GRASS VALLEY GROUP

Service Manual

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SERIES 7000
SIGNAL MANAGEMENT SYSTEM

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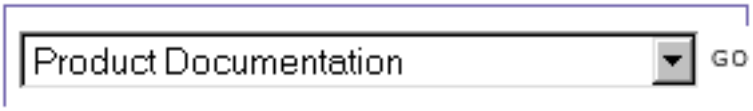

FAQ Database

Many solutions to problems and troubleshooting efforts can be found by searching our Frequently Asked Questions (FAQ) database. To access:

1. Select the Service / Support link on the Grass Valley Group home page.
2. Select the Online Support & FAQ link on the Service / Support page.
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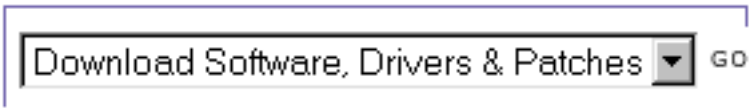

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Preface

About This Manual

This manual provides service information specific to Series 7000 Signal Management Systems.

Documentation Set

This Service Manual is part of the Series 7000 manual set which also includes an Installation Manual, a Configuration Manual, and a User Manual. An electronic copy of the manual set is on the Documentation CD-ROM.

Conventions Used In This Manual

Menu selections, soft buttons, or other software generated items in the Series 7000 Configuration Editor GUI are shown in the following type:

- Click **OK**.
- Under **ONLINE**, select **CONTROL,** then **TAKE** to access the Take window.
- **EXCLUDED** (software generated item) momentarily appears in the **PRESET** (control panel label text) display if a Take is attempted of a valid Source that is excluded by the system.

Button text and other labels on the Series 7000 Control Panels are shown in the following type:

- Press the **Protect** button.
- Press the **SRC** button.

Code text is shown in the following type:

- `SMS7000> booted`
- Enter **`booted`** at the prompt.

Safety Summary

Read and follow the important safety information below, noting especially those instructions related to risk of fire, electric shock or injury to persons. Additional specific warnings not listed here may be found throughout the manual.

WARNING **Any instructions in this manual that require opening the equipment cover or enclosure are for use by qualified service personnel only. To reduce the risk of electric shock, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so.**

Safety Terms and Symbols

Terms in This Manual

Safety-related statements may appear in this manual in the following form:

WARNING **Warning statements identify conditions or practices that may result in personal injury or loss of life.**

CAUTION Caution statements identify conditions or practices that may result in damage to equipment or other property.

Terms on the Product

The following terms may appear on the product:

DANGER — A personal injury hazard is immediately accessible as you read the marking.

WARNING — A personal injury hazard exists but is not immediately accessible as you read the marking.

CAUTION — A hazard to property, product, and other equipment is present.

Symbols on the Product

The following symbols may appear on the product:

Indicates that dangerous high voltage is present within the equipment enclosure that may be of sufficient magnitude to constitute a risk of electric shock.

Indicates that user, operator or service technician should refer to product manual(s) for important operating, maintenance, or service instructions.

This is a prompt to note fuse rating when replacing fuse(s). The fuse referenced in the text must be replaced with one having the ratings indicated.

Identifies a protective grounding terminal which must be connected to earth ground prior to making any other equipment connections.

Identifies an external protective grounding terminal which may be connected to earth ground as a supplement to an internal grounding terminal.

Indicates that static sensitive components are present which may be damaged by electrostatic discharge. Use anti-static procedures, equipment and surfaces during servicing.

Warnings

The following warning statements identify conditions or practices that can result in personal injury or loss of life.

Dangerous voltage or current may be present — Disconnect power and remove battery (if applicable) before removing protective panels, soldering, or replacing components.

Do not service alone — Do not internally service this product unless another person capable of rendering first aid and resuscitation is present.

Remove jewelry — Prior to servicing, remove jewelry such as rings, watches, and other metallic objects.

Avoid exposed circuitry — Do not touch exposed connections, components or circuitry when power is present.

Use proper power cord — Use only the power cord supplied or specified for this product.

Ground product — Connect the grounding conductor of the power cord to earth ground.

Operate only with covers and enclosure panels in place — Do not operate this product when covers or enclosure panels are removed.

Use correct fuse — Use only the fuse type and rating specified for this product.

Use only in dry environment — Do not operate in wet or damp conditions.

Use only in non-explosive environment — Do not operate this product in an explosive atmosphere.

High leakage current may be present — Earth connection of product is essential before connecting power.

Dual power supplies may be present — Be certain to plug each power supply cord into a separate branch circuit employing a separate service ground. Disconnect both power supply cords prior to servicing.

Double pole neutral fusing — Disconnect mains power prior to servicing.

Use proper lift points — Do not use door latches to lift or move equipment.

Avoid mechanical hazards — Allow all rotating devices to come to a stop before servicing.

Cautions

The following caution statements identify conditions or practices that can result in damage to equipment or other property

Use correct power source — Do not operate this product from a power source that applies more than the voltage specified for the product.

Use correct voltage setting — If this product lacks auto-ranging power supplies, before applying power ensure that the each power supply is set to match the power source.

Provide proper ventilation — To prevent product overheating, provide equipment ventilation in accordance with installation instructions.

Use anti-static procedures — Static sensitive components are present which may be damaged by electrostatic discharge. Use anti-static procedures, equipment and surfaces during servicing.

Do not operate with suspected equipment failure — If you suspect product damage or equipment failure, have the equipment inspected by qualified service personnel.

Ensure mains disconnect — If mains switch is not provided, the power cord(s) of this equipment provide the means of disconnection. The socket outlet must be installed near the equipment and must be easily accessible. Verify that all mains power is disconnected before installing or removing power supplies and / or options.

Route cable properly — Route power cords and other cables so that they ar not likely to be damaged. Properly support heavy cable bundles to avoid connector damage.

Use correct power supply cords — Power cords for this equipment, if provided, meet all North American electrical codes. Operation of this equipment at voltages exceeding 130 VAC requires power supply cords which comply with NEMA configurations. International power cords, if provided, have the approval of the country of use.

Use correct replacement battery — This product may contain batteries. To reduce the risk of explosion, check polarity and replace only with the same or equivalent type recommended by manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Troubleshoot only to board level — Circuit boards in this product are densely populated with surface mount technology (SMT) components and application specific integrated circuits (ASICS). As a result, circuit board repair at the component level is very difficult in the field, if not impossible. For warranty compliance, do not troubleshoot systems beyond the board level.

Regulatory Notices

Certifications and Compliances

FCC Emission Control

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

Canadian EMC Notice of Compliance

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'emet pas de bruits radioélectriques dépassant les limites applicables aux appareils numeriques de la classe A préscrites dans le Règlement sur le brouillage radioélectrique édicte par le ministère des Communications du Canada.

EN55022 Class A Warning

For products that comply with Class A. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Canadian Certified Power Cords

Canadian approval includes the products and power cords appropriate for use in the North America power network. All other power cords supplied are approved for the country of use.

Canadian Certified AC Adapter

Canadian approval includes the AC adapters appropriate for use in the North America power network. All other AC adapters supplied are approved for the country of use.

Laser Compliance

Laser Safety Requirements

The device used in this product is a Class 1 certified laser product. Operating this product outside specifications or altering from its original design may result in hazardous radiation exposure, and may be considered an act of modifying or new manufacturing of a laser product under U.S. regulations contained in 21CFR Chapter1, subchapter J or CENELEC regulations in HD 482 S1. People performing such an act are required by law to recertify and reidentify this product in accordance with provisions of 21CFR subchapter J for distribution within the U.S.A., and in accordance with CENELEC HD 482 S1 for distribution within countries using the IEC 825 standard.

Laser Safety

Laser safety in the United States is regulated by the Center for Devices and Radiological Health (CDRH). The laser safety regulations are published in the “Laser Product Performance Standard,” Code of Federal Regulation (CFR), Title 21, Subchapter J.

The international Electrotechnical Commission (IEC) Standard 825, “Radiation of Laser Products, Equipment Classification, Requirements and User’s Guide,” governs laser products outside the United States. Europe and member nations of the European Free trade Association fall under the jurisdiction of the Comite European de Normalization Electrotechnique (CENELEC).

For the CDRH: The radiant power is detected trough a 7 mm aperture at a distance of 200 mm from the source focused through a lens with a focal length of 100 mm.

For IEC compliance: The radiant power is detected trough a 7 mm aperture at a distance of 100 mm from the source focused through a lens with a focal length of 100 mm.

FCC Emission Limits

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may no cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesirable operation. This device has been tested and found to comply with FCC Part 15 Class B limits for a digital device when tested with a representative laser-based fiber optical system that complies with ANSI X3T11 Fiber Channel Standard.

Certification

Category	Standard	Designed/tested for compliance with:
Safety	UL1419	Professional Video and Audio Equipment

Section 1

System Description

Introduction

This section describes the Series 7000 control system and system architecture in terms of signal flow, from board to system level. Series 7000 control is very flexible and can be adapted to a wide variety of system configurations and multiple control levels. This book can not detail all possible control configurations. Instead, it describes control system components and applications.

Signal flow architecture varies depending upon Series 7000 signal and frame type. Analog and digital video systems differ mainly at board level. Digital video frames incorporate better electromagnetic interference (EMI) screening and grounded BNC connectors. Digital-ready audio frames use D connectors in place of terminal strips to achieve EMI compliance. Series 7000 video frames will accept either analog or digital modules; digital audio frames will accept analog audio modules.

Control System

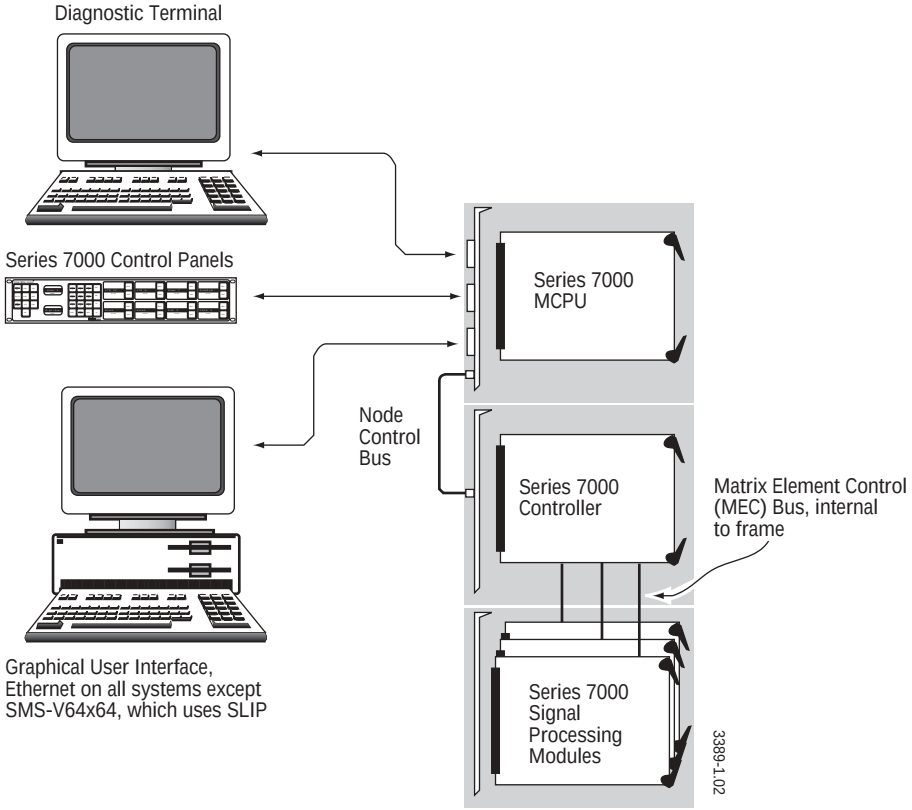
Depending on their total matrix size, Series 7000 Systems either have a Master Central Processing Unit (MCPU) located in the same frame which contains the Controller and signal processing modules (Input, Output, and Crosspoint modules), or the MCPU and additional Communication Interface (CIF) modules may be located in a separate, stand-alone Control Frame. (Controller, Input, Output, and Crosspoint modules are contained in a different frame).

The MCPU interfaces to numerous control devices. These include the Series 7000 Configuration Editor Graphical User Interface (on a PC used for system configuration), a dumb terminal (used for diagnostics and troubleshooting), and Series 7000 control panels (used to modify signal flow). Communication interfaces to the MCPU are handled by plug-on submod-

ules called Mezzanines. Two Mezzanine may be mounted on a MCPU module and as many as four Mezzanine may be mounted on each CIF module.

The MCPU communicates with the signal processing matrices through the Node Control Bus and Controller module(s). The Controller modules interpret the MCPU instructions and distribute these instructions to the signal processing modules over Matrix Element Control (MEC) Buses internal to their respective frames.

Figure 1-1. Series 7000 Control Structure



The Master Central Processing Unit (MCPU)

The MCPU controls the operation of the entire Series 7000 system. Optionally, the system may use two MCPUs; one will be in active control of the system (the primary MCPU), the other (the backup MCPU) will be in standby mode – ready to take over system control if needed.

MCPU Functionality in Compact Systems

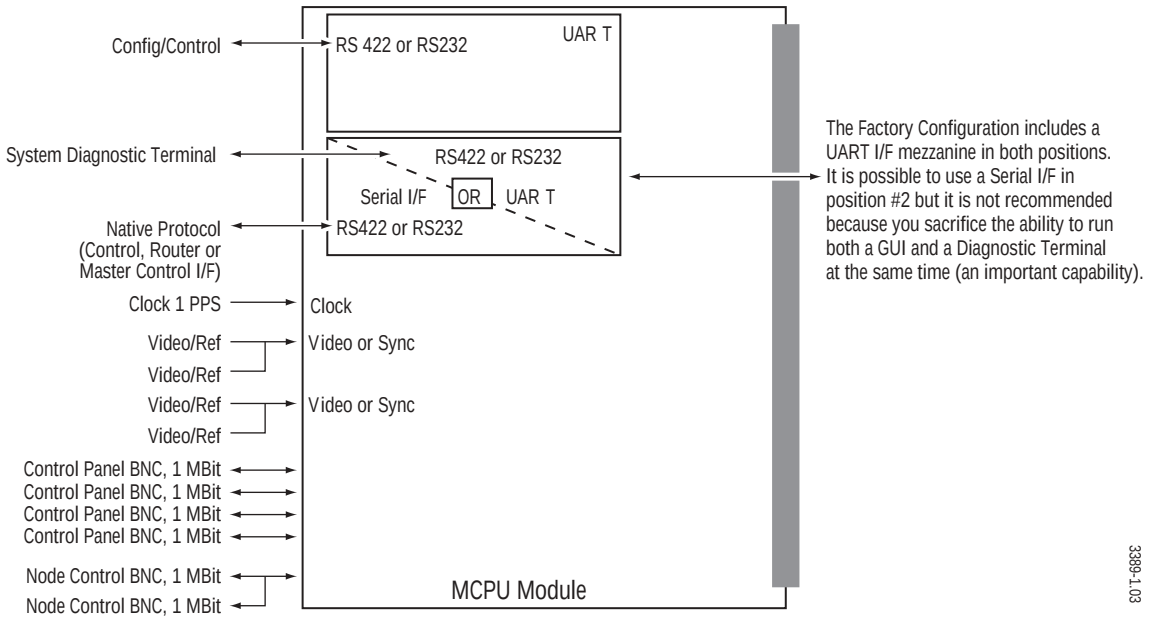
In compact systems, the primary and redundant MCPU pair is located in one of the frames in which signal processing takes place. A typical system might be a 64x64 Video / Audio configuration in which the MCPU pair is in the Video frame and the Audio frame is controlled through a coaxial (coax) cable Node Bus between the two frames.

In compact systems (Figure 1-2), the MCPU performs the following functions:

- Controls the system; maintains the system configuration in RAM and electronically erasable (Flash) ROM. Communicates with the Graphical User Interface (GUI) through a Universal Asynchronous Receiver Transmitter (UART) Mezzanine board.
- Communicates with the Diagnostic Terminal through a second UART Mezzanine board (standard configuration). Alternately, a Serial I/F Mezzanine may be used to allow the MCPU to communicate with other routers, master control switchers, or an automation system. However, because the Diagnostic Terminal is so critical to system maintenance, the UART is recommended. If additional functionality is needed, a stand-alone Control Frame may be added (see the following Expanded System discussion).
- Accepts a one-pulse-per-second master clock input to synchronize the MCPU real time clock. If a clock is not connected, the Series 7000 will provide its own. System time is initially set through the Diagnostic Terminal.
- Two Reference Video ports allow the 7000 to use two different video standards. See Control Interconnect Cabling in Section 3 of the *Installation Manual* for further information regarding the Reference Video ports.
- Provides four control panel bus (CP Bus) BNC connectors. Each will support up to 16 devices (Control Panels, Under Monitor Displays, Machine Status Displays). Each is a 1 MBit bus implemented through coaxial cable. Maximum cable length is 1500 feet (460 meters).

- Provides Node Bus connection BNCs. 1MBit bus implemented through coaxial cable. Maximum cable length is 1500 feet (460 meters). With the MCPU in the frame, one of these BNCs extends control to the Node Controllers in other system frames (the other BNC must be terminated into 75 Ohms). If the Control Section does not have an MCPU module and the frame is being controlled by an MCPU in a different frame, this is a looping Node Bus connection. Use these connectors to input and loop the Node Bus to additional frames (or terminate the second BNC if this is the last frame in the series).

Figure 1-2. MCPU Functionality in Compact Systems



MCPU Functionality in Expanded Systems

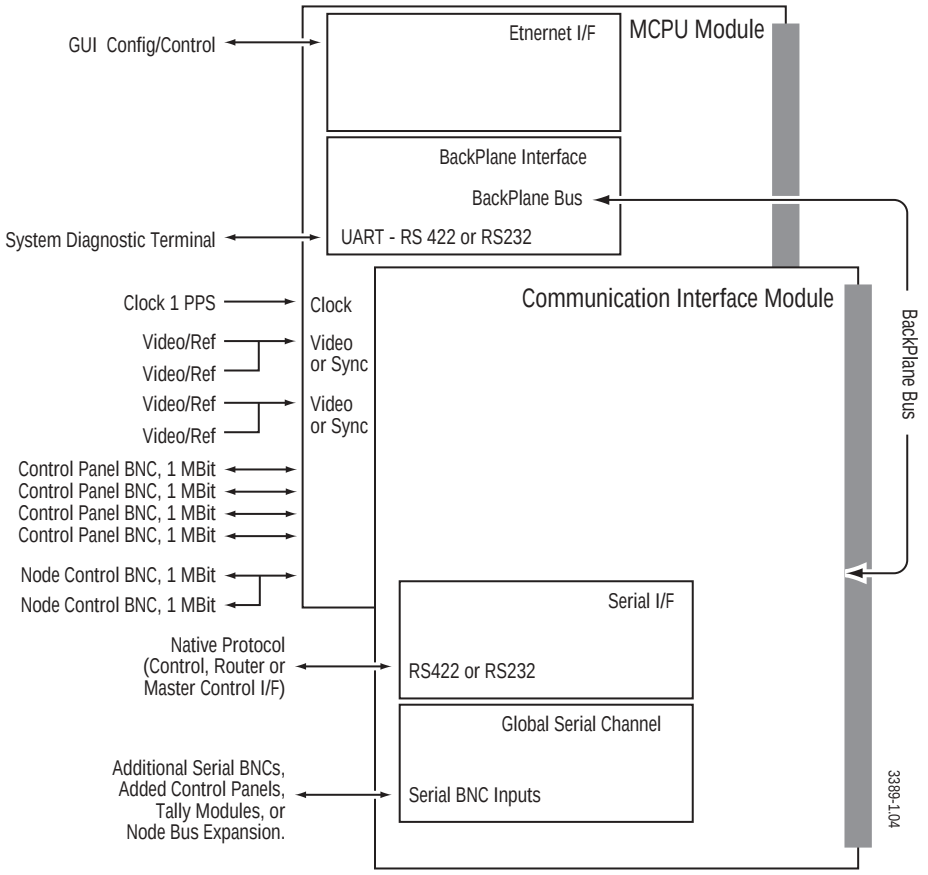
In expanded systems, the primary and redundant MCPU pair is located in a separate, stand-alone Control Frame along with up to eight (four pairs of primary and backup) optional Communication Interface (CIF) modules. Each CIF module in a pair mounts four mezzanine boards, identical in hardware and programming to the four mezzanine boards mounted on the other CIF in the pair.

In expanded systems (Figure 1-3), the MCPU performs the following functions:

- Controls the system; maintains the system configuration in RAM and Flash ROM. Communicates with the GUI through an Ethernet Mezzanine board. This Ethernet connection is for local, dedicated use only. The system may not be connected to a network.
- Through a Backplane Interface mezzanine board, drives a (frame internal) bus to interface the MCPU to the CIF module pairs.

- Accepts a one-pulse-per-second master clock input to synchronize the MCPU real time clock. If a clock is not connected, the Series 7000 will provide its own. System time is initially set through the Diagnostic Terminal.
- Provides two Reference Video ports to allow the 7000 to use two different video standards. See Control Interconnect Cabling in Section 3 of the Installation Manual for further information regarding the Reference Video ports.
- Provides four control panel bus (CP Bus) BNC connectors. Each of which will support up to 16 devices (control panels, Under Monitor Displays, Machine Status Displays). Each is a 1 MBit bus implemented through coaxial cable. Maximum cable length is 1500 feet (460 meters).
- Provides Node Bus connection BNCs. 1MBit bus implemented through coaxial cable. Maximum cable length is 1500 feet (460 meters). With the MCPU in the frame, one of these BNCs extends control to the Node Controllers in other system frames (the other BNC must be terminated into 75 Ohms). If the Control Section does not have an MCPU module and the frame is being controlled by an MCPU in a different frame, this is a looping Node Bus connection. Use these connectors to input and loop the Node Bus to additional frames (or terminate the second BNC if it is the last frame in the series).
- Communicates with the Diagnostic Terminal through a UART Mezzanine board (if one is mounted on a CIF module).
- Communicates with other routers, master control switchers, or an automation system through a Serial I/F Mezzanine (if one is mounted on a CIF module).
- Communicates with additional control panels or node controllers, or with the Tally Modules of the optional Tally System, through a Global Serial Channel Mezzanine (if one is mounted on a CIF module).

Figure 1-3. MCPU Functionality in Expanded Systems



MCPU Module Battery Backup

Should the Series 7000 suffer a power failure, a battery on the Power Supply module provides backup power to MCPU Static RAM. While the module remains in its frame, the battery will sustain crosspoint status and protect status for approximately six hours (on a full charge).

Note This does not apply to the 64x64 DV Series Power Supply module.

Removing the MCPU module from the frame disconnects battery backup causing:

- Loss of matrix crosspoint status
- Loss of protects and assignments
- MCPU cold-start on re-installation

If the system contains a redundant MCPU, the cold-started MCPU module will become the back-up MCPU. The new back-up MCPU will be restored to its original status by the now-active MCPU (which formerly had been the backup MCPU before the cold start-up.)

If there is no redundant MCPU, a re-started MCPU will regain crosspoint status from the system Node Controllers but protect and assignment status will not be restored.

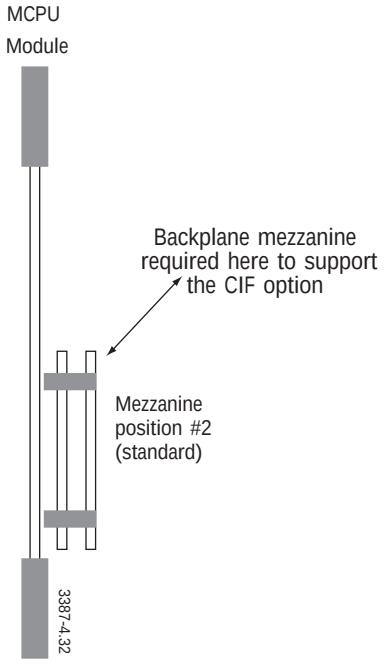
Refer to the Power Up section of the *Installation Manual* for specific instructions regarding the backup battery on the Power Supply module.

Communications Interface Modules and Mezzanine Boards

Communications Interface (CIF) modules, together with mezzanine boards of various functionality, provide expansion ports for the Series 7000 Node Bus, Control Panel Bus, Source Tally Bus, and Serial Control (RS232 / 422) Bus.

Note Backplane I/F Required for CIF use. To use CIF modules in the Control Frame, the MCPU module(s) must have a Backplane Interface (BPI) mezzanine in the top (#2) mezzanine position.

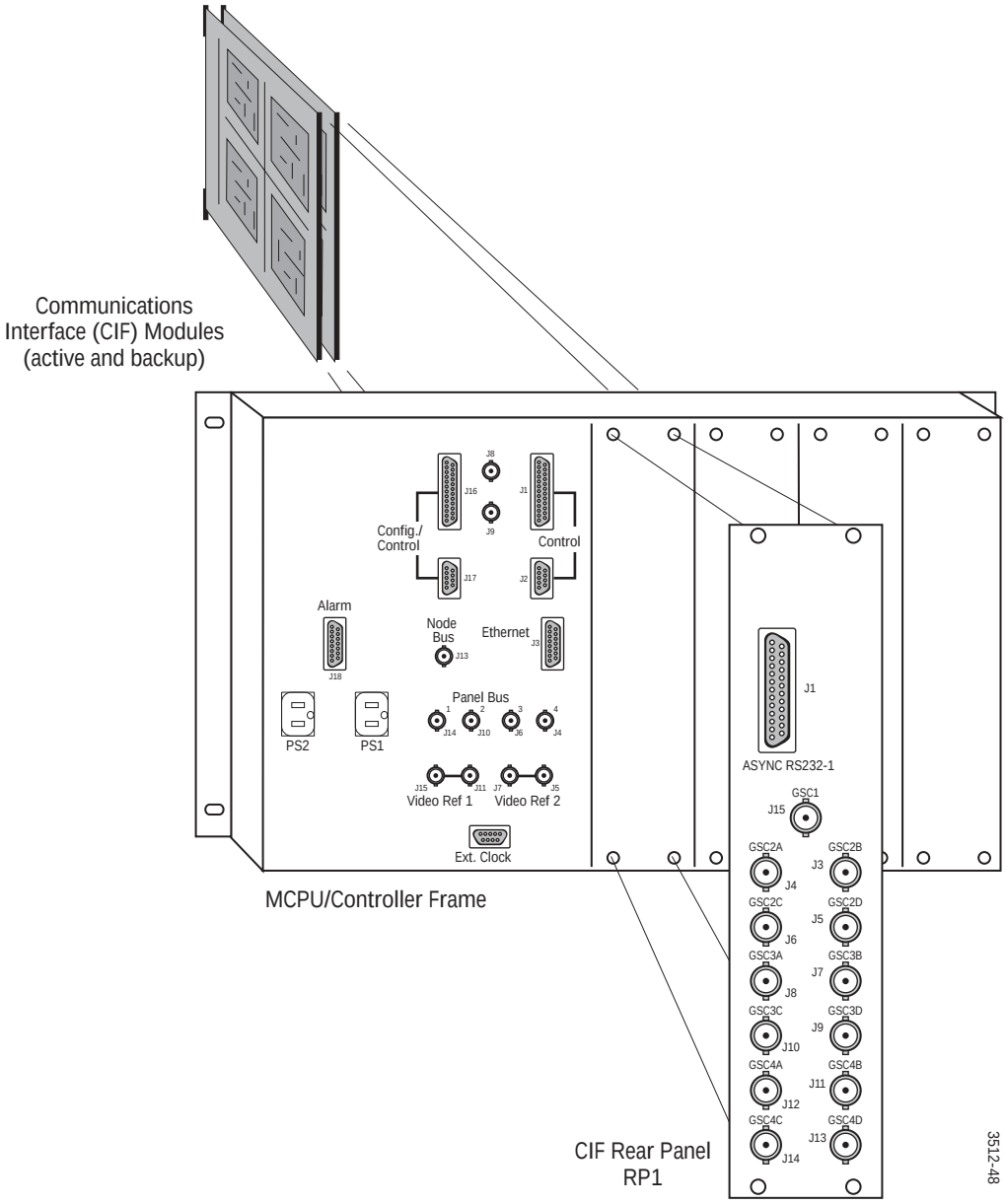
Figure 1-4. MCPU BPI Mezzanine Position



CIF Components

The CIF option is installed in the MCPU / Controller frame and consists of a CIF Module and a rear connector backplane assembly (see Figure 1-5).

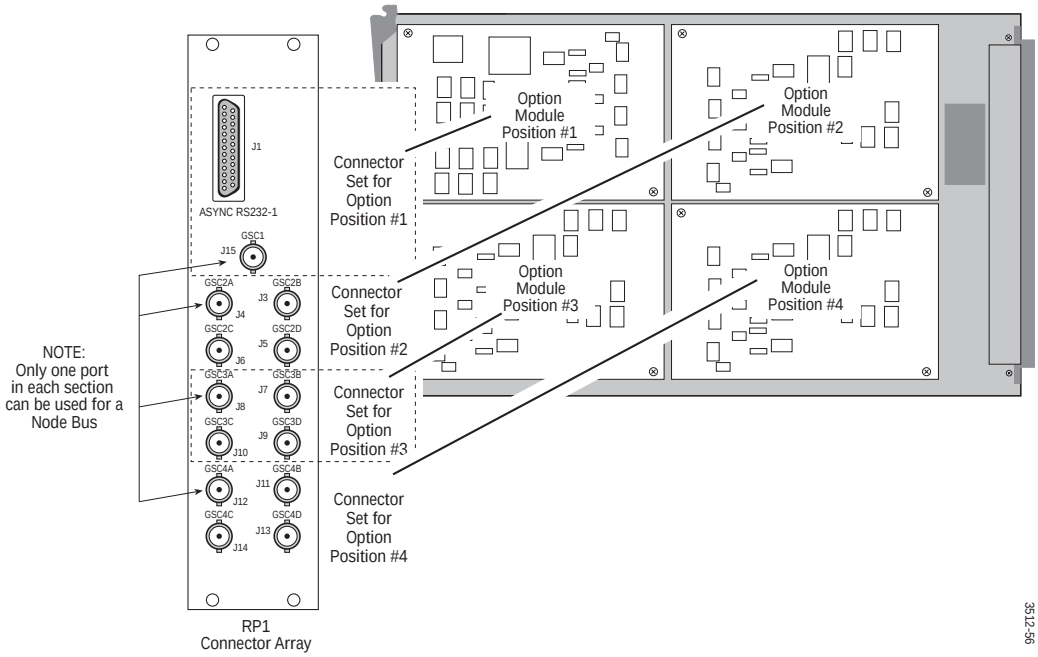
Figure 1-5. Components of the CIF Option



Mezzanine Board and Connector Array Options

The CIF Module is an option motherboard divided into four sections. Each section accepts a mezzanine card supporting a particular type of interface. The Rear Panel (RP) connector channel provides four corresponding groups of connectors. How the connectors function is determined by the type and version of mezzanine card used with the specific group, and by configuration using the GUI. Figure 1-6 illustrates an SMS-CIF-RP1 rear panel connector array (one of five RPs available) and associated mezzanine positions on the CIF Module.

Figure 1-6. CIF Module and Connector Array, SMS-CIF-RP1

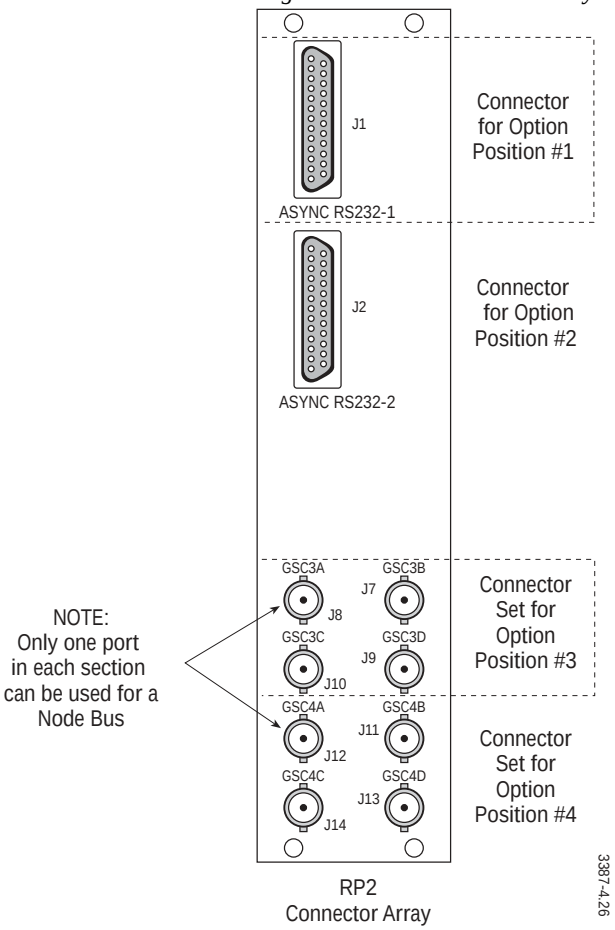


The connector array shown above (RP1) supports the following types of mezzanine cards in the appropriate CIF Module mezzanine position:

- Position 1 — SMS-SER-MZ (for RS232 / 422) or SMS-COAX-MZ (for Node or Source Tally Bus)
- Positions 2 thru 4 — SMS-COAX-MZ (for CP, Source Tally, or Node Bus)

Figure 1-7 illustrates the SMS-CIF-RP2 connector array for use with two Serial Mezzanine and two Coax Mezzanine cards on the CIF module.

Figure 1-7. RP2 Connector Array



The connector array shown above (RP2) supports the following types of mezzanine cards in the appropriate CIF Module mezzanine positions:

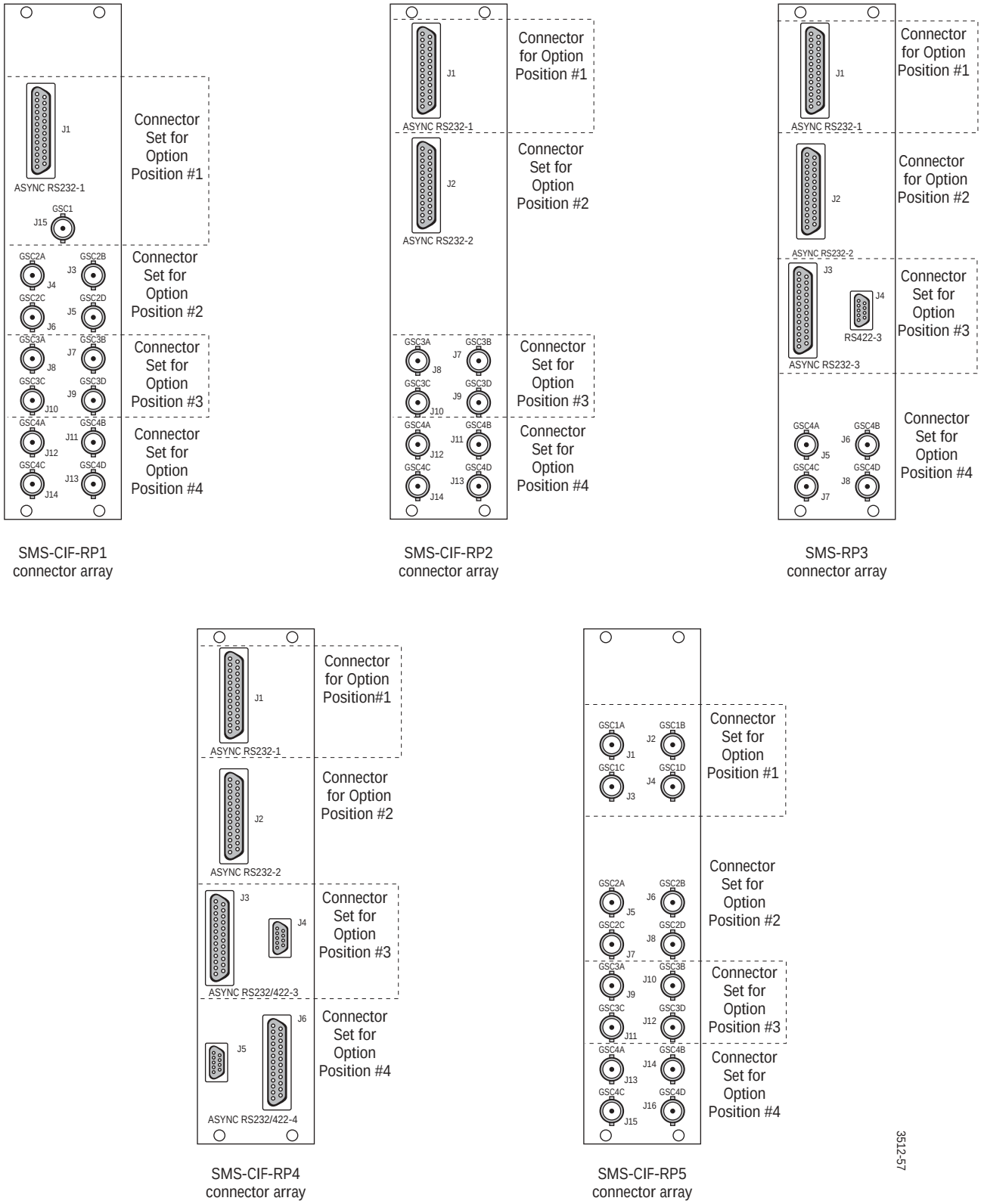
- Position 1 and 2 — SMS-SER-MZ (for RS232 / 422)
- Positions 3 and 4 — SMS-COAX-MZ (for CP, Source Tally, or Node Bus)

The Figure 1-1 shows each RP type and the connector groups provided.

Table 1-1. Rear Panel Connector Arrays

Rear Panel Type	Position 1	Position 2	Position 3	Position 4
SMS-CIF-RP1	SER/Coax	Coax	Coax	Coax
SMS-CIF-RP2	SER	SER	Coax	Coax
SMS-CIF-RP3	SER	SER	SER	Coax
SMS-CIF-RP4	SER	SER	SER	SER
SMS-CIF-RP5	Coax	Coax	Coax	Coax

Figure 1-8. Rear Panels - RP1 through RP5



Controllers

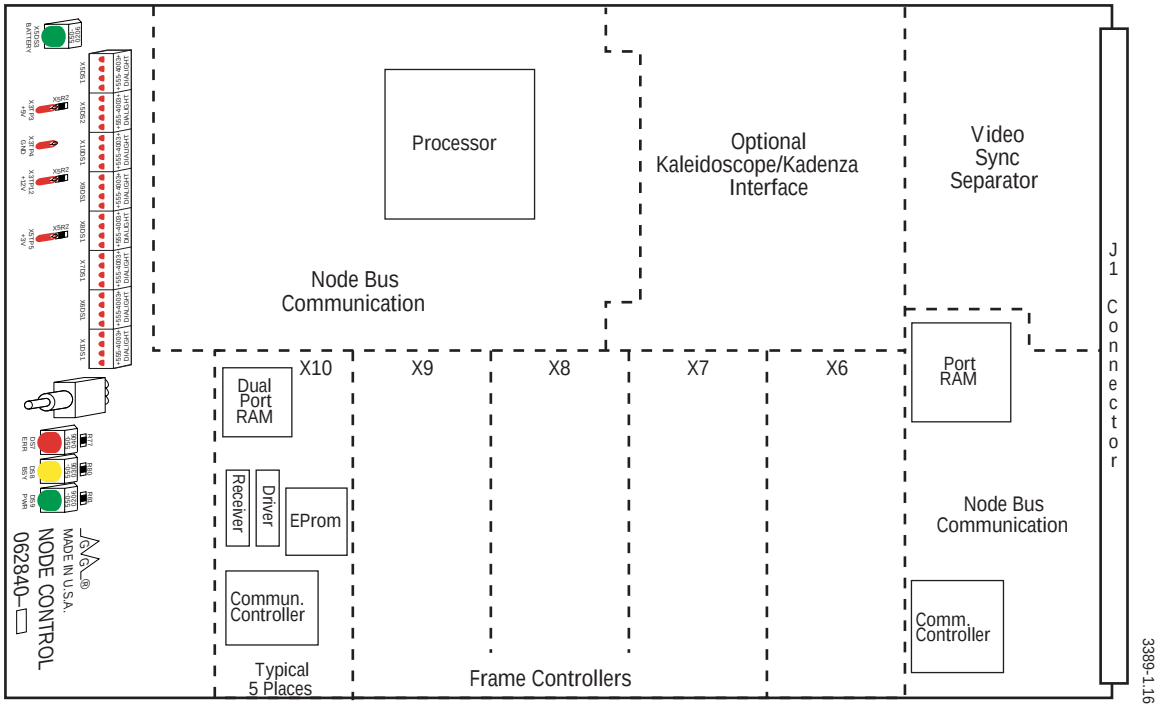
The MCPU interfaces with four types of Controller module; Node Controller, Enhanced Node Controller, Matrix Controller (see *7500 Series Instruction Manual*), and HD32x32 Controller (see *7000-HD Instruction Manual*). Controller modules translate high speed messages from the MCPU into a language understood by the signal processing modules.

Node Controller

There are four functional sections on each Node Control Module:

- Node Bus Communication: Communicates with the MCPU.
- Frame Controllers: The Frame Controller circuits distribute the MEC control buses (A, B, C, D, and E) to modules within the frame.
- Video Sync Separator: Separates the sync pulses from the incoming video reference. This reference should be from the same source as one of the two reference inputs to the MCPU so that the two are synchronized. The reference applied to the Node Controller will be used to time switching for all signal processing modules controlled by that Node Controller.
- Kaleidoscope / Kadenza interface submodule (optional): Provides video effects units direct access to control a block of inputs and outputs, allowing the 7000 to function as a source selector for the effects unit.

Figure 1-9. Functional Areas of the Node Control Module



Functionality

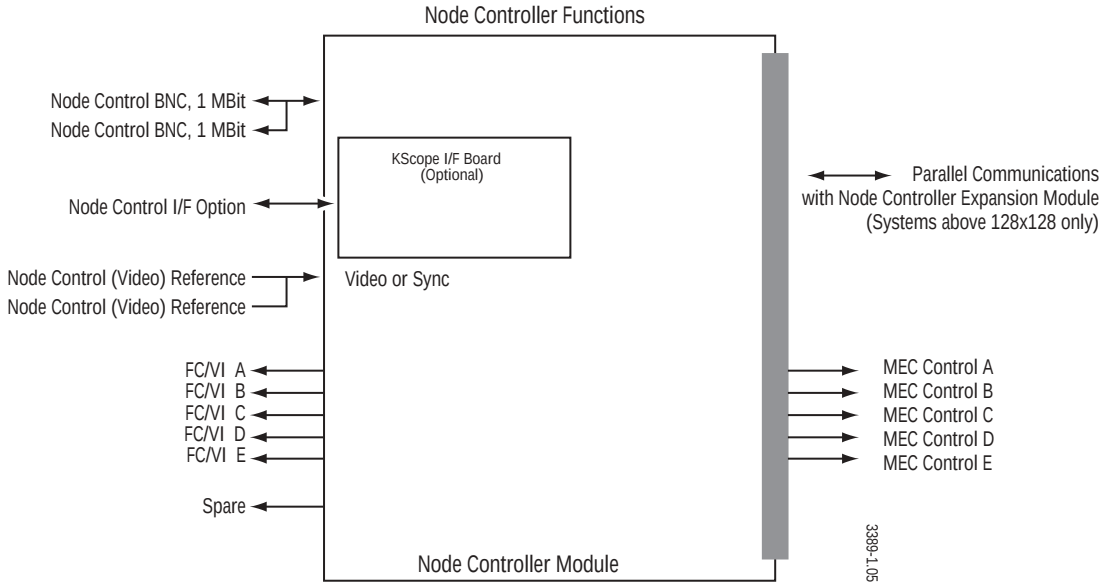
Node Controller Modules provide a control interface between the system MCPU and signal processing modules. They receive control information from the MCPU, translate it, and disseminate it to the signal processing modules within the frame. In addition to control, the Node Controller uses these paths to monitor the presence and health of signal processing modules.

Node Controllers can function individually. However, it is recommended that they be used in failure resistant pairs. Thus one will be the Primary Node Controller and the other will be a Backup – ready to assume control if the Primary fails.

Node Controller input/output ports include:

- Node Bus: 1Mb bus implemented through coaxial cable and BNC connectors. Maximum cable length is 1500 feet (460 meters). With the MCPU in the frame, this bus extends control to Node Controllers in additional system frames. If the MCPU is in a control frame, the bus is is looped to additional frames. In all cases, the Node Bus must be terminated with a 75 Ohms terminator.
- Node Control I/F: This is a direct control port intended to allow Kaleidoscope and Kadenza Digital Effects Units to use the Series 7000 as a Source Selector. See Section 4 of the *Series 7000 Installation Manual* and Section 6 of the *Series 7000 Configuration Manual* for additional information.
- Node Control (Video) Reference: These two BNCs form a looping input for the video or sync input from which the Node Controller derives its switching information. All signal processing modules controlled by a particular Node Controller will use the same reference.
- MEC Control Buses A - E: These are the internal buses over which the Node Controller controls and monitors the matrix elements. Buses A, B, D, and E each access modules associated with a specific block of 32 system outputs. Bus C controls the circuits on the input modules which buffer incoming digital inputs or determine whether incoming analog video signals are DC coupled or are DC restored.
- FC/VI Ports: In systems that are expanded using Node Controller Expansion frames the access to the internal MEC buses is then through the FC/VI ports on the frame connector channel.
- Spare: This connector is reserved for future use.
- Parallel Communications: This is an internal, parallel control bus which allows the Node Controller to communicate with a Node Control Expansion module in systems larger than 128x128 which employ a Node Control Expansion frame.

Figure 1-10. Node Controller Input and Output Buses



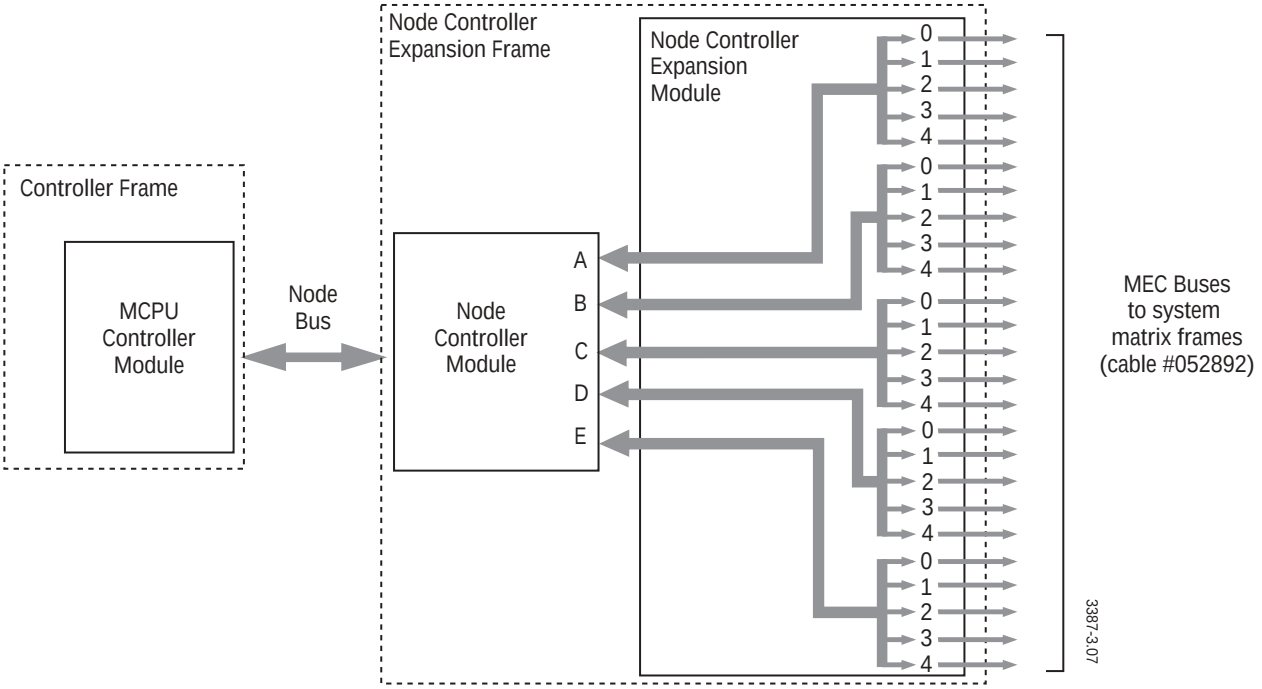
Controller Expansion Module

When system size exceeds the input and output limits of its individual frames, it is necessary to expand the MEC bus capacity of the Node Controller modules to distribute the same MEC signal to multiple frames. For example, in a 256x128 system (created using two SMS-V128x128 frames); there are 128 outputs, but they occur in three places—once in each of two 128x128 primary frames, and again in the secondary frame. The Node Controller Expansion module accepts the MEC buses from a Node Controller module and duplicates each five times. The duplicated buses can then be connected to matrix frames as needed through the FC / VI ports on the individual frame rear connector channels.

When Node Control expansion is required, Node Controller modules (and accompanying Node Controller Expansion modules) are located in a Node Control Expansion frame separate from the individual signal processing frames. Each Expansion frame is divided into Left and Right sections. Each section supports a failure resistant pair of Node Controller modules and a failure resistant pair of Node Controller Expansion modules. Thus, each section provides twenty-five MEC buses – five blocks of five duplicates of each of the original Node Controller MEC buses.

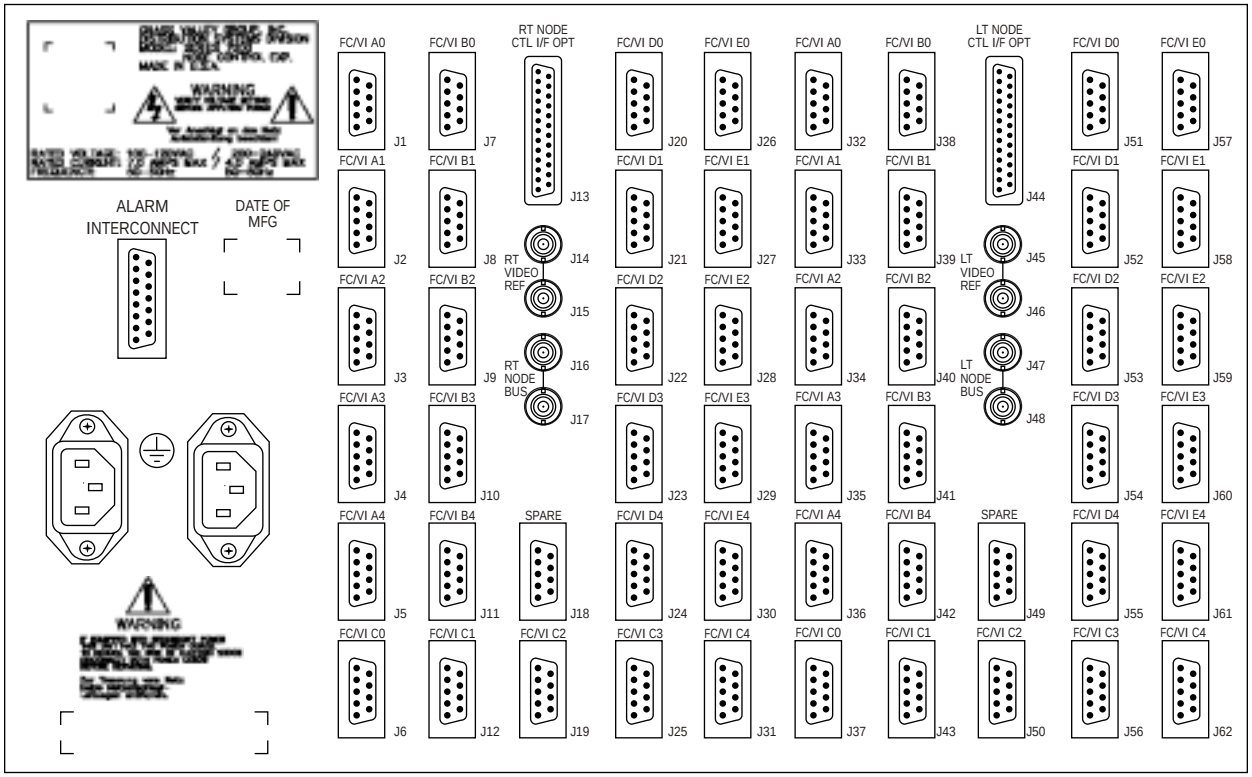
There are five sets (five ports each set) of output multi-wire connections sending signals to the matrix elements. Maximum cable length is 50 feet (15 meters). The Figure 1-11 illustrates the function of the Node Controller Expansion Module.

Figure 1-11. Node Controller Signal Expansion



The rear connector channel of the Node Control Expansion frame is illustrated in Figure 1-12.

Figure 1-12. Node Control Expansion Frame Connectors



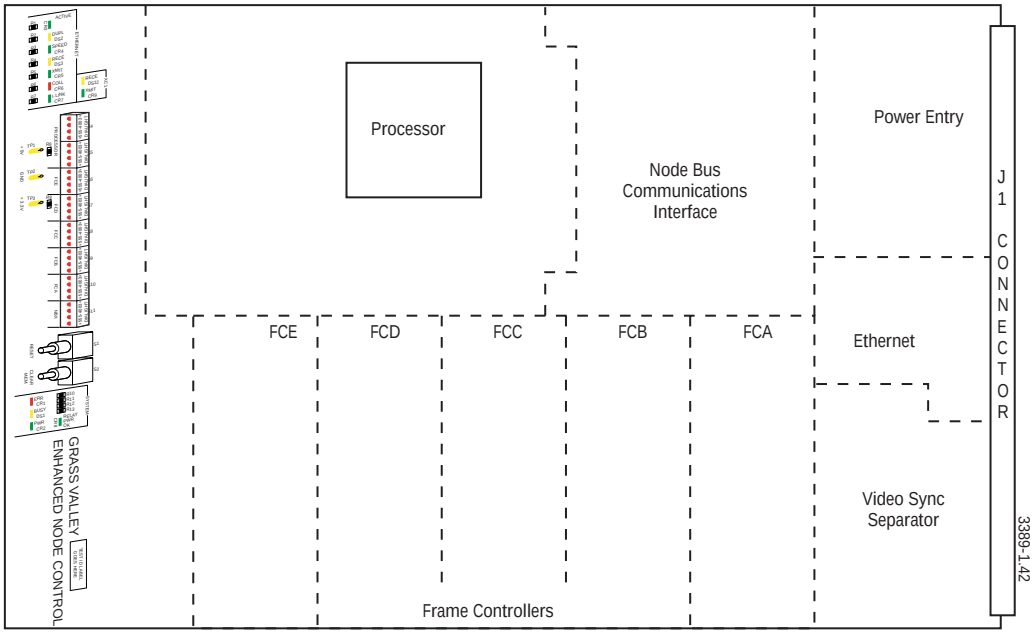
Enhanced Node Controller

The Enhanced Node Controller (ENC) is the replacement for the Node Controller. It functions exactly the same as the Node Controller and provides a connection for Dual Control of a matrix. It will not work with a Kscope mezzanine. The ENC is designed to be used with future upgrades to the Series 7000 System.

There are four functional areas on an Enhanced Node Controller:

- Node Bus Communication Interface: Communicates with the MCPU.
- Frame Controllers: The Frame Controller circuits distribute the MEC control buses (A, B, C, D, and E) along internal paths to modules within the frame.
- Ethernet Communications: 10 / 100 baseT
- Video Sync Separator: Separates the sync pulses from the incoming video reference. This reference should be from the same source as one of the two reference inputs to the MCPU so that the two are synchronized. The reference applied to the Node Controller will be used to time switching for all signal processing modules controlled by that Node Controller.

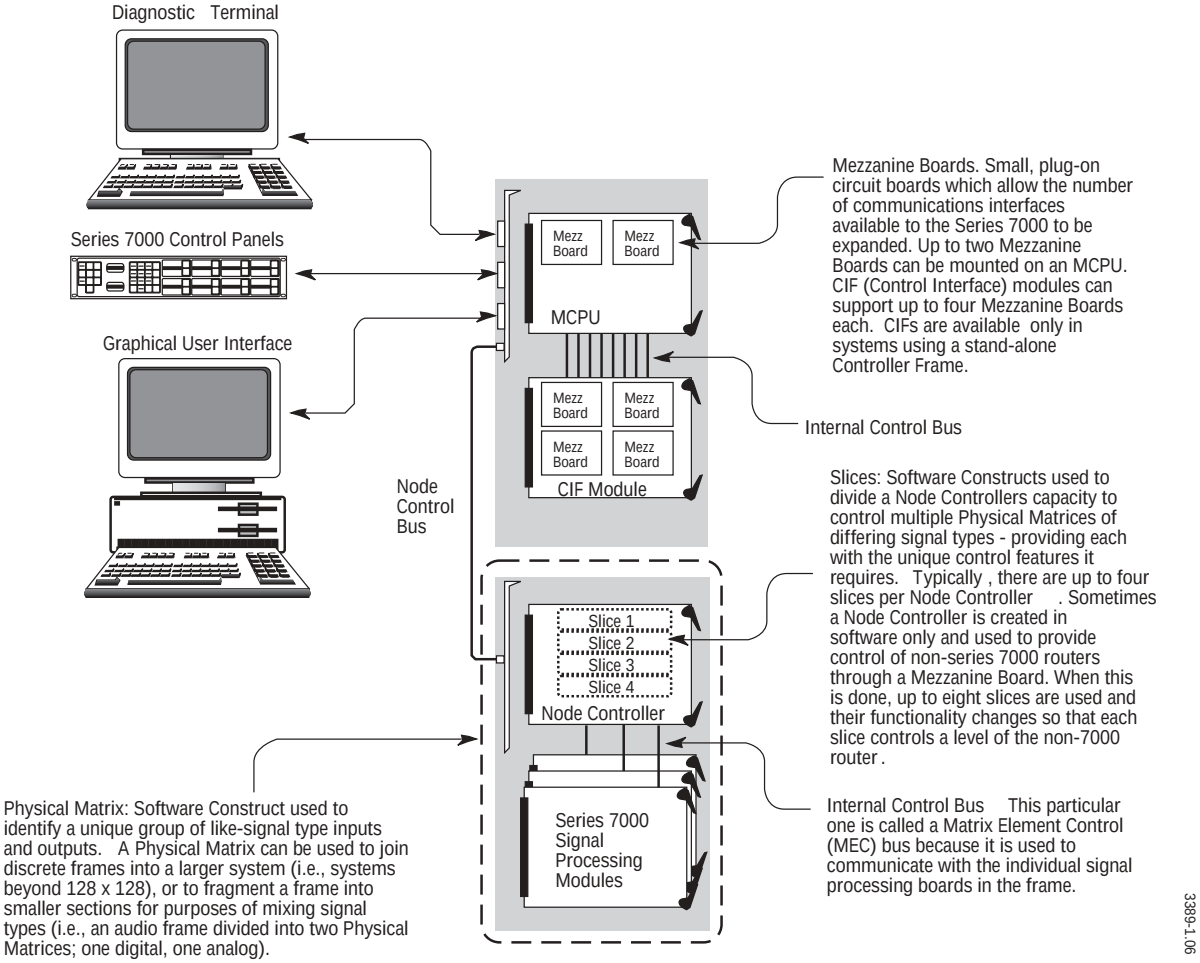
Figure 1-13. Functional Areas of the Enhanced Node Control Module



System Software

To understand the way the Series 7000 control system works, it is necessary to consider some of the software constructs which the MCPU uses to manipulate hardware.Figure 1-14 addresses some of these software constructs and the way they interact with hardware.

Figure 1-14. Control System Software Constructs



Physical Matrices

A routing matrix can extend across more than one discrete signal-processing frame. For instance, in a 256x256 video system, there are four 128x128 video frames. The MCPU needs a way to address these frames as one system. To accomplish this, the frames are made part of a single software construct called a Physical Matrix. A Physical Matrix defines the total input/output size of a matrix of like-signal types (i.e., video). Refer to the *Series 7000 Configuration Manual* for more detailed information about Physical Matrices.

Slices

At times, a single Node Controller is used to control more than one Physical Matrix. For instance, a system might have a D1 video Physical Matrix and a D2 video Physical Matrix. To handle both of these, the Node Controller capacity is divided into two software constructs called slices – one for each Physical Matrix. A Node Controller controlling a Series 7000 can be divided into a maximum of four slices.

Emulated Node Controllers

The Series 7000 can interface to and control other routing switchers including Grass Valley Horizon systems, and some other manufacturers' routers. One of the ways in which this is accomplished involves constructing a Node Controller in software only, called an Emulated Node Controller. The non-Series 7000 router is then controlled, through a Serial I/F Mezzanine board, according to the parameters defined in the Emulated Node Controller software construct (which resides in MCPU RAM as does the entire system configuration).

Emulated Node Controllers can be divided into as many as eight slices. Each slice is used to control a Level of a non-Series 7000 router.

Virtual Matrices

In some situations, it is desirable to restrict certain sources to selection by only certain destinations. For instance, if some of the inputs and outputs of a video matrix were R, G, B while others were composite, the system could be set up so that the R, G, B sources could only be routed to the R, G, B destinations. Virtual Matrices are software constructs to which inputs and outputs can be assigned on a one-by-one basis. Only destinations assigned to a Virtual Matrix can access the sources assigned to that Virtual Matrix. Refer to the *Series 7000 Configuration Manual* for more detailed information about Virtual Matrices.

Analog & Digital Video

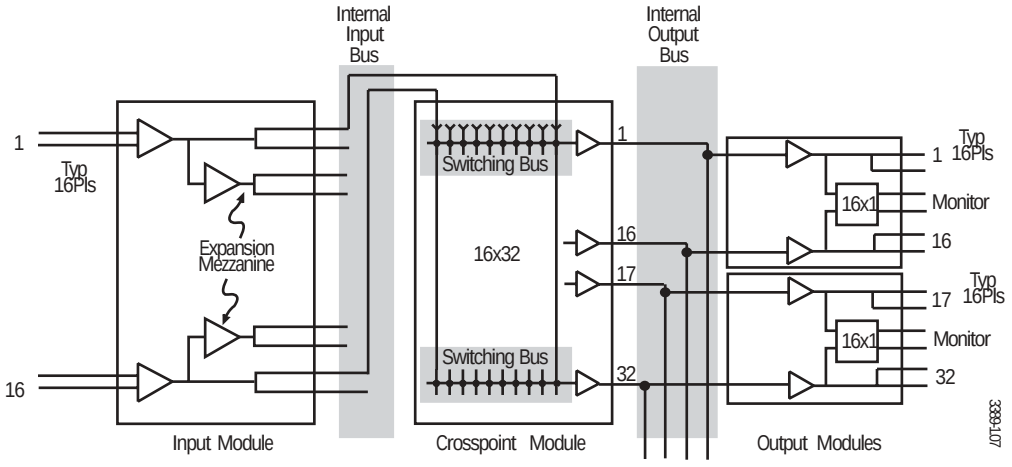
Series 7000 frames have grounded BNC connectors to reduce EMI.Grounding fingers can be removed if the frame is used only for analog video with differential inputs.) Series 7000 High Density DV Series frames are always grounded. Each type of matrix is composed of three module types: a 16-channel input module, a 16-input by 32-output crosspoint module, and a 16-channel output module. These capacities are doubled in modules used in High Density DV Series systems (32-channel input modules, 32-input by 64-output crosspoint modules, and 32-channel output modules). A digital input passes through a serial digital set of these three modules while an analog signal passes through a wideband analog set. (High Density Serial Digital Video systems do not support analog signals.)

Analog System Level Architecture

Classic Compact 16x16 and 16x32 Systems

The smallest Classic Video Matrix configuration is one Video Input module, with 16 inputs, feeding a single 16x32 Crosspoint module. The Input module buffers and equalizes 16 input signals, and places them on two balanced internal input buses. A single Crosspoint module receives the input signals and distributes them to 32 switching buses, each 16-by-one. The Crosspoint module, at its output, sends the selected signal on an internal output bus that can receive signals from up to two Crosspoint modules per bus. This internal bus hands off one selected signal per bus to one channel of an Output module. A single Output module is required, if the system is limited to 16 outputs, and two Output modules are necessary for a 32 output configuration. The Output modules receive a selected signal from each of the internal buses and produce two 75 Ohm signals at each of 16 outputs and one balanced feed to an internal video monitoring bus.

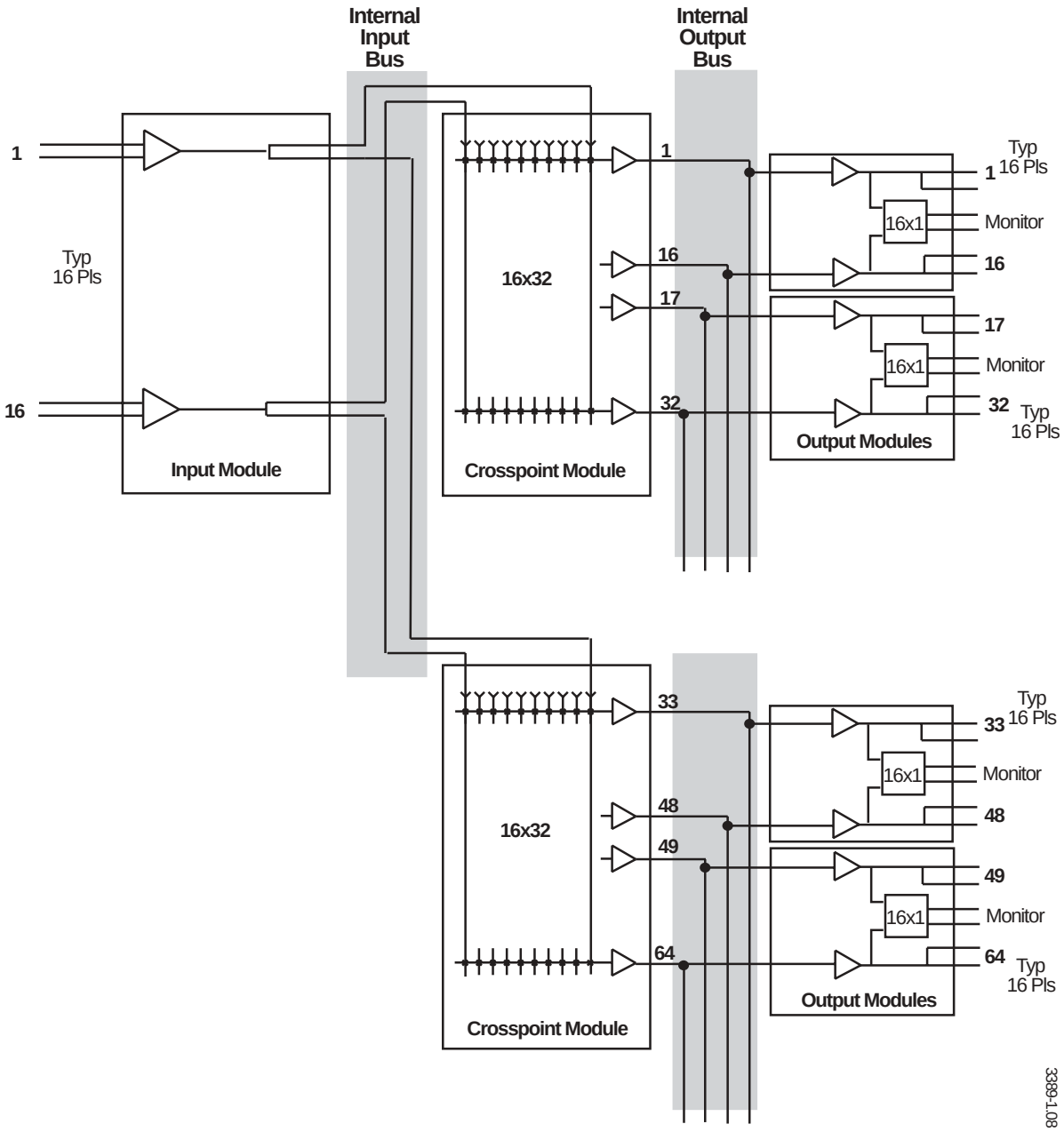
Figure 1-15. Small System Configuration (16x32)



Classic Compact 16x64 System

Output expansion is achieved by busing each input to multiple crosspoint / output groups (see internal input bus, Figure 1-16). A 16x64 Classic Video Matrix requires one Input module to buffer and equalize the 16 input signals; however, two outputs from each input channel are sent to the two Crosspoint modules required. The second Crosspoint module drives 32 additional internal buses, producing a total of 64 crosspoint module outputs. Because there are now 64 internal buses from the two Crosspoint modules, four Output modules are required to drive the 64 output pairs.

Figure 1-16. Small System Configuration (16x64)



System Level Architecture (Digital)

The following section describes the frame level architecture of various Series 7000 digital Video matrices. Specific motherboard or backplane requirements are described also.

Classic Compact 64x64 System

The Classic Compact 64x64 Video system requires four Input modules, eight Crosspoint modules, and four Output modules. The motherboard of the Compact 64x64 matrix uses balanced paths with impedance controlled traces. The path length between Input modules and Crosspoint modules, and Crosspoint modules and Output Modules is equal, thereby assuring accurate input to output signal timing. The signal flow in the 64x64 system (from the input module, through the crosspoint module, to the output module) is illustrated in Figure 1-17.

Figure 1-17. Classic Compact 64x64 System Signal Flow

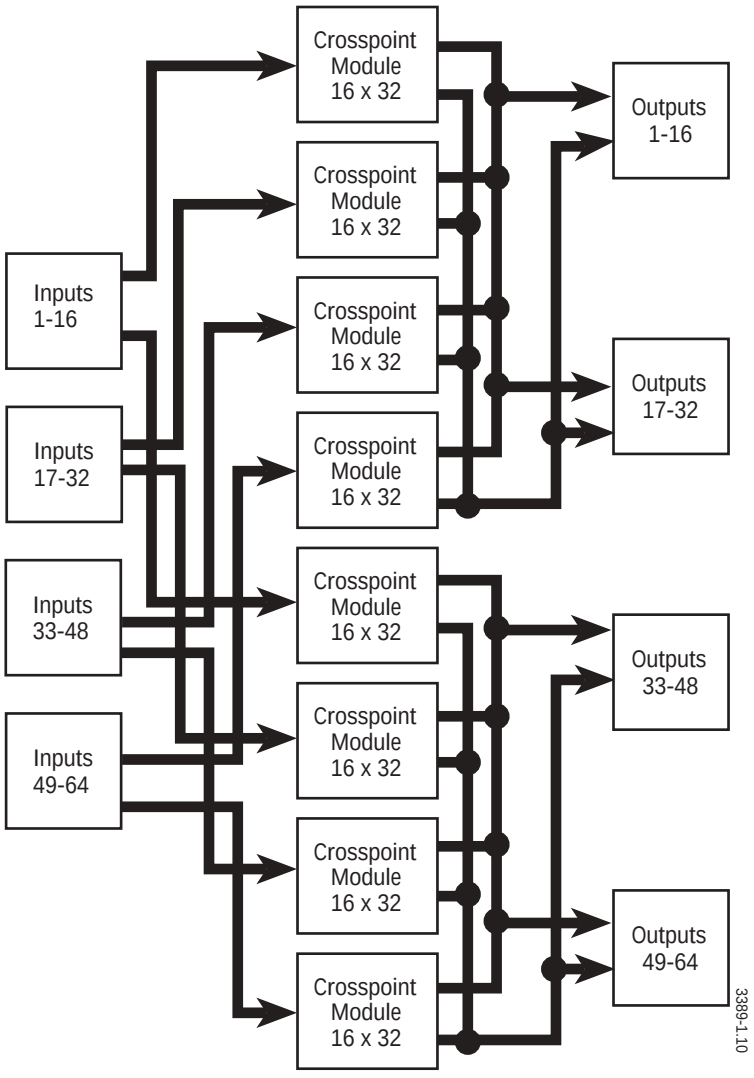
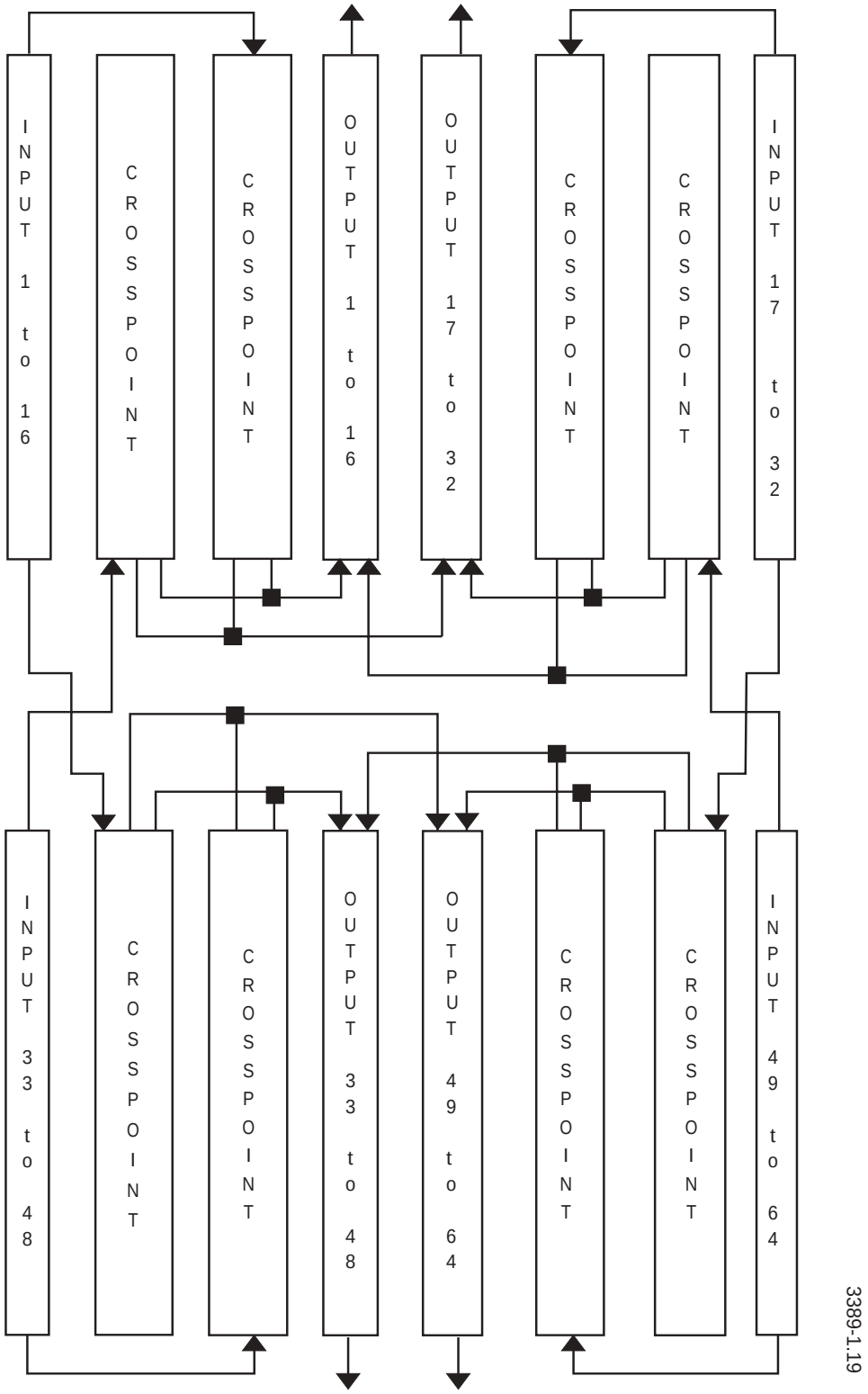


Figure 1-18 illustrates module placement and signal path through the Compact 64x64 matrix frame. All input signals are available at any output.

Figure 1-18. Classic Compact 64x64 System Signal Path



Classic Expanded 128x64 System

The Classic Expanded 128x64 matrix is populated with eight Video Input modules, 16 Crosspoint modules, and 4 Video Output modules. These modules are installed in a three-section core frame. The modules are keyed for proper insertion in their appropriate frame slot.

The motherboard of the 128x64 system uses balanced paths and impedance controlled traces. The path length between Input modules and Crosspoint modules, and Crosspoint modules and Output Modules is equal, assuring accurate input to output signal timing. However, additional Rear Video modules are required to terminate unused signal paths.

The Rear Video Input board provides 64 identical channels of input BNC connectors. A typical system with 128 inputs requires two Rear Video Input boards. The printed circuit coils match the external cable impedance to the Input board.

The Rear Video Output board provides 32 identical channels of output BNC connectors. A typical system with 64 outputs requires two Rear Video Output boards.

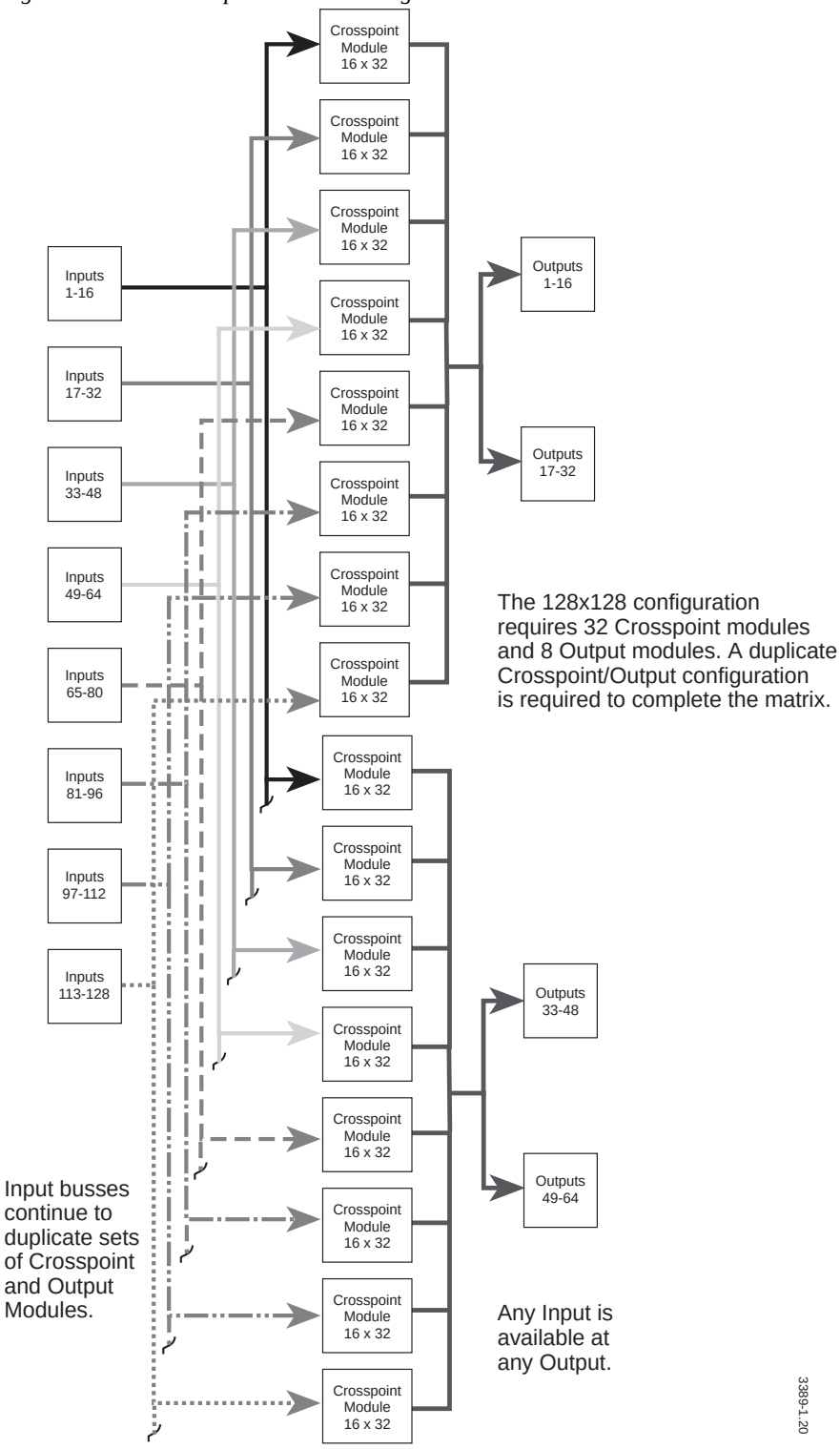
Matrices of 64 or fewer outputs require termination of internal Crosspoint and Control buses. Unused expansion frame inputs are terminated. Each of the Termination Boards has 64 input paths. Four boards are required in the expanded system. They may be used interchangeably in either the left or right side, or the top or bottom section of the frame. The Video Termination board also terminates the Crosspoint and Control bus signals.

Classic Expanded 128x128 System

A Classic Compact 128x128 Video matrix is populated with eight Video Input modules (each with input expansion mezzanines to drive four cross-point modules), 32 Crosspoint Modules, and eight Video Output modules. This system is installed in a five-section frame. Four frame sections (two top and two bottom) house Crosspoint and Output modules; the center section of the frame contains the Input modules and Control modules. Additional rear backplane interconnect boards are used to carry signals from the core section to the upper and lower expansion frame sections.

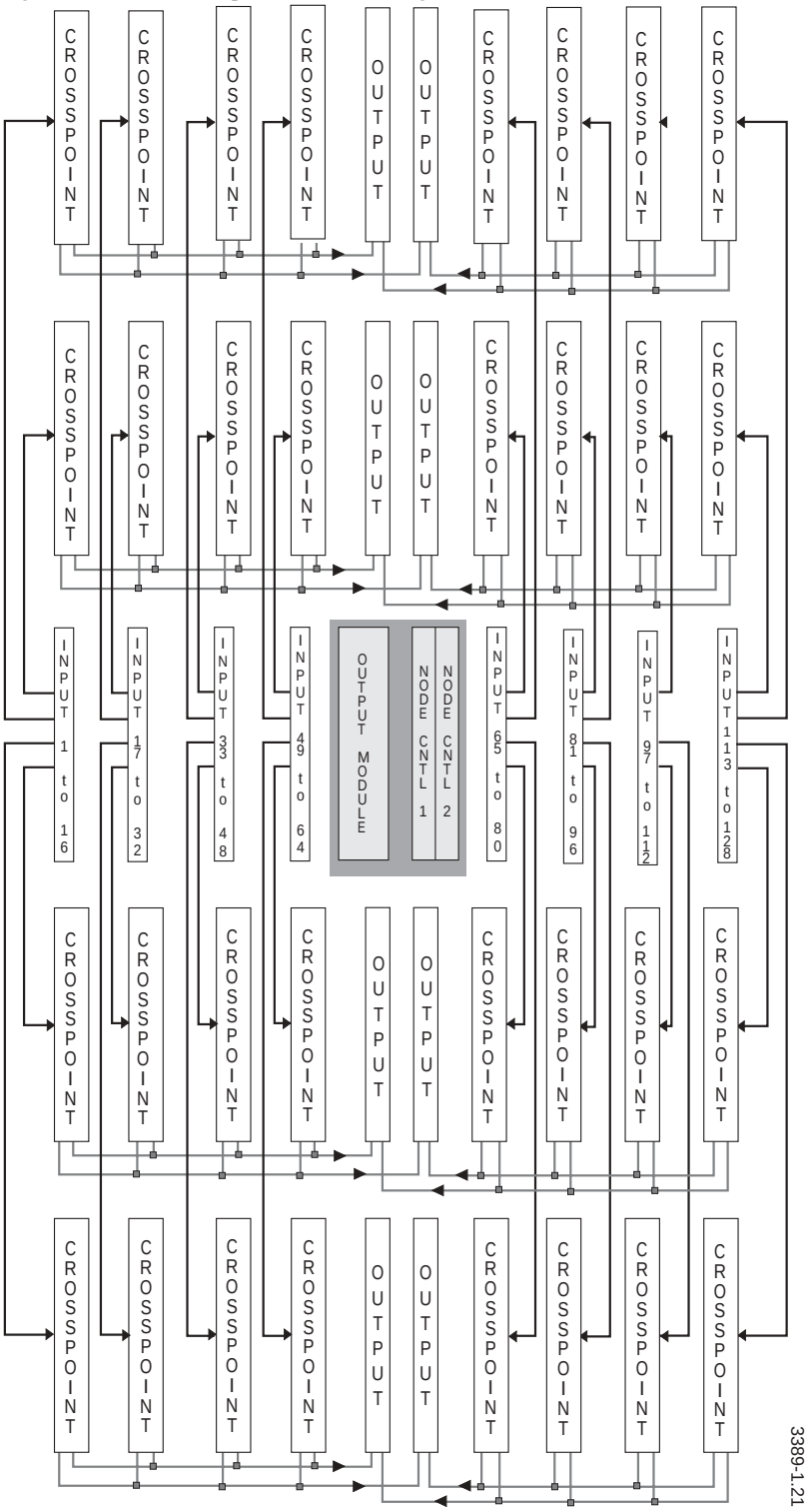
The Figure 1-19 illustrates the signal flow through a portion of the 128x128 matrix. All of the Input modules, and half of the Crosspoint Modules and Output modules are shown in the illustration.

Figure 1-19. Classic Expanded 128x128 Signal Flow



The Figure 1-20 illustrates signal path from Input, to Crosspoint, to Output module in a 128x128 matrix. The shaded area is discussed in detail in the Control section of this manual.

Figure 1-20. Classic Expanded 128x128 Signal Path



Classic Backplane Signal Transfer

Input, Crosspoint, and Output modules interface with the motherboard on the back of the frame. The Video signals are transferred from outside the frame, to the motherboard, and to output signal destinations through additional printed circuit boards.

The Rear Video Input board provides 64 identical channels of input BNC connectors. A typical system with 128 inputs requires two Rear Video Input boards. The printed circuit coils match the external cable impedance to the Input board.

The Rear Video Output board provides 32 identical channels of output BNC connectors. A typical system with 128 outputs requires four Rear Video Output boards.

Matrices with more than 64 outputs, but fewer than 129, require one or two Crosspoint / Output expansion frames to house the necessary 32 Video Output Modules. The signals from the Video Input modules pass from the three-section core frame to the expansion frames through the Rear Interconnect boards. Each Video Interconnect board has paths for 64 inputs; two boards are required for each expansion frame. The 128x128 system requires four Video Interconnect boards. These boards may be used interchangeably in either the upper or lower expansion position.

Classic External Power Supply

The expanded 128x128 matrix requires an external power supply system. A three-rack unit frame supplies DC power to the core frame via a 6 foot (2 meter) maximum length cable connected to the Rear Monitor Control board. An alarm cable, connected from the power supply to the Rear Monitor Control board, sends power supply status data to the core frame Node Controller. It will trigger an alarm indicating power malfunction should one occur.

Module Requirements for Classic Compact or Expanded Systems

Figure 1-21 may be used to determine the number of Video Input, Output, and Crosspoint Modules required for specific system sizes. Figure 1-22 provides an example.

Figure 1-21. Classic Module Requirement

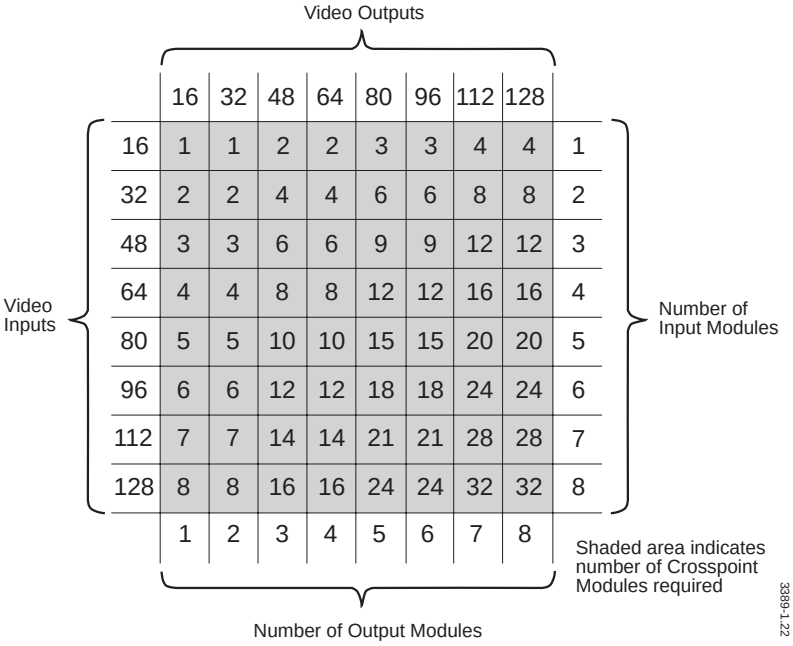
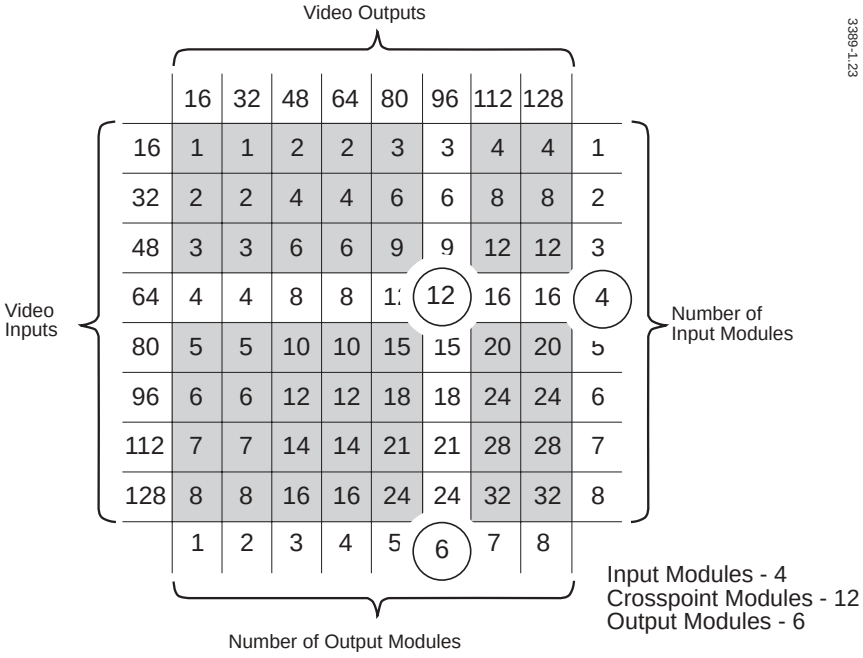


Figure 1-22. Example Configuration (64x96)



High Density 64x64 DV Series System

The High Density 64x64 Serial Digital Video (DV Series) system requires two Input modules, two Crosspoint modules, and two Output modules. All modules are keyed for proper insertion in their appropriate frame slot. The motherboard (MCPU) of the High Density 64x64 DV Series matrix uses balanced paths with impedance controlled traces. The path length between Input modules and Crosspoint modules, and Crosspoint modules and Output Modules is equal, assuring accurate input to output signal timing within acceptable limits. System signal flow (from input module, through crosspoint module, to output module) is illustrated in Figure 1-23.

Figure 1-23. High Density 64x64 DV Series System Signal Flow

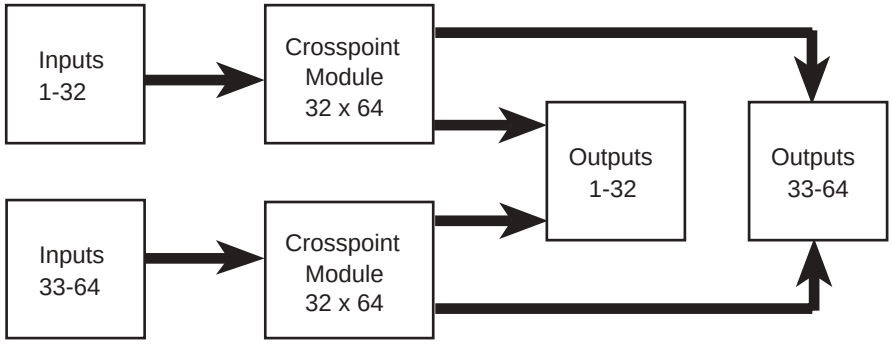
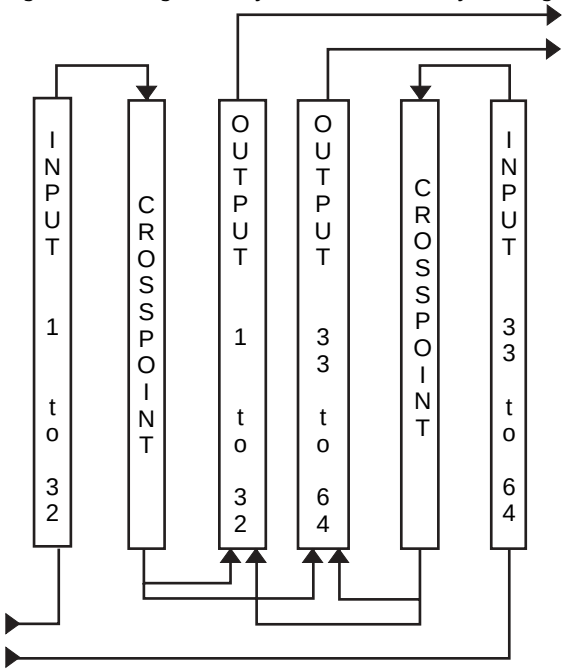


Figure 1-24 illustrates module placement and signal path through the High Density 64x64 DV Series matrix frame. As indicated, all input signals are available at any output.

Figure 1-24. High Density 64x64 DV Series System Signal Path



High Density 128x128 DV Series System

The High Density 128x128 Serial Digital Video (DV Series) system requires four Input modules, eight Crosspoint modules, and four Output modules. All modules are keyed for proper insertion in their appropriate frame slot. The motherboard of the High Density 128x128 DV Series matrix uses balanced paths with impedance controlled traces. The path length between Input modules, Crosspoint modules, and Output Modules is equal, assuring accurate input to output signal timing within acceptable limits. System signal flow (from input module, through crosspoint module, to output module) is illustrated in Figure 1-25.

Figure 1-25. High Density 128x128 DV Series System Signal Flow

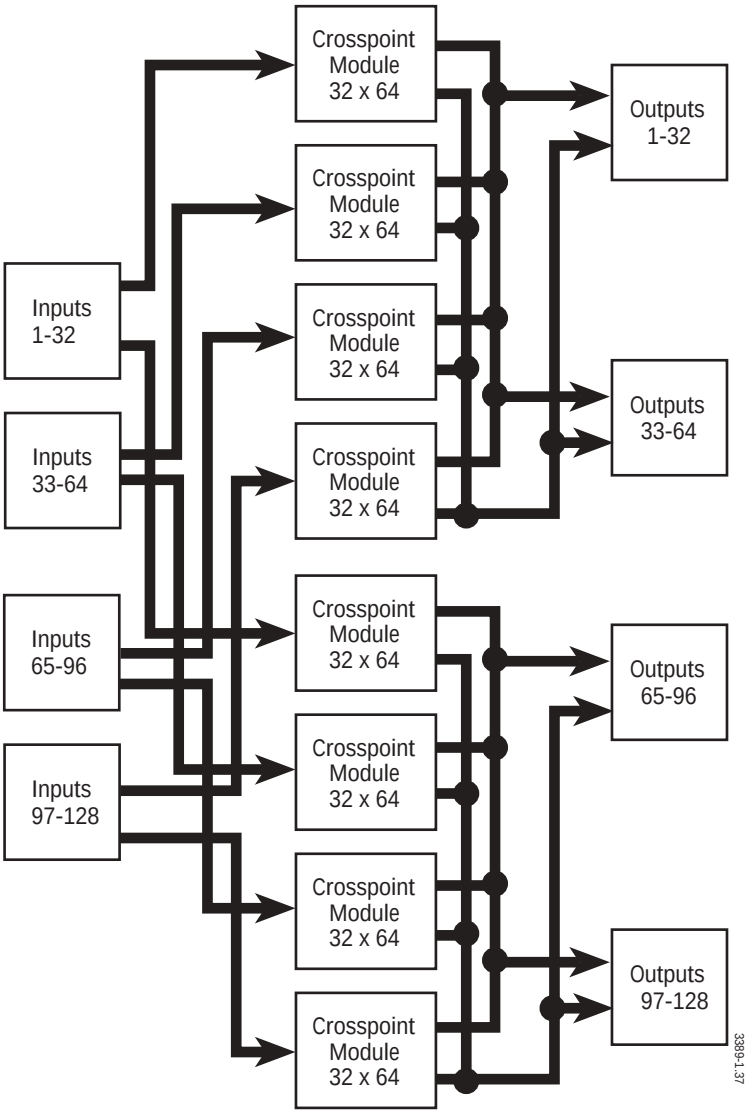
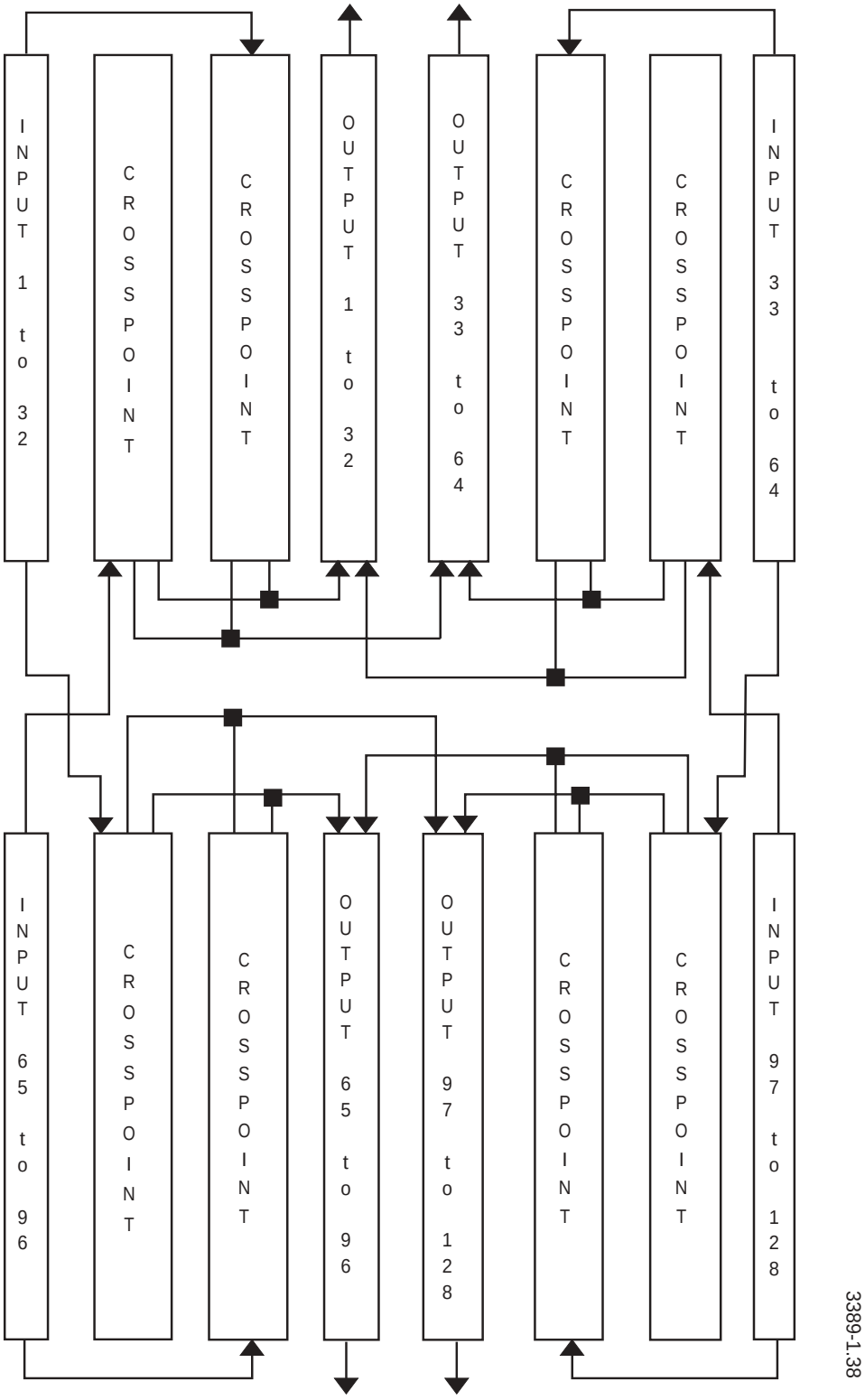


Figure 1-26 illustrates module placement and signal path through the High Density 128x128 DV Series matrix frame; all inputs are available to all outputs.

Figure 1-26. High Density 128x128 DV Series System Signal Path



High Density 256x128 DV Series System

The 256x128 matrix is populated with eight Video Input modules, 16 Crosspoint modules, and 4 Video Output modules. These modules are installed in a three-section core frame, and are keyed for proper insertion in their appropriate frame slot.

The motherboard of the 256x128 system uses balanced paths and impedance controlled traces. The path length between Input modules and Crosspoint modules, and Crosspoint modules and Output Modules is equal, assuring accurate input to output signal timing. System signal flow (from input module, through crosspoint module, to output module) is illustrated in Figure 1-27.

Figure 1-27. High Density 256x128 DV Series System Signal Flow

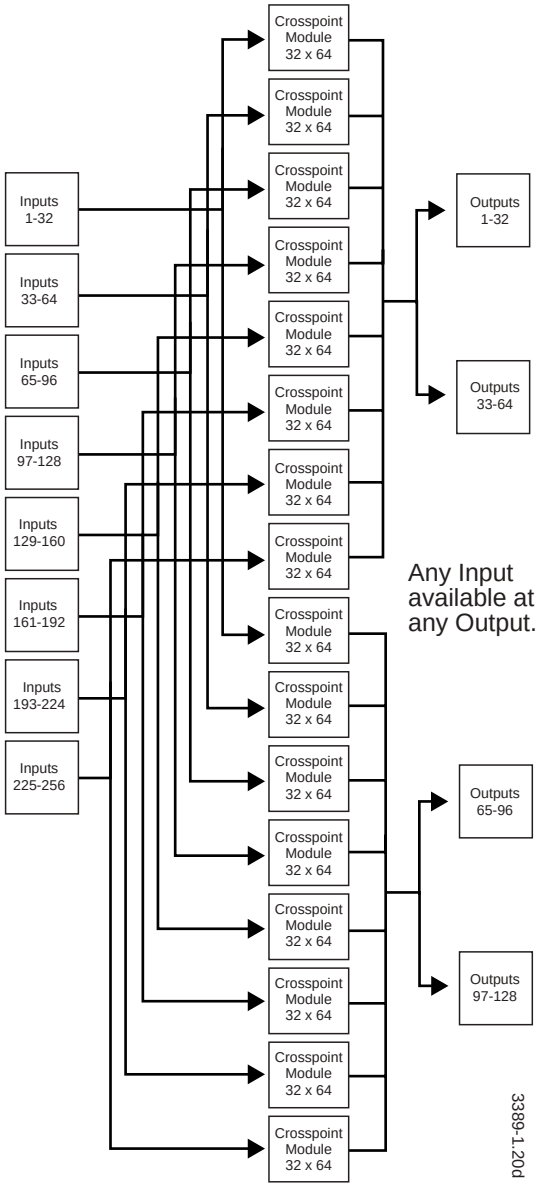
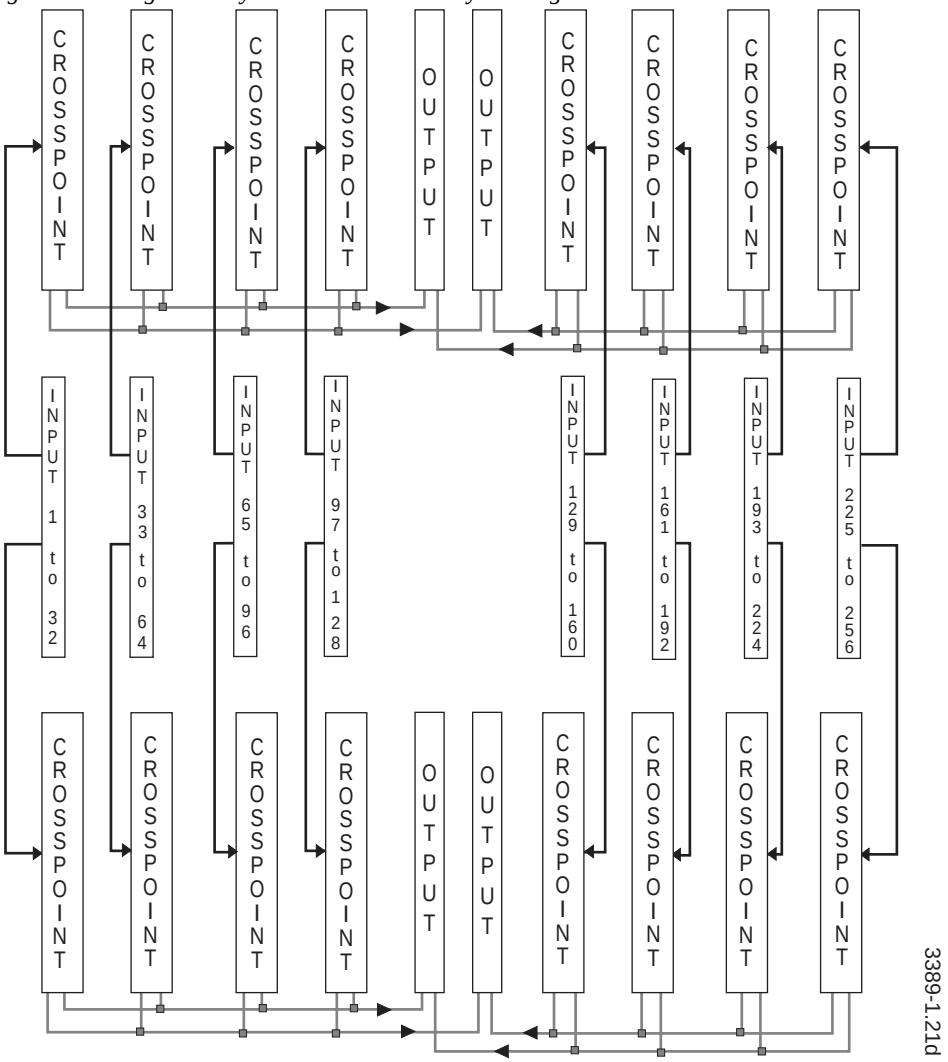


Figure 1-28 illustrates module placement and signal path through the High Density 128x128 DV Series matrix frame. As indicated, all input signals are available at any output.

Figure 1-28. High Density 256x128 DV Series System Signal Path



DV Series External Power Supply

The High Density 128x128 DV Series and 256x128 DV Series matrices requires an external power supply system. A three-rack unit frame supplies DC power to the core frame via a 6 foot (2 meter) maximum length cable. An alarm cable, connected from the power supply to the matrix frame, sends power supply status data to the core frame Node Controller, and will trigger an alarm indicating power malfunction should one occur.

Audio Systems

Series 7000 Audio Systems are designed around a 64x64 all-in-one crosspoint module; input and output circuitry resides on the same module as the crosspoint matrix. Input and output circuits are balanced.

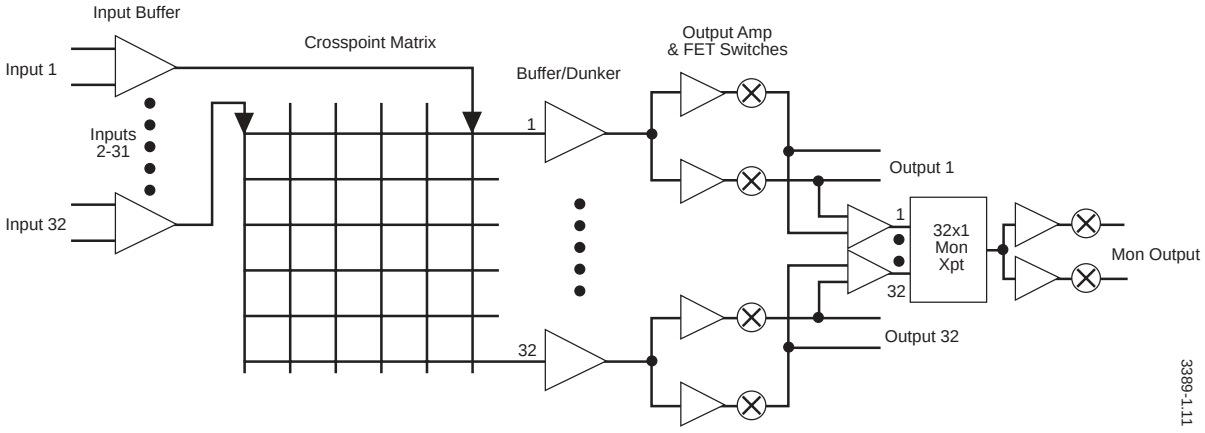
Classic Audio Module Level Architecture

The following section describes the module level architecture of Series 7000 Classic Audio systems.

Classic Analog Audio Crosspoint Module

Input impedance is 64 k Ohm (for a single module). Input signals are buffered by a balanced, common mode rejecting input stage. The 32 buffered input signals are then applied to a 32x64 crosspoint matrix. Each of the 32 output buses on the crosspoint matrix is buffered, and the signal is passed to the output amplifier circuitry. The output signal drives an operational amplifier pair which produces a 36 Ohm balanced output. The output amplifiers incorporate current limiting circuitry to withstand direct shorts in the output stage. Output expansion is accomplished by paralleling inputs. Up to 32 modules may be paralleled for a 1024 output system. (In this case, the input impedance falls to 2 k Ohm per input.) Module outputs incorporate secondary field effect transistor (FET) switching which allows input/source expansion by directly paralleling outputs. Monitor signals from each module are summed on the backplane board.

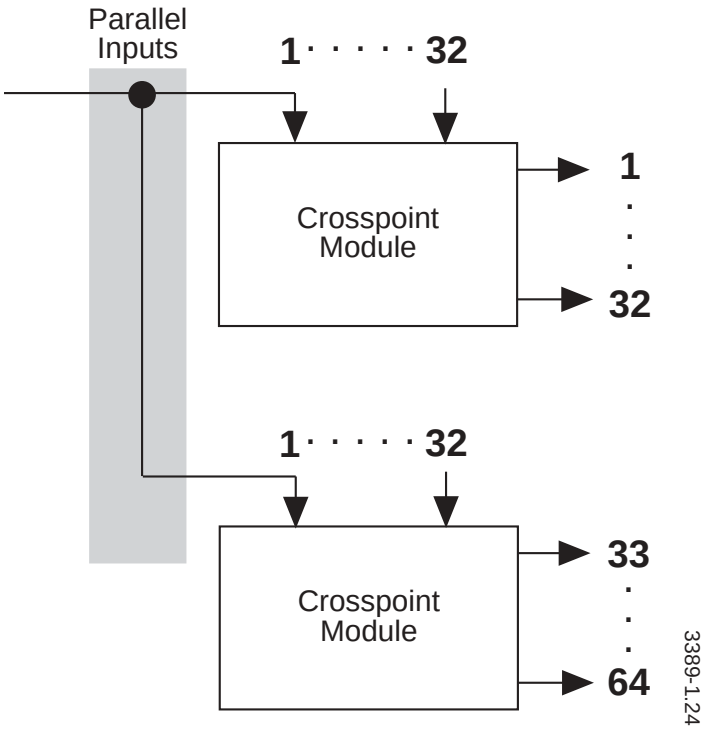
Figure 1-29. Classic Analog Audio Signal Path



Classic Audio Output Expansion

In a 32x64 Audio Matrix, all 32 input signals are paralleled on the backplane to both Audio Crosspoint Matrix modules, allowing any of the 32 input signals to be accessed by any output.

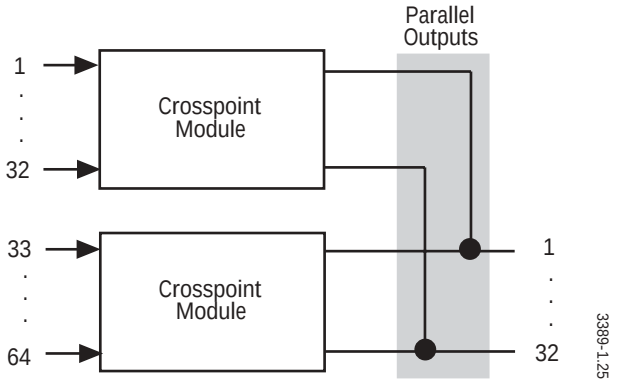
Figure 1-30. 32x64 Classic Audio System



Classic Audio Input Expansion

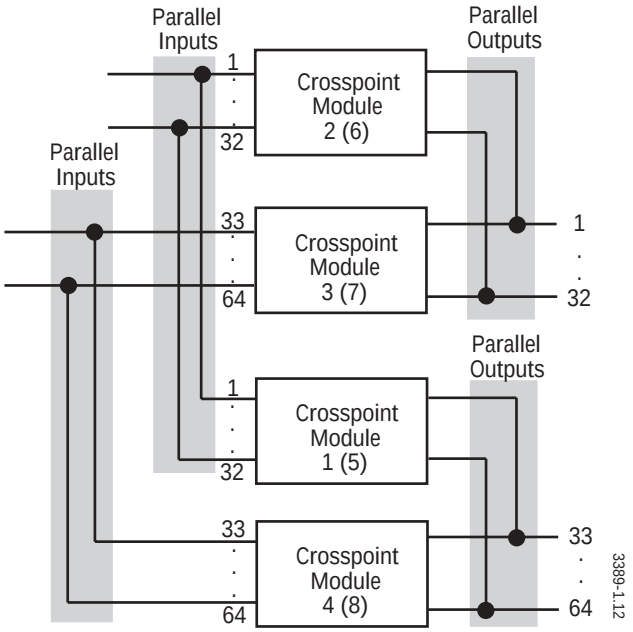
In a 64x32 Audio Matrix, the 64 input signals are sent to both Audio Crosspoint Matrix modules. The 64 outputs are bused on the backplane to output connectors 1 through 32.

Figure 1-31. 64x32 Classic Audio System



In a 64x64 Audio Matrix, input signals 1 - 32 are bused in parallel on the backplane to Crosspoint modules 1 and 2. Likewise, input signals 33 - 64 are bused on the backplane to Crosspoint modules 3 and 4. Outputs from modules 2 and 3 are bused to output connectors 1 - 32; outputs of modules 1 and 4 are bused to output connectors 33 - 64. If you have a second level of audio, the scheme repeats (module numbers in brackets).

Figure 1-32. 64x64 Classic Audio System



Classic Analog Audio Output Monitor

The Classic Analog Audio Output Monitor is capable of looking at any output bus and driving a +24dBu signal into 600 Ohms. There are four output monitors in the Quad 32x32 Audio Matrix, one for each of the crosspoint modules. Modules one and two will see the same destinations, therefore, in 2-level applications, level 1 signals will be on monitor one and two outputs while level 2 signals will be on monitor three and four outputs.

There are four output monitors in the Dual 64x64 Audio Matrix. The frame section is divided into two matrices. Modules one and two will display the same destinations, therefore, in 2-level applications, level 1 signals will be on monitor one and two outputs while level 2 signals will be on monitor three and four outputs.

There are two output monitors in the 128x64 Audio Matrix. Due to backplane busing, either monitor has access to any of the 64 outputs of the matrix. When a monitor crosspoint is selected, both monitors switch to that output.

The 128x128 Audio Matrix is essentially two 128x64 matrices with paralleled inputs. There are four output monitors in the 128x128 matrix. Due to backplane busing, either monitor has access to any of the 128 outputs of the matrix. When a monitor crosspoint is selected, all four monitors switch to that output.

Classic Audio System Level Architecture

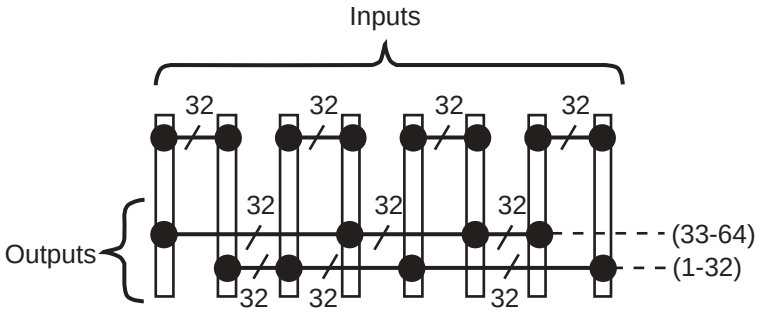
The following section describes the frame level architecture of various Series 7000 Audio matrices.

Quad 32/Dual 64 Classic Audio Matrix System

The Series 7000 Quad 32 / Dual 64Classic backplane (062923) may be configured to contain 4 levels of 32x32 audio, two levels of 64x64 audio, two levels of 32x64, or two levels of 64x32. This six-rack unit frame will hold eight audio crosspoint modules, a Node Controller with optional backup, and a Power Supply module with optional backup. The Node Controller(s) must be connected to an MCPU which resides outside of this frame.

The following illustration indicates input and output signal busing across the backplane. It also indicates the necessary crosspoint matrix modules and their frame locations for various configurations. Four levels of 32x32 audio require only four audio matrix modules; however, two levels of 64x64 audio require all eight matrix modules (see Figure 1-34).

Figure 1-33. Classic Backplane Busing and Module Placement (Quad 32/Dual 64)



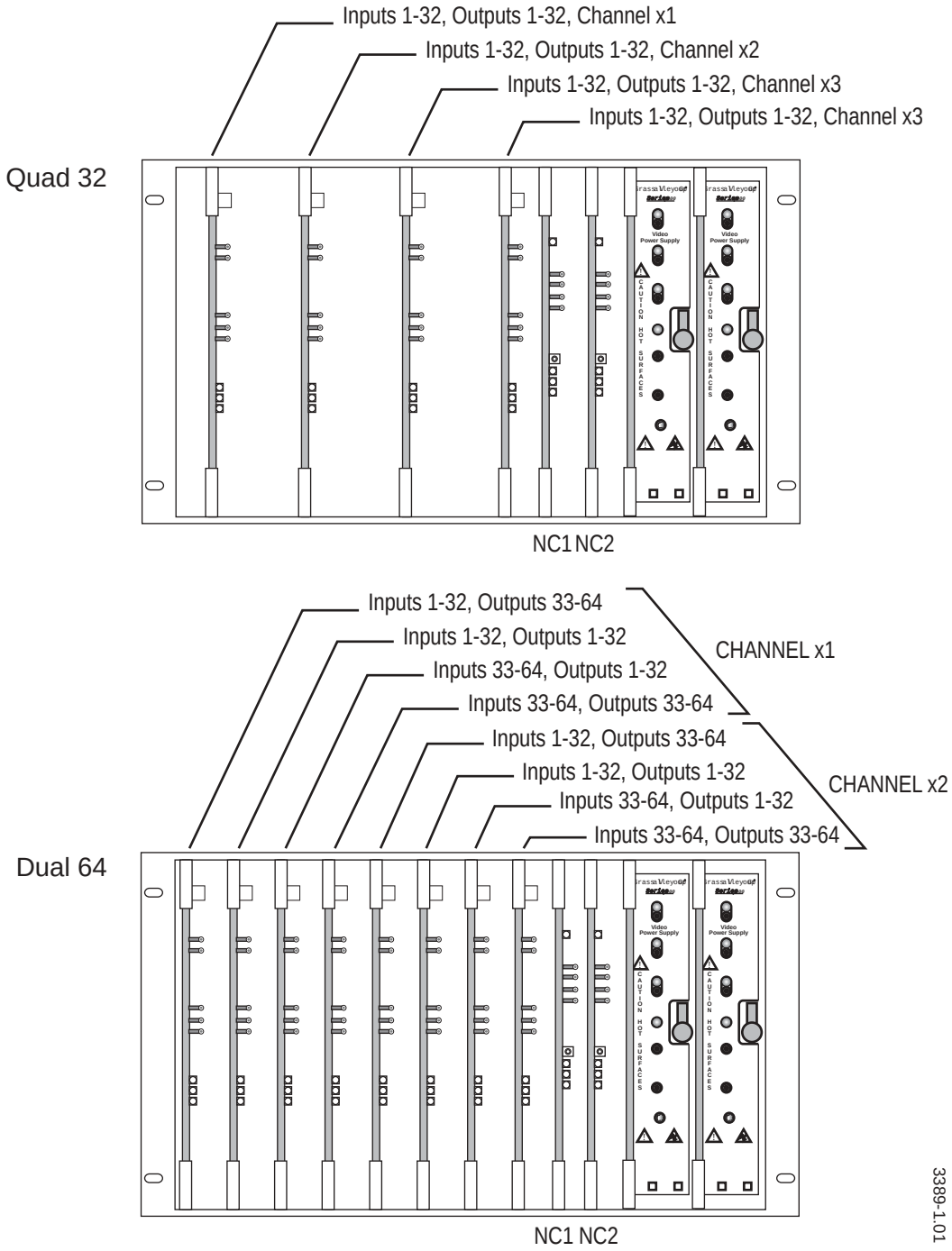
Slot	1	2	3	4	5	6	7	8
128x32	x			x		x	x	
64x64	x	x	x	x				
Dual 32x32		x		x				
96x64	x	x	x	x	x	x		
128x64	x	x	x	x	x	x	x	x

Module locations for various system configurations.

3389-1.13

Figure 1-34 illustrates each module position in the Quad 32 and Dual 64 frame and the inputs and outputs that it serves.

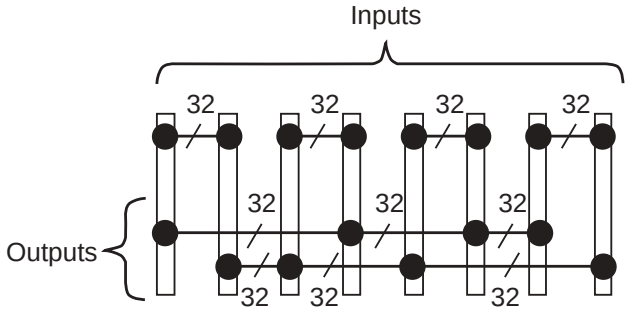
Figure 1-34. Quad 32 and Dual 64 Classic Inputs and Outputs by Module



128x64 Classic Audio Matrix System

The backplane is the foundation of all expansion frames. The six-rack unit expansion frame may contain 8 Audio Crosspoints modules, a Node Controller with optional backup, and a Power Supply module with optional backup. Audio input signals are connected to the backplane through a rear input / output module. If the primary Node Controller is placed in a frame, the optional secondary Controller is placed in the same frame. If two Node Controllers are in use, do not place them separately as this will create busing conflicts. For more specific information regarding Node Controller operation, see the *Configuration Manual*. Figure 1-35 shows backplane busing and crosspoint module slot locations.

Figure 1-35. Classic Backplane Busing & Module Placement (128x64)



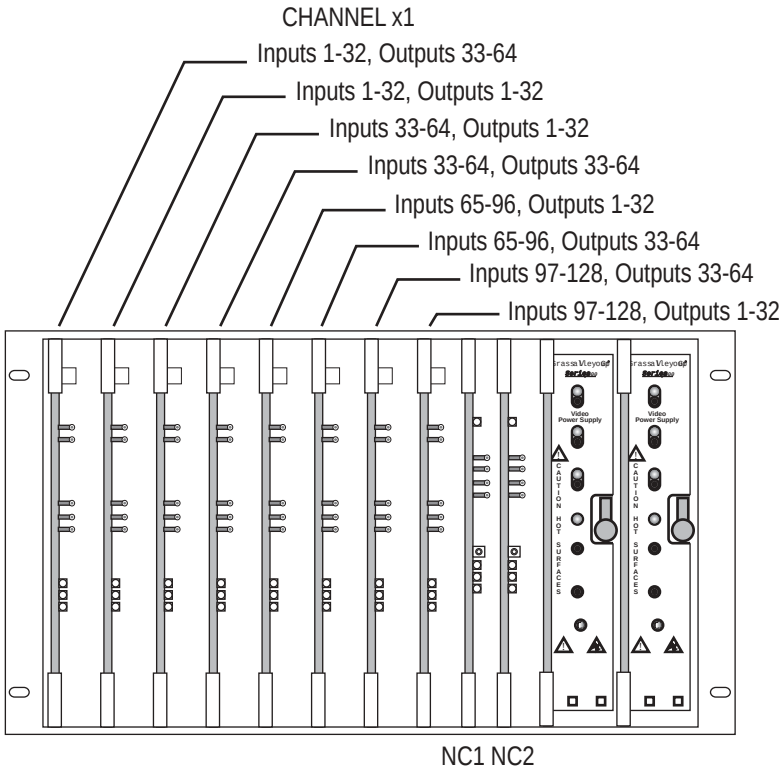
Slot	1	2	3	4	5	6	7	8
128x32	x			x		x	x	
64x64	x	x	x	x				
Dual 32x32		x		x				
128x64	x	x	x	x	x	x	x	x

Module locations for various system configurations.

3389-1.27

Figure 1-36 illustrates each module position in the 128x64 frame and the inputs and outputs that it serves.

Figure 1-36. Classic Audio 128x64 Inputs and Outputs by Module

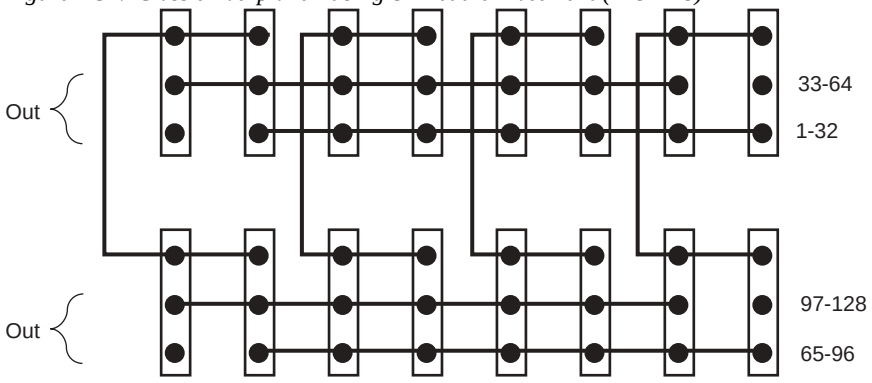


128x128 Classic Audio Matrix System

This frame consists of two 128x64 frames. The two backplanes are joined via two Analog I/O Boards, or with one Digital Expansion I/O Board (depending upon signal format). I/O boards bus input signals from the two frames together creating a single 128x128 matrix.

Two Node Controllers are used in the upper frame. Cables are used to bus frame control signals to the lower frame. Figure 1-37 shows backplane busing and crosspoint module slot locations.

Figure 1-37. Classic Backplane Busing & Module Placement (128x128)

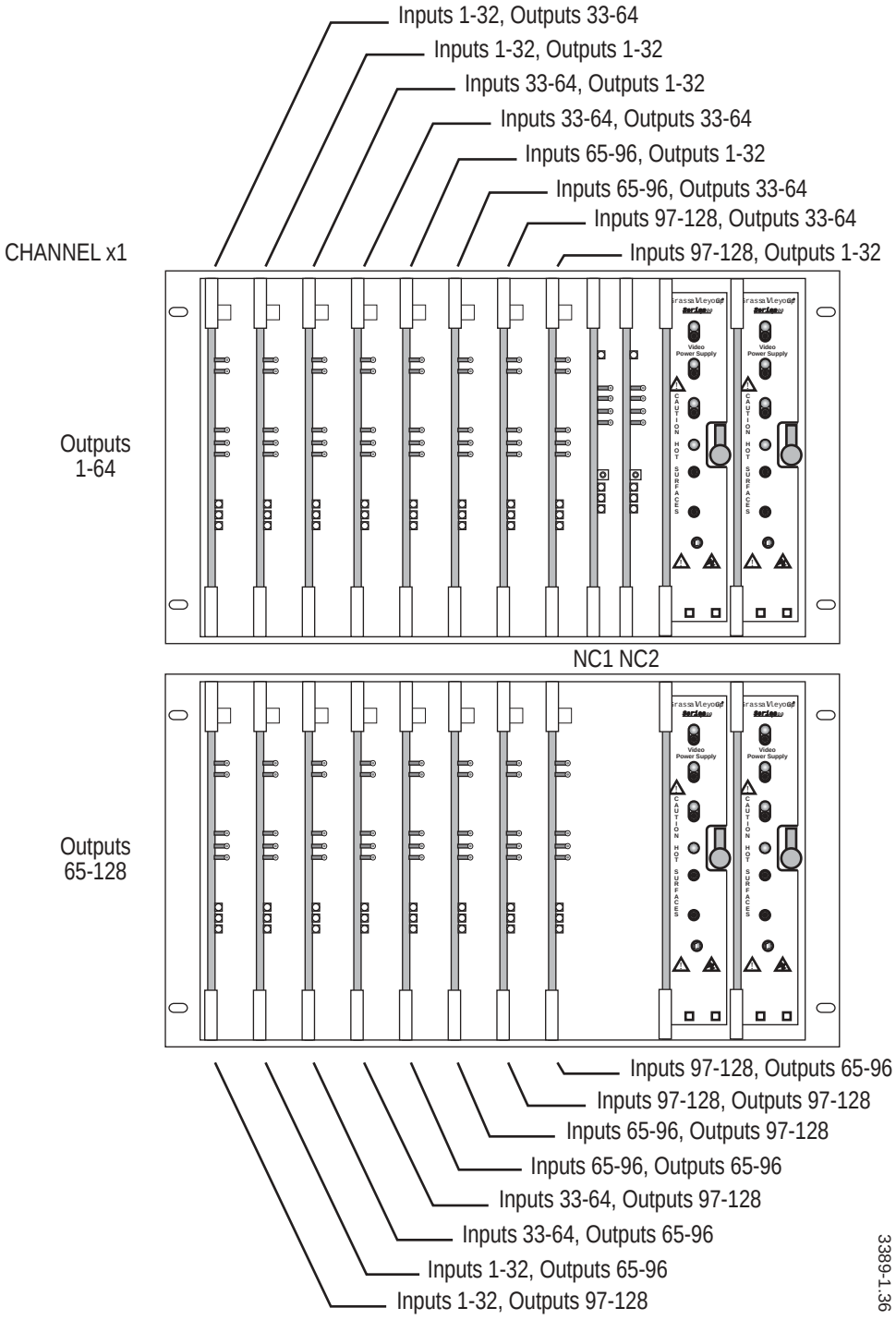


	Upper								Lower							
Slot	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
Dual 64 x 64	X	X	X	X						X	X		X	X	X	X
64 x 96	X	X	X	X						X	X					
96 x 128	X	X	X	X	X	X			X	X	X	X	X	X		
128 x 96	X	X	X	X	X	X	X	X		X	X		X			X
96 x 96	X	X	X	X	X	X				X	X		X			
128 x 128	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

3389-1.14

Figure 1-38 illustrates each module position in the 128x128 frame sections and the inputs and outputs that it serves.

Figure 1-38. Classic Audio 128x128 Inputs and Outputs by Module



Module Requirement for Various System Sizes

Figure 1-39 indicates the Audio Crosspoint Modules necessary for specific input and output requirements.

Figure 1-39. Classic Audio Module Requirement

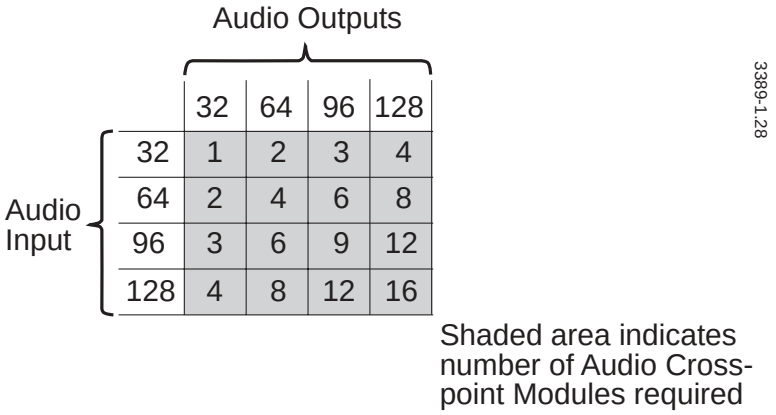
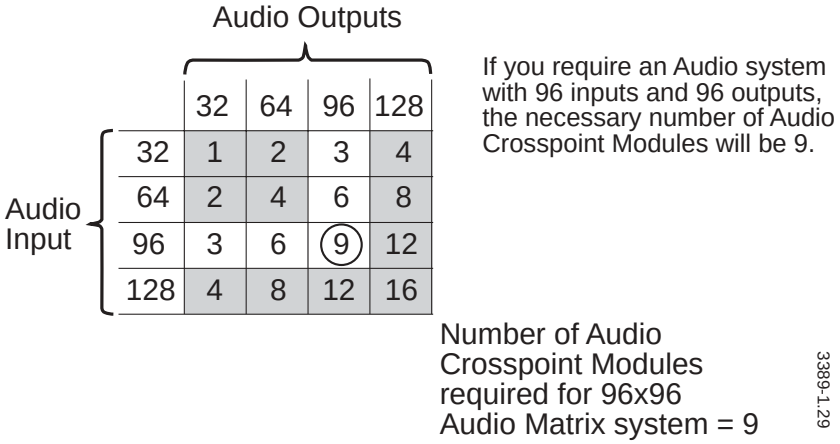


Figure 1-40. Sample Configuration Classic Audio (96x96)



Data Router Architecture

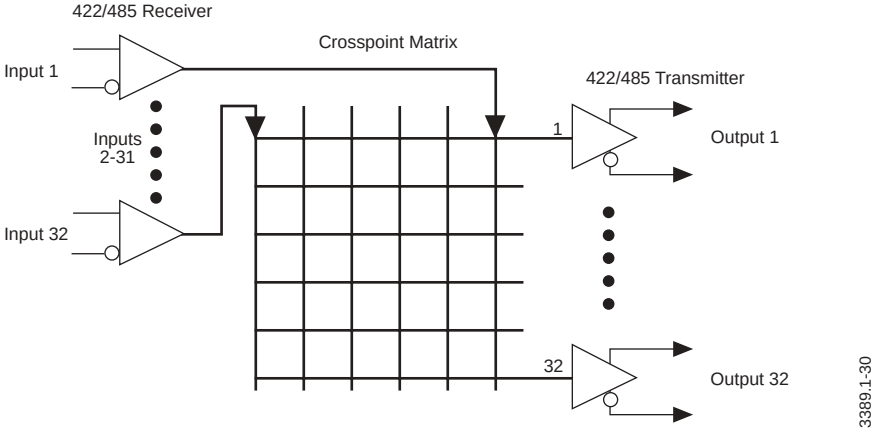
The Series 7000 Data Router is a two-way data routing system built of 64x64 blocks in six-rack unit frames. Each matrix frame contains a 64x64 forward matrix and its complementary 64x64 reverse matrix. The maximum size of this system is 256x256. The system is designed to receive and transmit RS-485 / RS-422A data signals at the rate of up to 300 Kbaud.

Data Router modules are 32x32 arrays. Four modules comprise a 64x64 matrix. A fully populated frame contains 8 data matrix modules, primary and optional redundant Node Controller modules, and primary and optional redundant power supply modules (12 modules total).

Data Router Module Level Architecture

Input signals are buffered by a balanced, common mode-rejecting receiver stage. The 32 buffered input signals are then applied to a 32x32 crosspoint matrix. Each of the 32 output buses on the crosspoint matrix is passed to the transmitter circuitry.

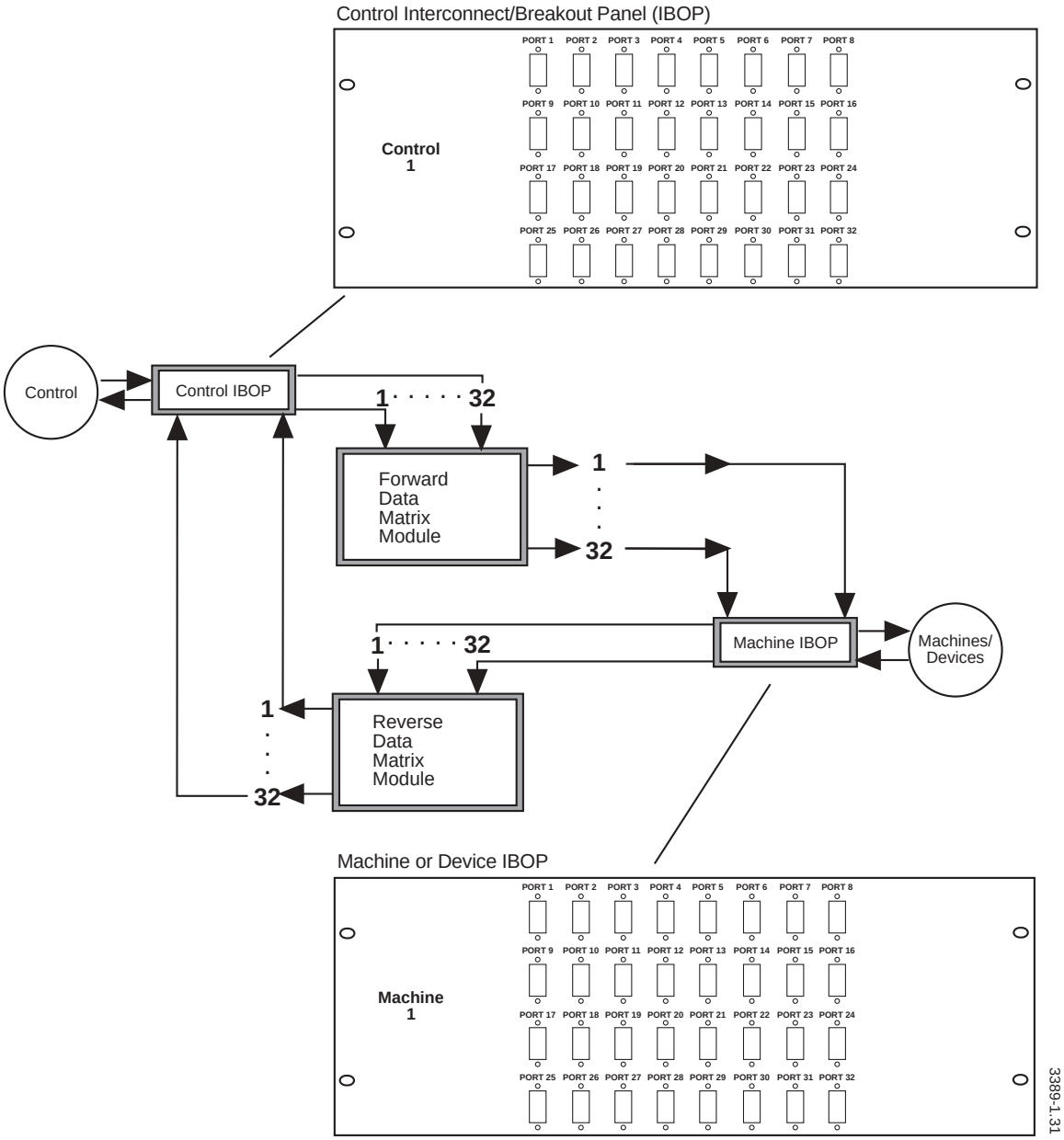
Figure 1-41. 32x32 Data Router Signal Flow



Reverse Matrices and Breakout Panels

To support two-way data flow, each Matrix Frame contains a forward and reverse matrix. User connections are made to 9-pin D connectors on breakout panels that connect to the inputs of one matrix and the outputs of the complementary matrix (see Figure 1-42). Refer to the *Series 7000 Installation Manual* for Data Matrix cabling information.

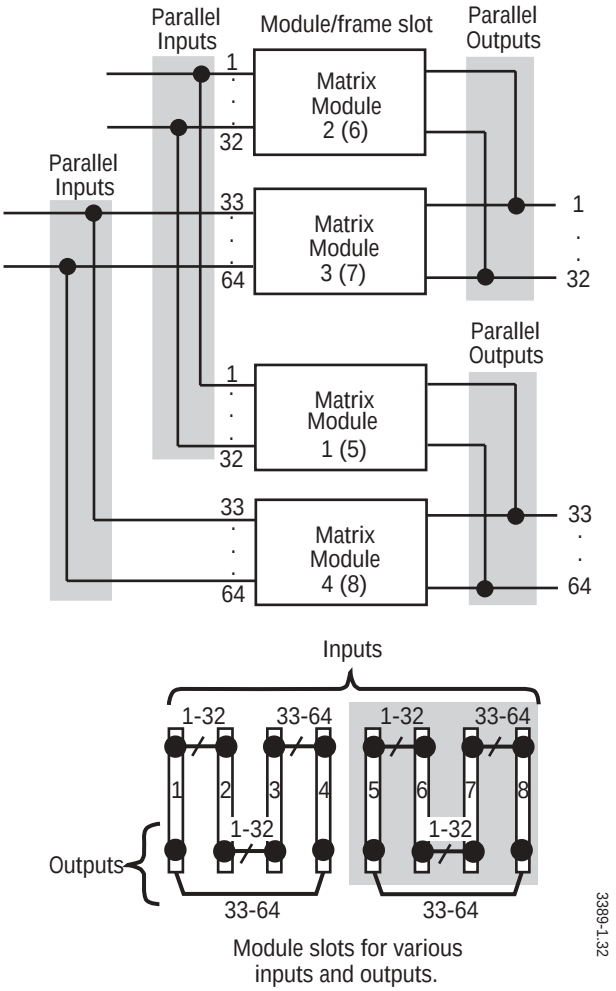
Figure 1-42. Data Matrix Breakout Panels and Reverse Matrices



Expansion

In a 64x64 Data Matrix, input ports are paralleled on the backplane to both Data Matrix modules in both forward and reverse matrices, allowing any of the input signals to be accessed by any output. Figure 1-43 illustrates a single direction matrix indicating the frame slot number for each module. Numbers in parentheses are for the complementary matrix direction. Larger systems are created by paralleling ports externally via the BNC Option Panel (IBOP) cabling. Maximum expansion supported is 256x256.

Figure 1-43. 64x64 Data Matrix (one direction shown)



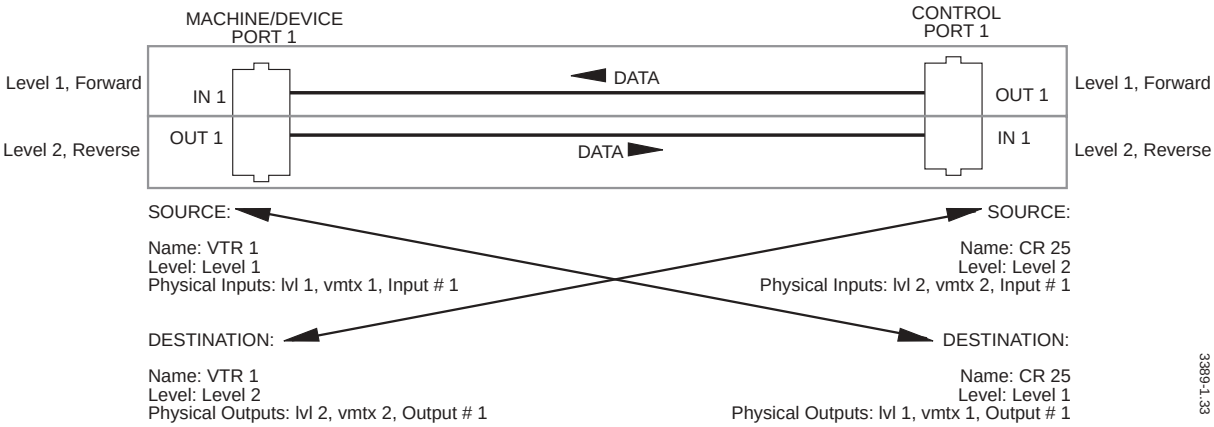
Module slots for various inputs and outputs.

Data Matrix Configuration

The Data Matrix has unique configuration characteristics relating to signal direction (Forward and Reverse matrices). Series 7000 software identifies various video and audio signal types within the System by assigning them to Physical and Virtual Matrix groups within independent or slaved Control Level identities. The Data Matrix bi-directional nature demands specific matrix and level setup with correct Source and Destination naming (refer to the *Configuration Manual*).

Figure 1-44 illustrates an example Control Port to Machine Port connection and the correct Matrix, Level, Source name, and Destination name relationships.

Figure 1-44. Forward and Reverse Matrix Configuration Relationships



Data Matrix Source and Destination Configuration Rules

- For every Source name with a **CONTROL LEVEL**, there must be a matching Destination name with a **MACHINE LEVEL**. The connector numbers must be the same.
- For every Destination name with a **CONTROL LEVEL**, there must be a matching Source name with a **MACHINE LEVEL**. The connector numbers must be the same.
- When defining the above Source-Destination pairs do not define another Source name with the same connector number. This rule applies only to Data Matrix Source-Destination pairs.
- When defining Sources to be used only as disconnects, the corresponding destination name is not entered. If it is, a **TAKE** may produce a **NO XPT** or **LEVEL ERROR** message.

Section 2

Modules

Introduction

Modules have LEDs, testpoints, and switches along the board edge which are visible when the frame door is opened. The LEDs indicate the operating condition of the module. Testpoints are used to check voltage and ground. Switches are used to reset the module. Testpoint and switch markings are self-explanatory.

Master Control Processing Unit Module

The Master Control Processing Unit (MCPU) module provides:

- Overall system control
- Node manager interface to Series 7000 matrices
- Direct control panel support for up to 64 control panels
- Programmable real-time clock, date and time stamping for logged events
- Redundant controller interface (allows primary and backup MCPU pairs)
- Static RAM sizes (ranging from 128k bytes to 4M bytes) are supported
- Flash ROM sizes (ranging from 128k bytes to 4M bytes) are supported

MCPU LEDs

The LEDs found on the MCPU module are shown in Table 2-1.

Table 2-1. MCPU LEDs

Group		LED	Indication	Condition
Mezzanines	EC1	1-4 (red)	On	Not used - can be on or off (Ethernet Mezzanine)
			Off	
	EC2	1-4 (red)	On	Not used - can be on or off (Backplane Mezzanine)
			Off	
Node Control Bus Ports	NM	1 (red)	On	Not used - can be on or off
			Off	
		2 (red)	On	Processor event
			Off	Processor not busy
		3 (red)	On	Not used - can be on or off
			Off	
		4 (red)	On	Node Bus Controller OK
			Off	Node Bus Controller not communicating
Control Panel Bus Ports	CPM	1 (red)	On	Not used - can be on or off
			Off	
		2 (red)	On	Processor event
			Off	Processor not busy
		3 (red)	On	Not used - can be on or off
			Off	
		4 (red)	On	Control Panel Controller OK
			Off	Control Panel Controller not communicating
MCPU	DS5	1 (red)	On	Flashing at fast toggle rate is normal
			Off	Bad or unseated module
		2 (red)	On	Flashes at 1 pulse/sec if external clock is present
			Off	External clock is not present
		3 (red)	On	Flashes 1-2 times/sec if Backup MCPU is present
			Off	Backup MCPU is not present
		4 (red)	On	Backup MCPU is being synchronized
			Off	Backup MCPU is synchronized
	DS6	1 (red)	On	Flashing at 2.5 pulses/sec = time base is normal
			Off	Bad or unseated module
		2 (red)	On	Not used - can be on or off
			Off	
		3 (red)	On	VI Sync is present at Video Reference 2
			Off	VI Sync is not present at Video Reference 2
		4 (red)	On	VI Sync is present at Video Reference 1
			Off	VI Sync is not present at Video Reference 1

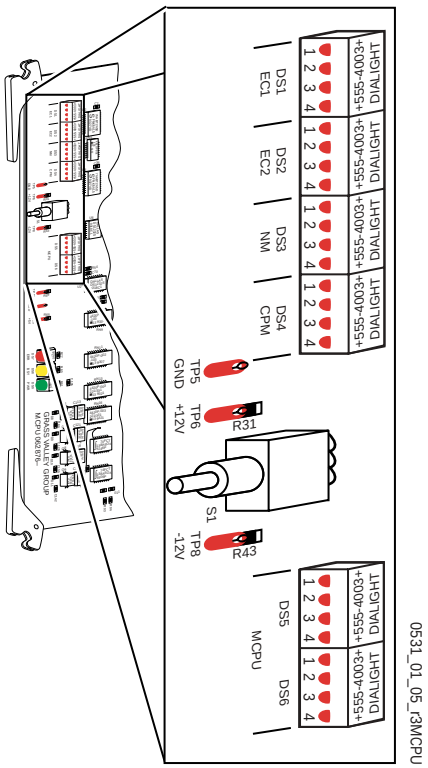
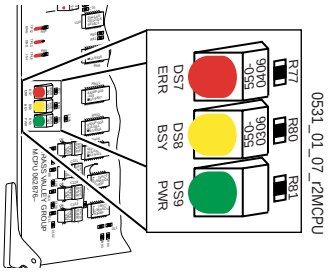


Table 2-1. MCPU LEDs - (continued)

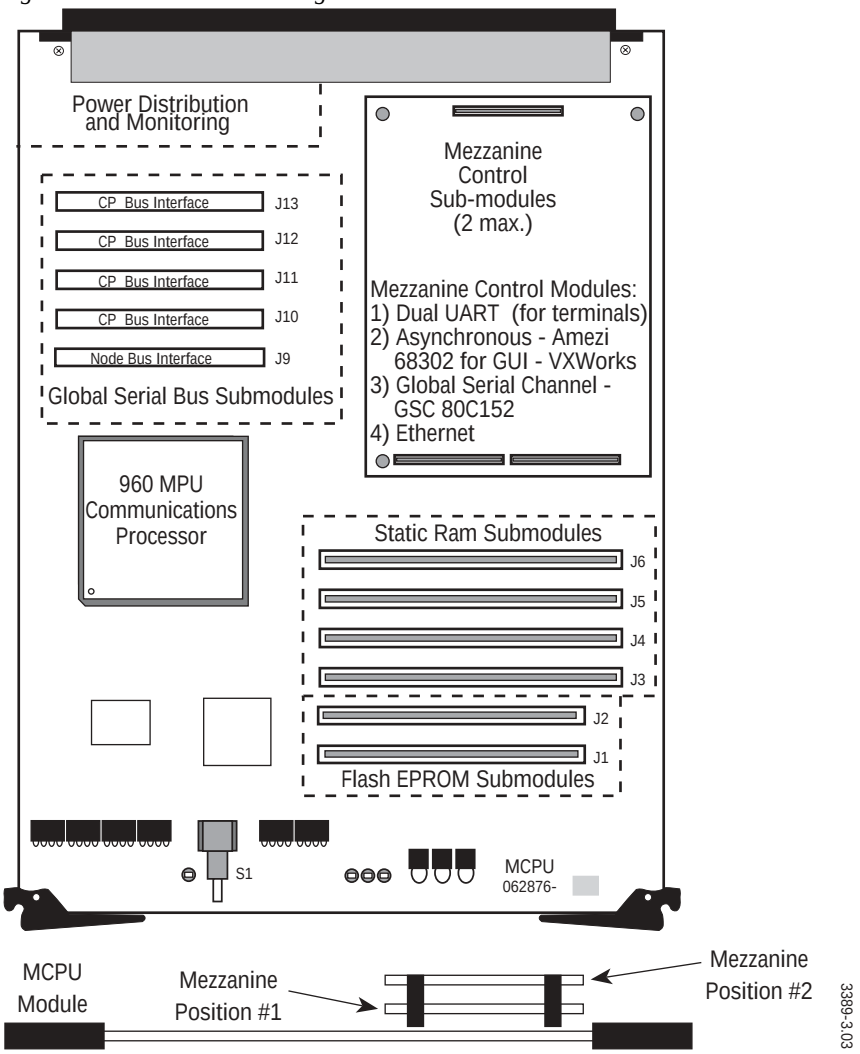


Group	LED	Indication	Condition
Activity and Power	ERR (red)	On	Circuit failure or reset
		Off	Normal
	BSY (yel-low)	On	Active Controller indication
		Off	Controller inactive
	PWR (green)	On	Power on
		Off	Blown fuse or unseated module

MCPU Diagram

Figure 2-1 shows the layout of the MCPU module. Submodules called mezzaines can be mounted on the MCPU. For information on mezzaines see *Mezzanines* (page 2-7).

Figure 2-1. MCPU Module Diagram

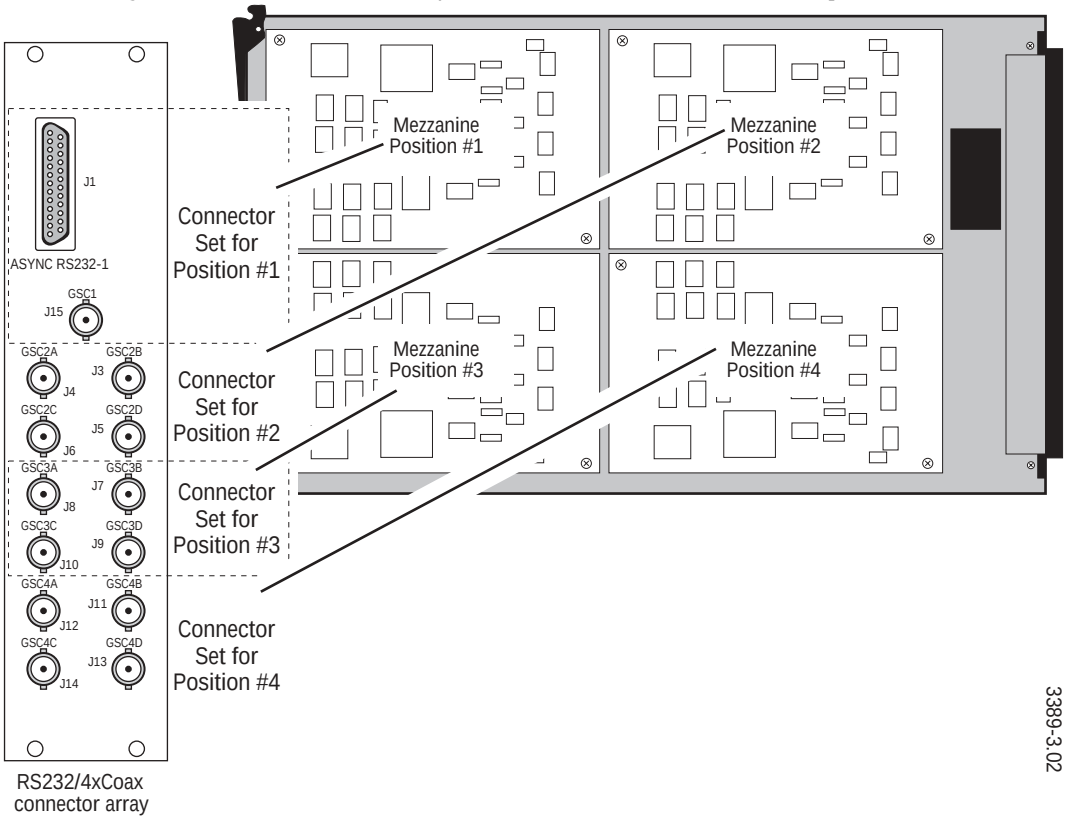


Communication Interface Module

The Communication Interface (CIF) module is a general purpose communications interface module used to augment the capability of the Series 7000 MCPU when the MCPU is housed in a stand-alone Control Frame. Each CIF module will support four mezzanine submodules; mezzanine submodules in turn provide a particular communications capability. Special connector channels, called Rear Panel connectors (RPs), support the various mezzanine boards. They are attached to the back of the stand-alone Control Frame according to which mezzanines are on the associated CIF module.

Figure 2-2 shows a CIF module with four mezzaines and an example of one of the five available RPs.

Figure 2-2. Communication Interface Module, Mezzanines, and RP Example



Each CIF module functions as a motherboard, supplying the connectors necessary to mount up to four mezzaine submodules. This allows the mezzaines to communicate through the CIF edge connector, and the frame backplane, to the RP associated with the CIF frame position.

CIF modules are designed to work in redundant pairs.

To Create a Redundant CIF Module Pair:

- CIF modules must be located in the proper two adjoining frame slots
- Each CIF module must have the exact same complement of mezzaine submodules.
- The mezzaine submodules must be in corresponding positions on each CIF module
- Each CIF module must be named and configured identically

System software will see a CIF module pair as a single module. One of the CIF modules in each corresponding pair will be in active control of its communications interface. The second CIF module will be the backup, ready to take over immediately if the primary CIF module should fail. The LED cluster banks on the front edge of each CIF module will indicate which mezzaine has failed (flashing LEDs on the LED cluster bank indicates an active mezzanine).

Redundant CIF module pairs have specific slot locations within the stand-alone Control Frame. The first CIF module pair resides in slots 1 and 2, the second CIF module pair in slots 3 and 4, the third CIF module pair in slots 5 and 6, and the fourth CIF module pair in slots 7 and 8. Slots 9 and 10 are reserved for the redundant MCPU module pair.

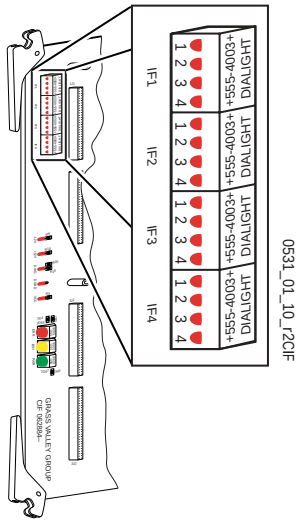
For information on mezzaines see *Mezzanines* *on page 2-7*.

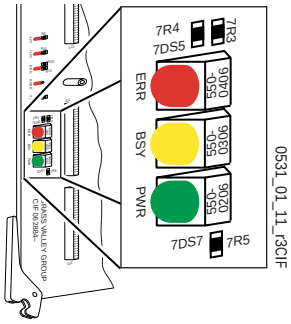
Configuration of a CIF module consists of configuring the mezzanines that reside on the CIF. For information on configuring mezzanines refer to Coprocessor, in Section 2, of the *Configuration Manual*.

CIF LEDs

The LEDs found on the CIF module are shown in Table 2-2. There is one LED cluster bank for each of the four mezzaine positions on the CIF module. If there is no mezzaine present in a position the related LED cluster bank will stay lit. If the CIF module is part of a redundant pair and a mezzaine fails on the primary CIF module, primary control will pass to the backup CIF module. The now inactive CIF module will show an error by lighting the large ERR LED and the failed mezzaine will be indicated by a steady red light in the second position of the related LED cluster bank.

Table 2-2. CIF LEDs, and Testpoints





Group	LED	Indication	Condition
If the interface is an Amezi (uses a **RS-232 connector**)			
IF1, IF2, IF3, & IF4	1 (red)	On	Normal once per second
		Off	Bad or unseated module
	2 (red)	On	Mezzanine Failure
		Off	Normal
	3 (red)	On	Flashing when transmitting
		Off	Not transmitting
	4 (red)	On	Flashing when receiving
		Off	Not receiving
If the interface is a Global Serial I/F or other (uses a **coax connector**)			
IF1, IF2, IF3, & IF4	1 (red)	On	Normally dark--used for S/W debugging
		Off	
	2 (red)	On	Mezzanine Failure
		Off	Normal
	3 (red)	On	Application dependent - can be on or off
		Off	
	4 (red)	On	Flashing 1/sec = normal
		Off	Bad or unseated module
Activity and Power	ERR (red)	On	Circuit Failure or Reset
		Off	Normal
	BSY (yellow)	On	Active Controller Indication
		Off	Inactive
	PWR (green)	On	Power On
		Off	Blown Fuse or Unseated Board

Mezzanines

Mezzanine modules are mounted either on the MCPU (maximum of two mezzaines) or on CIF modules (maximum of four mezzaines per CIF). Different mezzaine modules are used depending upon the required functionality. The available mezzaines are Serial Interface, Ethernet, Backplane Interface, UART, and Global Serial Channel.

Ethernet Interface Mezzanine

The Ethernet Interface mezzaine mounts on the MCPU module in the Number 1 position (see Figure 2-1 on page 2-3) on stand-alone Control Frame only. The Ethernet Interface mezzaine supports Ethernet protocol communications over a dedicated network communicating only between the Series 7000 and the Graphical User Interface.

UART Mezzanine

The UART mezzanine is used to interface the MCPU to the Graphical User Interface or to the Diagnostic Terminal.

The UART mezzanine is mounted on the MCPU or on a CIF module in systems with a stand-alone Control Frame, if desired. Systems without a stand-alone Control Frame are shipped from the factory with a UART mezzanine in both the Number 1 and 2 positions (see Figure 2-1 on page 2-3) on the MCPU, allowing communications with both the GUI and the Diagnostic Terminal. Systems with a stand-alone Control Frame are shipped from the factory with a UART mezzanine in the Number 1 position and an Ethernet mezzanine in the Number 2 position. This allows the Diagnostic Terminal to be connected through the UART mezzanine while the GUI is connected through the faster, Ethernet mezzanine. The UART mezzanine provides an RS-232 or RS-422 communications link.

Backplane Interface Mezzanine

The Backplane Interface (BPI) mezzanine is only used on MCPU modules in stand-alone Control frames. It is used to drive the bus that connects CIF modules to the MCPU. The BPI also contains UARTs to manage RS-232 / RS-422 communication to the Diagnostic Terminal ports (Control, J1 and J2) in the Control Frame.

If there are a pair of MCPUs (primary and back-up) in the Control frame, both must be configured identically – both hardware and software.

Serial Interface Mezzanine

The Serial Interface mezzanine (also called Amezi) can be mounted on the MCPU if the situation demands. However, the recommended configuration is to mount the Serial Interface mezzanine on a Communication Interface module located in a stand-alone Control Frame. In this position, and coupled with an appropriate RP (connector channel with correct connectors), the Serial Interface mezzanine provides an RS-232 or RS-422 Native Protocol communications link to devices outside the Series 7000. Native Protocol is the integral format for the Series 7000 Signal Management System.

The Serial Interface mezzanine supports all common baud rates and communication settings and allows the Series 7000 to be interfaced to a computer, an external automation system, or the Grass Valley Master-21 Master Control Switcher.

Global Serial Channel Mezzanine

The GSC mezzanine mounts on a Communication Interface module located in a stand-alone Control Frame. In this position, and coupled with an appropriate RP (connector channel with correct BNC connectors), the GSC mezzanine provides expansion for the Series 7000 Control Panel or Node Buses, or the primary point of connection for the Series 7000 Tally System. (Tally Modules).

The GSC mezzaine provides additional BNC, serial communications ports for the Series 7000 MCPU. The four additional BNCs provided per mezzanine can be used as additional control panel bus or Tally System ports. The GSC can also be used to provide Node Control Bus expansion. In this capacity, only one of the four BNCs can be used because traffic density is too great for all four BNCs to be serviced by a single communications controller.

Controller Modules

Controller Modules interface between the Master Control Processing Unit (MCPU) and matrix element controllers on the signal processing modules.

Controllers are designed to work in pairs (one primary and one backup) to provide additional failure resistance. The primary Controller provides all required functions. The backup is ready to take over should the primary unit fail. Control logic facilitates orderly change of control between the two modules and ensures that only one module at a time controls the external serial buses.

All systems that use the Node Controller module can use the Enhanced Node Controller module. The Matrix Controller module is used by the 7500 Series models (see *7500 Series Instruction Manual*).

Node Controller

Node Controller (NC) modules can be inserted into a powered frame. They can communicate with an external computer via an RS-485 serial channel. Also they are equipped with a watchdog timer, power monitor, and push-button reset circuit. The power monitor senses an out-of-tolerance power supply condition and resets the microprocessor.

The data store on the module is composed of static RAM. This RAM is battery backed to ensure that data is not lost if the system suffers a momentary loss of power. The battery is disconnected from the RAM whenever the module is removed from its card slot. This will erase existing configuration data before the module is transferred to another system.

Two power monitors signal the Node Controller regarding out-of-tolerance voltages. When the 5–volt DC input falls below 4.6 volts, the **VCC OK** signal becomes false. When the 12-volt DC output of the DC-DC converter falls below 11.6 volts, the **VPP OK** signal becomes false.

Kaleidoscope and Kadenza Submodule (Optional)

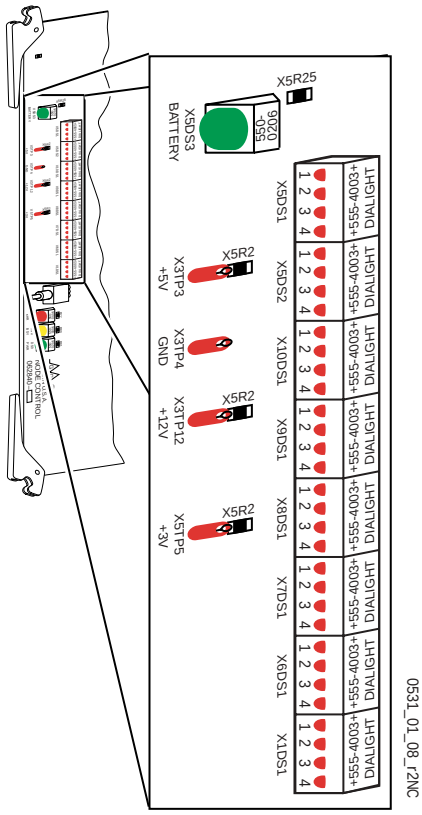
The KScope interface submodule connects the Kaleidoscope or Kadenza controller source selection bus to a Series 7000 Matrix Node. This allows the Kaleidoscope or Kadenza Controller to change crosspoints in the Series 7000. The submodule intercepts and stores Source Selection Bus transactions that are later retrieved by the Node Controller. The Node Controller will determine what, if any, submodule is installed. When the Node Controller is signaled that data is available, an interrupt is asserted until all of the bytes have been read.

Note This submodule will only work with the NC, ENCs do not support this option.

Node Controller LEDs

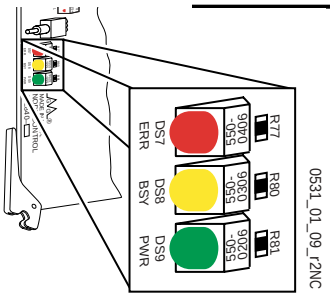
The LEDs found on the Node Controller module are shown in Table 2-3.

Table 2-3. Node Controller LEDs



Group		LED	Indication	Condition
BATTERY		X5DS3 (green)	On	Normal
			Off	Discharged Battery
X5DS1		1 (red)	On	Chop Indicator or MCPU Comm Problem
			Off	Normal
		2 (red)	On	Chop Indicator
			Off	Normal
		3 (red)	On	Not used - can be on or off
			Off	
		4 (red)	On	Not used - can be on or off
			Off	
X5DS2		1 (red)	On	Kscope present
			Off	Kscope not present
		2 (red)	On	Steady or flashing = no video reference or error
			Off	Video reference OK
		3 (red)	On	Not used - can be on or off
			Off	
		4 (red)	On	Flashing 1/sec = application running or flashing 2/sec = NC ROM not programmed
			Off	Bad or unseated module
Frame Controller	X10DS1, X9DS1, X8DS1, X7DS1, X6DS1	1 (red)	On	Not used - can be on or off
			Off	
		2 (red)	On	Processor event
			Off	Normal
		3 (red)	On	Not used - can be on or off
			Off	
		4 (red)	On	Frame Controller okay (health check)
			Off	Bad or unseated module
Node Bus	X1DS1	1 (red)	On	Not used - can be on or off
			Off	
		2 (red)	On	Processor Event
			Off	Normal
		3 (red)	On	Not used - can be on or off
			Off	
		4 (red)	On	Node Controller okay (health check)
			Off	Bad or unseated module

Table 2-3. Node Controller LEDs - (continued)



Group		LED	Indication	Condition
Activity and Power	ERR	DS7 (red)	On	Circuit failure or reset
			Off	Normal
	BSY	DS8 (yellow)	On	Active Controller indication
			Off	Inactive
	PWR	DS9 (green)	On	Power on
			Off	Bad or unseated module

Enhanced Node Controller

The Enhanced Node Controllers (ENC) are replacements for the Node Controller (NC). Like the NC, ENCs are designed to work in pairs (one primary and one backup) to provide additional failure resistance. The primary ENC provides all required functions. The backup is ready to take over should the primary unit fail. Control logic facilitates orderly change of control between the two modules and ensures that only one module at a time controls the external serial buses.

Control by the SMS7000 control system consists of messages created to set matrix crosspoints and the return from the ENC contains true tally status back to the SMS7000 control system.

The ENC Module can be inserted into a powered frame. To ensure that the system power supply is not disturbed, a pre-charge resistor is connected in series with one of the rear connector pins. The corresponding pin on the backplane connector is longer than any of the other power pins. This allows the pre-charge pin to make connection before the others.

ENCs have hardware interfaces for 10 or 100baseT Ethernet, a SMPTE Time Code reader, and a MPC860T serial port.

All interfaces added to the ENC are accommodated by using the Node **Cntrl I/F Options** 25 pin D connector on the rear panels. The ENC does not support the Kaleidoscope interface since the Options connector is dedicated to other interfaces.

A SMPTE Vertical Interval Time Code (VITC) reader is used to allow preloaded events to be triggered on a particular SMPTE frame number. This signal must be applied to the single coax vertical reference input.

Vertical interval reference is required for crosspoint switching tasks. This is an analog video input which can be NTSC or PAL. This input is processed to extract vertical sync and odd / even field (if any) information. Predefined programmable logic device (PLD) logic is used to create a switching strobe that is offset into line 10 for NTSC or line 6 for PAL. A video presence detector interrupts the processor if the video reference is missing. If it is missing then a fake sync is generated at a default asynchronous interval.

ENC LEDs

The LEDs found on the Enhanced Node Controller module are shown in Table 2-4.

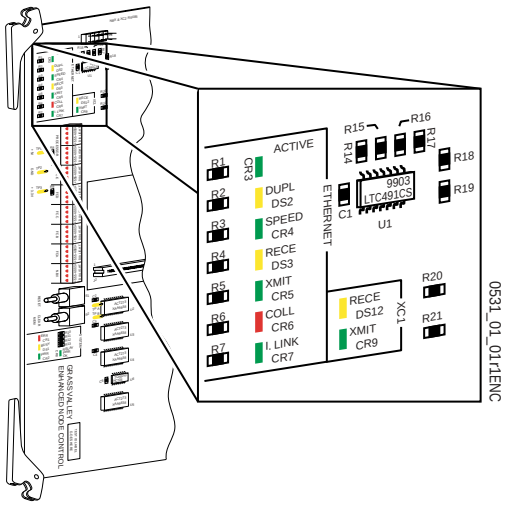
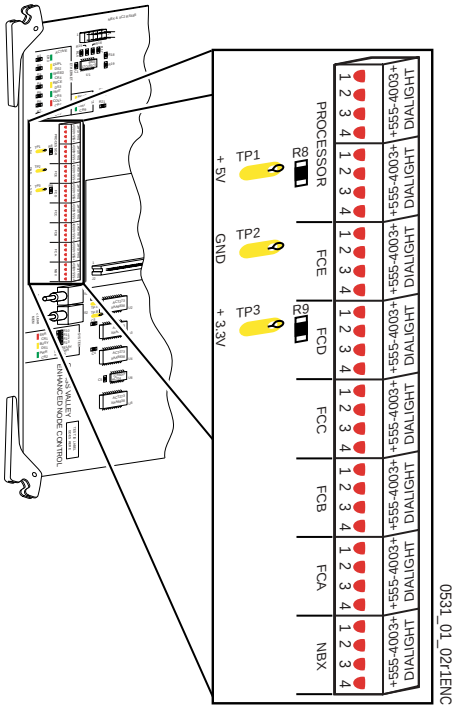


Table 2-4. Enhanced Node Controller LEDs

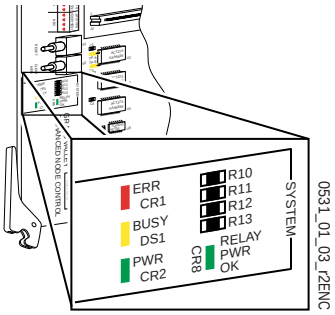
Group		LED	Indication	Condition
Ethernet	ACTIVE	CR3 (green)	On	Normal - active control
			Off	Standby
	DUPL	DS2 (yellow)	On	Ethernet half duplex
			Off	Standby
	SPEED	CR4 (green)	On	Ethernet 100BaseT
			Off	Ethernet 10BaseT
	RECE	DS3 (yellow)	On	Ethernet receiving
			Off	Not receiving
	XMIT	CR5 (green)	On	Ethernet transmitting
			Off	Not transmitting
	COLL	CR6 (red)	On	Ethernet collision
			Off	No collision
	LINK	CR7 (green)	On	Ethernet connected
			Off	No ethernet connection
XC1	RECE	DS12 (yellow)	On	Serial port receiving
			Off	Not receiving
	XMIT	CR9 (green)	On	Serial port transmitting
			Off	Not transmitting

Table 2-4. Enhanced Node Controller LEDs - (continued)



Group		LED	Indication	Condition
Processor	Bank 1	1 (red)	On	Chop Indicator or MCPU Comm Problem
			Off	Normal
		2 (red)	On	Chop Indicator
			Off	Normal
		3 (red)	On	Not used - can be on or off
			Off	
		4 (red)	On	Not used - can be on or off
			Off	
	Bank 2	1 (red)	On	Not used - can be on or off
			Off	
		2 (red)	On	Steady or flashing = no video reference or error
			Off	Video reference OK
		3 (red)	On	Flashing = MEC message sent
			Off	Not busy
		4 (red)	On	Flashing 1/sec = application running
			Off	Bad or unseated module
Frame Control	FCE/FCD/ FCC/FCB/ FCA	1 (red)	On	Not used - can be on or off
			Off	
		2 (red)	On	Processor event
			Off	Normal
		3 (red)	On	Not used - can be on or off
			Off	
		4 (red)	On	Frame Controller okay (health check)
			Off	Bad or unseated module
Node Bus Control	NBX	1 (red)	On	Not used - can be on or off
			Off	
		2 (red)	On	Processor Event
			Off	Normal
		3 (red)	On	Not used - can be on or off
			Off	
		4 (red)	On	Node Controller okay (health check)
			Off	Bad or unseated module

Table 2-4. Enhanced Node Controller LEDs - (continued)



Group		LED	Indication	Condition
Activity and Power	ERR	CR1 (red)	On	Circuit failure or reset
			Off	Normal
	BUSY	DS1 (yellow)	On	Active Controller indication
			Off	Inactive
	PWR	CR2 (green)	On	Power on
			Off	Bad or unseated module
	RELAY PWR OK	CR8 (green)	On	Power on
			Off	Bad or unseated module

Horizon Node Controller Module

The Horizon Node Control Module provides an interface between Series 7000 control panels and Horizon signal processing matrices via the Series 7000 Node Bus. In practice, the existing Horizon Controller Modules are removed and replaced with Horizon Node Controller Modules, allowing control by Series 7000 control panels. Existing Horizon control panels are no longer functional. There are no user adjustments on the module.

Horizon Node Controller LEDs

The LEDs found on the Horizon Node Controller module are shown in Table 2-5.:

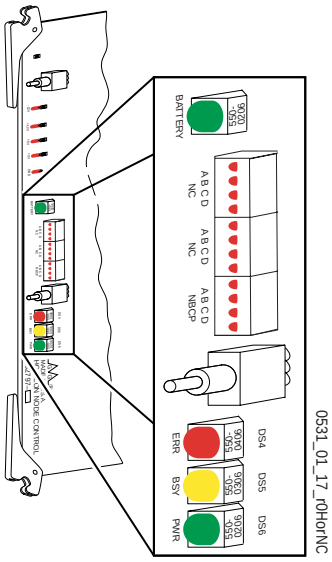


Table 2-5. Horizon Node Control LEDs

Group		LED	Indication	Condition
BATTERY		(green)	On	Normal
			Off	Discharged Battery
NC		A (red)	On	Chop Indicator or MCPU Comm Problem
			Off	Normal
		B (red)	On	Chop Indicator
			Off	Normal
		C (red)	On	When flashing indicates hardware configured 4 Level/32 Outputs
			Off	Hardware not configured 4 Level/32 Outputs
		D (red)	On	When flashing indicates hardware configured 1 Level/128 Outputs
			Off	Hardware not configured 1 Level/128 Outputs
NC		A (red)	On	Crosspoint error
			Off	Normal
		B (red)	On	Steady or flashing = no video reference or error
			Off	Video reference OK
		C (red)	On	Flashing = MEC message sent
			Off	Not busy
		D (red)	On	Flashing 1/sec = application running or flashing 2/sec = NC ROM not programmed
			Off	Bad or unseated module
NBCP		A (red)	On	Not used - can be on or off
			Off	
		B (red)	On	Processor Event
			Off	Normal
		C (red)	On	Not used - can be on or off
			Off	
		D (red)	On	Node Controller okay (health check)
			Off	Bad or unseated module
Activity and Power	ERR	DS4 (red)	On	Circuit failure or reset
			Off	Normal
	BSY	DS5 (yellow)	On	Active Controller indication
			Off	Inactive
	PWR	DS6 (green)	On	Power on
			Off	Bad or unseated module

Matrix Modules

Matrix modules fit inside a matrix frame. The three categories of matrix module are; video, audio, and data. The matrix modules are identified in Table 2-6.

Table 2-6. Matrix Module Type and Testpoint Pattern

Label	Series	Description
32 CHAN OUTPUT SDV	DV Video	Reclocking high density 32 channel serial digital video output module (page 2-17)
32 CHANNEL IN SDV	DV Video	Reclocking high density 32 channel serial digital video input module (page 2-17)
32X32 AES/EBU XPT	Classic Audio	Serial digital audio crosspoint module (page 2-21)
32X32 ANALOG AUDIO XPT	Classic Audio	Analog audio crosspoint module (page 2-21)
32X32 DATA MATRIX	Data Matrix	32x32 Data matrix module (page 2-22)
32X64 CROSSPOINT SDV	DV Video	High density 32x64 serial digital video crosspoint module (page 2-17)
DIGITAL VIDEO CROSSPOINT	Classic Video	Serial digital video crosspoint module (page 2-18)
DUAL SYNC VIDEO OUTPUT MONITOR	DV Video	Dual sync high density serial digital video output monitor (page 2-17)
EXPANSION SWITCH	Expansion Video	Reclocking serial digital video 2x1 secondary switch module (page 2-21)
NON-RECLOCKING INPUT	Classic Video	Non-reclocking serial digital video input module (page 2-18)
NON-RECLOCKING OUTPUT	Classic Video	Non-reclocking serial digital video output module (page 2-18)
RECLOCKING INPUT	Classic Video	Reclocking serial digital video input module (page 2-19)
RECLOCKING OUTPUT	Classic Video	Reclocking serial digital video output module (page 2-19)
SERIAL DIGITAL 1X2 DA	Expansion Video	Reclocking digital video 1x2 distribution amplifier module (page 2-21)
SERIAL DIGITAL 2X1 SS	Expansion Video	Reclocking serial digital video 2x1 or 4x1 secondary switch module (page 2-21)
SERIAL DIGITAL VIDEO OUTPUT MONITOR	Classic Video	Serial digital video output monitor (page 2-19)
WB VIDEO INPUT	Classic Video	Wideband analog video input module (page 2-19)
WB VIDEO OUTPUT	Classic Video	Wideband analog video output module (page 2-20)
WB VIDEO OUTPUT MONITOR	Classic Video	Wideband analog video output monitor module (page 2-20)
WIDEBAND VIDEO CROSSPOINT	Classic Video	Wideband analog video crosspoint module (page 2-20)

LEDs

Three LEDs are provided on the front edge of each Classic or DV Series matrix module. These can be used to verify certain fault messages communicated by the MCPU and to more easily locate a failed module in a frame.

- ERR (Red) Error On = error, Off = normal
- BSY (Yellow) Busy On = receiving, Off = standby
- PWR (Green) Power on On = normal, Off = blown fuse or unseated board

Video Modules

Video modules fit into video matrix frames. The modules all slide in and out of the frames sideways.

DV Series Video Modules

32 Chan Output SDV

The module labeled **32 CHAN OUTPUT SDV** is a reclocking high density 32 channel serial digital video output module used in DV Series frames. This module contains 32 identical video Output Stages, a 32x1Monitor Crosspoint, a module Controller with power and temperature monitoring, and a power regulator section. There are no user adjustments on the module.

32 Channel In SDV

The module labeled **32 CHANNEL IN SDV** is a reclocking high density 32 channel serial digital video input module used in DV Series frames. This module is a 32-channel distribution amplifier integral to the Series 7000 serial digital router. This module accepts serial digital video inputs conforming to SMPTE 259M (143Mbit/s, 177Mbit/s, 270Mbit/s) or to the proposed SMPTE standard for 16x9 aspect ratio digital component signals (360Mbit/s). The 32 Channel SDV Input Module is configured to drive two 32x64 video crosspoint modules. There are no user adjustments on the module.

32x64 Crosspoint SDV

The serial digital video (SDV) module labeled **32X64 CROSSPOINT SDV** is a high density 32x64 serial digital video crosspoint module used in DV Series frames. This module is a32 input by 64 output crosspoint array. The board contains differential receivers on the video inputs, a controller circuit with power circuitry, and power supply regulation. The 32x64 crosspoint array is composed of sixteen 16x8 serial digital crosspoint ICs. There are no user adjustments on the module.

Dual Sync Video Output Monitor

The module labeled **DUAL SYNC VIDEO OUTPUT MONITOR** is a dual synchronous high density serial digital video output module used in DV Series frames. The Video Output modules of the Series 7000 each have an output monitor crosspoint. The monitor output is selected by a control panel or panels configured to control system monitor crosspoints. There are two Output modules in each frame section.

The Dual Sync Video Output Monitor (DSVOM) Module provides standard output monitoring capability (refer to *Serial Digital Video Output Monitor on page 2-19*), and in a dual sync system the DSVOM Module deter-

mines the sync standard to which an output is referenced, if the references are different. The DSVOM creates a strobe from the second system reference and distributes it to crosspoint modules. This strobe may be used by other frames. The DSVOM also has an input for a strobe created by another DSVOM, and if a strobe is present on the input it will output that strobe to the system crosspoint modules.

The DSVOM module receives a differential, current-mode monitor signal from each of up to four Output module pairs. Control software allows only one path to be active; the monitor module detects the active path and passes it to the monitor output stage. The output stage provides two identical outputs; each is a 75 Ohm back-terminated video signal. There are no user adjustments on the module.

Classic Video Modules

Digital Video Crosspoint

The module labeled **DIGITAL VIDEO CROSSPOINT** is a serial digital video crosspoint module used in Classic Series frames. This module is a sixteen input by thirty-two output crosspoint array. The main module contains differential receivers on the video inputs, a controller circuit with power and overtemp circuitry, and power supply regulation. The 16x32 crosspoint array is composed of four 16x8 serial digital crosspoint ICs. There are no user adjustments on the module.

Non-Reclocking Input

The module labeled **NON-RECLOCKING INPUT** is a non-reclocking serial digital video input module used in Classic Series frames. This module is a 16-channel distribution amplifier integral to the Series 7000 serial digital router. This module accepts serial digital video inputs conforming to SMPTE 259M (143Mbit/s, 177Mbit/s, 270Mbit/s) or to the proposed SMPTE standard for 16x9 aspect ratio digital component signals (360Mbit/s). The serial digital video input module is configured to drive four video crosspoint modules. There are no user adjustments on the module.

Non-Reclocking Output

The module labeled **NON-RECLOCKING OUTPUT** is a non-reclocking serial digital video output module used in Classic Series frames. This module contains sixteen identical video Output Stages, a sixteen-by-one Monitor Crosspoint, a module Controller with power and temperature monitoring, and a power regulator section. There are no user adjustments on the module.

Reclocking Input

The module labeled **RECLOCKING INPUT** is a reclocking serial digital video input module used in Classic Series frames. This module is a 16-channel, 1-to-4, reclocking, digital video distribution amplifier. Each channel consists of a Grass Valley ASIC regenerator with associated components and an output driver with four source-terminated ECL outputs (to drive four buses). There are no user adjustments on the module.

Reclocking Output

The module labeled **RECLOCKING OUTPUT** is a reclocking serial digital video output module used in Classic Series frames. This module contains sixteen identical video Output Stages, a sixteen-by-one Monitor Crosspoint, a module Controller with power and temperature monitoring, and a power regulator section. There are no user adjustments on the module.

Serial Digital Video Output Monitor

The module labeled **SERIAL DIGITAL VIDEO OUTPUT MONITOR** is a serial digital video output monitor module used in Classic Series frames. The Video Output modules of the Series 7000 each have an output monitor crosspoint. The monitor output is selected by a control panel or panels configured to control system monitor crosspoints. There are two Output modules in each frame section.

The Video Output Monitor module receives a differential, current-mode monitor signal from each of up to four Output module pairs. Control software allows only one path to be active; the monitor module detects the active path and passes it to the monitor output stage. The output stage provides two identical outputs; each is a 75 Ohm back-terminated video signal. There are no user adjustments on the module.

WB Video Input

The module labeled **WB VIDEO INPUT** is a wide band analog video input module used in Classic Series frames. This module is a 16-channel distribution amplifier integral to the Series 7000 analog router. This module features 30 MHz signal bandwidth, input common mode rejection, optional input cable equalization, DC restoration or DC coupling, and differential video outputs. The base wide band video input module is configured to drive four video crosspoint modules.

The input coupling mode, DC restoration versus DC coupling, is software controlled through the Graphical User Interface (see the *Configuration Manual*). Fixed length cable equalization is supported through optional plug-in hybrid cable equalizers and is available in various lengths up to 150 M (500 feet). There are no user adjustments on the module.

WB Video Output

The module labeled **WB VIDEO OUTPUT** is a wide band analog video output module used in Classic Series frames. This module contains sixteen identical video Output Stages, a sixteen-by-one Monitor Crosspoint, a module Controller, four-channel De-glitch Controllers, and a power supply section. There are no user adjustments on the module.

WB Video Output Monitor

The module labeled **WB VIDEO OUTPUT MONITOR** is a wide band analog video output monitor module used in Classic Series frames. This module allows any output signal from a matrix of up to 128 outputs can be switched to the monitor output. The optional Video Output Monitor module receives a differential signal path from each of up to four output module pairs (4 output frame sections of an SMS-128V). Control software allows only one path to be active; the monitor module detects the active path and passes it to the monitor output stage. The output stage provides two identical outputs; each is a 1-volt nominal 75 Ohm source-terminated signal.

Selection of the monitor destination is by software on the output modules and is further de-glitched by the controller on the Video Output Monitor module. Internal path equalization is provided to ensure flat response to the Video Output Monitor output signal. There are no user adjustments on the module.

Wideband Video Crosspoint

The module labeled **WIDEBAND VIDEO CROSSPOINT** is a wide band analog video crosspoint module used in Classic Series frames. This module and two Analog Video Crosspoint Submodules create an analog video crosspoint assembly. This assembly comprises a sixteen input by thirty-two output crosspoint array. The main module contains differential receivers on the video inputs, a controller circuit, and power supply circuitry. Header connectors are provided to accept the crosspoint submodules, each of which contains a 16X16 crosspoint array with a differential current-mode video driver on each output. There are no user adjustments on the module.

Expansion Video Modules

Expansion Switch

The module labeled **EXPANSION SWITCH** is a reclocking serial digital video that can be configured as a 2x1 or as a 4x1 secondary switch. The Expansion Switch module replaces the Serial Digital 2x1 SS module.There are no user adjustments on the module.

Serial Digital 1x2 DA

The module labeled **SERIAL DIGITAL 1X2 DA** is a reclocking digital video 1x2 distribution amplifier module used in Expansion frames. This module is an 8-channel, 1-to-2, reclocking, digital video distribution amplifier. Each channel consists of a Grass Valley ASIC regenerator with associated components and an output driver with two SMPTE 259M cable drivers (to drive two matrices).There are no user adjustments on the module.

Serial Digital 2x1 SS

The module labeled **SERIAL DIGITAL 2X1 SS** is a reclocking serial digital video 2x1 secondary switch module used in Expansion frames. This module has been replaced with the Expansion Switch module. There are no user adjustments on the module.

Audio Modules

These modules all slide in and out of the matrix frames.

Classic Audio Modules

32x32 AES/EBU XPT

The module labeled **32X32 AES/EBU XPT** is a serial digital audio crosspoint module used in Classic Series frames. Each of the thirty-two AES/EBU serial digital audio inputs to this module can be selected on any one of the thirty-two outputs. The module also provides two (duplicate) audio monitor outputs. There are no user adjustments on the module.

32x32 Analog Audio XPT

The module labeled **32X32 ANALOG AUDIO XPT** is a analog audio crosspoint module used in Classic Series frames. This module is a 32x32 matrix providing input processing, crosspoint selection, and output drive on a single module. This module receives a balanced audio signal pair and provides common mode rejection. The balanced signal is converted to single-ended and is buffered for switching. The output stage provides minor gain adjustment and produces a 36 Ohm balanced output.

Gain Adjust

Each of the output circuits has a gain adjust potentiometer. Unity gain is set at the factory for a 10k Ohm termination and should require no further adjustment unless output loading is different or components have been replaced.

To Adjust the Gain of One or More Outputs

1. Remove the Audio Matrix Module from the frame.
2. Insert the extender (Part No. 092616) into the vacant module slot.
3. Insert the Audio Matrix Module into the extender.
4. On the Series 7000 rear connector channel, locate an unused input to the source terminal block.
5. Connect a 1kHz, +24dBu signal to the input.
6. On the Series 7000 rear connector channel, locate the Destination terminal block associated with the output path to be adjusted.
7. Connect a AC voltmeter or Distortion Analyzer to the Monitor output.
8. Using a Series 7000 control panel, switch the test source to the selected destination and set the Monitor to that same destination.
9. Using the appropriate channel gain adjustment potentiometer, adjust the gain of the selected circuit for unity gain +/-0.1dBu
10. Repeat the preceding steps for additional outputs to be adjusted.
11. When adjustment is complete, remove the module from the extender; remove the extender from the frame, and replace the module in its slot.

Data Matrix Modules

32x32 Data Matrix

The module labeled **32X32 DATA MATRIX** is a data matrix module used in Data Matrix frames. Each Data Matrix module accepts 32 RS-422 or RS-485 inputs and routes them to any one of the 32 outputs. Due to potential control conflicts and possible data degradation, the operating software imposes an exclusivity rule, allowing an input to be routed to only one output at a time. There are no user adjustments on the module.

Section 3

Maintenance

Introduction

This section presents information on obtaining replacement parts, handling modules, and routine maintenance procedures.

Replacement Parts

Replacement parts can be ordered. Use the information located on the back of the Title page to contact Customer Service. They will provide the current part numbers, part availability, and ordering directions.

Modules

Series 7000 makes extensive use of surface mount technology and programmable parts to achieve compact size and adherence to demanding technical specifications. Circuit modules, control panels, and power supplies should not be serviced in the field. Instead, faulty modules, control panels, or power supplies should be replaced with a known-good spare and the faulty unit returned to a designated repair depot. Use the information located on the back of the Title page to contact Customer Service.

Module Handling

Matrix modules can be inserted or removed from the frame without powering the system down. However, the AC power cord should be removed before placing or removing a Power Supply module. Be certain to use proper anti-static precautions when troubleshooting the equipment. Place modules in an anti-static envelope for protection if modules must be transported or stored outside the frame for an extended time.

Module Placement

A module placement illustration is provided inside the front door of Series 7000 Matrix frames. This illustration identifies each slot according to the type of module it accepts and, in the case of matrix module slots, the input and output group that the slot serves.

All modules are interchangeable within their functional type. However, Analog Video Output modules contain signal path equalizers of specific design for their frame size. When moving Analog Video output modules to a different size frame, change the equalizer hybrid to the proper version for that frame. If a frame is not fully populated with output modules, the equalizers hybrids required for a fully populated frame are provided on a carrier module in the frame.

CAUTION Each Series 7000 Module slot is keyed to accept the appropriate type of module.

To Insert a Module into a Frame:

1. Align the Module in the appropriate frame slot.
2. Gently slide the module into the frame, evenly guiding the module until it meets the connector on the backplane.
3. Pull the ejector tabs on the front edge of the module (top & bottom) forward and slide the module further into the frame. If resistance is felt at this point, use the illustration inside the front cover of the frame to verify the module is in the correct slot.

CAUTION Multi-pin module pins can become misaligned. Always be careful inserting modules. A damaged connector on one module can spread the problem to another connector if the damaged module is moved to other slots.

If module placement is correct, insert the module and lock it in place. Latch the hooks on the ejector tabs to the front edge of the frame.

To Remove a Module from a Frame:

1. Lift the ejector tabs until the hooks on the tabs have released from the front edge of the frame.
2. Slide the module out of the frame.

Optional Module Extender

An optional module extender is available. The extender allows an Audio system module to be adjusted or tested while functioning. For further information regarding Audio Crosspoint gain adjustment, see the *LEDs, Testpoints, and Switches* section of this manual.

Note The Series 7000 can only be serviced, on site, to the module or Field Replaceable Unit (FRU) level. Failed FRUs should be returned to a Grass Valley service depot for repair. Modules showing signs of unauthorized repair may be rejected from warranty service.

Audio Gain Adjustment

The Series 7000 Audio system is aligned for unity into a 10K Ohm load. However, other requirements may have been specified when the purchase was made and the system adjusted to meet those specifications. If the system needs have changed, audio gain adjustments may be made on the Audio Crosspoint Module. See the 64x64 Analog Audio XPT description in Section 2 of this manual for detailed instructions.

Preventive Maintenance

The following preventive maintenance functions should be a part of the normal equipment servicing routine.

Fan and Filter Testing

There are two types of units in the Series 7000 that use fans and filters; the convection cooling units and the Expanded System Power Supplies.

Convection Cooling Units

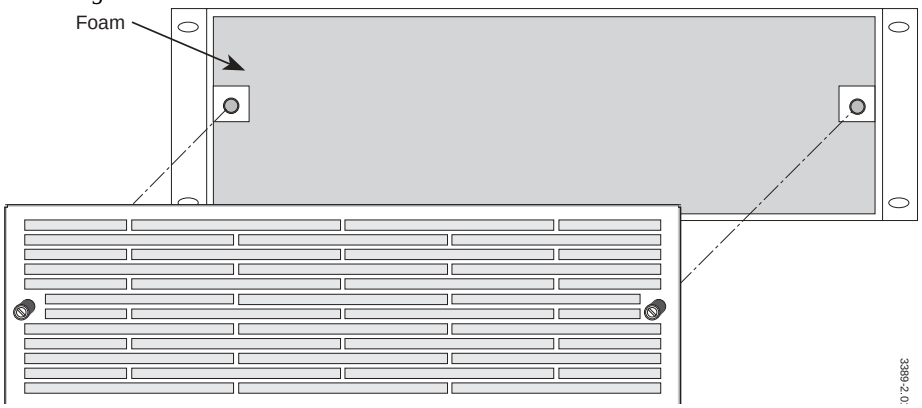
The Series 7000 Convection cooling system air filter should be routinely cleaned. The cleaning frequency depends upon the equipment environment. If the filter is not kept clean and cooling air is obstructed, the system may overheat, causing shut down and possible damage.

To clean the filter:

1. Unscrew the two thumb screws on the right and left sides of the convection fan set and remove the cover.
2. Remove the reticulated foam filter from the inside of the cover.
3. Clean the filter by either washing it in a mild detergent and water solution and drying the foam completely, or vacuum the filter clean.

   If the filter is damaged, either contact a Grass Valley service representative for a replacement part, or replace it with reticulated foam that meets or exceeds UL-900 standards for flammability.
4. Place the foam in the cover under the right and left thumb screw tabs.
5. Replace the front cover and tighten thumb screws until secure.

Figure 3-1. Convection Set Filter Location



Power Supply Cooling

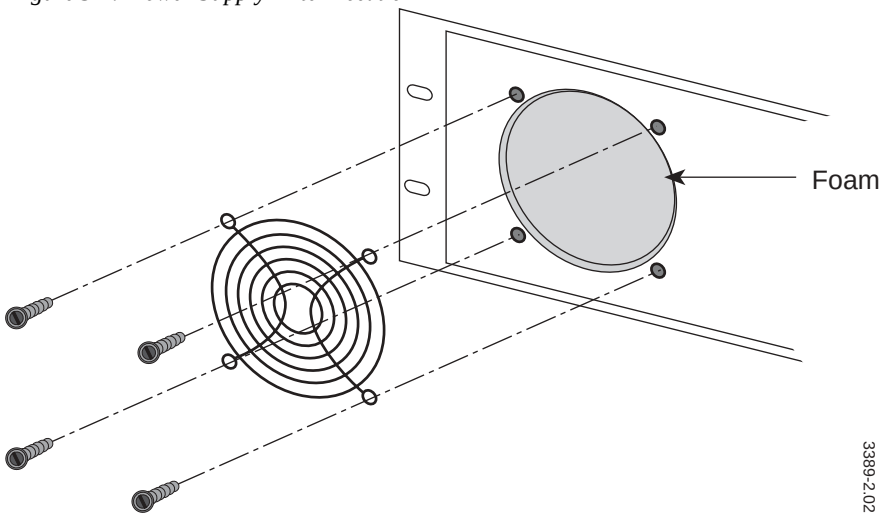
The air filter on the Series 7000 Expanded System Power Supplies (3 rack-unit frames) should be routinely cleaned. The cleaning frequency depends upon the equipment environment.

To clean the filter:

1. Unscrew the four crosshead (Phillips) screws on the front grill and remove it.
2. Remove the reticulated foam filter from the unit.
3. Clean the filter by either washing it in a mild detergent and water solution and drying the foam completely, or vacuum the filter clean.

   If the filter is damaged, either contact a Grass Valley service representative for a replacement part, or replace it with reticulated foam that meets or exceeds UL-900 standards for flammability.
4. Place the foam in the Power Supply unit.
5. Replace the grill and screws.

Figure 3-2. Power Supply Filter Location



Battery Testing

The Series 7000 System has battery back-up on the Power Supply Module and the Node Controller Module.

The back-up battery on the Power Supply module provides power-off retention of data for MCPU Module RAM. The battery requires a 24-hour trickle charge to reach full capacity. The system has been shipped with the battery fully charged and switched off (not supporting RAM) to preserve its power. However, if the battery enable switch is on, the battery may arrive fully discharged and will require the full 24 hour trickle charge.

The Node Controller Module has a lithium battery. A LED located on the front edge of the module indicates battery condition. With the system powered and the module in place, the **BATTERY LED** should light. If the LED is not lit, the battery is dead. Because lithium batteries pose a potential servicing hazard, the module must be returned to Grass Valley Products service depot for repair.

WARNING **Lithium batteries can explode if they are improperly charged or cross-connected. If your battery requires service or replacement, please return the module to a Grass Valley Service Depot.**

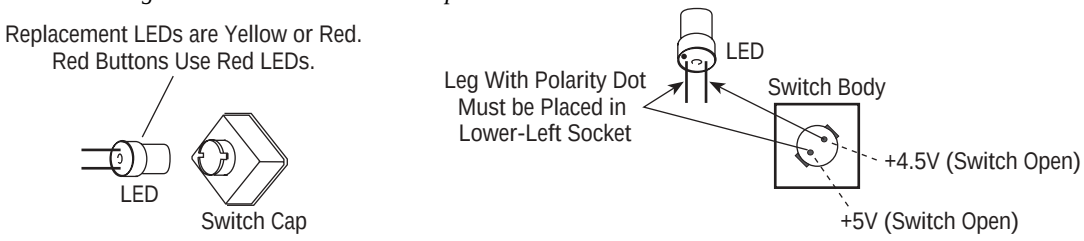
Control Panels

Control Panels are Field Replaceable Units and should be returned to a Repair Depot for service. User repair should be limited to servicing illuminated panel push buttons. Series 7000 control panels use LEDs for long-life push button illumination. Replacement LEDs are available. Use the information located on the back of the Title page to contact Customer Service.

To Replace Pushbutton LEDs:

1. Pull the button switch cap straight out to remove it.
2. Carefully pull the button LED straight out.
3. Without pressing the switch, use a voltmeter to verify power at the two sockets (see figure). If voltage is not present, contact GVP Customer Service.
4. If voltage is present, insert a new LED of appropriate color. Observe polarity as shown.
5. Replace the switch cap, power the panel, and verify LED function.

Figure 3-3. Push button LED Replacement



Section 4

Troubleshooting

Introduction

This section contains some general diagnostic tips, a Vertical Interval (VI) Reference check procedure, and a series of troubleshooting trees intended to help isolate a problem to a field-replaceable unit.

Tips

Listed below are the first steps in isolating any problem:

Check MCPU LEDs DS5 and DS6

Normal MCPU operation yields a specific pattern of illuminated LED segments on arrays DS5 and DS6. Refer to Master Control Processing Unit in Section 2.

Check Connections

- Connections should be tight and electrically sound
- Cables should be checked for damage

Substitute Modules

- A basic technique is to exchange a known-good module with the suspected problem module. This will determine if the problem exists in a specific module rather than in the frame or in peripheral equipment.

Check Inputs

- AC power connections, AC circuit breakers located on the back of the two and three rack power supplies, or the AC fuse located on the Power Supply Module
- Chassis ground connections and ground voltage levels
- Signal input (video, audio) must be present and within specifications
- Cables and connections should be protected from potential electromagnetic interference
- Cable length should be within recommended limits
- Reference Signal to MCPU and Node Controllers must be present, within specifications, and must not be electrically noisy. See the VI Reference Check procedure on the following pages.

Problems and Solutions

Control Panel Problems

Panel Responds Unexpectedly

Panel capabilities are determined by configuration. Check that the panel template, prefixes (if appropriate), and suffixes (if appropriate) are as you intended. Refer to the *Configuration Manual*.

Panel Template Won't Download

Check the panel's name. Spaces at the end, beginning, or buried within a name, or incorrect case will cause the GUI not to recognize the panel. Refer to the *Configuration Manual*.

Can't Copy Panel Template

Check the panel's name. Spaces at the end, beginning, or buried within a name, or incorrect case will cause the GUI not to recognize the panel. Refer to the *Configuration Manual*.

Can't Control Monitor Output

A control panel must be specifically configured to control the monitor output. Refer to the *Configuration Manual*.

Can't Control TieLine

TieLines may be assigned to control by only certain destinations, or, if you have a limited number of TieLines, they may all be in use (your panel will display a busy message). Check TieLine configuration and assignment in the *Configuration Manual*.

NO XPT Message

Problems in the matrix are reported to panel users via a **NO XPT** display when the panel is in Source mode. The active tally level will show a steady **NO XPT** if the Source / Destination pair goes through some part of the matrix that is not working or not present.

When the panel is set to **ALL LEVELS** and a problem arises in one of the other Levels, a **NO XPT** message will briefly be displayed, but only when a new Take is performed. In this case, go to Level mode and cycle through the Levels to determine which Level actually is producing the **NO XPT** display.

The constant **NO XPT** display will appear if one or more matrix modules has failed, been removed, or the control cable from the Node Controller to the matrix modules is bad (effectively removing the modules from the system). Two reasons for the brief display of **NO XPT** are:

- The Node Controller(s) that control the crosspoint has failed or is removed. Since only a brief **NO XPT** is displayed, an Event alarm should be set for Loss of Node Controllers or Node Control Switchovers in the Event Log (see *Event Logging*, in Section 5).
- The panel is set to **ALL LEVELS** and a problem arises in a Level other than the active tally level. **NO XPT** is briefly displayed when a Take is attempted.

In a Data Matrix, a panel controls only the Forward Level. The Reverse Level is controlled automatically. A **NO XPT** problem on the Reverse Level will not be reported to the panel. The only way to see the **NO XPT** display is to use the VSD display which can display all Levels.

Switching Problems

Switching Latency

All crosspoints involved in a Take do not switch in the same vertical interval. This can be caused by noisy or missing VI Reference Signal inputs to the MCPU or Node Controllers. Refer to *Recovery Procedure When Flash Memory is Overfilled* *on page 4-7* for Reference Signal checking and correcting procedures.

Control is Not as Expected

After installation of new MCPU application or other software / firmware, if control is not as expected, cold-start the MCPU(s) and Node Controllers.

Series 7000 control and abilities are dependent upon the way the system is configured. If any control element is not as expected, carefully check all related configuration items. Refer to the *Configuration Manual*.

No Crosspoint Switching

Check that the Node Controllers are on line and running as primary. The yellow LED on the module should be on.

System Hangs Up

This can be caused by noisy Reference Signal inputs to the MCPU. Refer to Section 2 of the Service Manual for Reference Signal checking and correcting procedures.

Node Controllers

Unexpected Node Controller Switchover

This can be caused by noisy or missing VI Reference Signal inputs to the Node Controller or interruption of FC / VI or Node Bus communication. Refer to *Recovery Procedure When Flash Memory is Overfilled* *on page 4-7* for Reference Signal checking and correcting procedures.

Redundant Node Controllers

If the Backup Node Controller goes on-line as primary or both the Primary and Backup Node Controllers are primary, then check configuration data for Node Controllers. Check that the Configured Node Controller names match the Active Node Controller names. For example, the Configured name **VIDEO** matches Active name **VIDEO**.

Redundancy example, the Configured name **VIDEO** matches Active names **VIDEO 1** and **VIDEO 2**.

A possible confusion occurs when a Configured Node Controller is given a number such as Audio 1 and Audio 2. The Redundant Active Node Controller names that match are:

Table 4-1. Redundant Active Node Controller Names

Configured	Redundant Active
Audio 1=	Audio 11 and Audio 12
Audio 2 =	Audio 21 and Audio 22

Some Inputs or Outputs not Working

The system allows control but some inputs or outputs are not working correctly, then reset the Node Controller. Check that the yellow LEDs on the matrix modules flash. This assures that the boards are communicating to the Node Controller. If one does not flash, re-seat the matrix module or try another Node Controller module.

Battery LED Not Lighted

Check that the module is seated in the frame and that power is applied. If the battery LED still does not light, return the Node Controller Module to a Grass Valley Service Depot for repair.

WARNING Lithium batteries can explode if they are improperly charged or cross-connected. If your battery requires service or replacement, please return the module to a Grass Valley Service Depot.

Alarm System

MCPU Frame Alarms Work Incorrectly

Only the alarm relays in the MCPU frame can be configured to respond to a variety of system problems. Check Alarm configuration in the *Configuration Manual* very carefully.

Additionally, if jumpers are placed in the alarm setup sockets of the MCPU Frame power supplies, they will override software selections. Jumpers should not be used in the MCPU Frame unless you do not intend to use the software-driven alarms.

MCPU Frame Alarms Won't Stop

Once triggered, the alarms must be cleared before they will stop. Refer to the Diagnostic Interface information in Section 5. The **`acc`** or **`arc`** commands can be used to clear alarms.

Configuration

Can’t Configure More Items

The number of any specific configurable element is determined by a maximum system limit and modified by the limit number you impose during configuration. For example, if you want to configure another Node Controller, and the system doesn’t respond, check your limit settings to make sure you haven’t exceeded the maximum.

Panel Template Won’t Download

Check the panel’s name. Spaces at the end, beginning, or buried within a name, or incorrect case will cause the GUI not to recognize the panel. Refer to the *Configuration Manual*.

Can’t Copy Panel Template

Check the panel’s name. Spaces at the end, beginning, or buried within a name, or incorrect case will cause the GUI not to recognize the panel. Refer to the *Configuration Manual*.

Can’t Save Config On MCPU

When a configuration file is downloaded to the Series 7000, it is stored in MCPU RAM. When the Save Config on MCPU command is executed from the GUI, the configuration file in RAM is copied to the MCPU flash ROM for permanent storage. It is possible to overrun the capacity of the ROM. If you suspect this is the case, refer to *Recovery Procedure When Flash Memory is Overfilled* *on page 4-7*.

All Items in Manual Not Available

The manual describes all potential configurable items. If some features are not enabled, certain configuration menus will not be accessible.

GUI Won’t Talk to 7000

Bad Connection

Check the connection between the GUI and the Series 7000. Both serial and Ethernet connections are described in the *Release Notes*.

Check PC Communications Settings

Check to make sure the communications settings (baud rate, stop bits, etc.) are properly set to conform to Series 7000 defaults. These are also described in the *Release Notes*.

Correct Mezzanine Board

If the cable connections and communications settings are correct, remove the MCPU module and check that the mezzanine board in the lower position is a UART Mezzanine (SLIP connection) or an Ethernet Mezzanine.

Communications Configuration

Use the *Release Notes* to verify that the installation was done correctly.

Data Routers

Incorrect Source/Destination Shown

Data Routers are unique in that a duplex path is established through the router for bi-directional communications. Since this is the case, listings of system sources and destinations may sometimes show data router sources or destinations in what might seem like the wrong list. This is normal.

Recovery Procedure When Flash Memory is Overfilled

Take care not to overfill the flash memory, as the router application can become corrupted. To determine how close the flash memory is to being overfilled, type **`dir`** from the Diagnostic Terminal to see how many free blocks remain. Delete all unnecessary control panel (.mot) files. (Control panel files remain on the PC, should they be needed.)

Should flash memory overfill, it must be reformatted in order to reclaim all of the sectors. Reformatting will destroy the configuration file in flash memory, as well as most other files, leaving only boot.ini, eventlog.ini, and console.ini. (Ensure that the GUI has the config saved. Also ensure that the **`gateways`** file – if resident in flash memory – is saved elsewhere.)

To Reformat Flash Memory:

1. Save router configuration on the GUI PC.

   Save (or write down the contents of) the following files in flash:
   `gateways` file, if any
   `*.ini` (any.ini) file other than boot.ini, eventlog.ini or console.ini
   (**`copy "thefilename" 0`** will show the file contents)

2. Enter the following command from the Diagnostic Terminal to start a reboot to reformat Flash Memory:

   ```
   C:\sms7000> Reboot
   ```

3. Hit a key to stop the boot process.

4. Enter:

   ```
   C:\SMS7000 Boot> F
   ```

5. Enter:

   ```
   C:\SMS7000 Boot> Y
   ```

   (please reformat flash) to reformat 2047 sectors with no errors.

   To resave boot.ini to flash memory:

6. Enter:

   ```
   C:\SMS7000 Boot> c
   ```

7. Enter:

   ```
   C:\ SMS7000 Boot> ctrl-D
   ```

8. Restore saved files:

   Either:

   a. Send the config to the MCPU by using the GUI to save it in Nonvolatile (Flash) Memory.

   b. Ftp the other saved files to the router.

   Or recreate the file in flash memory by typing:

   a. First line:

   ```
   copy 0 "thefilename"
   ```

   b. Second line:

   ```
   control-d
   ```

   c. verify it, type:

   ```
   C:\sms7000> copy "thefilename" 0
   ```

9. Use the **`reload`** command at the PC to reload MCPU software.

VI Reference Check

The video interval (VI) reference inputs to the Series 7000 MCPU (MR1 and MR2) and to the system Node Controllers (Ref1, Dual Sync Ref.) are critical to proper operation. These inputs are sensitive to noise in a facility, especially if a low amplitude signal like Color Black is used as the reference input.

Some situations which will produce noise on these lines are:

- Reference signal running between buildings
- Long reference signal lines within a building
- Reference signal looping between multiple pieces of equipment
- An electrically noisy environment

If the facility is prone to induce noise on reference inputs to the Series 7000, you may experience one or more of the following difficulties:

- Switching LatencyAll switches may not occur in the same vertical interval.
- Node Controller SwitchoverYour Node Controllers may switch from primary to backup unexpectedly.
- System InterruptSystem operation may be interrupted.

If you are experiencing any of the above, or another recurring problem, you should check to make sure that the reference input to the system MCPU and to all Node Controllers is clean.

Checking MCPU Reference Inputs

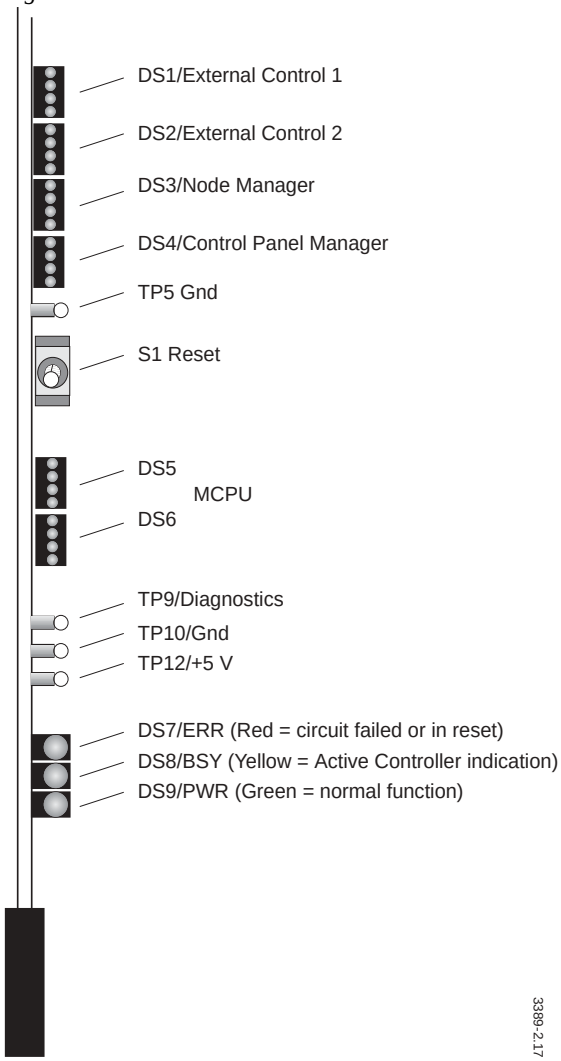
Check the MCPU reference input visually and, if necessary, by using an oscilloscope.

Visual Check

Figure 2-4 shows the front-edge mounted LEDs of the system MCPU. The bottom two LEDs of the DS6 monitor reference inputs MR1 (bottom LED) and MR 2 (the second LED from bottom).

A clean reference input will cause the associated LED to toggle at a stable rate, giving the appearance of being constantly lighted at half-brightness. (The bottom LED, MR 1, also monitors the panel edition event. This will cause a very slow flash of the LED. (Once every three to ten seconds.) This disturbance alone does not indicate a noisy reference input.)

Figure 4-1. MCPU LEDs Check

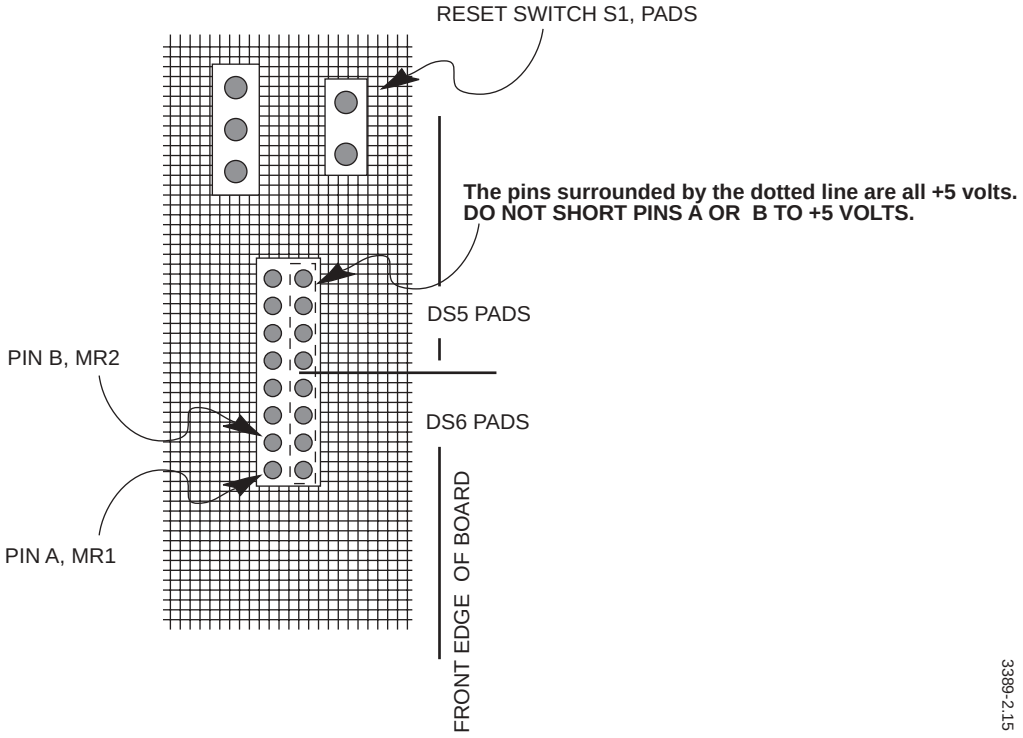


Use an oscilloscope to further check for noise on the reference inputs to the MCPU by checking the signal at the pin pads which connect to the LEDs that you viewed while checking visually. Refer to Figure 4-2.

Pin A = MR1
Pin B = MR2

- NTSC: Continuous square wave signal.
  High 16.7 milliseconds; Low 16.7 milliseconds.
- PAL: Continuous square wave signal.
  High 20 milliseconds; Low 20 milliseconds.
- If the signal is irregular, the reference input is noisy. (Remember to factor out the 3 to 10 second panel edition pulse at Pin A only.)

Figure 4-2. Checking VI Reference Using An Oscilloscope



Checking Node Control Reference Inputs

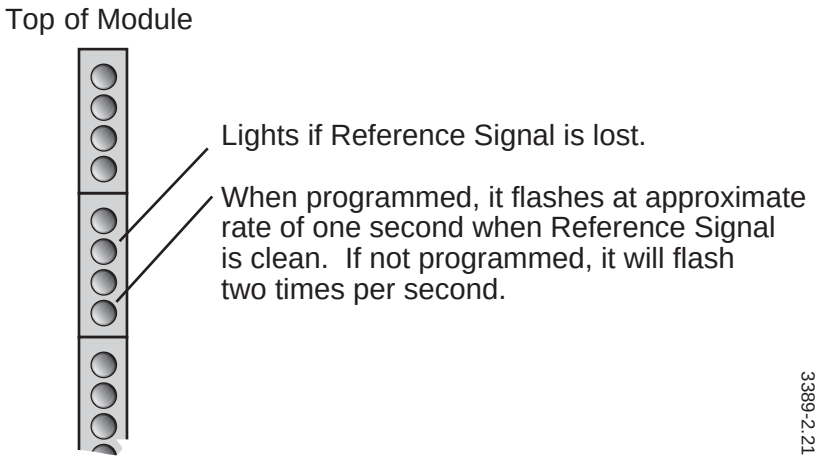
Check the Node Control reference inputs both visually and, if necessary, using an oscilloscope.

Visual Check

Figure 4-3 shows the top two of the front-edge mounted LED clusters on a Node Controller Module. The bottom LED of the second cluster down monitors the reference input to the module.

A clean reference input will cause the LED to toggle at a stable, about once per second, rate. (It toggles every 30 Vertical Intervals.) The LED will not flicker, but will be lighted, then dark, in a regular sequence.

Figure 4-3. Node Controller Reference, Visual Check

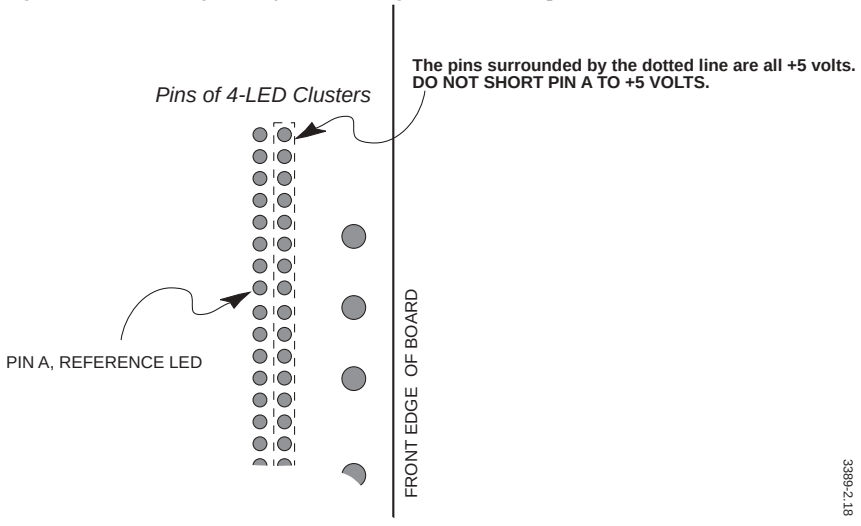


Oscilloscope Check

Use an oscilloscope to further check for noise on the reference input to the Node Controller by checking the signal at the pin pad which connect to the LED whose flashing was viewed while checking visually. Refer to Figure 4-4.

- NTSC: Continuous square wave signal.
  High 500 milliseconds; Low 500 milliseconds.
- PAL: Continuous square wave signal.
  High 600 milliseconds; Low 600 milliseconds.
- If the signal is irregular, your reference input is noisy.

Figure 4-4. Checking VI Reference Using An Oscilloscope



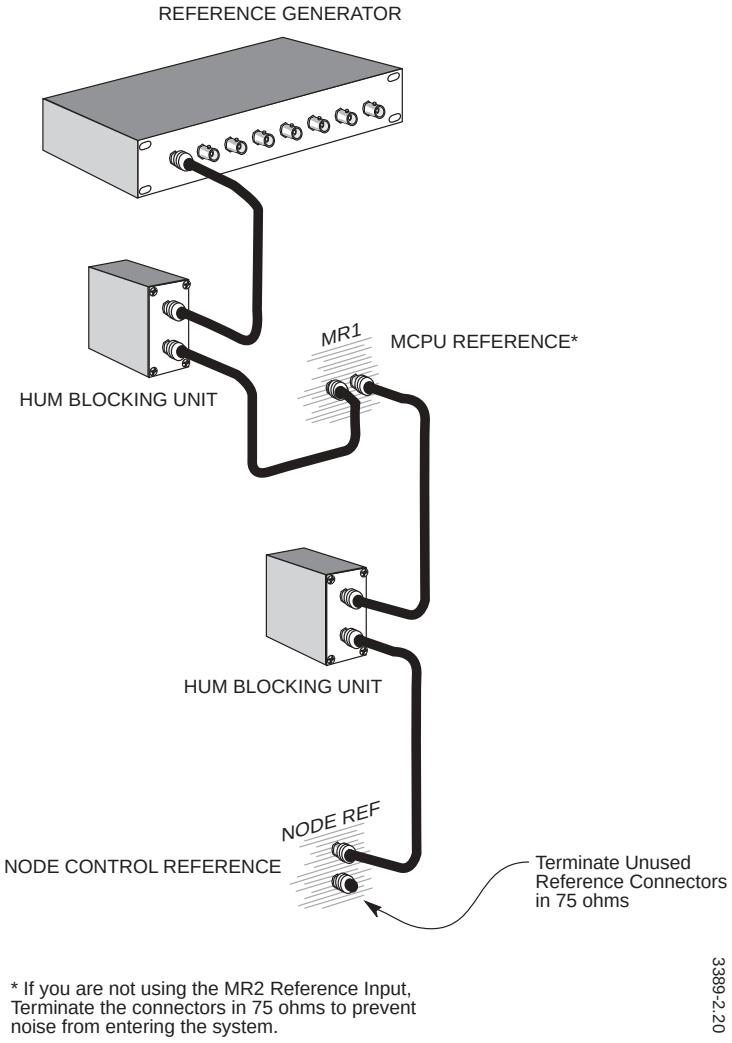
Solutions to Noisy Reference Inputs

Any noise on reference inputs which exceeds approximately 0.25 volts can cause erroneous reference interpretation and disturb system operation.

If There are Noisy Lines:

- If practical, switch reference signal from Color Black to Composite Sync. The greater amplitude of the Composite Sync will reduce the impact of high noise levels.
- If using Composite Sync is not practical, or fails to completely solve the problem, use hum-blocking units at the reference input to each MCPU or Node Controller affected by the problem. Refer to Figure 4-5.
- Optionally, use a Distribution Amplifier with common mode rejection (located in close proximity) to clean up the reference signal.

Figure 4-5. Using Hum-Blocking Units to Reduce Noise Problems



Symptom and Diagnostic Troubleshooting

The following symptom and diagnostic flowcharts are intended to guide you through a logical sequence of steps helpful in isolating a potential problem circuit module. Once you have isolated a problem, call Customer Service or return the module to a Grass Valley Products Service Center for repair.

Figure 4-6. System Communications Check Flowchart

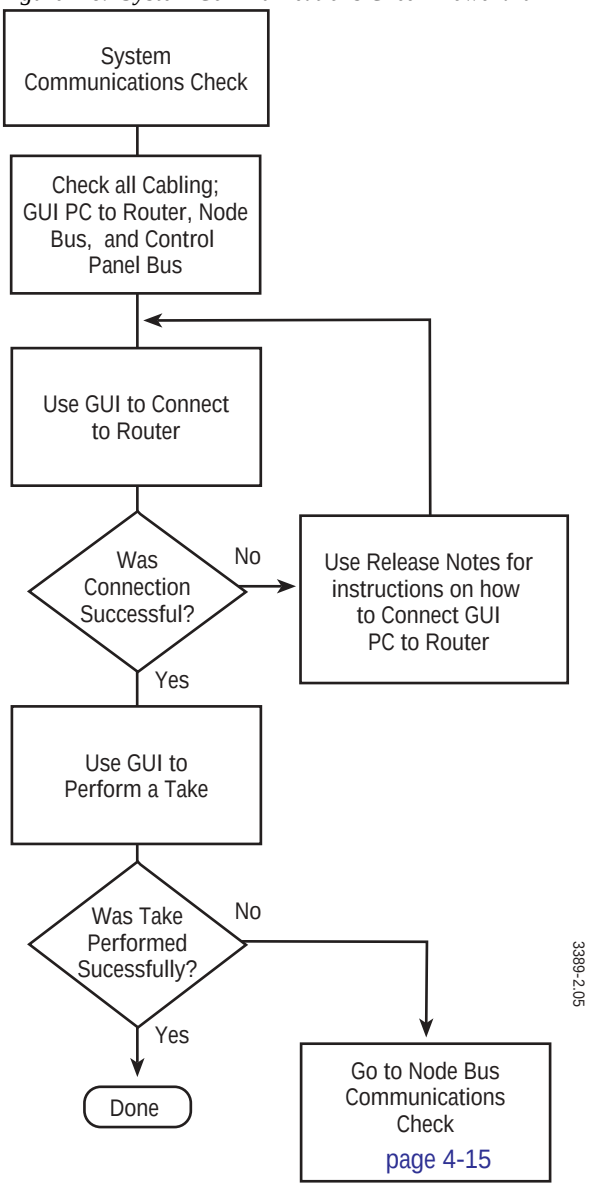


Figure 4-7. Node Bus Communications Check Flowchart

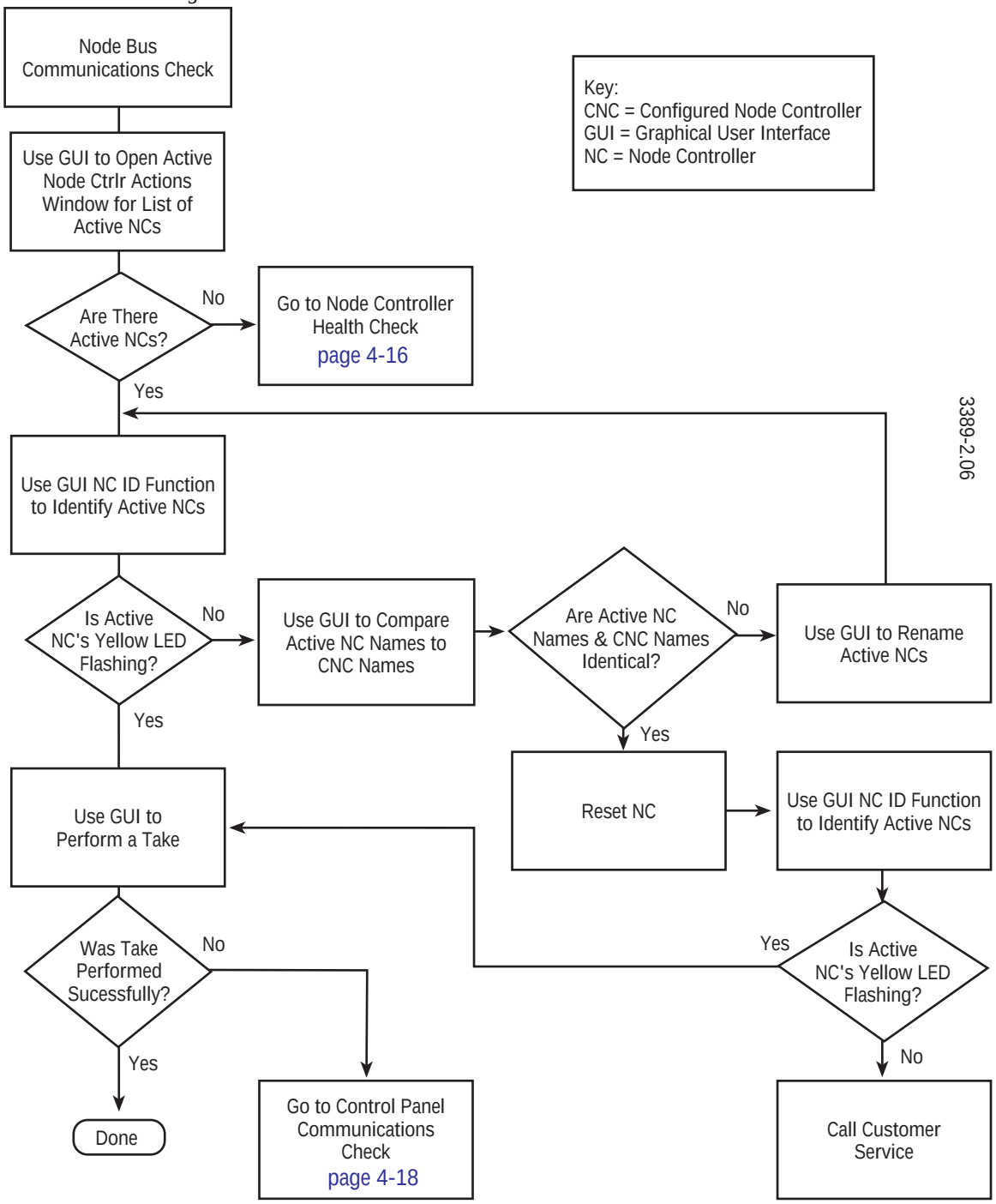
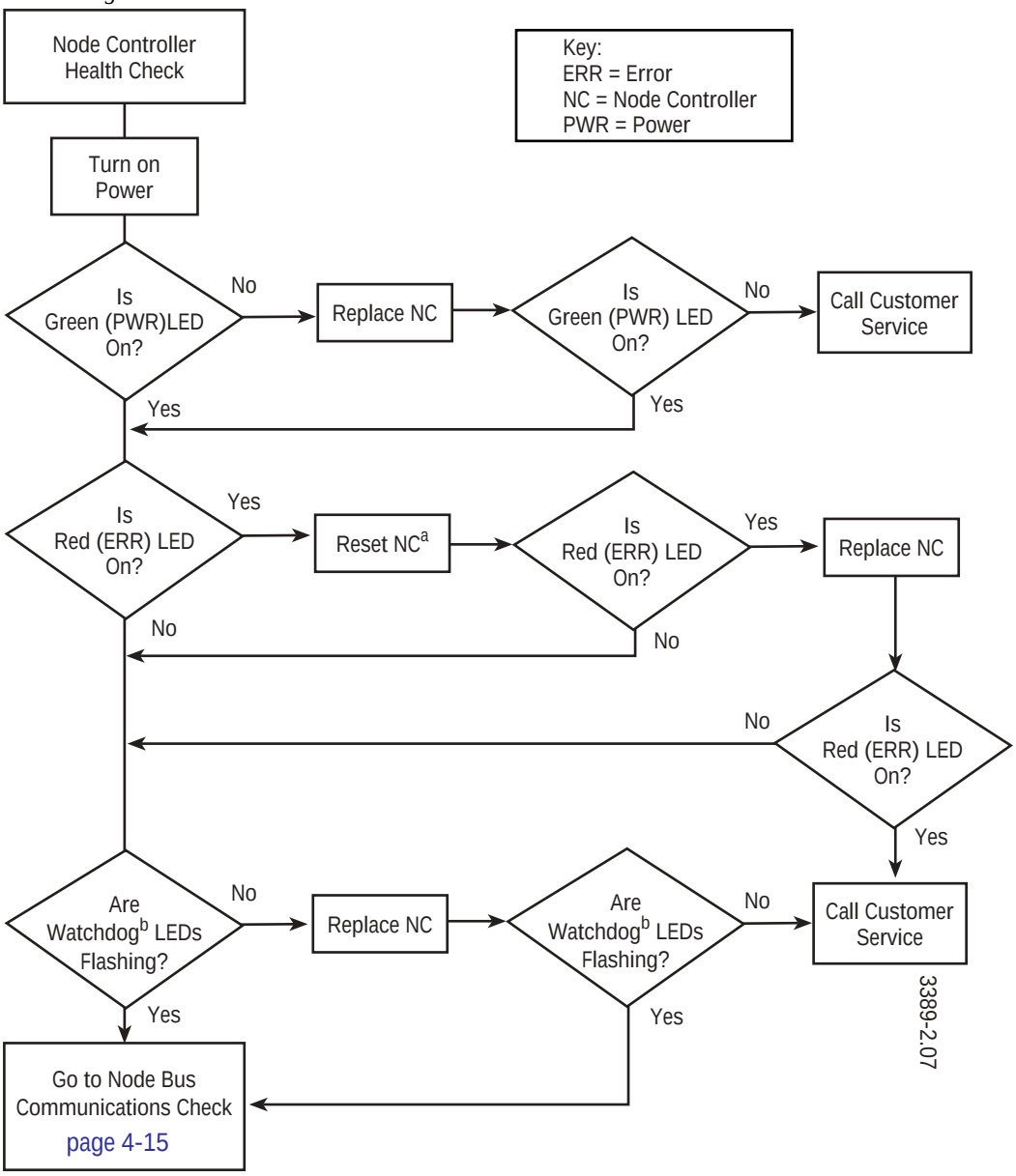


Figure 4-8. Node Controller Health Check Flowchart



a. All the LEDs will flash briefly during the diagnostic routine.
b. The Watchdog LEDs are the bottom red LED on each of the lower six data switch banks located on the Node Controller. For more information about the Watchdog LEDs refer to Node Controller Module LED Definitions.

Node Controller Module LED Definitions

Figure 4-9 illustrates the lights and LEDs on the end of the Node Controller module used to help diagnose problems. Upon reset or Node Controller switchover, the LEDs may all go through an initialization pattern before settling to the operational state described below. (For Horizon Node Controllers, see Circuit Details in this manual.)

Figure 4-9. Node Controller Module LED Definitions

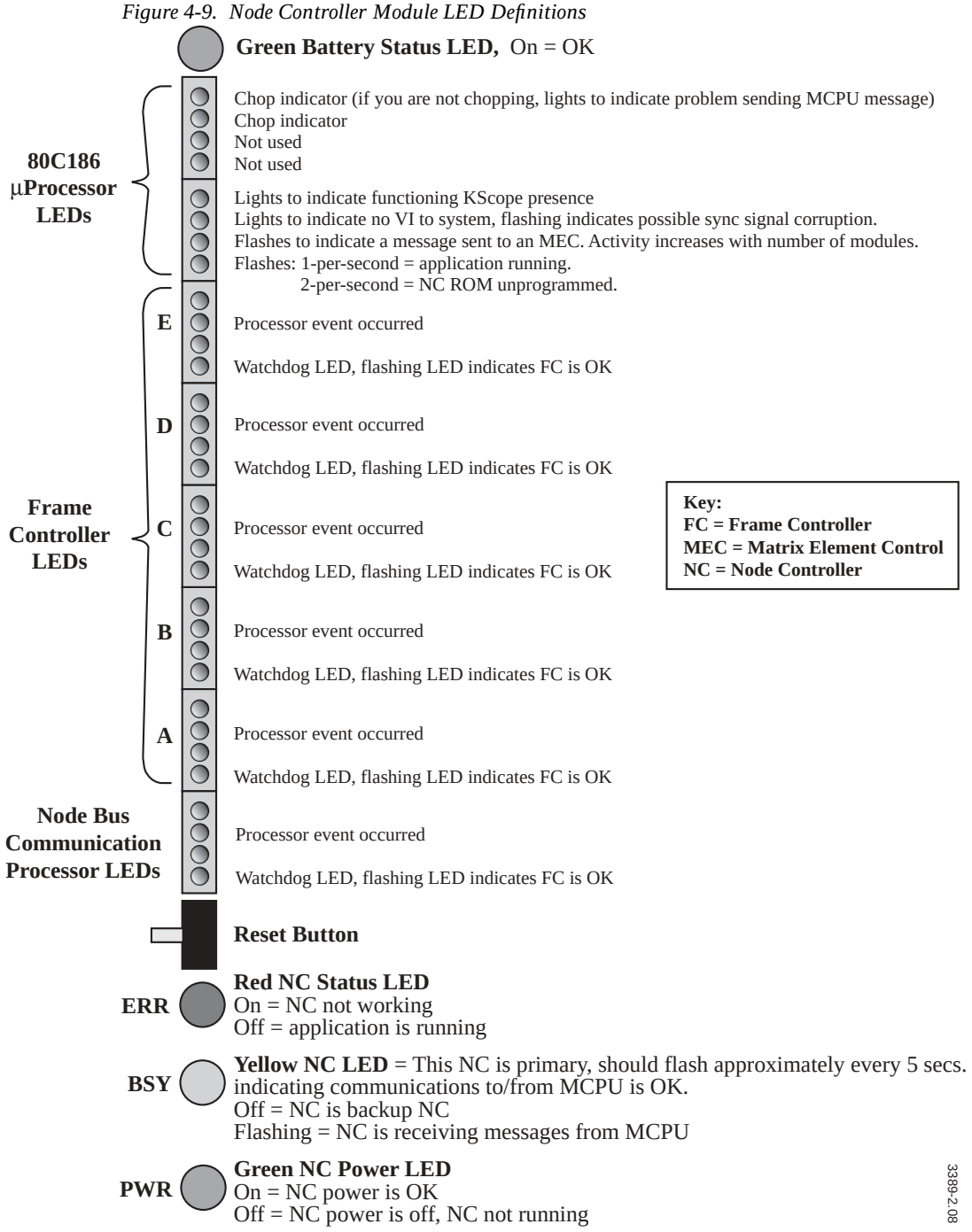


Figure 4-10. Control Panel Bus Communications Check Flowchart

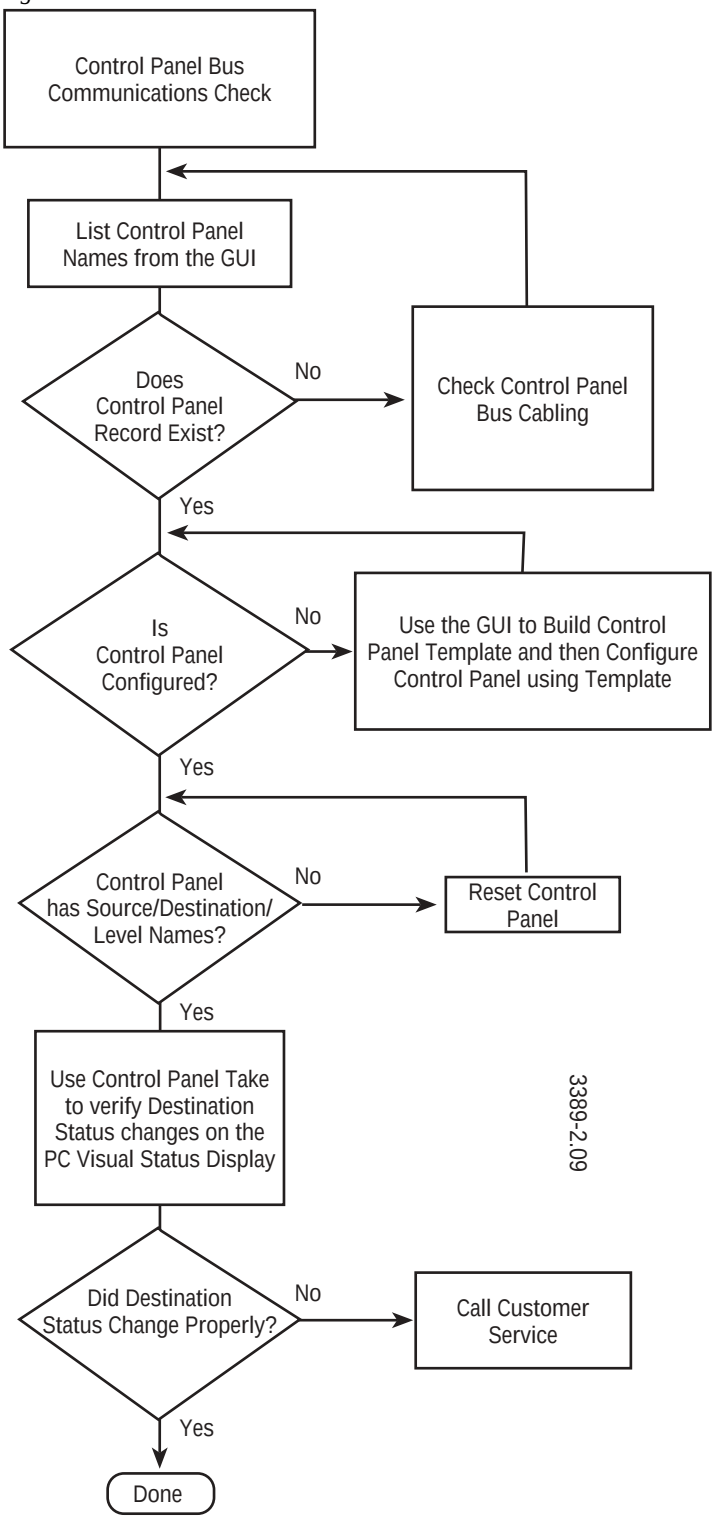


Figure 4-11. MEC Module Check Flowchar

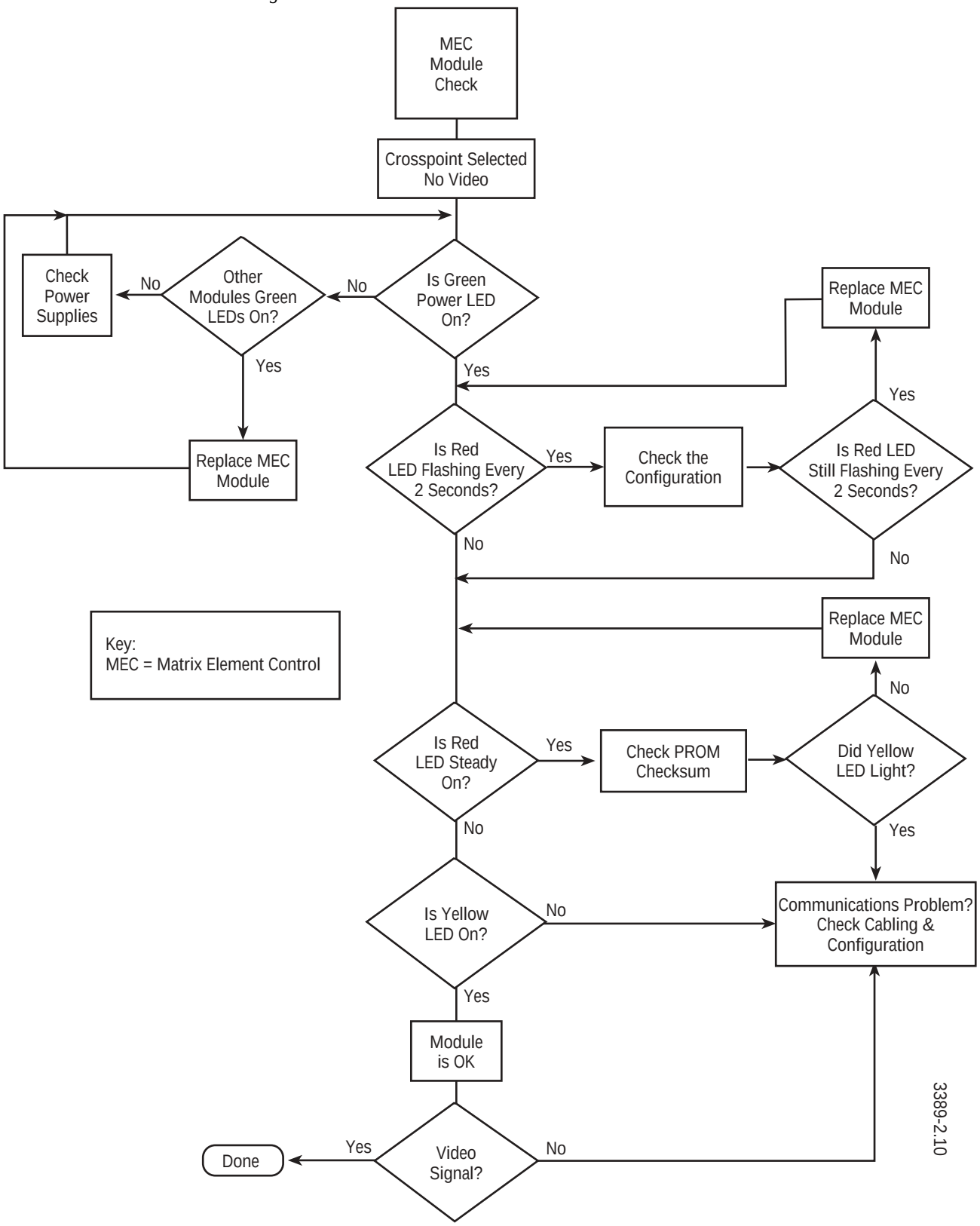
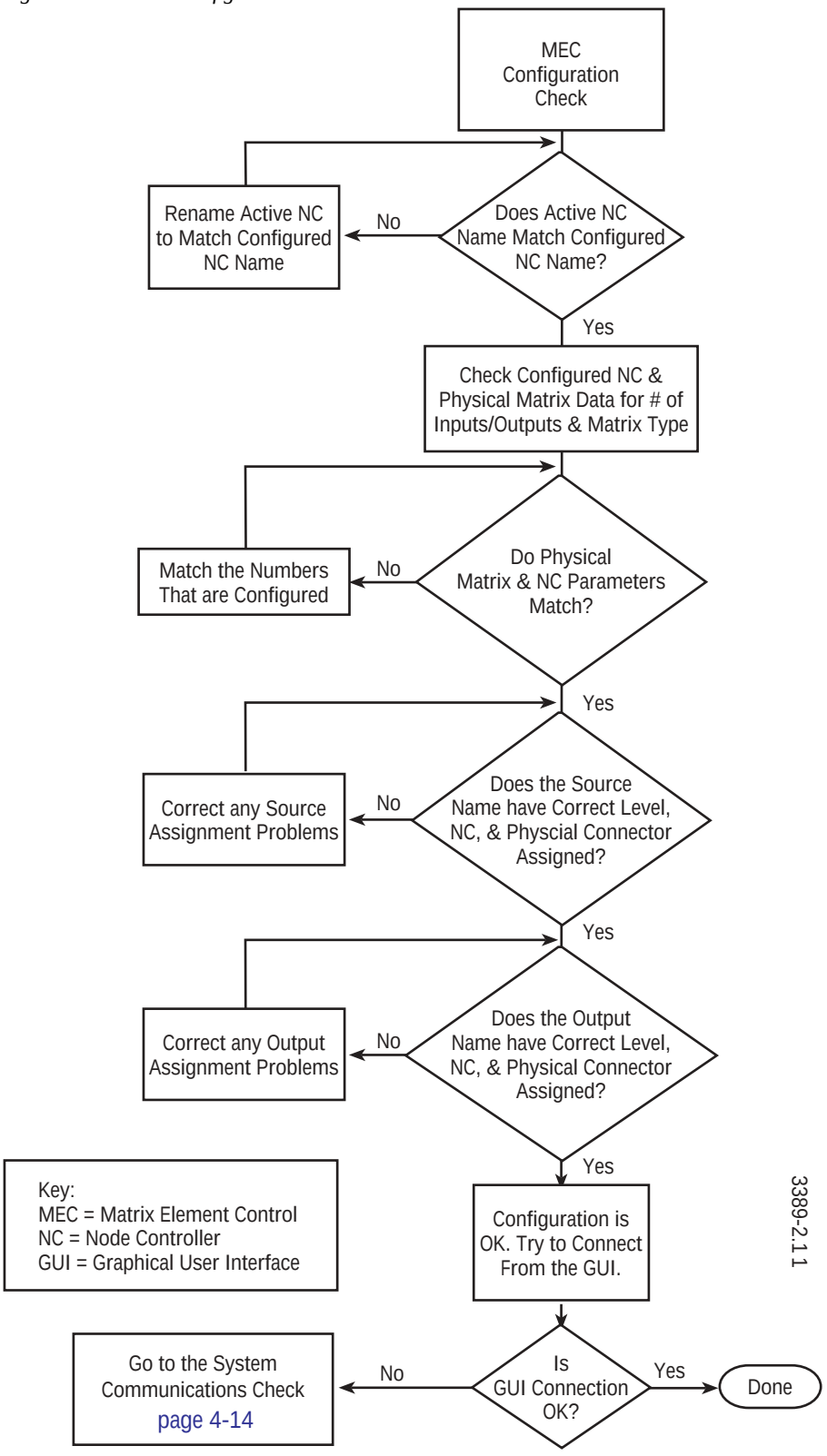


Figure 4-12. MEC Configuration Check Flowchar



Matrix Element Control Module LED Definitions

Figure 4-13 illustrates the LEDs on the end of the Matrix Element Control module used to help diagnose problems.

Figure 4-13. Matrix Element Control Module LED Definitions

Red MEC Status LED

ERR 

On = flash every two seconds, problem resetting
On = continuously, MEC board not running
On = briefly, communications error
Off = application is running

Yellow MEC LED

BSY 

On = this MEC module is in use
Off = this MEC module is NOT in use
Flashes = once, NC is transmitting a non-periodic messages to this MEC module
Flashing = continuously, GUI causing flashing to identify this MEC module

Green MEC LED

PWR 

On = all MEC module power supplies are OK
Off = one or more MEC power supplies are out of specification

Key:

MEC = Matrix Element Control
GUI = Graphic User Interface
NC = Node Controller

Figure 4-14. Video Check Flowchart

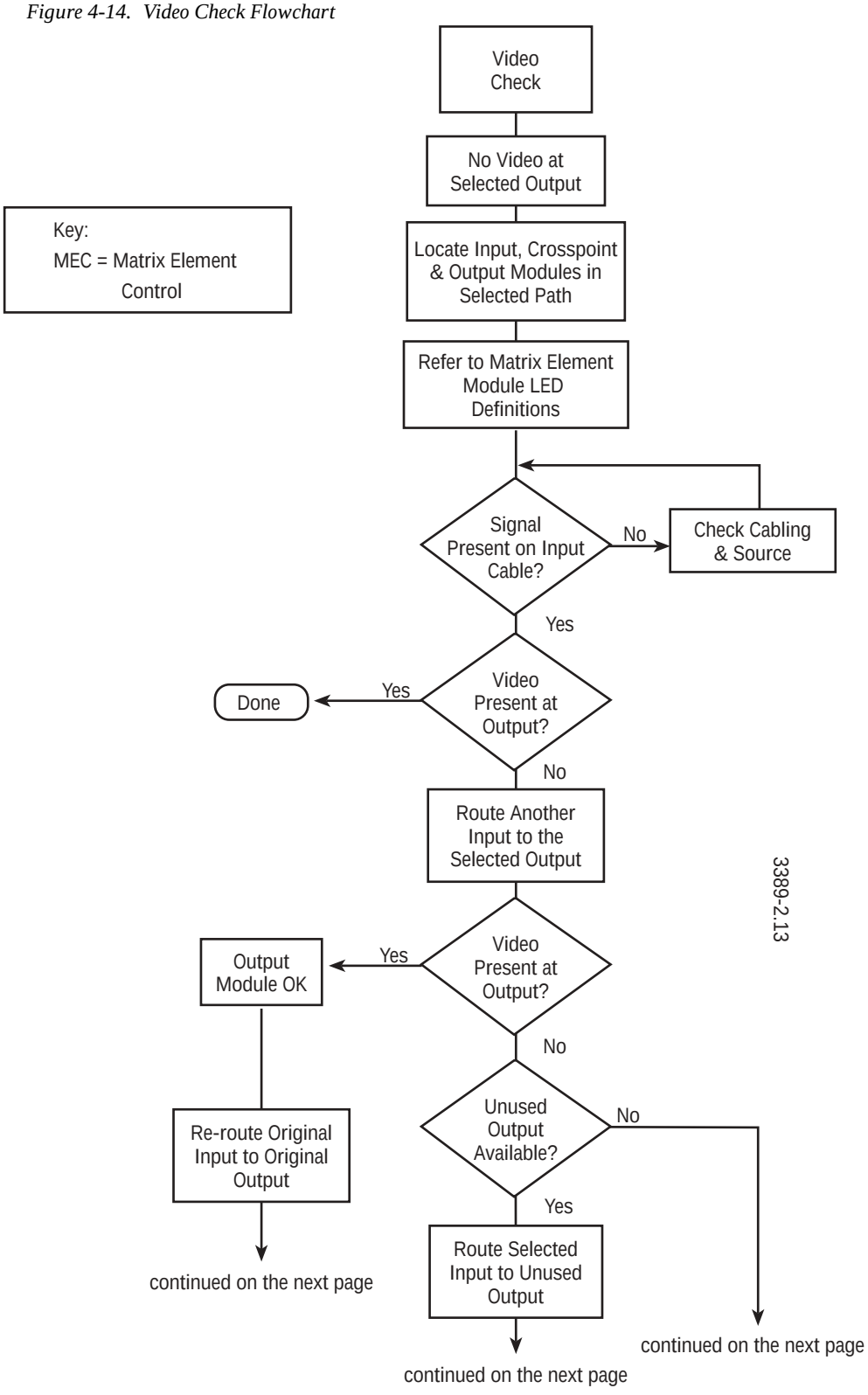
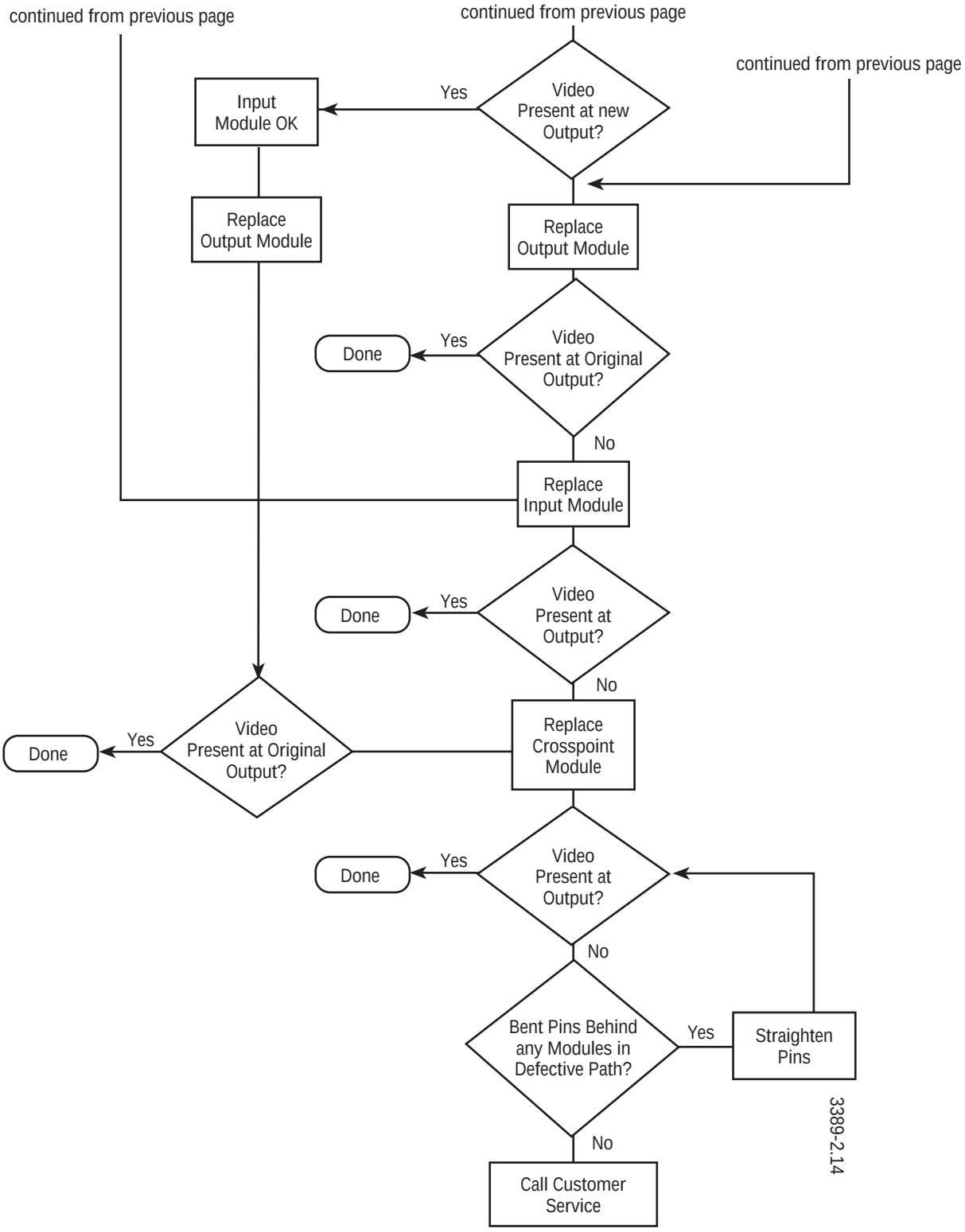
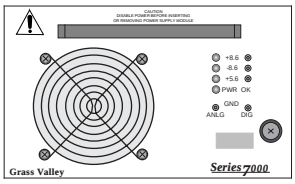


Figure 4-15. Video Check Flowchart (continued)



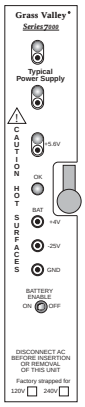
Power Supply Modules



Stand-Alone Power Supply

Series 7000 System matrix frames use a stand-alone 1200W power supply unit contained in a separate two unit drawer frame, or a compact power supply module.

The stand-alone 1200W power supplies are sealed units and can not be serviced in the field. Contact a Grass Valley Customer Service Representative for assistance in obtaining replacement units.



Compact Power Supply Module

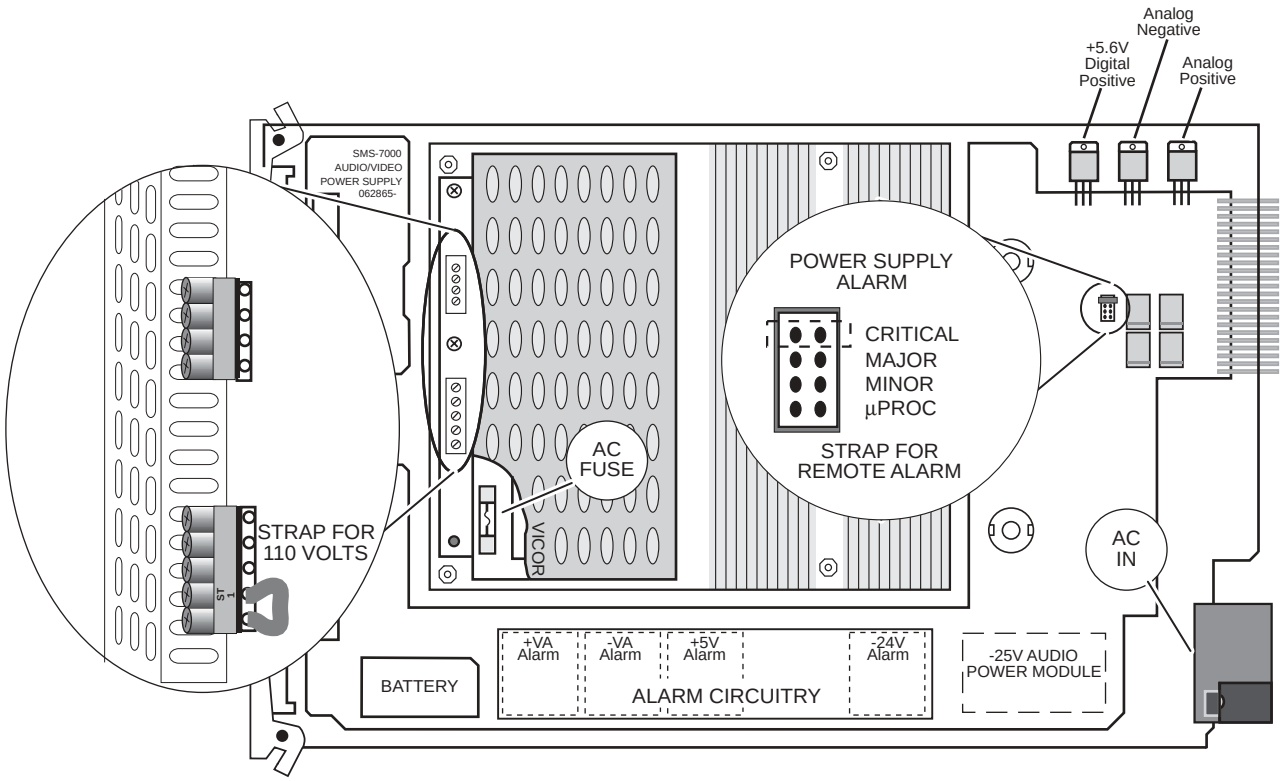
The compact power supply modules can have an external user-supplied alarm connection. They also have an AC fuse which may be replaced.

Compact power supply modules are used in video systems (frames) or in audio or data matrices. Several different modules are used, depending upon matrix type (video, audio, etc.) and input AC voltage.

All compact power supplies consist of a sealed core power supply mounted on a circuit board. These provide AC input connection, voltage testpoints and indicator LEDs, battery backup for MCPU RAM, power supply failure alarms, and DC power distribution to frame power rails. DC voltage outputs and labels may vary.

Figure 4-16 provides an example of a core power supply and the circuit board on which it is mounted. The strap is inserted for 110V operation.

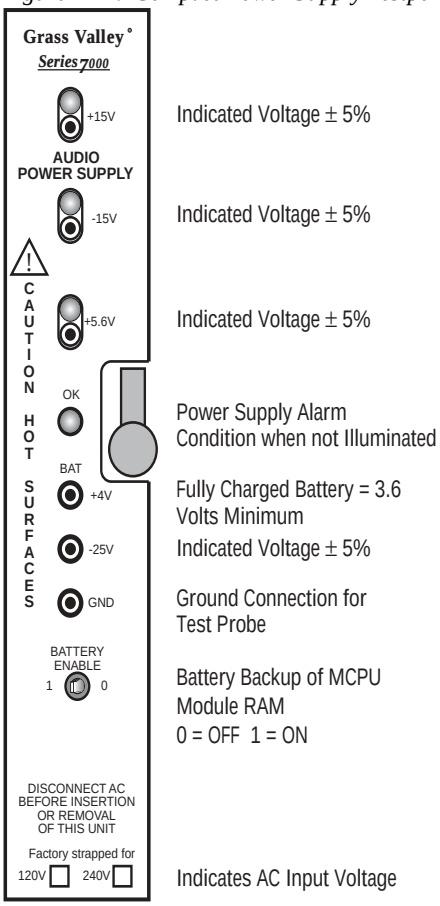
Figure 4-16. Typical Compact Power Supply Core Unit and Board



Testpoints, Indicators, Battery Enable

Testpoints and indicators on the front of each power supply provide visual and measurable evidence that the power supply is functioning correctly. Refer to the illustration below.

Figure 4-17. Compact Power Supply Testpoints and Indicators



Remote Alarms

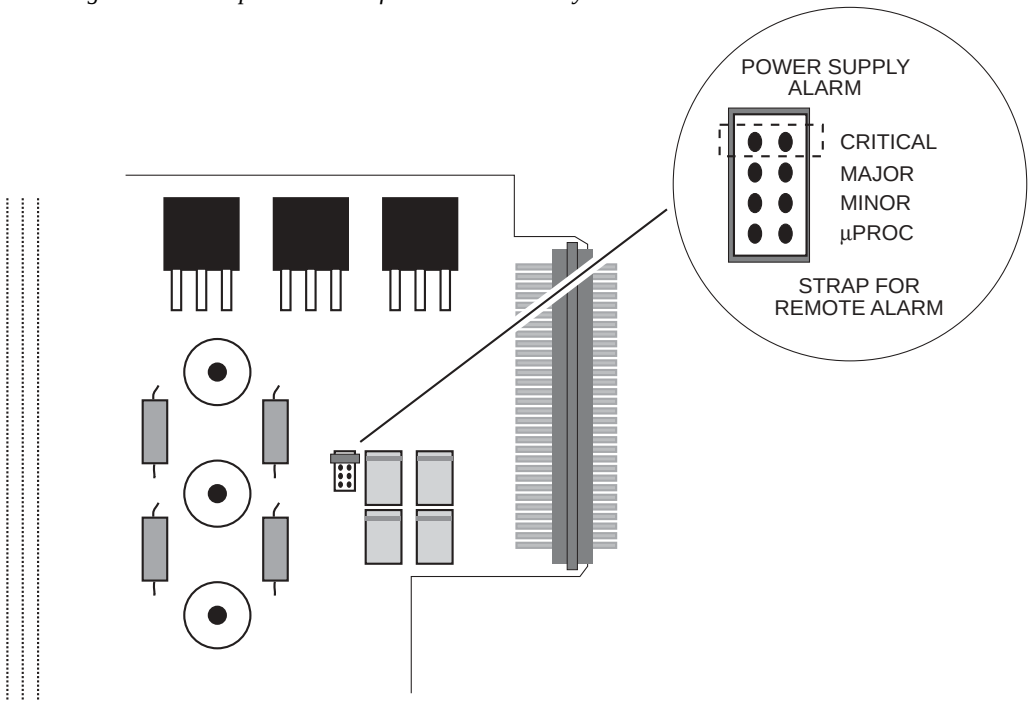
A 15-pin Alarm D connector is provided on the connector channel of compact and control frames. The connector provides access to one of four relays. The active relay is determined by the placement of a jumper on the power supply board. If any core power supply output fails, a circuit path is provided between the Normally Open and Common pins of the active relay.

The four relays are arbitrarily named:

- Critical Alarm
- Major Alarm
- Minor Alarm
- Microprocessor Alarm

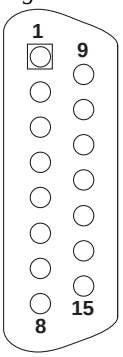
Figure 4-18 illustrates the jumper positions and resulting active relays. Note that, on the Control Power Supply, the jumper is in a different location on the board.

Figure 4-18. Jumper Selection of Active Alarm Relay



Once an active relay is selected, it is possible to connect an external, user–supplied visual or aural alarm. Figure 4-19 illustrates the pinout of the Alarm connector.

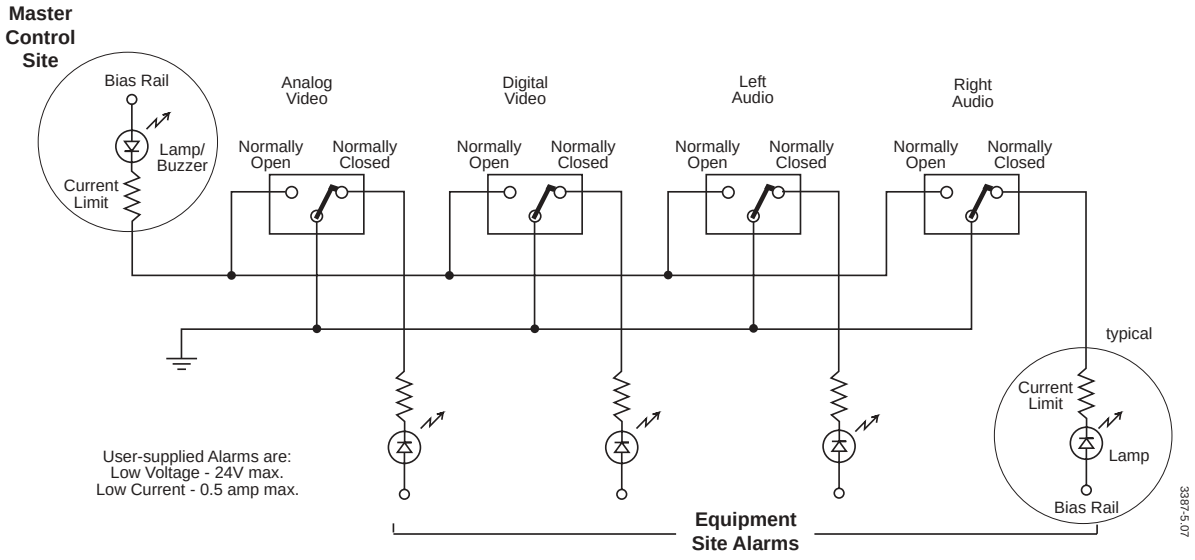
Figure 4-19. Alarm Connector Relay Pinout



Contact Closures		
Alarm	**Normal Condition**	**Alarm Condition**
Critical	1 to 3	2 to 3
Major	4 to 6	5 to 6
Minor	7 to 9	8 to 9
µProc (Controller)	11 to 12	10 to 12
µProc (others)	10 to 12	11 to 12

Only a contact closure is provided. There is no path to ground or any power provided from the Series 7000. The external alarm system may be designed to meet your requirements. Voltage passed through the alarm relay must not exceed 24VDC. Figure 4-20 illustrates a generic alarm installation.

Figure 4-20. Generic Alarm Installation



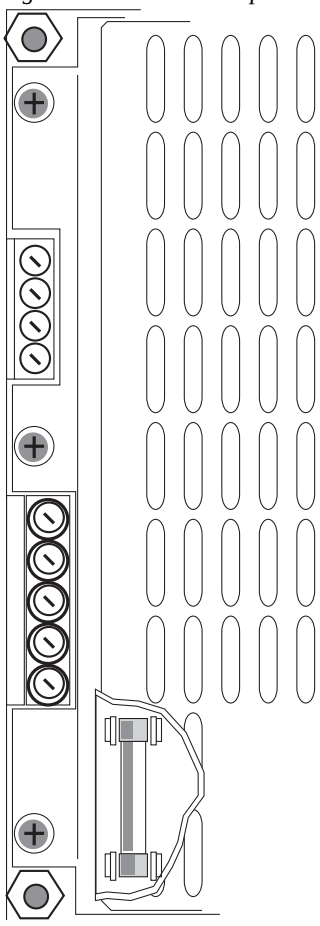
AC Fuse

An open fuse frequently indicates problems either within the core supply or in one of the modules it is supporting. The core unit of the compact power supply can be accessed and the fuse replaced, but the cause of the fuse failure should first be determined.

To replace a fuse in the core power supply unit:

1. Disconnect AC power and remove the module from the system.
2. Remove the three crosshead screws illustrated.
3. Open the perforated cover of the core supply.
4. Replace the AC fuse with one of the same size and rating (250V, 15A).
5. Replace the supply cover.

Figure 4-21. AC Fuse Replacement



Section 5

Diagnostic Terminal

Introduction

The Diagnostic Terminal Interface connection, is described in the *Installation Manual*. Diagnostic Terminal commands or queries are sent to the Series 7000 MCPU by typing in the command, then pressing **RETURN**.

Command/Query Listings and Examples

Table 5-1 on page 5-6 contains all commands and queries in alphabetical order and provides an example of usage. The Diagnostic Interface provides a Help function. Entering **h** alone will provide general Help instructions; entering **h**, followed by a command name, (for example **h anc)**, will provide help focused on that specific command.

If a command or query contains a proper name, for example, a source, destination, or level name, the name must be enclosed in quotation marks. If a command or query containing a proper name is entered and it does not execute, try it again enclosing each proper name in quotation marks.

Because the Diagnostic Terminal is based on a binary numbering convention, system elements which are numbered (inputs, outputs, levels, etc.) may be numbered beginning with zero rather than one as they are when working in the GUI. This results in a numbering offset of one (1). For example, input 0 in this interface is input 1 in the GUI. When listing or communicating with system elements, the zero-based number is the Index Number. The Index Number is used in the body of some commands.

When in communication with the Diagnostic Interface, the prompt visible on the terminal will be:

```
SMS7000>
```

Commands or queries are sent to the Series 7000 MCPU by typing in the command, then pressing the **RETURN** key. In the following examples, instructions to press **RETURN** are omitted and are assumed to be understood. A specific example of entry format, setting time, follows.

To set time:

At the SMS7000> prompt-

```
SMS7000> st mm dd yyyy hh mm ss
```

Where:

st = Set
mm= Month of year in two digits (01 through 12)
dd= Day of month in two digits (01 through 31)
yyyy= Calendar year in four digits (i.e., 1994)
hh= Hour of day, 24-hour clock (01 through 24 [01=1:00am, 24= 12:00pm])
mm= Minutes
ss= Seconds

Example: If the date were April 20, 2000 and the hour was 8:12am plus 52 seconds, command would be -

```
SMS7000> st 04 20 2000 08 12 52
```

CAUTION Potential System Disruption. Some commands can have serious consequences to system configuration and operation if used incorrectly or accidentally. The Diagnostic Interface is a service tool and is intended for use by qualified programmers. If given a command which will destroy files, or make major system changes, the Diagnostic Interface will execute the command without warning of consequences. Use this interface carefully!

Diagnostic Command (Booted)

The Series 7000 system requires certain parameters in order to power up, or boot. This initial process must establish network addresses and names, but most important is what boot device has the application software to be used.

boot device: fi - get the application from the MCPU resident flash memory
boot device: ei - get the application from the ethernet network
boot device: sl - get the application from the slip network

Use the following command to edit the current boot string in ram and the boot.ini file in FM0 (the following is an EXAMPLE only):

SMS7000>booted <enter>
. = clear field; **-** = go to previous field; **^D** = quit
boot device : **fi**

```
processor number    : 0
host name           : PC
file name           : sms
inet on ethernet (e) : 192.0.2.2:ffffff0
inet on backplane (b): 192.0.3.4
host inet (h)       : 192.0.2.1
gateway inet (g)    :
user (u)            : smsuser
ftp password (pw) (blank = use rsh): smsuser
flags (f)           : 0x8
target name (tn)    : sms7000
startup script (s)  :
other (o)           : ei
```

Usage Notes

The cursor will stop at the end of each line.
To change the line, enter the changes and <enter>.
To advance to the next line, (no change), just <enter>.
To clear field (remove line data), type **.** (period) then <enter>.
To backup to previous field, hit **-** (minus) then <enter>.
To quit, hit **^D** (control key and D key). SMS7000 prompt appears.

Any changes to the above will change the FM0:BOOT.INI file in flash memory and the current copy of this file saved in protected sram. However, these changes are installed:

- At the next bootup via the SMS7000>Reboot <enter> command
- After hit of the MCPU reset button on module front edge
- After reapplication of the MCPU module power

Accessing Help

The Diagnostic Terminal Help feature is hierarchical. If **h** is entered it will provide all the possible command classes as shown below.

Figure 5-1. Help Menu

```
wdstassign
SMS7000> h
============================================================
Grass Valley Group SMS7000 System Diagnostic Terminal - Classes
of Command
asi -- ASsIgnments and tielines
cfg -- ConFiGuration (misc)
file - FILE operations
entw - External NeTWork (ethernet/slip) operations
mtx -- MaTriX operations
nap -- NAtive Protocol; WARNING; intended for factory and custom
use only!
ntw -- NeTWork information; includes devices & files
pnl -- PaNeL operations
prc -- PRoCesses; servers & tasks, incl. status, editions, etc.
sta -- STAtus inquiries
sys -- SYStem information; mode changes, processes, stack, etc.
tak -- TAKes; includes protects, salvos, chops
tkn -- ToKeNs; list of all available keyword tokens
tly -- source TaLlY system
```

To access a list of the commands in one of the possible classes (i.e., asi):
SMS7000> **h asi**

Figure 5-2. Help Class Commands

```
================================
SMS7000> h asi
asi -- ASsIgnments and tielines
assign
deassign
dstassign
inuse
ls
off
on
pr
rdstassign
roomassign
room
tltype
tl
```

For help specific to the usage and intent of a specific class command, for instance, assign:
SMS7000> **h assign**

Figure 5-3. Assign Command Help

```
SMS7000> h assign
command usage: "assign" "dstName", "srcName" to assign
a source to
```

Commands and Queries

Table 5-1. Diagnostic Terminal Commands

Command	Meaning	Usage	SMS7000>
acc	Alarm/Statistics Clear	Used alone to clear all alarm relays and statistics. Also see **arc**.	**acc**
alarm	Alarm	Used alone to list configured alarms. Used as a modifier following ls (list) to list each alarm and details about its configuration.	**ls alarm**
amezi	Asynchronous Mezzanine	Used as a modifier following ls (list) to Active Mezzanine Networks with a brief summary of their configuration.	**ls amezi**
anc	Active Node Controller	Used alone or preceded by ls (list) to list Active Node Controller modules in the system. Used with rename (rename) and renamebyaddr (rename by address) to rename Active Node Controller modules.	**ls anc**
arc	Alarm Clear	Used alone to clear all alarm relays. Also see **acc**	**arc**
art	Alarm Test	Used alone to test alarm relays. After the test, the alarms are cleared; statistics remain unchanged.	**art**
as	Alarm Status	Used alone to list configured alarms, number of occurrences, and assignment (Major, Minor, µProc).	**as**
assign	Assign	Used with Destination and Source names to assign a Source to a Destination. This is not a Take operation, but rather an implementation of an Assignment System if it has been configured using the GUI. An assignment system allows specified sources to be assigned to a destination or destinations. Thereafter, the source can be connected to the destination only if it is on the assignment list. Assignment can be used as a condition of tally if so flagged when configuring the Tally System using the GUI.	**assign DestName SrcName**
btn	Button	Used as a modifier following the pr (print) command and followed by a specific control panel template name to display the Keypad Set name, specific prefixes assigned to buttons (display arrangement matches panel button arrangement), Suffix Set, and specific suffixes assigned.	**pr btn TemplateName**
camezi	Configured Amezis	Used alone to get a count of Amezis configured, Amezi limit. Used as a modifier following ls (list) to view Amezi configurations.	**ls camezi**
chopint	Chop Interval	Used alone to examine the current chop interval (see the chop description preceding), or followed by a numeric modifier (from 0 through 16) specifying the interval in seconds. An interval of 0 (zero) would disable the chopping function.	**chopint 10**
clrtlfeedtodst	Clear tieline usage by a destination	Used to clear tielines used by a destination.	**clrtlfeedtodst dstname**
clearallprotects	Clear All Protects	Used alone to clear all protects in the system.	**clearallprotects**
cnc	Configured Node Controller	Used by itself or preceded by ls (list), displays the configured node controllers used, the limit, the number and name of each, and reference channel and status information.	**ls cnc**
coproc	Coprocessor	Used to show the coprocessors in the system. ls coproc provides the coprocessors and their configuration information (I/F type, redundancy type, slot, mezzanine position)	**ls coproc**
csg	Client Server Group	Used alone to list Client/Server Panel groups. Used as a modifier following ls (list) to list Client/Server Panel groups by number. Used as a modifier following pr (print) and preceding a Client/Server Panel group name to list information about that group specifically.	**(list all groups): ls csg (list specific group): pr csg groupname**
diaglog	Diagnostic Log	Used as a modifier after the pr (print) command to list the Series 7000 Diagnostic Log.	**pr diaglog**
diagnose	Diagnose	N/A	**N/A**

Table 5-1. Diagnostic Terminal Commands - (continued)

Command	Meaning	Usage	SMS7000>
dirtly	Direct Tally	Used alone to list names of Tally Modules with direct tally assignments. Used as a modifier after ls (list) to list names and addresses of Tally Modules with direct tally assignments.	**ls dirtly**
dmacount	DMA Count	Used as a modifier after clr to clear DMA counts which are listed in the system status (SS) display.	**clr dmacount**
dmtx	Data Matrix	Used alone or as a modifier after ls (list) to list number, limit, names, and order of assignment of Data Matrices. Used as a modifier after pr (print) and followed by a specific data matrix name to list the forward and reverse levels.	**pr dmtx MtxName**
drtst	Dual Reference Test	Used for debugging the monitor board dual reference sensing. reset (or no value) =stop test, changes= print changes, (note this is not implemented yet), all= print all once, forceauto, force auto mode, off=turns off code in NC, diags= sends values to registers (2,3,4,5) on monitor (ex. diags 2 3 4 5).	**drtst all**
dst	Destinations	Used alone to list names of all destinations. Used as a modifier following ls (list) to list destinations by level name. Used as a modifier following pr (print) to list destinations by virtual matrix bitmap.	**pr dst**
dstassign	Destination Assignments	Used alone or as a modifier following ls (list) to list destination assignments by number. Used as a modifier following pr (print) to list destination assignments in greater detail.	**pr dstassign dstname**
dststat	Destination Status	Used, followed by a Destination name (and optional specified level) to print status of a Destination.	**dststat dstname**
exception	Exception	Used as a modifier following ls (list), clr (clear), or set to list, clear, or set exception objects.	**clr exception**
excl	Exclusions	Used alone or as a modifier following ls (list) to list exclusions (sources excluded from selection on particular destinations) by number. Used as a modifier following pr (print), and followed by a specific destination name to see exclusions for that destination.	**pr excl DstName**
ext	External Devices	Used as a modifier following ls (list) to list active external devices communicating over the 7000 buses (automation systems, other routers, etc.).	**ls ext**
gncv	Get Active Node Controller Version	Used alone or as a modifier preceding an Active Node Controller index number to retrieve the version number of the software on that Node Controller.	**gncv 2**
gt	Get	Used alone to view date and time settings.	**gt**
h	Help	Used alone to view general system help. Used preceding specific commands to view information about that command specifically.	**h anc**
inuse	Inuse	Used to list TieLine usage information.	**ls inuse tl**
krtr	Kaleidoscope or Kadenza Router	Used alone or as a modifier following ls (list) to view the number, limit, names, and order of assignment of Kaleidoscope or Kadenza interfaces. Used as a modifier following pr (print), and followed by the specific interface name to view input assignments within that interface.	**ls krtr or, pr krtr KISS/ VISS**
lm save default	Limit Save Default	Saves the current exception severity limit for exception display, as the default used after system initialization. See Diagnostic Messages later in this section.	**lm save default**
lm save severity	Limit Save Severity	Saves the current exception severity limit for exception display, as the system default used during system initialization. See Diagnostic Messages later in this section.	**lm save severity**
lm severity	Limit Severity	Used alone to list current exception severity limit for exception display. Used followed by severity level name, off, or default to set level, disable system, or set default. See Diagnostic Messages later in this section.	**(view setting): lm severity (set limit to Error): lm severity error**
logout	Log Out	If using TelNet from a PC or workstation, use logout to log out of the Diagnostic Interface.	**logout**

Table 5-1. Diagnostic Terminal Commands - (continued)

Command	Meaning	Usage	SMS7000>
ls	List	Used preceding many topics to list pertinent information. Enter h ls for a list of topics which work with the list command.	**ls anc**
lvl	Level	Used alone or as a modifier following ls (list) to list levels and associated virtual matrices. Used as a modifier following pr (print), and followed by a specific level name to view information about that level.	**pr lvl LvlName**
mez	Mezzanine	Used as a modifier following ls (list) to list mezzanine board slot, location, ID, and type.	**ls mez**
mezconfig	Mezzanine Configuration	Used as a modifier following ls (list) to list mezzanine board slot, location, ID, type, and configuration information.	**ls mezconfig**
monitor	Monitor	Used preceding a destination name to take it to the monitor output. A control panel configured to control the monitor crosspoints should be used for this function.	**monitor DstName**
monitorcon	Monitor Connection	Used followed by a Physical Matrix name, followed by a Physical Matrix output number to take it to the monitor output. A control panel configured to control the monitor crosspoints should be used for this function.	**monitorcon PMName PMOutput#**
off	Off	Used as a modifier following bs (Broadcast Status Task), ds (Destination Status Task), log, netevent (Net Event Task), poll (Polling Task), sc (Spit Connect Task), or spit (Spit Task) to deactivate the specified task.	**netevent off**
on	On	Used as a modifier following bs (Broadcast Status Task), ds (Destination Status Task), log, netevent (Net Event Task), poll (Polling Task), sc (Spit Connect Task), or spit (Spit Task) to activate the specified task.	**netevent on**
pm	Physical Matrices	Used alone or as a modifier following ls (list) to list the number, limit, name, configuration, and assignment order of Physical Matrices. Used as a modifier following pr (print), and followed by a specific physical matrix name to display a map of the active crosspoints for that matrix.	**pr pm PMName**
pr	Print	Used as a modifier preceding many item types (anc [active node controller], cnc [configured node controller], etc.,) to display information about that item type.	**pr cnc**
prog	Program	Used as a modifier preceding fileName, deviceType, and deviceSubtype (if needed) to program application code into the flash memory of certain devices. Additional information see *prog Command* *on page 5-10*	**prog FileName cp bps**
pxg	Programmable X-Y Groups	Used to list PXY panel groups.	**ls pxg**
rdstassign	Read Destination Assignment	Used, followed by a file name, to read in destination assignments from a specified file.	**rdstassign "filename"**
read	Read	Used as a modifier followed by a configuration file name to read the configuration file in Flash memory of the currently active MCPU into the RAM memory of that same MCPU. (The system operates using the configuration in RAM.) Also see the **wc** command.This command will completely erase the existing configuration in RAM. Be sure this is the intent before exercising this command.	**read c.cl**
\Reboot	Reboot	Reboots the Series 7000 Control System. Used alone. System will reboot. This command will reboot your Series 7000 Control System. Be sure this is the intent before exercising this command.	**Reboot**
room	Room	Used alone or as a modifier following ls (list) to list rooms. Used as a modifier following pr (print), and followed by a specific room name to list information about that room.	**pr room RoomName**
roomassign	Room Assign	Used as a modifier following pr (print), and followed by a specific room name to list room assignments.	**pr roomassign RoomName**
rtc	Real Time Clock	Used alone to display current real-time clock information.	**rtc**
s	Status	Used as a modifier preceding a specific destination name to display source assigned to that destination (status), and protect, chop, downstream, and downstream chop status.	**s DestName**

Table 5-1. Diagnostic Terminal Commands - (continued)

Command	Meaning	Usage	SMS7000>
slot	Slot	Used as a modifier followed by a slot number (1-10) to determine what mezzanine cards are present on the CIF module in that slot. Used as a modifier followed by a slot number (1-10) and switch to initiate a manual switchover of primary and redundant CIF modules in the slot-pair. Additional information see *slot Command* *on page 5-11*.	**slot Slot# switch**
st	Set	Used alone to examine system date and time. Used as a modifier preceding date and time to set system date and time. Date, Time format: mm dd yyyy hh mm ss. Additional information see *st Command* *on page 5-12*	**st 11 24 1994 08 56 37**
svo	Salvo	Used as a modifier following ls (list) to list salvos. Used as a modifier following pr (print), and followed by a specific salvo name to list information about that salvo.	**pr svo SalvoName**
svps	Salvo Permission Sets	Used to list (ls) all salvo permission sets by number; or display all permitted salvos in a specified set by typing **pr svps** followed by the specific set name in quotes	**ls svps or pr svps Setname**
switch	Switch	Used as a modifier following **pg slot#** to switch active CIF in a redundant pair of CIFs.	**pg 1 switch**
switchanc	Switch Active Node Controller	Used as a modifier preceding a configured node controller name to copy the configured node controller data into the specified active node controller.	**switchanc CncName**
switchmcpu	Switch Active MCPU	Used alone to switch control from one MCPU to the other in a Fault Resistant Unit pair (primary and backup MCPUs).	**switchmcpu**
tl	Tie Lines	Used alone or as a modifier following ls (list) to list Tielines.	**ls tl or ls inuse tl**
tltype	TieLine Type	Used alone or as a modifier following ls (list) to list Tieline Types.	**ls tltype**
tlydst	Tally Destinations	Used alone or as a modifier following ls (list) to list tally destinations. Used as a modifier following pr (print), and followed by a specific tally destination name to list information about only that destination.	**pr tlydst DstName**
tlymod	Tally Module	Used alone or as a modifier following ls (list) to list Tally Modules. Used as a modifier following pr (print), and followed by a specific tally module name to list information about only that tally module.	**pr tlymod TallyModName**
tlysrc	Tally Source	Used alone or as a modifier following ls (list) to list tally sources. Used as a modifier following pr (print), followed by a specific tally source name to list information about only that tally source.	**pr tlysrc SrcName**
tms	Timed Salvos	Used alone or as a modifier following ls (list) to list Timed Salvos. Used as a modifier following pr (print), and followed by a specific timed salvo name to list information about only that timed salvo.	**pr tms TSalvoName**
tpl	Template	Used alone or as a modifier following ls (list) to list control panel templates. Used as a modifier following pr (print), and followed by a specific template name to list information about only that template.	**pr tpl TemplateName**
ver	Version	Used alone to display MCPU application version. Used as a modifier preceding **all** to display all reportable software versions. Used as a modifier preceding one of several topics to display the software version of that particular item. For additional information see *ver Command* *on page 5-12*.	**ver cp**
vm	Virtual Matrix	Used alone or as a modifier following ls (list) to list Virtual Matrices.	**ls vm**
wc	Write Configuration	Used as a modifier preceding a file name to copy the configuration in RAM on the active MCPU to Flash memory on that same MCPU. The file name **c.cl** should be used. Additional information see *wc Command* *on page 5-10*.	**wc c.cl**
wdstassign	Write Destination Assignment	Used, followed by a file name, to write destination assignments to a specified file.	**wdstassign "filename"**

Additional Command Information

wc Command

In addition to the information in Table 5-1 on page 5-6 the following applies to the wc command. The configuration MCPU Flash system file name c.cl is used when the MCPU is cold-started. The file c.cl (no other file name will work) is copied from Flash memory to RAM when cold-started before the file is executed.

Only the configuration file loaded into RAM is used for active system operation.

The Flash file system can contain other configurations (named differently from c.cl) but only c.cl will be copied in the event of a cold-start. The read command can be used to copy these other files to RAM if you wish to use them.

If there are multiple files in Flash, it is possible to use up Flash memory and have inadequate room remaining when attempting to store a new configuration. If so, the system will attempt to load the new file, signaling an alert only when memory is actually used up and thereby increasing any system downtime involved in loading the new configuration. See *Recovery Procedure When Flash Memory is Overfilled* in Section 4.

prog Command

In addition to the information in Table 5-1 on page 5-6, the following applies to the prog command. For example, control panel device type would be cp (control panel); subtype might be bps (button per source), ucp (universal control panel), mb8 (multibus 8), umd1, 2, or 3 (under monitor displays), 129 (cubicle-or-studio panel), or 130 (machine control only). You

can list programs by entering ls prog. ALL of the same type devices connected to the MCPU will be programmed with each use of this command. This command may be used in software upgrades.

- FileName: The name of the hexadecimal (hex) file to be downloaded. It MUST be in Motorola™ hex format. Any valid path may be specified. If none is, the default path is **`FM0:/`**. The quotation marks should be used. The parser may have difficulty with periods and paths.
- DeviceType: The name of the device type to be programmed. Default names are cp or panel, and nc. If the name of the device to be programmed is not recognized, the numeric value must be used. Entering the program command without this argument will display the list of valid type names (a dummy filename may be entered). Device Subtype: The name of the device subtype to be programmed. If the name of the device type to be programmed is not recognized, the numeric value must be used. Entering the program command without this argument will display the list of valid type names (a filename and device type must be entered). If the device type is nc (node controller), the subtype need not be entered (it defaults to subtype 0). The subtype is required for control panels.

Note All command line parse errors are reported and the usage syntax is displayed. For any error in the device type or subtype argument, a context-sensitive list of valid tokens are also displayed. Other errors, such as missing or wrong format file, are reported and the command is aborted. Progress reports are displayed during programming. The system diagnostic prompt will not be redisplayed until programming is complete. Once programming is started for any device, there is a 15 second time out for programming messages. This means that if the device fails during programming and does not respond, you will have to wait up to 15 seconds for a response.

slot Command

In addition to the information in Table 5-1 on page 5-6, the following applies to the slot command. The slot command may also be used to download a file into a specified Mezzanine board.

```
SMS7000> slot slot# mez mez# mezname gsc/asy file
```

Where: slot# is the number of the CIF frame slot; mez# is the number of the Mezzanine board to be affected; mezname is the Mezzanine board name; gsc means the Mezzanine board is a Global Serial Channel Mezzanine or asy means the Mezzanine board is an Asynchronous Mezzanine; and file is the (optional) name of the executable file to download. If the file name is left off, a default file name is used or, if parameters have been previously defined for the mezzanine, the previously defined file name is used.

```
SMS7000> slot slot# mez mez# mezname gsc/asy (csos.bin)
```

May also be used to remove parameter definitions for a mezzanine.

```
SMS7000> slot slot# mez mez# rm
```

Where: slot# is the number of the CIF frame slot; mez# is the number of the Mezzanine board to be affected; rm removes the definitions.

The Series 7000 Control Frame contains ten module slots numbered 1 through 10. The redundant (pair of) MCPUs reside in slots 9 and 10; the other eight slots are used for Communications Interface (CIF) modules. Each odd / even slot pair (i.e., 1&2, 3&4, 5&6, 7&8) are used to contain redundant pairs (primary and secondary) of CIF modules to provide fault tolerance.

Each CIF can support up to four mezzanine boards (Global Serial Channel or Asynchronous Mezzanines) of various communications functionality. Both CIF modules in a pair must be configured with identical mezzanine hardware. Mezzanines on a CIF module are numbered from 1 through 4 according to their physical position. (See the *Installation Manual*.)

Each mezzanine, when initialized, corresponds to a network and is assigned a network address. The mezzanine name (assigned through the GUI) is also assigned to the network. The network (the devices with which the Mezzanine communicates and the mezzanine itself) uses the same name as that assigned to the mezzanine for purposes of easy identification in system commands and messages.

st Command

In addition to the information in Table 5-1 on page 5-6, the following applies to the st command.

Where:
mm = month of year (01 through 12)
dd = day of month (01 through 31)
yyyy = digits of year
hh = hour of day (24 hour clock, 01 through 24 valid)
mm = minutes past hour (01 through 59)
ss = seconds past minute (01 through 59)

ver Command

In addition to the information in Table 5-1 on page 5-6, the following applies to the ver command.

sms = primary MCPU application
net = active networks
cp = control panels
cpos = control panel operating system EEPROM
nbx = node controller operating system EEPROM
nc = node controller application

If a specific item (i.e., control panel) name is used following one of the above, the software version for only that specific item will be reported.

Diagnostic Terminal GUI Commands

Table 5-2 contains Diagnostic Commands that are usually handled by using the GUI. The only time that these commands should be used is if the GUI cannot connect to the router.

Table 5-2. Diagnostic Terminal GUI Commands

Command	Meaning	Usage	SMS7000>
confp	Configure Panel	Used followed by a specific control panel name and a specific control panel template name to download that template to that panel. The echop (Echo Panel) command does the opposite.	**confp PanelName PanelTemplate**
connect	Connect	Used followed by ANC index, input, output, and slice to connect the input and output referenced. Allows a Take by specifying Physical Matrix input and output numbers rather than source and destination names.	**connect NCName Input# Output# Slice#**
cp	Control Panel	Used as a modifier following the ls (list) command to list the number of panels used, the current limit, and control panel type and name. Used as a modifier following the pr (print) command, and followed by a specific control panel name to list control panel address and name.	**pr cp PanelName**
deassign	Deassign	Used followed by a specific destination name followed by a specific source name to remove the source from assignment to that destination. (See Assign.)	**deassign DstName SrcName**
dev	Device	Used alone or as a modifier after ls (list) to list number of devices, maximum configured limit, and device names.	**ls dev**
dxs	Destination Exclusion Sets	Used alone or as a modifier following ls (list) to list destination exclusion sets by number. Used as a modifier following pr (print), and followed by a specific destination exclusion set name to list destinations in that set.	**pr dxs ExcSetName**
echop	Echo Panel	Used followed by a specific control panel name, followed by a specific control panel template name to copy the control panel configuration to the specified template. Configure Panel (confp) does the opposite.	**echop PanelName TemplateName**
kst	Keypad Sets	Used alone or as a modifier following ls (list) to list the number, limit, order or assignment, and names of keypad sets. Used as a modifier following pr (print), and followed by a specific keypad set name to list that keypad assignment set.	**pr kst KpdSetName**
prot	Protect	Used as a modifier following pr (print) to display protects by destination and level. Used as a modifier preceding a specific destination name, followed by a specific level name to protect the specified destination. Also see the unprot command.	**prot DstName LvlName(s)**
rename	Rename	Used as a modifier preceding cp (control panel) or nc (node controller), followed by the specific old name, followed by the specific new name to rename a device.	**rename cp OldName NewName**
renamebyaddr	Rename by Address	Used as a modifier preceding a device network:address, followed by a specific new name to rename that device. (Use ls dev [list devices] to obtain network and address. Remove leading zeros from the network and address.)	**renamebyaddr 10:6 NewName**
src	Source	Used alone or as a modifier following ls (list) to list sources by level. Used as a modifier following pr (print), and followed by a specific source name to list a specific source and associated virtual matrices.	**pr src SrcName**
sst	Suffix Sets	Used as a modifier following ls (list) to list panel suffix sets. Used as a modifier following pr (print), and followed by a specific suffix set name to display that suffix set.	**pr sst SfxSetName**
t	Take	Used as a modifier preceding a destination name, followed by a source name, and (optionally) a level name to take the specified source to the specified destination on the specified level. If no level is specified, the take will be of all levels associated with the source.	**t DstName SrcName LvlName**
unprotoverride	Unprotect Override	Used as a modifier preceding a specific destination name followed by a level name to unprotect the specified destination on the specified level, overriding other factors.	**unprotoverride DstName LvlName**

Diagnostic Messages

When the Series 7000 operating system detects an error, it generates both a diagnostic code and a more verbose explanation of the error. Error codes are abbreviated explanations of errors suitable for control panel display. Codes are visible to the panel which caused them to be generated and to any other panel in active control of the same destination as the panel which caused the error. Control panel error codes are defined in the *Series 7000 User Manual*. Pertinent diagnostic explanations are sent by the Series 7000 MCPU to the terminal connected at the Diagnostic Interface.

Viewing Diagnostic Messages

Diagnostic messages are displayed on the diagnostic terminal as they are sent by the system MCPU. Most diagnostic messages reflect occurrences which will not affect system performance.

Diagnostic messages are posted to one of two message queues: A High Priority queue and a Low Priority queue. The High Priority messages are printed before other system task processing; the Low Priority messages are printed after other system task processing.

Each message is given one of five severity levels:

- Informational
- Warning
- Error
- Severe
- Fatal

The Severity Level may be defined so that only errors of a certain severity, or greater, are printed to the terminal while errors of lesser significance are ignored. The default system Severity Level is Error. (Exception: During system initialization, Severity Level is set to Info(rmational) and then assumes the defined level once the configuration file is read.) For example, if Severity Level is set to Informational, all error messages will be printed. If Severity Level is set to Error, only Error, Severe, Fatal, and Other messages will be printed.

Organization

Messages are generated by several different software tasks within the Series 7000 system. The format of messages generated by different tasks do not necessarily match each other. Messages documented in this section are organized according to message severity level; if a message does not specify severity level, it is grouped as other. Organization is:

- Informational
- Warning
- Error
- Severe
- Fatal
- Other

General Message Format

The general format of a message printed to the terminal is:
%<q><s>-<taskname>/<module or exception name>-<text>
Where:
<%> indicates the message was printed from the Diagnostic Message Logging system
<q> is L for Low Priority or H for High Priority
<s> is I, W, E, S, or F to indicate Severity Level (not always reported)
<taskname> is the name of the task from which the message was posted
<module> is a prefix indicating the source code file which posted the message
<text> is the specific message text

For example:
%LE- smsApp/NETCFG- Mezzanine type doesn't match configuration

The example message was from the Low Priority queue and of Error Severity Level. The posting task was smsApp; the posting module was NETCFG. The text indicates that the mezzanine board type read from coproc.cfg did not match the mezzanine type that was read from hardware. For example, an Asynchronous Mezzanine configuration was sent to a Global Serial Channel Mezzanine board.

Setting Severity Limit for Error Reporting

To view the current Severity Limit, enter:
SMS7000> lm severity

To set the Severity Limit which will be in effect after the configuration is read in, enter:
SMS7000> lm severity level

Where level can be:
info (informational)
warn (warning)
error
severe
fatal
off (disables error reporting)
default (system default is error)

Changing the Default Severity Limit

To change the default Severity Limit, enter:
SMS7000> lm save severity
The current Severity Level will be saved as the system default, used during system initialization.
To save the current Severity Level as the default message severity level used after initialization, enter:
SMS7000> lm save default

Example Messages

The following message examples can be printed from the Diagnostic Message Logging system. The messages appear in the format as shown in *General Message Format* (page 5-15). All Informational messages start with %LI-<task name>/, Warning messages start with %LW-<task name>/, etc.

Informational Messages

NETMBF- Can't free message buffer,...

Printed if the get buffer function (used by most system processes to reserve a message buffer) detects an error when attempting to reserve a buffer for a coprocessor message.

Probably the result of a busy network interface (i.e., all buffers temporarily in use). Take no action unless the error continuously occurs, indicating a possibly faulty interface. If the error continues, check network connections; replace the Mezzanine if indicated

NETALR- Network alarm received,...

A significant event occurred for a network, e.g., a network was deleted, a switchover occurred, etc.

Check the hardware associated with the network, try resetting devices or reseating boards causing the problem. If problem persists attempt a switchover to a redundant board if available. Final action, if necessary, is an MCPU system reset.

NETALR- Alarm server socket queue receive error

The text portion of this message is a program error.

Call Customer Service.

NETEOK: Success

Successful result.

Warning Messages

REDEMCPUMODECHNG: MCPU opMode has changed

The backup MCPU has changed to another state, i.e., backup, primary, synchronized, etc.

Take no action unless message repeats continually. Replace backup MCPU if indicated.

NETEMEZFOUND: System found mezzanine

MCPU has restored communication with a mezzanine.

No action required.

NETEIOBLOCKED: I/O blocked

The system could not send a message to get network events, if any. This is more a warning that the system may be busy.

Take no action unless the problem continues; if it does, try to determine any unusual activity in the system that might cause many messages to be sent. Try to reduce this system activity. The most likely cause is a disconnected communication cable or a device is not working which is connected to an AMEZI board.

NETETALLYNAME: Tally network configured wrong

The Tally system does not match the configuration.

Check the configuration to make sure it matches the hardware associated with the network. If both configuration and hardware appear OK, try resetting devices or reseating the boards associated with the problem. The most likely cause is a tally mezzanine is configured as a standard GSC mezzanine.

Error Messages

CSTESENDCFGTMO: system configuration send timed out

The system tried to send configuration data to backup MCPU and could not do it for some reason.

Check the backup MCPU and the hardware associated with it. If the hardware appears OK, try resetting devices or reseating the boards associated with the problem.

CSTECANTSENDCFG: can't send system configuration

The system tried to send configuration data to backup MCPU and could not do it for some reason.

Check the backup MCPU and the hardware associated with it. If the hardware appears OK, try resetting devices or reseating the boards associated with the problem.

CSTECANTRECVCFG: can't receive system configuration

Backup MCPU was unsuccessful in receiving the configuration.

Check the hardware associated with the backup MCPU. If the hardware appears OK, try resetting devices or reseating the boards associated with the problem.

CBDEMEZTYPMISMTCH: Mezzanine type mismatch with configuration

System is coproc. configuration doe not match hardware.

Check the system configuration. Check the configuration make sure it matches the hardware associated with the mezzanine. If both configuration and hardware appear OK, try resetting devices or reseating the boards associated with the problem.

CBDENOHEARTBEAT: Mezzanine heartbeat failed

Heartbeat counter in the mezzanine has failed to increment.

Attempt switchover to redundant hardware if present, replace mezzanine if indicated. If switchover fails reset CIF.

REDEUNKNOWNRMCPUST: Unknown remote MCPU state

System is confused about state of redundant MCPU.

Restart backup MCPU.

NETEDESTRCTFAIL: Backup MCPU config. destruct failed

When attempting to create a new configuration during integration of backup MCPU removal of the old backup MCPU configuration failed.

Restart the backup MCPU and try again. Also try re-sending new configuration from PC.

NETEMEZLOST: System lost mezzanine

MCPU has lost communication with a mezzanine.

The system will switchover to redundant hardware if present, replace mezzanine if indicated. If switchover fails reset MCPU.

NETEDESTRCTTMO: Backup MCPU config. destruct timed out

When attempting to create a new configuration during integration of backup MCPU removal of the old backup MCPU configuration failed.

Restart the backup MCPU and try again. Also try re-sending new configuration from PC.

NETECANTINTEGRT: Unable to integrate MCPUs

The system failed to synchronize the state of the primary and backup MCPUs.

The backup MCPU board will be integrated with the primary (i.e., config transfer, etc.) if the following criteria are met:

- Force integration flag is True. (default is False)
- Primary MCPU integration flag is TRUE (Default is True)
  backup MCPU integration flag is TRUE (Default is True)
- Primary boot ROM version / date is the same as the secondary boot ROM version / date
- Primary application version / date is the same as the secondary application version / date
- Primary console spec (console.ini) is the same as the secondary console spec
- Primary slip spec (slip.ini, only used with SMS-V64x64 systems) is the same as the secondary slip spec
- Primary MCPU mezzanine IDs is the same as the secondary MCPU mezzanine IDs

If the above criteria is not met the exception NETECANTINTEGRT will be created when the primary MCPU attempts to integrate the backup MCPU.

The following system diagnostic commands are provided to override this policy:

`“integration” <on|off>`

This command turns on or off (True / False) the MCPU integration flag. If either MCPU integration flag is False the MCPUs will not be integrated. This setting is temporary and defaults to True after a reset.

`“fintegration” <on|off>`

This command turns on or off (True / False) the force integration flag on the primary MCPU. Additionally, it attempts to start an integration process. If this flag is True integration will take place regardless of any other above criteria. This setting is temporary and defaults to False after a reset.

The configurations stored in Flash or RAM are not a criteria for integration.

NETEUNKNWNORGNET: Bad originating network

The system software found a bad value for a network address. The system is in an unusual state.

Check too see if the system was unusually busy for some reason, are devices getting deleted and added back, are there lots's of takes(100's)? You may want to try to switch to any redundant hardware to see if the problem occurs again. If the problems continues reset the MCPU. Check software and hardware revisions. Reload indicated software if available. Check to see if system configuration matches hardware.

NETEUNKNWNNET: Invalid network

The system software found a bad value for a network address. The system is in an unusual state.

Check too see if the system was unusually busy for some reason, are devices getting deleted and added back, are there lots's of takes(100's)? You may want to try to switch to any redundant hardware to see if the problem occurs again. If the problems continues reset the MCPU. Check software and hardware revisions. Reload indicated software if available. Check to see if system configuration matches hardware.

NETEUNKNWNSOC: Bad socket number

A device sent a message that the MCPU could not interpret. Could be a bad device, cable, or software release mismatch.

Check the device that created the problem. Check cables and hardware associated with the device that created the problem. Check software and hardware revisions. Reload indicated software if available. Check system configuration matches hardware. If both configuration and hardware appear OK, try resetting devices or reseating the boards associated with the problem.

NETERCVBADSOCMSG: Received bad socket message

A device sent a message that the MCPU could not interpret. Could be a bad device, cable, or software release mismatch.

Check the device that created the problem. Check cables and hardware associated with the device that created the problem. Check software and hardware revisions. Reload indicated software if available. Check to see if system configuration matches hardware. If both configuration and hardware appear OK, try resetting devices or reseating the boards associated with the problem.

NETEDEVADDRINUSE: Device address conflict

The system software found a value for a network that was already in use. The system is in an unusual state.

Check too see if the system was unusually busy for some reason, are devices getting deleted and added back, are there lots's of takes(100's)? You may want to try to switch to any redundant hardware to see if the problem occurs again. If the problems continues reset the MCPU. Check software and hardware revisions. Reload indicated software if available. Check to see if system configuration matches hardware. Reload indicated software if available.

NETEINVLDSTATE: Incorrect coprocessor state

A coprocessor mezzanine did not change to the state is was told to go.

Check to see if the system was unusually busy for some reason, are devices getting deleted and added back? Are there lots of takes(100s)? You may want to try to switch to a redundant CIF to see if the problem occurs again. If the problems continues reset the CIF. Check software and hardware revisions. Check system configuration matches hardware.

NETESTATECHNGTMO: Coprocessor state change timeout

A coprocessor tried to change it's state, e.g., backup, primary, idle, etc.

Check to see if the system was unusually busy for some reason, are devices getting deleted and added back? Are there lots of takes(100s)? You may want to try to switch to a redundant CIF to see if the problem occurs again. If the problems continues reset the CIF. Check software and hardware revisions. Check system configuration matches hardware.

NETECANTSHUTNET: Unable to shutdown network

The system is in an unusual state.

Check to see if the system was unusually busy for some reason, are devices getting deleted and added back? Are there lots of takes(100s)? You may want to try to switch to a redundant CIF to see if the problem occurs again. If the problems continues reset the CIF. Check software and hardware revisions. Check to see if system configuration matches hardware.

NETECANTRECVMSG: Unable to receive message

Printed if the receive buffer function detects an error when attempting to reserve a buffer for a coprocessor message. Probably the result of a busy interface, usually a temporary condition.

Take no action unless the error continuously occurs. If it continues, check the network connections; replace the mezzanine if indicated. If this occurs on the IPCB (inter processor comm bus) network check the backup MCPU.

NETECANTSENDMSG: Unable to send message

Printed if the get buffer function detects an error when attempting to reserve a buffer for a coprocessor message. Probably the result of a busy interface, usually a temporary condition.

Take no action unless the error continuously occurs. If it continues check the network connections; replace the mezzanine if indicated. If this occurs on the IPCB (inter processor comm bus) network check the backup MCPU.

NETECANTGETBUF: Unable to get message buffer

Printed if the get buffer function detects and error when attempting to reserve a buffer for a coprocessor message. Probably the result of a busy interface, usually a temporary condition.

Take no action unless the error continuously occurs. If it continues check the network connections; replace the mezzanine if indicated.

NETECANTQUEMSG: Unable to queue message

Printed if the get buffer function detects an error when attempting to reserve a buffer for a coprocessor message. Probably the result of a busy interface, usually a temporary condition.

Take no action unless the error continuously occurs. If it continues check the network connections; replace the mezzanine if indicated.

Severe Messages

NETMBF- Can't get message buffer

Printed if the get buffer function detects an error when attempting to reserve a buffer for a coprocessor message.

Probably the result of a busy network interface (i.e., all buffers temporarily in use). Take no action unless the error continuously occurs, indicating a possibly faulty interface. If the error continues, check network connections; replace the Mezzanine if indicated.

NETWRK- <var text>, net: <n>, for Control Message: <var text>

Printed from a common control message function which sends control messages to a coprocessor during the shutdown and start-up sequences if a message buffer has not been reserved or if the expected change state response was not received from the target coprocessor. The <var text> depends upon failure and message type.

This could be a busy coprocessor. Take no action unless the message repeatedly occurs, in which case it is probably the result of a failed coprocessor. Replace the failed Mezzanine.

NETWCH- Unknown message type from network

May have release mismatch. Check release revision numbers for software using **`ver all`** command. Also check hardware revisions, if any.

If message occurs repeatedly, attempt to reset the device causing the error message.

NETWCH- Event status from invalid network

An unusual state for the system has occurred, hardware or software problem.

If message occurs repeatedly, attempt to reset the device causing the error message.

NETWCH- Event status from network: #, unknown network type

An unusual state for the system has occurred, hardware or software problem.

If message occurs repeatedly, attempt to reset the device causing the error message.

CBDEUNKNOWNNETERR: Unknown network error

System software received a network initialization error it could not interpret.

Check the hardware associated with the network. If the hardware appears OK, try resetting devices or reseating the boards associated with the problem. Check release versions of hardware and software.

CBDEUNKNOWNNETTYPE: Unknown network type for mezzanine

The mezzanine and configuration do not match each other.

The hardware is likely at fault. The mezzanine hardware type code is not recognized. Also check the configuration make sure it matches the hardware associated with the network. If both configuration and hardware appear OK, try resetting devices or reseating the boards associated with the problem.

CBDETOOMANYNETWORKS: Too many networks created

Message occurs if too many networks are detected.

Check the system configuration limits. Re-send the configuration. Check cabling, isolate network if problem continues, switch to redundant hardware if present.

SMSEBADPROGPATH: Error in program path

The specified path to a file was not correct or the file does not exist in the path.

Call Customer Service.

Fatal Messages

NETWCH- Heartbeat timeout on network <n>

Printed if a coprocessor (mezzanine hardware) fails to increment its heartbeat time / counter in a timely manner. The coprocessor is expected to increment the timer a minimum of once per second.

The coprocessor / mezzanine (network) will shut down if this error occurs. If redundant CIF and mezzanine backups are available, the system will switch to them automatically. Replace the faulty Mezzanine board.

/NETWRK- Network state: <state>, net: <n> not correct for Control Message <state>

Printed from a common control message function which sends control messages to a coprocessor during the shutdown and start-up sequences. This same function waits for a response from the coprocessor and, if the response state from the coprocessor does not match the expected state, this message is printed.

Could be a busy coprocessor. Take no action unless the message repeatedly occurs. In which case it is probably the result of a failed coprocessor. Replace the failed Mezzanine.

REDEMCPUKILLSELF: This MCPU is killing itself

This message appears when the MCPU is rebooted or switchmcpu is done.

No action is needed.

REDE2PRIMRYMCPU: Found 2 primary MCPUs

The primary MCPU found the state of the backup to be primary as well.

Take no action unless condition persists. Remove or restart backup.

NETECANTINSDRV: Unable to install driver

Driver could not be found by network.

Call Customer Service.

SMSECANTFIND: Fatal error while searching for item.

Hardware or software is not running properly.

Attempt a switchover to redundant module if available. Otherwise reset MCPU. Call Customer Service.

SMSECANTINIMOD: Fatal error while initializing module

Hardware or software is not running properly.

Attempt a switchover to redundant module if available. Otherwise, reset MCPU. Call Customer Service.

SMSECANTSPNTSK: Fatal error while spawning a task

System software is not running properly.

Attempt a switchover if redundant MCPU is available. Otherwise reset MCPU. Call Customer Service.

SMSECANTCREQUE: Fatal error while creating message queue

System software is not running properly.

Attempt a switchover if redundant MCPU is available. Otherwise reset MCPU. Call Customer Service.

SMSECANTCREQUE: Fatal error while creating message queue

System software is not running properly.

Attempt a switchover if redundant MCPU is available. Otherwise reset MCPU. Call Customer Service.

SMSECANTCRESEM: Fatal error while creating semaphore

System software is not running properly.

Attempt a switchover if redundant MCPU is available. Otherwise reset MCPU. Call Customer Service.

Other Messages

NETCFG- Syntax error, after slot number

Something other than mez, switch, or end-of-line was detected after the slot or pg command. Printed from the coproc.cfg file while parsing the slot or pg command. This file contains the Communications Interface (CIF) and Mezzanine board parameters.

Re-enter the command or query which produced the error.

InitANCConfig: ERROR creating semaphores

Configuration, memory, or other system problem.

Reset Node Controller. Reset MCPU.

InitNCConfigServer: ERROR: Couldn't create message queue

Configuration, memory, or other system problem.

Reset Node Controller. Reset MCPU.

AttachANC(s): ERROR: CNC <name> already in use

Configuration error. Node Controller name already in use.

List Node Controller names, Active and Configured. Use a different name for a new Node Controller.

AttachCNC: ANC <name> already in use

Configuration error. Node Controller name already in use.

List Node Controller names, Active and Configured. Use a different name for a new Node Controller.

AddANC: ERROR: invalid device: network:device

Configuration error.

List Node Controller names, Active and Configured. Use a different name for a new Node Controller. Reset Node Controllers.

<name> bad ANC name

Configuration error.

List Node Controller names, Active and Configured. Use a different name for a new Node Controller. Reset Node Controllers.

<name> no redundant ANC on line

Configuration error.

List Node Controller names, Active and Configured. Use a different name for a new Node Controller. Reset Node Controllers.

<name> no ANC matched

Configuration error.

List Node Controller names, Active and Configured. Use a different name for a new Node Controller. Reset Node Controllers.

<name> no CNC by this name

Configuration error.

List Node Controller names, Active and Configured. Use a different name for a new Node Controller. Reset Node Controllers.

<name> switch did not occur for unknown reason

Configuration error.

List Node Controller names, Active and Configured. Use a different name for a new Node Controller. Reset Node Controllers.

SyncANCmsgWindow, WARNING: window is zero

Extremely busy communications bus. Node Controllers cycling on and off-line.

If message is only occasional and system does not appear to be affected negatively, ignore it. If message is continuously generated, or system is affected, reset MCPU.

ResetANCmsgWindowFrAddr, WARNING: can't reset window

Extremely busy communications bus. Node Controllers going on- and off-line.

If message is only occasional and system does not appear to be affected negatively, ignore it. If message is continuously generated, or system is affected, reset MCPU.

SyncANCmsgWindowFrAddr, WARNING: can't sync window

Extremely busy communications bus. Node Controllers going on- and off-line.

If message is only occasional and system does not appear to be affected negatively, ignore it. If message is continuously generated, or system is affected, reset MCPU.

CreditANCmsgWindow, WARNING: can't credit window

Extremely busy communications bus. Node Controllers going on- and off-line.

If message is only occasional and system does not appear to be affected negatively, ignore it. If message is continuously generated, or system is affected, reset MCPU.

ANCHealthUpdate, WARNING: no device record

Configuration, memory, or other system problem.

If message is only occasional and system does not appear to be affected negatively, ignore it. If message is continuously generated, or system is affected, reset and / or rename Node Controllers. If problem continues, reset MCPU.

ANCHealthUpdate, WARNING: no node control record

Configuration, memory, or other system problem.

If message is only occasional and system does not appear to be affected negatively, ignore it. If message is continuously generated, or system is affected, reset and / or rename Node Controllers. If problem continues, reset MCPU.

ANCHealthUpdate, WARNING: couldn't switch to backup

Configuration, memory, or other system problem.

If message is only occasional and system does not appear to be affected negatively, ignore it. If message is continuously generated, or system is affected, reset and / or rename Node Controllers. If problem continues, reset MCPU.

ANCHealthUpdate, WARNING: node control backup state mismatch

Configuration, memory, or other system problem.

If message is only occasional and system does not appear to be affected negatively, ignore it. If message is continuously generated, or system is affected, reset and / or rename Node Controllers. If problem continues, reset MCPU.

ANCHealthCheck, WARNING: no health response from NC <name>

Configuration, memory, or other system problem. Node controller off line.

If message is only occasional and system does not appear to be affected negatively, ignore it. If message is continuously generated, or system is affected, reset and / or rename Node Controllers. If problem continues, reset MCPU.

ANCHealthCheck, WARNING: couldn't switch to backup

Configuration, memory, or other system problem. Node controller off line.

If message is only occasional and system does not appear to be affected negatively, ignore it. If message is continuously generated, or system is affected, reset and / or rename Node Controllers. If problem continues, reset MCPU.

Error, cncinfo prec null

Configuration, memory, or other system problem. Node controller off line.

If message is only occasional and system does not appear to be affected negatively, ignore it. If message is continuously generated, or system is affected, reset and / or rename Node Controllers. If problem continues, reset MCPU.

mtPrintPMs: ERROR: bogus pmIndex: <physical matrix index #>

Configuration, memory, or other system problem. Node controller off line.

If message is only occasional and system does not appear to be affected negatively, ignore it. If message is continuously generated, or system is affected, reset and / or rename Node Controllers. If problem continues, reset MCPU.

Event Logging

If the function is enabled, the Diagnostic Interface terminal will maintain an event log. The event log is a First-In, First-Out buffer that can hold up to 255 event messages. The log is user-configurable to record events ranging from the addition of a device to Takes, Protects, alarms, and more.

Enabling or Disabling Event Logging

To enable the event log (can be overridden by log set commands below):
`SMS7000> log on`

To set event logging to be automatically enabled after a reset or restart:
`SMS7000> log set on`

To set event logging so that it must be manually enabled after a reset or restart:
`SMS7000> log set off`

To shut off the event logging task (can be overridden by log set commands):
`SMS7000> log off`

Configuring the Event Log

The event log can be configured to monitor several types of system events. These types are shown in Table 5-3

Table 5-3. Event Logging

Command	Event
devadd	Records addition of node controllers or control panels to the bus.
devdel	Records the removal of node controllers or control panels from the bus.
take	Records Takes.
warning	Records MCPU start-up.
salvo	Records Salvos.
protect	Records Protects and Unprotects.
mon	Records Monitor crosspoint takes.
assign	Records Assignments and Deassignments.
alarm	Records events assigned as Critical, Major, Minor, or µProc alarms.
critical	Records Node Controller Switchovers and Matrix Board problems.
rename	Controls panel renames.
time	Real Time Clock changes.

To display the current event logging configuration:

```
SMS7000> log stat
```

To display all possible logging event types:

```
SMS7000> log opt
```

To enable logging of an event type, enter log add followed by the event type. For example to enable Salvo recording:

```
SMS7000> log add salvo
```

Multiple event types can be added in a single command, for example:

```
SMS7000> log add salvo protect critical
```

To disable logging of an event type, enter log del followed by the event type. For example, to disable Protect / Unprotect logging:

```
SMS7000> log del protect
```

Multiple event types can be deleted in a single command, for example:

```
SMS7000> log del salvo protect critical
```

Viewing the Event Log

To view the event log buffer (independent of log on or off):

```
SMS7000> log dump
```

Event Format

Table 5-4. Event Format

<date>	<time>	<event>	<more info>
YYMMDD	HH:MM:SS	Event Identifier	Optional Information

The real time clock must be set using the st (set) command for the date and time to work correctly.

Devices are shown with their network address, followed by their device address in braces ([]), followed by their name.

Events with associated levels show only a hex number containing the level bitmap. Use the ls lvl (list level) command for explanation.

Isolating Problem Modules

To isolate a problem module, turn on logging option by entering the command **`log add critical`** With this option on, the MCPU will display matrix modules that have failed or been removed from the system. The log will display the data needed to isolate a problem module.

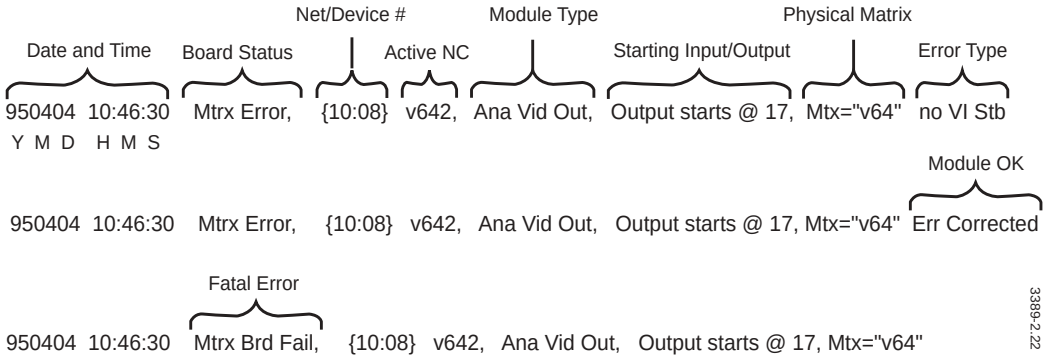
The Node Controller updates it's status of modules quickly (every 10 seconds for a 256x256 system. However, in order to keep the number of messages from potentially overwhelming the MCPU, the Node Controller sends module status only if it has a change to report and only in response to a Node Controller health message. Health messages are sent every 5 seconds.

The Figure 5-4 shows 3 typical Log entries displaying the following items:

- Date and Time
- Matrix Board (module) Status - added, failed (fatal error), or error (not fatal, possibly **`No XPT`**)
- Network and Device number
- Active Node Controller reporting the problem
- Type of module and the starting inputs / outputs it controls

- The Physical Matrix
- Type of error (if non-fatal)
  The list of abbreviations for possible errors are:
  `APwr`, MEC boards analog power is not correct.
  `PS`, One of the Redundant power supplies is missing or failed.
  `Rst`, The MEC board has reset itself for some reason.
  `Cfg`, The MEC board has received new configuration data.
  `VI`, The MEC has lost VI stb from the NC, it now fakes VI internally.
  `Temp`, The MEC has detected an over temperature condition.
  `Comm`, The MEC has detected a communication error.
- If the status of the module is okay, the **`Err Corrected`** message will be displayed

Figure 5-4. Event Log Matrix Error Messages



Use the Physical Matrix, Module Type, and Starting Input/Output information to locate the problem module.
Each matrix frame has a label inside the frame door showing:

- Module Type
- Slot Number
- Input/Output Group Controlled

If the Starting Input/Output number is negative, the Node Controller could not determine what the problem module should control. If this happens, reset the Node Controller in its slot. If the problem persists, re-seat all the modules of the indicated type in the suspect frame.

When isolating a **`NO XPT`** problem, it is useful to look at the Starting Input/Output number to verify that it matches the frame label. It is also important that the module type is correct. If an unknown type is displayed, re-seat the module.

Glossary

AES

Audio Engineering Society. AES represents any of the digital audio standards established by the Audio Engineering Society.

AES/EBU

Name for a digital audio standards established jointly by the Audio Engineering Society and European Broadcasting Union. The sampling frequencies for this standard vary depending on the format being used.

Alarm

A signal indicating major or minor alarm conditions.

Alien Matrices

Any matrix which is not a part of the Series 7000 router product line.

All-level Takes

Switch the same input number on all Levels, to the controlled Destination.

Amezi

Asynchronous Mezzanine board. An RS-422/RS-232 communications board which mounts on the 7000 MCPU or a 7000 Communications Interface (CIF) module and provides RS-422 and RS-232 ports. The Asynchronous Mezzanine board is one of several mezzanine boards of differing functionality.

ANC

Active Node Controller. An ANC is communicating with the MCPU and will appear in a list of Active Node Controllers when polled by the GUI. The Enhanced Node Controller and the Matrix Controller modules also appear in the list. ANCs include both the primary and backup Controller modules.

ANSI

American National Standards Institute.

Assignment

Assignment is an action that grants permission for exclusive control of a resource. Multiple devices may be assigned permission for exclusive control of a single device, however only one may exercise control at a specific point in time.

Control of particular sources and TieLines can be Assigned to destinations on a case-by-case basis. The Assignment system is enabled (Machine and TieLine Assignment) through the GUI Enables menu. Active Assignments are controlled through the GUI (on-line, OnLine menu, Assignments submenu) or may be handled by an external automation or scheduling system.

Backplane (Rear connector channel, Motherboard)

The circuit board at the back of an electronics frame where modules (from the front) and cables (from the rear) are plugged-in.

BNC

Bayonet Neill-Concelman (BNC) connector. (Named for its inventors). A type of coaxial cable connector.

BPI

Backplane Interface. This is required for a Communications Interface module to communicate with a MCPU module.

BPS

Button Per Source. Name given to a panel feature that performs a source take with the single push of a button.

Breakaway

A Take operation which is performed by accessing the control Levels of a Destination individually and selecting a different Source on at least one Level than that selected on the others. Breakaways allow a Destination to selectively utilize video and audio from different Sources.

BSY

Busy. This is commonly found on the modules to identify the yellow busy LED.

Bus

A signal path to which a number of inputs may be connected to feed one or more outputs. Also, a signal path used to communicate between devices such as the node bus or the Control Panel bus. the node bus is used to communicate between the MCPU and the Controller modules. The Control Panel bus is used to communicate between the MCPU and Control Panels.

Chop

A variation of a Take command that alternately connects each of two different Sources to a single Destination (flip-flopping) at a designated switching rate (the chop rate).

CIF

Communication Interface. A Series 7000 optional CIF module is a general purpose communications interface module used to augment the capability of the Series 7000 MCPU when the MCPU is housed in a standalone Control Frame. Each CIF module will support four mezzanine submodules; mezzanine submodules in turn provide a particular communications capability.

CLN

Client Control Panel. A companion panel used with the Server panel to expand Source and Destination selection. Each Client controls three Destinations.

Coaxial Cable (coax)

A cable which has a metallic noise shield surrounding a signal-carrying conductor. In video, the cable impedance is typically 75 ohms. Ethernet coax is typically 50Ω impedance.

Cold Start

A boot from power off.

Component Video

The un-encoded output of a camera, videotape recorder, etc., consisting of 3 primary color signals: Red, Green, and Blue (RGB) that together convey all necessary picture information. In some component video formats, these three components have been translated into a luminance signal and two color difference signals, e.g. Y, R-Y, B-Y.

Composite Video

An encoded video signal, such as NTSC or PAL video, that includes horizontal and vertical synchronizing information.

Control Device

Panel, computer, or other device that controls router crosspoint selections.

Control Panel Bus (CP bus)

Communications path between control panels or devices and the MCPU which controls the routing matrices.

Controllers

Part of the control system, Controllers are circuit modules which interface between the MCPU and signal processing modules.

COS

Cubicle or Studio. A custom configuration set.

CPO

Clear Protected Output.

Crosspoint (XPT)

An electronic switch that allows a signal to pass from an input to an output when the switch is closed.

DA

Distribution Amplifier. The Series 7000 uses DAs to expand outputs.

Data Matrix

A signal processing matrix containing modules that route RS-422 or RS-485 data.

Default

The setup condition existing when a device is first powered-up or after a system restart.

Destination (DEST or DST)

The point to which Source signals are routed. In Series 7000, a Destination may include one or more outputs, across multiple Levels, with any connector number offset (user-defined in system configuration). (See Multi-level Switching in Section 1.)

Destination Exclusion Set (DXS)

User-determined set of Destinations excluded from control by a particular panel. If used, Destination Exclusion Sets are included in a Panel Template before the template is downloaded to a particular control panel. A specific Destination Exclusion Set may be shared by more than one panel template.

DGND

Digital Ground.

DST

See *Destination (DEST or DST)*.

DSVOM

Dual Sync Video Output Monitor. Part of the DV Series.

Dumb Terminal

A conversational slave to a host computer.

EC I/F

External Control Interface.

EDP

Eight Destination Paging control panel.

EMI

Electromagnetic interference.

ENC

Enhanced Node Controller. Designed to replace the Node Controller it can be used in all Classic and DV Series matrices. The ENC is required for Dual Control of a matrix by the Series 7000 Control System and an external device such as a PC. The ENC does not support the Kscope Interface Mezzanine.

EPROM

Erasable Programmable Read Only Memory. EPROMs are non-volatile memory chips. They are commonly called Flash memory chips.

ERR

Error. This is commonly found on the modules to identify the red error LED.

Ethernet

A local area network (LAN) technology capable of transmitting information between computers at speeds of 10 and 100 Mbps.

Exclusion

User-determined Sources excluded from routing to a particular Destination.

FC

Frame Controller.

FET

Field Effect Transistor.

First Come First Served (FCFS)

Tieline status where it is not necessary to create a reservation to use the specified Tieline.

Flag

A parameter that can be set in a control panel template to control how the panel operates.

Flash Memory

See: *EPROM*.

Flip-Flopping

Alternately connecting each of two different Sources to a single Destination (at a designated switching rate (See: *Chop*).

GBR (Green, Blue & Red)

The three primary colors used in video processing, often referring to the three un-encoded outputs of a color camera. The sequence of GBR indicates the mechanical sequence of the connectors in the SMPTE standard. *Also see: RGB.*

GPI

General Purpose Interface. Refers to the HX-GPI or Horizon General Purpose Interface used to connect a Horizon Routing Switcher to a Series 7000 System.

GSC

Global Serial Channel. Refers to the GSC Mezzanine which provides additional BNC, serial communications ports for the Series 7000 MCPU. The four additional BNCs provided per mezzanine can be used as additional control panel bus or Tally System ports. The GSC can also be used to provide Node Control Bus expansion. In this capacity, only one of the four BNCs can be used because traffic density is too great for all four BNCs to be serviced by a single communications controller.

GUI

Graphical User Interface. Refers to the Configuration Editor software program used to configure the Series 7000 System.

Hardware

1. Electrical devices connected through physical wiring. 2. Electronic programming technique using physical connections and therefore essentially unalterable.

HDTV

Television with a resolution approximately four times that of Conventional Definition Television and a 16:9 (H x V) picture aspect ratio.

Heartbeat

A health status message provided by networked frames that are polled by MCPUs.

Horizon

A Grass Valley line of routing switchers.

HX

Grass Valley Horizon Series Crosspoint Routing System.

IBOP

Interconnect /Break Out Panel. An option panel used to add BNC connectors to an audio matrix using 50-pin D connectors.

ID or IDENT

A software routine that identifies a device (e.g. a control panel). Includes such information as:

- controlled Destination
- active tally level
- panel name
- software version
- system name

I/O

Abbreviation for input/output. Typically refers to sending information or data signals to and from devices.

Input

A single physical, numerically designated connection point of an in-coming signal to a matrix. One or more Series 7000 inputs can be assigned to a Source name during System Configuration.

Input Offset

Unlike traditional multi-level systems, Series 7000 Sources do not have to use the same input connector number on each matrix Level (i.e. RGB inputs for one Source can use input #1 in one matrix for R, input #4 in another matrix for G, etc.) The offset of the input numbers used is logged in the System Configuration.

J Number

Jack Number.

Jumper

A short conductor used to manually bridge two contact points. Used in Series 7000 Alarm system. Also called a strap.

Kadenza

A Grass Valley Group digital video effects system that can be used in an integrated environment with the Series 7000.

Kaleidoscope

A Grass Valley Group digital video effects system that can be used in an integrated environment with the Series 7000.

KISS

Key Input Source Select. Used in configuring the Kscope Key Sources.

KScope

The collective name for Kadenza and Kaleidoscope.

Krystal

A Grass Valley Group digital video effects system.

LED

Light emitting Diode. In Grass Valley products, LEDs illuminate to indicate a specific state (such as normal, error, on-line, and so on).

Level

Level is a name given to a group of signals that have something in common such as video, audio right, audio left, R, G, or B. This grouping becomes an independently controllable stratum of signals or crosspoints within a Physical Matrix or routing system. A Level may include more than one Virtual matrix as a slaved set. All elements in a Level respond to commands addressed to that Level.

Local

Local is used during configuration to identify local Sources and Destinations. Local Sources and Destinations are inputs and outputs physically connected to the Series 7000 System using the related configuration file.

Master

A module that controls a subordinate (slave) module.

Matrices

Plural of matrix.

Matrix

A configuration of potentially intersecting inputs and outputs. In routing switchers, signal switching hardware configured such that any input may be switched to any output.

MB4

Programmable Multibus 4 Control Panel.

MB8

Programmable Multibus 8 Control Panel.

MC

Matrix Controller. Controller module used in 7500 Series matrices.

MCO

Machine Control Only Control Panel.

MCPU

Master Control Processing Unit. This module provides:

- Overall system control
- Node manager interface to Series 7000 matrices
- Direct control panel support for up to 64 control panels
- Programmable real-time clock, date and time stamping for logged events
- Redundant controller interface (allows primary and backup MCPU pairs)
- Static RAM sizes (ranging from 128k bytes to 4M bytes) are supported
- Flash ROM sizes (ranging from 128k bytes to 4M bytes) are supported

MEC

Matrix Element Control. The MEC bus connects the control circuits of the various matrix modules in a frame section to the Node Controller. In some cases, when the MCPU and Node Controller reside in the same frame, these connections are all internal to the frame. More often, there are multiple Node Controllers in a system and a coaxial cable is run between Node Bus ports of each frame in the system. Only secondary systems and a particular compact configuration run external MEC buses.

MEDIC

Matrix Element Decode Integrated Circuit. Used as a communications bus between the MCPU and Controllers.

Mezzanine

A secondary printed circuit module consisting of a flat circuit board of insulating material with conductive circuits etched on and/or components mounted on its surface. These submodules generally plug into a primary module. Sometimes referred to as a submodule or daughter board.

Module

A single circuit board or assembly of circuit boards that can be readily removed from an electronics frame without first having to remove screws or other mounting hardware.

Multiformat

Ability to pass multiple signal types, such as serial digital, analog component, and analog composite.

Name(s)

Sources, Destinations, Levels, Salvos, Control Panels, Node Controllers, MCPUs, Mezzanine Boards, Tally Modules, and other components of the Series 7000 system all have names. When system software sets out to perform a function, a Take for instance, it looks for the source name, determines the inputs involved, and Takes the Source to the Destination specified (by name). Naming conventions are discussed in Section 1 of the *Configuration* manual. Names are important to operation and equally so to configuration.

NB (Node Bus)

Node Bus. A name for the communications bus between the MCPU and Controllers.

NB (Narrow Band)

Identifies the 7500 Series AES Audio Matrices.

NC

Node Controller. Controller used by Classic and DV Series matrices. The controller collects information from the modules in a matrix, sends the information to the system MCPU, and receives instructions from the MCPU.

Node Controller

See *NC*.

NTSC

Standard for scanning television signals. Used in the U.S., Canada, and Japan.

Output

A single physical, numerically designated connection point of an out-going signal from a matrix. One or more Series 7000 outputs can be assigned to a Destination name during System Configuration.

P32

32 Button-per-source Control Panel.

P48

48 Button-per-source Control Panel.

PAL

Standard for scanning television signals. Used in most European countries.

Panel Prefixes

A set of 1-to-8 printable ASCII character strings assigned to the 16-button or 24-button keypads on control panels. Used with suffixes to comprise a complete Source or Destination name. (Prefixes and 1-character suffixes are assigned to panel Keypad sets.)

Panel Suffix Set

A set of single printable ASCII characters usually the numbers 0-9 assigned to 10 buttons of a control panel 16-button or 24-button keypad. Pre-configured defaults exist for Telephone and Calculator style suffix sets.

Panel Template

Configuration data specifying control panel configuration; which includes items such as Tally Level, Destination, button assignments, and Flags restricting or allowing certain actions. Completed templates are downloaded to specific control panels.

Physical Matrix

Defines the total Input / Output size of a like signal type matrix. A Physical Matrix may be sized from 16x16 to 1,024x1,024 in increments of 16. Physical Matrices may be used to unite discrete frames in a large matrix or to fragment a single frame into smaller matrices. Every system must have at least one Physical Matrix and one Controller slice.

PLD

Programmable Logic Device.

Port

A connector, usually bidirectional, through which one device communicates with others.

Preset

Selecting a Source in preparation to taking it to air; a tentative change to one or more crosspoints which has not yet been executed.

Protect (PROT)

A control function which prevents control panels or devices from changing the current Source selection for the specified Destination.

PROTOVRD

Protect Override.

PWR

Power. This is commonly found on the modules to identify the green power LED.

PXD

X-Y Destination Control Panel.

PXS

Programmable X-Y Source Control Panel.

PXY

Programmable X-Y. Used to identify a group of control panels consisting of a PXS, and one or more PXYE and PXD panels.

PXYE

Programmable X-Y Expansion Control Panel.

Rack

An equipment rack. A standard EIA equipment rack is 19 inches (48.26 am) wide.

Rack Unit (RU)

Unit of measure of vertical space in an equipment rack. One rack unit is equal to 1.75 inches (445 mm). The height of a GVG electronics frame is typically specified in rack units.

RAM

Random access memory.

RAS

Remote Access Service.

Rear Connector Channel

See *Backplane (Rear connector channel, Motherboard)*.

Reboot (Reset)

To restart a computer, reloading the software.

Redundant Power Supply

Backup power supply which takes over immediately if the primary power supply fails.

Remote

Remote is used during configuration to identify remote Sources and Destinations. Remote Sources and Destinations are inputs and outputs not physically connected to the Series 7000 System using the related configuration file. These remote Sources and Destinations are controlled over a network.

Reserved

Tieline status where a reservation is required to use a specified Tieline. See *First Come First Served (FCFS)*.

Reset

See reboot.

Resource Group

A resource group is an association of machine control devices all within a single work area.

RGB (Red, Green & Blue)

The three primary colors used in video processing, often referring to the three un-encoded outputs of a color camera. *See GBR (Green, Blue & Red)*.

ROM

Read Only Memory.

Room

A group of Destinations (usually a physical studio or control room within a facility) to which machine control and tally assignments can be made by an automated facility control system or the GUI Assignments menu. An assignment made to one Destination in a room allows control by any of the Destinations in that room.

RP

Rear Panel. RPs are special connector channels that support the various mezzanine boards. They are attached to the back of the stand-alone Control Frame according to which mezzanines are on the associated CIF module.

RS-232 or RS-232C

A serial data communications standard. RS-232C is a low-speed serial interface which uses a single-ended (unbalanced) interconnection scheme. Commonly used in telecommunications to connect computers and terminals to modems and other devices. The C suffix refers to the version of the RS-232 standard.

RS-485

A high-speed serial interface connection between data communications equipment. RS-485 specifies the characteristics of a balanced (differential) multipoint transceiver / receiver interface.

RU

Rack Unit. See *Rack Unit (RU)*.

Salvo (SVO)

A named, system-wide Preset which, when executed, may change crosspoints on one or more Destinations at the same time.

Salvo Elements

The individual take commands (Source to Destination connections) which comprise a Salvo.

Salvo Permission Set

User-determined set of Salvos permitted to be controlled by a specific panel. If used, Salvo Permission Sets are included in a Panel Template before the template is downloaded to a particular control panel. A single Salvo Permission Set may be used by more than one panel template.

SCP

Simple Control Panel.

SDP

Single Destination Paging control panel.

SDV

Serial Digital Video.

SERIM

Serial Interface Module.

SID

Source Identification panel.

Slave

Component in a system that does not act independently, but only under the control of another component.

Slice

A group of inputs and outputs assigned to a Controller.

SLIP

Serial Line Internet Protocol. Used only in SMS-V64x64 Systems to communicate with the GUI.

SMS

Signal Management System.

Source

Software defined, can be made up of one or more inputs on one or more Levels (i.e., a Source may consist of one input on the video Level and two inputs [left and right] on the audio Level). Two different Sources may share one or more inputs on one or more Levels. For example, if the Source **BARSTONE** (Bars, Tone) consists of a video and an audio input connected to a Color bar generator, BarsSil (Bars, Silent) can use the same video input.

Source Exclusion

This provides a means for limiting system access to specified sources on a Destination by Destination basis. Also, it prevents the inadvertent transmission of material that might be inappropriate for a specified Destination. Source Exclusion is applicable to all Levels on which a specified Source appears. Multiple Sources shall be excluded for single or multiple Destinations.

SMPTE

Society of Motion Picture and Television Engineers.

SRC

Source. See *Source*.

SS

Secondary Switch. The Series 7000 uses SSs to expand inputs.

Status

The current Source connected to a given Destination on a specific Level (usually the Tally level); sometimes referred to as the on air signal.

STB

Strobe.

Strap

A short conductor used to manually bridge two contact points. Used in Series 7000 Alarm system. Also called a jumper.

STROPCHS

Store Operator Changes.

Submodule

A small circuit board designed to mount on a larger module. Also known as a mezzanine board.

SVO

See *Salvo (SVO)*.

SVR

Server.

System Controller

Another term for the MCPU.

Take

Direct, immediate switching from one Source to another, occurring during the vertical interval for clean transition. The control operation which switches a Source or Sources to a Destination.

Tally

An acknowledgment returned to a control panel or terminal that an operation has been executed.

Tally Level, Active

Initially set to the default tally level, the active tally level will tally if the default tally level is not defined for the Destination assigned to a bus. In the UCP,MB8, and Client panels, the name(s) of this / these Level(s) appear(s) in the status display(s) at the start of the IDENT function.

Tally Level, Default

Set during Configuration, this level is the default Level that will tally in panel displays if no other Level tally is activated by control panel operation. In the UCP, MB8, and Server panels, the name of this Level appears in the Preset display at the start of the IDENT function.

Tally Modules

Circuit modules, housed in Grass Valley MAX Series frames, which use opto-isolated inputs and relay closure outputs to facilitate visual or aural tally indicators within a facility. For example, when a Source machine is selected on a Destination, the returned tally could light a lamp to let the machine operator know that a machine was in use.

TCI

Terminal Computer Interface.

Terminate, Termination

To complete a circuit by connecting a resistive load to it. A video termination is typically a male BNC connector which contains a 75-ohm resistive load.

TieLine

A physical connection used to give a Destination connected to the output of one matrix access to Source equipment connected to the input of another matrix. A signal which passes through 2 or more matrices; more specifically the path (consisting of 1 or more Tie Wires) which links a Destination of one matrix to a Source of another matrix. Tielines are established during system configuration.

TieLine Type

Is the Level created to be assigned to one end of a TieLine. Each TieLine must have two TieLine Types, one for each end.

Tie Wire

A physical cable which links the output of one matrix to the input of another matrix. One or more tie wires comprise a tie line.

Time Code

Timing code laid down on video tape to give each frame a unique number to ensure exact transitions during editing.

Timing Scatter

The temporal range of the different electrical lengths of router paths.

TLYLVL

Tally Level.

TM

Tally Module.

Toggle

To switch back and forth between two settings.

Twisted Pair

A cable composed of two small insulated conductors twisted together without a common covering.

UART

Universal Asynchronous Receiver Transmitter.

UCP

Universal Control Panel.

UMD

Under Monitor Display.

VI

Vertical Interval.

Virtual Matrix

Virtual Matrices can be used to fragment a Physical Matrix. Inputs and Outputs within a Virtual Matrix need not be contiguous. Only Destinations with Outputs in a given Virtual Matrix will be able to directly, without using a TieLine, access the Sources within that Virtual Matrix. As an example of their functionality, Virtual Matrices, working with control Levels, allow you set up selected Inputs and Outputs to handle R, G, B video signals by assigning each component to its own Virtual Matrix. Extending this example, if you assign the R, G, and B Virtual Matrices to the same control Level, they will always switch together as a married block; if you assign the R component Virtual Matrix to one Level, and the G and B Virtual Matrices to a second Level, you would then be able to break the R component away from the other two by selecting to control only the R Virtual Matrix associated Level at the control panel.

VISS

Video Input Source Select.

VITC

Vertical Interval Time Code.

VOM

Video Output Monitor

VSD

Visual Status Display.

VT100

A standard protocol for dumb terminals. VT100 terminals may be used for router dignostics.

Warm Start

A boot from power on, where the CPU and peripherals are already powered up (warm).

A warm boot might be performed after a software crash or a hardware reset.‘

WO

Which block of Outputs.

XPT

See Crosspoint.

YUV

A type of video which employs luminance (Y) and two color components (U [B-Y] and V [R-Y]).

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