pick the chassis up from the shipping carton at the left and right side frames.
- Move the chassis to the 19" rack frame and carefully slide it into the rack frame, hooking the flange of the chassis above the rack screws installed in step b., above.

Note: An alternative method is to support the MC-4000 Chassis with a shelf or similar support and align the mounting holes accordingly.

- With the chassis resting on the lower rack screws, carefully lift the left side frame, align the lowest chassis frame mounting hole with a rack frame threaded hole and start rack screw. Repeat for the right hand side frame.
- Once the lower chassis rack screws are in place, snug both sides up, but do not tighten.
- Align remaining six mounting holes, install remaining six rack screws through mounting holes and then snug them down.
- Finally, tighten all eight rack screws installed in the chassis mounting holes.
- Replace all front covers when the installation is complete.

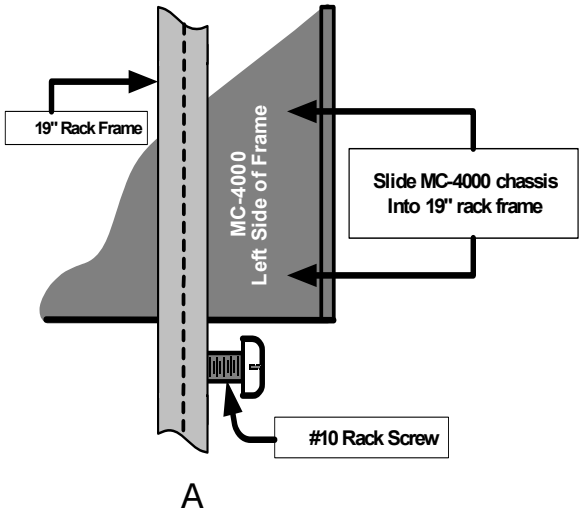


FIGURE 2-2. Sliding the MC-4000 chassis into the rack frame

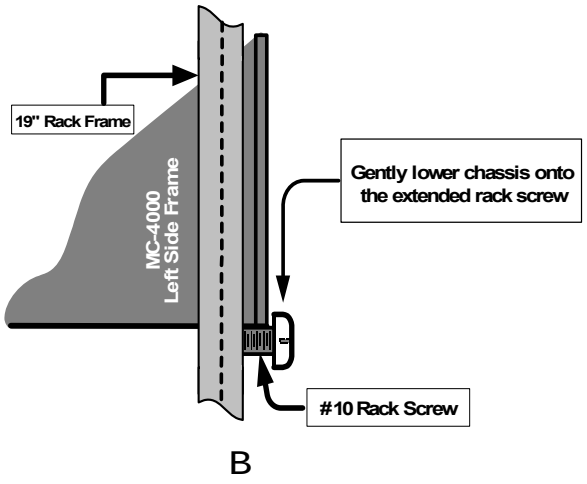


FIGURE 2-3. Securing the MC-4000 chassis into the rack frame

AC Power Connections

The MC-4000 rear panel has fully redundant AC power supply connections to each chassis section.

The recommended AC power cord is USI Part Number 42490-0003; Belden 17500, 10A/ 125VAC, 1250 Watts, max voltage rating 300 VAC.

Caution: The socket outlets should be installed near the equipment and be easily accessible to the operator.

FIGURE 2-4. Power connection locations

Video Input Connections

Video Inputs

Including *Digital Black*, there are 32 video input connections in the MC-4000 chassis. The sources for the Serial Digital Video inputs must not exceed 300 Meters (1000 feet), using 8281 coaxial cable, and High Definition SDI Video must not exceed 150 Meters (500 feet) using1694A coaxial cable.

Mode #1 - Dedicated

FIGURE 2-5. Dedicated/External - Inputs

MC-4000e External Router Input Connections

Inputs 0-15 are dedicated inputs for Channel 1, which is the top card in the chassis. The system uses video pass through cards only, with no router crosspoint control. A typical system would use an external router that feeds all inputs.

Inputs 16 - 31 are dedicated inputs for Channel 2. As above, the system uses video pass through cards only, with no router crosspoint control. A typical system would use an external router that feeds all inputs.

For specific input reference, please see “Video Pass Thru,” on page 1-10.

Mode #2 - Internal - SCX-400 Controller Mode

In an internal control scenario, inputs can be utilized in whatever combination the operator chooses. When more keyers are used however, fewer video inputs will be available. If there is only 1 channel, all remaining 24 inputs can be used as long as there are 4 keyers.

In a multiple format operating scenario, each input is dedicated.

The MX Bus is unused unless it is controlled by another router. The sync BNC is also required in this mode, and would use analog black and 75 ohm termination on the second BNC. Serial control could also be used for router automation.

Inputs 0-31 can originate from any device that has the same video format issued with that MC-4000. (Possible formats include SD525, SD625 PAL, HD720p, HD720p 50hz PAL, HD1080i0)

If there is only one video format to be used with the MC-4000, any of the 32 inputs “must” be assigned as a dedicated solid video source, such as black or color bars, and must remain on that input connection. This is used for the video reference for that format and can also be used on the PST and PGM busses as a video source.

If there is more than one format that needs to be switched between the MC-4000, any of the 32 inputs “must” be assigned as a dedicated solid video source, such as black or color bars for each of those formats, and must remain on those input connections. This is used for the video reference for that format and can also be used on the PST and PGM busses as a video source.

Any single keyer requires two video inputs per keyer (one for key, and one for fill).

Note the following operational scenario:

- There are four keyers available for each MC-4000 channel.
- All keyers used = 8 inputs per channel, for a maximum of 16 inputs.
- 4 installed input cards with (2) MC-4000 channels = 32 inputs (total)
- Each channel has its own video format, which requires 1 input for each reference
- 4 Keyers are used for each channel
- This equals a total of 18 dedicated inputs

In this scenario, (14) inputs would remain for use. Essentially, fewer keyers allow for a greater number of inputs.

Mode #3 - SCX-400 Controller - Router Only Mode

To be used with an SCX-400 in Router mode and controlled by an external controller SC-4/400. The MX-Bus would be connected to the SC-4/400. The sync and serial ports are unused in this mode.

The MX Bus is required as it is controlled by another router. Inputs 0-31 can originate from any device that has the same video format used with that MC-4000. (Possible formats include SD525, SD625 PAL, HD720p, HD720p 50hz PAL, HD1080i0)

If there is only one video format to be used with the MC-4000, any of the 32 inputs “must” be assigned as a dedicated solid video source, such as black or color bars, and must remain on that input connection. This is used for the video reference for that format and can also be used on the PST and PGM busses as a video source.

If there is more than one format that needs to be switched between the MC-4000, any of the 32 inputs “must” be assigned as a dedicated solid video source, such as black or color bars for each of those formats, and must remain on those input connections. This is used for the video reference for that format and can also be used on the PST and PGM busses as a video source.

Any single keyer requires two video inputs per keyer (one for key, and one for fill).

Note the following operational scenario:

- There are four keyers available for each MC-4000 channel.
- All keyers used = 8 inputs per channel, for a maximum of 16 inputs.
- 4 installed input cards with (2) MC-4000 channels = 32 inputs (total)
- Each channel has its own video format, which requires 1 input for each reference
- 4 Keyers are used for each channel
- This equals a total of 18 dedicated inputs

In this scenario, (14) inputs would remain for use. Essentially, fewer keyers allow for a greater number of inputs.

Input Definitions

Caution: Carefully route all cables to provide proper strain relief and EMI shielding.

Program, Preset and Preview In *(Only used in Pass Thru Dedicated Mode)*

These connectors receive their inputs from three busses on the associated routing switcher. Cables should be approximately the same length. The processor's input circuitry has a correction window of ±1/2 line with respect to the reference signal; router sources must be timed to within this window for correct operation of the system

Key and Fill Inputs:

There are four key fill and key inputs possible per channel. If all four are used, eight inputs are required for each channel, making a total of 16 inputs. These inputs can be assigned to any set of inputs if the internal routable control is utilized. During external SC-4/400 control, input Mode #2 or #3 is applicable. Please see "Video Input Connections" on page 2-8.

AUX Output

The AUX output is in development at this time. However there is one AUX output for each channel, and this output performs the same function as the router output bus. This is an unprocessed additional output that can be configured as the user sees fit.

The master control maintains control over AUX outputs and typically contains two.

Clean Feed Output

The clean feed output behaves the same as the program bus output, with the exception that there are no audio or video effects applied. It is also pre-programmed with transitions.

Video Format Reference

The system reference video signal is connected to a dedicated video input if used as an external pass thru system. See “Video Input Connections” on page 2-8 (Mode #1). Possible formats include SD525, SD625, HD720P, HD720P 50HZ PAL, HD1080i, and HD1080i 50 Hz PAL.

The reference video signal can also be assigned to any input desired when used as an internal controller system. See Modes #2 and #3 for usage.

The video reference output will go inactive if the following conditions occur:

1. Power to the chassis fails!
2. After a chassis reset where it will be inactive for approximately one second after the reset!

The user should insure that equipment downstream of the Video Reference Output would tolerate this type of interruption to the reference signal.

Controller Reference

If the MC-4000 contains an internal SCX-400 controller, it will require an analog black reference for correct vertical interval switching. This is to be plugged in to the BNC labeled **Sync**. The other BNC can be looped to other devices requiring sync, or simply terminated with a 75 ohm (terminator). If the system controller is set to router mode and is to be used as an expansion router, or if there is no controller in the system at all, the sync BNC is unused.

Audio Connections

The basic processor frame works with audio embedded in the SDI or HD-SDI signals. Up to four embedded AES streams can be manipulated within the processor. The video outputs of the processor carry embedded audio data.

The discreet AES audio connections are delivered to the chassis by a set of 26-pin D connectors. Each connector carries 8 AES signals – corresponding to four levels for each of two signal groups. For example, the first connector in the audio input section carries Program In and Preset In – each with up to four AES signal levels. Following are the signal assignments for the AES audio connectors:

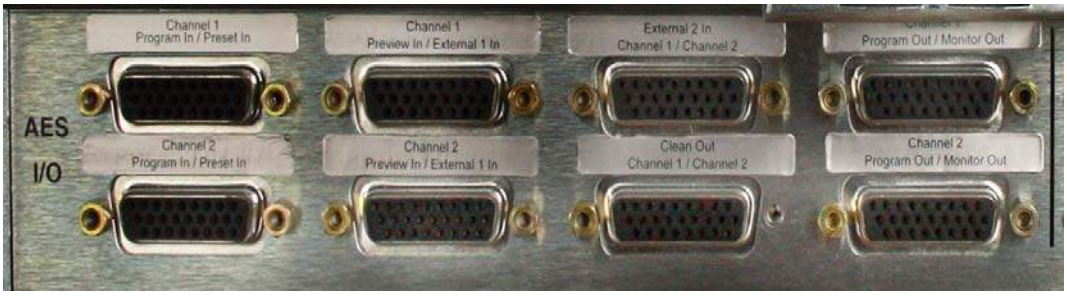
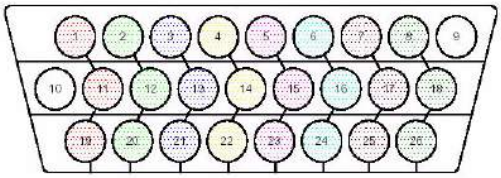


FIGURE 2-6. Audio Connections

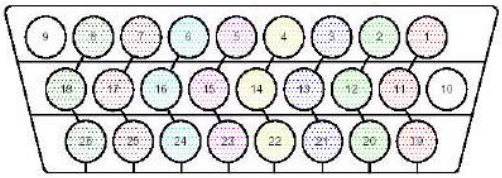
Connector Names and Descriptions

Connector Name	Description
Channel 1 PGM IN / PST IN	Channel 1 Program, Preset
Channel 1 PVW IN / EXT 1 IN	Channel 1 Preview, External 1
External 2 IN Channel 1 / Channel 2	Both channels 1 and 2 External 2
Channel 2 PGM IN / PST IN	Channel 2 Program, Preset
Channel 2 PVW IN / EXT 1 IN	Channel 2 Preview, External 1 IN
Channel 1 PGM OUT / MON OUT	Channel 1 Program, Monitor
Channel 2 PGM OUT / MON OUT	Channel 2 Program, Monitor
Clean OUT Channel 1 / Channel 2	Channels 1 and 2 Clean Feed

AES INPUT: Program and Preset (Channel 1)



DB-26B (Male)



DB-26S (Female)

TABLE 2-1. AES In – Program/Preset Pin Outs

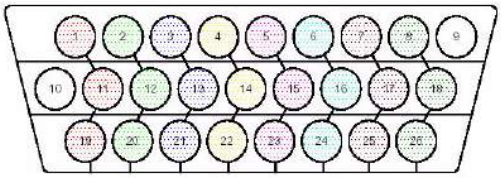
Pin #	Signal	Pin #	Signal
1	Preset 1 +	14	Preset 4 -
2	Preset 2 +	15	Program 1 -
3	Preset 3 +	16	Program 2 -
4	Preset 4 +	17	Program 3 -
5	Program 1 +	18	Program 4 -
6	Program 2 +	19	Preset 1CM*
7	Program 3 +	20	Preset 2CM*
8	Program 4 +	21	Preset 3CM*
9	N/C	22	Preset 4CM*
10	N/C	23	Program 1CM*
11	Preset 1 -	24	Program 2CM*
12	Preset 2 -	25	Program 3CM*
13	Preset 3 -	26	Program 4CM*

* CM = Common or Ground

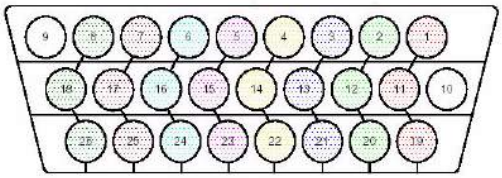
TABLE 2-2. AES IN - Preset and Program Pairs

Signal	Pairs	Signal	Pairs
Preset 1	Pin 1 +	Program 1	Pin 5 +
	Pin 11 -		Pin 15 -
	Pin 19 GND		Pin 23 GND
Preset 2	Pin 2 +	Program 2	Pin 6 +
	Pin 12 -		Pin 16 -
	Pin 20 GND		Pin 24 GND
Preset 3	Pin 3 +	Program 3	Pin 7 +
	Pin 13 -		Pin 17 -
	Pin 21 GND		Pin 25 GND
Preset 4	Pin 4 +	Program 4	Pin 8 +
	Pin 14 -		Pin 18 -
	Pin 22 GND		Pin 26 GND

AES INPUT: Program and Preset (Channel 2)



DB-26B (Male)



DB-26S (Female)

TABLE 2-3. AES In – Program/Preset Pin Outs

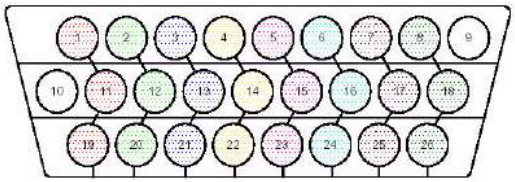
Pin #	Signal	Pin #	Signal
1	Preset 1 +	14	Preset 4 -
2	Preset 2 +	15	Program 1 -
3	Preset 3 +	16	Program 2 -
4	Preset 4 +	17	Program 3 -
5	Program 1 +	18	Program 4 -
6	Program 2 +	19	Preset 1CM*
7	Program 3 +	20	Preset 2CM*
8	Program 4 +	21	Preset 3CM*
9	N/C	22	Preset 4CM*
10	N/C	23	Program 1CM*
11	Preset 1 -	24	Program 2CM*
12	Preset 2 -	25	Program 3CM*
13	Preset 3 -	26	Program 4CM*

* CM = Common or Ground

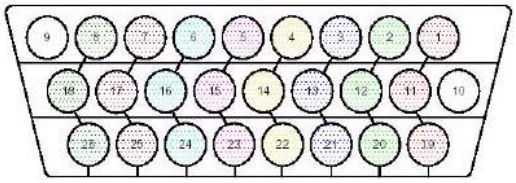
TABLE 2-4. AES IN - Preset and Program Pairs

Signal	Pairs	Signal	Pairs
Preset 1	Pin 1 +	Program 1	Pin 5 +
	Pin 11 -		Pin 15 -
	Pin 19 GND		Pin 23 GND
Preset 2	Pin 2 +	Program 2	Pin 6 +
	Pin 12 -		Pin 16 -
	Pin 20 GND		Pin 24 GND
Preset 3	Pin 3 +	Program 3	Pin 7 +
	Pin 13 -		Pin 17 -
	Pin 21 GND		Pin 25 GND
Preset 4	Pin 4 +	Program 4	Pin 8 +
	Pin 14 -		Pin 18 -
	Pin 22 GND		Pin 26 GND

AES IN -- Preview and EXT 1 (Channel 1)



DB-26B (Male)



DB-26S (Female)

TABLE 2-5. AES In – Preview (PVW) and EXT 1 Pin Outs

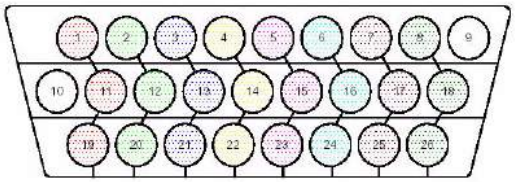
Pin #	Signal	Pin #	Signal
1	Preview 1 +	14	Preview 4 -
2	Preview 2 +	15	EXT 1: 1 -
3	Preview 3 +	16	EXT 1: 2 -
4	Preview 4 +	17	EXT 1: 3 -
5	EXT 1: 1 +	18	EXT 1: 4 -
6	EXT 1: 2 +	19	Preview 1CM*
7	EXT 1: 3 +	20	Preview 2CM*
8	EXT 1: 4 +	21	Preview 3CM*
9	N/C	22	Preview 4CM*
10	N/C	23	EXT 1: 1CM*
11	Preview 1 -	24	EXT 1: 2CM*
12	Preview 2 -	25	EXT 1: 3CM*
13	Preview 3 -	26	EXT 1: 4CM*

* CM = Common or Ground

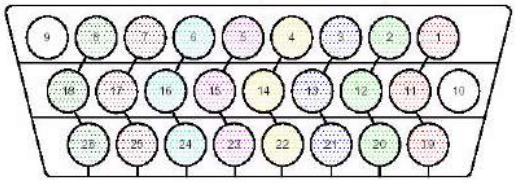
TABLE 2-6. AES IN – Preview and EXT 1 Pairs

Signal	Pairs	Signal	Pairs
Preview 1	Pin 1 +	EXT 1 - 1	Pin 5 +
	Pin 11 -		Pin 15 -
	Pin 19 GND		Pin 23 GND
Preview 2	Pin 2 +	EXT 1 - 2	Pin 6 +
	Pin 12 -		Pin 16 -
	Pin 20 GND		Pin 24 GND
Preview 3	Pin 3 +	EXT 1 - 3	Pin 7 +
	Pin 13 -		Pin 17 -
	Pin 21 GND		Pin 25 GND
Preview 4	Pin 4 +	EXT 1 - 4	Pin 8 +
	Pin 14 -		Pin 18 -
	Pin 22 GND		Pin 26 GND

AES IN -- Preview and EXT 1 (Channel 2)



DB-26B (Male)



DB-26S (Female)

TABLE 2-7. AES In – Preview (PVW) and EXT 1 Pin Outs

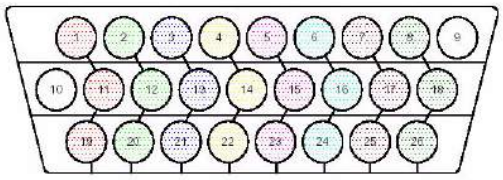
Pin #	Signal	Pin #	Signal
1	Preview 1 +	14	Preview 4 -
2	Preview 2 +	15	EXT 1: 1 -
3	Preview 3 +	16	EXT 1: 2 -
4	Preview 4 +	17	EXT 1: 3 -
5	EXT 1: 1 +	18	EXT 1: 4 -
6	EXT 1: 2 +	19	Preview 1CM*
7	EXT 1: 3 +	20	Preview 2CM*
8	EXT 1: 4 +	21	Preview 3CM*
9	N/C	22	Preview 4CM*
10	N/C	23	EXT 1: 1CM*
11	Preview 1 -	24	EXT 1: 2CM*
12	Preview 2 -	25	EXT 1: 3CM*
13	Preview 3 -	26	EXT 1: 4CM*

* CM = Common or Ground

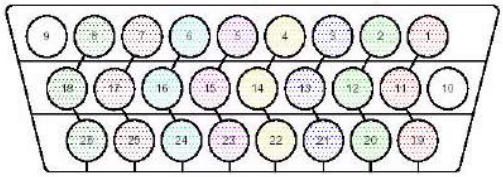
TABLE 2-8. AES IN – Preview and EXT 1 Pairs

Signal	Pairs	Signal	Pairs
Preview 1	Pin 1 +	EXT 1 - 1	Pin 5 +
	Pin 11 -		Pin 15 -
	Pin 19 GND		Pin 23 GND
Preview 2	Pin 2 +	EXT 1 - 2	Pin 6 +
	Pin 12 -		Pin 16 -
	Pin 20 GND		Pin 24 GND
Preview 3	Pin 3 +	EXT 1 - 3	Pin 7 +
	Pin 13 -		Pin 17 -
	Pin 21 GND		Pin 25 GND
Preview 4	Pin 4 +	EXT 1 - 4	Pin 8 +
	Pin 14 -		Pin 18 -
	Pin 22 GND		Pin 26 GND

AES IN: EXT 2 (For Channel 1 and Channel 2)



DB-26B (Male)



DB-26S (Female)

TABLE 2-9. AES IN -- External 2 and External 3 Pin Outs

Pin #	Signal	Pin #	Signal
1	CH1/EXT 2: 1 +	14	CH1/EXT 2: 4 -
2	CH1/EXT 2: 2 +	15	CH2/EXT 2: 1 -
3	CH1/EXT 2: 3 +	16	CH2/EXT 2: 2 -
4	CH1/EXT 2: 4 +	17	CH2/EXT 2: 3 -
5	CH2/EXT 2: 1 +	18	CH2/EXT 2: 4 -
6	CH2/EXT 2: 2 +	19	CH1/EXT 2: 1CM*
7	CH2/EXT 2: 3 +	20	CH1/EXT 2: 2CM*
8	CH2/EXT 2: 4 +	21	CH1/EXT 2: 3CM*
9	N/C	22	CH1/EXT 2: 4CM*
10	N/C	23	CH2/EXT 2: CM*
11	CH1/EXT 2: 1 -	24	CH2/EXT 2: CM*

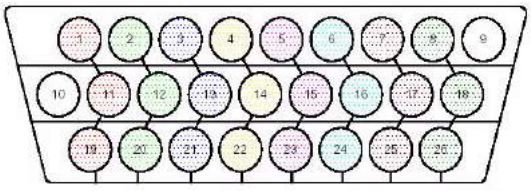
TABLE 2-9. AES IN -- External 2 and External 3 Pin Outs

Pin #	Signal	Pin #	Signal
12	CH1/EXT 2: 2 -	25	CH2/EXT 2: CM*
13	CH1/EXT 2: 3 -	26	CH2/EXT 2: CM*

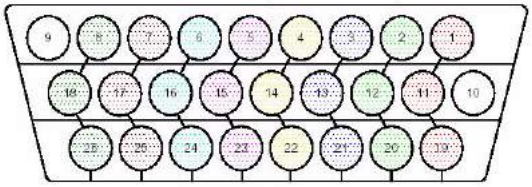
TABLE 2-10. AES IN -- EXT 2 and EXT 3 Pairs

Signal	Pairs	Signal	Pairs
CH1/EXT 2	Pin 1 +	CH2/EXT 2	Pin 5 +
	PIn 11 -		PIn 15 -
	Pin 19 GND		PIn 23 GND
CH1/EXT 2	Pin 2 +	CH2/EXT 2	Pin 6 +
	Pin 12 -		Pin 16 -
	PIn 20 GND		Pin 24 GND
CH1/EXT 2	Pin 3 +	CH2/EXT 2	Pin 7 +
	Pin 13 -		Pin 17 -
	Pin 21 GND		Pin 25 GND
CH1/EXT 2	Pin 4 +	CH2/EXT 2	Pin 8 +
	Pin 14 -		Pin 18 -
	Pin 22 GND		Pin 26 GND

AES Out: Program/Monitor (Channel 1)



DB-26B (Male)



DB-26S (Female)

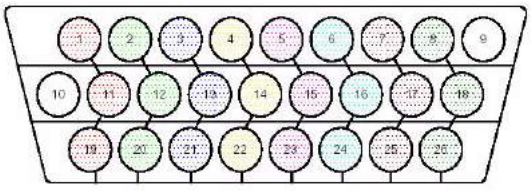
TABLE 2-11. AES Out -- Program and Monitor Pin Outs

Pin #	Signal	Pin #	Signal
1	MON Out 1+	14	MON Out 4 -
2	MON Out 2+	15	Program Out 1 -
3	MON Out 3+	16	Program Out 2 -
4	MON Out 4+	17	Program Out 3 -
5	Program Out 1+	18	Program Out 4 -
6	Program Out 2+	19	MON Out 1CM*
7	Program Out 3+	20	MON Out 2CM*
8	Program Out 4+	21	MON Out 3CM*
9	N/C	22	MON Out 4CM*
10	N/C	23	Program Out 1CM*
11	MON Out 1-	24	Program Out 2CM*
12	MON Out 2-	25	Program Out 3CM*
13	MON Out 3-	26	Program Out 4CM*

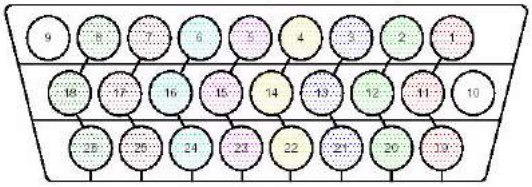
TABLE 2-12. AES Out -- Program and Monitor Pairs

Signal	Pairs	Signal	Pairs
MON Out 1	Pin 1 +	Program Out 1	Pin 5 +
	PIn 11 -		PIn 15 -
	Pin 19 GND		PIn 23 GND
MON Out 2	Pin 2 +	Program Out 2	Pin 6 +
	Pin 12 -		Pin 16 -
	PIn 20 GND		Pin 24 GND
MON Out 3	Pin 3 +	Program Out 3	Pin 7 +
	Pin 13 -		Pin 17 -
	Pin 21 GND		Pin 25 GND
MON Out 4	Pin 4 +	Program Out 4	Pin 8 +
	Pin 14 -		Pin 18 -
	Pin 22 GND		Pin 26 GND

AES Out: Program/Monitor (Channel 2)



DB-26B (Male)



DB-26S (Female)

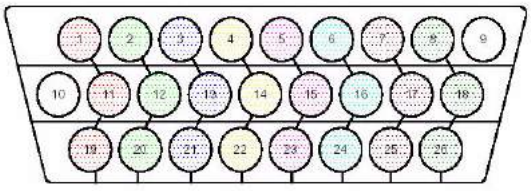
TABLE 2-13. AES Out -- Program and Monitor Pin Outs

Pin #	Signal	Pin #	Signal
1	MON Out 1+	14	MON Out 4 -
2	MON Out 2+	15	Program Out 1 -
3	MON Out 3+	16	Program Out 2 -
4	MON Out 4+	17	Program Out 3 -
5	Program Out 1+	18	Program Out 4 -
6	Program Out 2+	19	MON Out 1CM*
7	Program Out 3+	20	MON Out 2CM*
8	Program Out 4+	21	MON Out 3CM*
9	N/C	22	MON Out 4CM*
10	N/C	23	Program Out 1CM*
11	MON Out 1-	24	Program Out 2CM*
12	MON Out 2-	25	Program Out 3CM*
13	MON Out 3-	26	Program Out 4CM*

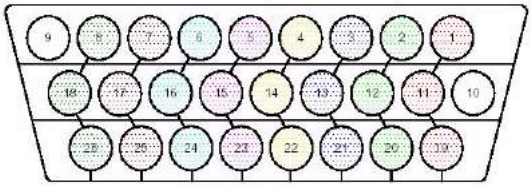
TABLE 2-14. AES Out -- Program and Monitor Pairs

Signal	Pairs	Signal	Pairs
MON Out 1	Pin 1 +	Program Out 1	Pin 5 +
	PIn 11 -		PIn 15 -
	Pin 19 GND		PIn 23 GND
MON Out 2	Pin 2 +	Program Out 2	Pin 6 +
	Pin 12 -		Pin 16 -
	PIn 20 GND		Pin 24 GND
MON Out 3	Pin 3 +	Program Out 3	Pin 7 +
	Pin 13 -		Pin 17 -
	Pin 21 GND		Pin 25 GND
MON Out 4	Pin 4 +	Program Out 4	Pin 8 +
	Pin 14 -		Pin 18 -
	Pin 22 GND		Pin 26 GND

Clean Feed (Channel 1 and Channel 2)



DB-26B (Male)



DB-26S (Female)

TABLE 2-15. AES Out -- Clean Feed

Pin #	Signal	Pin #	Signal
1	CH1 Clean Out 1+	14	CH1 Clean Out 4 -
2	CH1 Clean Out 2+	15	CH2 Clean Out 1 -
3	CH1 Clean Out 3+	16	CH2 Clean Out 2 -
4	CH1 Clean Out 4+	17	CH2 Clean Out 3 -
5	CH2 Clean Out 1+	18	CH2 Clean Out 4 -
6	CH2 Clean Out 2+	19	CH1 Clean Out 1CM*
7	CH2 Clean Out 3+	20	CH1 Clean Out 2CM*
8	CH2 Clean Out 4+	21	CH1 Clean Out 3CM*
9	N/C	22	CH1 Clean Out 4CM*
10	N/C	23	CH2 Clean Out 1CM*
11	CH1 Clean Out 1-	24	CH2 Clean Out 2CM*
12	CH1 Clean Out 2-	25	CH2 Clean Out 3CM*
13	CH1 Clean Out 3-	26	CH2 Clean Out 4CM*

TABLE 2-16. AES Out -- Program and Monitor Pairs

Signal	Pairs	Signal	Pairs
CH1 Clean Out 1	Pin 1 +	CH2 Clean Out 1	Pin 5 +
	PIn 11 -		PIn 15 -
	Pin 19 GND		PIn 23 GND
CH1 Clean Out 2	Pin 2 +	CH2 Clean Out 2	Pin 6 +
	Pin 12 -		Pin 16 -
	PIn 20 GND		Pin 24 GND
CH1 Clean Out 3	Pin 3 +	CH2 Clean Out 3	Pin 7 +
	Pin 13 -		Pin 17 -
	Pin 21 GND		Pin 25 GND
CH1 Clean Out 4	Pin 4 +	CH2 Clean Out 4	Pin 8 +
	Pin 14 -		Pin 18 -
	Pin 22 GND		Pin 26 GND

Relay Optos Specification

Relay = Voltage should be less than 24 Volts, current not to exceed 1 Amp (maximum)

The use of series current limiting resistors in circuits involving relays and optos is required. A 1k current limiting resistor must be placed in line with the circuit above to prevent damage to the relay.

Optos = 10 milliamp (typical), 40 milliamp (maximum) - ***2 volts minimum***

GPIO's (21)

Labeled 'GPIO 1-10 and GPIO 11-21' for each channel

There is a daughter card on the MC4000 card with either 21 relays or a mix of 16 relays and 5 optos. The 21 relays is for GPO's only and require a pull up resistor of 1k to be attached in line with the external device to be triggered by the relay. The system is shipped by default with a 16/5 mixed card which provides 16 GPO's and 5 GPI's. NOTE: For GPI use, an additional 5-12 volt supply must be applied to the connection. Apply the positive side of the voltage source to one side of the external device's GPO. Apply the other side of the external device's GPO to one of the two connections on the GPI of the MC4000. Apply the other side of the GPI on the MC4000 to the negative side of the power source. Additional setup must still be done in the configuration file for the MC4000 to enable the functionality for either use.

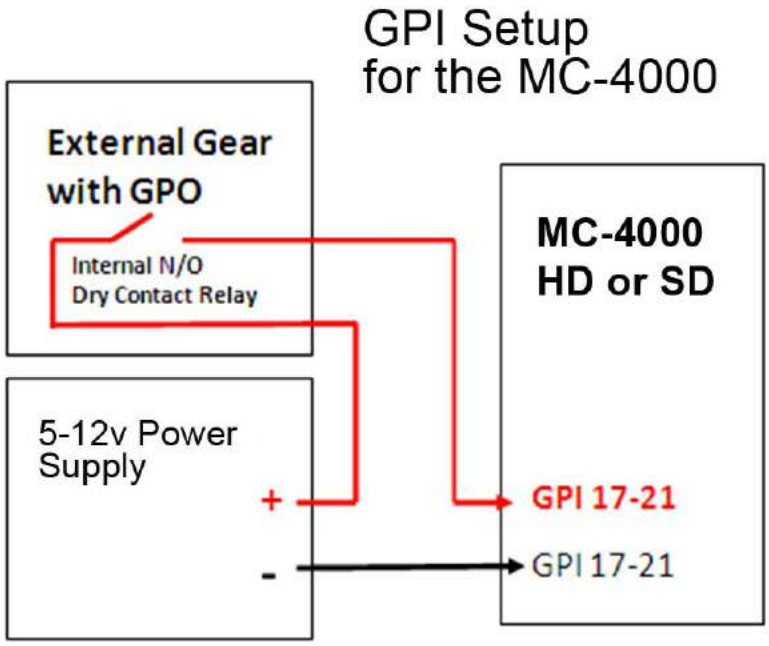
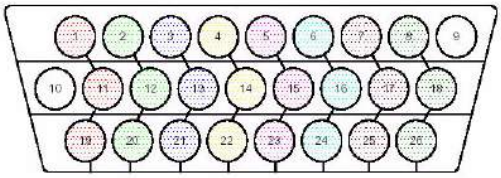


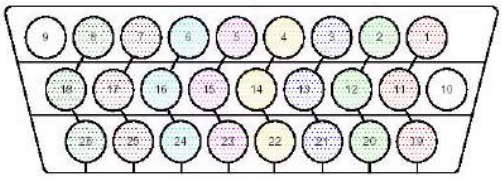
FIGURE 2-7. GPI Setup for an MC-4000

Relays/Optos A (Ports 1-10)

Table 15 contains the relay port pin-outs, while Table 16 contains the relay port pairs.



DB-26B (Male)



DB-26S (Female)

TABLE 2-17. Relay port pin-outs

Pin #	Signal	Pin #	Signal
1	T1A	14	T5B
2	T1B	15	Ground*
3	T2A	16	T6A
4	T2B	17	T6B
5	Ground*	18	Ground*
6	T3A	19	T7A
7	T3B	20	T7B
8	T4A	21	T8A
9	T4B	22	T8B
10	N/C	23	T9A
11	N/C	24	T9B
12	Ground*	25	T10A
13	T5A	26	T10B

* All Grounds are tied together.

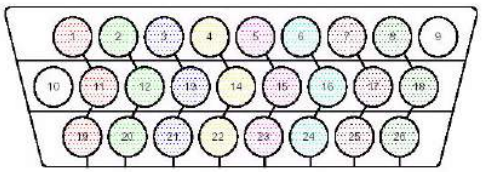
TABLE 2-18. Relay Ports (1 - 10 pairs)

Signal	Pairs	Signal	Pairs
T - 1	Pin 1 A	T - 6	Pin 16 A
	Pin 2 B		Pin 17 B
T - 2	Pin 3 A	T - 7	Pin 19 A
	Pin 4 B		Pin 20 B
T - 3	Pin 6 A	T - 8	Pin 21 A
	Pin 7 B		Pin 22 B
T - 4	Pin 8 A	T - 9	Pin 23 A
	Pin 9 B		Pin 24 B
N/C	Pin 10 A	T - 10	Pin 25 A
	Pin 10 B		Pin 26 B
T - 5	Pin 13 A	Grounds*	Pins - 5, 12, 15, and 18
	Pin 14 B		

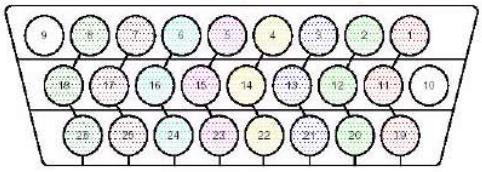
* All grounds are tied together on the Relay Port.

Relay/Optos B (ports 11 - 21)

Table B-17 contains the pinouts for relay port pinout, while table B-18 contains relay port pairs.



DB-26B (Male)



DB-26S (Female)

TABLE 2-19. Relay ports 11 - 21 pin-outs

Pin #	Signal	Pin #	Signal
1	T11A	14	T16B
2	T11B	15	Ground*
3	T12A	16	T17A
4	T12B	17	T17B
5	Ground*	18	Ground*
6	T13A	19	T18A
7	T13B	20	T18B
8	T14A	21	T19A
9	T14B	22	T19B
10	T15A	23	T20A
11	T15B	24	T20B
12	Ground*	25	T21A
13	T16A	26	T21B

* All Grounds are tied together.

TABLE 2-20. Relay ports 11 - 21 pairs

Signal	Pairs	Signal	Pairs
T - 11	Pin 1 A	T - 17	Pin 16 A
	Pin 2 B		Pin 17 B
T - 12	Pin 3 A	T - 18	Pin 19 A
	Pin 4 B		Pin 20 B
T - 13	Pin 6 A	T - 19	Pin 21 A
	Pin 7 B		Pin 22 B
T - 14	Pin 8 A	T - 20	Pin 23 A
	Pin 9 B		Pin 24 B
T - 15	Pin 10 A	T - 21	Pin 25 A
	Pin 11 B		Pin 26 B
T - 16	Pin 13 A	Grounds*	Pins - 5, 12, 15, and 18
	Pin 14 B		

* All grounds are tied together on the Relay Port.

Installing the MX-Bus Cables

The MX-Bus is the actual control bus that connects the MC-4000 hardware to the SC-4 or other controllers. The illustrations on the following page contain the proper connections for either a MC-4000 with internal SCX-400 control, or a MC-4000 with external SC-4 control

In either case, the proper levels and offsets must be set so they will operate on the proper signal levels.

The MX-Bus is a daisy chain configuration, must not exceed 300 feet (91.4 meters) in length; and must be terminated at both ends of the daisy chain.

If your MC-4000 was shipped as an external system to be connected to an SC-4/400, the system will include:

- One MX-Bus Cable – 10 ft. (USI Part Number: 80229-10). Other lengths are available and may be ordered through Utah Scientific sales at 1–800–453–8782.

Interconnecting the SC-4 and MC-4000 Frames

The MX-Bus interconnection to the MC-4000 typically starts at the SC-4 control system and is terminated at the last physical MC-4000 chassis. The actual physical arrangement depends on the site placement of the various physical components. *No connection to an SC-4 is needed if your system uses the internal SCX-400 in 'control' mode.*

The following illustration shows a typical MX-Bus installation.

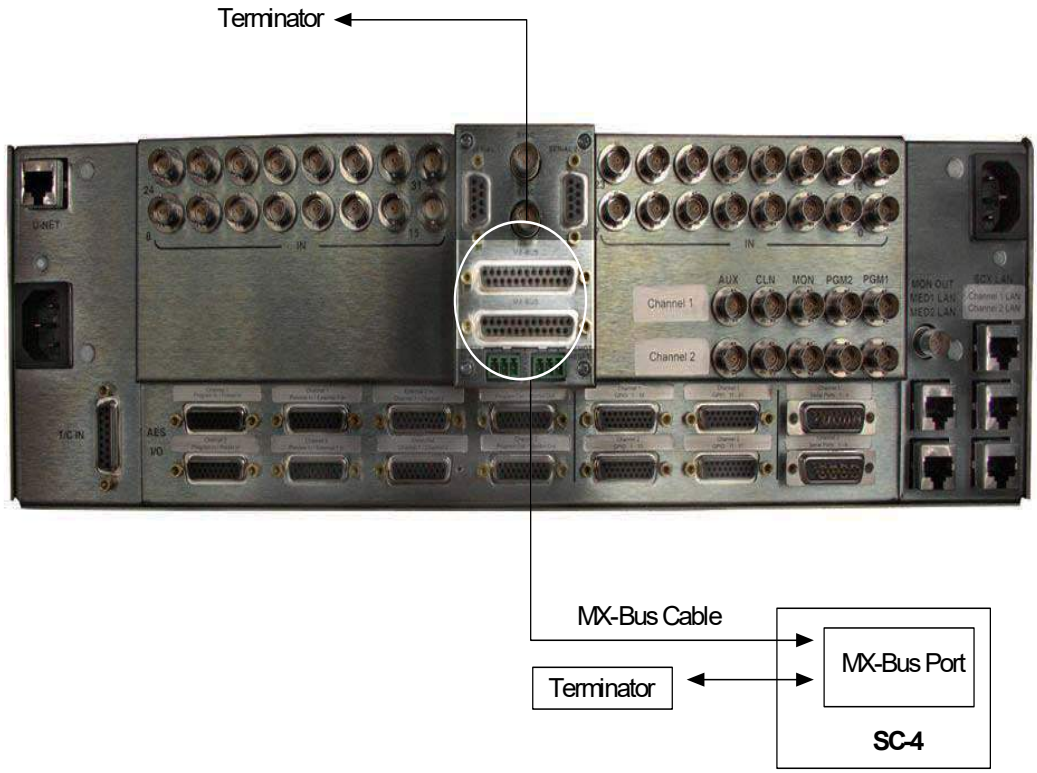


FIGURE 2-8. The MX-Bus Installation to an SC-4 Controller

If your MC-4000 was ordered stand-alone and no other UT-400 frames were ordered with your system, both MX-Bus ports should contain terminators. If your system is using the internal

SCX-400 cards and there are multiple UT-400 frames, use the following illustration as a cabling guide.

FIGURE 2-9. Basic MC-4000 cabling

SERIAL PORTS 1 & 2 on the SCX-400 (9-Pin)

These RS-422/232 ports can be configured for communication with automation systems. Port protocols and settings are configured by the configuration utility.

The 2 serial ports can be configured as RS-232 or RS-422. See *Board Jumpers / Board Reset/ Changeover"* in Chapter 4.

TABLE 2-21. RS-232 Connector Pin-outs

Pin #	Signal	Pin #	Signal
1	Carrier Detect (CD)	4	Data Term Ready (DTR)
3	Transmit (TX)	8	Clear to Send (CTS)
2	Receive (RX)	7	Request to Send (RTS)
6	Data Set Ready (DSR)	9	Ground*
5	Ground*	~	~

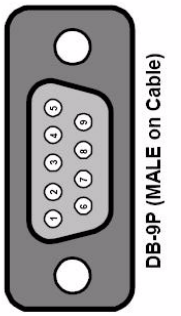
* All Grounds are tied together.

TABLE 2-22. RS-422 Connector Pin-outs

Pin #	Signal	Pin #	Signal
1	Carrier Detect (CD)	4	Transmit Common*
3	Transmit (TX+)	8	Transmit (TX-)
2	Receive (RX-)	7	Receive (RX+)
6	Receive Common*	9	Ground*
5	Ground*	~	~

* Grounds and Common are tied together.

The SCX-400 contains two serial ports.



	RS-232 Mode		RS-422 Mode
1	RI	1	Not used
2	TXD	2	TX-
3	RXD	3	RX+
4	DSR	4	Not used
5	Ground	5	Ground
6	DTR	6	Not used
7	CTS	7	TX+
8	RTS	8	RX-
9	CD	9	Not used

FIGURE 2-10. Pinout detail

Note: Set serial port modes on the SCX-400 by strapping JP1 and 2 to RS-232 or RS-422.

SERIAL CONNECTOR

The serial connector contains four (4) separate RS-232 or RS-422 strappable serial ports. JP 7, 8, 9, and 10 on the MC-4000 processor board determine the signal format.

The pin out of that connector is as follows:

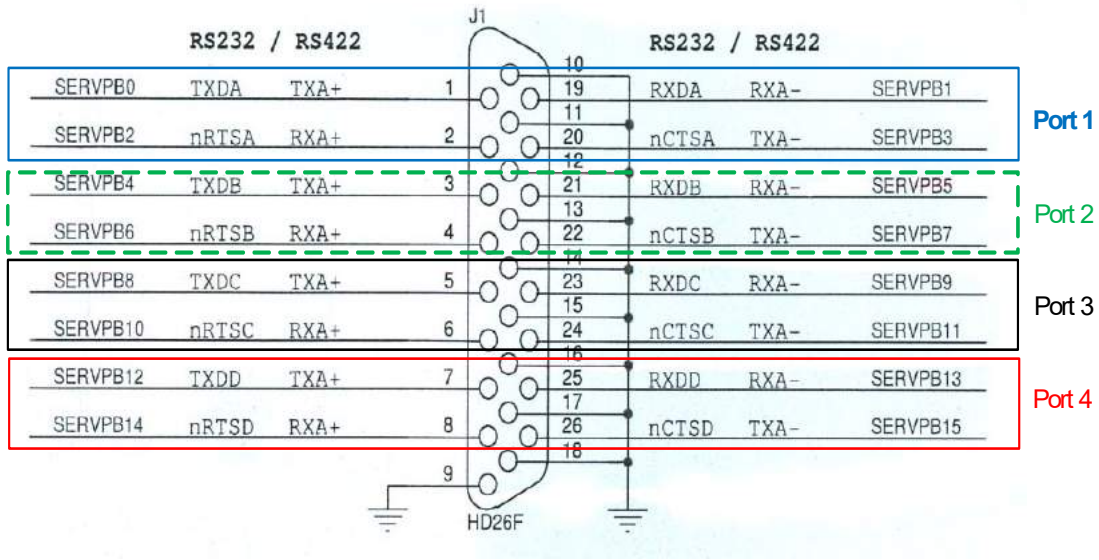


FIGURE 2-11. Serial Connector pinout

Termination Table

TABLE 3.

Serial Port 1				
Cable #	*Color*	*From*		*9-Pin (female)*
1	Black	J1-10	GND	5
1	White	J1-1	TX+	3
1	Red	J1-20	TX-	8
1	Brown	J1-2	RX+	7
1	Orange	J1-19	RX-	2
Serial Port 2				
Cable #	*Color*	*From*		*9-Pin (female)*
2	Black	J1-12	GND	5
2	White	J1-3	TX+	3
2	Red	J1-22	TX-	8
2	Brown	J1-4	RX+	7
2	Orange	J1-21	RX-	2
Serial Port 3				
Cable #	*Color*	*From*		*9-Pin (female)*
3	Black	J1-14	GND	5
3	White	J1-5	TX+	3
3	Red	J1-24	TX-	8
3	Brown	J1-6	RX+	7
3	Orange	J1-23	RX-	2
Serial Port 4				
Cable #	*Color*	*From*		*9-Pin (female)*
4	Black	J1-16	GND	5
4	White	J1-7	TX+	3
4	Red	J1-26	TX-	8
4	Brown	J1-8	RX+	7
4	Orange	J1-25	RX-	2

SMPTE Alarm Function

One main SMPTE alarm relay is provided with the MC-4000 Control Processor Board. If, for example, any alarm condition is sensed from the power supply, temperature, or fan, the SMPTE alarm relay contacts will close. This alarm condition is typically indicated by a custom configured LED (and/or audible alarm) in close proximity to the MC-4000. The plug-in for the SMPTE alarm is located below:

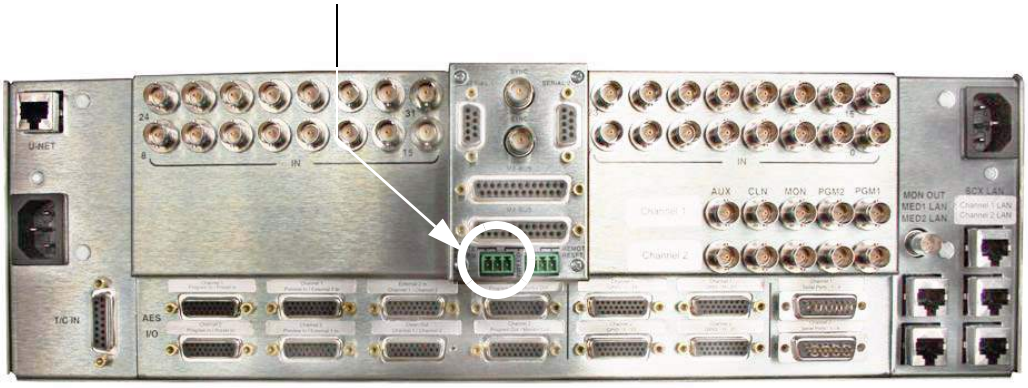
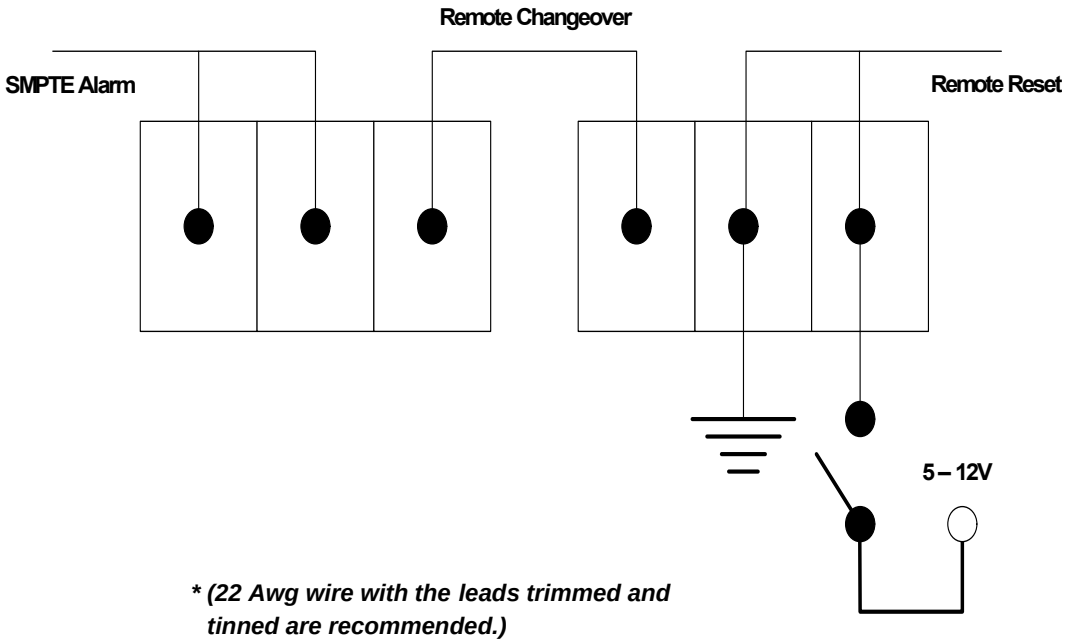


FIGURE 2-12. SMPTE Alarm

Remote Reset/Current Triggered Opto - A current across the pins will cause the controller to Reset.



**** (22 Awg wire with the leads trimmed and tinned are recommended.)***

Recommended current drive circuit

The Remote Reset and Changeover are activated when the + and - pins (for each) are *shorted* together. Remote Reset will reset the cards within the system[1], while Remote Changeover switches control from the active to the standby control card.

1. Caution - this will result in a system reset.

UNET Port

The UNET terminator is plugged directly into the port if it is used within a stand alone system. If the UNET originates from an external controller (SC-4/400), a direct connection to the SC-4 must be used, or a UNET hub is required for an SC-400.[2]

The total length of the UNET cable in this daisy chain must not exceed 300 meters (1,000 feet.).

Utah Scientific does not supply the UNET cables. They may be purchased or constructed using Category 5, UTP (unshielded twisted pair) cable with RJ-45 male connectors.

Timecode Input Ports

These connectors are used to bring a system clock into the system for display on the control panel.

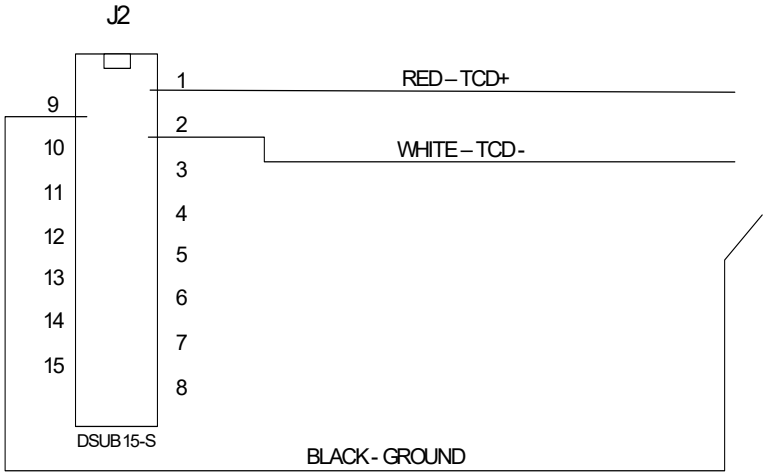


FIGURE 2-13. Timecode pinout and cabling

Channel 1 & 2 LAN (1 for each channel):

The Control Ethernet Port is a 10/100 Base-T topology. Its primary purpose is attachment to a closed control Ethernet LAN, shared by other Utah Scientific devices.

2. Single connection from the controller to the MC-4000 with no daisy chain or termination.

Each LAN Port is a 10/100 Base-T topology, and are used to interface with a configuration terminal or computer, machine control, or automation systems. Each MC-4000 chassis section has its own unique IP Address (for each Ethernet port), allowing several MC-4000 controllers to be installed on the same network.

The Master Control LAN is connected to this RJ-45 connector. This LAN interconnects all of the Control Panels and Processor Frames in the system. Standard wiring devices such as hubs, routers, etc. can be used as required

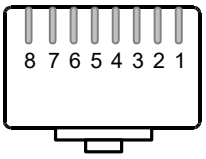
SCX Lan:

This is the E-NET port for the SCX-400 when used in controller mode. Use the same as Channel 1 & 2 LAN (above).

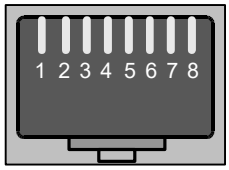
Med 1 & 2 LAN (not implemented at this time):

Ethernet Ports A and B

The following illustration contains pinouts for the RJ-45 Ethernet connector when a Network Hub is used. Both ends of the cable are wired in an identical manner.



Male on Cable

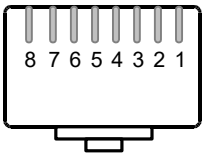


Female on Chassis

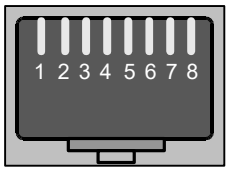
TABLE 2-1. Ethernet Connector Pin Outs -- Network Hub Wiring

Pin #	Signal	Pin #	Signal
1	TX +	5	Ground
2	TX -	6	RD -
3	RD +	7	Ground
4	Ground	8	Ground

The following illustration contains pin outs for the RJ-45 Ethernet connector when Point-to-point “hub-less” wiring is used (e.g., with the MC-4000 connected directly to the PC — and no other connections). Both ends of the cable are wired differently, with the transmit and receive pairs swapped at one end.



Male on Cable



Female on Chassis

TABLE 2-2. Ethernet Connector Pin Outs Point-to-point Wiring

Pin #	Signal	Pin #	Signal
	Cable End “A”		**Cable End “B”**
1	***TX +***	1	***RD +***
2	***TX -***	2	***RD -***
3	***RD +***	3	***TX +***
4	Ground	4	Ground
5	Ground	5	Ground
6	***RD -***	6	***TX -***
7	Ground	7	Ground
8	Ground	8	Ground

Input, Output, and Crosspoint Card Replacement

To correctly remove and replace the individual cards, always make sure the guides are located (inside the chassis) and the card slides all the way in before the ejector is locked in place. The card ejectors are pressed inward and down from the card when locking, and pulled outward from the card when removing.

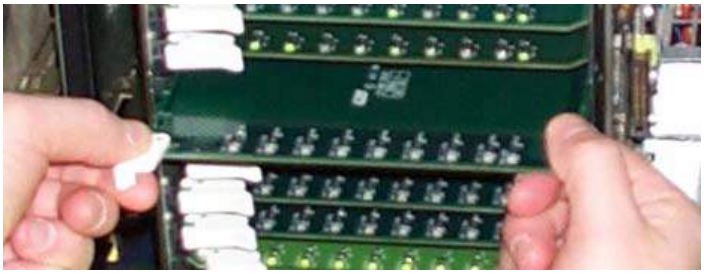


FIGURE 2-14. Input/Output Board Replacement and Removal

Note that all cards are situated at opposite sides, up and down on either side of the chassis, with the left cards facing up and the right cards facing down.

All boards within the MC-4000 system are hot-plug capable.

Advisory - MC-4000 Overheating Issue

Overview

The MC-4000's '12 Series' firmware, incorporating the Squeeze effect, may occasionally experience overheating problems that can result in video breakup. Changing the cooling fans from 38 CFM to 50 CFM will increase the air flow and provide adequate FPGA cooling. The fans can be replaced without taking the MC-4000 off line.

Please contact UTSCI Customer Service for assistance with this procedure or the materials involved.

Fan Replacement Kit Contents

- AFB0612DH cooling fan (2 each)
- Wire ties (1 each)

Procedure

Step 1

Remove the front door of the MC-4000 chassis, then remove either the left or the right power supply, allowing the system to run on a single power supply. Replace the door to allow system to cool properly while working on the fan replacement.

Note: To maintain an optimal temperature environment, is important to not delay the fan replacement once the procedure has started.

Step 2

Cut the wire tie that secures the 3 fan wires on the old fan (AFB0612EH).

Step 3

Unsolder the Black, Blue and Red fan wires.

Step 4

Unscrew the 4 screws holding the fan.

Step 5

Solder the replacement fan (AFB0612DH) into the following locations.

- BLACK = E6
- BLUE = E5
- RED = E4

Step 6

Attach the new fan to the circuit board standoffs using the screws from the old fan.

Step 7

Secure (by tying) the fan wires to the standoff.

Step 8

Remove the MC-4000 door and replace the modified power supply.

Step 9

Remove the second power supply and repeat steps 2 thru 8

CHAPTER 3

Software Operation SCX-400 and MC-4000

In This Chapter

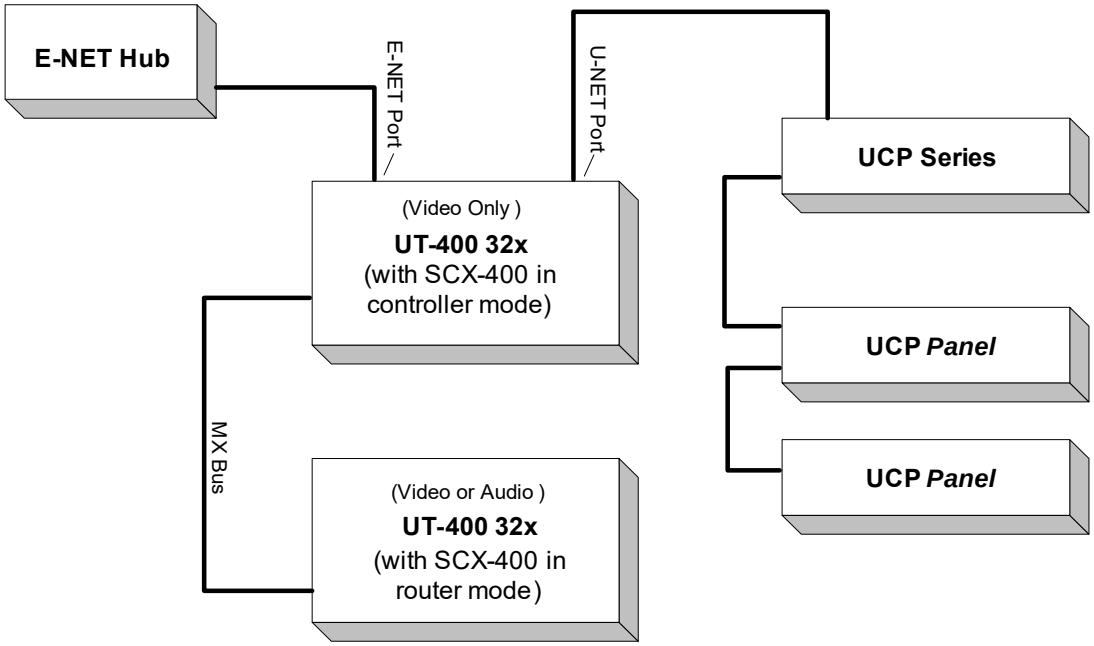
SCX-400 (video) and System Configuration

The SCX-400 must be configured correctly for proper system operation. Its setup will include determining whether it will be a Controller or Router.

In the Router mode the SCX-400 functions as a video crosspoint card and all control system ports are disabled. When set as a controller, the SCX-400 will serve as a system controller and a crosspoint card combined. In this mode all control ports are functional. Aspects of the SCX-400 setup include defining the router level, input-output offset and the XP-RST mode.

For additional detail, please see "Source and Destination Devices Specification" in the U-CON Setup and Operations Guide, Section 2.

Internal SCX-400 Connections (Video)



Note: The video system can be a controller or router, but an audio system can be a router only. There is no controller circuitry in the audio chassis.

Determining and Setting Router Level, Mode, and Offsets

Initially determined by customer input and requirements, router levels are preset at the factory and tested during manufacturing. The installation of your new MC-4000 Router should not require any signal level changes to operate following a new installation.

By definition, a router level represents a unique address configuration, which is set by a dip switch that the controller uses for identification. An example of this would involve a system containing 1 video and 2 audio routers. In this case, the setting would correspond to router levels 1, 2, and 3.

When used in the internal mode as a controller (or as a router) the MC-4000 must be set as a unique router level. The level the MC-4000 ships *as* should be correct in most cases, however if this needs to be changed, follow the instructions found on the next two pages.

Note: When changing the MC-4000 router level, the SCX-400 must be reset in order for the system to recognize the dip switch changes. It is advised that you attempt reconfiguration during off-air periods only.

1. If this is a video system, locate the configuration dipswitch on the SCX video crosspoint board (below).

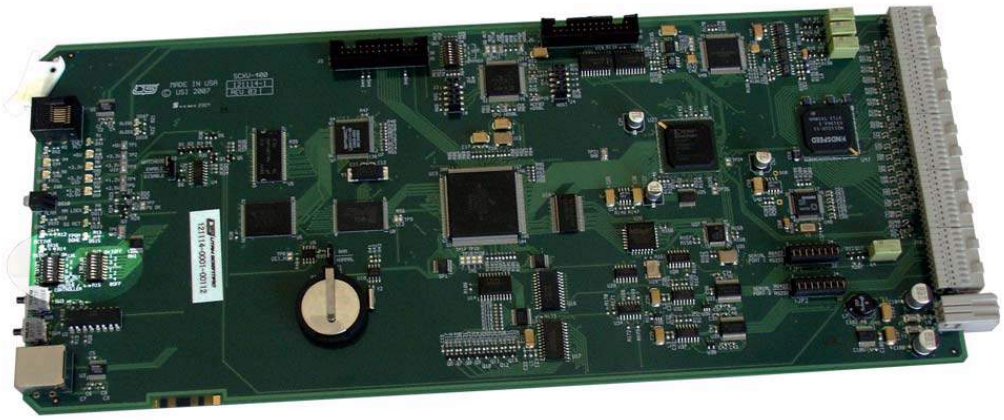
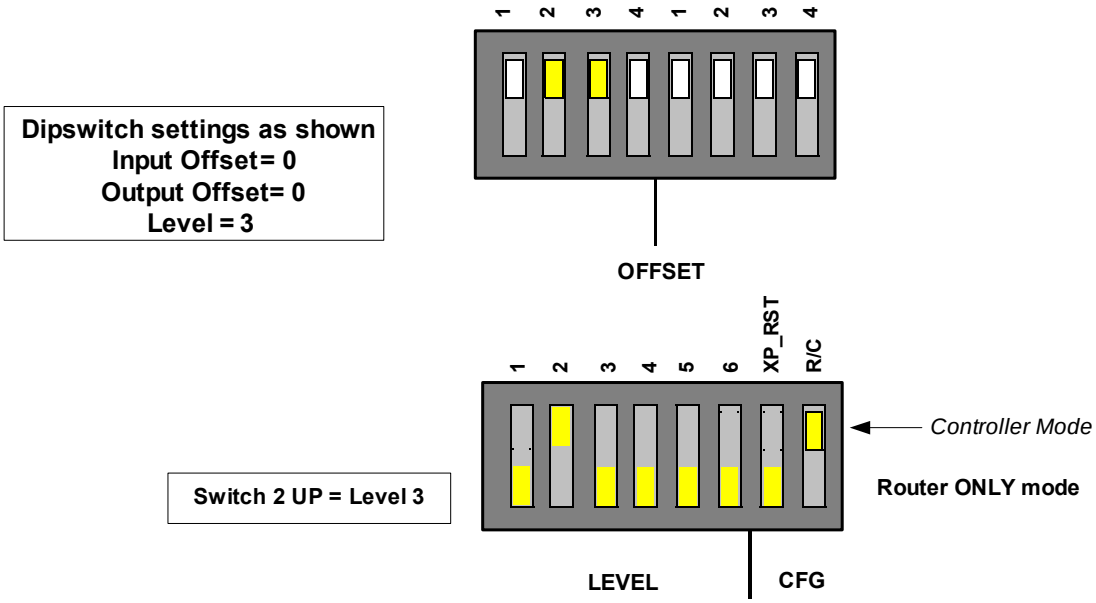


FIGURE 3-1. Crosspoint Board Dipswitch Location

- There are two eight-position dipswitches on the SCX-400.
- Please see Table Figure 3.1, “Switch Settings,” on page 3-7 to set the Level dipswitches and to determine which switches must be changed for the Level desired.
- Reference Tables 2.2 and 2.3 to set the Offset dipswitches per your requirements.
- CFG switches 7 and 8 are used to configure your system per your needs.
  - R/C is set to C “on” when the card is configured as a controller and crosspoint.
  - R/C is set to R “off” when the card is configured as a router crosspoint *only*.

Note: The following two items apply when this card is used as the Controller.

- XP_RST in the “on” position will reset the crosspoints following the controller reset. (Crosspoints will need to be refreshed before connections are available.)
- XP_RST in the “off” position will cause the crosspoint reset *not* to follow the controller reset. (Crosspoint connections will not be lost.)



ON = position *toward* the number on the board

FIGURE 3-2. MC-4000 Configuration Dipswitches as they appear on the SCX-400

TABLE 3.1 Switch Settings

Switch 1	Switch 2	Switch 3	Switch 4	
OFF	OFF	OFF	OFF	Level 1
ON	OFF	OFF	OFF	Level 2
OFF	ON	OFF	OFF	Level 3
ON	ON	OFF	OFF	Level 4
OFF	OFF	ON	OFF	Level 5
ON	OFF	ON	OFF	Level 6
OFF	ON	ON	OFF	Level 7
ON	ON	ON	OFF	Level 8
OFF	OFF	OFF	ON	Level 9
ON	OFF	OFF	ON	Level 10
OFF	ON	OFF	ON	Level 11
ON	ON	OFF	ON	Level 12
OFF	OFF	ON	ON	Level 13
ON	OFF	ON	ON	Level 14
OFF	ON	ON	ON	Level 15
ON	ON	ON	ON	Level 16

TABLE 3.2 MC-4000 Offset Dipswitch Settings

Input/Output Offset Switch Setting	Function	Description
0	Input/Output Offset 0	Offsets Base input/Output by 0 from 0
1	Input/Output Offset 32	Offsets Base input/Output by 32 from 0
2	Input/Output Offset 64	Offsets Base input/Output by 64 from 0
3	Input/Output Offset 96	Offsets Base input/Output by 96 from 0
4	Input/Output Offset 128	Offsets Base input/Output by 128 from 0
5	Input/Output Offset 160	Offsets Base input/Output by 160 from 0
6	Input/Output Offset 192	Offsets Base input/Output by 192 from 0
7	Input/Output Offset 224	Offsets Base input/Output by 224 from 0
8	Input/Output Offset 256	Offsets Base input/Output by 256 from 0

Input/Output Offset Switch Setting	Function	Description
9	Input/Output Offset 288	Offsets Base input/Output by 288 from 0
10	Input/Output Offset 320	Offsets Base input/Output by 320 from 0
11	Input/Output Offset 352	Offsets Base input/Output by 352 from 0
12	Input/Output Offset 384	Offsets Base input/Output by 384 from 0
13	Input/Output Offset 416	Offsets Base input/Output by 416 from 0
14	Input/Output Offset 448	Offsets Base input/Output by 448 from 0
15	Input/Output Offset 480	Offsets Base input/Output by 480 from 0

TABLE 3.3 Input/Output Offset

Input/Output Offset				
Switch 1	**Switch 2**	**Switch 3**	**Switch 4**	
OFF	**OFF**	**OFF**	**OFF**	**No offset**
ON	**OFF**	**OFF**	**OFF**	**Offset by 32**
OFF	**ON**	**OFF**	**OFF**	**Offset by 64**
ON	**ON**	**OFF**	**OFF**	**Offset by 96**

Installing the Video Input and Output Cables

This section provides guidelines for installing the MC-4000 Video and Unbalanced Digital Audio Inputs and Outputs on the backplane connectors. Serial Digital Video, Unbalanced Digital Audio, and High Definition cable specifications are listed below.

Input Signal	Recommended Cable Type	Maximum Cable Length	Termination Method
Digital Video & Unbalanced Digital Audio	Belden 8281	300 M. / 1000’	Internal - 75 Ohm
High Definition	Belden 8281	100 M. / 300’	Internal - 75 Ohm
	Belden 1694A	150 M. / 500’	Internal - 75 Ohm

3 Gig Input Card - Cable Information

TABLE 3.4

SD-SDI SMPTE259	350 Meters of 1694 Cable
HD-SDI SMPTE-292	140 Meters of 1694 Cable (-2 version) 200 meters (-1 version)
3G SDI SMPTE 424	120 Meters of 1694 Cable

SC-400 Jumper Settings

- J1 Switch -- Used to clear the RAM
- JP1 -- Serial Port 1 -- RS-232/422
- JP2 -- Serial Port 2 -- RS-232/422

SCX-400 Scangate Dipswitch Setting (SW5)

User Switch 0

When set, the system will initiate a software load, though the Linux application itself will not start. This is typically used for factory troubleshooting.

User Switch 1

User switch 1 determines which of the two memory banks is in use. A change to either memory partition (0 or 1) will not affect the other. The actual switch position determines which memory partition is in use.

User Switch 5

Used to start the Linux operating system, but not the actual application.

User Switches 2 - 4

Undefined at this time.

Bypass Switch

Also used for factory troubleshooting. The default configuration is all switches positioned away from the silkscreened numbers, or to the *left* as the board is viewed from the front.

For additional detail, please see “Board Jumpers / Board Reset/Changeover” on page 4-5.

System Diagnostics

Introduction

To aid in diagnosing system operating conditions or determine the state of various settings in the system, the user may occasionally wish to connect to a port on the Frame Communications Module or on an individual card itself. This section details the cabling and software settings for a common terminal emulation program, Tera-Term, which is available from Utah Scientific, and details the commands and status values that are available at these ports.

Format

All of the diagnostic ports in this system are based on RS-232. Tera-Term is a freeware terminal emulation program that operates well with RS-232 ports and this guide details the proper settings for Tera-term. If using another terminal emulation program, use its operating manual for settings. All diagnostic ports in the system use these common settings. There are 4 diagnostic ports; 2 on the SCX-400, 1 on the MC-4000, and 1 on the MCP-2020. The system ships with 2 different adapters, one labeled UT-400 and the other labeled SC4/2020.

Router (Diagnostic Port)

Note: The UTSCI black adapter (labeled UT 400) must be used for this operation.

Baud Rate Settings

Under Setup – Serial Port

Port: COM1 (typically, depends upon PC)
Baud Rate 38400
Data:8 bit
Parity:None
Stop:1 bit
Flow Control:Xon/Xoff

Terminal Settings

Under Setup – Terminal Setup

New-line – Receive:CR+LF
New-line – Transmit: CR

Using the Router Debug Port (Black RJ-45 connector)

The router debug port is the [black] RJ-45 female connector located at the left side of the crosspoint.[1] Its capabilities include:

- System **Power Up** Display
- **Main Menu** Display.
- Verifying the **FPGA Memory Status**.
- Verifying the **Software Version**.
- Checking the **Router Crosspoint Status** to verify switching.
- Checking the **I / O Card Information**.
- Checking the **Hardware Status**.

Only the “Active” crosspoint will have the update information to be read by the router debug port. By pressing the “Change Over” button on the currently active SCX-400 (video), or by pressing the reset button on the currently active card, the control will be transferred to the inactive card.

1. This is labeled P2 for the SCX-400 (video) and labeled P1 for the DA-32 XP.

Startup Display (Video)

If the debug port and terminal is connected to the Utah-400 system during the power up sequence, the following display will appear on the terminal. The display below is a portion of the ADC setup information, and is generally for factory use only.

```
************************************************
    lash Set...
    00000000FF
    XPT Enabled
************************************************
```

Audio - If the debug port and terminal is connected to the UT-400 system during the power-up sequence, the following display will appear on the terminal.

```
**********************************************************
                Utah Scientific Inc.
        Utah-400 32R Audio System Monitor - V1.01w
**********************************************************
```

Main Menu Display

The main menu displays the selections possible on the Router Debug port.

After connecting the router debug port to the crosspoint board, activate the Main Menu by pressing <Enter> or <Return> on the terminal or computer. The display will be as shown below and is self explanatory:

Menu-
M = FPGA Memory Status
V = Version
R = Router Crosspoint Status
I = IO Card Information
S = Hardware Status

FPGA Memory Status

Typing an upper or lower case “M” on the keyboard activates this feature. This display function enables the user to examine the crosspoint status as reported by the FPGA Controller. The status display and explanation is shown below.

FPGA MEMORY STATUS	**Min / Max Values**
Level Switch = 00	Range = 00 to 1F
Offset Switch = 00	Range = 00 to FF
MX Active? -> YES.	Yes / No
Monitor Matrix = FF	Range = 00 to 1F
Primary / ID Reg = 01	
FPGA Rev = X.XX	Reflects Current Version

Parameter	Description
Level Switch	Reflects the Router Level that is selected when the dipswitch is turned “Off” (toward the silkscreen number) on the crosspoint board.
Offset Switch	Reflects any router offsets selected.
MX Active	Indicates the MX Bus is active. If there is a “**No**” showing in this block, the MX Cable may be disconnected or the MX Bus daisy chain may not be terminated.
Monitor Matrix	Reflects the Monitor Output currently switched up. FFh = Default. Mon. Mtx. not switched up.
FPGA Revision	Subject to change.

Verifying the Software Version

This feature is the same as the Start Up Display with the exception of the “Set to Primary” message. Typing an upper or lower case “V” on the keyboard activates this feature. The displayed data is shown below.

Video

****
Utah Scientific Inc.
Utah-400/32 System Monitor, Rev. X.X
****

Audio

```
**********************************************************
              Utah Scientific Inc.
      Utah-400 32R Audio System Monitor - V1.01w
**********************************************************
```

Checking the Router Crosspoint Status

To activate this feature press an upper or lower case “R” on the keyboard. This feature displays all of the crosspoints and indicates which crosspoints are switched up. The table displayed is arranged in blocks of 16.

When the router is initially powered up the display will be all FF’s. This screen displays the Inputs that are switched up to the respective output in the crosspoint matrix. To check if an Input / Output has been switched up, first switch up the Input / Output and then press “R” again to refresh the screen. The display should reflect the Input / Output change to the router matrix.

Thus, if Input 00 is switched up to all outputs, after pressing “R” the crosspoint status block will show all 00’s.

An example of the screens is shown below:

Crosspoint display after router is powered up (Hexadecimal):

```
ROUTER STATUS
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
```

FIGURE 3-3. Crosspoint display (hex)

Crosspoint display with Inputs switched to Outputs diagonally (Hexadecimal):

```
ROUTER STATUS
00,01,02,03,04,05,06,07,08,09,0A,0B,0C,0D,0E,0F
,
10,11,12,13,14,15,16,17,18,19,1A,1B,1C,1D,1E,1F
```

FIGURE 3-4. Crosspoint display - Inputs to Outputs

Crosspoint display with Input 00 switched up to all outputs (Hexadecimal):

00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00,
00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00,

FIGURE 3-5. Crosspoint display - input 00 switched to outputs

Crosspoint display shown as a decimal matrix:

(This is shown for reference only; the terminal display will always be in the Hexadecimal format)

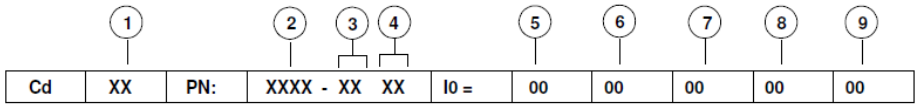
000, 001, 002, 003, 004, 005, 006, 007, 008, 009, 010, 011, 012, 013, 014, 015,
016, 017, 018, 019, 020, 021, 022, 023, 024, 025, 026, 027, 028, 0293, 030, 031,

FIGURE 3-6. Crosspoint display as decimal matrix

Checking Input / Output Card Information

Typing the upper or lower case “I” activates this feature. This display provides up to date information on the types of Input and Output boards in the system, the revision of each board and the Monitor Matrix Output that is switched up.

The display format (per line) is shown below:



Cd	XX	PN:	XXXX - XX XX	I0 =	00	00	00	00	00

1. Chassis location of Card: Range - 00h to 27h
2. Four Digit Part Number of Card
3. Card Dash Number
4. Card Revision Number
5. Signal Presence Indicator
6. Card Specific Range = 00h to FFh
7. Card Specific Range - 00h to FFh
8. Card Specific Range - 00h to FFh
9. Monitor Matrix Output Reported; (Indicated on Output boards only) 08h = Out 0, Monitor Matrix Enabled; 0Fh = Out 7 on; Default = 8Fh; Off = 00h

Cd	00	PN:	1026 - 10A0	I0 =	01	00	10	00	0F

Typical Data represented by a Digital Audio Input Board: *Card Slot 00, Board Part Number = 1026, Dash Number = 10, Revision A, IO Data = Input 00 contains* ***signal present****.*

Cd	05	PN:	1027 - 1001	I0 =	01	04	00	00	00

Typical Data represented by a Digital Audio Output Board: *Card Slot 05, Board Part Number = 1027, Dash Number = 10, Revision 01, IO Data = Output 00 contains* ***signal present****.*

5 <u>Signal Presence Indicator:</u> **The byte of information contains a single bit that indicates presence (1) or not (0) for each input or output on the card.**

Input / Output	0	1	2	3	4	5	6	7
Value	01	02	04	08	10	20	40	80

FIGURE 3-7. Display format - I/O card info

Note: These values <u>Add</u> if more than 1 I/O contains a signal. (FF = All Signals Active)

IO Information – full display

The complete terminal display of IO Information is shown below. This is how this screen should appear, dependent on the size of your system. A smaller system will have a larger portion of the screen showing boards “Not Installed”. Note: on the bottom of the display, data on the system crosspoint is reflected. This data is also available in the Hardware Status feature.

```
IO CARD INFORMATION =
Cd 00 PN:0967-1003 IO = 000000000F | Cd 01 PN:2407-1003 IO =
0400000000 |
Cd 02 PN:2407-1003 IO = 0000000000 | Cd 03 PN:2407-1003 IO =
0000000000 |
Cd 04 PN:2407-1003 IO = 0000000000 | Cd 05 PN:2406-1003 IO =
FF00000000 |
Cd 06 PN:0966-1003 IO = FF00000000 | Cd 07 PN:0966-1003 IO =
FF00000000 |
```

FIGURE 3-8. I/O info - Full display

IO Card Information – Locator Diagram

The following diagram gives an illustration of how the IO Information display actually relates to the physical chassis. This is a useful tool for locating suspect Inputs or Outputs or just for changing or Input or Output boards to your system.

<table>
<tr><td rowspan="2">B</td><td>In 16 - 23 Cd. 6</td><td rowspan="5"></td><td>In 31 - 24 Cd. 7</td><td rowspan="2">B</td></tr>
<tr><td>In 0 - 7 Cd. 4</td><td>In 15 - 8 Cd. 5</td></tr>
<tr><td></td><td>Crosspoint</td><td>Crosspoint (option)</td><td></td></tr>
<tr><td rowspan="2">A</td><td>Out 16 - 23 Cd. 2</td><td>Out 31 - 24 Cd. 3</td><td rowspan="2">A</td></tr>
<tr><td>Out 0 - 7 Cd. 0</td><td>Out 15 - 8 Cd. 1</td></tr>
</table>

FIGURE 3-9. I/O locator diagram

```
Cd 00 PN : 1041-0101 IO = 00100000008  |  Cd 01 PN: Not Installed
Cd 02 PN : 1040-0102 IO = 00100000000  |  Cd 03 PN: Not Installed
Cd 04 PN : 1026-0101 IO = 00001000000  |  Cd 05 PN: Not Installed
Cd 06 PN : Not Installed               |  Cd 07 PN: Not Installed
Xpt  =  1191-0100
```

FIGURE 3-10. I/O Card Information - AUDIO

Hardware Status Display

By pressing the lower or upper case “S” the Hardware Status is displayed on the screen. This display gives a snapshot of the current condition of the major system components being monitored in the router.

The display will be similar to what is shown below. A brief description of the data is explained below.

```
HARDWARE STATUS
 UT400/32   XPT
 Slot  =  Primary
 Active?  Yes
 Local PS Status  =  Local PS OK (Audio system list the crosspoint voltages)
 External PS Status  =
 PS1  (RH)  Installed  -> YES.  |  Error Code  -> No Error  |  TEMP  ->  32C
 PS2  (LH)  Installed  -> YES.  |  Error Code  -> No Error  |  TEMP  ->  32C
```

- Slot: Refers to the location of the crosspoint; primary or redundant.
- Active refers to the state of the crosspoint; yes or no.
- Error Register, Board Pres Regs, and Primary /ID Reg are for Factory Use.

- Local PS Status: Monitors all voltages on the crosspoint and reports any errors as “**FAIL**”.
- External PS Status: Reflects the status of the power supplies installed in the system and reports any errors. The temperature of each power supply is also monitored in Celsius. If a power supply is not installed, there is a “No” following the arrow. A fan failure will display an actual “Fan Error”.

Controller Port

Terminal Commands for the SCX-400 and Master Control

CASE SENSITIVE

Chassis Functions

chassis (displays all of the chassis operations)

chassis –r (reads chassis info including IP addresses, customer name and chassis ID)

chassis –d (displays scangate version and card serial number)

chassis –init (removes chassis flash data – confirm using –r cmd. Must put IP, chassis ID, cust name back using commands below)

chassis – ip1 xxx.xxx.xxx.xxx (sets ip address for port 1)

chassis – ip2 xxx.xxx.xxx.xxx (sets ip address for port 2)

chassis – gw1 xxx.xxx.xxx.xxx (sets gateway address for port 1)

chassis – gw2 xxx.xxx.xxx.xxx (sets gateway address for port 2)

chassis – mask1 xxx.xxx.xxx.xxx (sets subnet mask for port 1)

chassis – mask2 xxx.xxx.xxx.xxx (sets subnet mask for port 2)

chassis –cust xxxx (sets the customer name in chassis; 1 to 24 entries allowed)

chassis –chid xxxx (sets the chassis ID used by UCON; 1 to 24 entries allowed)

chassis –unet xx (unused)

SCX-400 Functions

sc4config (displays all of the current operations used by sc4config)

sc4config display (reads the configuration file from the SC400)

sc4config routers (displays the physical router table)

sc4config levels (displays the virtual router table)

sc4config srcs 25 (displays the first 25 lines in the source table. Replace the 25 with however many you would like to display)

sc4config dsts 25 (displays the first 25 lines in the destination table. Replace the 25 with however many you would like to display)

sc4config mx (displays the size of the mx table)

sc4config pl (displays the size of the party line table)

sc4config serial (displays the serial port table)

sc4config tieparms (displays tie line properties; max ties and max search table)

sc4config pools (displays tie pools created in SC4 config)

sc4config ties (displays tie line tables)

sc4config dstpools (displays destination index numbers and tie pools they are assigned to)

sc4config salvo 2 (displays salvo 2 assigned srcs and dsts; replace 2 with desired salvo)

sc4config syslog (displays syslog name used in SC4)

sc4config groups (displays group name tables for 8 and 4 char)

sc4config custstat (displays custom status table)

sc4config sim (turns simulation on for all levels; to turn simulation on for any single level add a space and then the level # after sim)

sc4config nosim (turns simulation off for all levels; to turn simulation off for any single level add a space and then the level # after nosim)

sc4config dstattrs (displays attribute table; for data router and audio attributes)

sc4config master (unused)

sc4config psrcs (unused)

sc4config pdsts (unused)

sc4config misc (unused – displays current encrypted password)

Router Functions

router (displays all of the router operations)

router save display (prints out current status of refresh table using index numbers)

router xy 1-10 (this will route inputs 1-10 to outputs 1-10; what ever number or range is entered it will switch the ins to the outs)

router src 3 (this will route source 3 to all outputs; change the 3 to desired number and this will route to all outputs)

router killstatus (blanks out the refresh table)

Miscellaneous Terminal Commands

lockdump (displays all locks and protects on the system. 0 = protect 1=lock)

lockdump clear (clears all locks – if only one needs to be cleared go to the panel)

logdump (displays entire event log in SC4 since last reset)

logdump 25 (displays only last 25 lines of events – enter desired amount after logdump)

mem (enters the memory utility for reading address information)

b (enter this while in the mem utility to check bootloader software version)

rx (enter this while in the mem utility to check firmware version – upper right corner)

tiedump (displays the tie pools created and connection status of any tie lines in use)

tiedump clear (clears status tie lines when doing tiedump but leaves tie lines connected)

sinv (displays the two control cards, part number, revs, SN# and their MAC addresses)

MC-4000

NOTE: There are some operations that will appear that are not listed below. We recommend that you do not attempt to utilize these functions as they are reserved for help from Utah Scientific.

Chassis Functions and Commands

chassis (displays all of the chassis operations)

chassis –r (reads chassis info including Ip addresses, customer name and chassis ID)

chassis –d (displays scangate version and card serial number)

chassis –init (removes chassis flash data – confirm using –r cmd. Must put IP, chassis ID, cust name back using commands below)

chassis – ip1 xxx.xxx.xxx.xxx (sets ip address for port 1)

chassis – ip2 xxx.xxx.xxx.xxx (unused)

chassis – gw1 xxx.xxx.xxx.xxx (sets gateway address for port 1)

chassis – gw2 xxx.xxx.xxx.xxx (unused)

chassis – mask1 xxx.xxx.xxx.xxx (sets subnet mask for port 1)

chassis – mask2 xxx.xxx.xxx.xxx (unused)

chassis –cust xxxx (sets the customer name in chassis; 1 to 24 entries allowed)

chassis –chid xxxx (sets the chassis ID; 1 to 24 entries allowed)

chassis –unet xx (sets the MC2020 channel node number)

MC-4000

HDconfig (displays all possible operations with this command)

HDconfig display (reads the configuration file from the CPU – 2020 and MC400)

HDconfig status (displays serial port jumpers in 2020 only, SW version and system name in 2020 and MC400)

HDconfig timeset (sets time and date for on board real time clock - format is HDconfig timeset mm/dd/yyyy hh:mm:ss - enter <tc> after timeset to set time to timecode)

HDconfig setembed (sets default sources to embedded audio)

HDconfig setdiscreet (sets default sources to discreet audio)

HDconfig sysname <new name here> (sets new system name in CPU)

HDconfig debug (sets debug flags permanently in flash – (see “General Status” on page 3-28)

HDconfig dimlevel <put number here> (sets audio dim to this number 0 to -45 range)

The Controller Debug Cable

The Controller Debug Cable is a full duplex serial cable, consisting of an RJ-45 Connector on one end and DB-9S (female) connector at the other end. Refer to the figure below if you wish to build your own cable for the debug port.

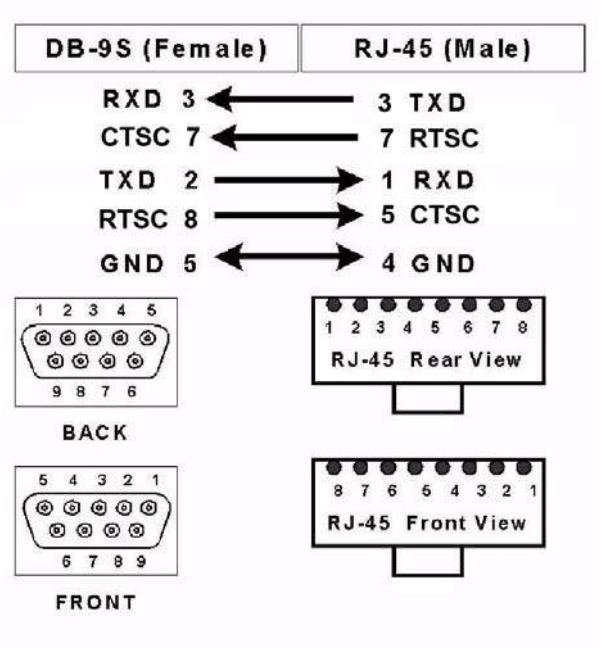


FIGURE 3-11. Debug Port Cable Pinouts

The Controller Debug Port has two primary functions:

1. To aid the user in system diagnostics or when diagnosing problems with Technical Services.
2. When performing software upgrades as recommended by Utah Scientific.

The Controller Debug Port can be connected to a PC using the adapter plug (Part # 140100-2, DB-9S to RJ-45) provided by Utah Scientific and a straight through CAT-5 cable (furnished by the user).

The controller debug port will communicate with any terminal program although Hyper-terminal and Tera-Term Pro are two of the programs that work well.

The set up for your terminal emulator should be:

1. 19200 Baud,
2. 8 Data Bits,
3. No Parity,
4. 1 Stop Bit,
5. No flow control.

The Debug Port

Introduction

The controller debug port is the major source of operational information and control. While configuration info is downloaded to the controller via UCON, some operational information is still best determined by a direct connection to the debug port.

Physical Connection

Supplied with your system is an adapter intended to plug on to the serial port of any standard PC. This adapter is USI PN 140100-2. It has a male 9 pin D connector on one end and a female RJ-45 connector on the other. The user supplies a straight thru CAT 5 cable between the adapter and the debug port on the controller (see figure 3-1 in this manual for location).

Terminal Emulation software setup

Any terminal emulation program such as windows Hyper terminal is useful for debug port operation. Utah Scientific recommends TeraTerm, a freeware terminal emulation software package available on the internet. Serial Port parameters necessary to communicate to the controller are as follows:

TABLE 3-5.

Baud Rate	19.2K
Data Bits	8
Stop Bits	1
Parity	NONE
Hardware Handshaking	NONE

General Status

Once you are connected to the controller, pressing the return key should return a prompt of "/ >". From this prompt various operations can be performed.

The most valuable data is gathered after a system reset. This is the point where the controller 'finds' all connected routers and control panels. The best method for determining what the controller discovers is to connect the debug port to the left controller and then press and release the reset buttons (See figure 3-1) simultaneously. After several screens of data that deal with the bootup process, you will see messages such as the following:

MX H/W found: input 0, output 0, level 0, id 0x40

configServer: register PL panel 3, name CSP-500, model CSP-16160

MX H/W messages indicate that the SC4 has found and MX-Bus based router at the specified address. The ID number varies with different address types.

configServer messages indicate panel types and address found.

Specific Operations

Reading system setup information

The chassis command is used to read and/or set the chassis IP address(s), system name and other parameters. It's usage is detailed below.

chassis

Synopsis: chassis [OPTIONS] [FILE]

This program allows the user to interact with the chassis identification ROM located in the local chassis. Not all new USI products support this feature. If you aren't sure or are getting unexpected results, please check the appendix and verify the operation is supported on the platform you are working with.

Options:

- -h – displays the help information
- -d – activates debug mode which displays low level interactions with the device hardware.

- -r – read and display data contained in the local chassis config ROM.
- -init – write a set of default values into the chassis config ROM
- -ip1 <xxx.xxx.xxx.xxx> – sets the IP address for network interface 1 to the specified value.
- -ip1 <xxx.xxx.xxx.xxx> network <xxx.xxx.xxx.xxx> optionally sets subnet mask
- -ip2 <xxx.xxx.xxx.xxx> – sets the IP address for network interface 2 to the specified value.
    - Please note not all devices support a 2nd network interface.
- ip2 <xxx.xxx.xxx.xxx> netmask <xxx.xxx.xxx.xxx> - optionally sets subnet mask
- -cust <customer name> - Sets the customer name to the text specified. Typically this will be the call letters of the station using the device.
- -chid <chassis ID> - This sets the chassis ID to the text specified. Typically this will be a description of the physical device location. Ex: MCP-CR01-KUSI
- -unet <xxx> - set the unet node for this device to that specified.
- mask1 <xxx.xxx.xxx.xxx> - sets subnet mask for network interface 1 to...
- mask2 <xxx.xxx.xxx.xxx> - sets subnet mask for network interface 2 to...

Shutting down the SC4 application

The sc4down command will turn off the SC4 application. This command might be used prior to reprogramming the controller's main image.

sc4down

Synopsis: sc4down

This command sends a signal to all active controller processes and tells them to shutdown. This replaces the need to perform a <ps> command followed by a kill –INT <pid> command which is the method for stopping the current SC-4 software from running. A message will tell the user whether the shutdown has been successful or not.

Resetting the SC4

sc4reset

Synopsis: sc4reset

This command resets the controller board being accessed. When this action is performed on an active board in a redundant system, control will switch over to the other board.

Gathering data from the onboard log

logdump

Synopsis: logdump [OPTIONS]

This command displays log entries from NVRAM. If no option is specified then ALL log entries will be dumped to the screen. Optionally, a number can follow the command, which specifies that only that number of final entries will be displayed. The log can only handle a certain number of entries. Older entries will be lost as the log overflows saving only the most recent events.

Example:logdump 10 - dumps the last ten log messages to the screen

Viewing / Setting Configuration parameters

sc4config is used to display and in some cases modify the custom configuration parameters of the controller. Various options are detailed below.

sc4config

sc4config display – displays all config tables

sc4config sim – Turns on simulation for all router levels. Append a level number to simulate that level

sc4config nosim – Turns off simulation for all router levels. Append a level number to unsimulate that level

sc4config mx – Displays MX Bus configuration

sc4config pl – Displays Party Line Configuration

sc4config routers – Displays router configuration

sc4config levels – Displays level mapping

sc4config srcs – Displays source table

sc4config dsts – Displays destination table

sc4config serial – Displays serial port parameters

sc4config misc – Displays miscellaneous parameters

sc4config dstattrs – Displays router attribute status

tiedump

Displays the tieline status

tiedump clear – clears out the tieline status (crosspoints are not affected.) This will free all tie lines.

lockdump

This displays the output lock status.

lockdump – displays lock status.

lockdump clear – removes all locks.

router

This utility provides certain router status functionality such as setting, viewing, and saving status.

- **router xy** - This connects each source to its corresponding destination; i.e., 0-0, 1-1, etc. This is best used with the controller default configuration.
- **router source** <srcnum> - This routes the source value specified as srcnum to all outputs. This is best used with the controller default configuration.
- **router killstatus** - This clears all router and tieline status (except for attributes) but leaves the controller configuration intact.

The router utility can also save the router status to a file that can be subsequently loaded. This functionality is best used with the *rtrsave* and *rtrload* scripts, found in the SCX installation directory; i.e., C:\usi\<cust> - scx401\updates.

Simply double-click the *rtrsave.ba*t file after running the NFS server, then enter the PC IP address and the controller IP address as prompted. You will also be prompted to enter a file-name where the current router status will be stored. You may then enter a list of destinations whose status you want to Sav. (Leave this blank to default to all destinations.)

The destination list should look something like this:

1-5,7,11,300-350 (no spaces)

Other destinations will not have their status saved in the file, so a load operation using that file will not affect them. Double-click the *rtrload.bat* file to load one of the saved files. The router connections will be restored to the saved status.

System IP Address Setting

Locating the IP Address for Additional System Devices

Complete the following steps to locate IP addresses for devices such as the SC-4, MX-Lator, SC-400, MC-2020, or MC-4000.

1. Connect the UTSCI Serial port to the RJ-45 adapter (marked SC-4/2020 on your PC COM port).
2. Place a standard straight through CAT 5 cable from the PC adapter to the front RJ-45 port on the desired device.
3. Launch **Tera Term Pro**, open the **Setup** menu, select *Serial Port* and complete the following:
4. Select the desired port (COM 1, 2, etc.)
5. Set the Baud Rate to **19200**.
6. Set the Data to **8-bit**.
7. Set the Parity to **None**.
8. Set the Stop to **1-bit**.
9. Set flow control to **None**.
10. Click **OK**.
11. In the prompt window, verify communication by pressing the space bar. If you are communicating properly you will see the **/>** symbol and a blinking box.
12. Type (lower case) *ifconfig*, then press ENTER. Your system detail should begin to scroll on the PC Tera Term window.

Changing IP Addresses in System Devices

The IP address for each device is actually located in that devices chassis. Note: this should be performed with care and done when there is adequate time to allow for the device to be reset. This may require bypassing some routes if the changes are done to the Master Control as there will be a few seconds of interrupted on air video and audio.

Complete the following steps to change the IP address in the SC4, SC400, MXLator, MC2020, MCP2020 and ESI2020.

Note: If the device is already connected to the network, you can bypass steps 1 - 9, select the TCP/IP connection, and proceed to step #10.

1. Connect the UTSCI Serial port to the RJ-45 adapter (Marked SC-4/2020 on your PC COM port).
2. Place a standard straight through CAT 5 cable from the PC adapter to the front RJ-45 port on the desired device.
3. Launch Tera Term Pro, open the Setup menu, select Serial Port and complete the following:
4. Select the desired port (COM 1, 2, etc.)
5. Set the Baud Rate to 19200.
6. Set the Data to 8-bit.
7. Set the Parity to None.
8. Set the Stop to 1-bit.
9. Set flow control to None.
10. Click OK.
11. At the prompt type chassis –r to view the current IP address for that device. (Insert bottom picture and notes from SIG page 2-12 here)
12. At the prompt type chassis –ip1 xxx.xxx.xxx.xxx (xxx's = new address) to change the IP address. Note: this will also change the subnet and router addresses automatically to correspond with the new IP address.
13. Reset that device in order for the changes to take effect. If this is to be done on the SC4, SC400 or MXLator you will need to take note of which card is currently the active card (locate the active green LED on the card) and then press and hold the reset button on both the active and back up cards, and then releasing the active cards reset button first followed by the back up card. This will ensure that the system comes back up on the active card. If this is not followed the changes will not take effect.The MC2020 and MCP2020 devices only have one card to reset. The MC2020 reset is located near the center of the CPU card on the inner side, not the top button. MCP2020 reset button is located right next to the RJ45 connector that the serial cable is attached to.

14. At the prompt type chassis –r and verify that the new address was accepted.

Note: **Note: The SC4 is the only device that has two IP address ports on the rear of the chassis. These are two NICs and if the second port is needed you will follow the procedures above replacing the command chassis –ip1 with chassis -1p2. These must be two separate subnets as they are literally two distinct network interface cards. The second port can be used for attaching Ethernet devices such as Utah Scientific Ethernet panels; however the UCON software must be connected via port 1.**

Changing Gateway and Mask Addresses in SC-4/SCX-400

1. Launch TeraTerm and connect to the SC4/SC400 (.

Note: If the device is already connected to the network, you can bypass steps 2 - 10, select the TCP/IP connection, and proceed to step #11.

2. Connect the UTSCI Serial port to the RJ-45 adapter (Marked SC-4/2020 on your PC COM port).
3. Place a standard straight through CAT 5 cable from the PC adapter to the front RJ-45 port on the desired device.
4. Launch Tera Term Pro, open the Setup menu, select Serial Port and complete the following:
5. Select the desired port (COM 1, 2, etc.)
6. Set the Baud Rate to 19200.
7. Set the Data to 8-bit.
8. Set the Parity to None.
9. Set the Stop to 1-bit.
10. Set flow control to None.
11. Click OK.
12. At the /> prompt type chassis –r to view the network connections.
13. To add or change the gateway type chassis –gw1 xxx.xxx.xxx.xxx (xxx's = new address).
14. To change the netmask type chassis –mask1 xxx.xxx.xxx.xxx (xxx's = new address).

15. Reset that device in order for the changes to take effect. If this is to be done on the SC4, SC400 or MXLator you will need to take note of which card is currently the active card (locate the active green LED on the card) and then press and hold the reset button on both the active and back up cards, and then releasing the active cards reset button first followed by the back up card. This will ensure that the system comes back up on the active card. If this is not followed the changes will not take effect.The MC2020 and MCP2020 devices only have one card to reset. The MC2020 reset is located near the center of the CPU card on the inner side, not the top button. MCP2020 reset button is located right next to the RJ45 connector that the serial cable is attached to.

Encoding, and MC-4000 Processor Card Configuration

For information, please refer to *'The MC-Configuration, System Setup and Operation'*. Utah Scientific Inc. part # 82102-0036.

Installing a Logo into a MC-4000 Master Control Channel

The MC-4000 is capable of storing a total of 16 different logos. Each logo occupies 1 of 16 storage locations inside the MC-4000. To place a logo into an MC-4000 system it must first be converted to the USI format (.lgo), then installed into the MC-4000 itself. The following steps will complete the installation of a logo in the first of the 16 location within the MC-4000. There is a working assumption here that the USI format file has already been created.

Note: In the following discussion, 'system name' refers to the device as it was installed using the install4000.exe program. Examples include KUSI-SD01, KUSI-HD01, etc.

1. Locate the converted logo file (filename.lgo).
2. Copy the converted logo file into c:\usi\[system name]\logos\[location.lgo]

Note: The location can be from 1 to 16.

Example:

The 1.lgo file will be placed into the 1st of the 16 possible logo storage locations in the MC-4000 master control system.

The 2.lgo file would use the 2nd storage location.

3. Open Windows Explorer.
4. Navigate to c:\usi\[system]-name]\logos
5. Double-click burn-logos.bat and follow the on-screen prompts. This process updates the MC-4000 with up to 16 new logo files that are present in the c:\usi\[system-name]\logos directory.

Note: Files not present in the logos directory are not changed in the MC-4000.

The process is now complete.

Displaying a logo you have installed into the MC-4000

At the MCP-2020 Master Control Panel, select the HOME button -- immediately below and to the left of the main LCD display.

Select the KEY button on the LCD touchscreen. This displays the key summary screen.

Select the KEY-1 button on the LCD touchscreen. This displays the logo select screen.

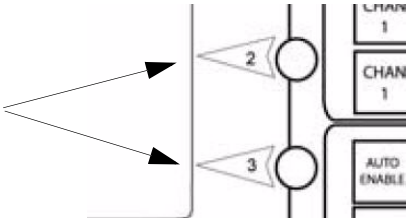
Select the LOGO-1 button on the LCD touchscreen. Any of the buttons can be selected if they have been loaded with a #.lgo file.

Turn on the PST KEY button for keyer 1 in the key section on the right hand side of the MCP-400 control panel.

Select the LOGO key input button, located to the right of the EXT button and directly below the PST KEY button for the keyer 3.

Note: The Logo button must be enabled in the MCP-2020 encoding file.

Adjust the logo position using the bottom 2 knobs located directly to the right of the LCD display screen.



The middle knob adjusts horizontal position, the bottom knob adjusts vertical position.

The logo position can only be changed with the logo select screen displayed. When you are satisfied with the location, press the BACK button, located just below and to the right of the LCD display. If you need to make adjustments at a future time, go to the logo key select screen in the LCD and adjust with the knobs as necessary.

Each Logo is independently positioned. If you have a need for the same logo to be placed in 1 or more predefined positions, install the same logo in 1 or more ***keyer card*** slots and position each per your adjustments. A specific logo can actually be loaded in all the remaining keyer cards in your system.

All internal logos should be displayed in the LIN MULT (or LIN) Keyer Mode.

Clearing Existing Logos

This must be completed from the diagnostics port either using a serial connection to the card or by telnetting into the IP address of the card. (Refer to Appendix D in the system installation guide). This will erase all logos at one time, and not individually. After all are removed, resend wanted logos back to the card.

Type the following at the prompt once you have established a connection:

mem (lower case and then press return)

r 6e0000 (these are zeros -- pressing return displays the current logos) ef 6e0000 (these are zeros -- pressing return erases all logos in flash).

The following is an example of what is displayed after these commands are typed. You should see the actual name of the logos in each location at the end of the line in table one (below).

This was extracted from a 4000, and as you can see, there are two logos enabled. The second table shows the table with all ffff, indicating the address showing logos is empty.

1. Follow page 2-12 in SIG for retrieving config file from the HD/SD encode folder.
2. Open Config File xxxx.conf and locate the section titled [macro_definitions_start]
3. If interfacing to TFT, use the example file below for the TFT macro settings.
4. Overwrite the macro section in step six with the macro from step 7.
5. Save & close file and then run the burnenc_network.bat file to send the changes to the HD4000. CAUTION: This will cause a reset to the 4000 system and a loss of video and audio will occur for up to ten seconds. Proper bypass prior to this step is recommended.
6. If interacting to a SAGE use the example file below for the SAGE macro and GPI settings. (GPI must be 16-21-see SAGE setup below)
7. Overwrite macro in step 6 and GPI section with macro and GPI settings from step 10
8. Save & close file and then run the burn-network.bat file to send changes to HD/SD 4000. CAUTION: This will cause a reset to the 4000 system and a loss of video and audio will occur for up to ten seconds. Proper bypass prior to this step is recommended.
9. For TFT, make change to EAS_Auto_Action in Misc Parameters.
10. For Sage, make change to EAS_Auto_Action in Misc Parameters.
11. Refer to TFT Manual for how to set up TFT. A short “how to” is provided below.
12. Refer to Sage Manual for how to set up SAGE. A short “how to” is provided below.

13. Also need to set Macro X= (where X is the Macro Number; see sample below in Auto Act section at misc.
14. You will also need to set the serial port settings in the MC-4000 config file to match the TFT or SAGE serial settings. Locate the [Machine_Control_Serial_Port_Definition_Start] section in the config file and use the sample below to make the changes.

Squeeze Page Setup and Operation

This section contains the steps required in setting up and displaying squeeze option from the MC-2020 console.

PLEASE NOTE BEFORE PROCEEDING:

- The illustrations within this section contain the various displays and menus that will appear during the squeeze development process. Many of the setup indicators (such as size, position or button shade) may vary, and are shown as examples.

- Resizer #1 corresponds to Program Video, or the RED program bus on the master control switcher. Resizer #2 will always correspond to the connection at the rear of the MC-4000.

- There are three pages in the squeeze tables that contain five soft buttons to use for configuring and using the squeeze application. Locate the hard buttons below the main LED and press the Home button to start the sequence.

- Within this section, the expressions 'Resizer' and 'DVE' are interchangeable and have the same meaning.

Background Video corresponds to the background BNC (content) at the rear of the MC-4000. Tapping the 'Activate' button will cause the currently selected Resizer to commence its display.

Once the squeeze option is accessed there will be three pages (described above) of items for use in creating and operating the single or dual squeeze back function. Use the right and left arrow keys located below the main LED to navigate between the three pages.

FIGURE 3-12. Squeeze Operation - Home button

The following screen will be visible.

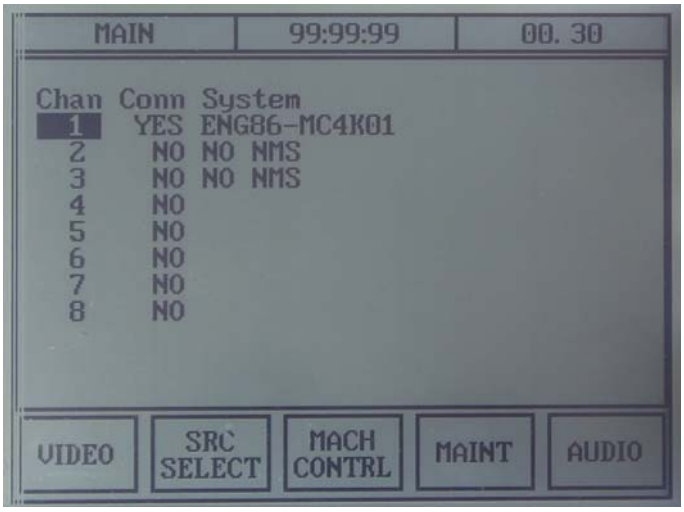


FIGURE 3-13. Video button

Now tap the Video button.

The following two buttons will appear when the Video button (on the display) is tapped.

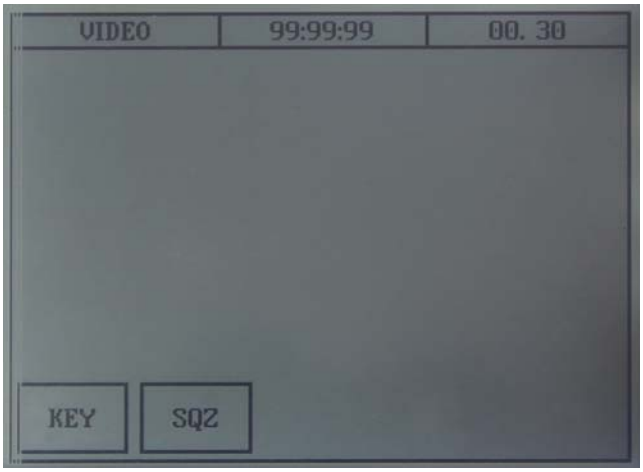


FIGURE 3-14. SQZ button

Now tap SQZ. This will access the following screen. On an initial Squeeze page build, the control panel's display area will be black.

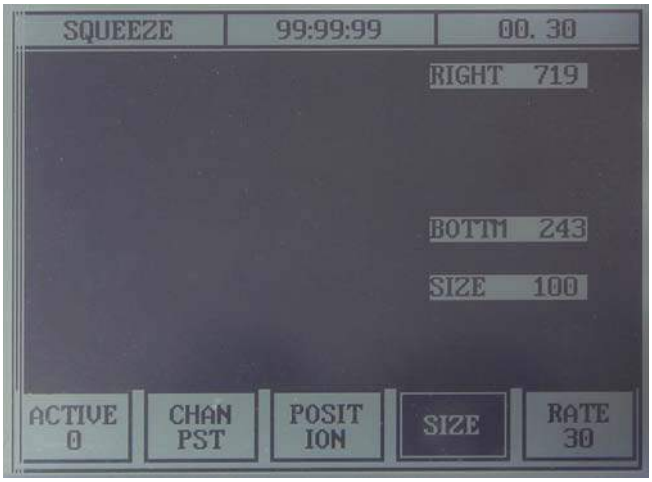


FIGURE 3-15. Squeeze Window

There are ***three*** pages of ***five*** soft buttons at the bottom of the LCD. It is important to note that the three pages are relative to the current page sequence location. In particular, the screens that are cycled through when the right and left arrow buttons (immediately below the LCD) are pressed.

Note: Any of the five buttons (at the bottom of the display) may be highlighted when the display appears. In our example 'Size' is highlighted. Note that 'Active X' appears on each page and will always be visible. ('X' represents the squeeze preset number.)

The arrow keys allow you to cycle through the individual pages. One press of the arrow key brings up **Save**, **Recall**, **Accept**, and the **Cancel** soft keys at the bottom of the display.

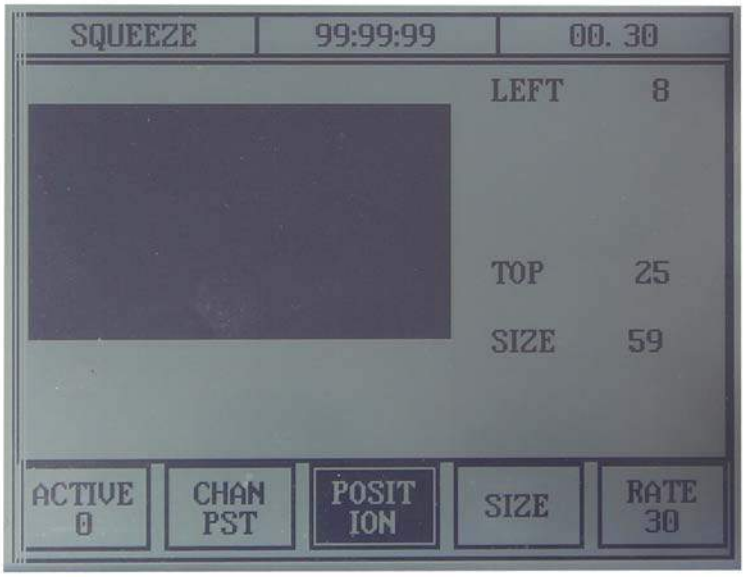


FIGURE 3-16. (1st page in sequence)

A second press of the same arrow key will access **Chan PST/Chan PGM**, **Position**, **Size**, and **Rate**. A third press of the same arrow key will access **Rate**, **Reszr1 or Reszr2**, **Blank or Reszr Enable**, and **Active Both**.

Note: Using the other arrow key will access the same three pages in reverse direction.

Button Function Description

Simply touch a button on any one of the 3 pages (described above). This will either bring up another window with additional functions or perform a specific task. In most cases the button will turn dark with white lettering, which indicates the button's current function. Refer to the list below for a full description of each button with its associated task.

Active

This will display the current preset that is being used. When pressed it will activate the indicated squeeze preset number shown below the word 'Active' (dark background, white letters). When pressed again it will take the selected squeeze out and revert to full program video, with the button turning light again (dark lettering).

> ***Note: This works in conjunction with Resizer 1 or Resizer 2 and will only squeeze back that specific Resizer. See 'Reszr1 / Reszr2' later in this section for more detail.***

Chan PST/Chan PGM

This is a dual mode function button and will **not** turn dark when pressed, but will only display its current mode (with light background and black lettering).

Chan PST mode is the off air mode and the preferred mode while editing, creating, or running presets. This mode allows the ability to operate behind the scene on the Preview monitor without affecting the on-air video.

In *Chan PGM* mode, the preset is sent directly to the on-air signal. This mode is not recommended for creating or editing any squeezeback presets.

Position

This button will turn dark when pressed and is used to move the resizer window left, right, up and down.

> *Note: This will move both resizer windows individually, depending on the one selected. (See the resizer description below for additional detail.) There is no way to move both resizers at the same time. To adjust the resizer position, use the physical rotary knobs to the right of the display labeled 1 & 2.*

Size

This button will turn dark when pressed and is used to adjust the viewing size of the resizer window. Like the position button, it will resize both resizer windows individually depending on the one selected. There is no way to adjust the size of both resizers at the same time.

To adjust the size of each resizer, use the physical rotary knobs to the right of the display; labeled 1, 2, and 3. Button 3 will scale the window *proportionately*, while buttons 1 and 2 are used to move the size from right to left *only*, or from bottom to top *only*.

Rate

There are two Rate buttons, with both working exactly the same; with either Resizer selected, both Rate buttons will receive status and allow the rate to be changed. A corresponding menu will appear when the button is pressed. Type the number for the desired speed, then press the “ENT” button. The number corresponds to frames, and corresponds to the speed at which the squeeze goes in and out.

Reszr 1 / Reszr 2

This is a toggle button and will not go dark when pressed but will simply change between Reszr 1 and Reszr 2. To create, edit, or run the squeeze for either of the two DVEs, select the desired Reszr1 or Reszr2 and use the other function buttons as needed. (See other function buttons in this section.)

Note 1: When Reszr2 is selected, the soft button to the right of the button will appear with the function labeled “Reszr Enabl” (description below). When Reszr1 is selected, the button to the right will be blank.

Note 2: All other function buttons except “Active Both” work only with the Resizer button that is selected.

Reszr Enabl

This button is only used to enable or disable Resizer 2. When enabled, the button will turn dark with light lettering and the 2nd DVE will appear as desired on the air. When disabled, the button will turn light with dark lettering and will not appear on the air. Note: When disabled, an adjustment may still be made to the 2nd DVE using the LCD, though the adjustment will not appear on the PST or PGM outputs until enabled.

Active Both

This will run both Resizers at the same time. When activated the button will turn dark with light lettering and both DVEs will squeeze to their current settings. When pressed again both will deactivate and squeeze back out to normal view. Note: The Resizer Enable button must be turned on (dark) for the 2nd DVE to squeeze. If it is not, the button will simply work exactly like the “Active” button and will only squeeze the first DVE.

Save and Recall

These two buttons allow the user to save and load up to 16 individual squeeze back configurations for each Resizer. These are referred to as “Presets” and work specifically for the Resizer that is selected on the Reszr1/Reszr2 button. To save a specific configuration, select the desired Resizer, create or edit its settings using the size, position, and rate functions, then press the Save button. A table will appear as illustrated in the figure below.

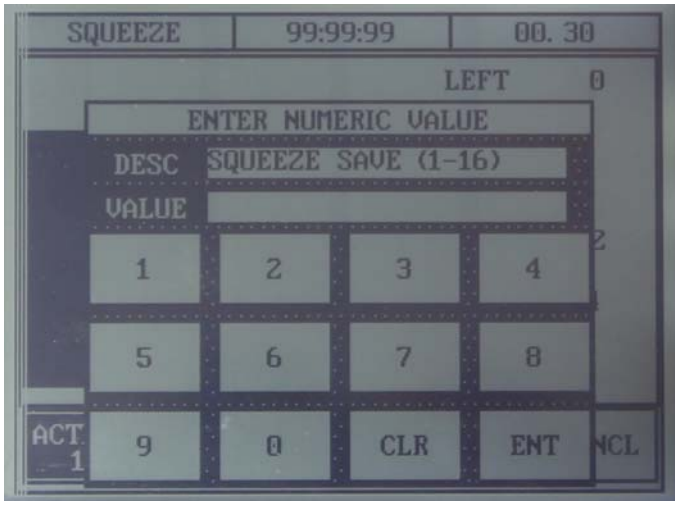


FIGURE 3-17.

Touch the desired number 1 - 16 and press the “ENT” button to save it to the Preset. Use the same steps above to load a desired preset 1 - 16, with the exception that “Recall” is pressed instead of the “Save” button.

> ***Note: You must be [on] the correct Resizer button to Save or Recall the configuration (in the above step). These buttons do not Save or Load both Resizers at one time. This allows for the use of any combination of the 2 Resizers for use at different times and does not lock them into the 16 Presets.***

Accept

This button is not currently functional.

Building a Squeeze Display

Using the arrow buttons under the display, navigate to the screen containing “Reszr 1 or Reszr 2” and select the desired DVE (Resizer 1 or 2). All of the functions except “Active Both” work specifically for the selected Resizer.

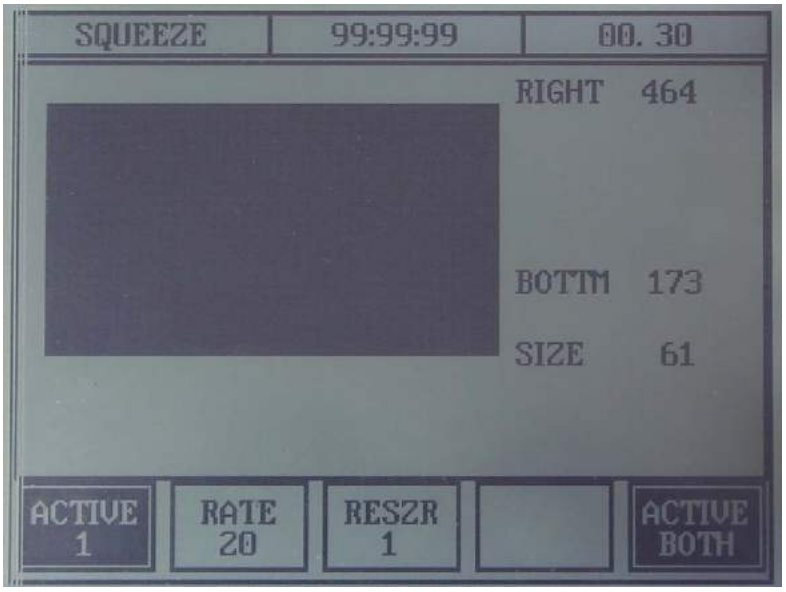


FIGURE 3-18.

Next, use the arrow buttons under the display to navigate to the screen containing ‘Position’ and ‘Size’. Make sure the CHAN PGM/CHAN PST button is set to **CHAN PST.**

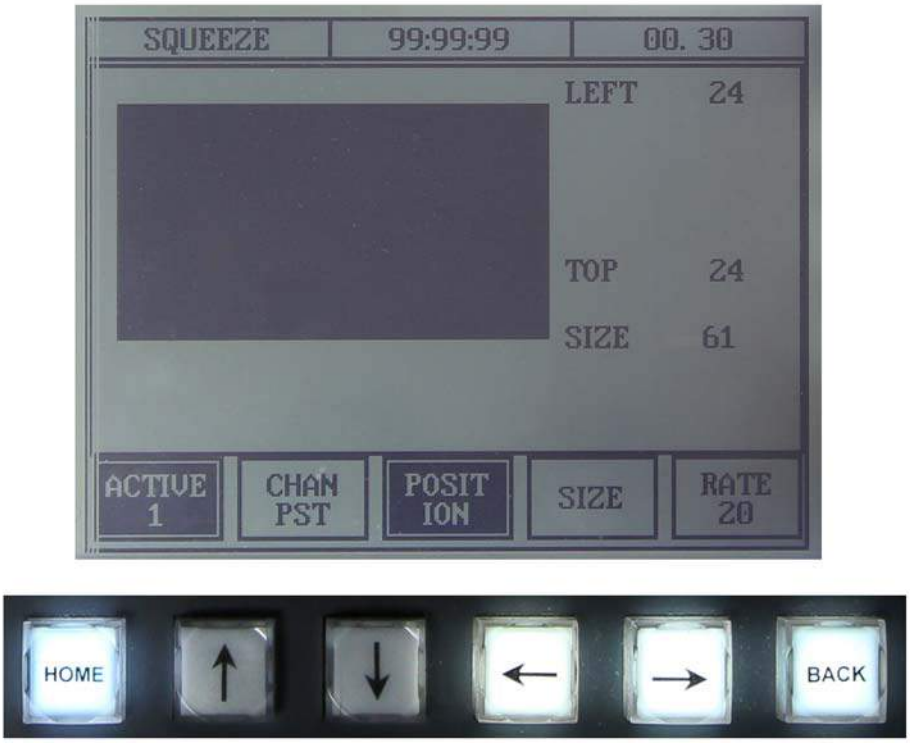


FIGURE 3-19.

The actual position button on the soft display (above illustration) initiates movement of the DVE in a ‘box’ on screen.

Tap the “Size” button to adjust the actual size parameters of the DVE Resizer that is selected. Use the three control knobs to make the actual modification.

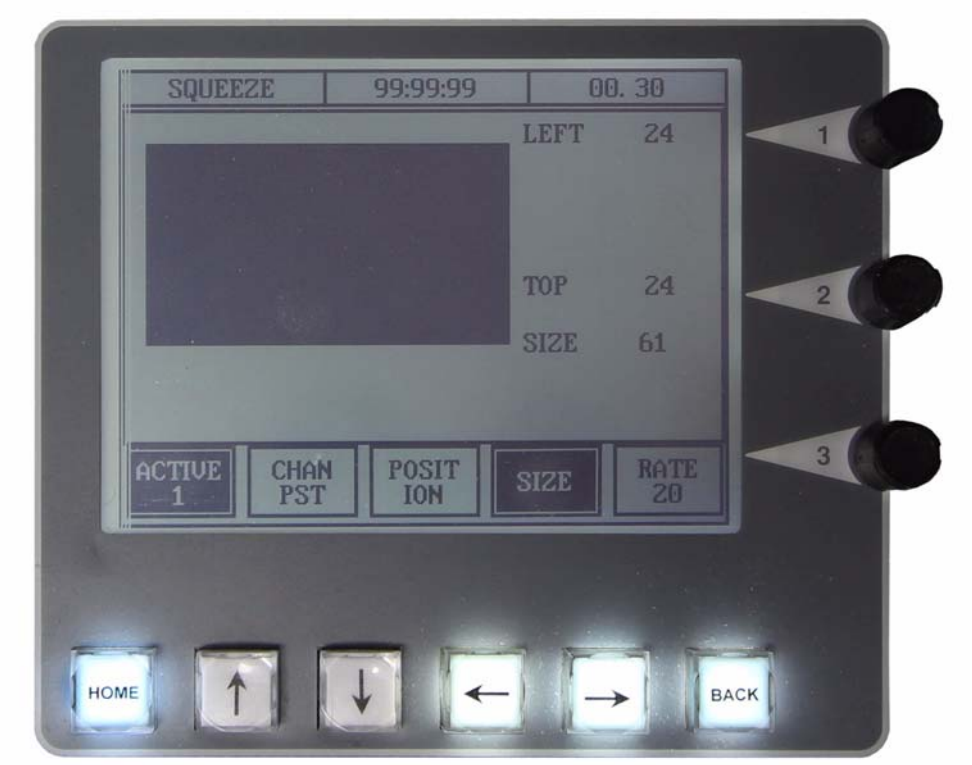


FIGURE 3-20.

- Knob #3 (above) maintains the aspect ratio. Notice that turning this knob pushes the squeeze box into the upper left corner of the display while keeping the aspect ratio intact, or linear.
- Knob #2 is the bottom adjuster. This modifies the box’s bottom size up or down in the display.
- Knob #1 adjusts along the right edge, in or out.

Modifying the box's position

Tap the Position button on the soft display (illustration) to maneuver the DVE to the desired location.

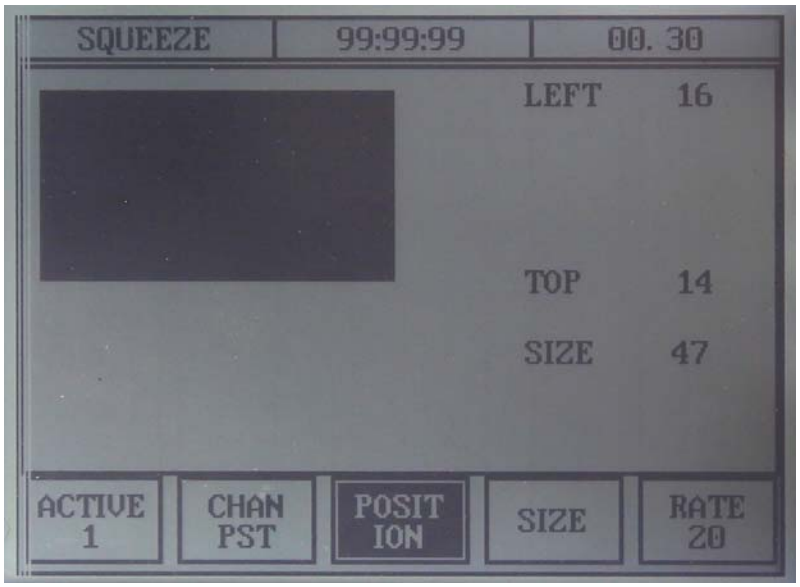


FIGURE 3-21.

- Knobs #3 maintains the aspect ratio. Notice that turning this knob pushes the squeeze box into the upper left corner of the display while keeping the aspect ratio intact, or linear.
- Knob #2 is used for Up and Down movement
- Knob #1 is used for Right and Left movement
- Resizer display - at current setup

Changing the Speed (Rate) of the Squeeze

The Rate display default is 30 frames per second, which literally corresponds to the speed at which each resizer will squeeze back. Press the right or left arrow buttons below the display and navigate to the Rate button as shown below.

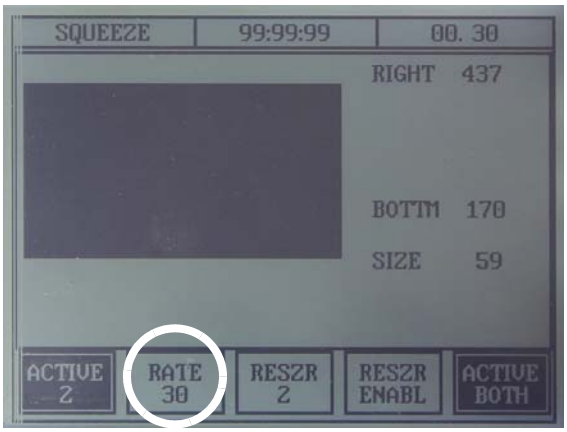


FIGURE 3-22.

The Rate button corresponds to number of ‘frames’ within the squeeze display’s duration. Tap the Rate button to view the following screen.

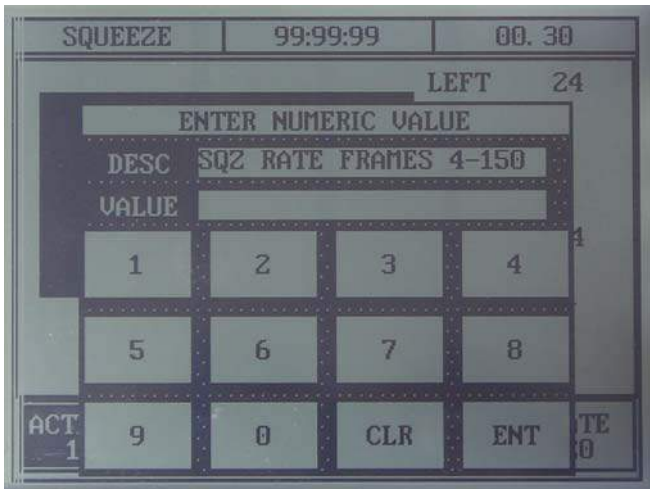


FIGURE 3-23.

To change the rate as applied to one of the Resizer buttons, tap the Resizer button, then the Rate button. Enter a new rate for the Resizer in the numeric keypad and then press the “Ent” button.

In this example, tapping this button will change the rate to 60 frames (2 seconds).

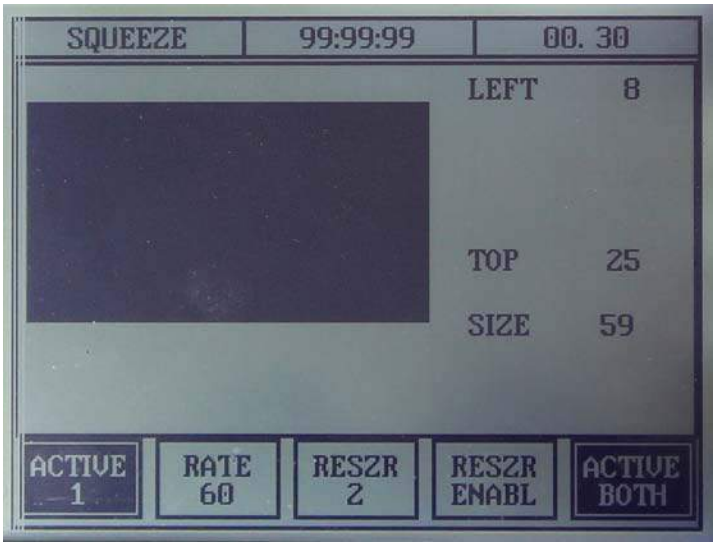


FIGURE 3-24.

To save the configuration, press the left arrow button on the switcher (under the display) until the SAVE button appears within the screen. ***Note: This must be done individually for Reszr 1 and Reszr 2. It is not possible to save both at the same time.***

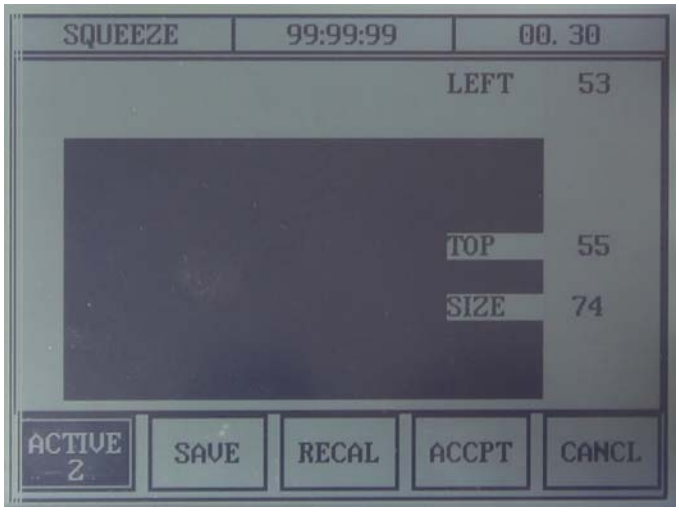


FIGURE 3-25.

Then select a number (1 - 16) when the next screen appears

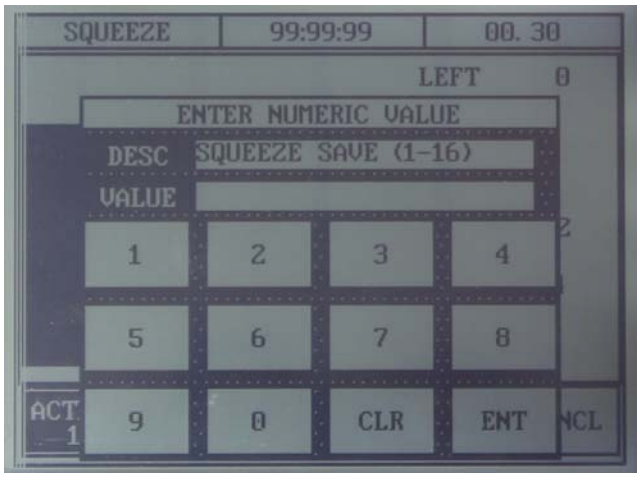


FIGURE 3-26.

The number that is entered in this screen will appear within the ‘Value’ field (top of screen) and will be saved at that particular position.

Tap ENTER when done. You will be returned to the screen below.

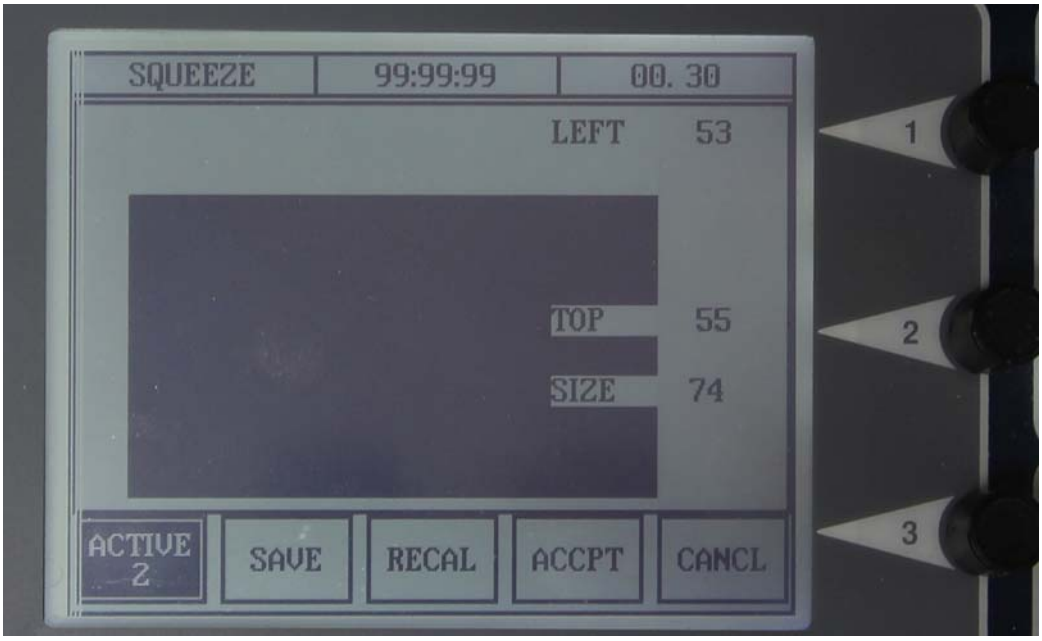


FIGURE 3-27.

To Recall any saved squeeze configuration, press the “Recall” button, select the desired number from the keypad, then tap the “Ent” button. ***Note: This will recall only Resizer 1 or Resizer 2. It is not possible to recall both Resizers at the same time.***

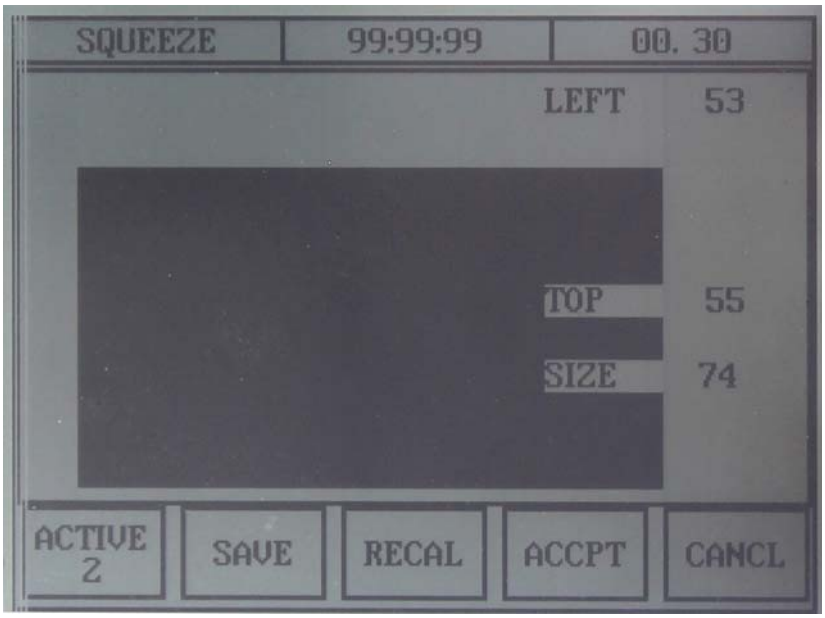


FIGURE 3-28.

Producing the Effect

The squeezeback can be previewed prior to actual on-air use (through the Preset monitor). Navigate to the page that contains the “Chan PST/Chan PGM” button and select “Chan PST”. Recall the desired preset and follow the steps below to run the squeeze in Single or Dual mode. When you’re satisfied with the effect, select “Chan PGM” to use the squeeze on-air. ***Note: Make sure the squeezeback is deactivated before pushing the “Chan PGM” button.***

Activation (Squeezeback)

The number displayed inside the ‘Active’ button (illustration) corresponds to the actual number assigned to a Preset. You have the ability to build (and Save) 16 different presets for both Resizer #1 and Resizer #2 - 16 in each location.

The *Active* button (shown in the figure) displays the number corresponding to the one that was recalled. This button is essentially a single DVE, or re-sizer activator, which activates the current squeeze.

This process activates the single Resizer that is selected on the Reszr 1/Reszr 2 button once they have been defined. In our example Resizer #1will squeezeback to the configuration that was defined in Preset 2 as seen in the “Active 2” button.

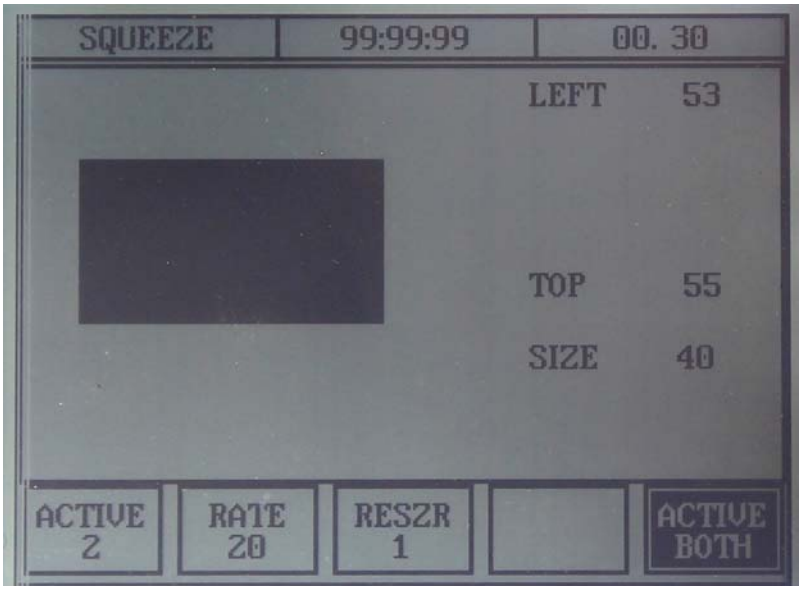


FIGURE 3-29.

Tapping the Active button (in our example Active 2), causes the button to turn dark (the ON state) with the current squeeze ‘pushed back’, or activated. ***Note: “Active” is the function and “2” is the defined preset configuration that was saved to #2 and recalled. See the section titled “Displaying a Squeeze” for additional detail.***

Note: Resizer #2 will not squeeze back unless it is enabled by tapping the RESZR button, which will toggle to “Reszr2”.

If Resizer #2 is selected and the “Reszr Enabl” button is off -- while the user is attempting to ‘Activate’ (Active button) -- Resizer #2 will not appear on the screen. In this case only the background will be revealed.

Activating Both (Dual Squeeze)

Dual Squeeze allows you to squeeze back two different DVEs. Independent DVEs can be squeezed in the display by themselves, but the dual squeeze will actually squeeze both.

When the ‘Active Both’ button is pressed, Resizers #1 and #2 will both squeeze back. It is important to note that the “Reszr Enabl” button must be on for Reszr 2 to squeeze back. Press the “Active Both” button again to remove the squeeze and return to normal operation.

Enabling the Manual Alert and Triggering from the MCP-2020 Panel

Complete the following to generate an EAS button blink on the MCP-2020, and to manually trigger the alert:

1. Install new version of MCPconfig
2. Run MCPconfig.exe
3. Go to Communications/ Specify Target IP Address and port. The port should be 5580. Click **Ok**.
4. Go to File the select Retrieve Configuration from Target
5. Click on the button that you would like it to be on then edit comes up.
6. Under Functions Group select Local EAS Controls and under function select Local EAS Alert Active then click **OK**.
7. Under File select Send Configuration To Target

TFT EAS Setup for the MC-4000

1. There is only one serial port that can be used on the TFT unit. It needs to be set to 9600, 8 N 1. (see TFT manual for this info or how to set port to these setting if they are not defaults)
2. Run a cross over RS232 cable (pins 2-3, 3-2, 5-5) from the port in step one to serial port 1 on the rear of the MC4000 chassis.
3. In the TFT menu you will need to set the CG type to TFT Standard.

Sage EAS Setup for the MC-4000

1. Choose one of the Sage serial ports that defaults to 9600, 8 N 1. (see SAGE manual for this info or how to set port to these setting if they are not defaults)
2. Run a cross over RS232 cable (pins 2-3, 3-2, 5-5) from the port in step one to serial port 1 on the rear of the MC4000 chassis.

3. If using an MC4000, locate the Relays/Optos B connector on the rear of the MC4000 and refer to the MC4000 Guide Appendix B for proper pin numbers to be used. The Optos are 16 to 21 on the daughter card.
4. Run one wire from one side of the GPO on the SAGE connector to one side of the desired GPI in step 3 on the rear of the MC4000.
5. You will need to attach a 5v – 12v supply source between the other side of the GPO on the SAGE and to the other side of the GPI in step 3 on the MC4000.
6. You will also need to put a 1k pull up resistor between the ground and whichever side that wire connects to. This is not built in to the 4000 and will cause damage to the Opto if not installed.
7. In the SAGE menu you will need to locate the serial ports and make sure step 1 above is correct.
8. In the SAGE menu you will need to locate the CG type and make it Generic CG.
9. In the SAGE menu you will need to locate the GPO you are using and set it to PTT.

Config Section Requirements Summary

1. 1.The TFT interface requires 4 config sections be set.
    - EAS Auto Action in section [MISC_START]
    - Serial Port configuration in section [MACHINE_CONTROL_SERIAL_PORT_DEFINITIONS_START]
    - EAS Audio Macro in section [MACRO_DEFINTIONS_START]
    - EAS Display Options in section [EAS_DISPLAY_CONFIG_DEFINITIONS_START]
2. The SAGE interface requires 6 config items be set
    - EAS Auto Action in section [MISC_START]
    - Serial Port configuration in section [MACHINE_CONTROL_SERIAL_PORT_DEFINITIONS_START]
    - EAS Audio Macro in section [MACRO_DEFINTIONS_START]
    - EAS Display Options in section [EAS_DISPLAY_CONFIG_DEFINITIONS_START]
    - EAS Macro for SAGE GPI
    - GPI for inbound connection from SAGE GPO programmed as PTT relay.

Sample TFT Macro

```
[MACRO_DEFINTIONS_START]
#
# This section defines the macros the system can perform.
#  See macro-definitions.txt in the software release
#  directory for detailed instructions on using macros
#
#NUMBER  1-??
#    ,ACTION  ON/OFF
#    ,     NUMBER      1-10
#    ,     ,AREA
#    ,     ,             ,FCN
#    ,     ,             ,             ,VALUE
#    ,     ,             ,             ,             ,STATE
#    ,     ,             ,             ,             ,     ,TEXT8
#4   ,  4  ,    12       ,    12       ,    12       ,  4       8
#---,----,------------,------------,------------,----,--------
1    ,DESC,EAS AUD MACRO USING TFT
1    ,ON   ,AUDIO_ONLY   ,PGM_INPUT    ,2            ,ON   ,
1    ,OFF  ,AUDIO_ONLY   ,PGM_INPUT    ,1            ,ON   ,
1    ,     ,CONTROL      ,DONE         ,             ,     ,
```

Sample SAGE Macro and GPI Section Config

```
[MACRO_DEFINTIONS_START]
#
# This section defines the macros the system can perform.
#  See macro-definitions.txt in the software release
#  directory for detailed instructions on using macros
#
#NUMBER  1-??
#   ,ACTION  ON/OFF
#   ,    NUMBER      1-10
#   ,    ,AREA
#   ,    ,            ,FCN
#   ,    ,            ,            ,VALUE
#   ,    ,            ,            ,            ,STATE
#   ,    ,            ,            ,            ,    ,TEXT8
#4  , 4  ,   12       ,   12       ,   12       , 4      8
#---,----,------------,------------,------------,----,--------
1   ,DESC,EAS AUD MACRO
1   ,ON  ,AUDIO_ONLY  ,PGM_INPUT   ,2           ,ON  ,
1   ,OFF ,AUDIO_ONLY  ,PGM_INPUT   ,1           ,ON  ,
1   ,    ,CONTROL     ,DONE        ,            ,    ,
2   ,DESC,EAS GPI MACRO USING SAGE
2   ,ON  ,GRAPHICS    ,LOCAL_EAS   ,            ,ON  ,
2   ,OFF ,GRAPHICS    ,LOCAL_EAS   ,            ,OFF ,
2   ,    ,CONTROL     ,DONE        ,            ,    ,

[GPI_DEFINITIONS_START]
#NUMBER  1-32
#   ,AREA
#   ,            ,FCN
#   ,            ,            ,VALUE
#   ,            ,            ,
#   ,            ,            ,            ,TYPE (LATCH/PULSE)
#4  ,   12       ,   12       ,   12       ,   8
#---,------------,------------,------------,--------
16  ,PANEL_MISC  ,MACRO       ,2           ,LATCH
```

Sample EAS Auto Action

```
[MISC_START]
#Example          EAS_AUTOMATIC_ACTION:    @01
#AUDIO_CHANNELS:          @000F

AUDIO_DIM_ADJUST: @-15
VIDEO_MIX_POSITION:       @08
KEY_LEVEL_RESET_MASK:     @0f
KEY_LEVEL_XFER_MASK:      @00
TRANS_SPEED_FAST: @30
TRANS_SPEED_MEDIUM:       @60
TRANS_SPEED_SLOW: @120
SYSLOG_SERVER_ID: @
AUX_OUT_XPOINT_SEL:       @PVW
EAS_AUTOMATIC_ACTION:     @01 (ENTER THE NUMBER FOR THE MACRO)
```

Sample Serial Port Setup for MC-4000 Interface to TFT or Sage

```
[MACHINE_CONTROL_SERIAL_PORT_DEFINITIONS_START]
#
# Example config a machine using port 3
# SQZMAX 1,PORT_02 ,38400   ,8       ,NONE    ,1       ,DISABLE
,DISABLE
# The system device name is not used programatically.  Just as a
reference when
#  looking at this file
#
# SYSTEM DEVICE NAME (Don't Care at this time 5/22/2004)
#   |    , SERIAL COMMUNICATIONS PORT NUMBER
#   |         |   ,BAUD RATE
#   |         |        |    ,BITS PER CHARACTER
#   |         |        |         |   , PARITY TYPE (ODD, EVEN, NONE)
#   |         |        |         |       |    ,STOP BITS PER CHARACTER
#   |         |        |         |       |               ,XONN/OFF FLOW
CONTROL (ENABLE/DISABLE)
#   |         |        |         |       |                        ,RTS/CTS
FLOW CONTROL (ENABLE/DISABLE/RS485???)
#-------,--------,--------,--------,--------,--------,--------,--------
EAS_STD ,PORT_01 ,9600    ,8       ,NONE    ,1       ,DISABLE ,DISABLE
```

Sample EAS Display Configuration for TFT

```
[EAS_DISPLAY_CONFIG_DEFINITIONS_START]
#
#  COLORS.  3 sets of colors are available.
#           1 normal color bars values @ 75%
#           2 normal color bars values @ 100%
#           3 custom colors set by USI
#
#  BLACK, WHITE, YELLOW, CYAN, GREEN, MAGENTA, RED, BLUE
#  BLACK_100, WHITE_100, YELLOW_100, CYAN_100, GREEN_100, MAGENTA_100,
#  RED_100, BLUE_100
#  TIMEKEY_FG, TIMEKEY_BG, NONE, more to come
#
#          ###  EAS_CRAWL  ###
#
# This line sets the display mode for the crawl messages
# that appear on the PGM output of the MC2020.
#
# EAS_CRAWL ,YES ,1   ,2   ,1   ,WHITE_100   ,TIMEKEY_BG  ,NO
#
#          ###  EAS_NOTIFY  ###
#
# This line sets the display mode for the text messages
# that appear on the MON output of the MC-2020
#
# EAS_NOTIFY,YES ,1   ,2   ,1   ,WHITE_100   ,TIMEKEY_BG  ,YES
#
#
#Item (EAS_CRAWL, EAS_NOTIFY)
#         ,Active (YES/NO)
#          ,    ,Display Line (1 or 8 <1 is top, 8 is bottom>)
#          ,    ,    ,Column (1-40)      <<SPEED 4 CRAWL 1,2,3>>
#          ,    ,    ,    ,Length (1-40)
#          ,    ,    ,    ,    ,FORGROUND COLOR (See above)
#          ,    ,    ,    ,    ,            ,BACKGROUND COLOR…
#          ,    ,    ,    ,    ,            ,            ,BLINK (YES/NO)
#   10     , 4  , 4  , 4  , 4  ,   12       ,   12       , 4
#---------,----,----,----,----,------------,------------,----
EAS_CRAWL ,YES ,1   ,2   ,1   ,WHITE_100   ,TIMEKEY_BG  ,NO
EAS_NOTIFY,YES ,1   ,2   ,1   ,WHITE_100   ,TIMEKEY_BG  ,YES
```

Sample EAS Display Configuration for Sage

```
[EAS_DISPLAY_CONFIG_DEFINITIONS_START]
#
#  COLORS.  3 sets of colors are available.
#           1 normal color bars values @ 75%
#           2 normal color bars values @ 100%
#           3 custom colors set by USI
#
#  BLACK, WHITE, YELLOW, CYAN, GREEN, MAGENTA, RED, BLUE
#  BLACK_100, WHITE_100, YELLOW_100, CYAN_100, GREEN_100, MAGENTA_100,
#  RED_100, BLUE_100
#  TIMEKEY_FG, TIMEKEY_BG, NONE, more to come
#
#          ###  EAS_CRAWL  ###
#
# This line sets the display mode for the crawl messages
# that appear on the PGM output of the MC2020.
#
# When the background is set to SAGE_AUTO_BG, the background
# color of the crawl will be either GREEN, YELLOW, or RED based
# on the type of alert the SAGE has received.
#
# EAS_CRAWL ,YES ,1   ,2   ,1   ,WHITE_100   ,SAGE_AUTO_BG,NO
#
# This line uses a single color for the background which can
# be used as an alternative to the multi-color background
# if desired by the user.
#
# EAS_CRAWL ,YES ,1   ,2   ,1   ,WHITE_100   ,TIMEKEY_BG  ,NO
#
# NOTE: Only one EAS_CRAWL Line can be active at a time.
#
#          ###  EAS NOTIFY  ###
#
# This line sets the display mode for the text messages
# that appear on the MON output of the MC-2020
#
# EAS_NOTIFY,YES ,1   ,2   ,1   ,WHITE_100   ,TIMEKEY_BG  ,YES
#
#Item (EAS_CRAWL, EAS_NOTIFY)
#          ,Active (YES/NO)
#          ,    ,Display Line (1 or 8 <1 is top, 8 is bottom>)
#          ,    ,    ,Column (1-40)      <<SPEED 4 CRAWL 1,2,3>>
#          ,    ,    ,    ,Length (1-40)
#          ,    ,    ,    ,    ,FORGROUND COLOR (See above)
#          ,    ,    ,    ,    ,            ,BACKGROUND COLOR…
#          ,    ,    ,    ,    ,            ,            ,BLINK (YES/NO)
#   10     , 4  , 4  , 4  , 4  ,   12       ,   12       , 4
#---------,----,----,----,----,------------,------------,----
EAS_CRAWL ,YES ,1   ,2   ,1   ,WHITE_100   ,SAGE_AUTO_BG,NO
EAS_NOTIFY,YES ,1   ,2   ,1   ,WHITE_100   ,TIMEKEY_BG  ,YES
```

APPENDIX B

MC-Series Logo Generation Utility with Program Installation

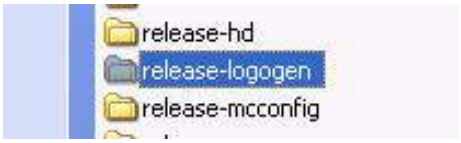
This Appendix covers the program installation for the MC-Series Logo Generation utility. This process presumes the general system installation (described earlier in this guide) has taken place. Logo Generation will allow you to import previously created .PNG files and convert them to the file format used by the UTSCI operating system.

Note: Though the MC-2020 is referenced in this appendix, the functionality is the same for MC-4000 operation.

This Appendix includes the following:

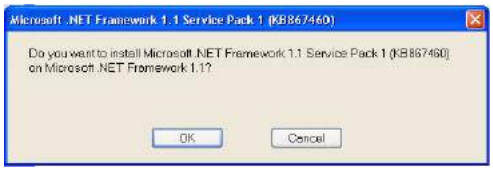
Installation of the Microsoft™ .net Framework

Locate the release-logogen directory, then open the net-1.1 directory and double-click the dotnetfx.exe application.

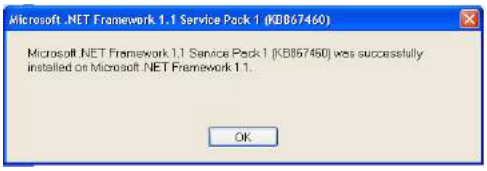


Depending on your equipment, this installation could take several minutes to complete. (Newer systems will allow the install to complete quickly.)

Next, launch the NDP1.1sp1-KB867460-x86.exe application by double-clicking the icon (same directory as above). This process is the Service Pack 1 installation, and will ask you to confirm and accept before continuing.[1]



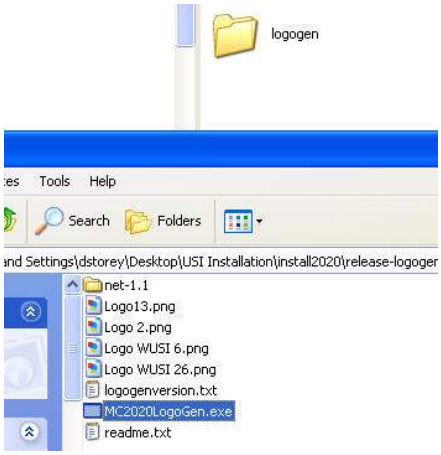
When the installation is complete, the following dialog will appear.



1. In a few isolated instances, some systems have reported the installation as “Already Complete”. This has not affected the proper installation however.

Installing the 2020 Logo Conversion Application

Create a new sub-directory within your USI directory called ‘logogen’, then copy the MC2020LogoGen.exe application, along with all other files in the original folder, to this location.



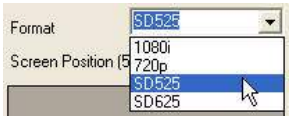
Once you have done this, make a short cut for this program to your desktop.

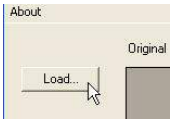
Now copy any .PNG files you have created to the new logogen directory.

Creating a USI Format Logo File

Launch the MC-2020 LogoGen utility.

Select the Video format using the format pick list. The default is SD525.



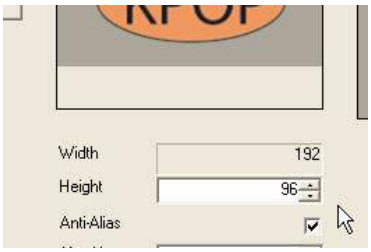


Click the **Load** button.

Now select the image you would like to read in.

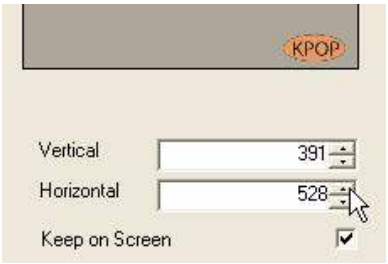
Note: This must be in the .PNG format.

Use the height control to reduce the size of the logo (if desired). The width value will adjust automatically to keep the aspect ratio correct.



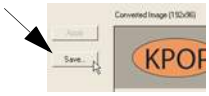
You must click the **Apply** button to see the resulting modification.

Use the vertical and horizontal adjustments to set the default location of the logo. *Note that in this case, you will not see immediate, on-the-fly changes.*



Note: This location information is used by the MC-2020 when it loads the logo from memory into 1 of the 4 keyers. If necessary, the location can be further modified using the controls on the MCP-2020 series master control panel.

Unless instructed otherwise, it is best to leave the ‘Anti-Alias’, ‘Algorithm’, and ‘Keep on Screen’ controls in their default setting.



Click the **Save** button.

Provide a filename for the save. The extension will default to .lgo.

Note: Do not change the extension name.

This completes the conversion process.

What is ‘Background On’ ?

If the logo you are converting is semi-transparent or contains transparent edges, **Background On** (when checked) will allow you to see the effects of the transparency on a patterned background.

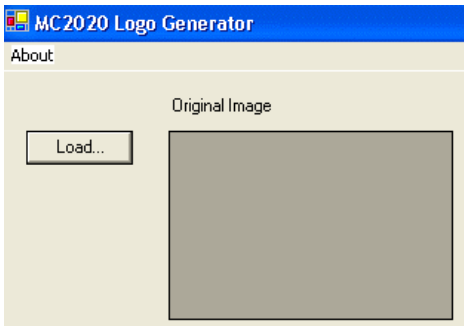
Creating PNG Files Prior to Conversion

Logogen can only convert files that have been built as png formats. The Logogen application converts the png file into an lgo format. Logogen will only resize the Logo to a maximum of 128x192 pixel size. The png file should be built as close to this size and saved as a png file prior to bringing it into the Logogen converter.

TIP: when creating the graphic for the desired Logo you should make the graphic as close to the 128x192 size as possible. You should not create a full transparent size and then add the graphic to the size you want it to be seen. If you do this then the Logogen will resize the entire file (full screen with transparent and graphic) to 128x192 which will make the graphic very small.

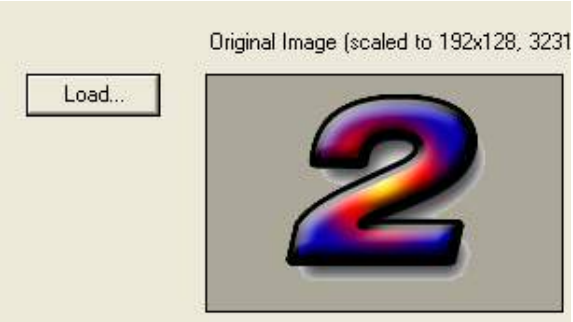
Converting PNG Files Using LogoGen

1. Launch the Logogen application from the Logogen folder found in the c:\usi folder or the shortcut you have created pointing to it by double clicking the following executable.
2. Click the Load button and search for the png file that you would like to bring in and convert.



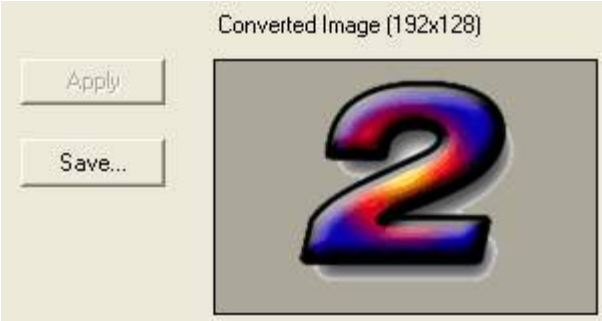
3. Drop down the format type and choose the video format that this logo will be used with.

4. The top display is how the file looks in its original raw form.



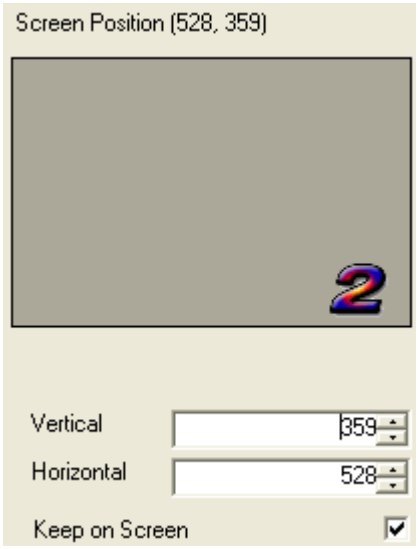
Top Left Display

5. The bottom left display is what it will look like if size changes are made below that window and applied. It will show the new numbers above the display.



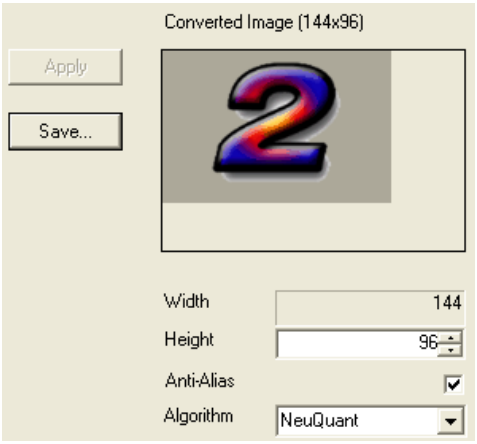
Bottom Left Display

6. The lower right display is how the logo will appear on the output of the MC when it is converted. Although the logo can be positioned and saved from the MC panel you can adjust the position of the logo in the logogen application to a permanent spot. Click on the Vertical and Horizontal arrows to move the Logo around. Leave a check mark in the Keep on Screen button to keep the logo from moving out of view.



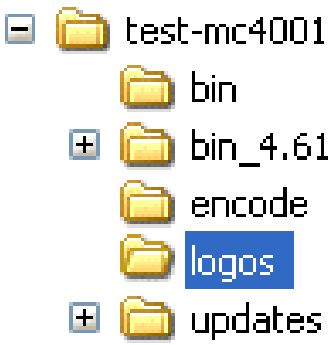
Bottom Right Display

7. To change the size of the logo use the arrows in the height window and remember that you can only go as large as 128. NOTE: if the file was made smaller than the 128 height then it will not be able to go any larger than its original creation. Click apply when you are satisfied with the size. Leave the Anti Alias button checked as this will keep crisper edges. Notice how it makes the image smaller in the display and it will also make the output display change as you watch it.



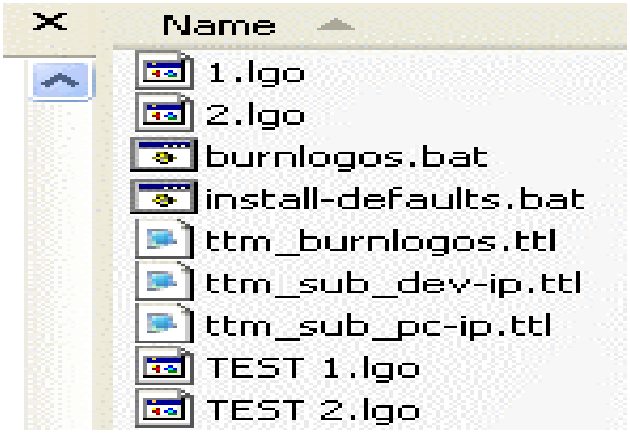
Converted Image

8. When you are satisfied then click on the Save button and then navigate to the c:\usi\folder and find the folder for the MC channel you are going to send the file to and then open the folder called logos. An example of this would be c:\usi\kusi-hd01\logos for an MC2020 or c:\usi\test-mc40001\logos for and MC400.



9. Save the file with whatever name you will remember it to be, along with the number of the Logo that you would like it to be used for. And give it the extension of lgo. An example of this would be TEST 3.lgo.

10. There are 16 logos that can be used by the MC. In order for the MC to use the new logo file it must be named using only the numbers 1-16 followed by a period and the extension of lgo. The number it is saved and burned with is the actual logo that will be shown in the MC display as 1-16. So, after you have saved the file in step 9 then go to that folder where the file has been saved. Then copy and paste the file in the same folder and then rename the copied file with the number of the logo only that will be used. So from the example in step 9 it would be renamed as 3.lgo, dropping the name TEST. The reason for both files is only to keep a file with a name that is recognized for future use. This is not required for any other reason so you could simply save all logos with just the logo number as this is how they are used. NOTE: The logos must be named with only the number in order to be burned into the master control. The picture below shows a few examples in the logos folder. It also shows the other files found in the logo folder.



Burning Logos to the MC

The MC-4000, MC-2020, and the MC400 are capable of storing a total of 16 different logos. Each logo occupies 1 of 16 storage locations inside the MC. To place a logo into a master control system it must first be converted to the USI format (.lgo) using the steps above and then burned into the MC itself. The following steps will complete the installation of a logo in the first of the 16 location within the MC-2020. (There is a working assumption here that the USI format file has already been created.)

1. Open Windows Explorer.
2. Navigate to c:\usi\[system]-name]\logos
3. Double-click burn-logos.bat and follow the on-screen prompts.
4. This process updates the MC-2020 with up to 16 new logo files that are present in the c:\usi\[system-name]\logos directory. Note: Files not present in the logos directory are not changed in the MC-2020 or MC400. And conversely all files that are in the directory will be burned even if they have not been changed. If this is not desired then the files that are not desired to be burned will need to be renamed prior to running the batch file.

Logo Operation from the Panel

From the MCP-2020 (Used with MC4000, MC2020, MC400 and MC40)

- At the MCP-2020 Master Control Panel, select the HOME button immediately below and to the left of the main LCD display.
- Select the KEY button on the LCD touch screen. This displays the key summary screen.
- Select the KEY-1 button on the LCD touch screen. This displays the logo select screen.
- Select the LOGO-1 button on the LCD touch screen. Any of the buttons can be selected if they have been loaded with a #.lgo file.
- Turn on the PST KEY button for keyer 1 in the key section on the right hand side of the MCP-2020 control panel.
- Select the LOGO key input button, located to the right of the EXT button and directly below the PST KEY button for the keyer 3. Note: The Logo button must be enabled in the MCP-2020 encoding file.
- Adjust the logo position using the bottom 2 knobs located directly to the right of the LCD display screen. The middle knob adjusts horizontal position, the bottom knob adjusts vertical position.
- The logo position can only be changed with the logo select screen displayed. When you are satisfied with the location, press the BACK button, located just below and to the right of the LCD display. If you need to make adjustments at a future time, go to the logo key select screen in the LCD and adjust the knobs as necessary. Each Logo is independently positioned. If you have a need for the same logo to be placed in 1 or more predefined positions, install the same logo in 1 or more keyer card slots and position each per your adjustments. A specific logo can actually be loaded in all the remaining keyer cards in your system. All internal logos should be displayed in the LIN MULT (or LIN) Keyer Mode.

From the MCP-400 (Used with MC400 and MC40 only)

- At the MCP-400 Master Control Panel, select the HOME button immediately below and to the left of the main LCD display.
- Select the KEYR CNTL button on the LCD touch screen. This displays the key summary screen.
- Select the LOGO KEY button on the LCD touch screen. This will not change screens but will highlight the button after it is pressed.

- Select the LIN KEY button on the LCD touch screen. This will not change screens but will highlight the button after it is pressed.
- Select the LOGO SEL button on the LCD touch screen. This will go to the Logo 1-8 screen. Select the desired Logo by pressing it on the screen. To see Logo 9-16 press the physical button labeled down which is located to the left of the LCD display.
- At this point you should see the Key on the Video Preset Monitor.
- Select the physical button labeled BACK just to the left of the LCD display until you get back to the key summary screen.
- Select the LOGO POS button on the LCD touch screen and you will see 4 direction arrows and a course and fine adjust button.
- Touch each of the arrows to move the Logo to the desired position on the monitor and turn on the course or fine adjust and then the arrows as needed.
- When you are satisfied with the position of the Logo and wish for it to go to the same location the next time it is selected then press the SAVE button on the LCD Touch screen.
- From here you can either press the take button which will transition the Logo to the Program bus or you can press the PGM/PST Toggle button just below the LCD display and then go through the steps above to select the Logo manually and put it on the Program bus.
- Each Logo is independently positioned. If you have a need for the same logo to be placed in 1 or more predefined positions, install the same logo in 1 or more keyer card slots and position each per your adjustments. A specific logo can actually be loaded in all the remaining keyer cards in your system.
- All internal logos should be displayed in the LIN MULT (or LIN) Keyer Mode.

Clearing Existing Logos

This must be completed from the diagnostics port either using a serial connection to the card or by telnetting into the IP address of the card. (Refer to Appendix D in the system installation guide). This will erase all logos at one time, and not individually. After all are removed, re-send wanted logos back to the card.

Type the following at the prompt once you have established a connection:

mem (lower case and then press return)

r 6e0000 (these are zeros -- pressing return displays the current logos) ef 6e0000 (these are zeros -- pressing return erases all logos in flash).

The following is an example of what is displayed after these commands are typed. You should see the actual name of the logos in each location at the end of the line in table one (below).

This was extracted from a 2020, and as you can see, there are two logos enabled. The second table shows the table with all ffff, indicating the address showing logos is empty.

```
/> mem

*****************************************
*           Utah Scientific             *
*         Hardware Test Utility         *
*                                       *
* Use "?" for help                      *
* Motorola M5307C3 boot Version: V1.1   *
*****************************************
>>r 6e0000
006e0000: face0001 000000ff 00010800 20050412
006e0010: 00000164 0000026d 00000000 deaddead       d   m
006e0020: 00000100 00000001 00000000 deaddead
006e0030: deaddead deaddead deaddead deaddead
006e0040: 77757369 362e6c67 6f000000 00000000    wusi6.lgo
006e0050: 00000000 00000000 00000000 00000000
006e0060: 00000000 00000000 00000000 00000000
006e0070: 00000000 00000000 00000000 00000000
006e0080: 4c6f676f 20362057 55534920 636f7079    Logo 6 WUSI copy
006e0090: 2e706e67 00000000 00000000 00000000    .png
006e00a0: 00000000 00000000 00000000 00000000
006e00b0: 00000000 00000000 00000000 00000000
006e00c0: deaddead deaddead deaddead deaddead
006e00d0: deaddead deaddead deaddead deaddead
006e00e0: deaddead deaddead deaddead deaddead
006e00f0: deaddead deaddead deaddead deaddead
>>
```

```
>>ef 6e0000
Man id: 1, dev id: 22d7
>>r 6e0000
006e0000: ffffffff ffffffff ffffffff ffffffff
006e0010: ffffffff ffffffff ffffffff ffffffff
006e0020: ffffffff ffffffff ffffffff ffffffff
006e0030: ffffffff ffffffff ffffffff ffffffff
006e0040: ffffffff ffffffff ffffffff ffffffff
006e0050: ffffffff ffffffff ffffffff ffffffff
006e0060: ffffffff ffffffff ffffffff ffffffff
006e0070: ffffffff ffffffff ffffffff ffffffff
006e0080: ffffffff ffffffff ffffffff ffffffff
006e0090: ffffffff ffffffff ffffffff ffffffff
006e00a0: ffffffff ffffffff ffffffff ffffffff
006e00b0: ffffffff ffffffff ffffffff ffffffff
006e00c0: ffffffff ffffffff ffffffff ffffffff
006e00d0: ffffffff ffffffff ffffffff ffffffff
006e00e0: ffffffff ffffffff ffffffff ffffffff
006e00f0: ffffffff ffffffff ffffffff ffffffff
>>
```

CHAPTER 4

Component Descriptions - Controls and Indicators for All Cards

In This Chapter

MC-4000 3G Input Card

Part #121170-1 the MC-4000 3G Input card contains 8 inputs that accept SDI signals. There are two versions of this card; identified by a -1 or a -2 in the serial number. The -1 version is capable of receiving all SDI signals up to the SMPTE-424 1080P standard. The -2 version contains a maximum data rate of HD-SDI, the SMPTE-292 standard.

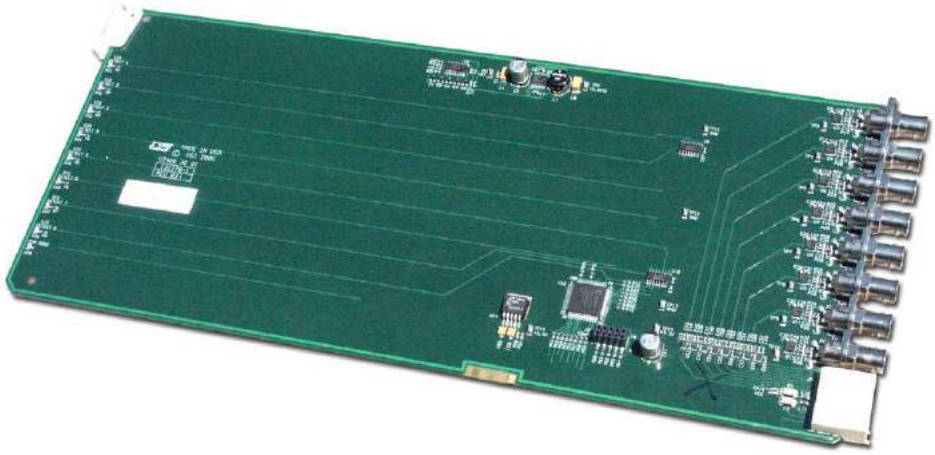


FIGURE 4-1. 3 Gig Input card

Features

The card handles 8 channels of video; receiving and equalizing the video signals coming from the 8 rear panel mounted BNC connectors, then distributing them to both the local crosspoint (in the frame) and to the midplane expansion output connector, allowing for connections to an additional MC-4000 output chassis stack. The card also contains an array of status LED's to indicate if it has acquired the carrier of a SDI signal.

Controls

None

Indicators

There are 9 LED's located on the card; 8 used for input signal carrier status, and one used for the 'power good' indication.

DS9 is the power good indicator, and when lit, all board power supplies are OK. When not lit, one of more of the supplies on the board have failed.

DS1-8 are carrier indicators for the 8 inputs on the board. DS1 corresponds to the lowest input number, while DS8 corresponds to the highest. ON indicates that this particular input is present. A *dark* LED means the signal is not present.

Specifications

Power Consumption - 3W

Cable EQ CApability

TABLE 1.

SD-SDI SMPTE259	350 Meters of 1694 Cable
HD-SDI SMPTE-292	140 Meters of 1694 Cable (-2 version) 200 meters (-1 version)
3G SDI SMPTE 424	120 Meters of 1694 Cable

SCX-400 (Video) - Crosspoint and Controller

Part number 121114-1, the SCX-400 board is a video crosspoint and a system controller combined. Depending on the application, this board can be configured as a controller and router, or router only. There are 32 inputs that are received from four input cards that are switched through a single crosspoint IC. The crosspoint will then switch the appropriate inputs to the 32 outputs located on the four output cards.

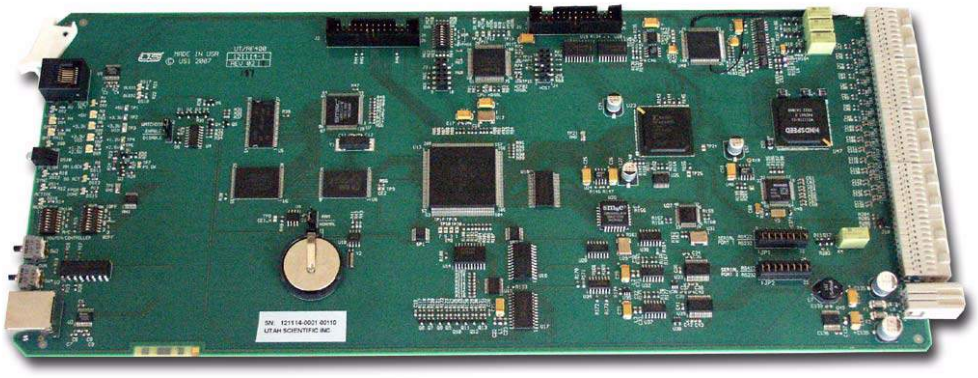


FIGURE 4-2. Crosspoint Board

Board Jumpers / Board Reset/Changeover

Reset - This re initializes the board. (The XP_RST switch will determine if the crosspoint follows this reset).

Changeover - This forces a changeover from the active to the standby card.

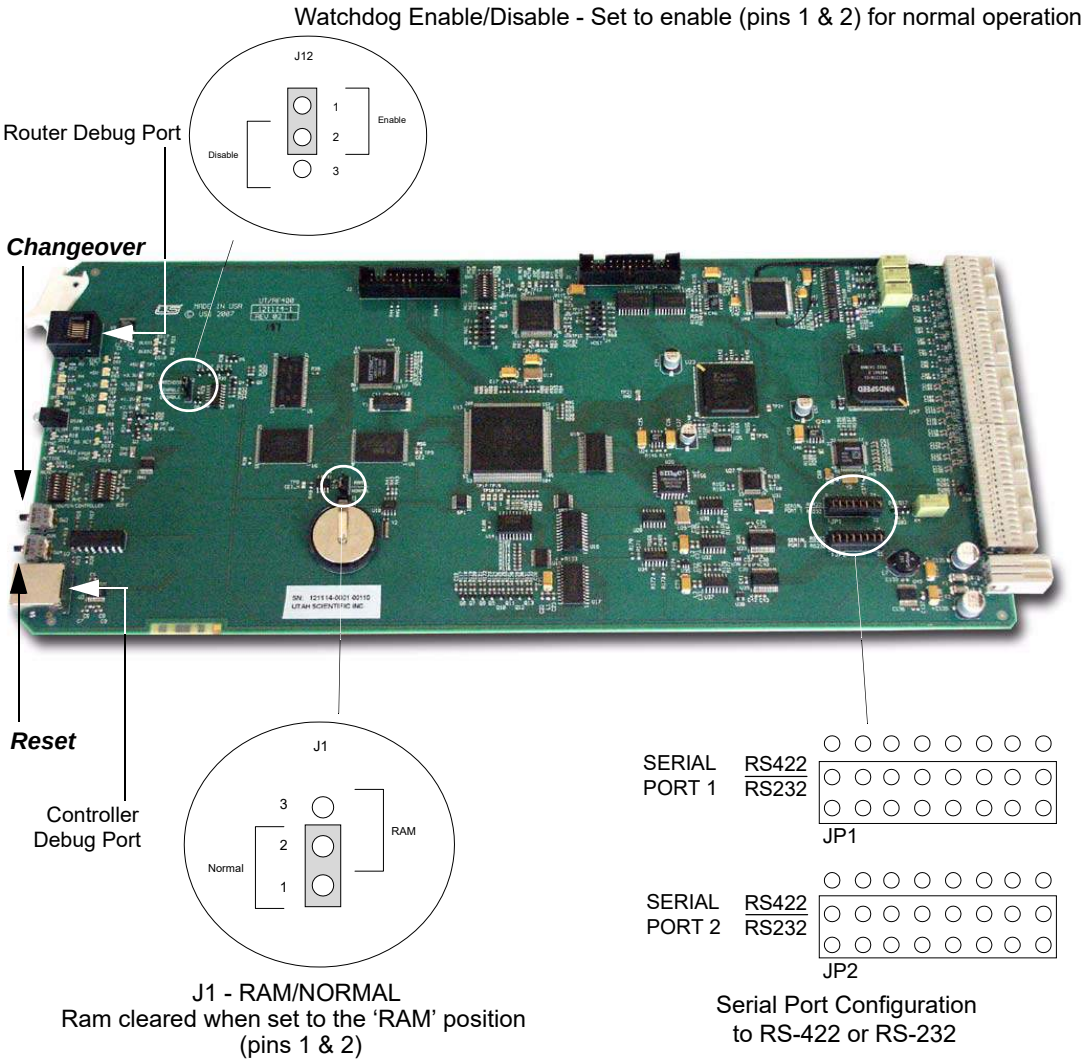


FIGURE 4-3. SCX-400 Jumper Locations

Fuses

The 32x32 system's crosspoint card contains two *resettable* fuses. These fuses will open if an over current situation occurs on the 3.3V or 5V board voltages. These fuses will close to normal operation once the overcurrent situation is resolved.

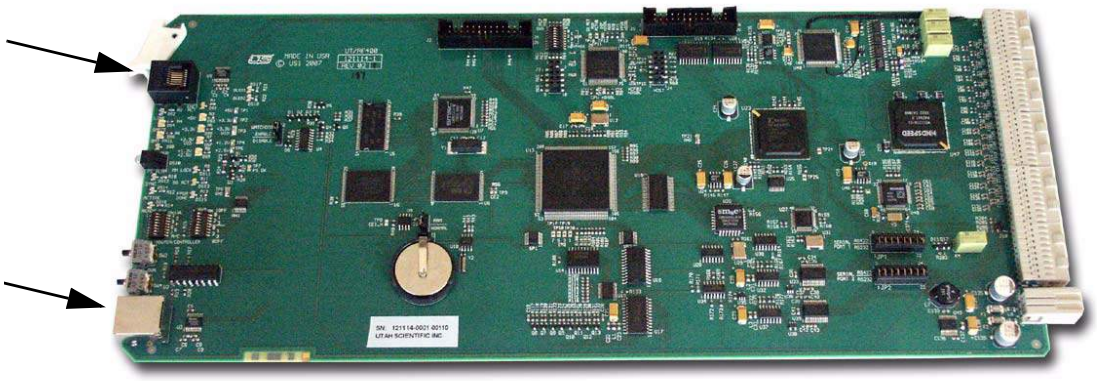
All other voltages on the board are derived from the 3.3V and 5V voltages.

Crosspoint failure independent of any other board failure is very uncommon, and is often the result of a problem elsewhere. Please contact Customer Service in the event the crosspoint card experiences a failure.

Debug Connectors

Controller Debug Port - (Silver RJ-45) - RS-232 serial interface to the controller portion of the board. (SC/MC RJ-45/DB95 Adapter - USI# 140100-2) - Baudrate = 19.2K, Data = 8 bit, parity = None, Stop = 1 bit, Flow = None

Router Debug Port - (Black RJ-45) - RS-232 serial interface to the router portion of the board. (UT400 RJ-45/DB9S Adapter - USI# 1400000-8) - Baudrate = 38.4K, Data = 8 bit, Parity = None, Stop = 1 bit, Flow = None



Test points

In rare cases, engineering personnel may (when receiving certain voltage alarms) clip onto these points with a volt meter & make certain deductions regarding system voltages.

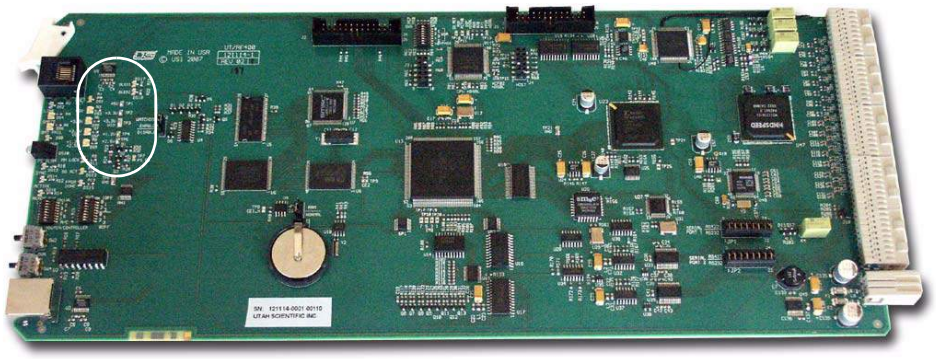


FIGURE 4-4. Board test points

Contacts

+ 5V

+ 3.3V

+3.3V VID

+ 1.2V

+ 2.5V

GND

RF400 Pass-Thru Video Xpoint (121111-1)

The Pass-Thru Xpoint has been designed to loop the input signals (0-31) to the output signals (0-31).

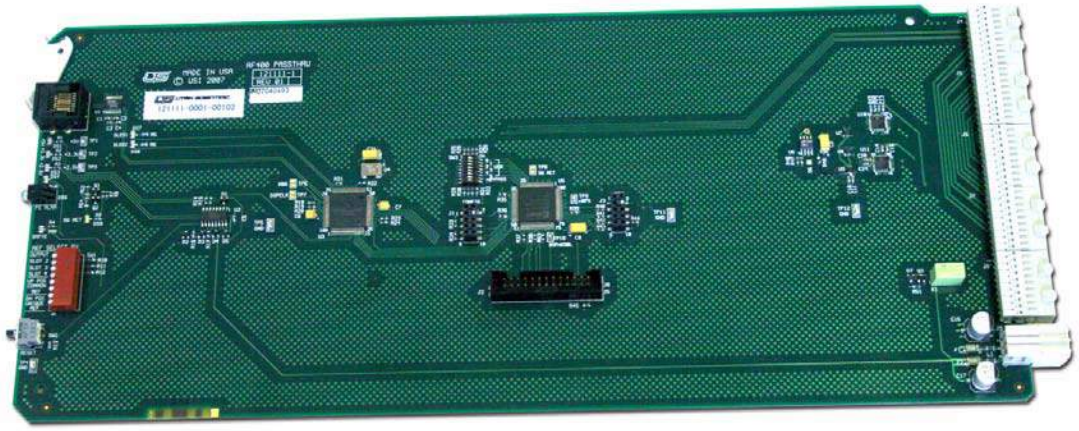


FIGURE 4-5. RF400 Pass Thru

Pass-Thru Xpoint Front Edge Details:

RJ45 (P1) - RS232 serial interface (UT400 RJ-45/DB9S Adapter - USI# 1400000-8). - Baudrate = 38.4k, Data = 8 bit, Parity = None, Stop = 1 bit, Flow = None

Power Error indications - These will illuminate to indicate a problem with a specified power supply. Note: The illumination of these LEDs will turn off the board power LED.

Test Points - +5V, +3.3V, +2.5V

Board Power - All onboard power supplies are functional (illuminates green).

PS ALARM = - This indicates the condition of the chassis power supplies. (Green = normal function, Red= fan, temp, or voltage failure)

SG Active - Indicates activity on the scangate bus.

SMPTE - will illuminate when there is a SMPTE alarm condition.

RESET - Initializes the board.

APPENDIX A

The MC-4000 Breakout Panel

Panel's Purpose

The MC-4000 utilizes high-density connectors as a means of accommodating two master control chassis. As a result, the MC-4000 Breakout Panel is offered as a means of allowing easier access and connectivity to the MC-4000 chassis within tight equipment spaces.[1] The Breakout Panel also provides convenient adaptability to the Micro-D connections and the GPI/O (relay-optos).

Items that are multi-plexed on common connectors on the back of the MC-4000 have been broken out into this panel.

Items that are not multi-plexed typically include the following:

- Standard serial ports –
- Ethernet
- UNET
- The actual coax BNC video connections

A BNC extractor and mini-flathead are also included to facilitate cable insertion and removal in tight spaces.

1. The Breakout Panel provides conversion to/from 110Ohm balanced, and 75 Ohm un-balanced AES audio connections.

Cabling

The included kit contains a number of cables of fixed length that will connect the breakout panel to the MC-4000 chassis.

(2) 140024-0001 (CLEAN/EXT2)

(1) 140024-0002 (Time Code)

(3) 65366-3 AES Audio (8-channel)
PGM/Mon, PVW/Ext., PGM/PST

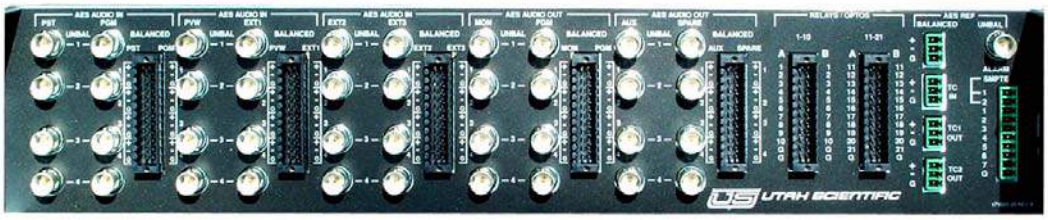
(2) 94005-0014 HD Sub-26 **-** (Relay)

FIGURE A-1. Breakout Panel cables (included)

Physical Layout

The panel's physical hook-up to the MC-4000 will remain constant regardless of how the jumper settings (balanced or unbalanced) are made.* The Breakout panel is typically set in the rack behind the MC-4000 chassis, but can be placed in any convenient location.

Inner Panel Connectivity



Breakout Connection Side

FIGURE A-2. Rear Layout

Breakout Rear Panel

The silkscreen on the back of the breakout panel matches the labeling on the MC-4000 rear.

Cable Connections - *TO MC-4000 Chassis*

FIGURE A-3. Breakout Panel rear

*** Balanced = 110 Ohm**
Unbalanced = 75 Ohm

Balanced and Unbalanced

Audio Output

For any given channel, the panel's AES outputs can be operated in either balanced or unbalanced mode. The jumpers on the back of the Breakout panel should be set once the balanced/unbalanced determination is made. This should be done prior to actual panel hook-up.

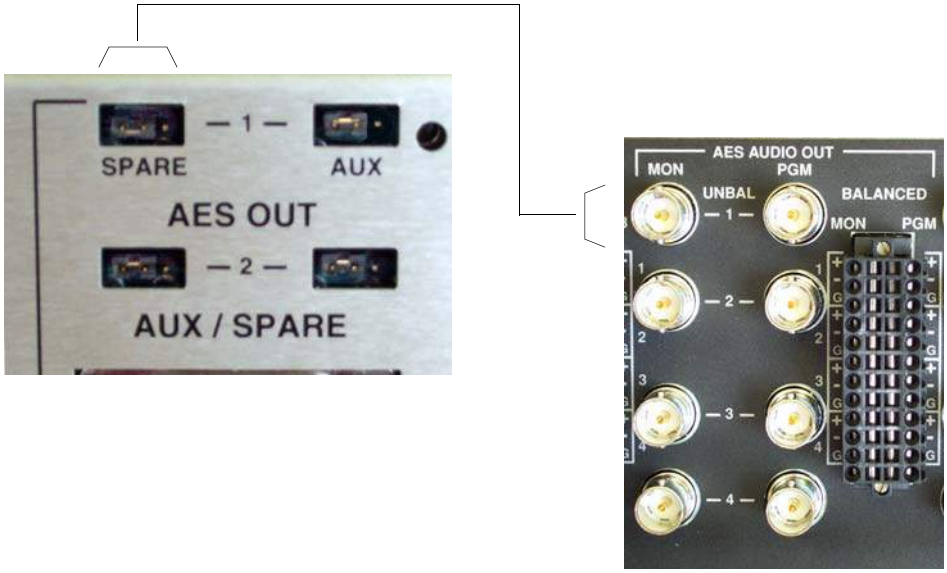


FIGURE A-4. Balanced/Unbalanced -- hookup to jumper settings

Audio Input

For each AES input, choose BALANCED or UNBALANCED -- but do not connect both.

Mixed connections (balanced v.s unbalanced) within one channel group can produce undesirable results. Though no actual damage will occur, audio degradation can take place.

Example: Acceptable; balanced on Preview 1, with Unbalanced on Preview 2.

Unacceptable; both balanced and unbalanced on Preview 1.

Hardware

The front *runner bar* is provided to facilitate tie-downs and cable organization.

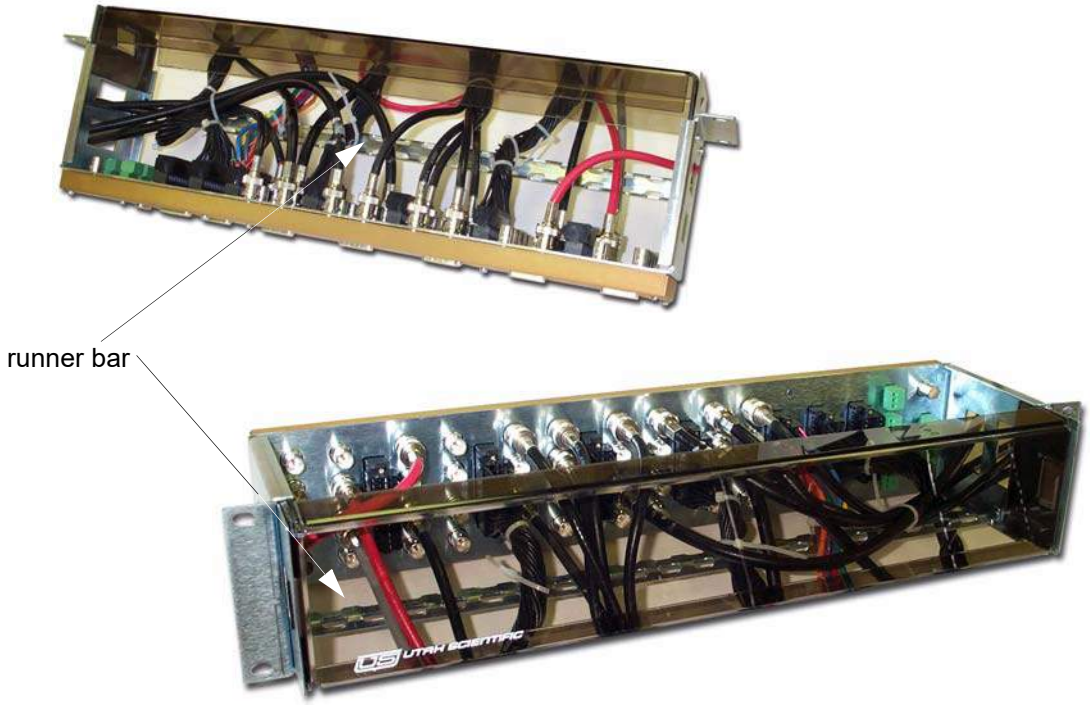


FIGURE A-5. Cabling/Tie Wrap bar

Ongoing Usage and Maintenance

The Breakout Panel's face is recessed to allow more convenient cable hook-up and disconnecting. The transparent cover should be kept in place to provide impact and debris protection. Once the cables are in place, they should be wrapped and tied down for easier handling and signal tracing.

U

V