

Master Control v7.2.9

Installation of the iMC Master Control System

Installation Guide

UG0064-01

7 Nov 2012



A **BELDEN** BRAND

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The fuse symbol indicates that the fuse referenced in the text must be replaced with one having the ratings indicated.



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- Do not use this equipment in or near water.
- This equipment is grounded through the grounding conductor of the power cord. To avoid electrical shock, plug the power cord into a properly wired receptacle before connecting the equipment inputs or outputs.
- Route power cords and other cables so they are not likely to be damaged.
- Disconnect power before cleaning the equipment. Do not use liquid or aerosol cleaners; use only a damp cloth.
- Dangerous voltages may exist at several points in this equipment. To avoid injury, do not touch exposed connections and components while power is on.
- Do not wear rings or wristwatches when troubleshooting high current circuits such as the power supplies.
- To avoid fire hazard, use only the specified fuse(s) with the correct type number, voltage and current ratings as referenced in the appropriate locations in the service instructions or on the equipment. Always refer fuse replacements to qualified service personnel.
- To avoid explosion, do not operate this equipment in an explosive atmosphere.
- Have qualified service personnel perform safety checks after any service.

General Cautions

A caution indicates a possible hazard to equipment that could result in equipment damage. Observe the following cautions when operating or working on this equipment:

- When installing this equipment, do not attach the power cord to building surfaces.
- To prevent damage to equipment when replacing fuses, locate and correct the problem that caused the fuse to blow before re-applying power.
- Use only the specified replacement parts.
- Follow static precautions at all times when handling this equipment.
- This product should only be powered as described in the manual. To prevent equipment damage, select the proper line voltage on the power supply(ies) as described in the installation documentation.
- To prevent damage to the equipment, read the instructions in the equipment manual for proper input voltage range selection.
- Some products include a backup battery. There is a risk of explosion if the battery is replaced by a battery of an incorrect type. Dispose of batteries according to instructions.
- Products that have (1) no on/off switch and (2) use an external power supply must be installed in proximity to a main power output that is easily accessible.

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Preface

Chapter 1 is an introduction to the Master Control Installation Guide.

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Chapter Structure

This guide provides installation guidelines for the Miranda master control system. It includes the following chapters:

- Chapter 1, [Preface](#) (this chapter) outlines effective ways to use this guide, presents an overview of the installation guide.
- Chapter 2, [Introduction](#) (this chapter) outlines effective ways to use this guide, presents an overview of the installation guide.
- Chapter 3, [Software Installation](#), provides information about installation of configuration software and the optional GUIs (software control panels).
- Chapter 4, [Hardware Installation for MCEs and MCPMs](#), provides information about the mounting and connection of the various pieces of equipment in your system.
- Chapter 5, [Configuration for MCEs and MCPMs](#), provides information about the configuration of master control switchers (MCEs and MCPMs) and control panels, and to some degree, the configuration of a connected NV9000 system.
- Chapter 6, [Installing and Configuring Imagestore 750s](#), describes the installation and configuration of Imagestore 750s.
- Chapter 7, [Maintenance](#), provides information about maintenance of Master Control equipment.
- Appendix A, [References](#), provides useful reference sections, include a list of “caveats” — limitations, incompatibilities, system requirements, etc., that you must take into consideration.

An [Index](#) and [Glossary](#) are also provided.

The PDF Document

This guide is provided in PDF format, allowing you to use Acrobat’s “bookmarks” to navigate to any desired location. You can also easily print a hardcopy. Please note:

- Use the Table of Contents bookmarks to jump to any desired section.
- Many hyperlinks are provided within the chapters.

- Use the Index to jump to specific topics within a chapter. Each page number in the index is a hyperlink.
 - Use Acrobat's 'Go to Previous View' and 'Return to Next View' buttons to retrace your complete navigational path.
- Use the 'First Page', 'Previous Page', 'Next Page', and 'Last Page' buttons to go to the first, previous, next, or last page within a PDF file.

Note

To display the Acrobat navigation buttons, right-click the Tool Bar area, and check 'Navigation'.

- Use Acrobat's extensive search capabilities, such as the 'Find' tool and 'Search' tool to perform comprehensive searches as required.

Terms, Conventions and Abbreviations

The following conventions are used throughout this guide:

- The symbol ▲ denotes either an example or a special message.
- Entries written in a **bold-face** font, in Capital Letters, or enclosed in single quotation marks ('') denote the names of GUI menus and buttons, and on occasion, physical control panel buttons and knobs. For example:
Click 'Apply' to . . .
Press **Transition** to . . .
- Double quotation marks ("") denote colloquial or informal language. Single and double quotes do **not** have the same meaning.
- Entries written in a monospaced font denote pathnames, parts of your file system, or items that you must select or enter, within the scope of Windows XP (or Vista):
C:\Program Files\Miranda\Master Control\ . . .
- The term "iMC" is the name of the integrated master control system.
- "MCPM" stands for Master Control Processing Module—a "transition processor" that installs in the NV5100MC or NV5128-MC frame. One MCPM provides one master control channel.
- "MCE" stands for Master Control Engine. An MCE is a specific type of MCPM. One MCE also provides one master control channel.
- The terms "panel" and "control panel" refer to master control panels, either hardware or software. The term "GUI" usually means the iMC-Panel-GUI software control panel.
- The terms "low-tally" and "high-tally" mean low illumination and high illumination for buttons and indicators. High-tally generally means selected or active; low-tally means the opposite.
- The term "MC" is an abbreviation for "master control." The term "MFR" is an abbreviation for "multi-format router."

Other terms, used occasionally, include the following:

- Intuition XG is a single- or dual-channel graphics processor. The term "Intuition XG" can encompass all the hardware and software involved in the Intuition XG component of master control.

- XMedia is a term that includes different software applications that create and manage images, keyers, logos, etc. used by Intuition XG.
- Xplay and the XG Dashboard are software applications under XMedia. Both of these are used to configure the Intuition XG processor.
- Oxtel is a division of Miranda. Its name is used to identify certain ports of the Intuition XG hardware. A reason for this is probably unobtainable.
- The term “DC21” identifies the master control device controller used for machine control. “DC21” is trademark of DNF Controls.

Document Usage

There are several manuals and user’s guides in the master control documentation set:

Configuration Guides and Information

UG0061	MasterConfig User’s Guide	How to configure MCPMs and MCEs.
UG0062	MasterDiag User’s Guide	How to initialize and update MCPMs and MCEs.
UG0063	MasterLogo User’s Guide	How to convert graphic files to the format required by MCPM logos and send logos to the MCPMs.
UG0064	iMC Installation Guide	How to install, connect, and configure MC equipment.
UG0065	iMC Reference Manual	Architectural and functional detail regarding Miranda master control systems.
UG0066	MCS Panel Configuration Editor User’s Guide	How to use <i>MCS Panel Configuration Editor</i> software to configure control panels.
UG0067	Device Controller User’s Guide	How to use and configure the master control device controller.
UG0068	Tally Processor User’s Guide	How to use and configure the master control tally processor.

Panel Operator’s Guides

UG0069	iMC-Panel-100 Operator’s Guide for Imagestore 750	3RU control panel
UG0053	iMC-Panel-GUI Operator’s Guide for Imagestore 750	Software control panel
UG0054	iMC-Panel-200 Operator’s Guide for Imagestore 750	Compact panel
UG0055	iMC-Panel-300 Operator’s Guide for Imagestore 750	Full-size panel
UG0070	iMC-Panel-100 Operator’s Guide for MCEs and MCPMs	3RU control panel
UG0057	iMC-Panel-GUI Operator’s Guide for MCEs and MCPMs	Software control panel
UG0058	iMC-Panel-200 Operator’s Guide for MCEs and MCPMs	Compact panel
UG0059	iMC-Panel-300 Operator’s Guide for MCEs and MCPMs	Full-size panel

Note the following:

- Control panel operators should read the operator’s guide (for instructions) and the *iMC Reference Manual* (to understand system features).
- An iMC-Panel-GUI operator need not read the iMC-Panel-300 manual.
- Operators who control Imagestore 750s should read the *Imagestore 750 Reference Manual*.
- Administrators should read the documentation for all installed equipment. Although it is a large amount of reading, it is essential.

- The documents do **not** address the installation or configuration of an NV9000 router control system or the installation or configuration of an automation system.
- If your master control system is to include machine control, configurers should read the DC21 Device Controller User's Guide.
- If your master control system is to support Intuition XG functions, administrators should obtain and distribute all Intuition XG documentation and related documents from Miranda.
- The Imagestore 750 is a 1RU "channel branding processor." It provides one master control channel, as do MCPMs and MCEs. For brevity, the term "Imagestore 750" also represents the LGK-3901, DSK-3901, and ISM-3901, all of which perform some subset of the Imagestore 750's functions.

The terms used here (MCPM, GUI, etc.) will become clearer if you read the introduction to this installation guide or the *iMC Reference Manual*.

2 Introduction

Chapter 2 is a broad introduction to the installation of an iMC master control system.

Topics

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It is important to have an understanding of the capabilities and interactions (and limits) of all components in your system before you can properly configure (or for that matter, plan) your system. That would include the NV9000 router control system if it is present.

- ▲ By the time you receive your system and are ready to install it, you (or someone in your organization) will have made many of the design decisions already.

This chapter is an overview. For architectural details, refer to the *iMC Reference Manual*. You can skip this chapter if you are already familiar with Miranda's master control products.

Objective

This document presents installation *guidelines* because there is no one way to install a master control system. Each system is unique and there are many variables.

There are a few constraints and limits that are not obvious to the uninitiated. This guide points out those constraints in the appropriate sections. See [Things to Consider](#) on page 204.

One of the many master control options is whether to couple the master control system to an NV9000 router control system. This guide will address those issues and address NV9000 configuration to the extent it applies to master control.

If you have used the *iMC Quickstart Guide* to perform a quick installation, you can use this installation guide to complete the job and to adjust some of the more advanced features.

After you have performed initial installation tasks, the remainder of the job is configuration. This guide is not a configuration manual, but presents some configuration tasks that are important during installation. To carry out more detailed or advanced configuration (using the configuration software) you will want to read the configuration manuals.

Summary

A master control system is moderately complex, involving a number of hardware components, software applications, documentation, computers, networks, and several options. One such option is whether to operate the master control switcher in conjunction with an NV9000 router control system.

Figure 2-1 represents the components of a iMC master control system.

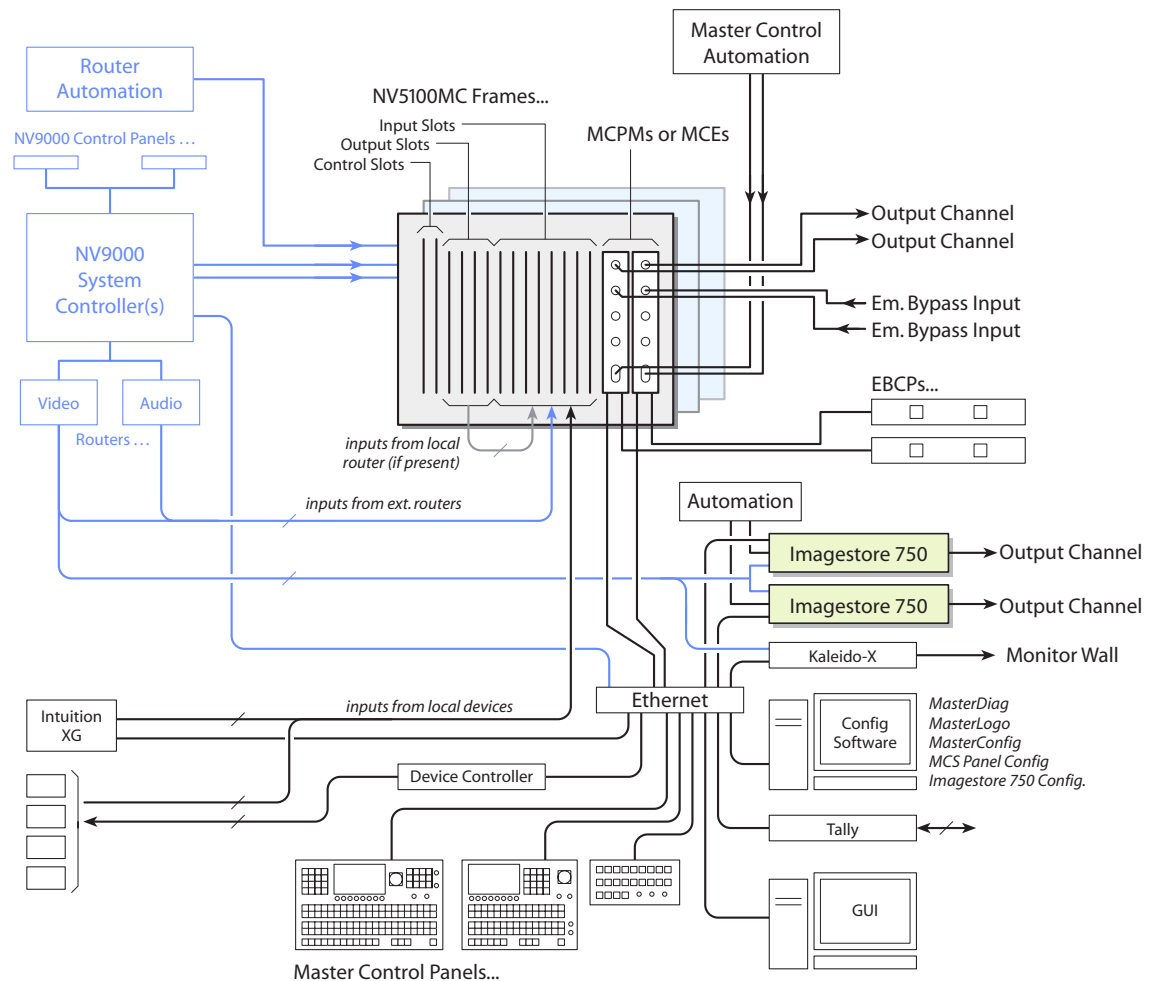


Fig. 2-1: An iMC Master Control System

Master control transition processors are the heart of the master control system. There are three broad categories:

- MCPMs — master control processing modules.
- MCEs — master control engines (called “next generation” master control).
- Imagestore 750s — “channel branding processors.”

We include the LGK-3901, DSK-3901, and ISM-3901 in the category with Imagestore 750s. These processors perform a subset of the functions of an Imagestore 750 and are configured the same way.

Each MCPM, MCE, Imagestore 750, or -3901 processor is considered a *channel*. The output of a *channel* is called “program output.” An MCPM or MCE can also produce “preset output” and audio monitor output, among other things. MCEs can also produce “preview output” and “aux output.” Imagestore 750s can also produce “preset output.” (In the Imagestore 750 Configurator, it is called “preview” output.)

Frames

MCPMs and MCEs reside in a master control frame. Imagestore 750s are independent 1RU processors and do not require a frame. The LGK-3901, DSK-3901, and ISM-3901 each fit in 2 slots of a 3RU Densité frame.

An iMC master control system can include one or more master control frames. The two types of master control frames, NV5100MC, and the older NV5128-MC, are nearly identical, the main difference being the midplane. The NV5100MC is the newer frame and provides higher throughput. Each frame has 8 input card slots, 8 output card slots, and two control card slots. MCPMs and MCEs occupy output card slots.

Master control frames can also contain relatively small multi-format routers (MFRs). The MCPMs and MCEs can work closely in conjunction with the MFR.

Master control frames have I/O backplanes. Each input card and output card has a corresponding backplane module. The backplane module presents the I/O connectors for the I/O card. All I/O backplanes provide 16 signal connections. An SD input card, for instance, has 16 BNCs. An analog audio card has 4 DB25s. MCPMs and MCEs also have corresponding backplane modules.

The master control backplane can receive inputs from (1) local devices such as VTRs, (2) an external router controlled by an NV9000 system, or (3) from an MFR in the master control frame, or a combination of all of these types of input.

Panels

Master control operators use control panels to control transition processors. The transition processors and control panels communicate on an Ethernet LAN. The master control product line includes both software control panels (GUIs) and hardware control panels.

Automation

MCPMs, MCEs, and Imagestore 750s can also be controlled by an automation system. For MCEs and MCPMs, that is NVISION Serial Protocol for Master Control (NP0024-00, rev G), and for Imagestore 750s, it is the Oxtel automation protocol.

NV9000

A master control system can operate in the context of a NV9000 router control system. The routers in the NV9000 system can supply (some of) the inputs to the master control system via the backplane. The NV9000 can be subject to automation. Generally, an NV9000 system has one or more router control panels (such as an NV9641).

- ▲ If the master control system includes an Imagestore 750, an NV9000 system is a requirement.

An NV9000 control system includes one or two NV9000 system controllers. The NV9000 system controller can be connected to the master control frame. It communicates with the control card(s) in the master control frame. A NV9000 controller *must* be connected if the frame contains an MFR. Router automation can also control the MFR in the frame.

Master control can rely on the NV9000 system for 3 elements: salvos, router outputs (and device categories and indexes for “router pre-select” functions), and router sources (for “external router source” functions and Imagestore 750 inputs). The NV9000 can also act as an SNMP agent for the MCPMs and MCEs in your master control system. It is not (yet) an agent for Imagestore 750s.

Emergency Bypass

All MCPMs and MCEs have an *emergency bypass* component. This is a switch that can route alternate programming to output when the MCPM or MCE detects a critical problem.

The product family includes an emergency bypass control panel (EBCP) that can be used to force an emergency switch. The EBCP provides what could be regarded as a “panic button.”

See [EBCP](#) on page 33 for more information.

See [Linking Two MCPMs as Primary and Backup](#) on page 192 for a way to use the emergency bypass inputs.

Intuition XG

Miranda’s Intuition XG processor (with its associated Xmedia software) can be integrated with the master control system. An Intuition XG processor can be used by MCEs and can also be connected to Imagestore 750s.

The Intuition XG subsystem includes a graphics processor that stores, and plays out, video keys on two channels. It can access “live” data including feeds from wire services.

For MCEs

The Intuition XG processor delivers from one to four XG media clips simultaneously to one MCE. Additional Intuition XG subsystems might be required for multiple MCEs. The Intuition XG processor, further, can control an MCE’s squeezeback function and audio overs, and can select main sources.

- ▲ Intuition XG is not supported by MCPMs.
- ▲ Intuition XG requires at least one SWB input card in the frame of the MCE with which it communicates.

See [Intuition XG](#) on page 78 for hardware installation information and [Intuition XG](#) on page 106 for configuration information.

For Imagestore 750s

The Intuition XG processor delivers from one to eight XG media clips simultaneously to one Imagestore 750. Each Imagestore 750 can potentially be connected to more than one Intuition XG processor.

Device Controller

MCEs can perform machine control and pre-roll operations. Control panels correspondingly might have several machine control and pre-roll buttons. Machine control and pre-roll functions are carried out by a DC21 Device Controller on the master control network. The device controller can control up to 4 VTRs (or similar devices) with a serial protocol and has the capability of controlling up to 16 other devices with start and stop pulses.

See [Device Controllers](#) on page 77 for hardware installation information and [Device Controller](#) on page 105 for configuration information.

Kaleido-X

Master control can be integrated with a Kaleido-X multi-viewer (or monitor wall) in such a way that master control can trigger a Kaleido-X *re-layout*. The Kaleido system defines *rooms* (in which a multi-viewer exists) and *layouts* (the organization of views on the multi-viewer) for each room. Panel operators can have available 'Kaleido-X Layout' buttons that trigger multi-viewer re-layout. A channel change can also trigger a multi-viewer re-layout.

Control panels, when they are controlling Imagestore 750s, can cause the *source content* of a monitor wall to change when the operator changes the current source group. In contrast, a multi-viewer re-layout changes the *organization* of the sources on the display.

Frames

The NV5100MC master control frame is a metal enclosure that has the following functions:

- It holds MCPMs, MCEs, and I/O cards.
- It communicates with the NV9000 (if present).
- It provides a place to connect inputs and outputs.
- It distributes input signals to the outputs, MCPMs, and MCEs.

There are two frames available: the NV5100MC and the older, obsolete NV5128-MC. Both are 8RU (14") and approximately 18.75" deep. Each has 16 slots for I/O, MCPMs, and MCEs. Each has 2 control card slots.

The NV5100MC frame accepts the same control cards and power supplies, and to some extent accepts the same I/O cards as the older frame. The NV5100MC frame has an enhanced motherboard that allows multiple (single-slot) SWB output cards and provides additional throughput for up to 8 HD MCEs.

You can use a router control card (EM0374) or a simple clock card (EM0414) in either or both of the control card slots. A router control card is required if the frame hosts a router (an MFR). You can use 2 control cards (or clock cards) for redundancy. If one fails, the other takes over.

All frames have control system connectors (Ctrl1, Ctrl2, Diagnostic) and AES reference, video reference, system alarm, and power supply alarm connectors. They also have aux bus and time code reference connectors. The aux bus connector is used when the frame is controlled by an SMS7000 system. The time-code reference connector does not apply under master control, but might be used by the MFR.

▲ An SMS7000 requires a mezzanine addition to the router control card.

Refer to [Control Connections](#) on page 53 for details.

Each frame has two power supply bays. One power supply is sufficient. Use two for power supply redundancy. The power connectors are AC jacks. Each supports 90–130V, 180–250V, 50/60Hz. The frame may draw 660W maximum. Customer-replaceable fuses are present on the power supply modules (PS6000s). A heavy-duty ground lug is present for safety or regulatory compliance.

Each frame has fan unit at top that draws air up through the grill in the door of the frame and out through the grill at the rear, top.

Card Slots

Figure 2-2 is a schematic view of the frame from the top, showing the relative position of the I/O cards, control cards, and backplanes, and their relationship to the motherboard.

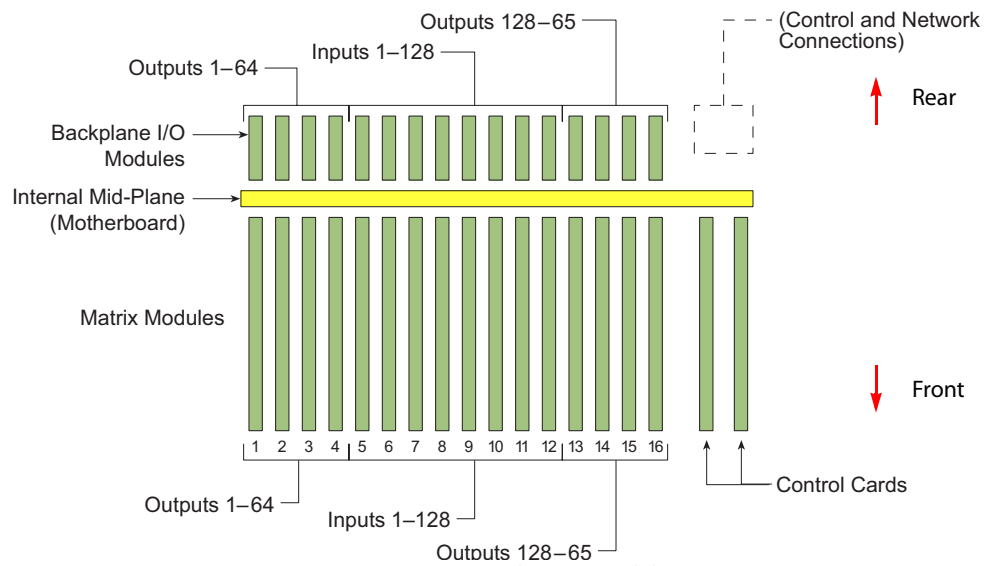


Fig. 2-2: NV5128-MC or NV5100MC Frame, Top View, Showing Module Locations

Frames have 8 input slots and 8 output slots. The input slots occur in the middle of the frame. The output slots are divided into two groups of four. Each I/O slot handles 16 I/Os.

The numbering of the slots is sequential, from 1 to 16, but the connector numbers in slots 13–16 are in reverse order. These are the connectors numbers, as seen from the rear:

Slots															
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Output				Input								Output			
65	81	97	113	113	97	81	65	49	33	17	1	49	33	17	1
66	82	98	114	114	98	82	66	50	34	18	2	50	34	18	2
67	83	99	115	115	99	83	67	51	35	19	3	51	35	19	3
68	84	100	116	116	100	84	68	52	36	20	4	52	36	20	4
69	85	101	117	117	101	85	69	53	37	21	5	53	37	21	5
70	86	102	118	118	102	86	70	54	38	22	6	54	38	22	6
71	87	103	119	119	103	87	71	55	39	23	7	55	39	23	7
72	88	104	120	120	104	88	72	56	40	24	8	56	40	24	8
73	89	105	121	121	105	89	73	57	41	25	9	57	41	25	9
74	90	106	122	122	106	90	74	58	42	26	10	58	42	26	10
75	91	107	123	123	107	91	75	59	43	27	11	59	43	27	11
76	92	108	124	124	108	92	76	60	44	28	12	60	44	28	12
77	93	109	125	125	109	93	77	61	45	29	13	61	45	29	13
78	94	110	126	126	110	94	78	62	46	30	14	62	46	30	14
79	95	111	127	127	111	95	79	63	47	31	15	63	47	31	15
80	96	112	128	128	112	96	80	64	48	32	16	64	48	32	16

The various backplane modules differ in their connectors. I/O connectors are DB25s, Phoenix 3-pin quick-release, or BNCs. All backplane connectors are numbered from 1 at the top to 16 at the bottom. This is true regardless of the type of connectors. For example, certain audio backplanes have 4 DB25s. The top DB25 presents inputs (or outputs) numbered 1–4, the bottom connector, 13–16.

- ▲ Audio signals are pairs, often stereo pairs. A DB25 connector presents 4 pairs whereas a BNC presents one pair.

Connector Numbering Formulas

The “input” number I (1–128) assigned to any *input* connector C is

$$I = (slot - 5) \times 16 + C \quad \text{where } slot = 5-12.$$

The “output” number O (1–128) assigned to any *output* connector C is

$$O = (slot - 1) \times 16 + C \quad \text{where } slot = 1-4$$

$$O = (16 - slot) \times 16 + 64 + C \quad \text{where } slot = 13-16$$

The Inverse Formula

Given G (in the range 1–128), **any** connector C (in the range 1–16) is

$$C = [(G - 1) \bmod 16] + 1$$

MCPMs and MCEs have a variety of connector types, including 1.0/2.3 coax, RJ-45, and D-type connectors. Their connectors do not follow any particular sequence and are not numbered.

Motherboard

The motherboard distributes the 128 input signals from the backplane to the router output cards (if any) and to the MCPMs and MCEs (which always go in output slots). Figure 2-3 is a simplified block diagram of a sample master control frame. In this example, the MCPM and MCE occupy two output slots each, leaving room for 4 router output cards.

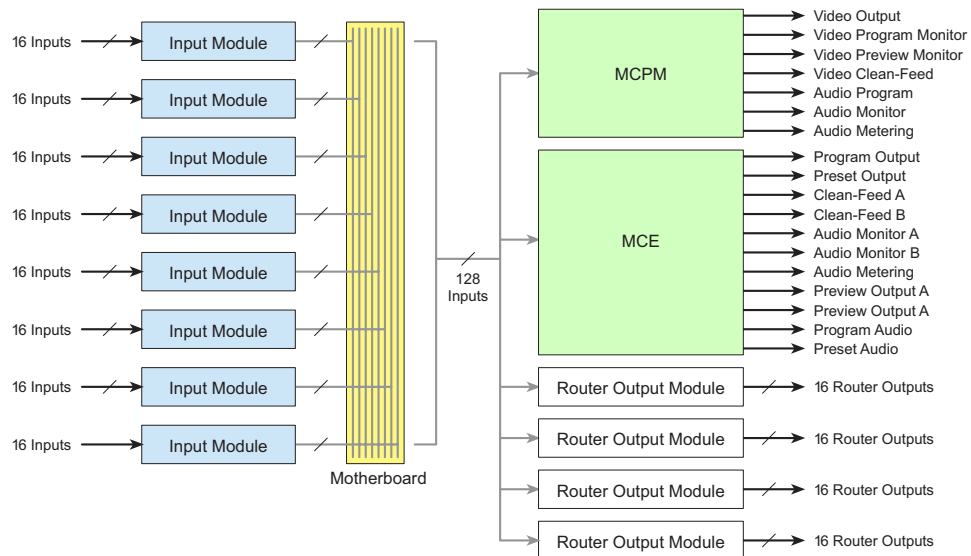


Fig. 2-3: Typical Master Control Frame

Master control's input signal formats can be a mix of AES audio, analog audio, analog video, SD video, and HD video. The MFR can route time-code signals and machine-control signals. The master control (MC) system does not accept signals of these types.

Each I/O card handles 16 signals. Because audio signals are generally stereo pairs, each audio card handles 32 audio channels.

Output cards, MCPMs, and MCEs all share—and compete for—the output slots. A 16-output SD video output card consumes one slot. An MCPM-HD requires 4 output slots (an entire output bay). Trade-offs must be made during the allocation of slots. Other MCPMs and MCEs require fewer slots.

All I/O modules, MCPMs, and MCEs, and their backplanes are “hot-swappable.”

An MFR crosspoint matrix, if present, is distributed through the 128×16 crosspoints of the output cards. Please refer to the application notes AN0004 (Routing and Master Control Integration) and AN0013 (NV9000 System Configurations) for more information.

Please note:

- ▲ The MCPM-MK-HD does not receive inputs from the motherboard, but from its own backplane. No other MCPM or MCE can use those inputs.
- ▲ The MCPM-HD and -HD2 each have an additional crosspoint that, in conjunction with an MFR, distribute SWB¹ inputs to 32 SWB outputs. SWB output cards fit in the two “wings” of the MCPM-HD (or -HD2).

1. SWB (super wide band) includes both SD and HD formats.

- ▲ The MCPM-SDHD has an additional crosspoint that, in conjunction with an MFR, can distribute SWB inputs to 16 SWB outputs. SWB output cards fit in the single “wing” of the MCPM-SDHD.

Refer to [Transition Processors](#) on page 13 for more information.

Local Input and Router Input

There are several ways to connect video and audio devices to the frame’s inputs:

- Static, direct or *local* connection. The video and audio outputs of a device (such as a camera or VTR) are cabled to connectors on the frame’s backplane.
- Static, indirect connection. Video and audio outputs of a device have a dedicated connection, via one or more router(s), to the frame’s backplane.
- Dynamic, *router pre-select* connection. A large number of router sources are available for *explicit* selection. The connection requires that a router destination (one or more router outputs) be cabled to the frame. (Control connections to the NV9000 system are also required.) The master control operator must actively browse router sources to choose a source. The operator must also “take” the source to the destination connected to the frame. The operator can select from potentially thousands of router sources.
- Dynamic, *external router source* connection. Specific router sources are available for *transparent* selection. An MCPM configuration designates some video or audio sources as *external* (i.e., from the NV9000) and others as *local* (i.e., connected at the frame’s backplane). All external sources reach the MCPM through a specifically configured set of the frame’s ports. A master control operator need not know which sources are external and which are not. The mechanism for accessing the router source is automatic and hidden from the operator. The operator can select from a limited number of router sources.

See [Router Pre-Select](#) on page 69 and [External Router Sources](#) on page 70 for more information.

Connectors

At the rear of the frame are a variety of connectors:

Serial Ports	Video Reference	System Alarms
Ethernet Ports	Aux Bus	Power Supply Alarms
AES Reference	Time Code Reference	Power

Refer to [Control Connections](#) on page 53 for details.

Some of the connectors are used when a router is present in the frame and are not necessarily useful for master control.

There is (for the most part) one of each type of connector for each of the 2 possible control card.

Transition Processors

Transition processors include MCEs, MCPMs, and Imagestore 750s. MCEs and MCPMs require a master control frame. Imagestore 750s are independent 1RU devices and do not require a frame.

MCEs and MCPMs

There are several models:

MCPM-SD	SD video, 3 keyers, 2 logos, 1 squeezeback generator, 2 slots.
MCPM-HD, MCPM-HD2	HD video, 3 keyers, 2 logos, 1 squeezeback generator, 4 slots. Supports 2 wing output cards.
MCPM-SDHD	HD or SD video, field-programmable. 3 keyers, 2 logos, 1 enhanced squeezeback generator, 4 slots. Supports 1 wing output card.
MCPM-MK-SD	SD video, 3 keyers, 1 logo, no squeezeback, 1 slot. These modules are also called “mixer/keyers” or “branding engines.”
MCPM-MK-HD	HD video, 3 keyers, 1 logo, no squeezeback, 2 slots. These modules are also named “mixer/keyers” or “branding engines.”
MCE	HD or SD video, field-programmable. 3 keyers, 2 logos, squeezeback, 1–3 slots. The availability of “next generation” features depend on the number of modules present.

All MCPMs and MCEs have common characteristics, such as audio meter/monitor outputs, general-purpose I/O, and emergency bypass capability.

Refer to [MCPM Comparison](#) on page 176 for a table of differences.

Notes

Use MasterConfig to configure MCPMs and MCEs.

Use MasterDiag to assign an MCPM or MCE its IP address. (MasterDiag requires a straight-through DE9 male-female cable for MCPMs and requires a custom cable for MCEs.) See [MCEs](#) on page 73 for the MCE cable diagram.

An MCPM has two parts: the processing module itself and its “backplane module” which presents the I/O connectors. MCEs have one backplane module for each card (up to 3) in the MCE.

The MCPM-MK-HD receives video input from its backplane module. All other MCPMs receive video (and audio) input from motherboard of the frame in which the MCPM is placed.

If an MCPM-HD, -HD2, or -SDHD contains a wing output card, each output card also requires a backplane module.

Each MCPM or MCE is functionally independent. Each has its own network port, automation port, and video reference port. However, all MCPMs and MCEs share the frame’s motherboard and input modules.

▲ MCEs have internally terminated reference connectors. MCPM reference connections are not internally terminated and provide loop through to other devices. MCPM reference connections require external termination.

MCPMs and MCEs occupy output slots. You can have as many as you can fit in a frame. (For example, an MCPM-HD takes 4 slots. You can have two MCPM-HDs in a frame.)

MCEs range from 1 to 3 cards. A 3-card MCE takes 3 slots. You can have two in a frame, with one slot remaining for some other module in each output bay.

The NV5100MC frame allows eight 1-slot MCEs.

MCEs

MCEs are advanced MCPMs. MCEs perform all the functions of the earlier MCPMs and provide additional capabilities. The most prominent added features are the *preview bus* and the *aux bus* and 16-channel audio. The preview bus and aux bus give an operator freedom to experiment without affecting the delivered program output.

MCEs are also *modular*, comprising from 1 to 3 circuit boards and a number of optional daughter cards. There are 5 modules in the MCE card set:

- MCE-CORE. The minimum MCE comprises this single (full-size) card that performs *core* master control functions.
- MCE-PVW. The *preview* module supports the preview bus.
- MCE-AXM. The *audio expansion module* provides Dolby E decoders for the program and preset buses and presents Dolby E metadata and AES output (the 8 channels for each of the program and preset buses and 8 channels for monitor A) at its backplane.
- Main sources in MCEs can be configured with or without Dolby E encoding, and with dual Dolby encoding. The MCE can be configured with dual Dolby decoders in two ways:
 - Dual decoders for program and preset main sources and for program and preset overs.
 - Dual decoders for program, preset, and preview main sources.
- This of course depends on the number of Dolby decoders in the MCE-AXM card:
- MCE-DVE. The *digital video effect* cards are small mezzanine cards that can be added to the core and to the preview boards for video effects.
- Dolby E. These are third-party Dolby E processors. Up to 8 Dolby cards mount on the MCE-AXM board, depending on your needs.

MCEs have features that work in conjunction with the iMC-Panel-200, iMC-Panel-300, iMC-Panel-GUI, and with older panels such as the CECF. MCEs also work in conjunction with the (new) video and audio timing page of MasterDiag.

MCEs have inputs and outputs similar to those of other MCPMs, such as audio meter outputs, GPIO, clean-feed outputs, and emergency bypass inputs. All MCEs have a reset switch, a bypass toggle (for the emergency bypass relay) and an diagnostic port at their front.

Differences

Notable differences between the MCEs and MCPMs include:

- MCE audio and video connectors are coax (1.0/2.3 DIN) connectors; MCPM audio and video connectors are BNCs.
 - ▲ DIN-to-BNC breakout panels are available. The part number for these 1RU panels is NV5100MC-BOP. Each BNC connector on the panel is coupled to a 2m cable with a DIN connector.
- MCEs have 2 clean feed outputs; MCPMs have 1 clean feed output.
- MCEs have 2 aux outputs and 2 (video) source inputs; MCPMs do not have these.
- Most MCE outputs (video or audio) carry 16 embedded audio channels. The exception to this is that the MCE-AXM backplane provides 24 AES outputs (12 pairs). MCPM audio output varies depending on the output. Certain MCPMs offer analog audio monitoring output.
- MCEs have preview and aux buses. MCPMs do not.

- The diagnostic port (for MasterDiag) uses 3 pins of a 6-pin Phoenix connector. The diagnostic port of an MCPM is a DE9 connector.
- MCEs support machine control, pre-roll, and audio macros. MCPMs do not.
- MCEs can be integrated with an Intuition XG subsystems, and play out XG media clips. Intuition XG is not available for MCPMs.

There are other minor differences.

Imagestore 750s

The Imagestore 750 is an independent transition processor (also called a “channel branding processor”) that can operate as a stand-alone unit with or without automation, or as part of the iMC master control system. In the context of the combined master control system, it operates in conjunction with an NV9000 router control system that provides video and audio sources and one or more master control panels, such as the iMC-Panel-200, that provide commands. The Imagestore 750 issues switching instructions to the NV9000 when it receives commands from a master control panel.

The Imagestore 750 is essentially an A/B transition processor that inserts video effects (DVEs and DSKs) and voice-overs into its output. It has many configuration options. The software used is the “Imagestore 750 Configurator.”

- ▲ Note that a particular version of this software is required for operation in the context of an iMC master control system: at present, it is v4.5.
- ▲ Version 4.5 of the Imagestore 750 is required.

Inputs and outputs of the Imagestore 750 include:

- Four SDI inputs, A, B, C, and D. These accept HD and SD input.
- Two external keyer pairs (fill and key). Inputs C and D can be used for a third keyer pair.
- A GPIO connector that supports 16 GPIO ports (each configurable as an input or an output), LTC, and Dolby metadata.
- 16 AES inputs and 16 AES outputs.
- Four SDI outputs (program, preview, clean-feed, and monitor).

There are also 4 COM ports and 2 Ethernet ports.

Features

The Imagestore 750 has two video processing paths, program and preview. The program path has an A/B mixer, 4 downstream keyers (DSKs) and an optional DVE processor. The preview path has all these modules except the A/B mixer.

After audio is disembedded, the audio processing path includes an A/B mixer for 16 audio channels and two voice-over processors, also for the 16 channels. Audio is re-embedded in program and preview audio after processing.

The model also includes a clean-feed (video) output and a (video) monitor output. There are many selectable tap locations for these outputs.

Details

Each input (A, B, C, D, Fill1, Key1, Fill2, and Key2) can be individually selected as an SDI input or one of 5 test signals. (Each SDI input can be subject to a rectangular clipping mask.)

Both the A and B side of the A/B mixers can connect to any of the inputs (A, B, C, D, Fill1, Key1, Fill2, and Key2). Similarly, any of the DVEs can connect to any of those inputs.

The DVEs can also accept the output of the A/B mixer. The DVE output (either DVE1 or DVE2) can be inserted in the processing path in one of 3 places: before DSK1, before DSK2, or before DSK3. The DVE processing section is a purchase option. The DVE processor can be bypassed if it is installed.

The Imagestore 750 has storage supporting internal keyers (logos, etc.). Inputs C and D can be used as external keyer (fill3, key3) inputs.

The preview output can present video from one of several different tap points. Similarly, the clean-feed (CLN) output and the monitor (MON) outputs can present video from several different tap points.

Audio is disembedded from SDI sources, sent to the audio processing section, and re-embedded on output. The audio is re-embedded in the PGM, PVW, CLN, and MON outputs.

LGK-3901, DSK-3901, and ISM-3901

The iMC master control system can control the LGK-3901, DSK-3901, and ISM-3901. These are transition processors that fit in a 3RU Densité frame. These units provide a subset of the functions of an Imagestore 750. The iMC master control system treats these units as if they were Imagestore 750s and the documentation includes them in discussions of the Imagestore 750. They are configurable using the Imagestore 750 Configurator and each has a browser application (for remote management) that is similar to the browser application for the Imagestore 750.

Control Panels

Presently there are 3 hardware control panels and 1 software control panel (GUI):

iMC-Panel-GUI	A software control panel, also called the "GUI." This panel runs on a PC and has a graphical user interface. The GUI is a software emulation of the <i>iMC-Panel-200</i> . The GUI is designed to operate with (or without) a touch-sensitive screen.
iMC-Panel-100	A 3RU rack-mountable button panel with a separate display. The button panel is slim (less than 4" in depth). The display is third-party equipment. The panel's firmware supports the Planar PT1945R touchscreen and other VGA non-touchscreen displays.
iMC-Panel-200	A compact hardware control panel that has a large LCD touchscreen, many function buttons, and a joystick. The iMC-Panel-200 mounts on a desktop or work surface. All buttons have LCD legends and color-coding.
iMC-Panel-300	A "full-size" control panel that has a large LCD touchscreen, many function buttons, and a joystick. The iMC-Panel-300 mounts on a desktop or work surface. All but 2 buttons have LCD legends and color-coding.

In most cases, a panel's function buttons have dynamic legends and change color and brightness as required to indicate the function state. For example, a source selection button turns red if the source is disconnected or LOS. A source button turns bright (generally green) when its source is selected.

The iMC-Panel-GUI emulates the iMC-Panel-200. The GUI has no physical controls and no GPI terminals (obviously) but it can be used on touch-screen PCs as well as traditional PCs (or laptop PCs) that use keyboards and pointing devices such as a mouse.

The panels usually have fewer than 16 physical source buttons. The GUI and the iMC-Panel-200 have a set of 16 “virtual buttons” that can be mapped to physical buttons by the use of a “bank selection” button. The iMC-Panel-300 does not.

The panels, when controlling an Imagestore 750, can have ‘Group Select’ buttons which support a number of *source groups* defined in the Imagestore 750 configuration. When a source group is selected, the Imagestore 750 can switch a monitor wall to display those sources. The panel must be configured to support the monitor wall.

Both the control panel and an MCE or MCPM under control must be configured to support router pre-select if the operator is to be able to perform router pre-select. See the *iMC Reference Manual* for more information.

See [Panel Comparison](#) on page 177 for additional information.

GUIs

An important point — easily overlooked — is the way GUI configurations are “loaded.” A hardware panel requires its configuration to be uploaded to the panel. The GUI requires a specifically named configuration file in the same folder as the GUI executable program.

Three GUIs, the iMC-Panel-GUI, the older CECP GUI, and the older Aux/Preview GUI, share the same file name: `cecp_gui.exe`. The three GUIs also share the same configuration file: `cecp_gui.uicfg`. The name of this file must not change.

If you are to run multiple GUIs on the same PC, or even multiple copies of the same GUI, you must keep the instances in separate folders. Each folder would contain the executable file and the configuration file. The configuration file name must always be named `cecp_gui.uicfg`.

NV9000

A master control system can operate in the context of a NV9000 router control system. If your master control system does not, you can ignore this topic.

- ▲ An NV9000 system is required if your master control system includes Imagestore 750s.
- ▲ An NV920 — a member of the NV9000 family of system controllers — is also suitable.

NV9000 Control System

The control system itself is *software*. This software receives commands from NV9000 control panel operators, sends them to the routers in the system, and forwards the status responses back to the control panel operators.

The software executes on an NV9000 (or NV920) *system controller*, either in a stand-alone system or on one of the two system controllers in a redundant system.

The configuration that the NV9000 system uses is maintained as an SQL database. Master control configurations reference the source devices, destination devices, and salvos defined in the NV9000 configuration by their SQL record numbers (IDs). When you view an NV9000 configuration in NV9000-SE Utilities, you will see the IDs in almost every table.

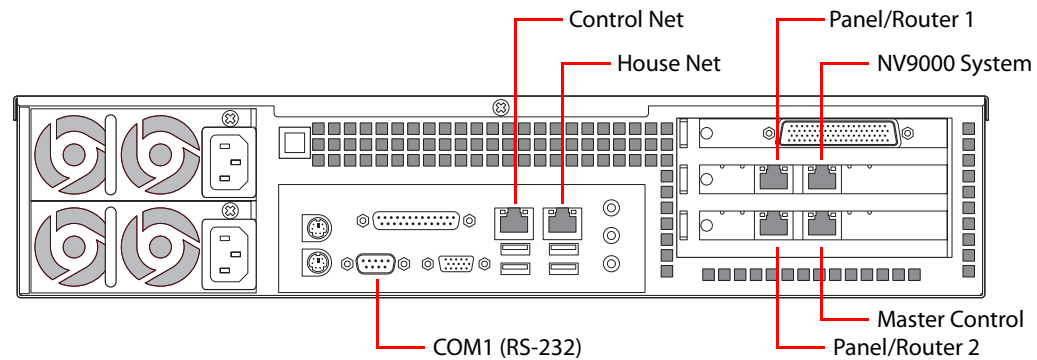
The IDs are important when a master control system is connected to a NV9000 system.

NV9000 System Controller

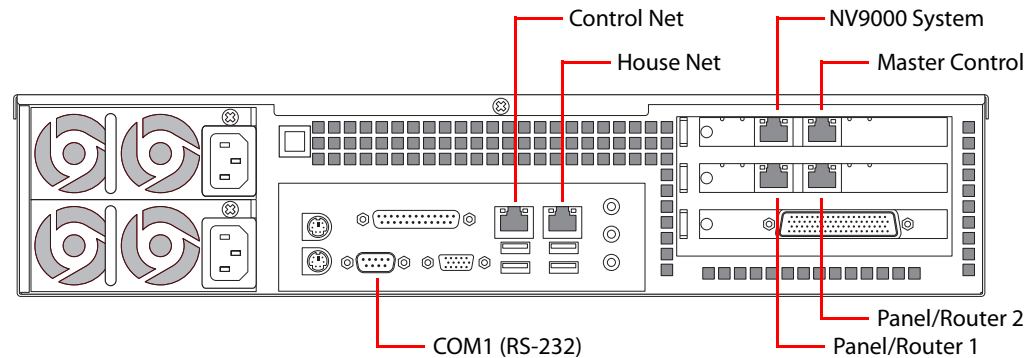
The NV9000 system controller is a 2RU device that has multiple connectors at the rear. There are 3 versions of the NV9000. The -00 version is obsolete now, and typically has its Ethernet NICs at the top. The -02 and -10 versions are newer and have their Ethernet NICs at the bottom.

It is possible to reconfigure the function of the Ethernet NICs and their IP addresses. Therefore, this guide refers to the *default* NIC functions and addresses.

This diagram identifies the default NIC ports in the -02 and -10 versions:



This diagram identifies the default NIC ports in the obsolete -00 version:

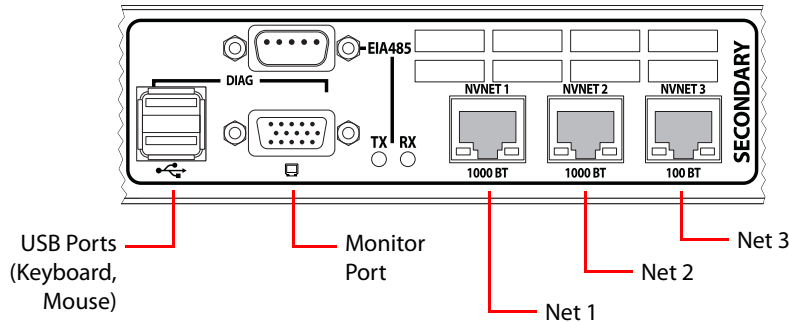


There are stand-alone or redundant systems. A redundant system includes a *primary* controller and a *secondary* controller. (A redundant pair is cross-connected on the control net.)

(The -10 version also has several other internal features that are of little concern.)

NV920 System Controller

The NV920 resides in a 1RU frame that contains one or two NV920 system controllers. Each system controller has a set of connectors:



Typically you would use one network port for routers and router control panels, the second for master control, and the third for your house network.

MFR

An MFR (multi-format router, in the frame) can stand alone or be used as an integral part of the master control system.

Refer to the *NV5128 MFR User's Guide* for additional information.

Also refer to the application notes AN0004 (Routing and Master Control Integration) and AN0013 (NV9000 System Configurations).

“Glue”

Typical systems include many miscellaneous devices, such as distribution amplifiers, sync generators, signal converters, etc. This document does not address such equipment and assumes that you will have provided it when and where it is needed.

SNMP

The NV9000 system has an agent that can handle a master control MIB. The master control processors (MCEs and MCPMs) report to the master control MIB. The NV9000 agent would report to your SNMP manager (if you have one). The master control MIB is licensed software (EC9610) that can be unlocked if you choose to purchase the license. Refer to the *NV9000-SE Utilities User's Guide* for information regarding SNMP.

The NV9000 is not (yet) an agent for Imagestore 750 SNMP.

UniConfig and MRC

UniConfig and MRC (Miranda Router Configurator) are the applications for configuring routers and router partitions either in the MFR in the master control frame or in external routers controlled by the NV9000 system.

- ▲ If you understand NV9000 architecture (and know what you want to accomplish), using UniConfig takes about a minute for each router and thereafter need not be used.

- ▲ MRC is a larger application and handles many complex router issues, but only for the NV8500 family hybrid routers.

MFR

You may skip this section if you have no MFR in your NV5100MC frame. If you have an MFR, you must also have a router control card (EM0374) in the frame.

This is the recommended procedure for using UniConfig to set up your router control card:

- 1 Connect a COM port of your configuration PC to the DE9 port at front of the router control card. (The port is RS-232 at 9600 Baud.)

- 2 Launch UniConfig. Choose serial mode.

(The Uniconfig installer is on Miranda's SB0033 software and documentation CD. Contact Miranda if you need to obtain this CD.)

- 3 In UniConfig, set the IP address and subnet mask of the control card. It is simple to do. Read the UniConfig documentation if you need it. The IP address you assign must be unique on the NV9000's panel/router network you have chosen to use for the MFR.

Remember to first read the data from the control card and then to write the new data to the control card.

- 4 In UniConfig, define the partitions and switchpoint settings of the MFR.

For the MFR, Uniconfig supports 8 partitions (not 4) and allows mono partitions.

Use UniConfig if you want to change the video reference between redundant and dual-reference modes. The option is useful only if your frame has two video reference signals. If it has only a single video reference, the choice in Uniconfig does not matter.

Thereafter, it is possible to use UniConfig through the card's Ethernet port which is at the rear of the master control frame. Your configuration PC must be assigned an IP address on the MFR's panel/router network and it must be connected to the panel/router network while you are performing the control card configuration.

Other Routers

You (or someone in your organization) will use UniConfig (or MRC) to set up and configure the video and audio routers in your NV9000 system. Router setup is mostly outside the scope of this document.

The process for setting up any router (in UniConfig) is similar to the process described above for an MFR.

NV9000-SE Utilities

NV9000-SE Utilities (SE, for short) is the software for configuring the NV9000 system itself. Portions of the NV9000 configuration must match the partition information set up in UniConfig.

You (or someone in your organization) will use SE to define source and destination devices, device categories and indexes, level sets, and salvos, among other things. Master control systems that communicate with an NV9000 system controller make use of source and destination IDs, device categories and indexes, and salvo IDs.

- ▲ Master control can use up to 10 NV9000 device categories and the indexes within those categories. It does not recognize category suffixes. The NV9000 configuration must accommodate this minor limitation of the master control software.

I/O Cards

Master control frames contain video- and audio-format input cards. Its MCPMs and MCEs are its output modules. Some MCPMs (-HD, -HD2, -SDHD) accommodate “wing” output cards. A multi-format router (MFR) uses output cards and the wing output cards of MCPMs that have them. See the MCPM chapter of the *iMC Reference Manual* for a discussion of wing output cards.

This table lists the I/O cards and backplanes related specifically to master control.

Group	Card	Part No	Backplanes
A	Analog Audio	NV5000-AA-IN	IO5000-AA-IN (DB25)
	AES Audio	NV5000-SA-IN	IO5000-AES-IN-TP / IO5000-AES-IN-BNC
	Analog Video	NV5000-AVC-IN	IO5000-AVC-IN
	SD Video	NV5000-SD-IN	IO5000-SD-IN
	SWB Video (input)	NV5000-HD-IN	IO5000-HD-IN
	SWB Video (output) ^a	NV5000-HD-OUT	IO5000-HD-OUT
B	SWB Video (input)	NV5100MC-SWB-IN	IO5100MC-SWB-IN
	SWB Video (output) ^b	NV5100MC-SWB-OUT	IO5100MC-SWB-OUT

a. This SWB output card fits in the wing slots of an MCPM-HD or -HD2 or MCPM-SDHD.

b. Any output cards belong to the MFR, if it is present in the frame.

SWB cards support both HD and SD video.

The input cards in group A work in all input slots of NV5128-MC frame. They do **not** work in slots 5–8 of the NV5100MC frame. (Keep in mind that frame slots 5–12 are *input* slots 1–8.)

The SWB input card in group B works in all input slots of the NV5100MC frame. Any cards in slots 5–8 must be SWB input cards. These cards consume more power (25W) than the SD video cards (17W), so it would be prudent to use the SD video cards in slots 9–12 if you require additional SD video.

The MCPM-HD, -HD2, MCPM-SDHD, and MCE require video in slots 5–8 and audio in slots 9–16. These processors are consistent with the division of the input slots. It is only when you are using an MCPM-SD or MCPM-MK-SD that any complication occurs. That is because the SD processors allow audio in any slot and video in any slot.

- ▲ The MCPM-MK-HD does not receive input from the motherboard and so does not use any input cards. Its 16 BNCs support HD (and not SD or 3Gig) video for its exclusive use.

The NV5100MC frame allows multiple (single-slot) SWB output cards. The NV5128-MC frame allows one.

The NV5100MC frame provides throughput for up to 8 HD MCEs. The throughput of the NV5128-MC is less.

Summary for NV5100MC

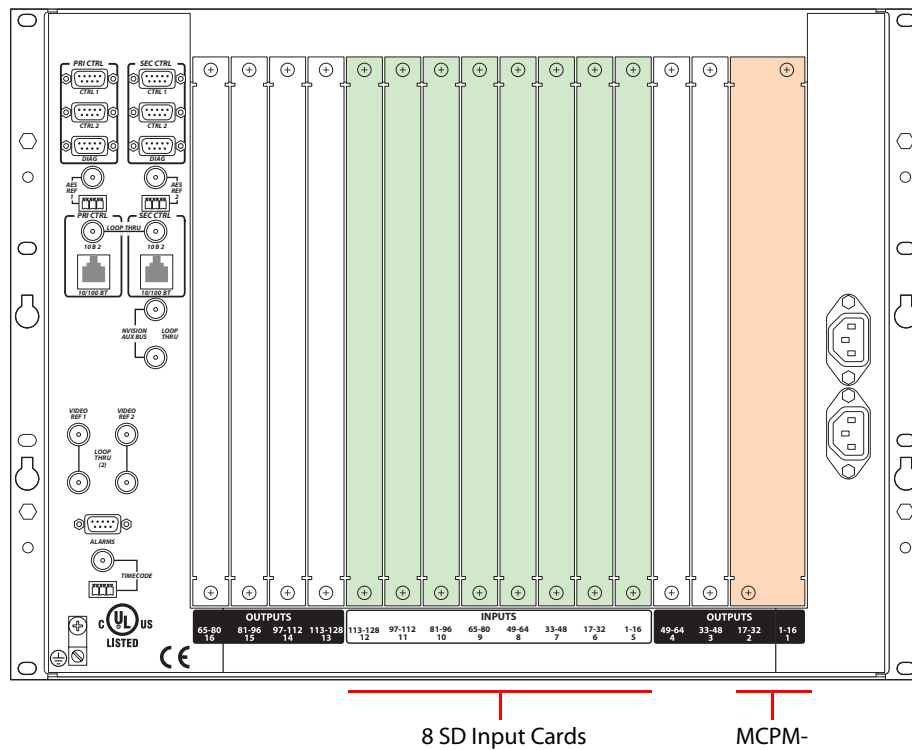
Use only SWB cards in slots 5–8.
Use any card in slots 9–12.
The frame supports up to 8 HD MCEs.

Summary for NV5128-MC

The NV5128-MC can have at most 1 SWB card.
SD input cards and audio cards for SD can go in any slot.
HD input cards go in slots 5–8. Audio cards for HD and for MCEs must go in input slots 9–12.
MFRs can use other types of cards (in NV5128-MC frames only), including those that would interfere with master control. Avoid using such cards. See the *NV5128 MFR User's Guide* for information.

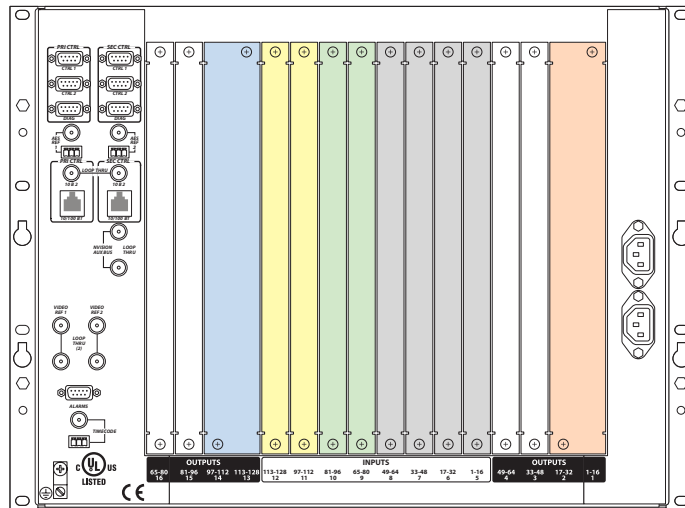
Cases

Case 1: An MCPM-SD with 128 SD inputs all having embedded audio.

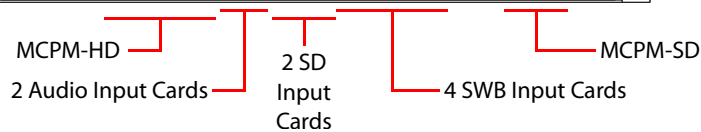


The frame must be an NV5128-MC.

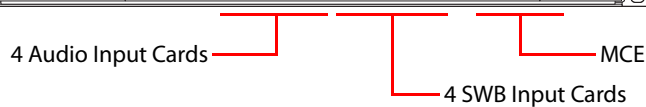
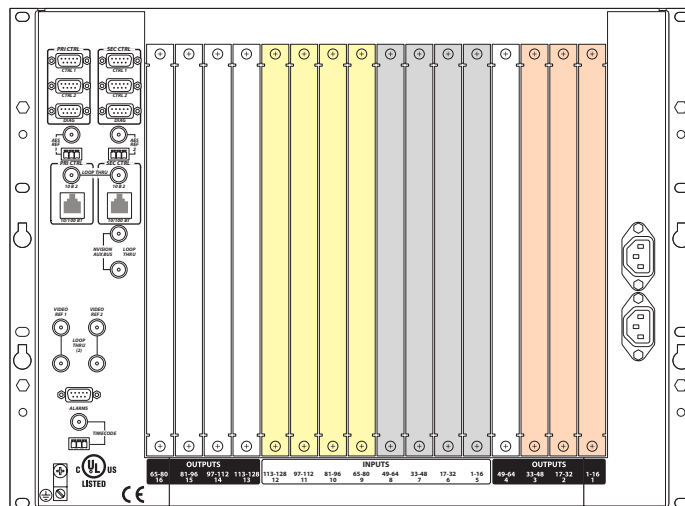
Case 2: An MCPM-HD with 64 HD inputs, an MCPM-SD with 32 inputs, and 32 audio inputs. The frame may be an NV5128-MC or an NV5100MC.



Note that the MCPM-HD is a 4-slot module but its backplane module occupies only two slots. The other two backplane slots would be used for SWB output backplanes if the MCPM-HD were to include wing output cards.



Case 3: An MCE with 64 HD or SD inputs, and 64 audio inputs. The frame must be an NV5100MC. Audio may be embedded or discrete as required.



Other arrangements are possible.

Analog Audio

Master control (and the MFR) route only AES audio, at 48 kHz with 24-bit sample values. Each analog audio card (and its backplane) converts analog audio to AES format and processes 16 stereo (i.e., 32 mono) signals.

Analog Audio Input Module

The module is designed for balanced analog audio signals.

On-board DIP switches allow the gain of each channel to be raised +6dB to accommodate low-level or single-ended input channels. See [Analog Audio Switches and Jumpers](#) on page 179.

System clocks are supplied by the frame's control card. The conversion rate is nominally 48 kHz. The frame can be locked to an external AES reference.

The backplane module for analog audio input has 4 DB25 connectors. Each connector handles 4 stereo pairs or 8 mono signals.

Each connector requires a DB25 breakout cable (WC0053, or your own).

Analog Audio Output Module

The analog audio output card is the matching analog audio output card. It is used with the MFR, but is **not used** for master control.

The backplane module for analog audio output also has 4 DB25 connectors. Each connector handles 4 stereo pairs or 8 mono signals.

Each connector requires a DB25 breakout cable (NV5000-CABLE1, or your own).

AES Audio

Master control requires synchronous AES audio. An MFR can use asynchronous AES cards.

AES input cards provide 16 AES channels of input.

AES backplanes are available in two types: BNC, for unbalanced signals on BNC cable, and Phoenix 3-pin quick-release connectors for balanced, shielded twisted-pair signals.

Synchronous AES Input Module

AES signals, balanced or unbalanced, arrive at the input card from the appropriate backplane module. The card extracts timing information from the signals on the input receivers. The card uses the timing information to format the data and to correct timing errors. The card can accommodate nearly synchronous input signals by either deleting or repeating samples to bring the signal into synchronization.

One of the AES input backplane modules has 16 Phoenix connectors for balanced signals. The other has 16 BNC (75Ω) connectors for unbalanced signals.

Synchronous AES Output Module

The AES output card is the matching synchronous AES output card. It is used with the MFR, but is **not used** for master control.

One of the AES output backplane modules has 16 Phoenix connectors for balanced signals. The other has 16 BNC (75Ω) connectors for unbalanced signals.

Asynchronous AES input cards exist for the MFR but are not used under master control.)

Analog Video

The Analog Video Conversion (AVC) input card converts incoming composite analog video signals (NTSC or PAL) to SD video.

- ▲ MCEs do **not** accept analog video input (even though it is converted to SD at the input card). SD MCPMs do. Because analog video input is not defined for HD, HD MCPMs also do **not**.

Analog Video Conversion Input Module

Each of the 16 composite video inputs from the backplane module is received by a differential input amplifier. The single-ended outputs of these amplifiers are passed to anti-aliasing filters before being processed by a video converter. The outputs of the converters are then passed to an SMPTE 259M formatter. A PLL locked to the video converter reduces jitter in the data formatting process.

See [Analog Video Conversion \(AVC\) Card Switches](#) on page 182.

- ▲ The input processing delays the signal by approximately 1.25 lines. AVC modules are intended for use in applications where signal timing is not critical.

The AVC input backplane module has 16 BNC connectors.

Analog Video Converter Output Module

This card is the “inverse” of the AVC input module. It is used with MFR, and not for master control. The AVC input backplane module also has 16 BNC connectors.

SD Video

SD Video Backplane and Input Module

The backplane performs cable equalization for up to 300 m of Belden 1694A or equivalent cable. The equalizer also has a muting function that prevents digital noise in the output in the absence of a valid signal. Inputs are self-terminating.

The SD input backplane has 16 BNC connectors.

SD Output Module

This card is the “inverse” of the SD input module. This older cards relock at several SD rates, including 270 Mps.

The SD output backplane has 16 BNC connectors.

SWB Video

The NV5128-MC and NV5100MC frames differ in their support for SWB video.

The NV5100MC frame is newer and provides more throughput for HD channels. It supports any number of SWB cards. The limit is the number of input or output slots which is 8.

The NV5128-MC frame supports up to 4 of the older SWB output cards that mount in the wings of MCPM-HDs, -HD2s, and -SDHDs (and the old SWB output modules). The NV5128-MC frame also allows 1 (only) new SWB output card.

(Without the MFR, there is no reason to have output cards of any kind.)

Old SWB 16-Input Backplane and Input Modules

The SWB input card accepts a wide range of data rates, both HD and SD.

The SWB backplanes contain active circuitry that performs cable equalization (up to 150 m).

SWB input cards support 16 inputs. An SWB input card buffers the automatically equalized inputs from the backplane and feeds the 16 input signals to the motherboard.

New SWB 16-Input Backplane and Input Modules

The SWB input card accepts a wide range of data rates, both HD and SD.

The SWB backplanes contain active circuitry that performs cable equalization (up to 150 m).

SWB input cards support 16 inputs. An SWB input card buffers the automatically equalized inputs from the backplane and feeds the 16 input signals to the motherboard.

The new SWB input cards can feed more than one MCE.

- ▲ At least one SWB input card (and backplane) is required for Intuition XG integration.

Old SWB Output Module

This module is a special card that plugs into a wing slot of an MCPM-HD, -HD2, or -SDHD. The module also fits in the wing slots of an NV5000-HD-XPT/OUT output module (when an MFR is present).

In either case—master control or MFR—the output card is part of the MFR's crosspoint matrix. The old SWB output card supports a number of reclocking rates.

- ▲ When an MFR is present, it can use the SWB output card for routing HD, SD, and even asynchronous AES signals.

The MCPM-HD and -HD2 provide 2 wing slots; the MCPM-SDHD provides 1 wing slot.

The SWB output backplanes have 16 BNC connectors. Even though the SWB output cards plug into the wing slots of another module, they require backplanes.

New SWB Output Module

The NV5100MC-SWB-OUT is a newer output card designed to work especially well in the NV5100MC frame. Any number of these output cards can be used in an NV5100MC frame. Only one of these cards can be used in an NV5128-MC frame. The card does **not** plug into an MCPM wing slot.

The output card is, as previously stated, part of the MFR crosspoint matrix. The new SWB output card reclocks at 270 Mbps, 1.485 Gbps, and 1.5 Gbps.

- ▲ When an MFR is present, it can use the SWB output card for routing HD, SD, and asynchronous AES signals.

The SWB output backplanes have 16 BNC connectors.

Control Cards

A master control frame requires one or two control cards. Control cards can be of two types:

- EM0374 router control card.
- EM0414 clock generator card.

The EM0374 is required only if you have an MFR in the frame. The frame has two control card slots. One of the slots for a redundant (or secondary) control card.

In all case, the control cards provide clocks and AES reference signals to the MCPMs.

The MFR (if present) receives commands from a router control system through the router control card.

MCPMs and MCEs receive instructions directly from control panels or automation and **not** through the control card. They are independent modules and, although they receive clocking from the control card and video and audio from the motherboard, they are controlled independently.

EM0374

The EM0374 includes a backup battery. The battery may be replaced with the control card powered on without affecting the operation of the system.

Flash memory stores FPGA code and application program(s), including protocols for communicating with the external control system. Using UniConfig to program the control system protocol is a quick and relatively easy process.

A pair of EEPROMs are located on the *motherboard*—one for each control card. The EEPROMs store UniConfig settings and other system parameters. Thus, any control card can be installed in the frame without reconfiguration. The configuration stays with the frame.

The control card includes processing circuitry for the video and AES reference inputs.

Its Ethernet NIC is auto-negotiating. All ports of the control card may be used simultaneously.

See [EM0374 Jumpers](#) on page 178 for more information.

EM0414

The EM0414 is an AES clock generator card. It also includes processing circuitry for the video and AES reference inputs. It does not perform any router control functions. It does not have an Ethernet circuit. It requires no configuration other than jumper settings.

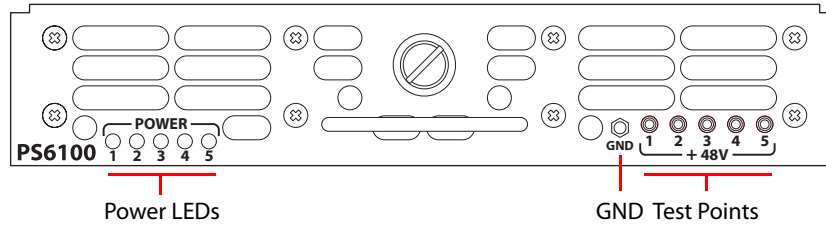
See [EM0414 Jumpers](#) on page 179 for more information.

Power Supply

The PS6100² power supply module accepts a wide range of AC input voltages and produces five identical outputs. The power supply senses the AC input voltage (90–130 or 180–250VAC, 50 or 60Hz) and adjusts itself to maintain a relatively constant DC output. You do not have to make a voltage selection.

2. Some master control frames in the field might still use PS6000 power supplies.

The five regulated outputs are directed to the various modules in the frame where on-board regulators produce the DC voltages required by the local circuits. Each 48V output powers one of the five green LEDs and output test points on the front of the power supply.



Under normal operation, all five LEDs should be on. When the power supply output voltages are measured at the test points, the voltage should be approximately +48VDC under a full load. If power supply modules have been removed from the frame or options are not installed, some or all of the test point voltages could be somewhat higher than +48 VDC.

There are four low-speed fans located along the front edge of the power supply. They are intended to pull a small quantity of air across the internal heat sinks.

Fuse

A replaceable AC fuse cartridge is used on the PS6100 power supply modules. The correct fuse is 15A (1.25" x 0.25" fast-blow).

The correct fuse for the older PS6000 power supply is given in this table:

90–130VAC	8.0A, 5×20 mm, slow-blow fuse
180–250VAC	6.3 A, 5×20 mm, slow-blow fuse

Figure 2-4 shows the location of the fuse on either power supply module.



Fig. 2-4: Fuse Location, PS6000 or PS6100 Power Supply

- ▲ Replacing the fuse without determining what caused it to fail could cause equipment damage or fire by restoring power to an already damaged unit.

Intuition XG with MCEs and MCPMs

Intuition XG is a master control *option*. Intuition XG systems can stand on their own independently. Master control is enhanced by it but does not require it.

The Intuition XG system is an “advanced HD/SD graphics processor.”



When it is integrated with an iMC master control system, the Intuition XG processor feeds HD or SD keys (fill and key video inputs with up to 16 audio channels) to MCEs. It is a single- or dual-channel graphics processor that provides multi-level character generation, and animation, still, and clip playout with multi-channel audio. The Intuition XG processor can also control an MCE's squeezeback functions, audio overs, and main sources.

With these features, Intuition XG adds what can be called “rich branding” to the MCE.

Intuition XG is associated with a set of configuration tools and graphics generation applications. These tools generally belong to Miranda's 'Xmedia' product series.

One of the most significant aspects of the Intuition XG processor is that it can process “live” data:

- Multiple databases files, RSS feeds, and web data.
- Proprietary data feeds, including Reuters, AP, SportsTicker, and Bloomberg.

Intrinsic Features

- HD and SD character generator.
- Text and graphics on multiple layers.
- Large capacity storage.
- Simultaneous playout of multiple clips.
- One or two outputs. SD output as NTSC or PAL. HD output as 1080i, 720p or 480p.
- Full integration with the Xmedia suite for graphics automation.
- 16-channel audio.
- Automation.

Integration with MCE

The XG processor delivers two channels of HD or SD video (each with fill and key and up to 16 audio channels) to the MCE. Audio reaches the MCE through the keyer *fill* input dedicated to the XG channel. The audio from the keyer input is handled internally (and can be selected by panel operators) as a special audio over named “XG over.” The program XG over uses the same BNC input as the keyer used for the XG layers on the program bus. The preset (or preview) XG over uses the same BNC input as the keyer used for the XG layers on the preset (or preview) bus.

The MCE configuration can specify that the XG over turns on (or off) when the keyer assigned to the XG channel turns on (or off) — unless the XG over was selected independently.

The MCE can control up to 4 XG layers. Each layer corresponds to an XG media clip (identified by a recall ID). In general, recall IDs must be in the range 1–65535. However, if you are using a legacy M2100 automation protocol, recall IDs must be in the range 1–255 (a single byte). Miranda’s NVEP automation protocol can use the full range 1–65535.

- ▲ Master control does not recognize recall IDs that are blank or zero, or that include any character other than 0–9 or that contain leading zeroes.

The clips in the XG processor can also send control messages to the MCE that do the following:

- Select a main source.
- Select and control the position, size (and opacity) of squeeze images.
- Select audio overs and control their over-to-main ratios.

The control messages are entered in the timeline of a media clip developed in Xstudio. There is a set of 18 control messages from which to choose. See [Xstudio Functions](#), following.

Automation

Your automation system (if any) can be configured to control XG layers — by sacrificing other video effects layers. In brief, the MCE will substitute an XG layer for, say, a logo under automation. The choices are MasterConfig options, made in the RS-422 configuration page. Thus, the choices cannot be overridden by the automation system. You can make changes only by reconfiguring the MCE.

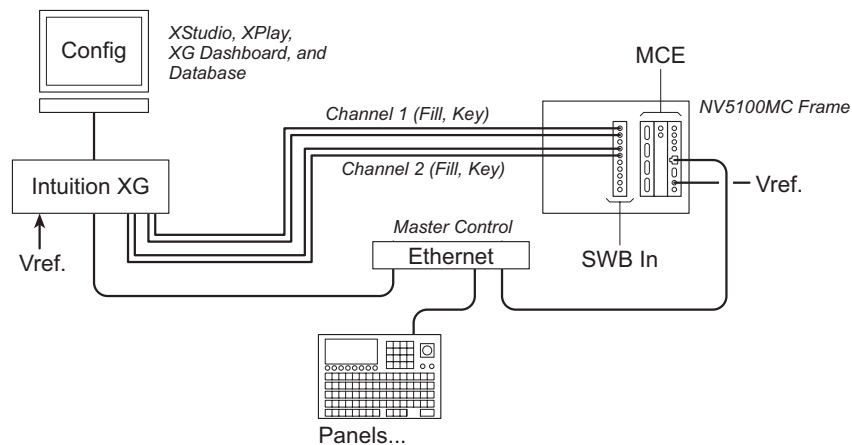
Xstudio Functions

There are 18 MCE add-on functions you can choose in Xstudio.

- ▲ The add-on functions are built into non-standard XML files that must be obtained either from the installation CD (SB0221) or from Miranda technical support. See [Xstudio Add-On Functions](#) on page 110 for instructions.

Connections

This diagram shows the Intuition XG connections:



The Intuition XG processor and the MCE communicate on the master control network. The Intuition XG processor delivers one or two (fill, key) pairs to the master control system through an SWB card (a requirement). The MCE configuration identifies the ports through which the signals enter the master control system.

Introduction

Intuition XG with Imagestore 750s

The Intuition XG processor provides the XG configuration, video storage, and access to a network of graphics tools, information databases, and so on.

Operators at master control panels use (and choose) the XG “layers” created or stored within the Intuition XG processor as they would choose any other video effect.

Video cables connect to the Intuition XG processor with an 8-BNC breakout connector. One of those cables is video reference (Analog Ref In). Note that the required reference is tri-level (1080i/59.94). The MCE can use tri-level, NTSC, or PAL reference. There are timing requirements if the MCE does not use tri-level.

The 4 video cables on the breakout connector are labeled:

(Program)	(Preset)	
SDI out A	SDI out B	“fill”
SDI out C/key	SDI out D/key	“key”

On panels that are configured for Intuition XG, there is an ‘Int XG’ button and a ‘Preview Int XG’ button in the main menu where the operator can choose XG layers to place on air. Those panels have up to 4 ‘XG layer’ buttons in the program button row and matching ‘XG layer’ buttons in either the preset button row or the preview button row. The ‘XG layer’ buttons place the selected XG layers on the preset (or preview) bus and the program bus.

A panel can have an optional ‘XG Keyer Control’ button. That button turns the keyers that support the XG layers on and off when the panel operator presses it. It is intended as an emergency kill switch. (The button does affect the Intuition XG processor.)

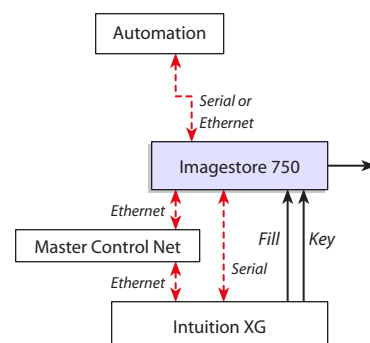
Intuition XG with Imagestore 750s

An Intuition XG processor can provide clips to an Imagestore 750.

The Intuition XG processor has either 1 or 2 output channels. Each channel is a (fill, key) video connection. Connect the paired cables from the Intuition XG processor to the Fill 1/Key 1, Fill 2/Key 2, or Fill 3/Key 3 inputs of the Imagestore 750.

Note that the Imagestore 750 can receive one input pair from the Intuition XG.

Many configuration steps are required for the Imagestore 750s in your system, some of which involve a connected Intuition XG processor (sometimes called a “slave” processor). This figure illustrates the basic connections:



See [Intuition XG Options](#) on page 146 for configuration details. Also refer to the *Imagestore 750 Reference Manual*.

Ancillary Hardware

EBCP

▲ The EBCP is obsolete as of May 2, 2012. EBCPs in the field are still supported.

All MCPMs have emergency bypass capability. Under certain conditions (e.g., malfunction, power-up, external switch) an MCPM or MCE enters bypass mode with this effect: alternative video and audio signals are switched to program output. When the MCPM or MCE leaves bypass mode, normal output resumes.

The mechanism is reasonably reliable: the bypass relays are in the backplane module and the MCPM or MCE is bypassed almost entirely if the MCPM or MCE fails. The MCPM or MCE boots in bypass mode and switches to normal operating mode only if it is functioning properly.

The emergency bypass control panel (EBCP) is a 1RU panel that has two large button switches. One button's legend is "Main" and the other's is "Bypass." Pressing the red "Bypass" button places an MCPM or MCE in bypass mode. Pressing the green "Main" button enables normal mode. (The panel controls only the MCPM or MCE to which it is connected.)

▲ Refer to the *iMC Reference Manual* for connection details and other information.

The green button is also a status lamp: it lights when the MCPM is in normal mode. Similarly, the red button lights when the MCPM is in bypass mode. Because the buttons are large, the MCPM state is obvious from a distance. The bypass button functions as a "kill switch" or a "panic button." Because it is large, it is easy to find and press quickly.

(A bypass switch and bypass LED are situated at the front of each MCPM and each MCE, but they are enclosed in the frame and might not be readily accessible.)

Emergency bypass operations are configured in MasterConfig.

See [Linking Two MCPMs as Primary and Backup](#) on page 192 for a sample application.

Tally Processor

Miranda offers a third-party³ "tally processor"—a 1RU device that provides 32 optically isolated inputs and 32 relay outputs, also optically isolated. Through Miranda's Ethernet protocol (NVEP⁴), the tally processor can sense master control events such as main source selections and transitions. It can also trigger master control events.

Multiple tally processors can be added to a master control network. The product includes a self-contained configuration utility program that operates as a browser application.

▲ The tally processor functions as if it were a control panel and the presence of one or more tally processors limits the number of actual panels that can control a single MCPM or MCE. (An MCPM or MCE can communicate with a maximum of 4 panels.)

See [Tally Processor Connectors](#) on page 185 for more information.

3. DNF Controls (www.dnfcontrols.com).

4. NVEP stands for "NVISION Ethernet Protocol."

Device Controller

Miranda offers a third-party “device controller”—a 1RU device that can control 4 VTRs or other devices using a serial protocol and up to 16 devices using start and stop pulses. Like the tally processor from the same company,² the device controller also provides 32 optically isolated inputs which are not used by Master Control, but can be used for any purpose. The device controller receives commands from MCEs under Miranda’s Ethernet protocol (NVEP).

Multiple device controllers can be added to a master control network. The product includes a self-contained configuration utility program that operates as a browser application.

See [Device Controller Connectors](#) on page 186 for more information.

Other Topics

GPIO for MCEs and MCPMs

MCPMs and MCEs have two GPI inputs and two GPI outputs (solid-state relay contacts). They are optically isolated.

Hardware control panels also have two optically isolated GPI inputs and two GPI outputs (SPDT relay contacts). Software control panels (GUIs) do not have GPI connections.

A GPI input device might be something as simple as a pushbutton or toggle switch—it is customer-defined in any case. GPI inputs must be of relatively low power, typically TTL levels.

GPI output devices are switched by relay outputs (NO, NC, and COM). GPI outputs can drive relatively large loads including AC. A panel’s alarm outputs are the same, electrically, as the GPI outputs and on the same connector. See [GPI](#) on page 73 for connection details.

A limited set of events can cause an MCPM’s GPI output relay transition. An MCPM’s GPI inputs, if enabled, control its emergency bypass relay. An MCPM’s outputs can be controlled from a panel. An MCPM’s GPI inputs can be assigned to a panel’s buttons. The buttons reflect the state of the GPI input in high or low illumination.

A control panel’s GPI output is triggered when an operator presses a button configured for GPI output. The state of a control panel’s GPI input is reflected on a button in high or low illumination.

The GPI functions of an MCPM or MCE are configured in *MasterConfig*. A panel’s GPI functions are configured in the *MCS Panel Configuration Editor*.

- ▲ Miranda offers a third-party tally processor that extends the GPIO functions of the master control system.

GPIO for Imagestore 750s

The master control system does not use the Imagestore 750’s GPIO. Customers may use it for any purpose. Panel operators can execute GPI macros defined in the Imagestore 750.

Reference for MCEs and MCPMs

A master control frame’s router control cards can receive video reference signals for the MFR. Individual MCPMs accept video reference also.

The frame can accept an AES reference for the MFR and for master control.

Video Reference

Video reference to the frame applies only when there is an MFR in the frame. You can have redundant or dual-standard references for the frame. See [Video Reference](#) on page 58.

MCPMs and MCEs usually require a video reference signal. MCEs terminate video reference internally and you'll need a DA (or similar device) to distribute reference signals to more than one MCE. MCPM reference connectors are loop-through: MCPMs can "daisy-chain" reference signals to other devices. An MCPM reference signal chain must be terminated at some point. Use 75Ω BNC terminators.

MCE video reference must be analog (NTSC or PAL) only. MCPM video reference can be HD tri-level as well as NTSC or PAL.

Audio Reference

You may supply a house reference signal to the frame and master control will use it. If you do not, the control card (EM0374 or EM0414) generates a 48 kHz reference internally. That will suffice unless you have more than one master control frame and you want to synchronize AES signals across frames.

Reference for Imagestore 750s

The Imagestore 750 accepts tri-level (HD) or bi-level (SD) analog reference.

The reference source can be selected at the Imagestore 750 front panel. It can be 'External Ref', 'SDI A', 'Free Running' or 'Unknown'. Do not use 'SDI A' because it is a main source input. We recommend using 'External Ref'.

Video Timing for MCEs

MasterDiag has a timing page that lets you see (although not change directly) the timing points of an MCE's video (and audio) inputs. The timing page cannot be used with other MCPMs.

Inputs that are out of the allowable timing range are termed "non-synchronous." MCPMs and MCEs bypass internal processing for non-sync inputs. Under bypass conditions, program output is the same as the input. The MCPM or MCE applies no video effects or audio overs. Transitions to or from non-sync sources can only be cuts.

Refer to the *MasterDiag User's Guide* for more detail.

Automation for MCEs and MCPMs

Router automation uses the 'Ctrl' ports of the master control frame. Master control automation uses the automation port (DE9) on the MCPM and MCE backplanes. Router automation and master control automation are two independent concepts.

This guide does not address either form of automation.

Automation can control XG layers. See the RS-422 configuration page in the *MasterConfig User's Guide* for details.

Monitoring for MCEs and MCPMs

MCPMs, MCEs, and master control panels provide a number of monitoring ports for video and audio. There are differences among the various models. Use this chart as a guideline:

Connector	-HD, -HD2, -SD, -SDHD	-MK-SD -MK-HD	MCE
Program Out	Y	Y	Y
Bypass Video In	Y	Y	Y
PGM Monitor	Y	N	N (can use aux bus)
Preset Out	Y	Y	Y
Clean-feed Out	1	1	2
Program AES Out	4 (pairs)	N	Yes, if AXM card installed
Preset AES Out	N	N	Yes, if AXM card installed
Preview AES Out	N	N	Yes, if AXM card installed
Bypass AES In	4 (pairs)	N (embedded in the bypass video input)	
Audio Meter Out	4 (pairs)	4 (pairs)	1 coax (16 embedded ch.)
Audio Monitor Out	4 (pairs) with additional analog outputs	4 (pairs)	2 coax (16 embedded ch. in each) Additional outputs on AXM card
Video Ref. In	2	2	1 (terminated)
Misc output	mixed	mixed	mixed
Special HD inputs	-na-	(-MK-HD only)	-na-
Preview bus output	N	N	2 if PVW card installed
Aux bus output	N	N	2
Metadata output	on "aux" conn	N	8 if AXM card installed

- ▲ An MCPM's preset output is labeled "PVW OUT." Please do not be tempted to think this is the same as the PVW (Preview) output available from MCEs.

An MCPM's program output includes 8 channels of embedded audio. Its emergency bypass input does also. An MCE's program output includes 16 embedded audio channels and its emergency bypass input also includes 16 embedded audio channels.

MCEs present video and audio outputs on coax (1.0/2.3) connectors. MCPMs use BNCs.

MCE audio monitor and meter outputs carry 16 embedded channels of audio also on coax connectors. Your audio metering subsystem must include a disembedder. (Note that CECPs, FECPs, iMC-Panel-200s, and iMC-Panel-300s have audio metering inputs that can accept the output from an MCE.)

MCEs can be configured to present program video, preset video, or black on the audio monitor and meter channels.

MCPMs present audio monitor and meter output (4 AES channel pairs each) on DB25 connectors. Some MCPMs also present analog metering output. The analog output is the same as the AES output, except that it has been converted to analog and can drive analog speakers.

MCPMs (and MCEs in older releases) present an A/B mix of AES output to the audio monitors. MCEs, at 6.0.0 and later, do not mix audio monitors A and B and produce 16 audio channels on each monitor. MCEs also produce 16 audio channels on the metering output.

MCEs that include preview cards can present preview output (video plus 16 embedded audio channels). Presently, preview port B is a replica of the single preview output that appears on port A.

MCEs have two clean-feed outputs A and B. MCPMs have one. There are 7 clean-feed taps in the processing pipeline. You can choose the tap in MasterConfig.

An MCE's aux outputs (A and B) can be configured to follow program or preset video or program or preset audio, or to follow a control panel's aux button selections.

- ▲ Following the aux buttons works when the aux buttons have aux delegate buttons assigned to the MCEs' aux output and one of these is selected. Otherwise, the aux outputs might not carry any signal.

NV9000 Ports

If your master control system is part of an NV9000 control system, you must connect the master control port of the NV9000 system controller to the Ethernet switch that supports the master control network. (The NV9000 expects its master control port to be 192.168.7.1 or .2 but you can set up the MC network as you wish. Your master control net should not conflict with other NV9000 networks.)

The default IP addresses of the NV9000 controller's network ports are as follows:

Network	Primary IP Address	Secondary IP Address
Control net	172.16.1.1	172.16.1.2
Panel and Router Net 1	192.168.1.1	192.168.1.2
Panel and Router Net 2	192.168.2.1	192.168.2.2
(Panel and Router Net <i>n</i>)	192.168.xxx.1 ^a	192.168.xxx.2 ^b
NV9000 System Net	192.168.3.1	192.168.3.2
Master Control Net	192.168.7.201	192.168.7.202
House Net	192.168.20.1	192.168.20.2

a. The value of xxx is arbitrary for any additional panel and router networks.

b. The number of networks is limited by the number of NIC ports. To have more than 2 panel and router networks, you might add a NIC or reassign existing network ports.

NV920 Ports

Each of the NV920's three ports has a unique IP address, fixed internally. The IP addresses depend on whether the system controller is stand-alone or redundant:

Port	Single Controller	Redundant Controller 1	Redundant Controller 2
NVNET1	192.168.1.1	192.168.1.1	192.168.1.2
NVNET2	192.168.2.1	192.168.2.1	192.168.2.2
NVNET3	192.168.3.1	192.168.3.1	192.168.3.2

You may change any of these addresses to match your facility's networks.

Preset Tally

Panel configurations have an option that applies to panels when they are controlling Imagestore 750s. This option governs the way a panel's preset button row tallies before, during, and after transitions.

Some operators like the "PresStation" method of arming DVEs, DSKs, and voice-overs on the preset bus. Other operators like the traditional method (which is used for MCEs and MCPMs).

The option—"Enable Traditional PST Tally"—is specified in the 'Advanced' configuration page of the MCS Panel Configuration Editor. If you enable the option, the panel will operate using the traditional method. Otherwise, the panel will use the "PresStation" method.

If you do enable the option, it is imperative that the 'Active Preview Keyers' parameter of the Imagestore 750 configuration be set to true. See [Preset Tally Option](#) on page 167. Refer also to the *Imagestore 750 Reference Manual* for details.

Installation Process in Brief

The installation process follows these basic steps:

- 1 Unpack your Miranda equipment, checking for contents, damage, or defects. Gather together all your other equipment, software, and tools.
- 2 Load the configuration software onto your configuration PC(s). If you have GUI software, load that onto one or more GUI PC. The GUI PC may be the same as the configuration PC.
- 3 Establish how you want to connect *everything*. This means compiling very detailed lists. Included in the lists are
 - Relevant NV9000 sources, destinations, and salvos.
 - Which signals use which master control port numbers.Do not neglect this step.
- 4 Put the master control frame(s) into place. We assume that you are using 19" racks but this is not a requirement. If you have a control panel, put it in place.
- 5 Connect your MCPMs, MCEs, Imagestore 750s, control panels, and PCs on an Ethernet LAN. This LAN is the master control network. Assign IP addresses to all the devices on the network.
- 6 Connect optional equipment on the master control network: DC21 device controllers for machine control, Intuition XG hardware, and tally processors.
- 7 Connect video and audio cabling at the back of the master control frame.
- 8 Create a configuration file for each MCPM and MCE and upload it.
- 9 Create configuration file(s) for each Imagestore 750.
- 10 Create a configuration file for each control panel and upload it. (The upload for hardware control panels is different from the upload for software control panels.)
- 11 Power up the equipment. Test your setup. "Installation" is complete if it passes your test.
- 12 Adjust and complete your configurations as you see fit. This begins the maintenance phase.

Please note:

You do not have to specify a complete configuration to get started. You can always add to, or change, configurations any time.

Leave yourself the option to expand or change.

3 Software Installation

Chapter 3 describes software installation.

Topics

<i>Preliminary Steps</i>	39
<i>Installing Configuration Applications</i>	40
<i>Installing Documentation</i>	45
<i>Installing the GUI</i>	45
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Preliminary Steps

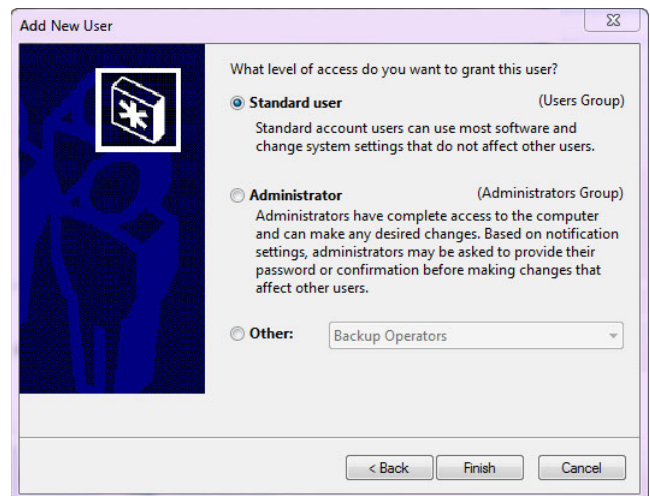
Obtain and set up a Windows PC (XP, Vista, or Windows 7) for configuration. If you intend to use a software control panel (GUI), obtain and set up a Windows PC for the GUI. It can be the same PC.

The PC(s) you use must be connected on the master control network. The PCs must be configured with IP addresses on that network. See [PCs](#) on page 75.

Master control users' accounts on your PCs must **not** be set to 'Restricted User'. 'Standard User' or 'Administrator' is recommended:



Windows XP



Windows 7

When the setting is restricted, the master control software will not function properly.

Go to 'User Accounts' under the Windows control panel to change the settings.

Installing Configuration Applications

There are several configuration applications.

NV5100MC

- MasterConfig— configures MCEs and MCPMs.
- MasterDiag— sets up communication with MCEs and MCPMs.
- MasterLogo— converts graphics into logos that can be used by MCEs and MCPMs. This utility also uploads the logos to the MCE or MCPM.
- MCS Panel Configuration Editor— creates and manages panel configurations for Imagestore 750s, MCEs, and MCPMs.

These applications are bundled in one installer named `InstallConfig.msi` that comes on the SB0243 CD that ships with the iMC master control products. Actually, the installer is a directory of several files, all of which are essential for installation.

Imagestore 750

- Imagestore 750 Configurator— creates and manages Imagestore 750 configurations. The Imagestore 750 also has a set of built-in web pages that support configuration, restart, and status.
- Several other configuration applications come with the Imagestore 750:

- Audio Builder
- Clip Builder
- Clock Builder
- Batch Converter
- Animation Builder
- DVE Editor

These applications come bundled on the MCS CD that ships with the Imagestore 750.

MCE and MCPM Configuration Software

Follow these steps to install configuration software on the configuration PC:

- 1 You can obtain the installer(s) from Miranda or from the SB0243 CD.

If you get the installers from Miranda, load the installers on each PC that you want to be able to execute configuration programs. Double-click the installer icon to launch the installer.

If you are using the SB0243 CD, insert the CD in your CD drive and wait for the CD to “autoplay.”

You will see this window:



Click the 'Installer' button to launch the installer.

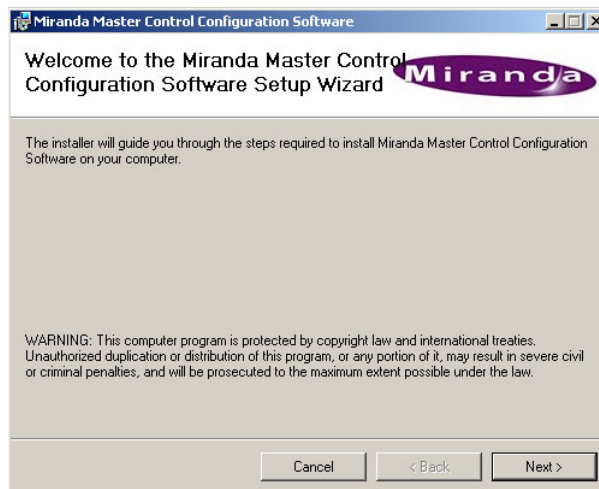
2 If you already have MC software installed, you will see an add/remove message:



Click 'OK' and go to the Windows "control panel" to delete the existing software.

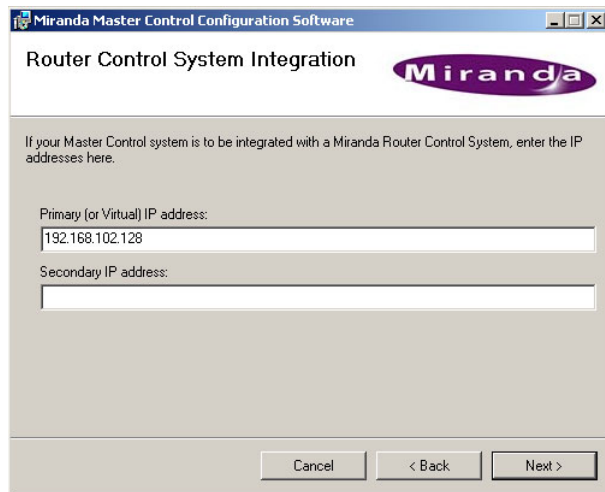
Then repeat step 1 and proceed to step 3.

3 The Welcome screen displays:



Click 'Next' to proceed.

4 The NV9000 Integration screen displays:



If you are integrating an NV9000 router control system with your NV5100MC, enter the IP address of the NV9000's primary system controller (and secondary system controller, if applicable). A stand-alone system controller is considered the primary, in this instance.

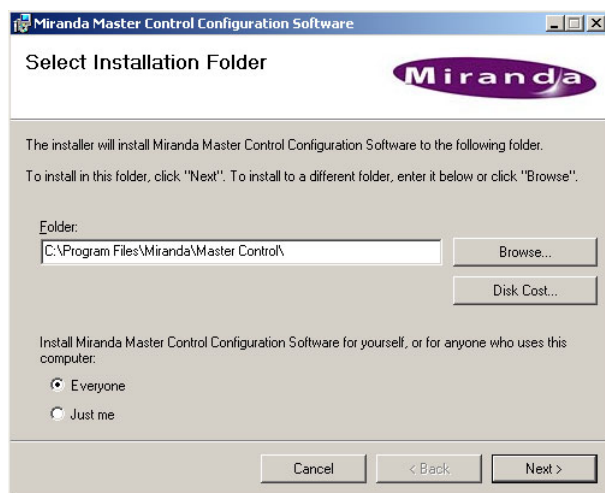
▲ If your NV9000 system has a virtual IP address, use that for the primary IP address.

This integration lets you configure router pre-select, external router sources, and salvos.

If you do not have an NV9000, leave these fields empty. If you add an NV9000 at a later date, you will have to remove and re-install this software. Specify these IP addresses during re-installation.

Click 'Next' to proceed.

5 The "Select Installation Folder" screen displays:

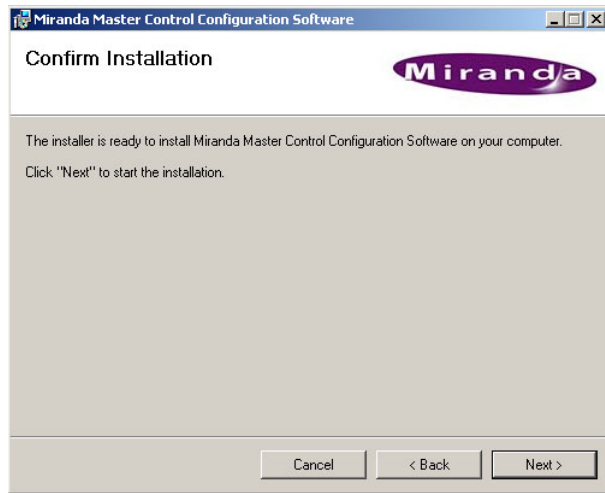


The default folder for the installation is C:\Program Files\Miranda\Master Control\. Browse to choose another folder. We recommend that you select "Everyone" so that everyone who uses the PC can access the software.

Click 'Disk Cost' if you wish to see how much disk space you need.

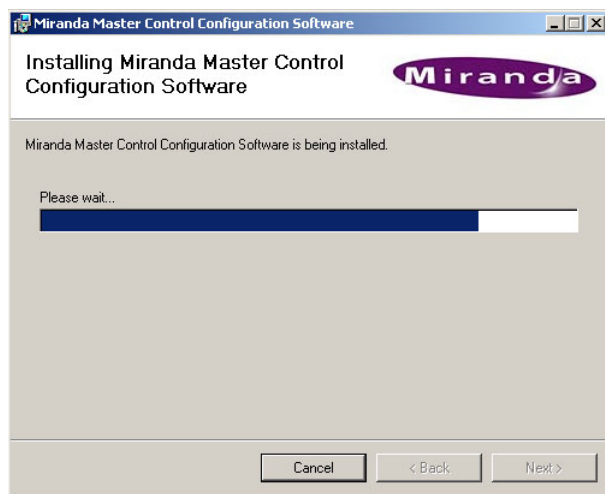
Click 'Next' to proceed.

6 The confirmation screen displays:



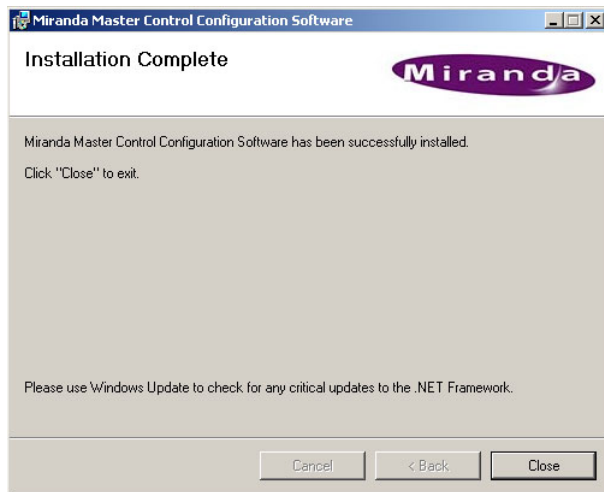
Click 'Next' to proceed. Click 'Cancel' to cancel the installation. Click 'Back' to change your installation parameters.

7 When the actual installation begins, a progress indicator displays:



Click 'Cancel' to terminate the installation before it completes or wait for the installation to complete. (The installation takes only a few seconds.)

8 The completion notice displays:



Click 'Done.' You will be returned to the main CD screen.

Barring errors, the installation is complete. The installer has created a master control folder, with entries in the Windows XP Start menu. The Start menu path is:

Start > Programs > Miranda > Master Control > ...

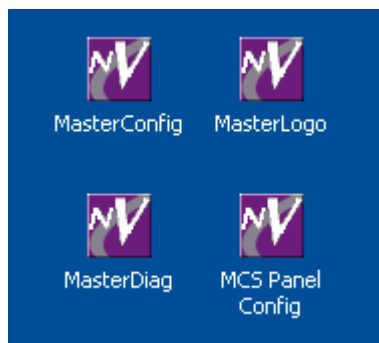
The default names of the four configuration programs are:

MasterConfig.exe
MasterDiag.exe
MasterLogo.exe
MCSPanelConfig.exe

in the default folder

C:\ProgramFiles\Miranda\Master Control\bin\

Miranda recommends that you create shortcuts on your PC's desktop:



To launch any of the applications, (1) choose the application from the Start menu, (2) double-click the application in its folder, or (3) double-click its desktop shortcut.

Installing Documentation

There are several manuals and user's guides in the master control documentation set:

Configuration Guides and Information

UG0061	MasterConfig User's Guide	How to configure MCPMs and MCEs.
UG0062	MasterDiag User's Guide	How to initialize and update MCPMs and MCEs.
UG0063	MasterLogo User's Guide	How to convert graphic files to the format required by MCPM logos and send logos to the MCPMs.
UG0064	iMC Installation Guide	How to install, connect, and configure MC equipment.
UG0065	iMC Reference Manual	Architectural and functional detail regarding Miranda master control systems.
UG0066	MCS Panel Configuration Editor User's Guide	How to use <i>MCS Panel Configuration Editor</i> software to configure control panels.
UG0067	Device Controller User's Guide	How to use and configure the master control device controller.
UG0068	Tally Processor User's Guide	How to use and configure the master control tally processor.

Panel Operator's Guides

UG0069	iMC-Panel-100 Operator's Guide for Imagestore 750	3RU control panel
UG0053	iMC-Panel-GUI Operator's Guide for Imagestore 750	Software control panel
UG0054	iMC-Panel-200 Operator's Guide for Imagestore 750	Compact panel
UG0055	iMC-Panel-300 Operator's Guide for Imagestore 750	Full-size panel
UG0070	iMC-Panel-100 Operator's Guide for MCEs and MCPMs	3RU control panel
UG0057	iMC-Panel-GUI Operator's Guide for MCEs and MCPMs	Software control panel
UG0058	iMC-Panel-200 Operator's Guide for MCEs and MCPMs	Compact panel
UG0059	iMC-Panel-300 Operator's Guide for MCEs and MCPMs	Full-size panel

These documents are available on the SB0243 master control CD.

Other documentation, including the *Imagestore 750 Reference Manual*, is also available Miranda.

Installing the GUI

Miranda provides the GUI software as a separate purchase item.

The GUI installer comes on the SB0244 CD and is named `InstallCECP_GUI.ms.i`. Actually, the installer is a directory of several files, all of which are essential for installation.

Ensure that your PC is running Windows XP, Vista, or Windows 7.

For optimal GUI performance, your PC should have a video card capable of 1280×1024 (or better) resolution. The GUI is optimized for a touchscreen, but you can use a conventional monitor, keyboard, and mouse if you want.

- ▲ The GUI does not scroll. If your screen is too small, it overflows the screen. It is possible, however, to drag the GUI around to use different sections.
- ▲ The GUI will not run properly until you have established your master control network, with the GUI PC on that network.

Follow these steps to install the GUI software:

- 1 Insert the SB0244 CD in your CD drive and wait for the CD to “autoplay”:



Click the 'Installer' button to launch the installer.

- 2 If you already have the GUI software installed, you will see an add/remove message:



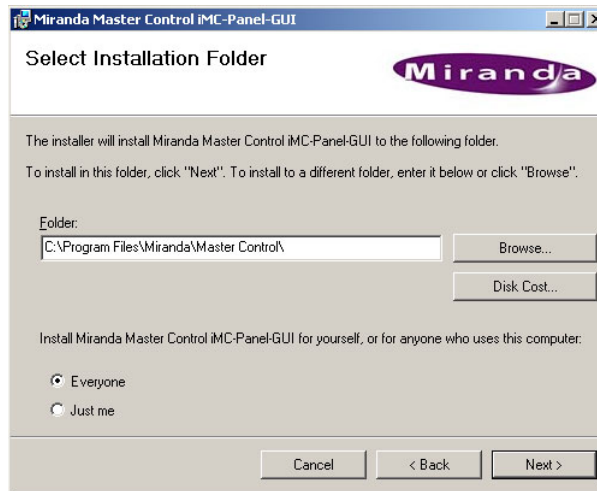
Click 'OK' and go to the Windows “control panel” to delete the existing software. Then click the 'Installer' button again, as in step 2, and proceed.

- 3 The Welcome screen displays:



Click 'Next' to proceed.

4 The “Select Installation Folder” screen displays:



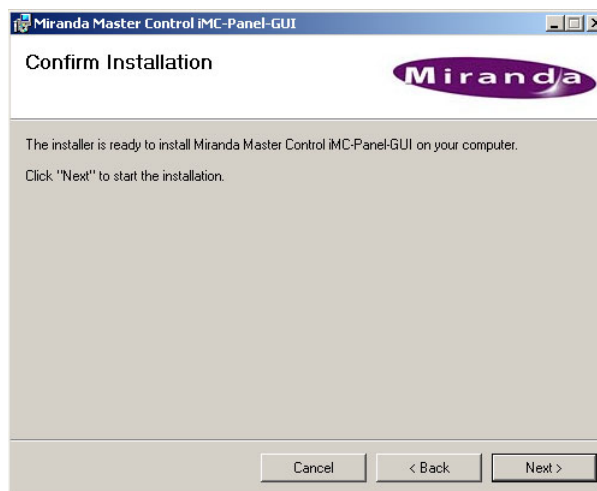
The default folder for the installation is C:\Program Files\Miranda\Master Control\.

Browse if you want to choose another folder. We recommend that you select “Everyone” so that everyone who uses the PC can access the software.

Click ‘Disk Cost’ if you wish to see how much disk space you need.

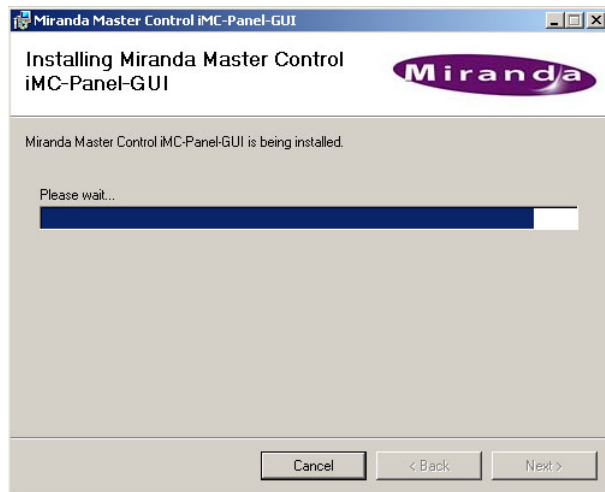
Finally, click ‘Next’ in the “Select Installation Folders” window to proceed.

5 The confirmation screen displays:



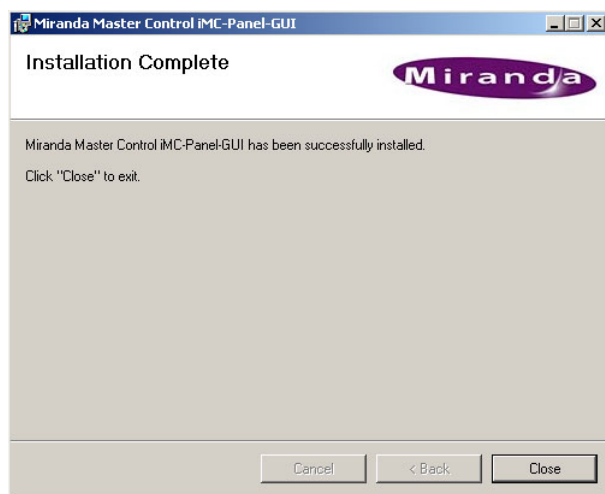
Click ‘Next’ to proceed. Click ‘Cancel’ to cancel the installation. Click ‘Back’ to change your installation parameters.

6 When the installation begins, a progress indicator displays:



Click Cancel to terminate the installation before it completes or wait for the installation to complete.

7 The completion notice displays:



Click 'Done'.

Barring errors, the installation is complete. The installer has placed the GUI software in the master control folder, with an entry in the Windows XP Start menu. The Start menu path is:

Start > Programs > Miranda > Master Control > Master Control iMC-Panel-GUI

The default pathname is:

C:\ProgramFiles\Miranda\MasterControl\bin\cecp_gui.exe

(If you intend to run multiple instances of the GUI on the same PC, copy the executable file and the configuration file, `cecp_gui.uicfg`, to a separate folder. Create a separate folder for each instance of the GUI.)

Miranda recommends that you create a shortcut on your PC's desktop:



To launch the GUI, (1) choose the application from the Start menu, (2) double-click the application in its folder, or (3) double-click its desktop shortcut.

If you have multiple instances of the GUI, create a shortcut for each one.

Other Software

NV9000-SE Utilities, UniConfig, and MRC (Miranda Router Configurator) are available. Contact Miranda if you need to obtain that software.

If you have an SNMP manager, you will want to know that your NV9000 system (if you have one) contains a master control subagent and MIB. You can unlock this software if you purchase the license. (The part number for the license is EC9610.)

The Imagestore 750 also supports SNMP. The NV9000 does not have a subagent for it.

4

Hardware Installation for MCEs and MCPMs

Chapter 4 describes hardware installation for MCEs and MCPMs in NV5100MC frames.

Topics

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Preliminary Thoughts

Hardware installation means (1) placing equipment and (2) interconnecting equipment. Configuration is, in a real sense, part of hardware installation, but it is covered in Chapter 5, [Configuration for MCEs and MCPMs](#), on page 81.

This guide cannot address placement. However, you will need to consider cabling limitations. SD signals require cables of 300 m or less. HD signals require cables of 150 m or less. Signals at 3Gig require cables of 100 m or less. Analog audio or analog video cables should be 300 m or less. Ethernet cables should be 300 m or less.

If your master control system is part of an NV9000 system, you will (probably) be connecting your master control backplane(s) to one or more router outputs. If your master control system contains an MFR, your NV9000 will (probably) control the MFR through the frame's control ports.

If your master control system is part of an NV9000 system, you might wish to enable its NV5100MC SNMP reporting service to monitor MCEs and MCPMs in your system. (The service is available by license. The part number for the license is EC9610.)

If your master control system is to support machine control or pre-roll, it must have at least one MCE and your automation system (if any) must be capable of executing pre-roll transitions with the appropriate timing and you will need at least one DC21 device controller.

If your master control system is to include an Intuition XG subsystem, it must have at least one MCE and at least one SWB input card (and backplane module). In many cases, it will already have such a card.

Control panels, MCEs, and MCPMs must communicate on an Ethernet LAN. The NV9000 will probably communicate with master control devices on that LAN (providing salvos, router present functions, and "external router sources").

- ▲ Note that master control also has this restriction: up to 4 control panels may control any single MCE or MCPM.

If you have many MCEs, you will probably need a DA to supply video reference to each one.

Monitor walls, re-routing, and obscenity control, and “glue” devices are other issues you will face. This guide cannot address those topics. We refer you to Miranda’s application notes AN0004 and AN0013 that discuss some of these ideas.

Miranda offers a third-party tally processor that might be of use in your system. A tally processor is counted a control panel in the number of control panels accessing an MCE or MCPM.

We recommend that, before you begin cutting cable and configuring MCPMs and panels, you know everything about all connections in detail. Know what will work and what will not work. Know what your configuration software supports. It is advisable to make detailed lists of all your router sources, destinations, salvos, master control inputs, and MFR inputs and outputs.

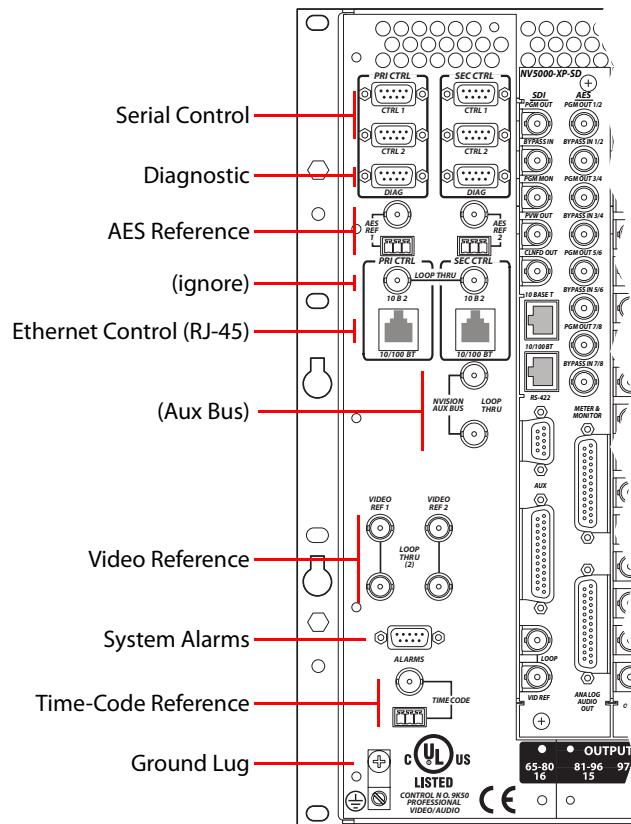
- ▲ If you have an MCPM-MK-HD, its video sources are connected at its backplane. It does not receive video signals through the motherboard. The -MK-HD video inputs cannot be used by other MCPMs or MCEs.

NV9000 devices that serve as external router sources for master control must be defined, under NV9000-SE Utilities, in a level set with 1 video level and up to 4 AES levels. If the source has embedded audio, then it must be defined as a level set with a single level.

- ▲ External router sources require A *and* B connections for main sources and for audio over sources, and 3 connector groups for keyer sources, unless those source groups are not enabled.
- ▲ As of software version 6.0.0, external router sources (of any kind) are not supported for MCEs that have preview enabled. This will change.

Control Connections

The control connectors (including reference connectors) are at the left at the rear of the frame:



The master control frame (NV5100MC or NV5128-MC) has two control card slots and therefore two control cards potentially. The second control card is for redundancy. A control card can be either an EM0374 router control card or an EM0414 clock card. The EM0374 is required if the frame contains a router. Otherwise, the clock card is sufficient.

- ▲ The control cards have switch settings. See [Control Card Jumpers](#) on page 178 for how to set the switches.

If the frame contains a router, any external router control system must communicate with the router through its control card(s). A third-party control system (or automation system) will generally communicate with the router control card using Miranda's NVISION serial protocol.

If the router control system is an NV9000, it can use Miranda's Ethernet protocol. The NV9000 system might have a single stand-alone controller or two NV9000 controllers for redundancy.

(The two control cards in a master control frame are never in use at the same time. One is always the active control card and the other is stand-by. The same is true of a redundant NV9000 router control system: one controller is active and the other is stand-by.)

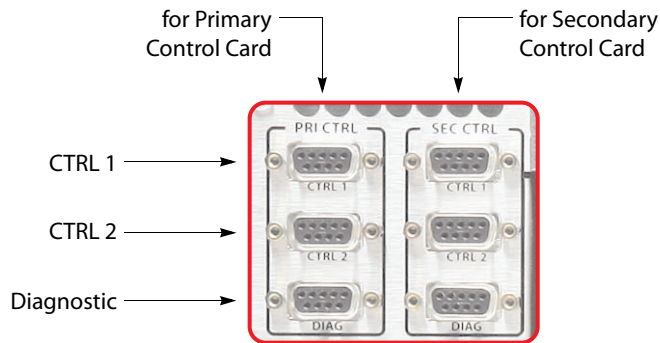
Serial Ports

At the top left portion of the rear of the frame are 6 serial connectors, and below that are 2 Ethernet connectors. If you are connecting an NV9000 control system, Ethernet control is preferable.

Hardware Installation for MCEs and MCPMs

Control Connections

The CTRL1 and CTRL2 ports are DE9, RS-422.

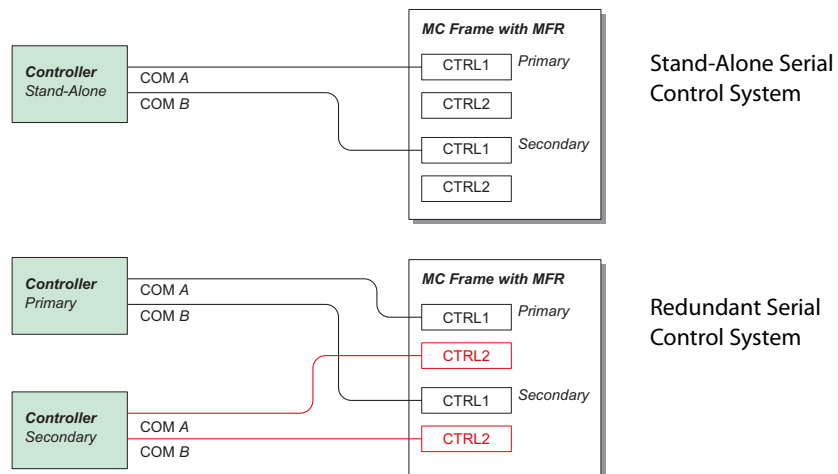


You can use these connectors for control using a serial protocol from (1) a primary or secondary NV9000 router control system, (2) a primary or secondary third-party router control system, or (3) a router automation system.

- ▲ The CTRL connectors are needed only when a router is present in the frame and a serial control protocol is in use.
- ▲ If your NV9000 uses serial protocol, you will probably want to add a serial card in its PCI bay. Miranda offers a number of serial cards from 8 to 32 ports.

Cases:

- 1 If you are using an NV9000 system controller with a serial protocol, connect the primary CTRL1 port to a COM port on the system controller. Connect the secondary CTRL1 port to another COM port of the system controller if your frame has a secondary control card.
- 2 If you are using a third-party control system (that is not an SMS7000), connect the primary CTRL1 port to a COM port of that device. If your frame has a secondary control card, connect the secondary CTRL1 port to a COM port of the device.
- 3 (SMS7000 systems connect at the 'Aux' ports.)
- 4 If you have a redundant (secondary) NV9000 system controller (with a serial protocol), connect the primary CTRL2 port to a COM port on the redundant system controller. Similarly connect the secondary CTRL2 port if your frame has a secondary control card.



- 5 If you do not have a redundant control system, but have an automation system, connect the primary CTRL1 or CTRL2 port to a COM port of the automation system. Similarly connect the secondary CTRL1 or CTRL2 port if your frame has a secondary control card.

The system controller's COM ports must be compatible with the frame's serial ports—the same Baud rate, parity settings and so on. The defaults for Master Control frames are 38400 Baud, RS-422, 8 data bits, no parity, 1 stop bit.

Similarly, a router automation system's COM ports must also be compatible with the frame's serial ports.

Diagnostic Ports

The DIAG ports are DE9, either RS-232 or RS-422 (selectable in UniConfig).

These ports are for configuration, firmware uploads, and testing. The ports are typically used with UniConfig to initialize the primary and secondary control cards for routing.

- ▲ The 'Diag' ports must be set up properly before you can use them. If they are not, use the diagnostic port at the front of the control card. This port is always RS-232 at 9600 Baud, 8N1.

The DIAG ports are not used during normal operation.

Use UniConfig to set the IP addresses of the control card(s). If the frame contains an MFR, you'll use UniConfig to define its partitions. See [UniConfig and MRC](#) on page 20.

Suggestions

If you are connected to an Ethernet port while using UniConfig, choose your master control frame in the router list at the left.

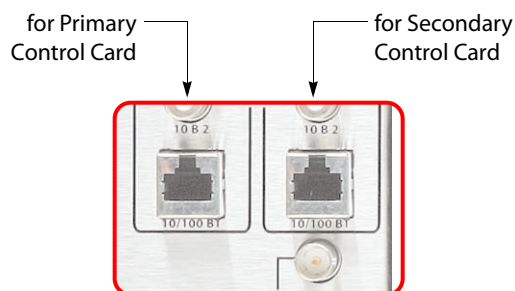
Whether UniConfig is in serial mode or Ethernet mode, set the frame's IP address and mask in the 'Configuration' page. Define partitions in this page also. You should first click 'Read All' and follow your changes with a 'Write All'.

Set video reference options in the 'Switch Point Setup' page. Click 'Write Changes' afterward.

Set Ctrl1, Ctrl2, and Diag port parameters (e.g., RS-485/422 vs. RS-232) in the 'Router Serial Configuration' page.

Ethernet Ports

The Ethernet connectors are used when you have an NV9000 router control system connected over Ethernet.



- ▲ The Ethernet connectors are needed only when a router is present in the frame and an Ethernet control protocol is in use.

- ▲ Above the Ethernet ports are 10base2 connectors. Ignore these. They are not used.
- ▲ Before you can use the Ethernet ports, the control card(s) must be assigned IP addresses in UniConfig. See [UniConfig and MRC](#) on page 20 for details.

Cases:

- 1 If you are using an NV9000 control system with an Ethernet protocol, connect the primary Ethernet port to one of the “Panel/Router” network switches connected to the NV9000 system controller. Similarly connect the secondary Ethernet port of your frame if it has a secondary control card.
- 2 If you have an automation system (in addition to the NV9000), connect a COM port of the automation system to *either* primary serial port, CTRL1 or CTRL2. Similarly connect a COM port to either secondary serial port if your frame has a secondary control card.

Figure 4-1 shows stand-alone and redundant Ethernet connections:

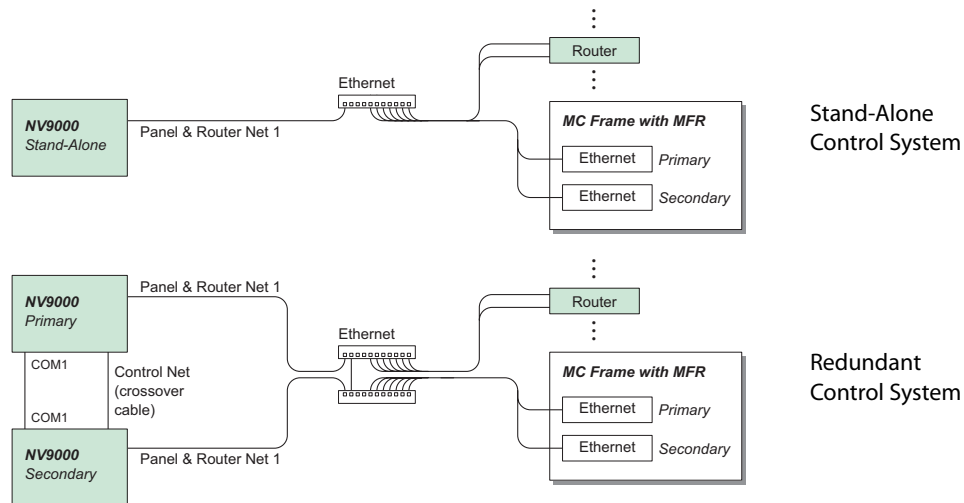


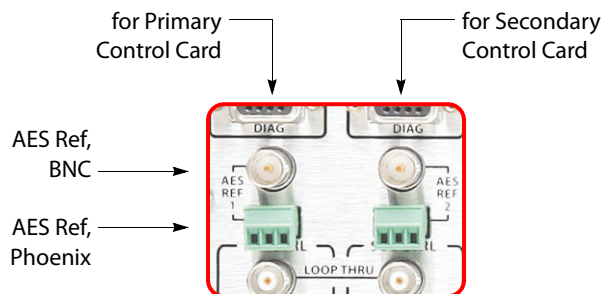
Fig. 4-1: NV9000 to Frame Connections

Note that there is a crossover cable between the two Ethernet switches in the illustration of the redundant connections in Figure 4-1.

- ▲ An NV920 system controller is an alternative to an NV9000 system controller.

AES Reference

AES reference connectors allow you to sync AES audio in the master control frame to your house reference. If you do not supply an external AES reference, the control card itself will generate its own 48 kHz reference.



There are two pairs of connectors for AES reference—one for the primary control card and one for the secondary control card. Each control card can use either:

- BNC (75Ω)—unbalanced signals.
- A 3-pin Phoenix quick-release connector for STP connections (balanced signals).

Both accept AES3-id signals at a 48kHz sample rate (3.072MHz bit rate). The AES reference signal does not loop-through. Each input supports both balanced and unbalanced formats. Only one connector can be used at a time for a given input.

The use of redundant references from independent reference generators increases reliability and is the recommended method of operation. If one reference is lost, the frame automatically selects the backup reference. If you provide an external AES reference, it must be a 48kHz reference signal.

The NV5100MC and NV5128-MC frames support “near-sync” operation. That is, an unlocked 48kHz AES source can be routed by a synchronous AES input/output module pair. To accomplish this, the input card discards or repeats audio samples as required to bring the source into exact synchronization at the output.

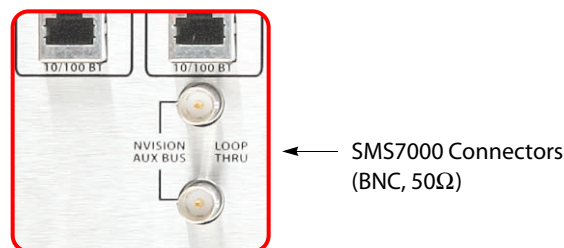
An AES reference is required only when there is a router in the frame and the router has AES or analog I/O cards. The reference makes inter-mixing analog and AES audio formats easier.

An acceptable reference includes any AES signal with a sample rate of 48kHz. Typically, digital silence is used as a house AES reference. Miranda manufactures AES sync generators suitable for this task.

- ▲ At software release 6.1.0, MCEs derive AES reference from their video reference.

Aux Bus

At the middle left portion of the rear of the frame are 2 ‘NVISION Aux Bus’ (BNC) connectors:.



If (and only if) you are using an SMS7000 router control system with the master control system, connect the SMS7000 to the NVISION aux bus connector.

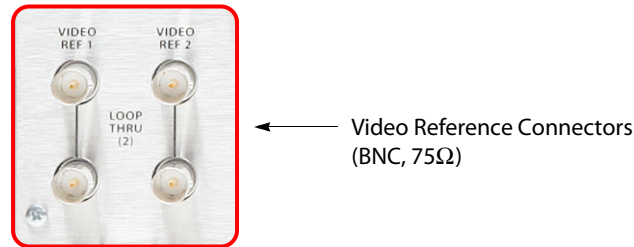
The frame has two aux bus connections. The connection is loop-through: you can pass the SMS7000 “node bus” control signals on to another device. You can connect a redundant control system on the “node bus.”

If you are using an SMS7000 control system, terminate the “node bus” with a 50Ω terminator.

- ▲ Using an SMS7000 requires an SMS7000 mezzanine card installed on each router control card. Jumpers J4 and J6 must be set. See [Control Card Jumpers](#) on page 178 for detail.
- ▲ There is *no relation* between this “aux” bus and the aux bus of an MCE, the aux buttons of certain control panels, or the aux audio inputs of an MCPM or MCE.

Video Reference

At the lower left portion of the rear of the frame are 4 video reference (BNC) connectors:



These references affect only the router, if present, **not** the MCPMs in the frame. Each MCPM should have a video reference too. However, it is possible to “daisy chain” your house reference from the frame’s reference connectors to the MCPMs’ reference connectors.

If there is no video reference, the control card’s front red LED remains lit and takes within the MFR will not occur at defined switch points.

Four video reference connections (Video Ref 1 and Video Ref 2) are provided — two for each control card. Each connection is “loop-through.” One connector receives the reference signal; the other feeds it to another device.

Acceptable reference signals include NTSC analog, PAL analog, or HD tri-level analog signals. External 75-ohm termination is required on the frame if you do not feed the reference to another device. You can feed the MCPM references from these connectors.

- ▲ Many MCPMs (include MCEs) support Dolby E audio, embedded or discrete. Dolby E requires a non-interlaced video reference format. Dolby E works with 720p video sources when the reference is 525i, 625i, or 1080i.
- ▲ MCEs have only one video reference connection and that is internally terminated. If you have more than one MCE in a frame, you will need some means (perhaps a DA) to distribute video reference to each MCE.

In the case of composite reference signals, only the sync portion is used. Reference signals may be *single*, *redundant* (same video standard and rate) or *different* (*dual-standard* mode, different rates).

- ▲ The choice between redundant and dual modes is made in UniConfig. If you have only a single reference signal, these modes do not apply.

Single Reference Signals

There is one reference input, possibly “daisy chained” to reference inputs on other devices.

Redundant Reference Signals

In this mode, both reference inputs are driven with identical but separate reference signals. At startup, the control card checks both inputs for valid signals. If both inputs are good, it uses reference input 1. If this input fails, the controller automatically selects reference input 2. If input 1 is subsequently restored, the router will continue to use input 2 until the control card is reset. If both references fail, an internally generated reference signal will be used. In this case, switches will be asynchronous.

Redundant mode improves system reliability.

Dual-Standard Reference Signals

In this mode, the reference inputs are driven with different signals. An example might be NTSC analog black on reference input 1 and HD tri-level sync on reference input 2.

If either reference fails, it will be replaced with the internally generated signal and any outputs using the failed reference will switch asynchronously.

This mode allows the use of SD and HD video with video reference.

▲ Remember that the clock-generator cards do not accept video reference signals.

Time Code Reference

At the lower left portion of the rear of the frame are 2 connectors for time-code reference.

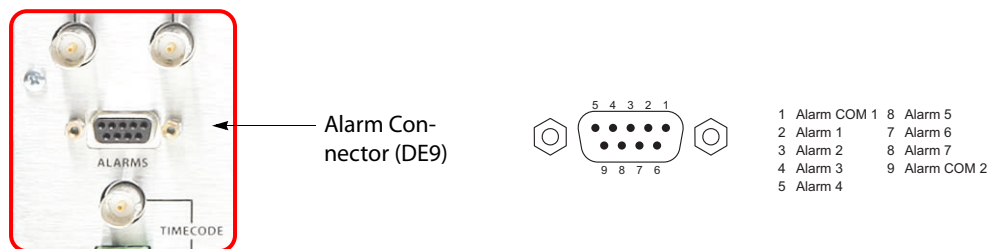


The time-code reference is not used for master control.

Alarm Connections

System Alarms

At the lower left portion of the rear of the frame is a DE9 connector for system alarms:



This connector allows you to create alarm circuits of your own. (These are alarm *outputs*.)

The internal alarm signalling is provided by solid-state relays that turn on in the event of an alarm condition. This table describes the individual alarm connections:

Pin	Signal	Description	Possible Alarm Condition(s)
1, 9	Alarm Com	Common	Common connection for all alarm signalling pins. This is a "return" for an external circuit.
2	Alarm 1	Major alarm	Missing reference inputs, possible failure of fans or over-temperature conditions on one or more modules.
3	Alarm 2	Minor alarm	Any of alarms conditions 3, 4, 5 or 6.
4	Alarm 3	Power supply	Main power supply module is missing.

Hardware Installation for MCEs and MCPMs

Alarm Connections

Pin	Signal	Description	Possible Alarm Condition(s)
5	Alarm 4	Video reference	Missing video reference signal 1 or 2 (if applicable).
6	Alarm 5	AES or time code reference	Missing AES reference signals or loss of system clock.
7	Alarm 6	Fans or internal Temperature	Failure of any one of three fans. Over-temperature conditions on one or more modules.
8	Alarm 7	Controller health	Control card(s) are not "healthy."

- ▲ Pins 2 through 8 signal alarm conditions that are signalled on either the primary or secondary control cards. The connector offers no way to distinguish which control card signaled the alarm.

Figure 4-2 shows sample system-level alarm circuits. Each pin of the connector monitors a specific function and activates a specific alarm.

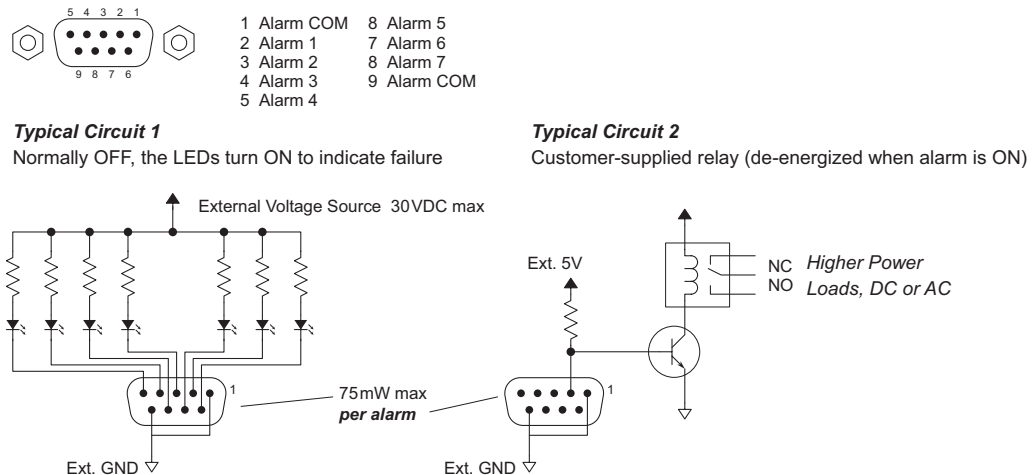


Fig. 4-2: Alarm Connections and On/Off Switches

Each of the 7 alarm connections corresponds to a solid-state, optically isolated relay. The relay allows current to pass in your external circuit when the alarm is on. The relay can accept up to 30VDC and tolerate up to 75 mW. Typical applications might use the following values for circuit 1 above:

Ext. Voltage	Resistor	Current	Power
5 V	470Ω	6.3 mA	19.15 mW
12 V	1600Ω	6.25 mA	62.5 mW

A current of about 6 mA is sufficient to illuminate LEDs brightly.

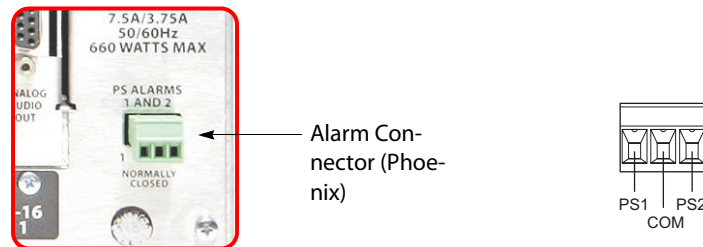
- ▲ **Warning:** do not reverse bias the alarm connections. They will not function and damage might occur.

Circuit 2, in Figure 4-2, controls relays to drive higher loads, such as lamps or speakers, possibly using AC.

Caution: If your alarm load is inductive, protect the internal alarm relay contacts with a reversed-biased diode. The external supply voltage should not exceed 30VDC and the load resistors should be sized to limit contact current to less than 150 mA.

Power Supply Alarms

At the lower right at the rear of the frame is a Phoenix 3-pin connector for power supply alarms:



The frame has one alarm output for each power supply installed in the frame. (If a power supply module is removed, the alarm circuit is also.) An internal solid-state relay is provided for each supply. The relay turns on when there is an alarm condition.

Figure 4-3 shows sample power alarm circuits. Each pin of the connector monitors an individual power supply.

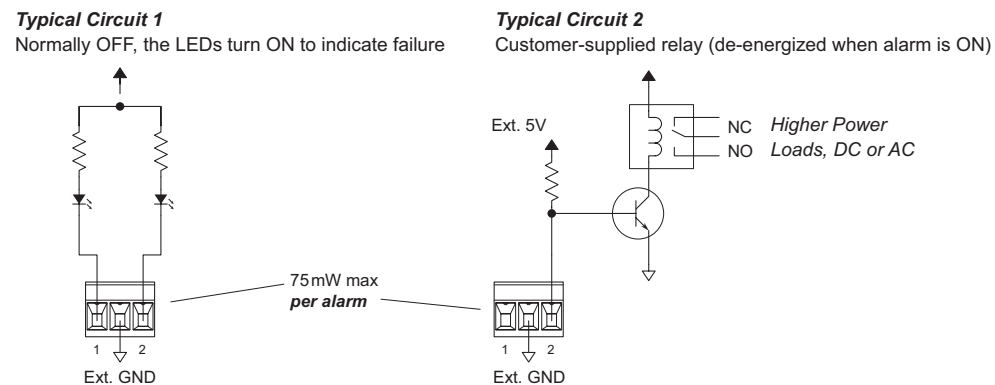


Fig. 4-3: PS Alarm Connections

Each of the alarm connections corresponds to a solid-state, optically isolated relay. The relay allows current to pass in your external circuit when the alarm is on. The relay can accept up to 30VDC and tolerate up to 75 mW. Typical applications might use the following values for circuit 1 above:

Ext. Voltage	Resistor	Current	Power
5V	470Ω	6.3 mA	19.15 mW
12V	1600Ω	6.25 mA	62.5 mW

A current of about 6 mA is sufficient to illuminate LEDs brightly.

▲ **Warning:** do not reverse bias the alarm connections. They will not function and damage might occur.

Circuit 2, in Figure 4-3, controls electromechanical relays to drive higher loads, such as lamps or speakers, possibly using AC.

Caution: The voltage of the external power supply for alarm signalling should not exceed 30VDC. Resistors should be sized to limit the current through each internal alarm contact to less than 150mA.

If the load is inductive, the alarm contacts should be protected with a parallel, reverse-biased diode.

Power

The frame has two power supply bays (and two power connectors) to support redundancy. Only one power supply is actually required.

Connectors

At the middle right portion of the rear of the frame are 2 AC connectors:



The frame has one (IEC) 3-conductor power connection for each of its 2 power supplies. These should be connected to a 90–130VAC or 180–250VAC 15A grounded circuit wired in accordance with local electrical codes. The power supplies operate at either 50 or 60Hz.

Fuses for both AC power inputs are located on their respective power supplies. Ensure that the fuse ratings comply with specific requirements in your area. A 7.5A fuse is required for 110/120VAC applications. For 220/240VAC operation, a 3.75 A fuse is required.

For increased protection against loss of power, we suggest that each power supply be connected to a separate branch circuit. A removable wire bail grips the power cable and hold it in place to reduce the possibility of accidental loss of power.

The power cords represent the only means of disconnecting main power from the frame. Make sure to clearly mark the line side power connection with its function so that in the event of an emergency, power can be disconnected quickly. Disconnect both power cords before servicing any internal frame components.

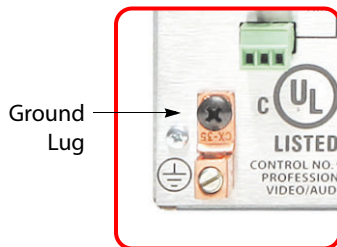
Power Supplies

The top power connector corresponds to the power supply on the left and the bottom connector corresponds to the power supply on the right (as you face the front of the frame).

Only one power supply is required, but you can use two for redundancy.

Ground Lug

At the lower left of the rear of the frame is a ground lug:



Connect this “lug” to earth ground using 8–14 AWG wire.

Local Sources

We define “local sources” as those being connected directly at the backplane of the master control frame, and not through a set of routers controlled by an NV9000 router control system. (They might be switched at a small local router or patch bay. The essential point here is that the sources do not come from a NV9000 system.)

These include:

- Main sources—video only or video with a combination of embedded and discrete audio sources. Local main sources do **not** include router pre-select sources or external router sources.
- Keyer sources—video only, “fill,” “key,” or both. Up to 8 pairs per MCE/MCPM.
- Squeezeback backgrounds—video only. Up to 32 per MCE/MCPM.
Enhanced squeezeback can use a second source (with or without embedded audio) but the second source is connected as either a main source or an external squeeze source (from a router).
- Audio overs—AES, up to 4. These audio sources compose the audio over, “off-air,” and “aux” inputs. All other discrete audio sources are treated as belonging to a main video source.
It is possible for each audio over to consume 8 inputs per MCE/MCPM.
 - ▲ An MCE or MCPM-SDHD has an over dedicated to audio from squeezeback image 2.
 - ▲ An MCE configured for Intuition XG has an over dedicated to XG audio (called the XG over).
- Audio sources— analog or AES, these audio sources compose the “off-air” and “aux” inputs. All other discrete audio sources are treated as belonging to a main video source.
It is possible for each of these two sources to consume 8 inputs per MCE/MCPM.

For example: you have a VTR that delivers SD and AES channels 1–4. You’d use one BNC of one SD input card for the SD, and two BNCs on AES input cards for the audio. That would consume 3 of the 128 inputs. This would be an example of video with discrete audio sources.

- ▲ The I/O connections you make are depend in part on the configurations that are possible in MasterConfig.
- ▲ Although 128 inputs might seem plenty, the inputs can be consumed in large numbers. If you have multiple master control frames, it might not be a problem. In a single frame, you’ll want to share as many inputs as you can among the MCPMs and MCEs.

Important Points to Remember

The various MCPMs allow different numbers of main sources. (Keep in mind that a main source can use more than one input.)

MCPM-SD	128	MCPM-HD, -HD2	64	MCPM-SDHD	64
MCPM-MK-SD	128	MCPM-MK-HD	16	MCE	2048 ¹

You can mix any MCPMs and MCEs in a frame as you like as long as they fit in the available output slots. The following points might affect where you place MCPMs and MCEs.

- An MCE, MCPM-HD, -HD2, MCPM-MK-HD, or MCPM-SDHD expect video inputs (main sources, keys, squeeze background sources) in the range 1–64 (i.e. input slots 1–4).
- In the same vein, an MCE, MCPM-HD, -HD2, MCPM-MK-HD, or MCPM-SDHD will **not** allow audio inputs (overs, aux, or off-air) in the range 1–64 (i.e. slots 1–4).
- The MCPM-SD and MCPM-MK-SD allow video or audio inputs in any position in any slot.

Note also that the 16 inputs for the MCPM-MK-HD are on its backplane module. They are not routed through the frame's motherboard. These inputs exist *in addition* to the 128 potential inputs in the input slots. *These inputs are HD only, and not SWB.* These inputs are not accessible by other MCPMs or MCEs.

Local sources, router pre-select, external router sources, and MFR inputs share the input space. Further, inputs always come in sets of 16. If you need 17 inputs of some type, you'll need 2 input cards. The implication is that you will have allocated 32 inputs. You must find some way to balance your requirements. Deploying multiple Master Control frames is one way to solve the problem.

DB25 connectors (analog audio) require breakout cable. Miranda's WC0053 is such a cable. (Its length is 15 feet.) Each DB25 supports 4 inputs (8 pairs). See [WC0053 Breakout Cable](#) on page 188.

Phoenix 3-pin quick-release connectors (for AES) require cable construction but it is not difficult, require no special tools or precision, and the connectors are already present.

Potentially, all 128 inputs could be video with embedded audio for SD systems. That would be 64 inputs for HD systems.

If you run out of inputs, it is possible to use a small router (such as Miranda's compact routers) or a patch panel to multiplex sources onto a single input. Implied is that the control (or patch) panel is quite near the MC panel.

DIN-to-BNC breakout panels are available. The part number for these 1RU panels is NV5100MC-BOP. Each BNC connector on the panel is coupled to a 2 m cable with a DIN connector.

(Local) Main Sources

Local main sources are those connected directly at the master control backplane. Main sources can be also configured as router pre-select sources and external router sources. Main sources can be internal black/silence.

You have 3 choices: video alone, video with embedded audio, video with discrete audio. It is possible to combine embedded audio and discrete audio for a single main source.

1. Although the MCE allows 2048 main sources, only 64 may be connected at the NV5100MC backplane.

There is no restriction on inputs (video or audio) for SD: the range for each is [1–128]. HD video inputs must be in [1–64] and audio must be in [65–128] except that MK-HD video must be in [1–16] and come from the MK-HD backplane.

- ▲ Although MCEs allow 2048 main sources, only 64 may be local sources. The remainder must be external router sources.

Video

For MCPMs, video can be analog, SD, or HD. (Analog video is converted to SD at the input card.) MCEs do not accept analog video inputs.

Note that if an MFR is present, an analog video output card would convert internal SD (and not HD) to analog output.

Connect your analog video source to a BNC of one of your analog input backplane modules.

Connect your SD video source to a BNC of one of your SD input backplane modules.

Connect your HD video source to a BNC of one of your HD input backplane modules or to the backplane of an MCPM-MK-HD.

Discrete Audio

Discrete audio can be analog or (synchronous) AES or a combination of the two. Dolby E audio is possible. An MCPM can accept up to 8 individual channels (or 4 channel pairs). An MCE can accept up to 16 individual channels (or 8 channel pairs).

Connect an analog audio source to a set of DB25 terminals using a DB25 breakout cable such as the WC0053. An analog audio input card and backplane are required. Analog stereo pairs can be split — connected at different inputs. An MCPM or MCE can also be configured to take an analog stereo pair from different inputs. (Each input comprises 3 wires: “+”, “–” and shielding.)

Connect an AES source to a BNC or Phoenix connector. An AES input and backplane are required. Phoenix connectors support balanced signals. Although AES pairs cannot be split, the MCPM or MCE can be configured to take an AES pair from different inputs. (Each Phoenix input comprises 3 wires: “+”, “–” and shielding.)

See [Misc. Connectors](#) on page 193 for detail.

Embedded Audio

Video with embedded audio is either SD or HD. Straight AES or Dolby E. MCPMs accept up to 4 AES pairs (8 channels). MCEs accept up to 16 channels (8 pairs) but currently process only the first 8 and pass the second 8 through to output unprocessed.

You'll configure the main source in MasterConfig according to the particular details of the embedded audio. You can mix embedded Dolby, embedded AES, and discrete audio (analog or AES).

If a main source has only embedded audio, then only the video connector is required.

(Local) Keyer Sources

Local keyer sources are those connected directly at the master control backplane. Keyer sources can be also configured as external router sources.

A keyer is typically a pair of video sources: a fill source and a key source. However, “self-keyers” use only a fill source. (The key source is also sometimes called a “cut” source.)

Up to 8 keyer sources (potentially 16 video inputs) may be defined for each MCE or MCPM. Some or all of those sources may be external keyer sources. It is possible for multiple MC processors in a single master control frame to use entirely different keyer inputs. You probably want to avoid that situation.

- ▲ Up to 20 inputs can be required if an MCE or MCPM uses both discrete and external keyers. External keyer sources consume either 3 (self-keying) video inputs or 6 (regular) video inputs.)

For MCPMs, keyers can be analog, SD, or HD. (Analog video is converted to SD at the input card.) MCEs do not accept analog keyer inputs.

- ▲ You cannot mix an SD keyer with HD program output or vice versa.

Connect your analog keyer source to a BNC of one of your analog input backplane modules.

Connect your SD keyer source to a BNC of one of your SD input backplane modules.

Connect your HD keyer source to a BNC of one of your HD input backplane modules or to the backplane of an MCPM-MK-HD.

- ▲ Although MCEs allow 2048 keyer sources, only 8 may be local sources. The remainder must be external router sources.

(Local) Squeeze Background Sources

A squeeze background is a video source.

Local squeeze background sources are those connected directly at the master control backplane.

- ▲ MCEs do not support squeeze local squeeze backgrounds — only those squeeze backgrounds defined as main sources (or internal black).
- ▲ You’d be tempted to think (using MasterConfig’s External Router Sources page) that you can define external squeeze source(s). Although you can provide an entry in this page, the squeeze pages allow only local inputs (but not for MCEs) and main source selections.

For MCPMs, squeeze backgrounds can be local discrete inputs, analog, SD, or HD (or taken from the main sources, or generated as internal black). (Analog video is converted to SD at the input card.)

MCEs do not accept local squeeze background sources. Squeeze backgrounds in MCEs can be main sources or internal black.

Up to 32 squeeze sources (32 video inputs) may be defined for each MCE or MCPM. These may be local sources (not for MCEs), main sources, or internal black. It is possible for multiple MC processors in a single master control frame to use entirely different inputs. You probably want to avoid that situation.

Connect your analog squeeze source to a BNC of one of your analog video input backplane modules.

Connect your SD squeeze source to a BNC of one of your SD input backplane modules.

Connect your HD squeeze source to a BNC of one of your HD input backplane modules or to the backplane of an MCPM-MK-HD.

- ▲ You cannot mix an SD squeeze background with HD program output or vice versa.

- ▲ Squeeze image 2 sources — really another matter — are not separate inputs. They are taken from the set of main sources.

(Local) Over Sources

Audio overs are audio signals overlaid on (or mixed with) the audio of program output.

Local over sources are those connected directly at the master control backplane. Over sources can be also configured as router pre-select sources and external router sources.

For MCPMs and MCEs alike, an audio over source is a set of discrete AES inputs AES. Dolby is not supported.

Up to 4 overs may be defined for each MCE or MCPM. Each over can use up to 8 inputs (4 pairs). It is possible for multiple MC processors in a single master control frame to use entirely different inputs. You probably want to avoid that situation.

An AES card and backplane are required. Connect an AES source to a BNC or Phoenix connector. Phoenix connectors support balanced signals. Each Phoenix input comprises 3 wires: "+", "-", and shielding. In either case, BNC or Phoenix, the MCPM or MCE can be configured to take an AES pair from different inputs.

(Local) Audio Sources

Local audio sources are auxiliary signals that may be directed to the audio meters or monitors. They are not directly accessible by the processing buses of an MCPM or MCE.

Each MCPM or MCE can direct two auxiliary audio inputs to audio monitors or audio meters. These sources are called, respectively, "off-air" and "aux." Each source uses a set of up to 8 AES inputs. It is possible for multiple MC processors in a single master control frame to use entirely different inputs. You probably want to avoid that situation.

An AES card and backplane are required. Connect an AES source to a BNC or Phoenix connector. Use Phoenix connectors for balanced signals. Each Phoenix input comprises 3 wires: "+", "-", and shielding. The MCPM or MCE can be configured to take an AES pair from different inputs.

NV9000 Sources

There are two ways for master control to access NV9000 sources: *router pre-select* and *external router sources*. Router pre-select applies to main sources and audio over sources. External router sources may be main sources, keyer sources, squeeze sources, and over sources. The behavioral difference between router pre-select and external router sources is described in the *iMC Reference Manual*.

In brief:

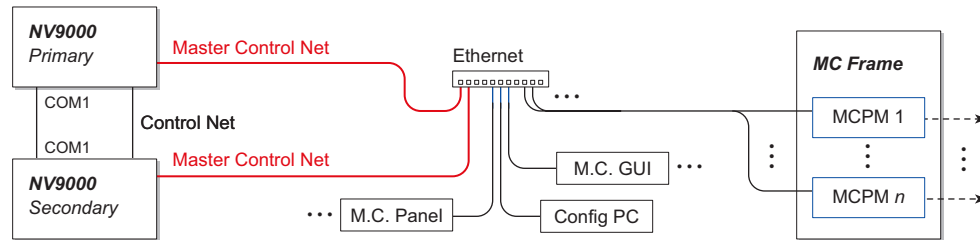
- Router pre-select sources are explicitly selected by the operator by browsing NV9000 device categories. It is the router **destination** that is important during configuration.
- There is no real limit to the number of router pre-select sources.
- External router sources are preselected during MCE and MCPM configuration. The operator probably has no knowledge of which sources are external and which are not. It is the router **source** that is important (during configuration).

The number of external sources is limited to the number of sources configurable.

In most if not all cases, a source from a router connects at the master control backplane as do local sources. However, the other ends of the cables connect to router outputs.

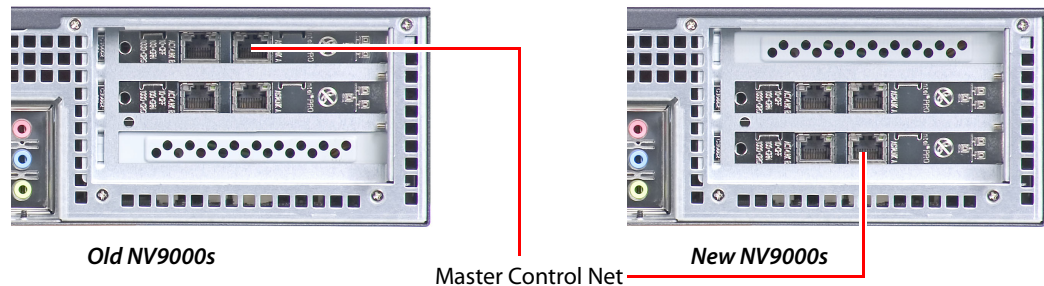
NV9000 Connection

A pre-requisite for router sources is a connection between the NV9000 controller(s) and the master control system:

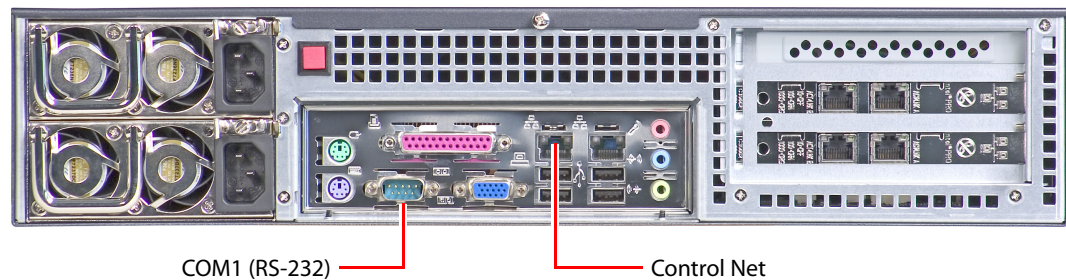


The connection is fairly simple: it is just an Ethernet cable from each NV9000 controller's master control port to the Master Control Ethernet switch. If you have a stand-alone NV9000 system, disregard the connection for the secondary controller.

The one complication might be determining which of the NV9000 ports is the master control port. Technically it's the one you set up to match the master control network. But which RJ-45 on the back of the NV9000 box(es)? There are two defaults: very old NV9000 frames and new ones:

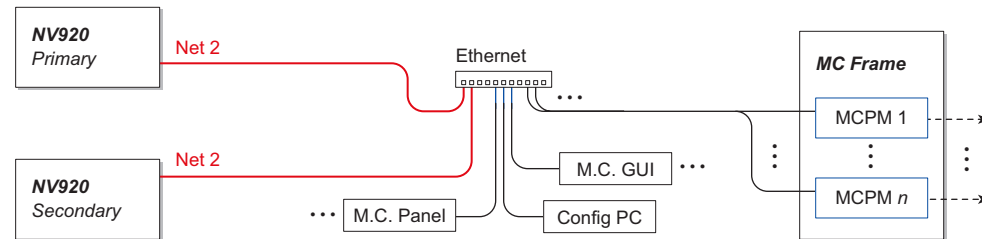


Although it is not strictly a master control topic, a redundant NV9000 system also requires a crossover Ethernet cable between the control ports and a serial cable between the COM1 ports on each NV9000 controller. This shows the COM1 port and the default location of the control network port:



NV920 Connection

An NV920 is an alternate system controller. To access the NV920's router sources, a connection is required between the NV920 controller(s) and the master control system:



As for the NV9000, this connection are fairly simple: it is just an Ethernet cable from each NV920 controller's master control port to the Master Control Ethernet switch. If you have a stand-alone NV920 system, disregard the connection for the secondary controller.

Use one of the 3 available network ports for the master control net.

Router Pre-Select

Router pre-selection applies to main sources and over sources. An M.C.P.M. or M.C.E. configuration defines a main source "virtual button" (one of 16) as "operator modifiable" which means that the button can be used for router pre-selection. A control panel configuration then defines the NV9000 device categories that are selectable for router pre-selection (up to 10 categories).

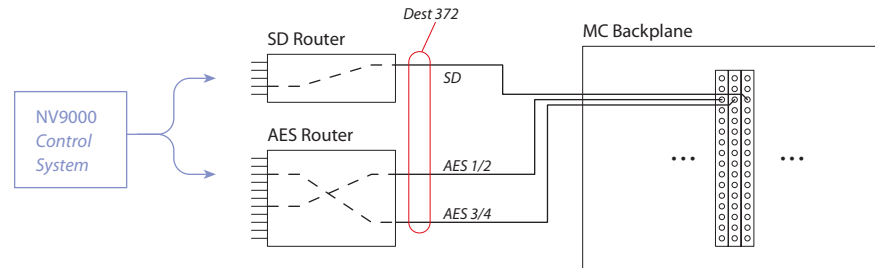
Similarly for over sources, an M.C.P.M. or M.C.E. configuration defines an over source button (one of 2) as "operator modifiable." A control panel configuration specifies the NV9000 device categories that a connected M.C.P.M. or M.C.E. can use. Over sources and main sources share the same NV9000 device categories.

- ▲ Router pre-select sources connect at the backplane the same way local sources do. The difference is that router pre-select inputs are connected to router outputs that compose a router destination in the NV9000 control system whereas inputs of local sources are connected directly to the outputs of devices.
- ▲ It is possible for a "local" source to be connected through a small independent router or through some other means, but such a router is not controlled by an NV9000 system.

Under router pre-select, the M.C.P.M. or M.C.E. configuration specifies the router **destination** to which NV9000 sources are routed. A destination is a logical, not physical entity, belonging to a level set (NV9000 term). The level set determines what signals are routed.

Generally, a level set includes one video level (SD, for example) and one or more audio levels (AES 1/2, AES 3/4, etc.). Video with embedded audio is considered just one level.

To connect the destination to the master control backplane implies connecting one video cable and one or more audio cables. This example shows the cabling for a destination that has 3 levels: SD, AES 1/2, and AES 3/4:



The router **destination** ID is specified, during MCPM or MCE configuration, for the source.

The preceding illustration shows a main source. Over sources are similar, but all the connections are audio.

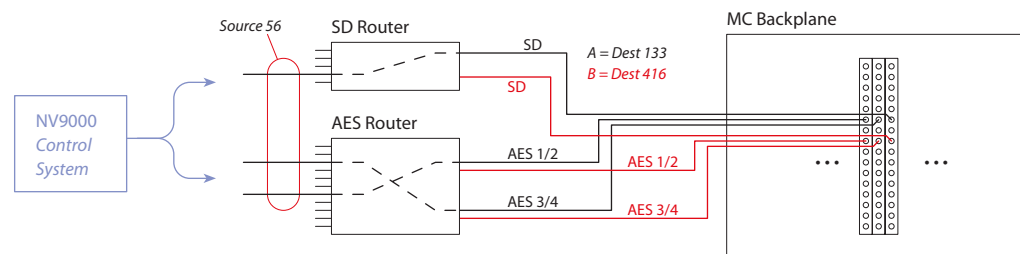
- ▲ For video sources, if you have an HD MCPM and SD MCPM in the same frame, it is not likely that they can share the same connectors.
- ▲ Squeeze background sources and squeeze image 2 sources can be selected from the set of main sources. These can include router pre-select sources.

It is possible to have more than one router pre-select source “button” defined for an MCE or MCPM. You might, for example, need a different router pre-select source for the preset, program, preview, and aux buses.

If you have more than one MCPM or MCE in a frame, they may use the same router-preselect destinations or different router pre-select destinations.

External Router Sources

The connection of external router sources is different:



External main sources require 2 connections, A and B, where the A and B form a resource pool from which the available resource is selected. The A and B connections must be equivalent, albeit on different connectors.

Similarly, external keyer sources require a pool of 3 connections. The connections in this pool must be identical, albeit on different connectors. And similarly, over sources require a pool of 2 identical connections, A and B.

- ▲ For video sources, if you have an HD MCPM and SD MCPM in the same frame, it is not likely that they can share the same connectors.
- ▲ Squeeze background sources and squeeze image 2 sources can be selected from the set of main sources. These can include external main sources.

These connections support all the external sources you might define. The limit to the number of external sources is in the configuration software: you may define up to 2048 (or 128, 64, or 16) main sources any or all of which may be external, up to 8 keyer sources any or all of which may be external, or up to 4 over sources, any or all of which may be external.

- ▲ The MCE allows 2048 main sources and 2048 keyer sources. Most of these will be external router sources.

The effect is that the operator selects the external router source without knowing whether the source is external. That is because, the external router source is defined as a main source (or keyer source or over source) during MCPM or MCE configuration. The router **source** ID specifies the source.

(The NV9000 control system and master control cooperate to make the switch in the router.)

- ▲ External squeeze sources come through the external squeeze BNCs even when they are handled as main sources.

Master Control Network

The master control network connects Imagestore 750s, MCPMs, MCEs, master control panels, configuration PCs, and optionally, Intuition XG processors, tally processors, and device controllers. If you are using an NV9000 control system, it is also connected on the master control network. The NV5100MC frame is **not** on the network.

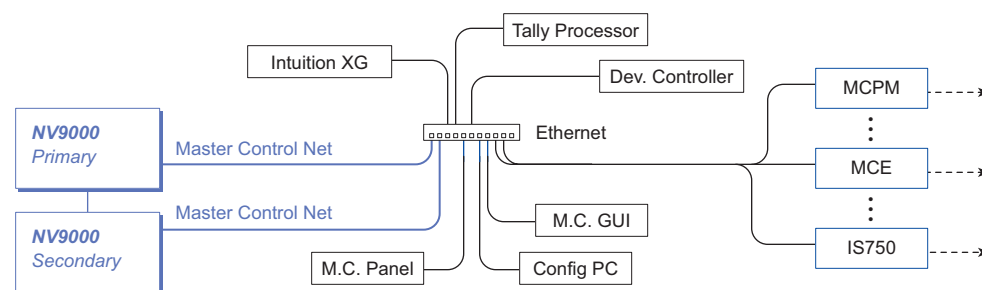
Before you connect MCPMs or MCEs to the Ethernet switch of the network, use MasterDiag to assign (through their diagnostic ports) their IP addresses.

Before you connect hardware control panels to the Ethernet switch of the network, assign their IP addresses. Use their menu system to do so.

Software control panels (GUIs) and configuration software execute on PCs which connect on the master control network. Ensure that the PCs have IP addresses on the master control network.

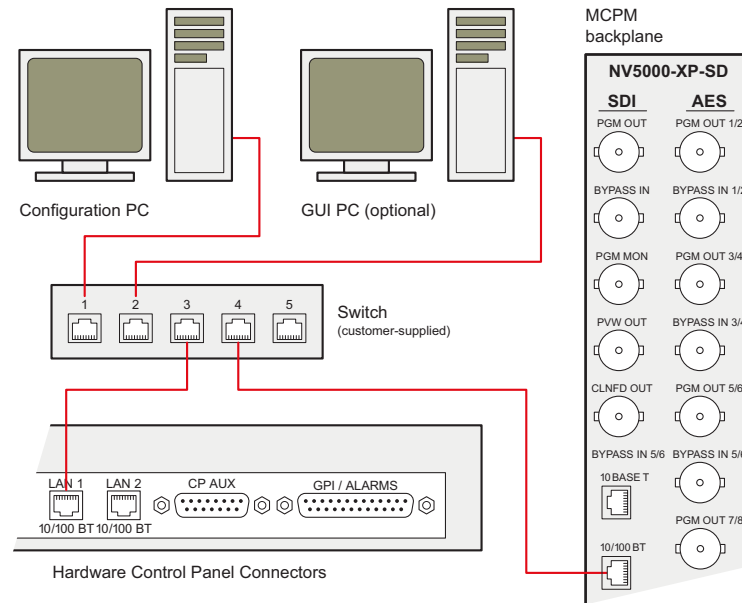
Subnet masks are always 255.255.255.0.

This is a sketch:



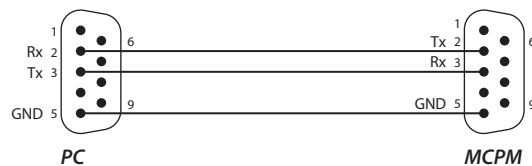
- ▲ All MCPMs and MCEs ship with the same default IP address. All control panels ship with the same default IP address. If you have purchased more than one MCPM, MCE, or control panel, do not connect and power them on all at the same time until you have configured unique IP addresses for all devices.

This diagram shows some connector detail:



MCPMs

Before you can place an MCPM on the master control network, you must assign it an IP address. Doing so requires a straight-through serial cable and MasterDiag in serial mode. This is the cable connection:

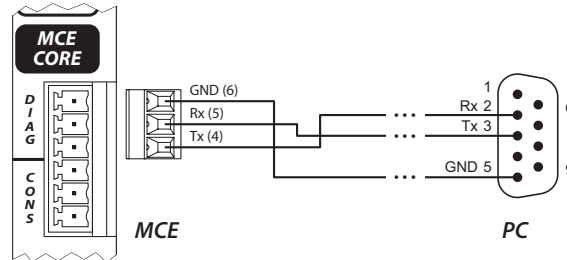


Follow these steps:

- 1 Connect a straight-through serial cable from a COM port (typically COM1) of your PC to the diagnostic port at the front of the MCPM. The diagnostic port is a female DE9. The protocol is RS-232 and the Baud rate is 115,200. There are no options for parity, data, or stop bits in MasterDiag.
- 2 Launch MasterDiag. Choose serial mode from the 'Communications' menu. Choose the COM port at this time if necessary.
- 3 Choose the 'Ethernet Settings' tab. We recommend that you click the "Read" button first. Then enter the IP address and subnet mask (255.255.255.0) for the MCPM. Click the 'Write' button.
- 4 You can disconnect the MCPM at this point, because you can use Ethernet communication through the master control network for all further modifications.
- 5 Repeat steps 1–3 for all MCPMs you want to be in your master control network. Each device on the network must have a unique IP address.

MCEs

Before you can place an MCE on the master control network, you must assign it an IP address. The process is the same as for MCPMs, but the cable is different. This is the cable connection:



If you have not done so, obtain or fabricate a DE9-to-Phoenix cable. Then, follow these steps:

- 1 Connect the DE9-to-Phoenix from a COM port (typically COM1) of your PC to the diagnostic port of the MCE. The diagnostic port is the upper lower 3 pins of a 6-pin Phoenix connector. Like its counterpart in the MCPM, the MCE's diagnostic protocol is RS-232 and the Baud rate is 115200. There are no options for parity, data, or stop bits in MasterDiag.
- 2 Launch MasterDiag. Choose serial mode from the 'Communications' menu. Choose the COM port at this time if necessary.
- 3 Choose the 'Ethernet Settings' tab. We recommend you click the "Read" button first. Then enter the IP address and subnet mask (255.255.255.0) for the MCE. Click the 'Write' button. You can disconnect the MCE at this point, because you can use Ethernet communication through the master control network for all further modifications.
- 4 Repeat steps 1–3 for all other MCEs you want in your master control network. Each must have a unique IP address.

Hardware Panels

Ethernet

First, enter the IP address and subnet address in the appropriate submenu of the panel's menu system. This step will vary from panel to panel.

For most panels, choose the 'Panel' button from the menu, then choose 'IP Setup' from the resulting submenu and proceed. Some panels have a "LAN 2" option. Use LAN 1 and ignore LAN 2.

▲ It is **not** necessary to restart the panel.

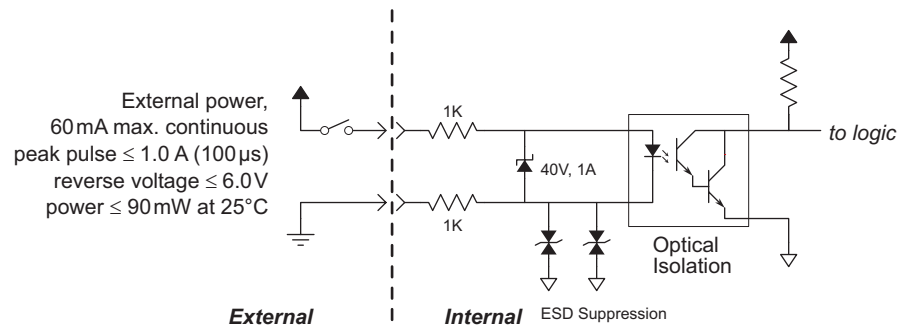
Then, using an Ethernet cable, connect the panel to the Ethernet switch of the master control network. Some panels have one Ethernet port; others have two. Use "LAN1" if a panel has two.

GPI

All hardware panels have GPI/Alarms connectors that support 2 optically isolated GPI inputs and 2 GPI relay outputs. The alarm signals on the connector represent the health of the panel.

You can connect these to circuits of your own. Refer to [Control Panel Connectors](#) on page 198 for the pinouts.

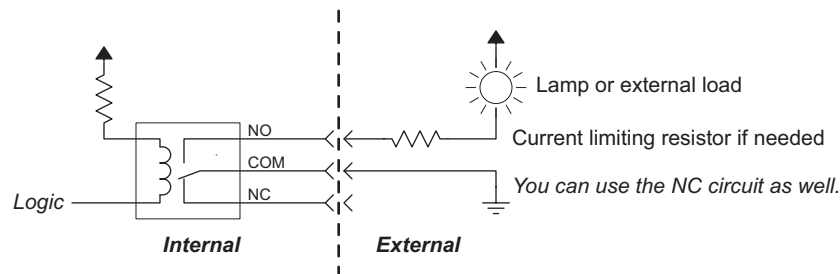
This is GPI input (for panels):



There is a Schottky diode across the GPI input terminals to prevent damage to the internal circuitry (if you happen to reverse the input connection). And if you do, the input circuit won't work, even if it survives.

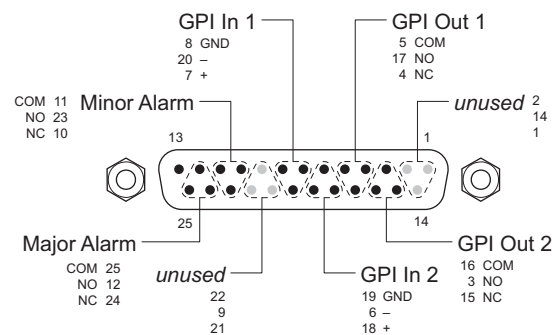
During panel configuration you can specify the polarity of the GPI inputs. That is (1) whether a GPI input button on the panel goes high-tally or low-tally when an input switch is closed.

This is GPI output (for panels):



The outputs are mechanical SPDT relays with 3 terminals. You can switch fairly large loads with these relays. The panels' alarm relays are the same.

This is GPI/Alarm pinout (for panels):



An alarm will clear when all of the triggering conditions are off for 5–10 seconds continuously.

Power applied to the GPI inputs can be from 5 to 24VDC, and less than 30 mA, typically, 5V at 1 mA. Loads for the GPI and alarm outputs can be larger:

- Max current: 1 A
- Max voltage: 125 VAC, 110VDC.
- Max capacity: 62.5VA, 33 W.
- Rated loads: 1 A at 30VDC; 0.3A at 110VDC; 0.5A at 125VAC.

In case you are using the WC0053 breakout cable for the GPIs and alarms, these are the WC0053 wire numbers and colors:

WC0053 Pinout for GPI/Alarm Connectors

Bundle	Jacket Color	DB25 Pin			GPI/Alarm Function
		Red (+)	Black (-)	Drain	
1	Brown	24	12	25	Major
2	Red	10	23	11	Minor
3	Orange	21	9	22	(not used)
4	Yellow	7	20	8	GPI Input 1
5	Green	18	6	19	GPI Input 2
6	Blue	4	17	5	GPI Output 1
7	Violet	15	3	16	GPI Output 2
8	Gray	1	14	2	(not used)

The colors of the wiring bundles tells you the functions of the bundles.

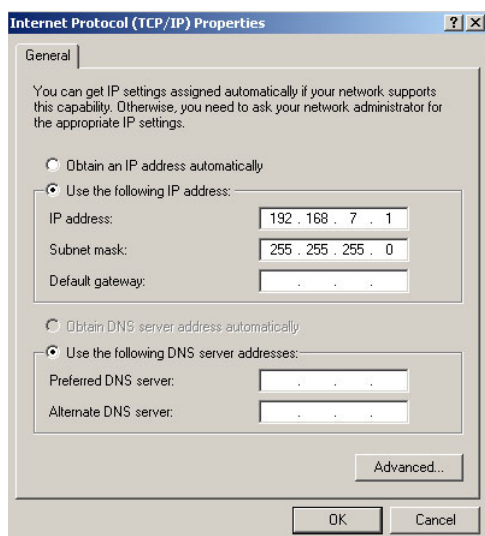
PCs

PCs can have one or more Ethernet ports. (Your NV9000 system controller, if you have one, has 6 Ethernet ports by default).

Configure one of your PC ports to be on the master control network.

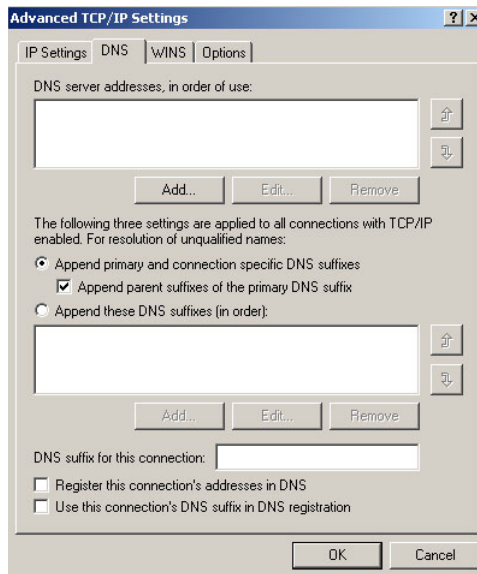
Follow these steps to configure IP addresses on each PC.

- 1 Using the Windows Start menu on the Configuration PC, choose Settings > Network Connections > Local Area Connection.
- 2 Set the IP address and subnet as shown. Each PC on the master control network must have a unique address on the network.



The subnet address should be 255.255.255.0.

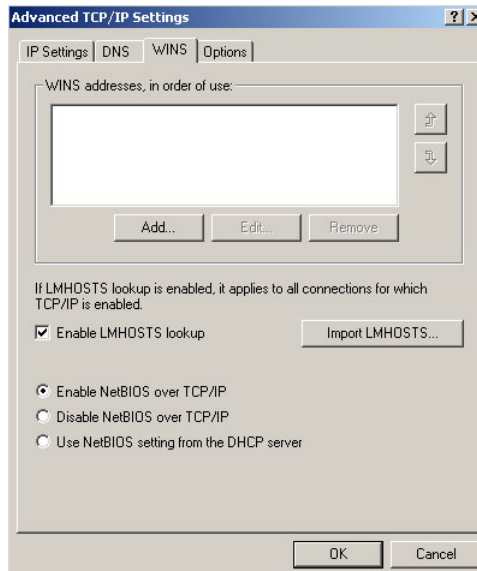
3 Click 'Advanced'. Choose the DNS tab and ensure the settings appear as shown here:



DNS Tab

These values are the same for all PCs in the network.

4 Choose the WINS tab and ensure the settings appear as shown here:



WINS Tab

These values are the same for all PCs in the network.

- ▲ Other than the IP address, the settings are typical Windows' XP default selections.
- ▲ Important: DNS, WINS, or any other form of name resolution are **not** required and should **not** be enabled.

Tally Processors

The tally processor is slightly different because it is a third-party device.

First, connect the tally processor to the master control Ethernet switch. Use the front panel “menu” of the tally processor to define its IP address (which must be unique on the master control network).

Following that step, you can access the tally processor’s internal configuration software through a browser on your PC (such as Internet Explorer). To launch the software, type in the box’s IP address as the URL. Perform configuration as required and as directed in the *Tally Processor User’s Guide*.

You will have to fabricate cables to the tally processor’s GPIs (up to 32 inputs) and GPOs (up to 32 outputs) connecting them to the appropriate switches and circuits at your facility. See [Tally Processor Connectors](#) on page 185.

▲ You can connect the GPIs of control panels, MCPMs, and MCEs to the tally processor GPIOs. The tally processor receives event notification (e.g., preset keyer selected, transition occurred) from master control. The tally processor sends event commands (e.g., take, keyer on/off, transition) to master control based on its internal event-monitoring list (which you must configure).

Device Controllers

The DC21 device controller, like the tally processor, is a third-party device. It is a 1RU processor that functions as an intermediary between your MCEs and devices that require machine control.

Your master control network can have more than one DC21. The configuration of every MCE that performs machine control identifies the DC21 with which it will communicate. A single DC21 could receive commands from more than one MCE.

Ethernet Connection

First, connect the device controller to the master control Ethernet switch. Use the front panel “menu” of the device controller to define its IP address (which must be unique on the master control network).

In MasterConfig’s general settings, for each MCE that is to communicate with the DC21, specify that IP address for the device controller’s address.

You can access the device controller’s internal configuration software through a browser on your PC (such as Internet Explorer). To launch the software, type in the box’s IP address as the URL. Perform configuration as required and as directed in the *Device Controller User’s Guide*.

The device controller receives commands, through the master control network, from the MCE(s) that have been configured to communicate with it.

Ports Connections

The DC21 can control up to 4 devices on its 4 serial ports using one of 3 protocols: Sony, Odetics, or VDCP. It can control up to 16 other devices with 100 ms start and stop pulses on its GPO lines.

The devices you connect on the serial ports must, of course, recognize one of the available protocols. The device controller’s DE9 pinout is shown in [Device Controller Connectors](#) on page 186.

Under master control, the DC21's 32 GPO ports are paired (1,2), (3,4) and so on up to (31,32). This gives you control over 16 devices. The odd port in the pair carries a start pulse and the even port in the pair carries a stop pulse. MCEs can use these ports for device control as long as the device in question recognizes 100 ms start and stop pulses. Actual wiring of the GPO connections depends on your device(s). The port pinouts are also shown in [Device Controller Connectors](#) on page 186.

The DC21's 32 GPI ports remain available but master control does not use them. It is possible to configure any GPOs not used by master control to be switched by the GPIs and by state changes in controlled devices.

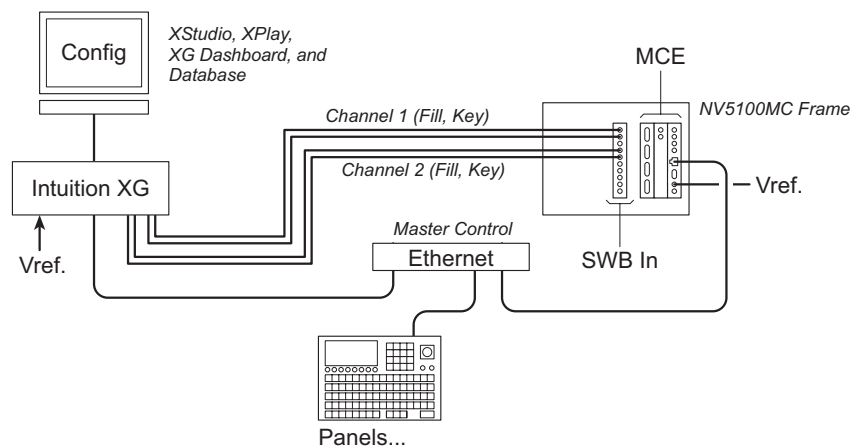
Intuition XG

The Intuition XG system is a single- or dual-channel graphics processor coupled with Xmedia software. When it is integrated with an NV5100MC master control system, the Intuition XG processor feeds HD or SD keys (fill and key video inputs with up to 16 audio channels) to MCEs. It provides multi-level character generation, and animation, still, and clip payout with multi-channel audio.

- ▲ This guide does not address Xmedia creative software at all. Any discussion of installation and configuration is limited to the role of Intuition XG in the master control system. Please refer to the Intuition XG and Xmedia documentation available from Miranda.

Connections

This diagram shows the required Intuition XG connections:



The Intuition XG processor is the subsystem's graphics processor and provides the XG configuration, video storage, and access to a network of graphics tools, information databases, and so on. Operators at master control panels use (and choose) the XG "layers" created or stored within the Intuition XG processor as they would choose any other video effect.

A dual-channel Intuition XG processor has 4 video outputs, fill and key for each channel. A single-channel Intuition XG processor has only two.

Ethernet

The Intuition XG processor and the MCE communicate on the master control network. First connect the Intuition XG processor to the Ethernet switch. Then, in MasterConfig's Intuition XG page for the MCE, specify the IP address of the Intuition XG processor.

Video Cables

The Intuition XG processor delivers one or two (fill, key) pairs to the master control system through an SWB card (a requirement). The MCE configuration identifies the ports through which the signals enter the master control system.

Video cables connect to the Intuition XG processor with an 8-BNC breakout connector. One of those cables is video reference (Analog Ref In). Note that the required reference is either NTSC or tri-level (1080i/59.94). The MCE can use tri-level, NTSC, or PAL reference. If the references supplied to the Intuition XG and MCE are different (e.g., one is using NTSC and the other is using tri-level) the two references must be properly timed.

The 4 video cables on the breakout connector are labeled:

(Program)	(Preset)	
SDI out A	SDI out B	"fill"
SDI out C/key	SDI out D/key	"key"

If your Intuition XG processor is single-channel, do not connect cables to SDI outputs B and D.

These cables feed to 4 (or 2 if single-channel) SWB input connectors on the master control frame's backplane. Enter your connector choices in MasterConfig's 'Intuition XG' page.

Panels

No Intuition XG connections are required for panels. However, you will want to consider on which panels you place XG layer buttons. (The XG layer buttons operate somewhat like keyer buttons.)

For a single-channel Intuition XG processor, an XG layer can use any of the 3 keyers. A dual-channel Intuition XG requires keyers 2 and 3. Remember that keyer 1 is pre-squeeze in the effects ordering and keyers 2 and 3 are post-squeeze.

- ▲ When an XG layer button is active, the keyer it uses becomes inaccessible as a keyer. (An XG layer button is active when a panel controls an MCE with Intuition XG enabled.)

More Information

Intuition XG requires pre-roll enabled in the MCE and a pre-roll value of 6 frames for interlaced video or 12 frames for progressive video. The "pre-roll" value is just a delay value; there is no tape motion.

See [Intuition XG](#) configuration on page 106.

Configuration for Intuition XG involves both MasterConfig for your MCEs and MCS Panel Configuration Editor for your panels.

Kaleido-X

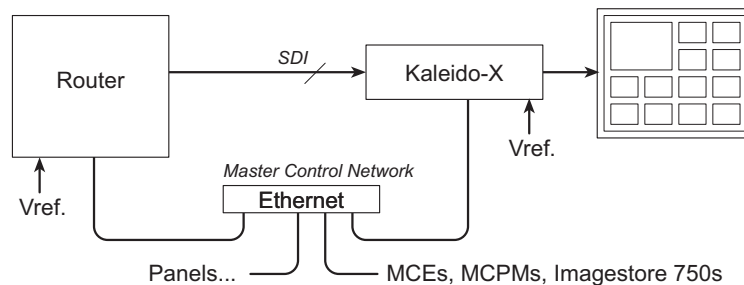
Master control can be integrated with a Kaleido-X multi-viewer (or monitor wall) in such a way that master control can trigger a Kaleido-X *re-layout*. The Kaleido system defines *rooms* (in which a multi-viewer exists) and *layouts* (the organization of views on the multi-viewer) for each room. Panel operators can have available 'Kaleido-X Layout' buttons that trigger multi-viewer re-layout. A channel change can also trigger a multi-viewer re-layout.

Control panels, when they are controlling Imagestore 750s, can cause the *source content* of a monitor wall to change when the operator changes the current source group. In contrast, a multi-viewer re-layout changes the *organization* of the sources on the display.

It is possible for the monitor wall router destinations (appropriate to Imagestore 750s) to be the same as the inputs to the Kaleido-X.

Connections

This diagram shows the required Kaleido-X connections:



The SDI (SD, HD, or 3Gig) inputs, from a router or other equipment, feed the inputs of the Kaleido-X.

There are a number of Kaleido-X models, so the actual connectors and number of connectors might vary. For one, the Kaleido-X16 has 16 SDI inputs and two outputs, with DVI, HDMI, and BNC connectors for each output.

5

Configuration for MCEs and MCPMs

Chapter 5 is an introduction to the Master Control Installation Guide.

Topics

<i>Introduction</i>	81
<i>MasterConfig</i>	82
<i>MasterDiag</i>	93
<i>MasterLogo</i>	93
<i>MCS Panel Configuration Editor</i>	94
<i>Tally Processor</i>	103
<i>Device Controller</i>	105
<i>Intuition XG</i>	106
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Please see Chapter 6 for information about Imagestore 750 configuration.

Introduction

Configuration for MCEs and MCPMs applies to control panels, MCPMs, MCEs, and tally processors.

NV9000 system configuration is outside the scope of this guide. The use of UniConfig to set up routers (including MFRs) is also outside the scope of this guide, although it is addressed briefly, in the Introduction. See [UniConfig and MRC](#) on page 20.

The tally processor is third-party equipment and comes with its own built-in configuration utility that runs in a browser on a connected PC. Refer to the *Tally Processor's User's Guide*.

Other third-party equipment (e.g., automation systems, or router control systems) are also outside the scope of this guide.

All configuration pre-supposes a connected configuration PC. GUI configuration files require special handling.

Configuration Tools

The NV5100MC series includes 4 configuration applications:

- MasterConfig
Configures master control processors (MCPMs and MCEs).
- MasterDiag
Sets up MCPMs and MCEs. MasterDiag is also used for software uploads.

- MasterLogo
Converts logo artwork to the internal format required by MCPMs and MCEs. MasterLogo performs the upload of logos to the MCPM's or MCE's logo store.
- MCS Panel Configuration Editor
Configures master control panels.

The tally processor's configuration application is built-in.

We recommend that you read the configuration user's guides carefully. It is usually only necessary to read the portions in which you have an interest.

The following configuration tool summaries are meant to be helpful, but they are no substitute for reading the actual configuration manuals.

MasterConfig

MasterConfig is the software that configures MCPMs and MCEs.

When approaching MCPM and MCE configuration you should keep in mind that the various MCPM and MCE models are different, sometimes in subtle ways. Feature available in one might not be available in others. All MCPMs and MCEs operate independently.

MCEs are advanced master control processors and differ from other MCPMs in these major areas:

- MCEs support 16-channel audio. MCPMs support 8 audio channels.
- MCEs have preview and aux buses. MCPMs do not. These buses allow panel operators to view and compose effects with affecting on-air content.
- MCEs have extended features and features that MCPMs do not. For example, MCEs have two clean-feed outputs, not one.

Your master control software comes with several default configurations. In fact, every MCPM or MCE that ships has some basic configuration.

There are 6 default configuration files for MCEs: one for each video format supported by the MCE.

MCE_default_525.cfg	MCE_default_625.cfg
MCE_default_720p_50.cfg	MCE_default_720p_59_94.cfg
MCE_default_1080i_50.cfg	MCE_default_1080i_59_94.cfg

Usage

MasterConfig is organized into several configuration pages roughly according what an MCPM or MCE can do. These are the pages:

1 General settings.

The 'General Settings' page defines fundamental properties of the MCPM or MCE and enables or disables several features.

2 Main sources

The 'Main Sources' page defines program sources and associates video inputs with audio inputs. This page also defines certain squeeze background images and secondary squeeze images.

3 Source groups

- ▲ Source groups are available only for MCEs (and for Imagestore 750s).

The 'Source Groups' page allows the configurer to organize main sources into groups that conveniently fit on the buttons of master control panels. Operators then may select one or another source group when they wish to use the sources in the group.

Source groups must be enabled (in the general settings). When source groups are enabled, button mapping for main sources is disabled and vice versa. Operators will be able either to choose source groups or to perform button mapping.

4 Over sources

The 'Over Sources' page defines audio over sources.

5 Audio monitors and meters (and analog outputs)

This page configures the way the MCPM or MCE handles audio metering outputs.

6 Keyer sources

The 'Keyer Sources' page defines keyer sources.

7 Logo images

The 'Logo Images' page identifies logo image files that are to be used by logo keyers.

8 Logo keyer sources

The 'Logo Keyer Sources' page defines logo keyers.

9 Squeeze settings

The 'Squeeze Settings' page defines squeezeback settings. The squeeze settings page applies to squeeze backgrounds whereas the squeeze 2 settings page applies to squeeze image 2.

- ▲ The MCPM-MK-SD and -MK-HD do not provide squeezeback. The MCPM-SDHD and MCE offer squeeze "image 2" functions as part of enhanced squeezeback.

10 Squeeze 2 settings [-SDHD and MCE only]

The 'Squeeze 2 Settings' page further defines squeezeback settings. Whereas the squeeze settings page applies to squeeze backgrounds, the squeeze 2 settings page applies to squeeze image 2.

11 RS-422 communication settings

The RS-422 page configures the master control automation settings.

In this page, you can specify a remapping that allows automation to control XG layers (at the expense of other video effects). This page is for MCEs only. ***Do not use this feature unless you are sure of what you are doing.***

12 Button mapping — main source

The main button mapping page defines where and how master control main sources are placed on control panel buttons.

Source groups must be *disabled* (in the general settings) if an operator is to perform button mapping. When source groups are enabled, button mapping for main sources is disabled and vice versa.

13 Button mapping — over source

The main button mapping page defines where and how master control over sources are placed on control panel buttons.

14 Misc. settings

The miscellaneous settings page defines miscellaneous MCPM or MCE parameters including which is the default main source and where the clean-feed tap occurs.

15 Video effect and over settings

This page partially defines the behavior and certain defaults for video effects and audio overs.

16 Transition and fade-to-black settings

This page defines the transition timing for transitions and fades.

17 GPI inputs

This page defines the behavior of the two GPI inputs.

18 GPI outputs

This page defines the behavior of the two GPI outputs.

19 Wing outputs

This page configures the outputs of (optional) wing output cards.

It is available for the MCPM-HD2 and MCPM-SDHD only.

20 Aux outputs [MCE only]

This page configures the aux outputs of MCEs. It is available only for MCEs.

21 ExtRtrSrc settings

This page defines the ports used for external router sources.

22 Intuition XG settings

This page defines the ports and other parameters for Intuition XG channels. The page is available only for MCEs.

Not every MCPM uses every configuration page. For example, the MCPM-MK-SD and -MK-HD do not have squeezeback and MasterConfig shows no squeezeback pages for those MCPMs.

With MasterConfig, you can, of course, save and re-open configuration files in your PC's file system. You can manage configuration files any way you'd like.

This is the general process to develop a configuration:

- 1 Choose an MCPM or MCE.
- 2 Read its configuration from the MCPM or MCE.
- 3 Modify its configuration.
- 4 Write the new configuration back to the MCPM or MCE.

You can develop configuration files "off-line." It is not actually necessary to select an MCPM or MCE unless you want to read its configuration.

You can start with a new "empty" configuration, use a default configuration, or use an existing configuration as the basis for a new one.

MCPM and MCE Characteristics

Besides the MCPM and MCE architecture and feature set—which you can read about in the reference manual—MCPMs and MCEs have some interesting characteristics.

Assumption of Source Buttons

MCPMs and MCEs assume that a control panel has 16 main source buttons. Some have fewer physical main source buttons, but all have 16 “virtual buttons.” It is in MasterConfig that you specify how the virtual buttons are used. How the buttons are used is therefore an MCPM (or MCE) characteristic, and not a control panel characteristic.

Router Sources

MCPMs and MCEs support two concepts: (1) external router sources and (2) router pre-selection.

Router pre-selection relies on control panel configuration. Router pre-selection requires that at least one main source button (or at least one over button) being configured in MasterConfig as “operator-modifiable” or “system-modifiable.”

External router sources require nothing of the operator or of a control panel. However, external router sources can require a commitment of many input connectors at the rear of the master control frame.

There can be potentially thousands of router pre-select sources. Those can vary daily without the MCPMs or MCEs requiring reconfiguration. The number of external router sources is limited to the number of main sources, over sources, keyer sources, and squeeze sources allowed by the MCPM or MCE. These do not vary.

Automation

There are just a few automation options. The term “system modifiable” applies to source buttons that can be controlled by automation.

MasterConfig also provides a remapping function that allows automation to control XG layers, by sacrificing other video effects.

Preview and Aux

MCEs have 2 aux buses and might have a preview bus (if a preview board is present). MCPMs do not have these buses.

The aux bus can be put to use in several very different ways.

The control panels support the aux bus and the preview bus of the MCE.

General Settings

There is a ‘General Settings’ page in which you define fundamental characteristics of the MCPM you are configuring.

Certain general settings enable (or disable) configuration pages. For example, its “Enable External Router Source” checkbox option enables the ‘ExtRtrSrc’ page. Unless you check that box, you will not see an ‘ExtRtrSrc’ page.

Certain general settings enable (or disable) options in the configuration pages. For example, the “Enable AutoRestore of Audio Mixer Settings” checkbox option causes an ‘Auto Restore’ checkbox option to appear on the main and over source configuration pages.

Main Source Limits

SD MCPMs allow 128 video and/or audio inputs.

HD MCPMs allow 64 video inputs in the range 1–64 and 64 audio inputs in the range 65–128.

The -MK-HD allow 16 video inputs, from its own backplane, and 64 audio inputs in the range 65–128. These video inputs cannot be used by any other MCPMs or MCEs.

MCEs allow 64 physically connected video inputs in the range 1–64 and 64 audio inputs in the range 65–128. However, MCEs allow 2048 main sources most of which will be external router sources.

Each of an MCPM's video sources can be configured with up to 8 audio sources. Each of an MCE's video sources can be configured with up to 16 audio sources. Options include embedded audio, discrete audio, analog audio, and Dolby E encoding.

An MCPM's over sources can be configured with up to 8 audio inputs. An MCE's over sources can be configured with up to 16 audio inputs.

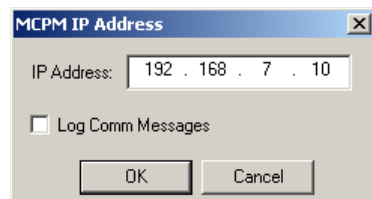
Misc.

The MCPM-MK-SD and MCPM-MK-HD have no squeezeback generator, only one logo, and no analog audio outputs. The MCEs have no analog audio outputs.

Choosing an MCE or MCPM

There is a list of MCPMs and MCEs at the left side of the MasterConfig window. You can click (or define or delete) any entry in this list.

You can also enter the IP address of an MCPM or MCE directly at any time:



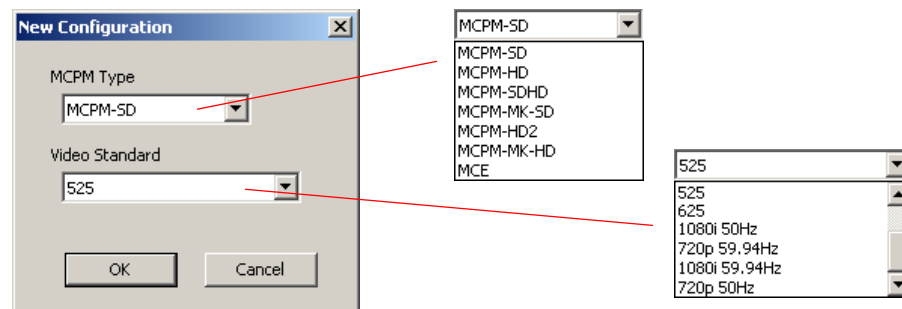
You can create and edit a configuration off-line, without actually selecting an MCPM or MCE.

After you create a configuration, you can associate it with any of the MCPMs or MCEs in the list.

- ▲ Be careful, when writing data, not to load a configuration into an MCPM of the wrong type. There are some safeguards, but they are not fool-proof.

Editing

A new configuration starts with a dialog asking what MCPM type you want to configure and for what video standard:



General Settings

Use the General Settings page to specify the very basic parameters of your MCPM. The page varies with the MCPM. Figure 5-1 shows some of the variations:

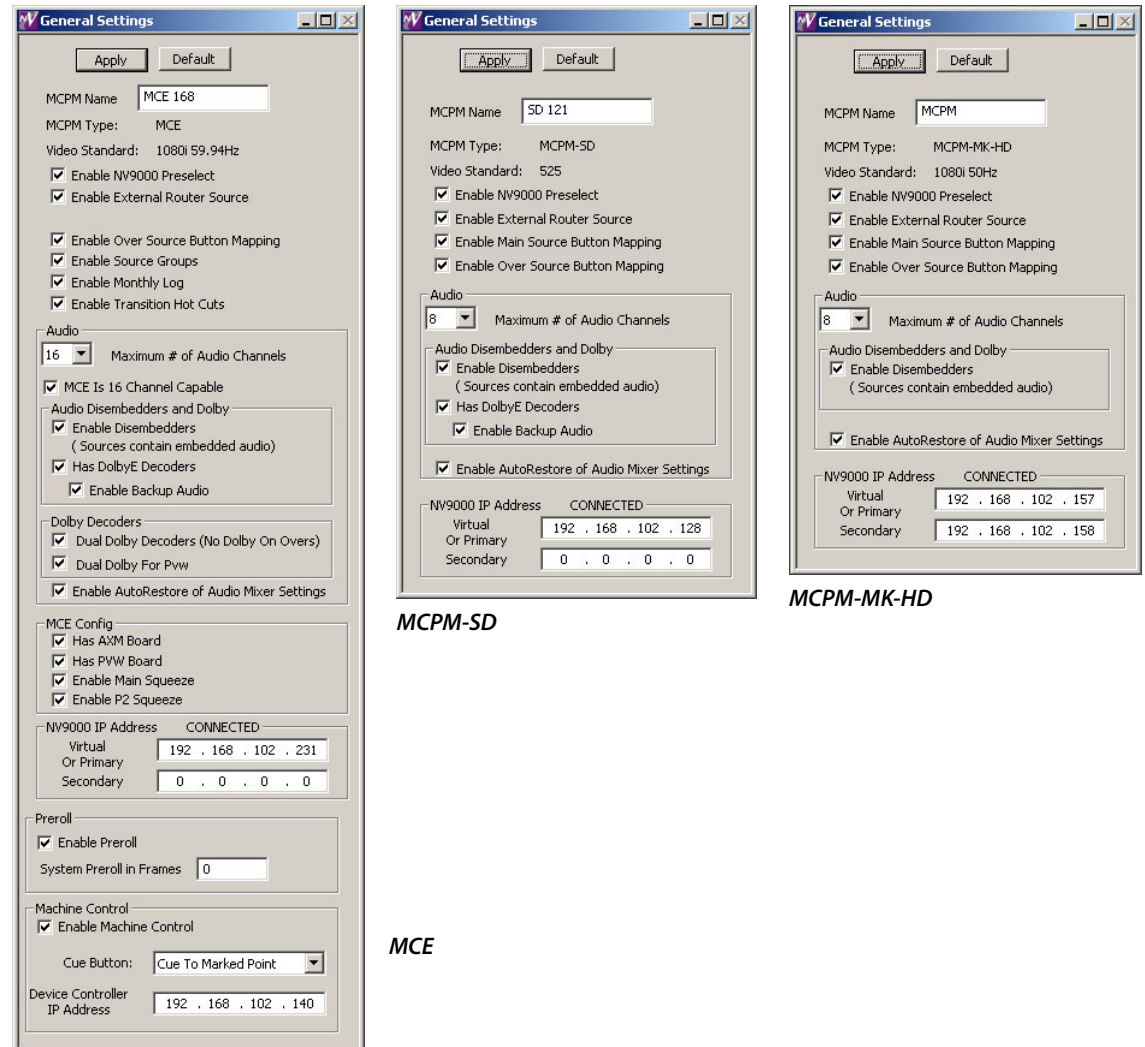
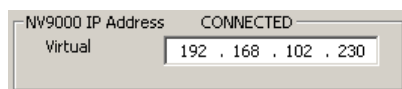


Fig. 5-1: MasterConfig General Settings Window

It is in this page that you can name the MCPM or MCE and specify the IP addresses of the NV9000 system (if present) from which you want to obtain source and destination IDs (if they apply).

- ▲ If you have enabled external router sources and **not** router pre-select, this section of the general settings page changes:



In this case, you must enter a virtual IP address. (This requires that the NV9000 system support virtual IP addresses.) The 'ExtRtrSrc' page also requires you to enter the virtual IP address because external router sources require the use of a virtual IP address.

There are several complex and inter-related options in this page. Refer to the *MasterConfig User's Guide* for information.

You must click the 'Apply' button to confirm and capture the choices you make in this page.

Main Sources

Use the Main Sources page to list, and define, video sources. Specify the source mnemonic, the video and audio input connections, and audio channel usage. Use this page to specify the audio sources to be associated with this video. Audio may be embedded or discrete.

A main source may be from a router in which case it is specified as an external source, or it may be local (in which case it is specified as a master control input). A main source may also be internally generated black/silence in which case there are no connectors.

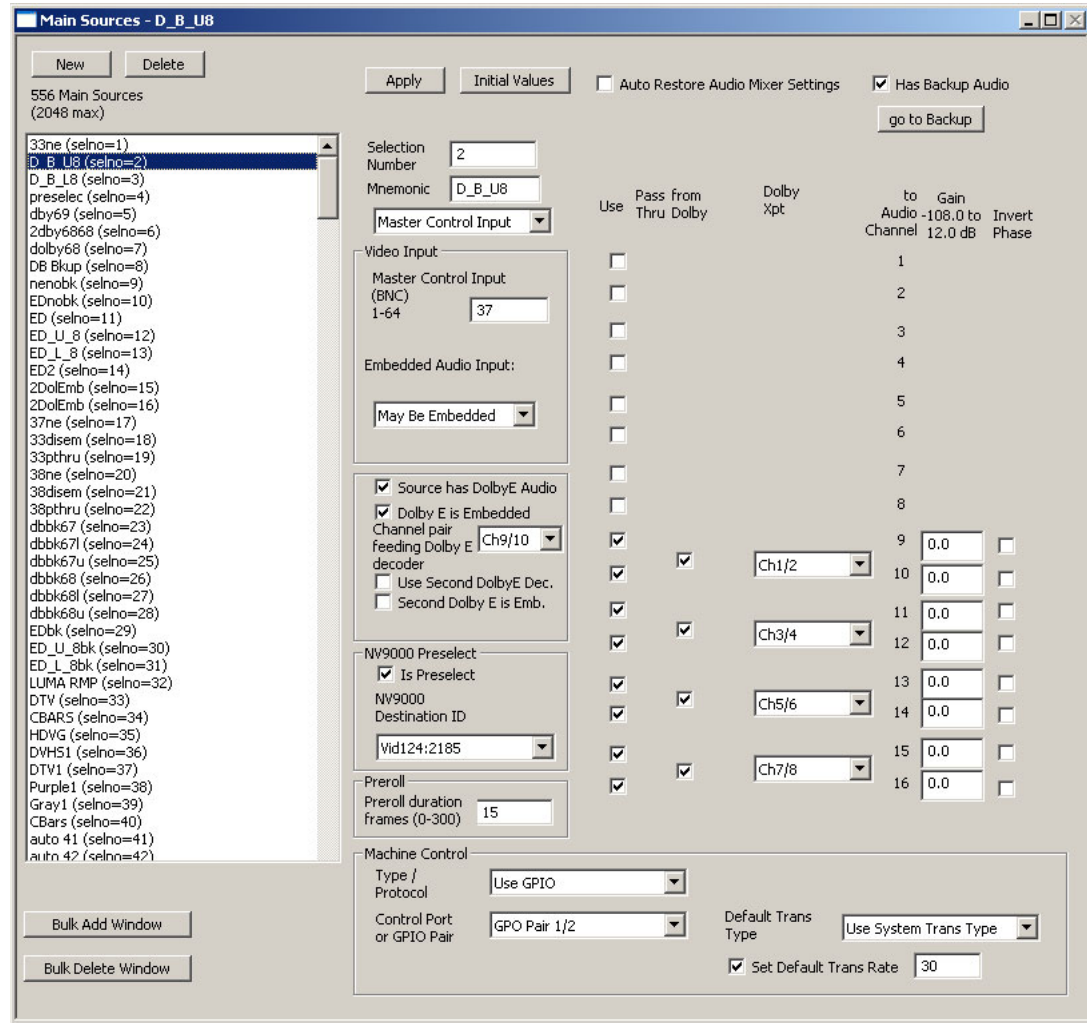
When you specify an external source, you give its NV9000 source ID.

When you specify a router pre-select source, you give the ID of a NV9000 destination through which the source is sent.

When you specify a master control source, you give its backplane connector number.

Main sources can also be selected as squeeze background and squeeze image 2 sources.

This shows the 'Main Source' page for an MCE:

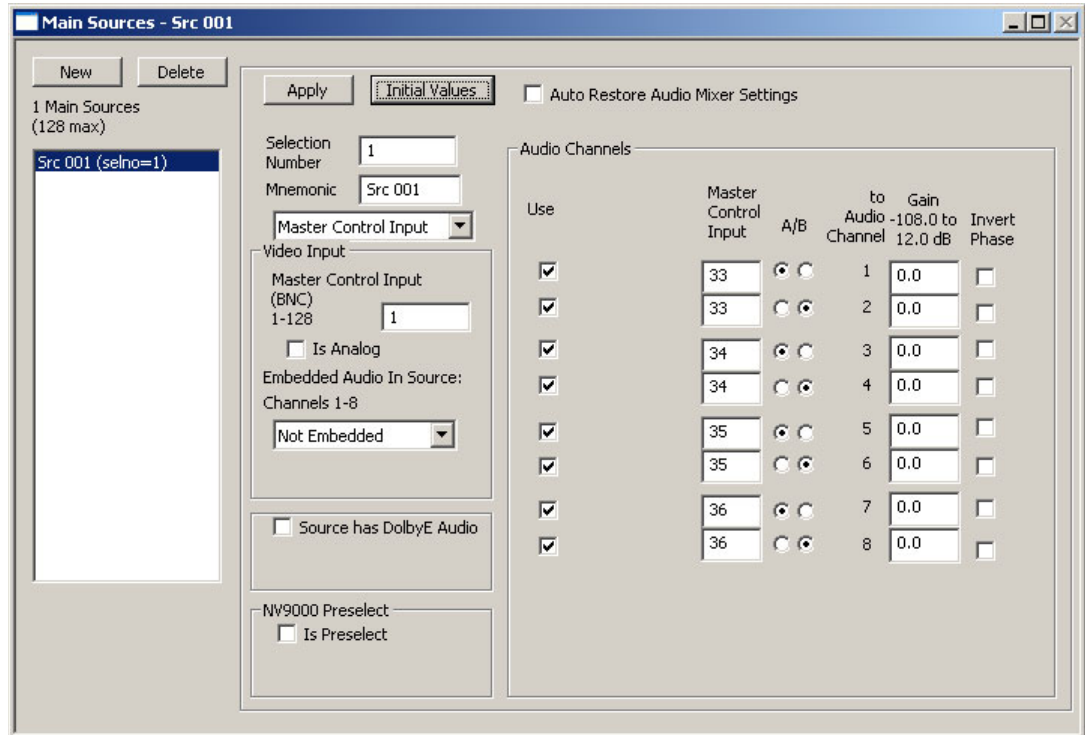


It shows 16 audio channels. The 'Initial Values' button will automatically enter the connector numbers, starting with the value you specify at the top of the list.

The MCE does *not* support analog video.

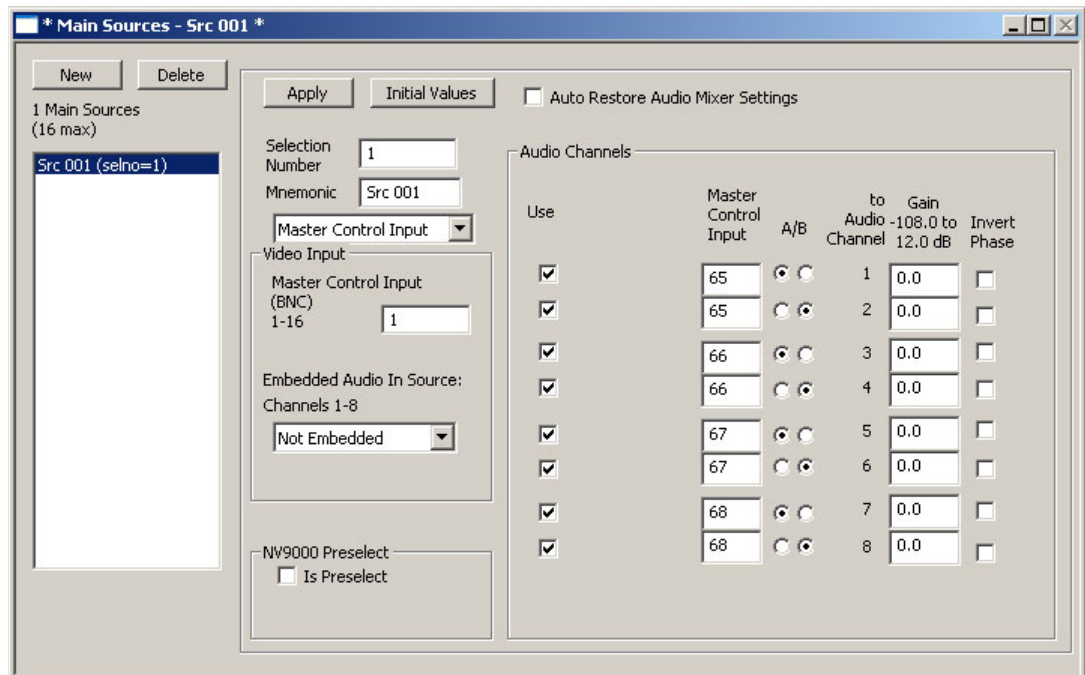
The MCE *does* support machine control and pre-roll.

This shows the 'Main Sources' page for an MCPM-SD:



It has 8 audio channels. The video source can be analog.

This shows the 'Main Sources' page for an MCPM-MK-HD:



The -MK-HD has no analog option, no Dolby option, and its 16 allowable inputs come from its own backplane or from external router sources.

Video Effects and Audio Overs

There are pages (similar in style, but not content) in which you may specify logo parameters, and the parameters of logo keyers, video keyers, squeezeback effects, and audio overs.

The MCPM-SDHD and MCE support enhanced squeezeback effects. Other MCPMs do not.

Audio overs allow router pre-select sources as do main sources.

Meters and Monitors

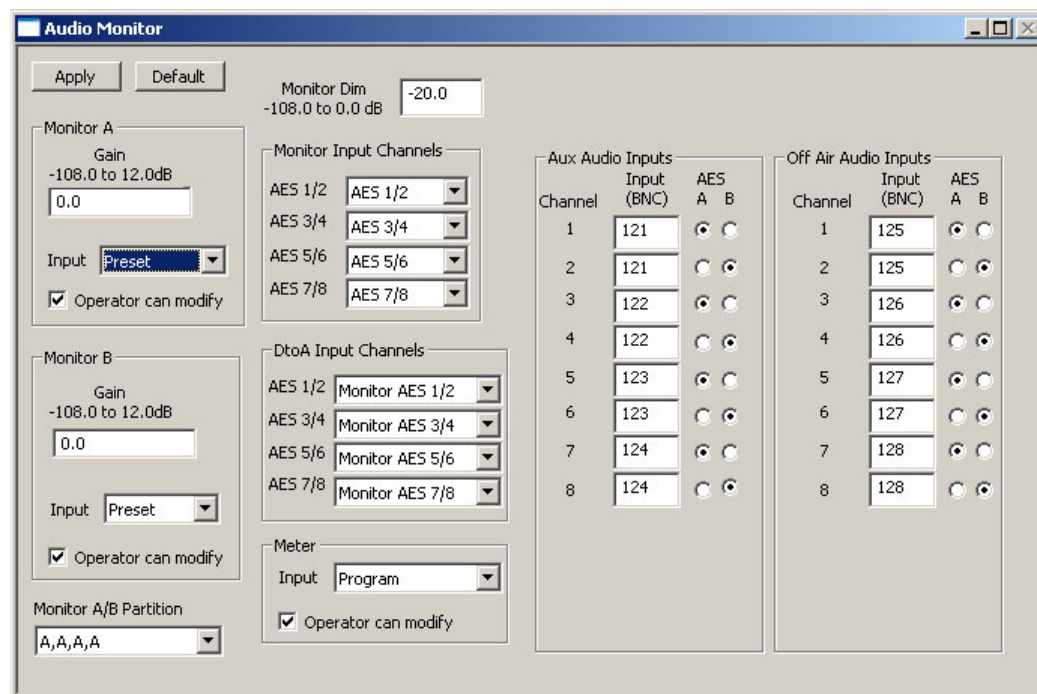
The different MCPM types have different audio monitor/meter features. One common feature is the "User can modify" option. What this means is that a panel operator can direct program, preset, preview, aux, or off-air audio to monitors or meters if you enable it in the check box(es).

The monitor outputs of MCPMs are partitioned so they distribute some portion of both monitor A and monitor B to the outputs. There are 4 partitions allowed:

- A, A, A, A
- A, A, A, B You can reverse A and B if you need, for example, B, B, B, B.
- A, A, B, B That amounts to pretending A is B and vice versa.
- A, B, B, B

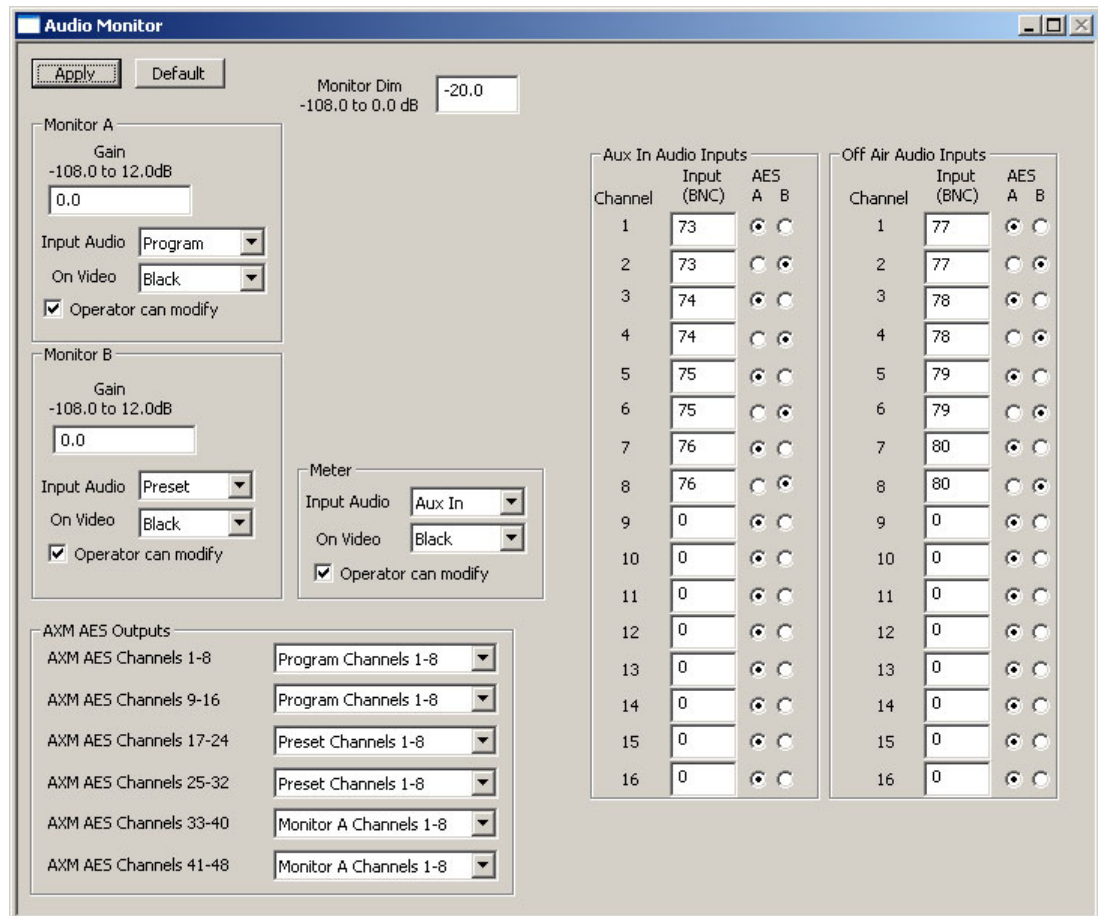
MCEs do not partition the monitor outputs. In fact, each monitor output produces up to 16 channels, embedded in a blank video stream.

This shows the 'Audio Monitor' page for an MCPM-SD:



It shows 8 audio channels. There is an analog output section and the A/B monitor channels are partitioned on the outputs.

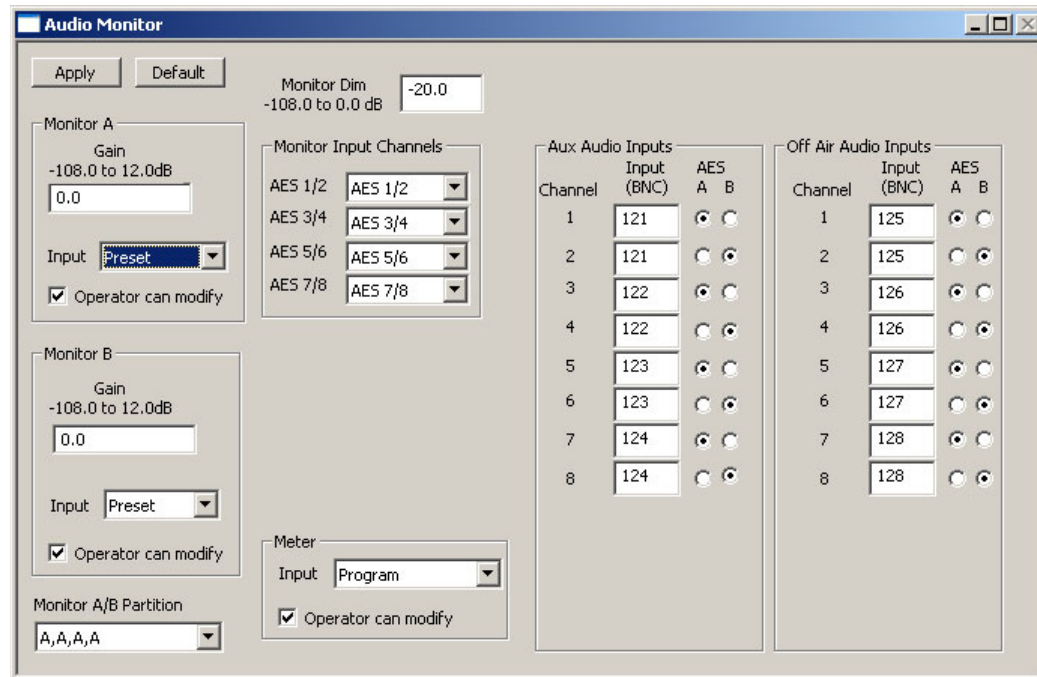
This shows the 'Audio Monitor' page for an MCE:



It has 16 audio channels. The monitor outputs are not partitioned and there is no analog section.

The audio monitor outputs include the 24 AES outputs on the MCE-AXM card.

This shows the 'Audio Monitor' page for an MCPM-MK-HD:



The -MK-HD has no analog option, but its monitor outputs are partitioned as for other MCPMs.

MasterDiag

MasterDiag is a relatively small program, but nonetheless important. It is not really a configuration program. With MasterDiag, you can do the following:

- Set the IP addresses of MCPMs and MCEs.
- Upload MCPM and MCE firmware. There are two cases:
 - MCPMs. At times, you will be directed by tech support to upload firmware to an MCPM. The firmware files are not directly available. You must obtain them from tech support.
 - MCEs. There is a .nvz file (MCEsoftwarePackage.nvz) in the 'setup' subfolder of the master control installation folder. If it becomes necessary — as when you receive new firmware — you can upload this firmware to an MCE. The single .nvz file is appropriate for all MCEs.
- Use the 'Timing' page to view timing characteristics of video and audio inputs of MCEs.
- Use the 'System Status' page to set the time and date.

MasterLogo

MasterLogo is a utility program that supports the use of logos in the master control system. Like MasterDiag, it is not really a configuration program. Logos can be static or animated. Animated logos can play once or loop, with or without pauses between passes of the loop.

MasterLogo converts graphic files (.TIF, .BMP, .JPG, .TGA, .PNG, .GIF) to the internal form (10-bit YCrCb) required by master control.

It is MasterLogo that executes the upload of logos to MCPM or MCE when MasterConfig writes configuration to an MCPM or MCE. (The upload is an option. Logo upload can take a long time and MCEs don't generally need it beyond the first upload.)

Logo Limits

MCPMs

MCPMs have up to 128MB or up to 512MB of RAM in which to store logos, depending on the model. HD logos require the larger memory. The maximum number of logos of any type is 64. The first logo (identified in the MasterConfig logo images list by 'selno 1') is stored in non-volatile memory (flash) and is always available immediately after an MCPM restarts. It must be static, not animated, and must be less than 1.7 MB in size. The MCPM stores all other logos in logo RAM (which is volatile) and you must upload these logos to the MCPM after a restart. The upload process is semi-automatic. You will be prompted to upload them after a reset initiated by MasterConfig. The maximum file size for these logo images is 2.3 MB per image.

The maximum number of frames for an animated logo image is 256. At 30 fps, that amounts to 8.5 seconds of animation. At 25 fps, that is 10.2 seconds of animation.

MCEs

MCEs have up to 2 GB of memory in which to store logos. The maximum number of logos of any type is presently 400. The maximum number of frames for an animated logo image is 900.

All logos in an MCE reside in non-volatile storage. It is not necessary to reload logos at every restart.

MCS Panel Configuration Editor

The MCS Panel Configuration Editor (the "panel editor," for short) has an assortment of configuration pages whose presence and content vary depending on the control panel you are configuring.

As with other configuration tools, you should refer to the user's guide for detailed information.

The panel editor configures **all** NV5100MC control panels ever made, including the legacy panels and panels designed for specific customers: These include the FFCP, CFCP, PC GUI, SCP, CECP, CECP M1, CECP GUI, Aux/Preview GUI, FECF, iMC-Panel-200, iMC-Panel-300, and iMC-Panel-GUI.

For the iMC-Panel-200, iMC-Panel-300, and iMC-Panel-GUI, the panel editor provides two separate sets of configuration pages, one set for the Imagestore 750, and the other set for MCEs and MCPMs. These panels can, therefore, control either Imagestore 750s or MCEs and MCPMs.

A panel configuration does the following:

- Defines which channels (MCPMs or MCEs) a master control operator can select. (You can configure a *default* channel which is especially useful if you have only one channel and do not want to waste a panel button on channel selection.)

The default channel can be configured as one of up to 4 automatically "ganged" channels. Such a configuration is called "automatic gang mode." Whenever the default channel is selected (by any method) the defined channel gang automatically becomes active. (Automatic gang control is not available for Imagestore 750s.)

- Selects the NV9000 source categories the operator can use (if an NV9000 system is present).
- Defines configurable button functions.

A panel might support features not available in the MCPM. For example: a panel might have a squeeze button when it is controlling an MCPM-MK-SD or -MK-HD. The squeeze button is disabled because these MCPMs have no squeeze function.

A panel might lack features that support MCPM or MCE features. For example: the aux bus or preview bus in an MCE cannot be accessed from an FFCP, CFCP, PC GUI, or SCP. Automation can do so, however, because it is not limited by any panel features.

- ▲ All but the iMC panels are considered legacy panels with respect to the iMC master control system.

Usage

The panel editor is organized into several tabbed configuration pages roughly according what an panel can do. These are its pages:

1 General settings

The 'General Settings' page is minimal: it allows you to name a control panel.

2 Channel selection list

The 'Channel Selection List' page allows you to define the channels a control panel can access, which channel is the default, and what salvo, if any, will execute when a channel is selected.

The 'Channel Selection List' page also determines which channels, if any, are to be ganged with the default channel under "automatic gang mode."

3 User button layout

This page defines configurable buttons in the upper section of a panel.

4 Bottom row layout

This page defines configurable buttons at the front of the lower section of a panel.

5 Logging settings

This page specifies several logging levels. There are 7 levels that can be applied to each of 8 functions.

6 NV9000 settings

This page specifies the IP address(es) of an associated NV9000 control system and specifies the NV9000's source categories to be used by the panel.

7 Advanced settings

This page specifies miscellaneous parameters which are not necessarily "advanced."

8 Button assignments

The panels allow a configurable number of main source buttons (from 0 to 16), and a configurable number of "layer" buttons (video effects, XG layers, audio overs, DVEs, DSKs). The button assignments page specifies the number of main source buttons, and places the video effects, etc., on the panel buttons in the order and position required.

The iMC-Panel-GUI and iMC-Panel-200 have a "bank select" function. The iMC-Panel-300 does not.

9 User menu lists

This page exists for the SCP only. It allows you to create (and name) menu pages in the SCP's hierarchical menu system.

10 Menu layouts

This page exists for the SCP only. It allows you to define the button functions of menu pages you created in the 'User Menu Lists' page.

11 Aux delegates

This page exists for panels that have aux buttons: the CECP, CECP M1, CECP GUI, Aux/Preview GUI, FECP, iMC-Panel-200, iMC-Panel-300, and iMC-Panel-GUI.

It allows you to assign "aux delegate" functions to configurable (non-main-source) buttons in the aux button row. (Pressing an aux delegate button changes the function of the aux button row.)

12 Audio monitoring layout

This page exists for the FECP and iMC-Panel-300. It lets you redefine the audio metering/monitoring button functions. (These are not generally configurable buttons. They have only audio functions.)

13 Audio macros

This page exists for the CECP, CECP M1, CECP GUI, Aux/Preview GUI, FECP, iMC-Panel-200, iMC-Panel-300, and iMC-Panel-GUI. It lets you define up to 16 "audio macros." Audio macros (1) perform "channel swaps"—audio crosspoint mappings—and (2) set channel gain. The audio macros can be assigned to panel buttons. Pressing an audio macro button causes an instant audio crosspoint change.

With the panel editor, you can, of course, save and re-open configuration files in your PC's file system. You can manage configuration files any way you'd like.

This is the general process to develop a configuration:

- 1 Choose a panel.
- 2 Read its configuration.
- 3 Modify its configuration.
- 4 Write the new configuration back to the panel.

You can develop configuration files "off-line." It is not actually necessary to select a panel unless you want to read its configuration.

You can start with a new "empty" configuration, use a default configuration, or use an existing configuration as the basis for a new one.

Panel Characteristics

Master control panels have some interesting characteristics. The SCP (obsolete) is quite different from other panels. GUI configuration files are treated differently from hardware panel configuration files. The iMC-Panel-100 is also different from other panels because its monitor is third-party equipment and separate from the button panel.

GPI

All hardware panels have 2 GPI inputs and 2 GPI outputs. MCPMs and MCEs also have 2 GPI inputs and 2 GPI outputs. The GUIs (software control panels) do not have GPI inputs or outputs. A control panel can control and sense MCPM GPIs as well as its own GPIs.

Assumption of Source Buttons

Some control panel have 16 physical main source buttons. Some panels have fewer, but have 16 “virtual source buttons” that can be selected with a “bank select” button. The button switches the “bank” that appears on the physical buttons.

(Some panels have a fixed set of video effect and audio over buttons. Some panels have a configurable set.)

Router Sources

Master control has two concepts: (1) external router sources and (2) router pre-selection.

Panel configurations have little or nothing to do with external router sources.

Panel configurations, however, do support router pre-selection. It is in the panel configuration that you specify (1) the NV9000 control system with which the panel communicates to obtain router sources, and (2) the source categories to which the panel has access. (Router pre-selection covers main sources and over sources.)

For router pre-selection to work, main source buttons and over source buttons must be configured — in MasterConfig — as “operator-modifiable” or “system-modifiable.”

Automation

Control panels are not automated. However, all panels have a configurable button function that enables or disables MCPM or MCE automation.

Source buttons (main and over) can be configured in MasterConfig as “system-modifiable.” This is in fact an MCPM or MCE characteristic, not a panel characteristic.

- ▲ A panel’s buttons reflect an MCPM’s or MCE’s status and as automation changes an MCPM or MCE, the panel buttons might (or might not) reflect the change. Nevertheless, automation is an MCPM or MCE function, not a panel function.

Preview and Aux

MCEs have 2 aux buses and might have a preview bus (if a preview board is present). MCPMs do not have these buses.

The CECP, CECP GUI, FECF, iMC-Panel-200, iMC-Panel-300, and iMC-Panel-GUI have an aux button row and a preview button row. The CECP M1 has aux buttons but does not have preview buttons.

The aux buttons can be assigned very different functions. See [Aux Delegates](#) on page 100.

The preview buttons simply allow experimentation with video effects and does not affect (or interfere with) program content.

Configuration Files

Configuration files for GUIs are handled differently from configuration files for hardware control panels.

To take effect, a GUI's configuration file must be placed in the same folder as the GUI's executable file and must be named `cecp_gui.uicfg` (for the CECF GUI, iMC-Panel-GUI, or Aux/Preview GUI) and `MasterGUI.uicfg` (for the older PC GUI).

For a hardware panel, you must write the configuration file to the panel from the panel editor. Use the 'Write Config to Panel' command from the 'File' menu.

You can also read GUI configuration files and hardware panel configuration files. Use the 'File > Open' command to read a GUI file. Use the 'File > Read Config from File' command to read a hardware panel's configuration.

Choosing a Panel

There is a panel list at the left side of the panel editor window. You can select (or define or delete) any entry in this list. If you want to choose a panel, it must be in this list. If the list is empty, create a panel definition (name and IP address) by clicking the word 'Panels' at the top of the list.

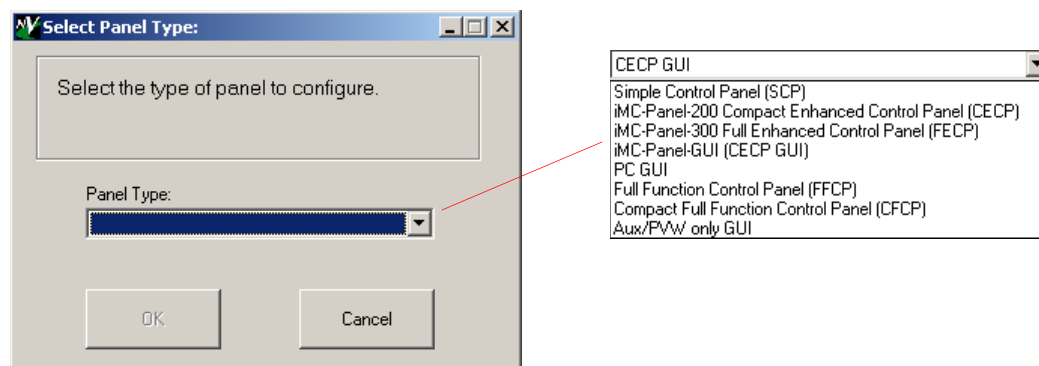
You do not need to choose a panel.

After you create a configuration, you can associate it with any of the panels in the list.

- ▲ Be careful, when writing data, not to load a configuration into a panel of the wrong type. There are some safeguards, but they are not fool-proof.
- ▲ The handling of configuration files is different for GUIs and hardware control panels.

Editing

A new configuration starts with a dialog asking what panel type you want to configure:



General Settings

There is very little in the 'General' page—just the name you give the panel.

Channel Specification

Use the 'Channel Selection List' page to specify what channels (MCPMs or MCEs) the control panel may access:

Channel Selection List

Define MCE/MCPM Channels

Mnemonic	IP Address	Salvo ID	Default MCE/MCPM	Ganged	KaleidoX Room	KaleidoX Layout
M243	192.168.7.10		<input checked="" type="checkbox"/>	<input type="checkbox"/>	ROOMX16	Layout 02.kg2
M244	192.168.7.20		<input type="checkbox"/>	<input checked="" type="checkbox"/>		
M245	192.168.7.30		<input type="checkbox"/>	<input checked="" type="checkbox"/>		
S52	192.168.7.40		<input type="checkbox"/>	<input type="checkbox"/>	ROOMX16	Layout 04.kg2
S53	192.168.7.50		<input type="checkbox"/>	<input type="checkbox"/>	ROOMX16	Layout 09.kg2
			<input type="checkbox"/>	<input type="checkbox"/>		

Place a check mark in the 'Default MCPM' column to indicate which channel is the default channel (the one to which the panel attaches at startup).

A panel must have at least one channel defined to be functional.

- ▲ If you are configuring a CECP M1, the table has an extra field "Live Levels A/B" that allows you to select which audio metering input, A or B, for the Live Levels display. This can vary with the channel selected.

A channel change can also execute an NV9000 system salvo. If you have an NV9000 connected, you may choose a salvo from the drop-down list that appears in the salvo field.

- ▲ You must have clicked 'Attach to NV9000' in the 'NV9000 Settings' page to be able to see salvo IDs.

The 'Ganged' column at the right allows you to designate certain channels as followers under "automatic gang mode." If you do that, the default channel then functions as the "main" channel of a channel gang. When panel operators carry out actions for the default (main) channel, the same actions apply to the follower channels.

Automatic gang mode means that when the default channel is selected (by any method, especially panel startup), all the other channels in the gang become selected, and the default channel is the main channel of the gang.

- ▲ Automatic gang mode is not available for Imagestore 750s.

If the channel is to trigger a multi-viewer re-layout when it the channel is selected, specify the *room* and *layout* for the room in the 'KaleidoX Room' and 'KaleidoX Layout' fields for the channel. These options are available in drop-down lists and are determined by the Kaleido-X configuration. (If you are working off-line or if the Kaleido-X is not connected to your PC's network, you will not see the drop-down lists.)

Configurable Buttons

Most panels have an array of 16 configurable buttons. (The SCP has a configurable menu structure implemented on 8 buttons. Any menu item can be assigned one of many functions.)

Most panels also have additional configurable buttons which are normally defined as transition control buttons and system control buttons. You can override these default functions if it suits the needs of your system.

The panel editor has configuration pages in which you can assign button functions. (When you are editing an SCP configuration, you modify the menu system.)

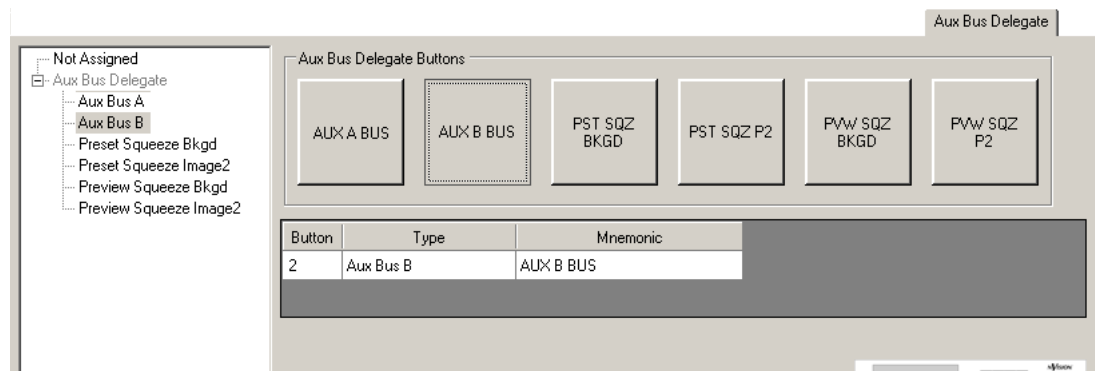
Aux Delegates

The CECP, CECP M1, CECP GUI, Aux/Preview GUI, FECP, iMC-Panel-200, iMC-Panel-300, and iMC-Panel-GUI have a set of aux buttons. When the panel is controlling an MCPM or MCE, up to six of the aux buttons may be configured as “aux delegates.” The delegates determine the function of the aux bus.

These are the 6 aux delegate types:

- Aux Bus A
The main source selected on the aux bus appears at the MCE's aux A output.
- Aux Bus B
The main source selected on the aux bus appears at the MCE's aux B output.
- Preset Squeeze Background
The main source selected on the aux bus becomes the preset squeeze background image.
- Preset Squeeze Image2
The main source selected on the aux bus becomes the preset squeeze image 2.
- Preview Squeeze Background
The main source selected on the aux bus becomes the preview squeeze background image.
- Preview Squeeze Image2
The main source selected on the aux bus becomes the preview squeeze image 2.
 - ▲ It should be noted that unless an 'Aux Bus A' or 'Aux Bus B' button is pressed, the aux buttons have nothing to do with the MCE's aux bus(es). Further, the MCE configuration can associate or disassociate the aux bus(es) with a panel's aux buttons.
 - ▲ The aux buttons are disabled unless the panel is controlling an MCE.
 - ▲ The preset aux delegates are not available in the Aux/Preview GUI.

This is a sample Aux Delegates' configuration page:



The iMC-Panel-200, iMC-Panel-300, and iMC-Panel-GUI have a set of aux/user buttons. When the panels are controlling MCEs or MCPMs, the buttons include aux delegates as described above. When the panels are controlling Imagestore 750s, those buttons are customer-configurable buttons.

Virtual Source Buttons

The CFCP, CECP, CECP M1, CECP GUI, Aux/Preview GUI, SCP, iMC-Panel-200, and iMC-Panel-GUI have button rows of 16 buttons that must accommodate main source buttons and video effects and audio overs. Up to 16 of those buttons are main source buttons. The FECF and iMC-Panel-300 have button rows of 24 buttons and up to 16 of those are main source buttons.

All of those panels but the FECF and the iMC-Panel-300 have a bank select button function. Operators can use the bank select button to place different sets of main sources on the physical main source buttons. The panel editor has a configuration page that allows you to define how the main sources, video effects, and audio overs are organized.

This is the configuration page (as for the iMC-Panel-200).

Button Assignments

Main Source Button Qty: Enable - Changes will reset all Button entries below

Button	Function	Bank A Source	Bank B Source
Button 1	Main Source	1	7
Button 2	Main Source	2	8
Button 3	Main Source	3	9
Button 4	Main Source	4	10
Button 5	Main Source	5	11
Button 6	Main Source	6	12
Button 7	XG keyer layer 1 <input type="button" value="v"/>		
Button 8	XG keyer layer 2 <input type="button" value="v"/>		
Button 9	Key 1 <input type="button" value="v"/>		
Button 10	Logo A <input type="button" value="v"/>		
Button 11	Sqz <input type="button" value="v"/>		
Button 12	Key 2 <input type="button" value="v"/>		
Button 13	Key 3 <input type="button" value="v"/>		
Button 14	Logo B <input type="button" value="v"/>		
Button 15	Over 1 <input type="button" value="v"/>		
Button 16	Over 2 <input type="button" value="v"/>		

In this illustration, the panel has 6 physical main source buttons configured for MCEs and MCPMs. The mapping of virtual main sources buttons to physical allows the operator 12 virtual main sources.

- ▲ Keeping the same virtual buttons in both button banks might be useful if those buttons are router pre-select buttons.

In this example, two of the buttons are XG keyer layer buttons. The remaining 8 buttons are keys, logos, and audio overs (in their standard ordering).

For all panels, up to 16 buttons may be main source buttons. In that case, in panels that have 16 buttons, all “layer” buttons (XG keyer layers, video effects, and audio overs) are sacrificed. This does not prevent automation (or another panel) from using video effects and audio overs in the same MCPM or MCE.

- ▲ It is possible for the panels to have no main source buttons.
- ▲ If a 16-button panel has more than 10 main source buttons, aux delegate button positions are sacrificed.

Menus for the SCP

The SCP is unique because it offers a hierarchical customer-defined menu system in lieu of a finite set of configurable buttons. The menu buttons also provide status. Some of the configurable button functions are status functions.

There are two pages in the panel editor that support an SCP’s menus: ‘Menu Layouts’ and ‘User Menu List’. You must create a menu in the ‘User Menu List’ page before you can assign functions

to it in the 'Menu Layouts' page. Note that the leftmost button is always the 'Home/Panel Menu' button and the other 7 buttons of the menu are configurable.

This is the 'User Menu List' page (empty):

User Menu List			
	Menu ID	Menu Name	Menu Mnemonic
	4001	Audio Functions	AUDIO
*			

This is the 'Menu Layouts' page:

Menu Layouts			
Menu Name		Top Level	Note: the leftmost button in the Top Level menu is reserved for the Panel Menu.
Panel Menu	Not Assigned	Not Assigned	Not Assigned
Not Assigned	Not Assigned	Not Assigned	Not Assigned
Not Assigned	Not Assigned	Not Assigned	Not Assigned
Not Assigned	Not Assigned	Not Assigned	Not Assigned
Not Assigned	Not Assigned	Not Assigned	Not Assigned
Not Assigned	Not Assigned	Not Assigned	Not Assigned
Not Assigned	Not Assigned	Not Assigned	Not Assigned
Button	Type	Mnemonic	
<ul style="list-style-type: none"> Not Assigned Menus Transitions Transition Rate GPI Channel Audio Utility Effects Selection 			

It is empty—none of its buttons have functions assigned. The left-most button is always the 'Panel Menu' button. Its function is fixed. The other 7 buttons are assignable.

This illustration shows the 'Top Level' menu. This menu always exists and you do not have to define it in the 'User Menu List' page.

Tally Processor

The master control tally processor is third-party¹ equipment. Its configuration application is built-in and requires no separate installation. It communicates with a designated MCPM or MCE using NVEP.² It senses and controls a certain set of master control events.

1. DNF Controls of Sylmar, California (www.dnfcontrols.com)
2. Miranda's NVISION Ethernet Protocol.

Configuration for MCEs and MCPMs

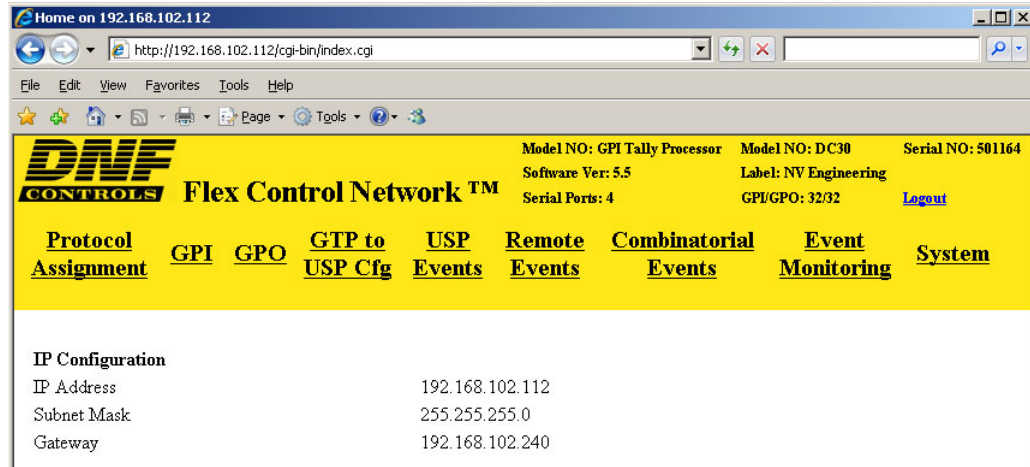
Tally Processor

The master control system treats the tally processor as if it were a control panel.

Prior to configuration, you must have assigned the tally processor an IP address on the master control network. That assignment is made through the tally processor's front panel.

Once you have made that assignment, you can use any browser application (such as Internet Explorer) on your configuration PC to configure the tally processor. To access the configuration application, type the IP address of the tally processor in the URL field of the browser.

When you launch the internal DNF configuration tool in your browser, its initial screen is this:



(The IP address in the illustration is 192 . 168 . 102 . 112.)

The main page presents 9 options (sub-pages) listed across the top in the yellow region:

Protocol assignment	Define connections to MCEs and MCPMs and master control events.
GPI	Configure any or all of the 32 GPIs.
GPO	Configure any or all of the 32 GPOs.
GTP to USP Cfg	Ignore this unless you have a USP. ^a
USP events	Ignore this unless you have a USP.
Remote events	Events coming from another master control on the network.
Combinational events	Logic expression based on inputs and master control events.
Event monitoring	Defines what the events to monitor are and what to do when the events occur and when they expire.
System	Presents a login dialog and provides configuration options for the tally processor (to which you are connected) and its software.

a. Miranda does not provide any support for the USP (Universal Switch Panel) — a separate DNF product.

Each sub-page manages a configuration table. Configuration tables can be saved and retrieved for fast setups and quick changes during a broadcast or production.

Summary

The tally processor can be configured to respond to master control events such as source or keyer presses and can be configured to trigger events such as source or keyer presses.

The tally processor also has 32 GPI inputs and 32 GPI outputs. These can be connected to master control GPIs and to other GPI devices in your facility.

See [Tally Processor Connectors](#) on page 185 for connector details.

Read the *Tally Processor User's Guide* for further information.

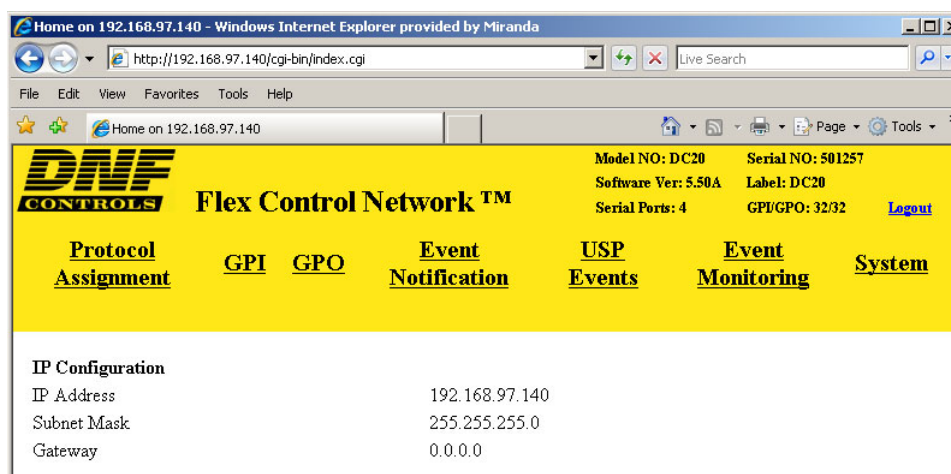
Device Controller

The DC21, the master control device controller, is third-party³ equipment. Its configuration application is built-in and requires no separate installation. It communicates with a designated MCE using NVEP.⁴ It functions as an intermediary between an MCE and devices that are subject to machine control and pre-roll. It receives commands from the MCE and dispatches control signals to connected devices in the appropriate protocol (Sony, Odetics, or VDCCP).

Prior to configuration, you must have assigned the device controller an IP address on the master control network. That assignment is made through the tally processor's front panel.

Once you have made that assignment, you can use any browser application (such as Internet Explorer) on your configuration PC to configure the tally processor. To access the configuration application, type the IP address of the tally processor in the URL field of the browser.

When you launch the internal DNF configuration tool in your browser, its initial screen is this:



(The IP address in the illustration is 192 . 168 . 102 . 112.)

It presents 7 options (sub-pages) listed across the top in the yellow region:

Protocol assignment	Define connections to MCEs and MCPMs and master control events.
GPI	The GPIs are not used for master control.
GPO	Configure any or all of the 32 GPOs.
Event notification	Ignore this unless you have a USP. ^a
USP events	Ignore this unless you have a USP.

3. DNF Controls of Sylmar, California (www.dnfcontrols.com)

4. Miranda's NVISION Ethernet Protocol.

Event monitoring	Ignore this unless the device controller has spare GPOs that you want to respond either to GPI events or device control events. This table is not used by master control.
System	Presents a login dialog and provides configuration options for the tally processor (to which you are connected) and its software.

a. Miranda does not provide any support for the USP (Universal Switch Panel) — a separate DNF product.

Only 4 of these used by master control.

Each sub-page manages a configuration table. Configuration tables can be saved and retrieved for fast setups and quick changes during broadcast or production.

Summary

The DC21 device controller relays machine control commands to VTRs and similar devices when requested to do so by an MCE. Protocols supported are Sony, Odetics, and VDCP.

The device controller has 32 GPI outputs, used in pairs, and 4 serial ports that can perform machine control. See [Device Controller Connectors](#) on page 186 for connector details.

Read the *Device Controller User's Guide* for further information.

Intuition XG

The Intuition XG system is an “advanced HD/SD graphics processor” coupled with Xmedia software. Refer to Miranda’s Intuition XG documentation for full detail.

Intuition XG Configuration

Some of points noted in this section are “givens”— features that are created during commissioning. This document assumes that any and all “commissioning” has taken place.

- 1 The Intuition XG graphics processor runs Windows XP. Use the built-in Windows tools to give the Intuition XG processor an IP address on the master control network.
- 2 Verify the software versions. At revision 6.3.1 and later, MCEs are compatible with:
- 3 XMedia Suite version 4.3 build 249 (or later)
 - In earlier software revisions, MCEs are compatible with XMedia Suite version 4.2, but not version 4.3.
- 4 There are 3 .ini files in C:\Program Files\VertigoXmedia\Apps\
 - XPlay.ini
 - Channel_A\VCG2.ini (These channel names are arbitrary)
 - Channel_B\VCG2.ini
- 5 Use the Dashboard and MasterDiag together to adjust the timing of the Intuition XG output channels with respect to the MCE inputs.
- 6 Verify the configuration of XG channels A and B.

Start the Dashboard. Be sure that each entry in the table has a green dot, not red. This is the Dashboard table with channel A selected:



The screenshot shows the XG Dashboard application window. At the top, there is a menu bar with 'File', 'Device', 'Tools', and 'Help'. Below the menu bar is a toolbar with a refresh icon and 'Load' and 'Save' buttons. The main area contains a table with the following data:

Output Ch	Host name	IP	Output Resolution	Description
A	localhost	127.0.0.1	1080i30M	Hardware XG
B	localhost	127.0.0.1	1080i30M	Hardware XG

Below the table, there are several configuration sections:

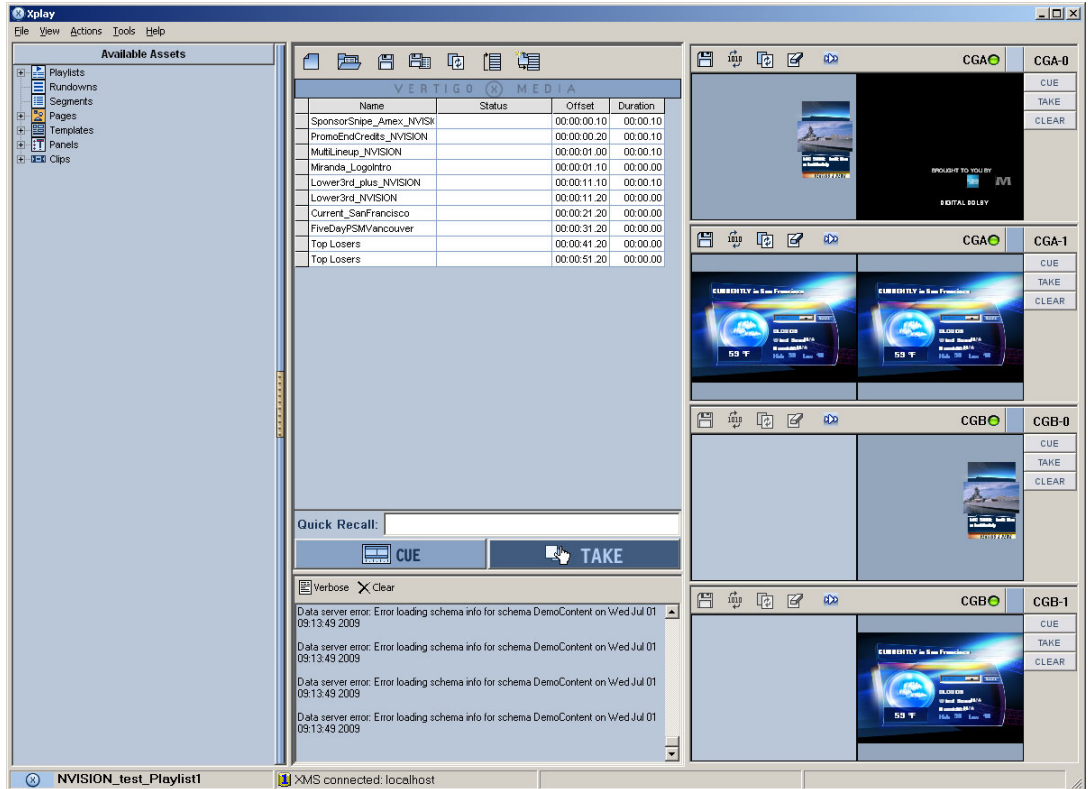
- Settings Mode:** Simple
- General:** Device Name: CGA, Device Type: Hardware XG
- Version:** Application Version: 1.10.107.0, DSX.utils version: 6.1.0.70
- Graphics:** Card Type: Radeon X1950 Pro, Memory Use: 739 MB
- Ports:** Application Port: 6000, Command Port: 4000
- Output:** Resolution: 1080i30M, Channel: A
- Mode:** UpStream, DownStream, Advanced (selected)
- Genlock:** Source: BlackBurst, Resolution: 1080i30M, Status: Locked

At the bottom, there are buttons for 'Restore Factory Defaults', 'Apply Changes', and 'Undo Changes'.

Output resolution must be 1080i30M (29.97 Hz), not 1080i30 (30 Hz) for both channels.
Genlock status to be "locked," not "locking" or "free running" for both channels.

7 Verify that Xplay is properly configured.

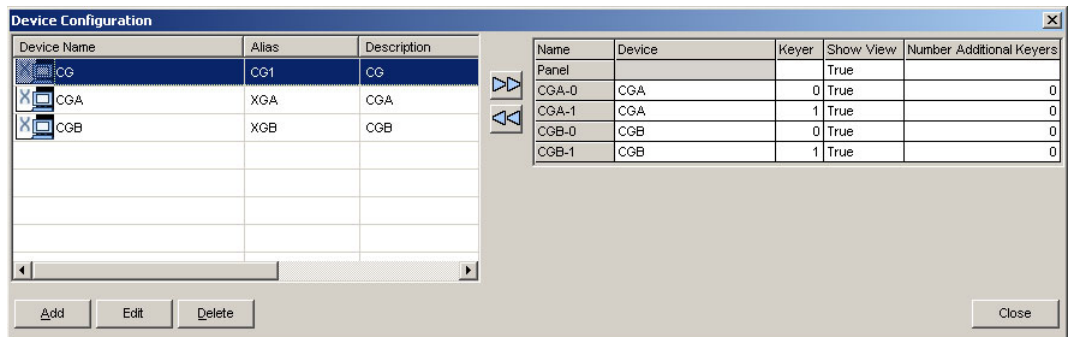
You should see 4 panes, i.e., 2 keyer layers for channels A and B. The names are arbitrary. Here they are CGA-0, CGA-1, CGB-0, and CGB-1:



Choose Xplay > Tools > Settings > General.

Ensure that the layout is 'Multidevice'. Ensure that the number of devices is 4.

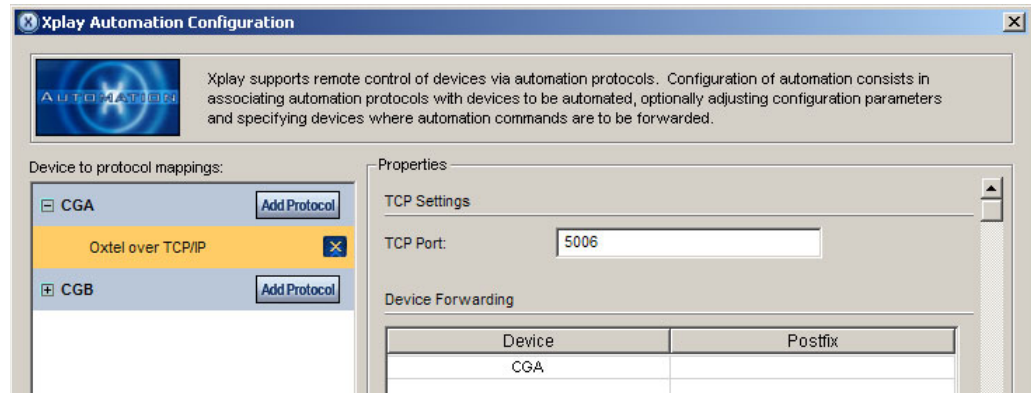
Choose Xplay > Tools > Device Manager



Verify that your channels (here named CGA and CGB) are present.

Choose Xplay > Tools > Configure Automation.

For channel A (“program” in MasterConfig) the TCP port must be 5006.



If it exists, channel B (“preset” in MasterConfig) must be 5007.

8 Ensure that all keys have proper recall IDs.

Although Xmedia software allows recall IDs to be alphanumeric, master control requires that the recall IDs of XG keys be numeric and in the range 1–65535. Master control panel operators will not be able to select XG keys that have any other recall IDs.

▲ Legacy M2100 automation protocols are restricted to the range 1–255 (a single byte).

Recall IDs must not be blank or zero.

Recall IDs must not have leading zeroes.

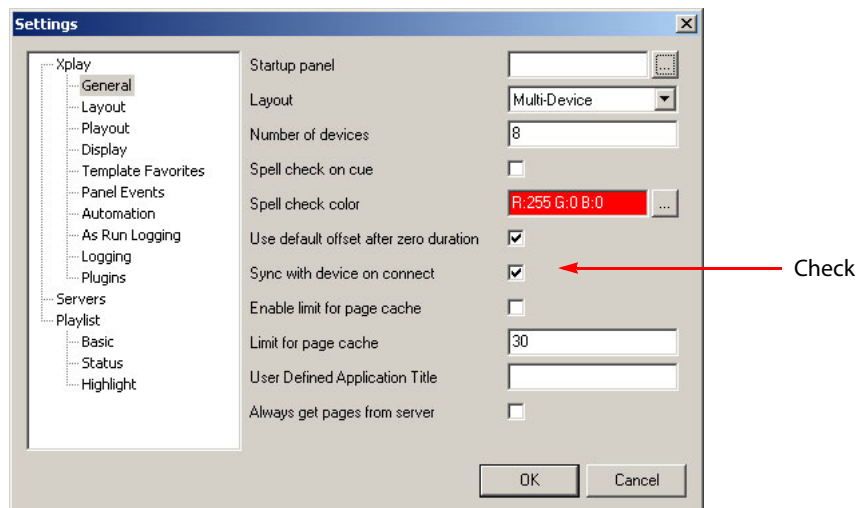
Recall IDs must not contain characters other than 0–9. Hexadecimal digits, alphabetic characters, punctuation, and underbars are not allowed.

Any XG clip that has a recall ID that violates these conditions is inaccessible to master control. A control panel produces a notification beep if an operator attempts to access such a clip.

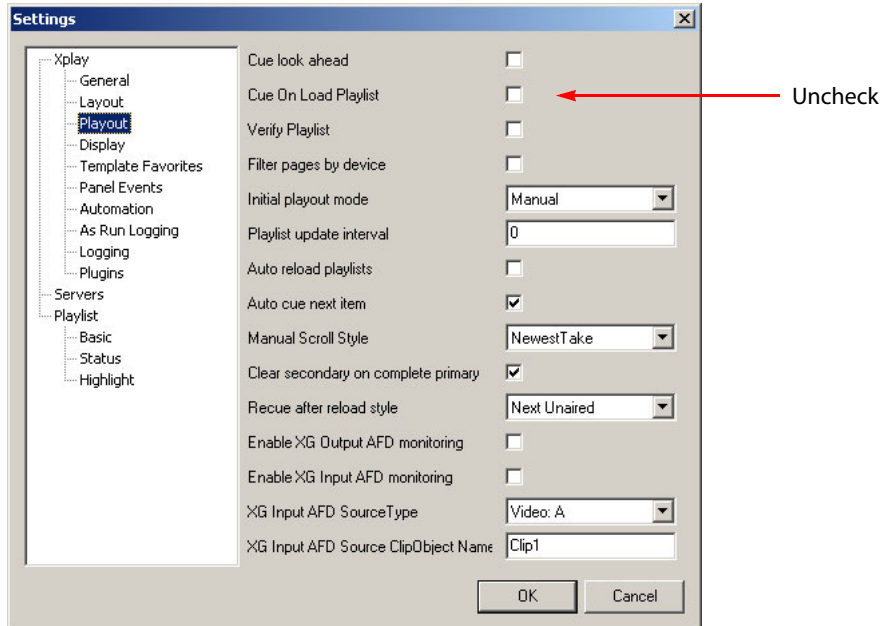
XPlay Settings

Choose ‘Settings’ under XPlay’s Tools menu.

- 1 Under the ‘General’ category, ensure that the ‘Sync with device on connect’ is checked:



2 Under the 'Playlist' category, ensure that the 'Cue on Load Playlist' is **unchecked**:



Xstudio Add-On Functions

There are 18 add-on functions that allow Xstudio clips to manipulate an MCE's squeezeback, audio overs, and main sources.

The add-on functions are built into special XML files. The XML files that come as a standard part of Xstudio do **not** contain the add-on functions. You can obtain these from the Master Control CD (SB0221). You can also obtain these files from Miranda technical support.

The location on the CD is the folder named 'XStudio Support'. The files are named:

```
Commands.xml  
Commands_User.xml
```

and they should be placed in

```
C:\Program Files\VertigoXmedia\Apps
```

or in the folder you have chosen for Xmedia software. When you obtain the special XML files, use them to replace the standard files. (Rename the standard files so you don't lose them.)

The special XML files are for customers who want to make use of the MCE embedded commands. The default XML files are intended for use with Imagestore.

You must install these files on every PC for which you want to modify Xstudio.

Adjusting the Timing of the Intuition XG Output

Figure 5-2 shows the Intuition XG connections:

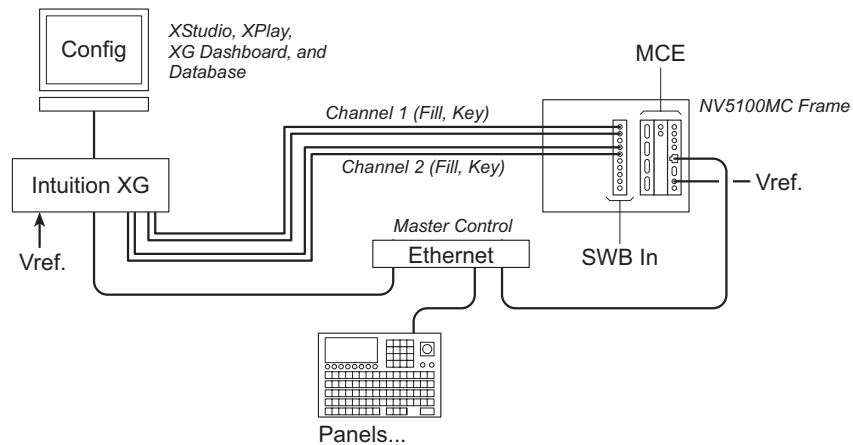


Fig. 5-2: Intuition XG Connections for MCEs

An Intuition XG processor has either one or two output channels. If it has two, the two can be used by one MCE, or each channel can be used by different MCEs. (One of the channels could be used by an Imagestore 750, but that is a separate issue.)

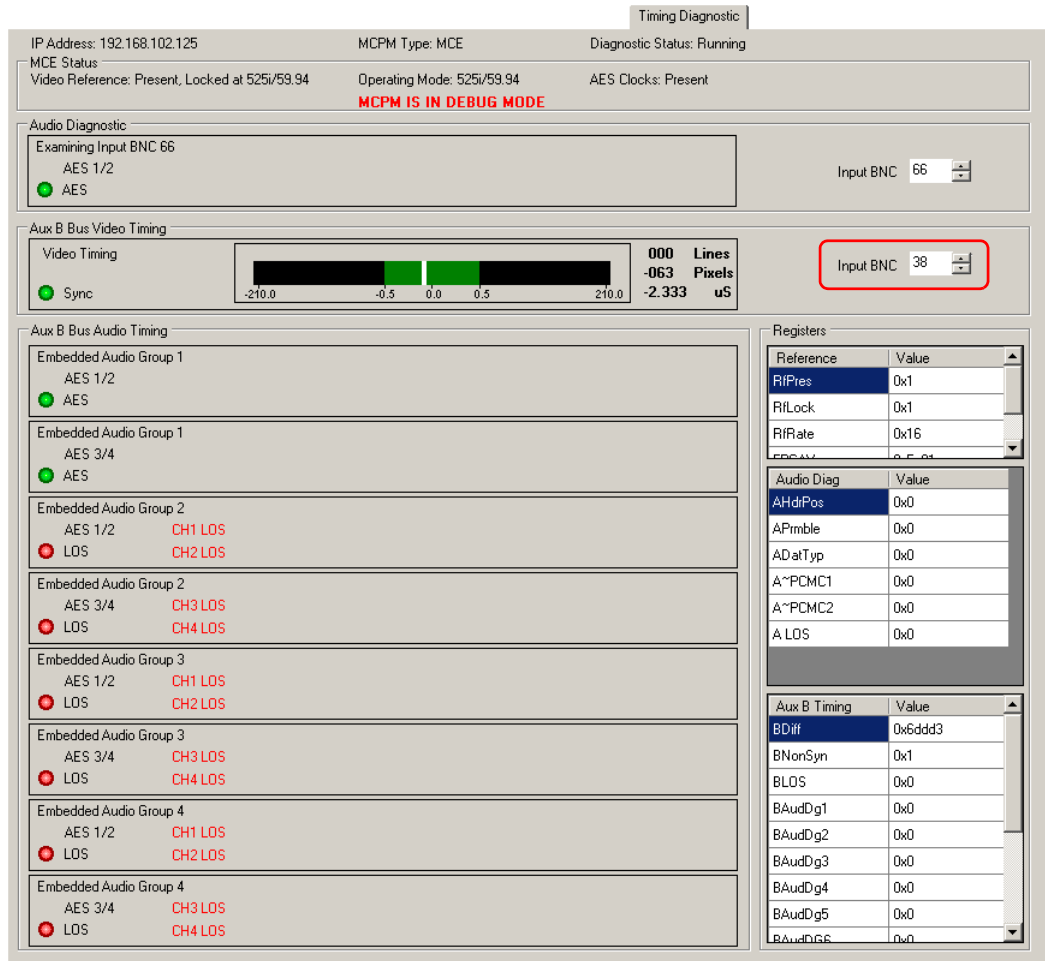
You might need to adjust the timing of the output channels with respect to the SWB card in the frame in which the MCE resides.

To adjust the Intuition output timing, launch the Dashboard and launch MasterDiag. Follow these steps:

- 1 In MasterDiag, go to the 'System Status' page and toggle debug mode ON:

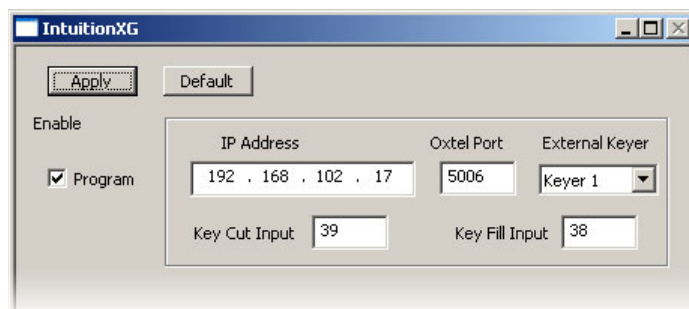


2 Then go to the 'Timing Diagnostics' page:



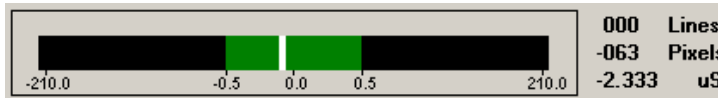
3 In the indicated scroll box (which was enabled in debug mode), select the BNC number for the Intuition XG channel (A or B) you want to examine.

If you forget the BNC number, the BNC number was specified (or should have been specified if it was not) in the 'Intuition XG' page of MasterConfig:

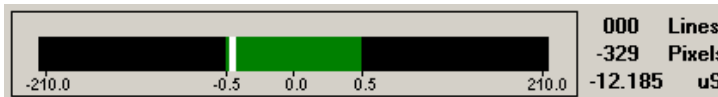


(Use the connector number for the 'Fill' input. The BNC in question belongs to one of the cables connecting the Intuition XG to the SWB input backplane of the MCE's frame.)

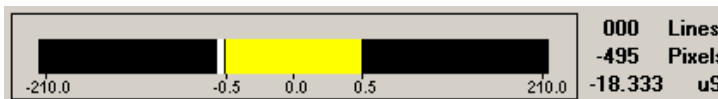
4 Now examine the timing graphic:



If the center portion of the graphic is green and the white line is reasonably centered, no adjustments are needed. If the white line is not centered



or if the center portion of the graphic is yellow, then adjustment is needed.



5 If adjustment is needed, switch to the Dashboard. Choose 'Advanced' in the 'Settings Mode' drop-down menu. The choose channel A or B whichever matches the BNC you have chosen in MasterDiag:

Dashboard

File Device Tools Help

Load Save

Output Ch	Host name	IP	Output Resolution	Description
A	localhost	127.0.0.1	NTSC	Hardware XG
B	localhost	127.0.0.1	NTSC	Hardware XG

Settings Mode: Advanced

General Resolution Live Window Clips 3D Engine Logging Hardware Settings Licensing

Genlock Video Audio Ancillary Watch Dog

Source: BlackBurst

Resolution: NTSC

Bit Count: 10

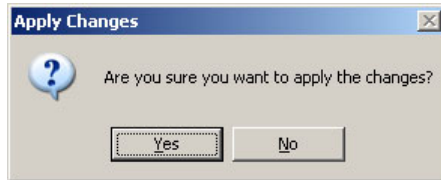
Status: Locked Refresh

Horizontal Delay 0 ns

Vertical Delay 0 Lines

Restore Factory Defaults Apply Changes Undo Changes

- 6 Adjust the sliders ('Horizontal Delay' or 'Vertical Delay'. What setting to choose is different for every system. You might have to experiment with different settings to get the best setting. After you adjust the sliders, click 'Apply Changes'. The software will ask if you really want to make the change:



Click 'Yes'.

- 7 In a few moments, the timing display in MasterDiag will change. View the changes. Repeat step 6 until the timing display turns green and the white line is reasonably centered.
- 8 Repeat the entire procedure for the other Intuition XG output channel (if it has another output channel).
- 9 Do not forget to return to the 'System Status' page of MasterDiag and toggle debug mode OFF. The MCE will not operate until you do.

NV5100MC Configuration for Intuition XG

Configuration of the master control system for Intuition XG occurs in two parts: one is in MasterConfig and the other is in the MCS Panel Configuration Editor.

Please refer to those manuals for more detail.

MasterConfig

- 1 Enable pre-roll in the general settings. Intuition XG requires it to function properly.
- 2 In the 'Intuition XG' page, check the 'Program' box and, if your XG box has 2 channels, also check either the 'Preset' box or the 'Preview box'.
- 3 Assign IP addresses to 'program' and 'preset' or 'preview'. If they use a single XG processor, use the same IP address. If you have not checked the 'Program' box, the *check boxes* for preset or preview are dim (disabled). You must check the preview or preset check boxes for their options to appear.
- 4 Assign "Oxtel" ports. Use 5006 for program and 5007 for preset. These are predetermined by the Intuition XG processor.
- 5 Choose a keyer for the 'program' channel and choose a (different) keyer for the preset (or preview) channel.
If you have a two-channel XG processor, the program keyer must be keyer 3 and the preset keyer must be keyer 2. (Note that these are both post-squeeze in the effects ordering.)
If you have a single-channel XG processor, you may use any of the 3 keyers. (Keyer 1 is pre-squeeze.)
 - ▲ Master control supports up to 4 XG layers. Each layer can be assigned an XG media clip identifiable by a "recall ID." The clips mix with the MCE's program video through the keyers assigned to the XG channels. In an MCE configured for Intuition XG, those keyers are not available as independent keyers.

- 6 Specify the SWB input ports for each channel. (These belong to an SWB input backplane. The SWB input card and backplane are required for Intuition XG.)
- 7 Specify the XMS port as 14050 (predetermined by the Intuition XG processor) for the processor(s) you have identified by their IP addresses. Specify the keyer behavior (disabled, normal or clear after preset). It is not likely that you would want 'disabled' but it is one of the choices.
- 8 Specify the pre-roll value as 6 (frames). This is actually not a pre-roll, but a latency. The latency might vary and might have to be determined through experimentation.
 - ▲ The value 6 is suitable for interlaced formats. Use 12 for progressive video formats.
- 9 Specify the audio parameters.

The Intuition XG video signals can include embedded audio (up to 16 channels). The MCE processes this audio as an audio over. These are the audio options:

The number of audio channels (from 8 to 16).

The default over-to-main ratio of the XG layers. This is simply labeled 'Ratio'. Panel operators can adjust the over level and the over-to-main ratio.

Whether to turn on the audio over when a panel operator presses an 'XG layer' button. This is a checkbox option. With this option enabled, the XG over follows the state of the keyer assigned to the XG channel: when the keyer is on, the over is on; when the keyer is off, the over is off.
- 10 Specify the maximum number of layers.

The lower this value, the better your system performance will be.
- 11 Specify the keyer behavior.

The choices are 'Normal' and 'Clear Preset after Program Transitions to On'. See the *NV5100MC MasterConfig User's Guide* for details.

MCS Panel Configuration Editor

(Intuition XG configuration is available only for the SCP, CECP, CECP M1, CECP GUI, Aux/Preview GUI, FECP, iMC-Panel-200, iMC-Panel-300, and iMC-Panel-GUI.)

In the 'Button Assignments' page, place from one to four XG layer buttons on the program bus. The same buttons can appear on either the preset bus or the preview bus depending on configuration of MCEs under control.)

- ▲ The program bus corresponds to one channel of the Intuition XG processor. The preset (or preview) bus corresponds to the other channel of the Intuition XG processor (if it has the second channel).
- ▲ You might have to sacrifice a main source button or two to do so.
- ▲ When XG layer buttons are active, the keyers assigned to the XG layers become inaccessible for normal use.

Optionally configure one of the customer-definable buttons as an "XG Keyer Control" button. (The button causes the keyers that support XG layers to turn on or off at any time. The button should be considered an emergency button, to be used rarely, if ever. Note that the button does not affect the Intuition XG processor, only its assigned keyers.)

Notes

The Intuition XG's video reference must be tri-level 1080i/59.94, connected to 'Analog Ref In'. The reference for the MCE and Intuition XG references must be closely timed (within $\pm 1/2$ line). Otherwise, you'll get non-sync errors.

The Intuition XG processor receives information regarding what to play and when to play it from the MCE over its Ethernet connection.

Misc. Topics

Restarting an MCPM or MCE

MCPM and MCEs restart, or reset, after you (1) press the reset switch at the front of the module, (2) reinsert the module in the frame, or (3) cycle power to the module.

At reset, the MCPM enters bypass mode (the emergency bypass relay routes bypass signals to the program output and inhibits MCPM output), the red bypass LED comes on, the red alarm LED comes on, and the MCPM initializes. After a few seconds, the heart beat LED comes on. Soon the red alarm light goes out, and the green LED (health) comes on and the amber light comes on (active). If the MCPM is functioning properly, the bypass light will have gone out.

Put simply: if the green LED turns on, the MCPM has restarted successfully. (Otherwise, it will remain in bypass mode).

If it has reset properly, the MCPM configuration will have been copied from flash to RAM, possibly overwriting operator changes.

For MCPMs, any logos previously in RAM will have been lost, and must be reloaded from the configuration PC. (You can use MasterLogo for that purpose.)

For MCEs, logos are not lost because they remain in flash memory.

MCPM Health

At the front of the MCPM, there is a green LED labeled "HEALTH" and a red LED labeled "ALARM." When an MCPM is operating normally (it is "healthy"), the green LED is on and the red LED is off. When an MCPM cannot operate normally (it is "unhealthy"), the green LED will be off and the red LED will be on. Any of the following conditions can cause the MCPM to be "unhealthy":

- 1 A problem with video reference (e.g., reference not present or video not locked).
- 2 The FPGAs are not loaded properly.
- 3 The application is missing or not loaded properly (e.g., an application for the MCPM-SD is loaded in the MCPM-MK-SD).
- 4 A problem with MCPM configuration (e.g., it is missing, corrupt, or of the wrong type for this type of MCPM).
- 5 A problem with AES clocks (received on the backplane from the control card or clock card).

Restarting a Control Panel

A control panel restarts when you reconnect power or after you press the Panel Status > Update Config menu button (6 seconds) or Panel Status > Restart Panel menu button (70+ seconds).

As the control panel restarts, the user-definable buttons display a cycling pattern and the LCD is kept off until the panel's main processor has booted. When the pattern stops cycling and the LCD lights up, the panel has reset. The LCD touchscreen will display a warning or error message (e.g., Panel Not Connected) if something is wrong.

The cyclic pattern displays the message "Master Control Panel Starting" on the upper row of user-definable buttons and turns the lower row of buttons red, one by one.

Put simply: when the red buttons go out and the LCD lights up, the control panel has restarted successfully. You should check the messages on the LCD.

- ▲ There are .nvz files (software/firmware files for FECF, CECP, SCP, iMC-Panel-200, and iMC-Panel-300 control panels) in the 'setup' subfolder of the master control installation folder. You can use the MCS Panel Configuration Editor to upload these files to the appropriate panel if it becomes necessary, such as when you receive new software.

Control Panel Health

The control panel can have two kinds of problems:

- Major alarm:
 - A failure of any circuit board.
 - Failure of both power supplies.
 - A detected failure of an attached transition lever arm.
- Minor alarm:
 - Failure of one power supply.
 - Fan failure or over temperature.

The control panel has alarm outputs (relays) which can be used to signal problems.

See [Control Panel Connectors](#) on page 198 for connector information.

Installing and Configuring Imagestore 750s



Chapter 6 describes the installation and preliminary configuration of Imagestore 750s.

Topics

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The procedures given in this chapter will connect the Imagestore 750 and establish communication with the NV9000, with iMC panels, and with a Kaleido-X multi-viewer. Subsequent Imagestore 750 configuration is not addressed here. Nor is Kaleido-X configuration. For more information, refer to the *Imagestore 750 Configurator Reference Manual* and any of the Kaleido-X documents.

Introduction

Before You Begin

Most of the installation and configuration of the Imagestore 750 in the iMC master control system is relatively simple if you complete a few specific (and simple) tasks.

The exception is configuring audio. You have a choice:

- Construct an “audio graph.” The audio graph (in the Imagestore 750 Configurator) is a graphical representation of interconnections of various audio components of the Imagestore 750.
- Choose a pre-configured audio template — one that most fits the needs of your system. If you choose a template, it will become available in the audio graph tool, and you can then modify it as you wish.

You should decide whether to use an audio template or to start from scratch using the audio graph tool. In either case, you must familiarize yourself with the audio graph tool if you are to complete the audio configuration successfully. See [Audio Configuration](#) on page 150 for a brief description of the audio graph tool and a suggested configuration. Please refer to the *Imagestore 750 Reference Manual* for a full discussion of the audio graph tool.

After you have installed the Imagestore 750, there are additional configuration tasks, which can be demanding and subtle. This guide does not address anything beyond the few installation steps.

Essentials

First, make sure that you have the version 4.5 of the Imagestore 750.

Second, make sure that you have the correct version of the Imagestore 750 Configurator. Presently, it is v1.8:



In the context of the iMC master control system, an NV9000 router control system is required and a video router¹ that supports embedded audio is required. To configure the NV9000 system, you need a recent version of NV9000-SE Utilities. At this writing, the released version is 6.2.2.

To configure control panels to control Imagestore 750s, you will need the MCS Panel Configuration Editor, version 7.2.9.0 or later.

An Ethernet switch is required for a master control network.

LGK-3901, DSK-3901, and ISM-3901

The iMC master control system can control the LGK-3901, DSK-3901, and ISM-3901. These are transition processors that fit in a 3RU Densité frame. These units provide a subset of the functions of an Imagestore 750. The master control system treats these units as if they were Imagestore 750s. They are configurable using the Imagestore 750 Configurator and each has a browser application (for remote management) that is similar to the browser application for the Imagestore 750.

The ISM-3901 is “bundled” version of the LGK-3901.

For detailed information, refer to the *LGK-3901/DSK-3901 Installation and Operator's Guide*.

Overview

Installing the Imagestore 750 involves making cable connections and describing those connections in NV9000-SE Utilities, in the Imagestore 750 Configurator, and in various control panel configurations. (You can also use the Imagestore 750's browser application for some tasks.)

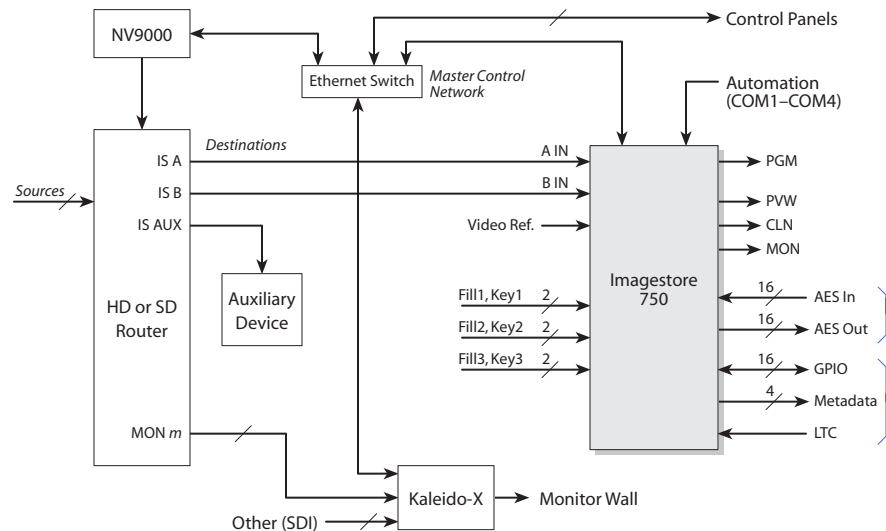
(Note: all of the Imagestore 750's video connectors are 75 Ω BNCs.)

The installation process for a single Imagestore 750 is different from the process for multiple Imagestore 750s. The difference lies in how you allow multiple Imagestore 750s to share resources such as a monitor wall. With only a single Imagestore 750, sharing is not at issue.

1. The NV8256 and the NV8500 family routers are suitable.

Single Imagestore 750

The connections for a system that includes a single Imagestore 750 are simple:



The NV9000 system controls a video router and the router provides the signals that are controlled by the Imagestore 750. The Imagestore 750 receives commands from master control panels and relays those commands to the NV9000 whereupon the NV9000 switches sources to the destinations of interest.

Two of the router destinations connect directly to the A and B inputs of the Imagestore 750. The Imagestore 750 instructs the NV9000 to switch router sources to these destinations.

A third router destination feeds an *aux* (auxiliary) device such as a waveform monitor.

Other router destinations related to the Imagestore 750 feed router sources to a Kaleido-X multi-viewer supporting a monitor wall. Master control can control up to 24 sources of a monitor wall. When a panel operator changes sources, the Imagestore 750 sends messages to the NV9000 that switch these sources to the monitor destinations.

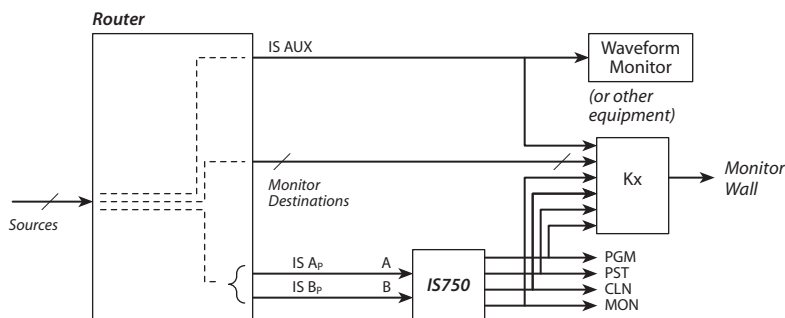
The various devices communicate over the master control network. The NV9000 communicates with the router or routers over one of its own panel and router networks.

Connections to the AES, GPIO, metadata and LTC inputs and outputs of the Imagestore 750 are optional and subject to the requirements of your facility. Connections to the fill and key inputs of the Imagestore 750 are also optional.

If the Imagestore 750 has an Intuition XG coprocessor, the feed from the Intuition XG uses one of the fill/key pairs. (The Imagestore 750 can control input from one Intuition XG processor.)

Multiple Imagestore 750s

The connections (and configuration steps) are slightly more complex when you have more than one Imagestore 750 in your system. Shown here is a single-Imagestore 750 system for comparison with Figure 6-1:



The system for multiple Imagestore 750s feeds the outputs of the various Imagestore 750s back into the router and switches the output of the currently selected Imagestore 750s to a single set of destinations that feed a Kaleido-X monitor wall:

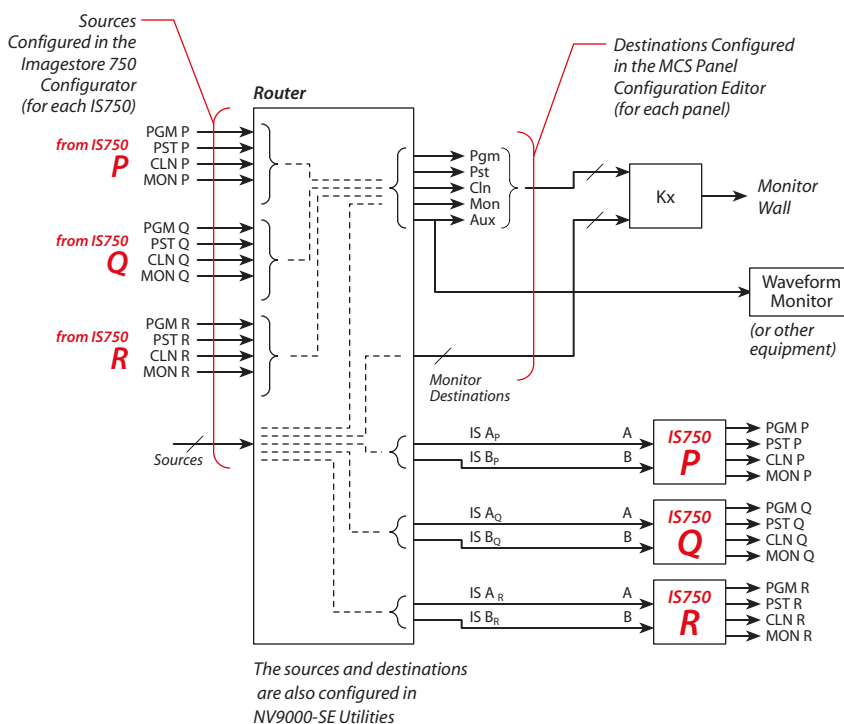


Fig. 6-1: Multiple Imagestore 750s

The basic connections for each Imagestore 750 are the same as for a single Imagestore 750. However, now it is possible to direct the sources and outputs of the multiple Imagestore 750s to the same monitor wall. When a panel operator changes channels, the newly acquired Imagestore 750 sends commands to the NV9000 to take the appropriate sources to the router destinations supporting the monitor wall.

(The aux output associated with an Imagestore 750 is actually a router destination and is not part of the Imagestore 750. If an aux destination is defined for the monitor wall—in the panel

configuration—that destination is used instead of the aux destination defined for an individual Imagestore 750. That is, the aux destination defined in the panel configuration overrides any aux destination defined for an Imagestore 750. If there is no aux destination defined in the panel configuration, no override takes place.

The monitor wall layout can also change with a channel change. The panel operator can also trigger a layout change with a function button.

All related router sources and destinations must first be defined in NV9000-SE Utilities. Then you must select router sources (and some destinations) in the Imagestore 750 Configurator. You must select certain router destinations (e.g., for the monitor wall) in the MCS Panel Configuration Editor.

Installation Summary

The following is a *summary* of the installation process. The details of installation process follow, starting at [Network Connections](#) on page page 125.

Preliminary (NV9000-SE Utilities, PCs, Imagestore 750 Front Panel)

- 1 Define, and make, connections to the master control Ethernet switch for the NV9000, for each Imagestore 750, for each Intuition XG, for iMC panels, and for each configuration PC and GUI PC.

In NV9000-SE Utilities

- 2 If you have only a single Imagestore 750 . . .

Define two router destinations for the Imagestore 750's A and B inputs. Optionally, define a third router destination that feeds an auxiliary device. Make the physical connections.

- 3 Otherwise, you have multiple Imagestore 750s . . .

For each Imagestore 750, define two router destinations for the Imagestore 750's A and B inputs. Optionally, define a third router destination that feeds an auxiliary device. Make the physical connections.

- ▲ The aux outputs assigned to the Imagestore 750s can be overridden by the aux destination specified in a control panel configuration. This is recommended for multiple Imagestore 750s.

For each Imagestore 750, define router sources for the Imagestore 750's outputs (PGM, PST, CLN, and MON) that are to feed the monitor wall. Physically connect those outputs to their respective router inputs. (Do **not** make such a connection for the aux output associated with the Imagestore 750.)

- 4 Define monitor wall connections.

Define a router destination for each router source to be monitored and define up to 5 destinations for Imagestore 750 output. Later on, connect those destinations physically to the Kaleido-X inputs.

In the Imagestore 750 Configurator

- 5 For each Imagestore 750, define its NV9000 connections.

Specify the IP address of the NV9000 system controller. Use the NV9000's *virtual IP address* if it has one.

- ▲ It is important to complete this step before proceeding. The configurator cannot perform certain functions without knowing the NV9000's IP address.

Also specify the 'router type' as NV9000. Leave the 'router port' field at its default.

- 6 For each Imagestore 750, identify its router destinations (A, B, and aux).

- ▲ The aux outputs can be overridden by the aux destination specified in a control panel configuration. This is recommended for multiple Imagestore 750s.

- 7 For each Imagestore 750, define its router sources.

Under 'Master Control', choose 'File > New' and specify the IP address of the Imagestore 750. A list of NV9000 sources appears. Select some or all that apply to this Imagestore 750.

- 8 For each Imagestore 750, create salvo configuration files. (Although this is optional, you will probably want salvos and therefore will have to identify them in the Imagestore 750 Configurator.)

Under 'Salvo Mode', choose 'File > New' and specify the IP address of the Imagestore 750. A list of NV9000 salvos appears. Select some or all that apply to this Imagestore 750.

- 9 For each Imagestore 750, designate the names of the 'Master Control Config File' and (optionally) of the 'Salvo Config File' you created.

- 10 For each Imagestore 750, identify the router sources that feed the Imagestore 750's PGM, PST, CLN, and MON outputs into the router. These fields are required only you have more than one Imagestore 750.

- 11 For each Imagestore 750, define channel ownership. These are the 'Allow Kick' and 'Allow Share' options. See step 19 also.

- 12 For each Imagestore 750, describe the NV9000 configuration.

- ▲ We recommend that you leave these fields at their default values.

Optionally, specify which NV9000 name set to use. Optionally, specify a post tally delay. The default value of 4 is acceptable for installation.

- 13 For each Imagestore 750, define Imagestore 750 preferences. You can also do this later.

- 14 For each Imagestore 750, define "preview" options—those that govern the use of the preset buttons on panels. See also step 22.

- 15 For each Imagestore 750, define Intuition XG options (if it has a connected Intuition XG).

Run a serial cable from a COM port of the Imagestore 750 (RS-232, 19200 Baud, 8N1) to the RS-232 port of the Intuition XG processor. This allows the Imagestore 750 to control the Intuition XG processor.

- 16 For each Imagestore 750, define source groups.

- ▲ Do this before you define 'Group Select' buttons in panel configurations.

(Choose 'Master Control' in the top right drop-down menu. Then choose 'File > Open'. Specify the IP address of the Imagestore 750 and choose a master control configuration file. Select the 'Source Groups' tab.)

Source groups are implicitly numbered, *starting at 0*.

- 17 For each Imagestore 750, define an audio configuration.

Audio configuration is complex. You have a choice of selecting an audio template or starting from scratch using the 'Audio Graph' tool of the Imagestore 750 Configurator. Please refer to the *Imagestore 750 Reference Manual* for audio graph details.

In the MCE Panel Configuration Editor

- 18 For each panel, in the 'Monitor Wall' page, identify the router destinations (defined in step 4) that feed the monitor wall.

▲ Panels configurations that use the same monitor wall use the same router destinations.

- 19 For each control panel, in the 'Advanced' page, enable or disable sharing and choose a kick option.
- 20 For each control panel, define group selection buttons.
(This is discretionary. You might not actually want group selection buttons.)
- 21 For each control panel, define salvo buttons and specify salvos that execute when a channel change occurs.
- 22 For each control panel, specify the 'preset tally' option. Go to the 'Advanced' page.
Some operators like the "PresStation" method of arming DVEs, DSKs, and voice-overs on the preset bus. Other operators like the traditional method. The 'preset tally' option lets you choose.

Miscellaneous connections

The use of all other Imagestore 750 signals is optional. Their ports are documented in the *Master Control Reference Manual* and *Imagestore 750 Reference Manual*. Other than pin-out and electrical characteristics, their use is outside the scope of this document.

The GPIO connector is an HD44. A breakout device is available.

The AES connector is a SCSI VHDCl-68 female. Breakout boxes are available, one for 75 Ω BNCs and one for 110 Ω 3-pin STP connectors. The cable must have male connectors with 0.8 mm pin spacing.

Please refer to the *Imagestore 750 Reference Manual* for details.

Network Connections

- [Step 1] Follow these steps to make network connections:

- 1 Using the NV9000's *master control* network port, connect the NV9000 to the master control Ethernet switch. Assign an IP address to the NV9000's master control network port. (See [NV9000 System Controller](#) on page 19 for the port's physical location.)
The default IP address is 192.168.7.201 for the primary NV9000's master control network and 192.168.7.202 for the secondary's.
If you prefer not to change the NV9000's master control address, make all other IP addresses on the master control network part of the 192.168.7.xxx subnet.
- 2 Connect the Imagestore 750 to master control's Ethernet switch. You can use either of the two LAN ports on the Imagestore 750.

- 3 Assign an IP address to the Imagestore 750.

Use the front panel of the Imagestore 750. See the *Imagestore 750 Reference Manual* for instructions. Its IP address must belong to the master control subnet.

- 4 Repeat steps 2 and 3 for any additional Imagestore 750s.

- 5 If your system has Intuition XG processors, connect those and assign them IP addresses on the master control network. (Imagestore 750s typically receive clips from Intuition XGs.)

- 6 Connect a configuration PC to the master control Ethernet switch and give it an appropriate IP address on the master control subnet. Also connect a configuration PC to the NV9000 at its house network port (again with an appropriate IP address). You can use the same PC for both networks.

At this point, if you have the configuration software installed, it is possible to configure the Imagestore 750(s), the NV9000, and any control panels you have installed.

Similarly, connect any GUI PCs to the master control Ethernet switch.

In NV9000-SE Utilities

[Step 2] Router Connections for a Single Imagestore 750

The Imagestore 750 accepts HD or SD video, with or without embedded audio, at its A and B input ports. It is a router controlled by the NV9000 system that provides these inputs.

Follow these steps:

- 1 In NV9000-SE Utilities, define two router destinations² for the Imagestore 750.

Use the 'Devices' page in the 'Configuration' navigation pane to configure destinations.

Each of these destinations can involve multiple virtual levels, but the Imagestore 750 connects on exactly one level, which is the level corresponding to a video output of an HD or SD router.

- 2 Optionally, define a third router destination that supports an auxiliary device.

Master control panels that control Imagestore 750s have an "aux" button row with which the panel operator selects router sources. The Imagestore 750 will issue commands to the NV9000 that direct the selected source to a designated auxiliary device (e.g., a waveform monitor).

2. You will need some understanding of NV9000-SE Utilities concepts, such as *destinations*, *sources*, *devices*, *virtual levels*, *level sets*, or *categories*, to proceed.

There are many other considerations in NV9000-SE Utilities beyond the scope of master control setup. These cannot be avoided. It is likely that someone else in your organization is responsible for overall NV9000 and router configuration. You should collaborate with that person.

This is a sample from NV9000-SE Utilities *after* A, B, and aux destinations have been defined for a single Imagestore 750:

	ID	Description	Device*	Virtual Level*	Port Number*	Port Type*
1	1903	IS750 input A	IS A	VID	6	Output Port
2	1904	IS750 input B	IS B	VID	7	Output Port
3	1909	Aux Bus	IS AUX	VID	8	Output Port

This view is the 'PhysConns' table, available under the 'Views' navigation pane.

The names of the destination devices are helpful, but not important.

It is the ports (in this illustration, 6, 7, and 8) of the applicable router that are important. You need to know the port numbers when making physical connections.

To make the physical connections:

- 1 Connect the video router port belonging to the "A" destination to the A input port of the Imagestore 750.
- 2 Connect the video router port belonging to the "B" destination to the B input port of the Imagestore 750.
- 3 Optionally, connect the router port supporting the aux device to the input port of the auxiliary device.

[Step 3] Router Connections for Multiple Imagestore 750s

The Imagestore 750 accepts HD or SD video, with or without embedded audio, at its A and B input ports. In typical systems, the outputs of the Imagestore 750s are fed back into the router to be directed to a monitor wall. That way the multiple Imagestore 750s can share the monitor wall.

It might help to refer to Figure 6-1.

Repeat these steps, in NV9000-SE Utilities, for each Imagestore 750:

- 1 Define two router destinations for the Imagestore 750's A and B inputs.
Use the 'Devices' page in the 'Configuration' navigation pane to configure destinations. Each of these destinations can involve multiple virtual levels, but the Imagestore 750 connects on exactly one level, which is the level corresponding to an output of a video router. In figures 6-2 and 6-3, following, these are outputs 'IS1 A', 'IS1 B', 'IS2 A' and 'IS2 B'.
- 2 Optionally, define a third router destination that supports the "aux bus."
Master control panels that control Imagestore 750s have an "aux" button row with which the panel operator selects router sources. The Imagestore 750 will issue commands to the NV9000 that direct the selected source to a designated "aux" destination. These aux outputs are overridden by the aux destination defined (in a panel configuration) for the monitor wall. If you define an aux destination in the panel configuration, it becomes the designated aux destination instead of the Imagestore 750's aux destination.

Installing and Configuring Imagestore 750s

In NV9000-SE Utilities

In the sample shown in figures 6-2 and 6-3, this option was **not** taken because there is a common aux output for the Kaleido-X multi-viewer.

- 3 Define a router source for each of the Imagestore 750's outputs that is to be taken to the monitor wall. The Imagestore 750's outputs are its PGM, PST, CLN, and MON outputs.

In the sample shown in figures 6-2 and 6-3, these outputs are 4 of the 5 outputs (i.e., destinations) whose names begin with "KX."

To make the connections, for each Imagestore 750:

- 1 Connect its PGM output to the designated router input.
 - 2 Connect its PST output to the designated router input.
 - 3 Connect its CLN output to the designated router input.
 - 4 Connect its MON output to the designated router input.
- ▲ Do not make a feedback connection for the aux output associated with the Imagestore 750.

Figure 6-2 is the 'PhysConns' table in NV9000-SE Utilities that describes connections for two Imagestore 750:

PhysConns Table ✕

ID	Description	Device*	Virtual Level*	Port Number*	Port Type*
80	2044 IS1 feedback	IS1 PST	VID	9	Input Port
81	2055 IS1 feedback	IS1 PGM	VID	10	Input Port
82	1953 IS1 feedback	IS1 CLFD	VID	11	Input Port
83	1954 IS1 feedback	IS1 MON	VID	12	Input Port
84	1955 IS1 input A	IS1 A	VID	1	Output Port
85	2053 IS1 input B	IS1 B	VID	2	Output Port
87	2558 IS2 feedback	IS2 PST	VID	13	Input Port
88	1956 IS2 feedback	IS2 PGM	VID	14	Input Port
89	1957 IS2 feedback	IS2 CLFD	VID	15	Input Port
90	1958 IS2 feedback	IS2 MON	VID	16	Input Port
91	1951 IS2 input A	IS2 A	VID	17	Output Port
92	1952 IS2 input B	IS2 B	VID	18	Output Port

* Required column.

Revert to Saved Save

Fig. 6-2: Two Imagestore 750s Set Up for Use with a Monitor Wall

Figure 6-3 shows the result of making connections for the two Imagestore 750s.

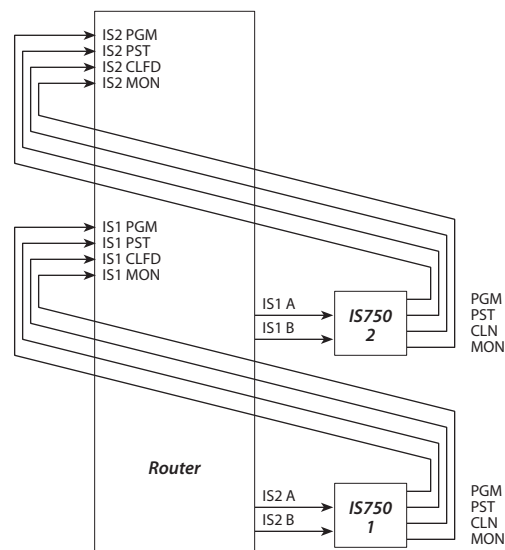


Fig. 6-3: Two Imagestore 750s Ready for a Monitor Wall Connection

[Step 4] Monitor Wall Connections

There are 3 monitor wall functions to consider:

- A monitor wall can display the currently selected Imagestore 750's sources and outputs.
- A monitor wall can display the currently selected Imagestore 750's aux output.
- If the monitor wall is driven by a Kaleido-X multi-viewer, a panel operator can cause a monitor wall re-layout to occur.

To make monitor wall settings, first define monitor wall *destinations* for sources, then define monitor wall *destinations* for Imagestore 750 outputs and the aux output associated with the Imagestore 750.

Later, in step 19, identify those destinations in the MCS Panel Configuration Editor.

(You will later identify the router sources (defined in step 3, for each Imagestore 750) that feed the monitor wall destinations for PGM, PST, CLN, and MON in the Imagestore 750 Configurator. See step 10.)

Important: this step associates source *buttons* (of one or more panels) with the monitor wall destinations. Because an Imagestore 750 can have a number of source groups, a source button may correspond to more than one source.

There is potentially a monitor wall display for each source *button*. The sources controlled by that button always appear on that particular display. (If one panel has 8 source buttons, and another has 10, and a third has 12, then you would probably want to define 12 monitor wall destinations for the sources that are controlled by the panel buttons.)

At the upper limit, the Imagestore 750 can control up to 29 monitor wall displays out of the total number used in your system. The number 29 stems from the fact that the largest number of sources that can be controlled on a master control panel is 24. With 4 Imagestore 750 outputs and the aux output, the number comes to 29. (The monitor wall can have additional displays beyond the ones controlled by master control panels.)

Follow these steps, in NV9000-SE Utilities:

- 1 Define router destinations for each of the monitored source (buttons).
- 2 Define router destinations for up to 5 destinations for Imagestore 750 output.

Later on, connect those destinations physically to the Kaleido-X inputs.

This is a sample from NV9000-SE Utilities *after* the monitor destinations have been defined:

PhysConns Table x

Device Filter:		Virtual Level Filter:				
ID	Description	Device*	Virtual Level*	Port Number*	Port Type*	
74	2038	IS output	KX PGM	VID	28	Output Port
75	2039	IS output	KX PST	VID	29	Output Port
76	2040	IS output	KX CLFD	VID	30	Output Port
77	2041	IS output	KX MON	VID	31	Output Port
78	2042	IS output	KX AUX	VID	32	Output Port
13	1911	IS source	MONITOR1	VID	9	Output Port
14	1912	IS source	MONITOR2	VID	10	Output Port
15	1913	IS source	MONITOR3	VID	11	Output Port
16	1914	IS source	MONITOR4	VID	12	Output Port
17	1915	IS source	MONITOR5	VID	13	Output Port
18	1916	IS source	MONITOR6	VID	14	Output Port
19	1917	IS source	MONITOR7	VID	15	Output Port
20	1918	IS source	MONITOR8	VID	16	Output Port
21	1919	IS source	MONITOR9	VID	17	Output Port
22	1920	IS source	MONITOR10	VID	18	Output Port
23	1921	IS source	MONITOR11	VID	19	Output Port

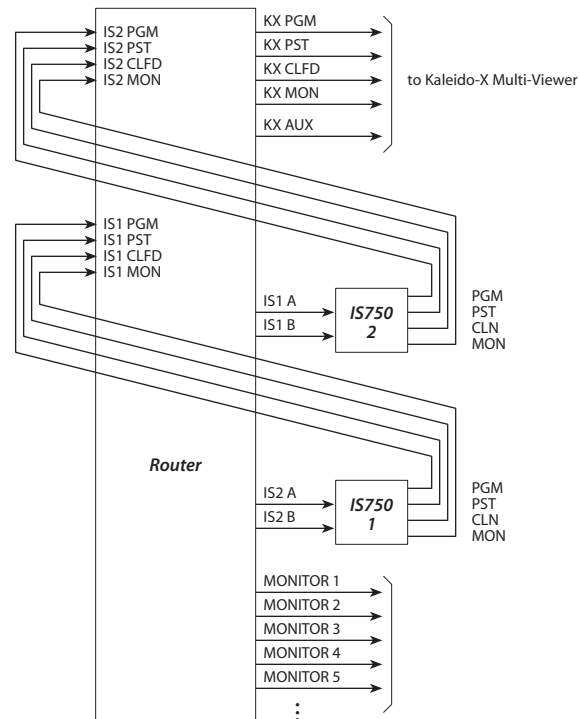
Add Delete

Here again, this view is the 'PhysConns' table, available under the 'Views' navigation pane.

The names of the destination devices are not important.

It is the ports of the applicable router that are important. (In this illustration, 9–19 and 28–32 are visible.) You need to know the port numbers when making physical connections.

Figure 6-4 shows the addition of the monitor wall connections:



In this diagram, KX AUX is used to feed both the auxiliary device and the monitor wall. This signal is used instead of an aux output for each Imagestore 750.

The most recently selected Imagestore 750 causes the router to take the appropriate inputs to the monitor wall.

Fig. 6-4: Connections for Two Imagestore 750s and Monitor Wall

Imagestore 750 Configuration

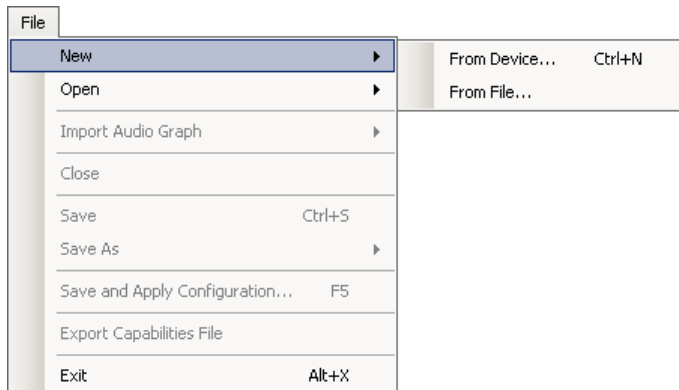
Perform basic configuration steps for each Imagestore 750. (More advanced configuration and configuration adjustments can be performed after installation.)

Notes

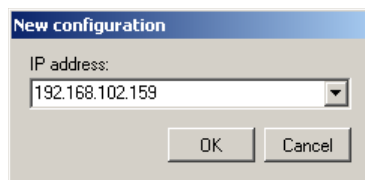
Creating a Configuration

To create a configuration for an Imagestore 750:

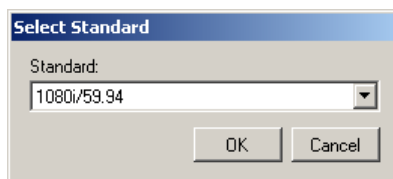
- 1 Launch the Imagestore 750 Configurator.
- 2 Choose 'File > New > From Device ...':



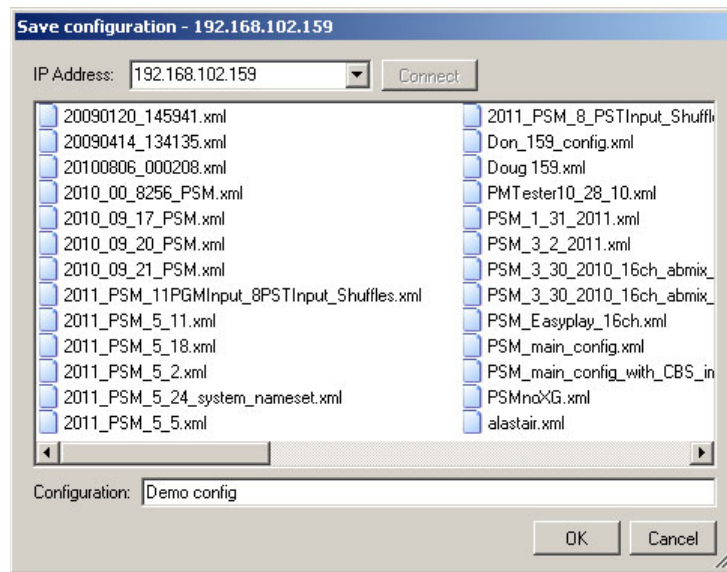
- 3 Then specify the IP address of the Imagestore 750. (You defined its IP address in either step 2 or step 3):



- 4 You will be asked for the video format of the Imagestore 750:



- 5 Save the configuration. At this point, all the settings in the configuration are either at their default values or undefined:



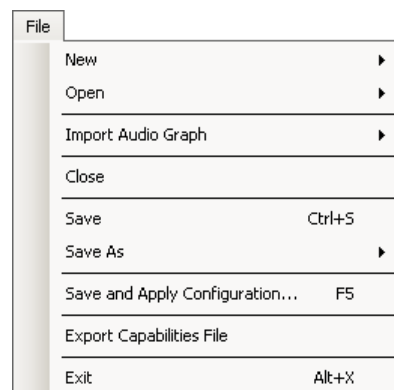
Note that the configuration is saved *in* the Imagestore 750 itself.

Each of the steps described in this section assume that you have opened the configuration file for the Imagestore 750 on which you are currently working.

Activating a Configuration

When you are configuring an Imagestore 750, you typically want to choose the *active configuration* when you select the Imagestore 750 for configuration. The active configuration is the one that is running in the Imagestore 750.

To make a particular configuration the active configuration, you can choose 'Save and Apply' from the File menu

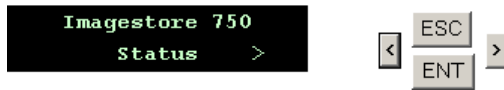


or you can use the Imagestore 750's front panel.

It is easier to use the Imagestore 750's browser application than the front panel:

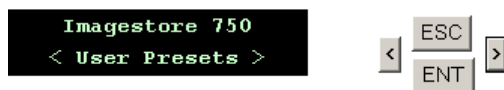
- 1 Launch your browser. Enter the IP address of the Imagestore 750 as the URL.
- 2 Login. (The default password is "miranda.")
- 3 Choose 'Front Panel Mirror' from the list of options. A graphical front panel view appears:

Front Panel Mirror



- 4 Scroll right (click the right arrow) to find 'User Presets':

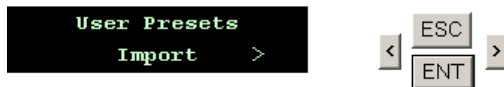
Front Panel Mirror



Click 'ENT':

- 5 The 'Import' command appears. Click 'ENT':

Front Panel Mirror



- 6 Scroll to find the configuration that you want to become active:

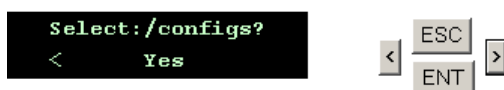
Front Panel Mirror



Click 'ENT':

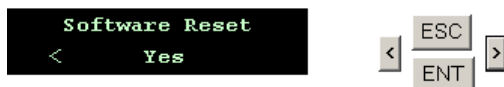
- 7 To confirm that you want that configuration, scroll once to choose 'Yes' and click 'ENT':

Front Panel Mirror



- 8 After a few seconds, the "Software Reset" command appears. To confirm that you want to restart the Imagestore 750, scroll once to choose 'Yes' and click 'ENT':

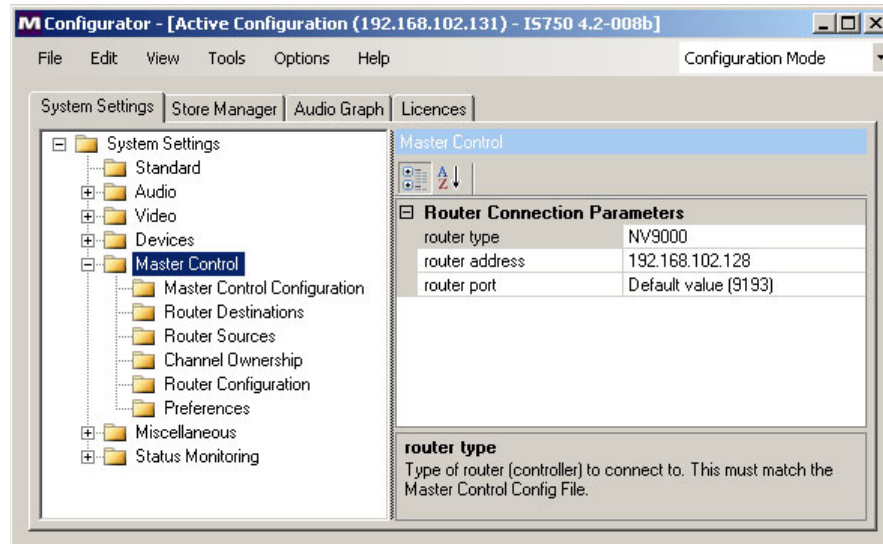
Front Panel Mirror



- 9 After approximately 20 seconds, the Imagestore 750 will have restarted with the selected configuration as the active configuration and the browser application will report 'Done'.
- 10 Close the browser application unless you have more to do.

[Step 5] **NV9000 Connection**

Choose 'Configuration Mode' in the top right drop-down menu. Then, choose the 'System Settings' tab and open the 'Master Control' branch of the navigation tree at the left:



Specify the 'router type' as NV9000.

Enter the IP address of your NV9000 *system controller* in the 'router address' field.

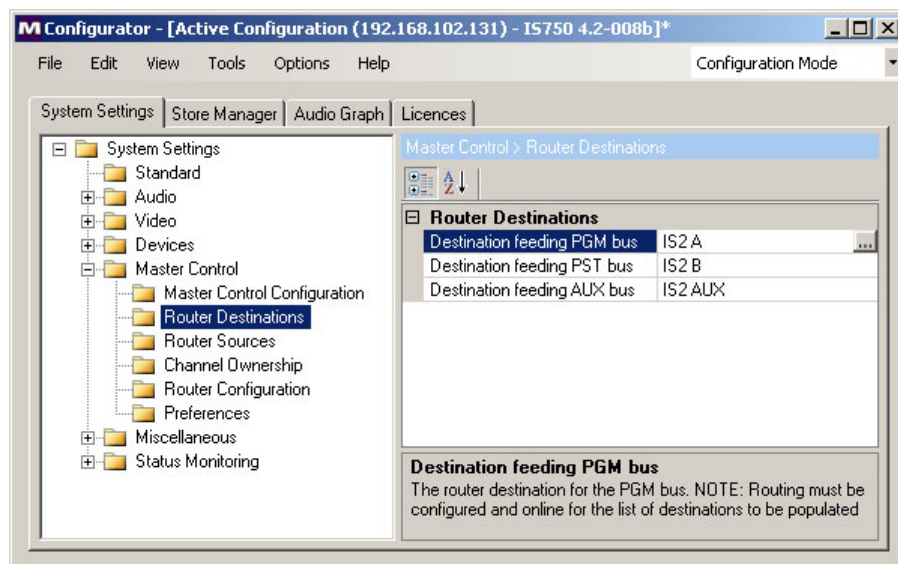
Leave the 'router port' field at its default.

- ▲ It is important to complete this step, for each Imagestore 750, before proceeding. The configurator cannot perform certain functions without knowing the NV9000's IP address.
- ▲ If your NV9000 is a redundant system (one that has both an active and a stand-by system controller), each system controller has its own IP address. NV9000-SE Utilities allows you to define a single "virtual" IP address for the redundant pair. You should define the virtual IP address in NV9000-SE Utilities and use the virtual IP address here.

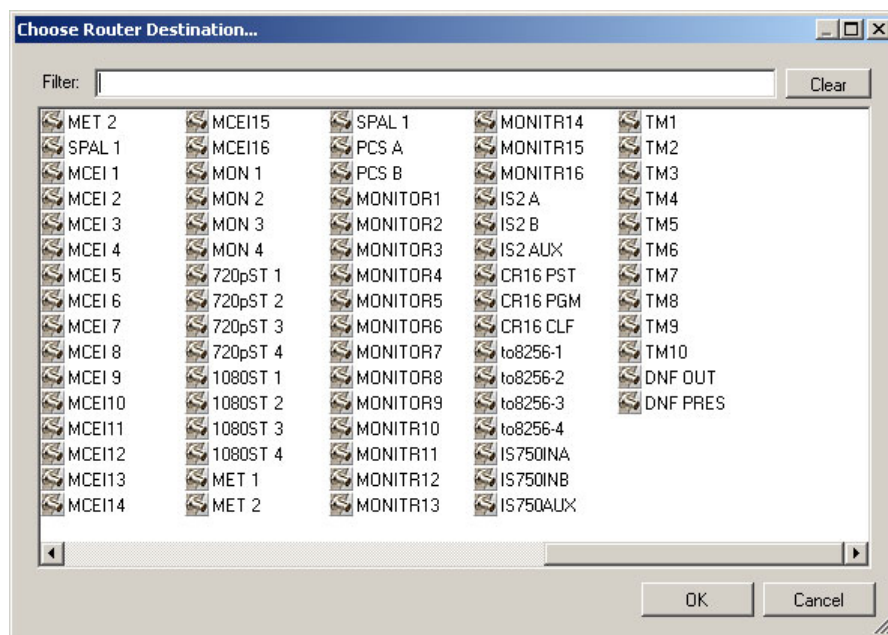
[Step 6] **Router Destinations**

Select the router destinations for Imagestore 750's A and B inputs and optionally for the auxiliary device.

To do this, again choose the 'System Settings' tab under 'Configuration Mode' and open 'Master Control > Router Destinations' in the navigation tree at the left.



Choose a router destination for each of the three entries. Note that 'PGM bus destination' corresponds to the A input and 'PST bus destination' corresponds to the B input. When you click the field to make an entry, a list of NV9000 destinations appears:



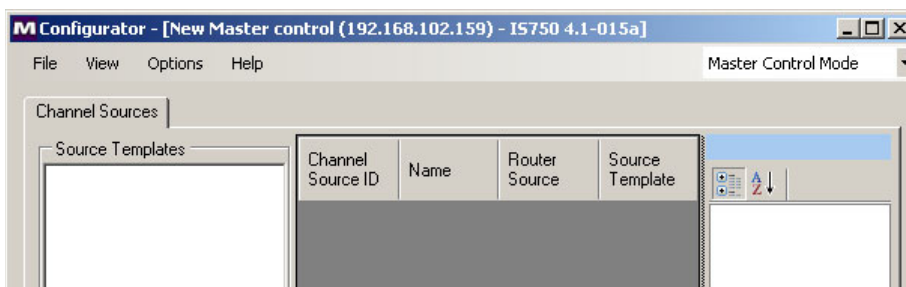
Choose one of them and click 'OK'. (The entries appear in this list because you defined them, in step 2 or step 3, in the NV9000 system's configuration.)

[Step 7] **Router Sources**

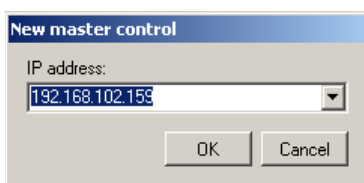
This step identifies router sources. These are the sources that can be included in source groups and that can be selected by panel operators.

- 1 Create a master control configuration file for the Imagestore 750 you are configuring.

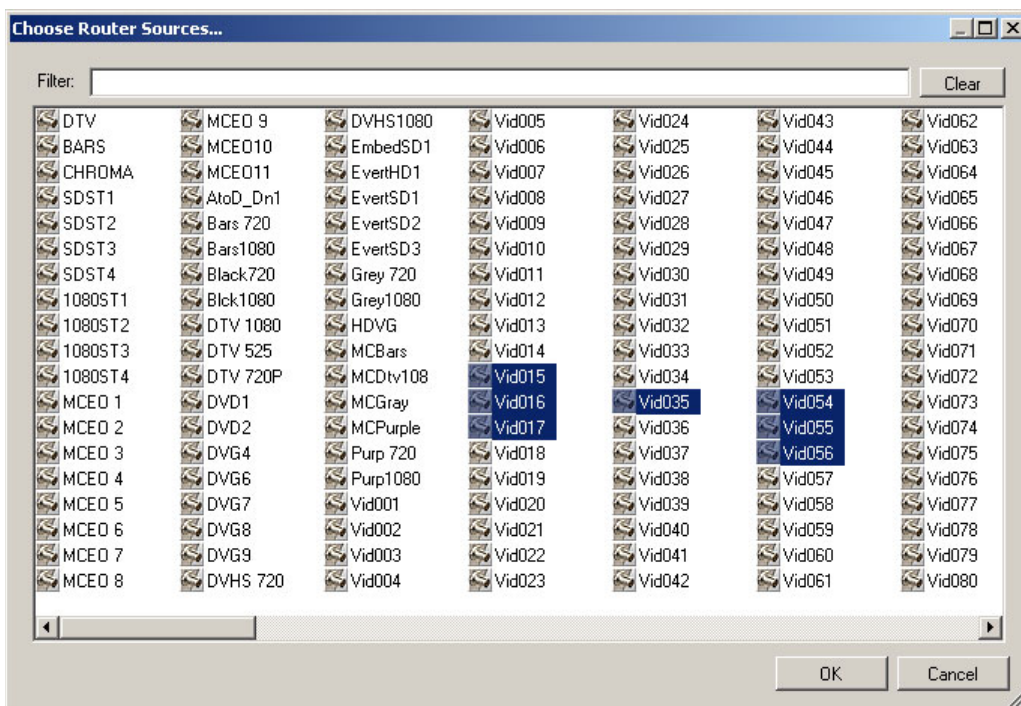
To do that, choose 'Master Control' in the top right drop-down menu:



Then choose 'File > New'. Specify the IP address of the Imagestore 750:



After doing so, a list of NV9000 sources appears:



- 2 Select *some* or *all* that apply to this Imagestore 750. You can revise the list at any later time. (You will eventually need all the sources that you intend to assign to source groups.)
- 3 Save the configuration using the 'File > Save' or 'File > Save As' command.

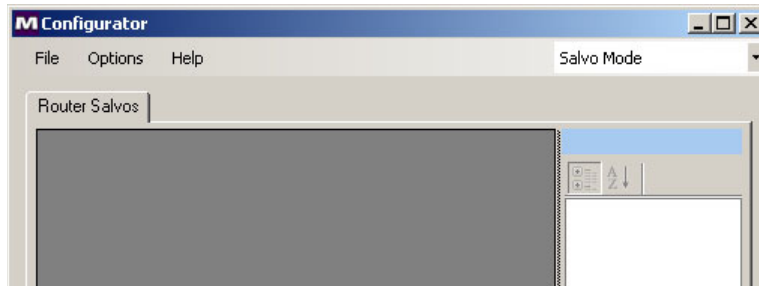
[Step 8] **Router Salvos**

This *optional* step identifies router salvos. Salvos are NV9000 “programs”—files containing NV9000 commands in sequence.

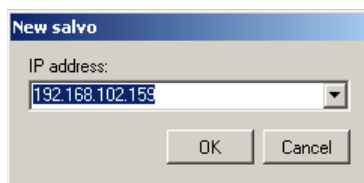
(Salvos execute upon a channel change or when an operator presses a salvo button or through automation. The salvos that can execute are the ones defined in this step.)

- 1 Create a salvo configuration file for the Imagestore 750 you are configuring.

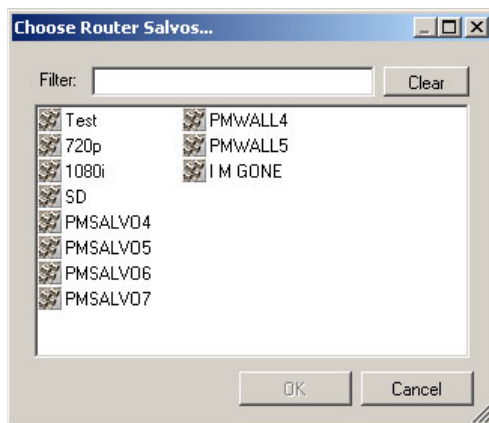
To do that, choose ‘Salvo Mode’ in the top right drop-down menu:



Then choose ‘File > New’. Specify the IP address of the Imagestore 750:



After doing so, a list of NV9000 salvos appears:



You will need to know which salvos are needed for your Imagestore 750.

Although writing salvos (in NV9000-SE Utilities) is straightforward, this document does not address it.

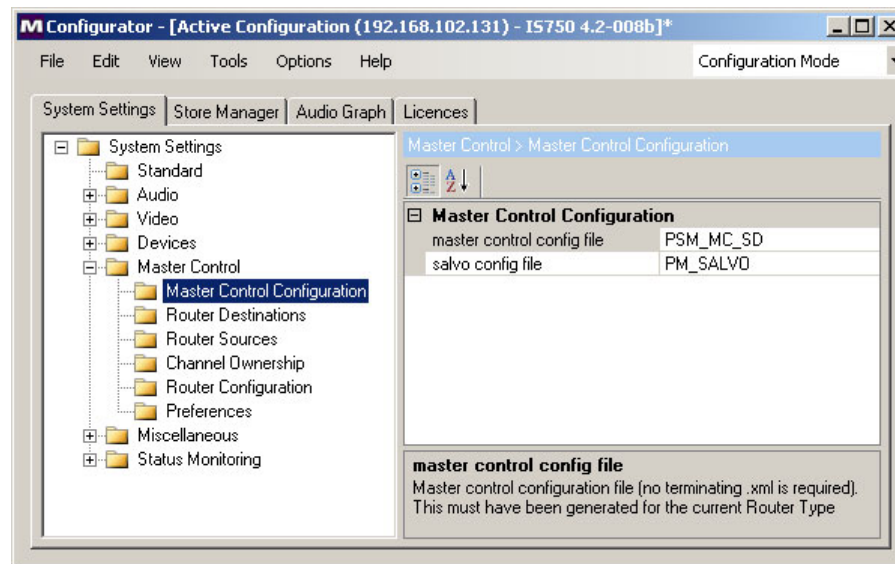
Either you or some other persons in your organization will have written the salvos that appear in this list.

- 2 Select some or all that apply to this Imagestore 750. You can revise the list at any later time.
 - 3 Save the configuration using the ‘File > Save’ or ‘File > Save As’ command.
- ▲ The salvos you identify are implicitly numbered, *starting at 0*. These salvo numbers are the salvo IDs to be used in the MCS Panel Configuration Editor. See step 21.

[Step 9] **File Names**

Designate the name of the ‘Master Control Config File’ and (optionally) the name of the ‘Salvo Config File’ you are using for this Imagestore 750.

To do this, again choose the 'System Settings' tab under 'Configuration Mode' and open the 'Master Control' branch of the navigation tree at the left:



Because you defined the master control configuration file (step 7), its name will appear in the drop-down menu when you click next to 'master control config file'. Choose that file. (Do not choose the default or system values.)

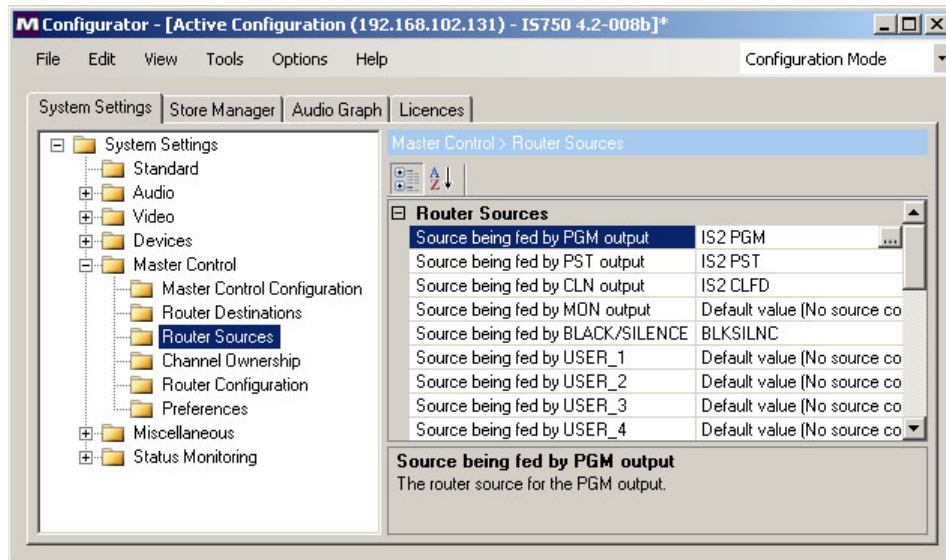
Similarly, the name of the salvo configuration file (step 8), will appear in the drop-down menu when you click next to 'salvo config file'. Choose that file. (Because the salvo configuration file is optional, the drop-down menu might not have any entries unless you created a salvo configuration file in step 8.)

[Step 10] **Router Sources for the Monitor Wall**

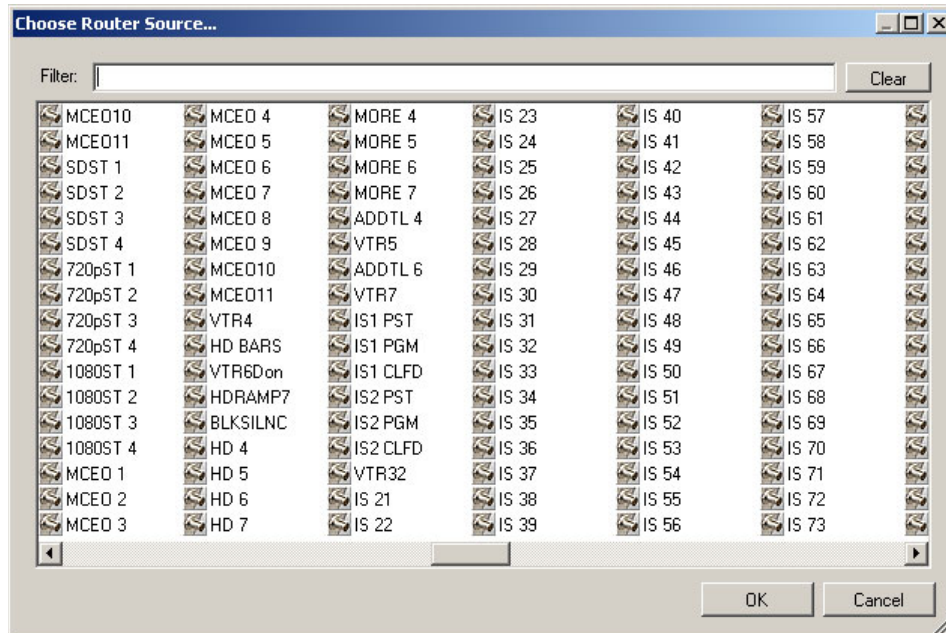
Select the router sources that feed this Imagestore 750's PGM, PST, CLN, and MON outputs into the router.

- ▲ These fields are required only you have more than one Imagestore 750 sharing a connection to a Kaleido-X multi-viewer (or some other device).

To do this, again choose the 'System Settings' tab under 'Configuration Mode' and open 'Master Control > Router Sources' in the navigation tree at the left.



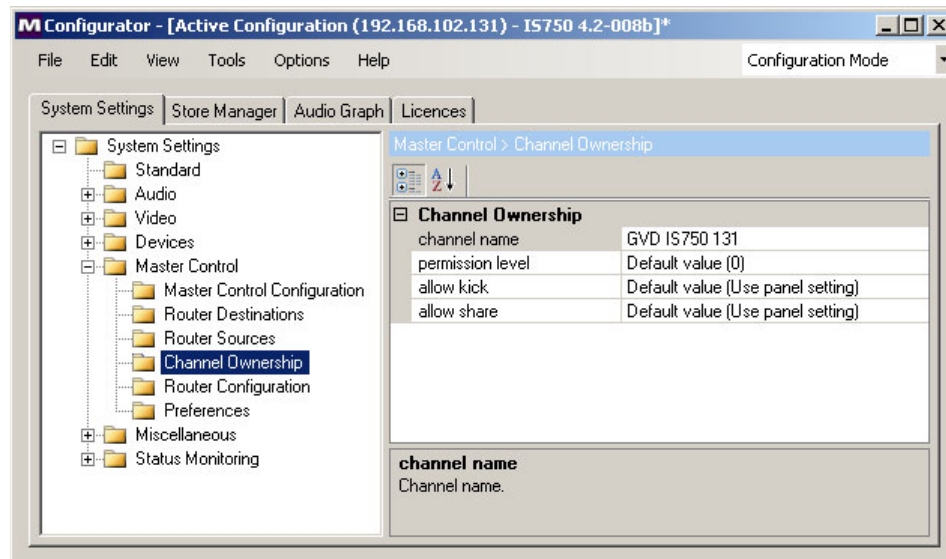
Click the field next to 'Src being fed by PGM output'. When you click the field to make an entry, a list of NV9000 sources appears:



Select one of them and then click 'OK'. Do the same for the PST, CLN, and MON outputs. The other fields in this page are optional. You can configure them now or later, at your discretion.

[Step 11] **Channel Ownership**

Choose the 'System Settings' tab under 'Configuration Mode' and open 'Master Control > Channel Ownership' in the navigation tree at the left. Select 'Channel Ownership'.



Here you can define the Imagestore 750's channel name and specify how the Imagestore 750 is to be used by multiple users.

'Allow Kick'

A "kick" is when a panel operator who wants to control an Imagestore 750 preempts an operator who already has control of the Imagestore 750. The conditions that govern kicking are listed in the drop-down menu for the 'Allow Kick' option:

- Never
The Imagestore 750 cannot be acquired by another operator if it is already attached to a control panel.
- By higher priority panels only
The Imagestore 750 can be acquired by another panel if that panel has been configured with a higher "priority" than the panel that currently "owns" the Imagestore 750.
- By same or higher priority panels
The Imagestore 750 can be acquired by another panel if that panel has been configured with a priority the same or higher than the priority of the panel that currently "owns" the Imagestore 750.
- Always
The Imagestore 750 can always be acquired by another operator.
- Use panel setting
Whether an Imagestore 750 can be acquired by another panel is determined by the panel settings of the two panels involved.
The panel settings are made in the 'Advanced' page of the MCS Panel Configuration Editor.

'Allow Share'

"Sharing" means that more than one panel operator can control an Imagestore 750. The conditions are listed in the drop-down menu for the 'Allow Share' option:

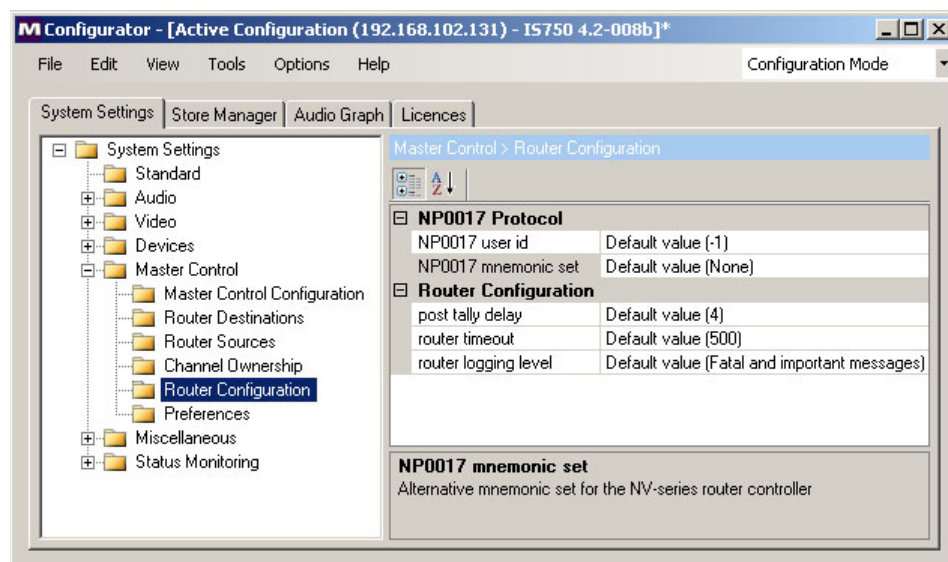
- True—the Imagestore 750 is sharable.
- False—the Imagestore 750 is not sharable.
- Use panel setting—whether an Imagestore 750 can be shared is determined by the panel settings of the two (or more) panels involved.

The panel settings are made in the 'Advanced' page of the MCS Panel Configuration Editor.

[Step 12] Router Configuration

Here, you provide details about the NV9000 configuration (not a router configuration).

Choose the 'System Settings' tab under 'Configuration Mode' and open 'Master Control > Router Configuration' in the navigation tree at the left:



We recommend that you leave these fields at their default values.

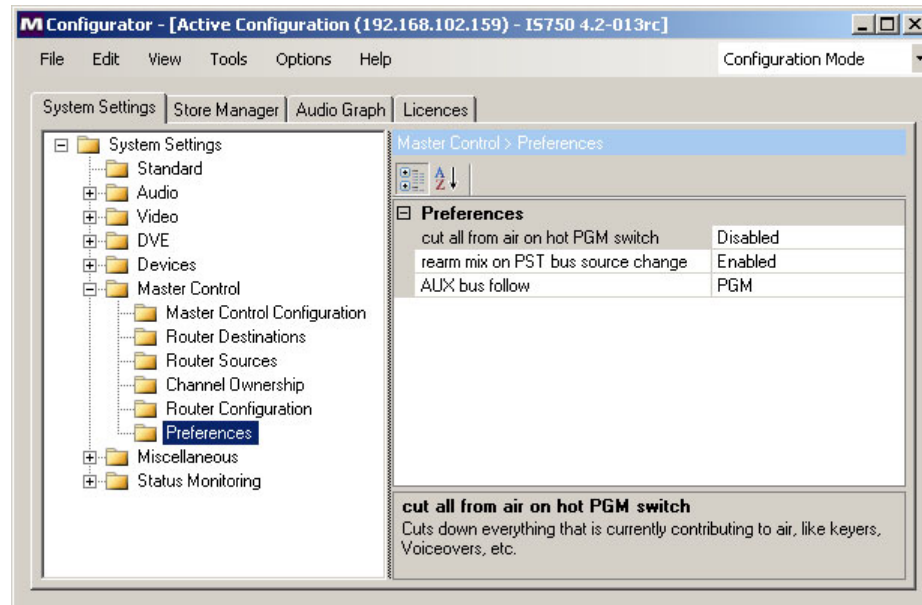
(Note: the 'NP0017³ mnemonic' option controls which NV9000 name set is used by the Imagestore 750 Configurator. The names in that name set appear on control panel buttons. When the mnemonic option is the default, the Imagestore 750 uses the NV9000's system names.)

The default value of 4 is acceptable for installation. You might wish to set this value higher, later on, if you see flashes at the end of transitions. Higher values are for slower routers. Use a value for the longest switch time where there is some variance in your routers' switch delays.

3. The term "NP0017" is the part number of the document describing an NVISION protocol. The term has no actual significance here.

[Step 13] **Preferences**

This step is optional during installation. You can perform this step at any time after installation. Choose the 'System Settings' tab under 'Configuration Mode' and open 'Master Control > Preferences' in the navigation tree:



These are the options:

- **Cut all from air on hot PGM switch**
This option can be enabled or disabled.
When it is enabled, performing a hot cut on the program bus causes all effects (DVEs, XG keyer layers, DSKs, and voice-overs) to be removed (cut down) from the program bus.
When this option is disabled, a hot cut does not change the effects present on the program bus.
- **'Re-arm mix on PST bus source change.'**
This option can be enabled or disabled.
When it is enabled, selecting a source on the preset bus that is different from the source selected on the program bus causes the most recently selected transition type to become selected. (It does not matter why that transition type was selected—the option uses *the most recently selected transition type*.) Further, if the operator selects a source on the preset bus that is the same as the source on the program bus, all transition types becomes de-selected.
When this option is disabled, selecting a source on the preset bus has no effect on whatever transition type is selected or not selected.
- **'Aux Bus Follow'**
This option—although not strictly a transition option—has 3 choices: 'none', 'PGM', or 'PST':
When the option is 'PGM', the aux bus “follows” the program bus. That means that whatever source an operator selects on the program bus is also selected on the aux bus.
When the option is 'PST', the aux bus “follows” the preset bus.

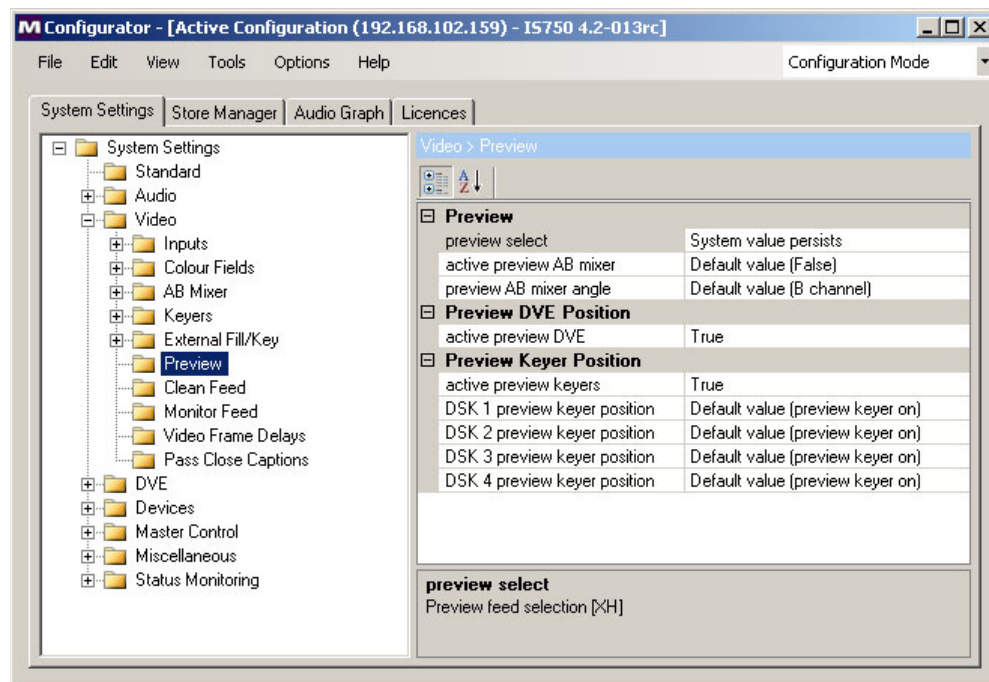
When the option is 'none', the aux bus does not "follow" either bus and operates normally.

Note that when the option is 'PGM' or 'PST', the operator can still use the aux buttons, normally, to switch sources to your aux output.

[Step 14] "Preview" Options

This step is optional during installation. You can perform this step at any time after installation. The Imagestore 750 has several options that govern the use of the preset button row on master control panels before, during, and after transitions. (The preset bus is called "preview" in the parlance of the Imagestore 750 Configurator.)

To configure these options, go to the 'System Settings' pane under 'Configuration Mode' and open 'Video > Preview':



These are the options:

- 'Preview Select'

Normally, this option presents the preset bus at the preset output. (Within the configuration software, this output is called either preview or preset.)

It is possible, although not likely, for the Imagestore 750 to be configured to present program output, the program A/B mixer output, the program DVE output, or the outputs of DSKs 1, 2, or 3 as the preset output.

- 'Active Preview AB Mixer'

This option can be enabled or disabled.

When it is *enabled*, the preset (a.k.a. preview) background video depends on both the progress of the program A/B mixer and its arm state.

If the operator has not armed the A/B mixer (i.e., has not selected a transition type), the preset background video is the same as the program video background.

When the operator selects a transition type, the preset background video is what was chosen as the preset source, which will be the background video on program after the next transition (or “Take”).

When the option is *disabled*, the preset background video is independent of the A/B mixer and its arm state. The preset background video is always the chosen preset source.

- ‘Preview AB Mixer Angle’

This option can be either ‘A channel’ or ‘B channel’.

Leave this at the default which is ‘B channel’.

- ‘Active Preview DVE’

When this option is activated, if you hot-cut a DVE on the program bus, it will also become active on the preset bus. And, if you hot-cut a DVE off the program bus, it will also be removed from the preset bus.

- ‘Active Preview Keyers’

Some operators like the “PresStation” method of arming DVEs, DSKs, and voice-overs on the preset bus. Other operators like the traditional method (which is used for MCEs and MCPMs).

When this option — coupled with ‘Enable Traditional PST Tally’ of the MCS Panel Configuration Editor — is chosen, the panel will operate using the *traditional* method. Otherwise, the panel will use the *PresStation* method.

▲ This setting must match the setting in the MCS Panel Configuration Editor. See step 22.

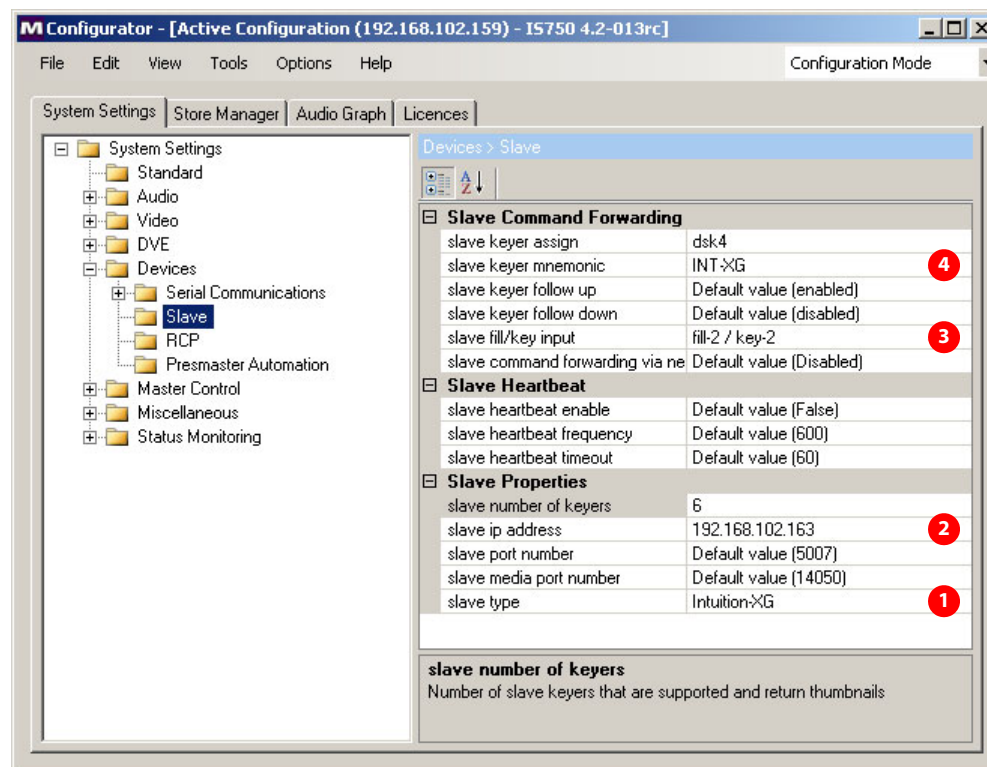
- ‘DSK *n* Preview Keyer Position’

This basically turns the Imagestore 750’s individual DSKs on or off.

If your panel has DSK buttons, and they are disabled in the Imagestore 750’s configuration, the buttons will be disabled on your panel. They might be enabled for another Imagestore 750.

[Step 15] **Intuition XG Options**

If your Imagestore 750 receives input from an Intuition XG, it is essential that you configure its connection. To do so, go to the 'System Settings' pane under 'Configuration Mode' and open 'Devices > Slave':



At a minimum, specify

- 1 Specify 'Intuition XG' in the 'slave type' field.
- 2 Enter the IP address (on the master control network) of the Intuition XG processor in the 'slave ip address' field.
This IP address is used for command forwarding (if you prefer Ethernet control to serial control).
- 3 In the 'slave fill/key input' field, choose one of the 3 fill-and-key pairs for the input from the Intuition XG processor. (You will cable these ports to the outputs of the Intuition XG processor later. The Intuition XG processor might have two sets of outputs. The Imagestore 750 Configurator supports only one, but you can use either one.)
- 4 In the 'slave keyer mnemonic' field, enter a mnemonic for the Intuition XG.

Other options

XG layers are peculiar. First, XG layers are processed by one of the Imagestore 750's DSKs. Second, operators cannot view an XG layer merely by selecting it on PST. Doing so only arms the XG layer for transition.

However, operators can view XG layers by selecting an XG layer on PGM and then selecting the DSK that carries it, either on PGM or on PST. If you select the DSK on PGM, the XG layer appears on air. If you select the DSK on PST, it does not.

There are several Intuition XG (i.e., “slave”) options that relate to this phenomenon:

- Slave keyer assign.

This option designates one of the DSKs as the default carrier for XG layer content. When the operator selects an XG layer (on PST or PGM) the default DSK is also selected. The operator can always override this default.

To make this configuration, choose one of the DSKs (or none) in the drop-down list. ‘None’ means there is no default.

- Slave keyer follow up.

This option can be enabled or disabled.

When it is enabled, the default DSK turns on automatically when the operator has selected one or more XG layers.

When this option is disabled, the default DSK is not affected by XG layer selections.

- ▲ Note: If the operator is be able to preview an XG layer on PST without it appearing on air, set this parameter to *disabled*. Because the XG layer can be viewed only when it is on PGM, when this option is enabled, the DSK becomes selected on PGM (and viewable on air).

- Slave keyer follow down.

This option can be enabled or disabled.

When it is enabled, the default DSK turns off automatically when no XG layers are selected.

When this option is disabled, the default DSK is not affected by XG layer selections.

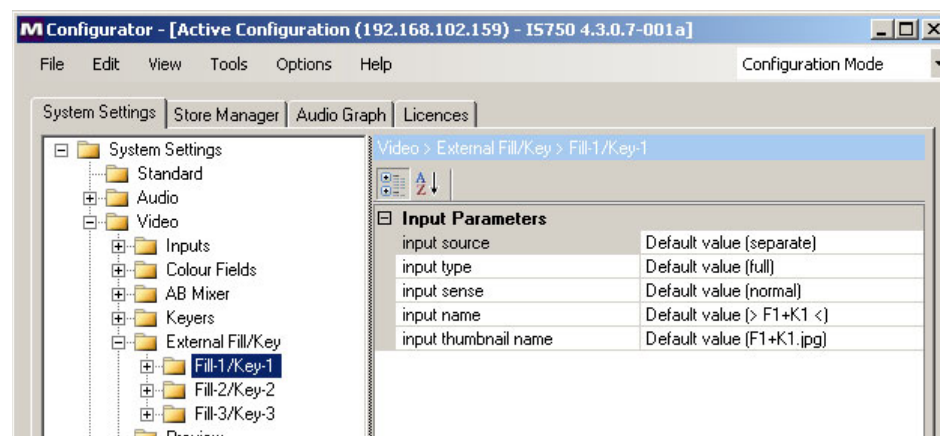
- Slave number of keyers.

The number of XG layers that are supported and return thumbnails. By default, Intuition XG provides 8 layers.

Keyer Settings

Go to the ‘System Settings’ pane under ‘Configuration Mode’ and open ‘Video > External Fill/Key’. Choose Fill-1/Key-1, Fill-2/Key-2, and Fill-3/Key-3 in succession and specify the ‘input name’ and the ‘input thumbnail name’ for each.

For the external keyers that are **not** from the Intuition XG, leave these fields at their default. In this illustration, Fill-1/Key-1 is set to its default:



Installing and Configuring Imagestore 750s

Imagestore 750 Configuration

The default name for input pair 1 is "> F1+K1 <" and the default for the thumbnail (file) name is F1+K1 . jpg. (Note that these defaults are built into the Imagestore 750.)

For the external keyer that belongs to the Intuition XG, select instead the name "> INT-XG <" and the thumbnail INT - XG . jpg:

input name	> INT-XG<
input thumbnail name	INT-XG.jpg

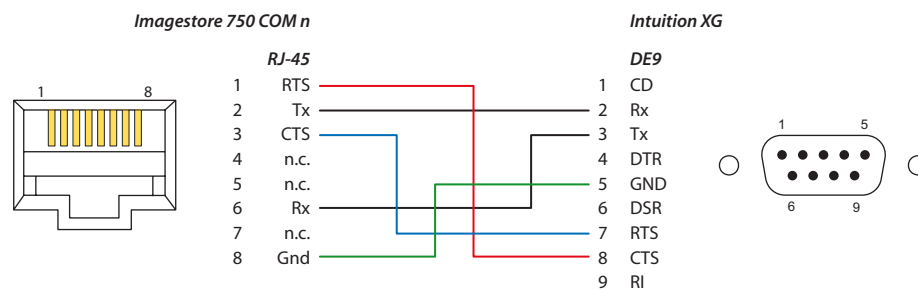
These names are also built into the Imagestore 750.

Serial Cable

An Imagestore 750 controls an Intuition XG processor over a serial connection.

Connect one of the Imagestore 750's COM ports to the RS-232 port of the Intuition XG processor. You need either a special cable or an RS-45 cable with a special adapter that comes with the Imagestore 750. The part number of the adapter is 1897-1800-100.

The pinout of the Imagestore 750's COM port (RJ-45) and the pinout of the Intuition XG's RS-232 port are both non-standard. The Intuition XG's RS-232 port is male. This is the wiring of the cable you need:



The following serial port settings are normally recommended between the Imagestore 750 and Intuition XG:

Baud rate	19200
Serial protocol	Oxtel slave
Serial standard	RS232

In the Imagestore 750 Configurator, configure the rate and settings for the port you chose under 'Configuration Mode'. Choose Devices > Serial Communications > COM *n*.

For the Intuition XG, configure the rate and settings for this port using Xplay. (Choose Tools > Configure Automation > CQB > Oxtel over Serial.) The rate should match that of the Imagestore 750's COM port.

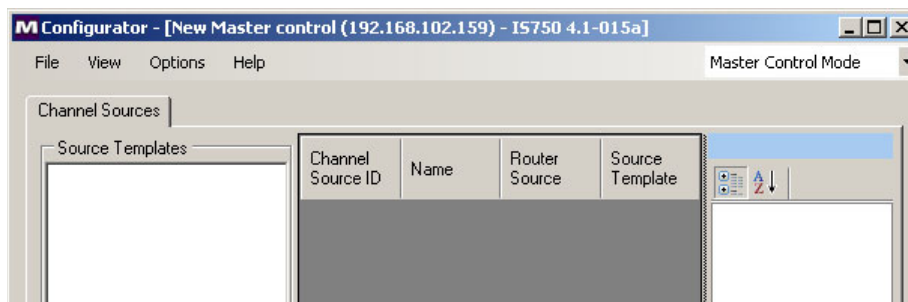
[Step 16] Source Groups

You must define at least one source group. Typically, panel operators may select from several source groups. Sources may be assigned to more than one source group.

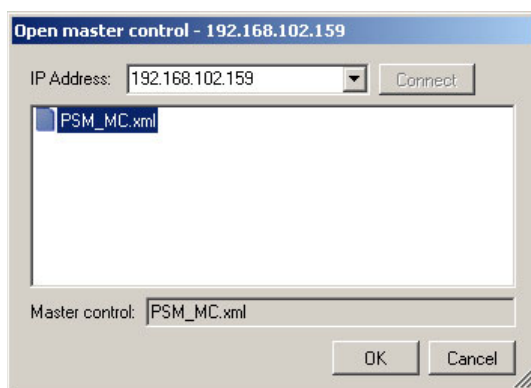
A defined source group identifies the sources that are to appear on a control panel's source buttons at any one time, and on which buttons they are to appear.

- ▲ You should define source groups in the Imagestore 750 Configurator before you define 'Group Select' buttons in panel configurations.

1 Choose 'Master Control' in the top right drop-down menu:

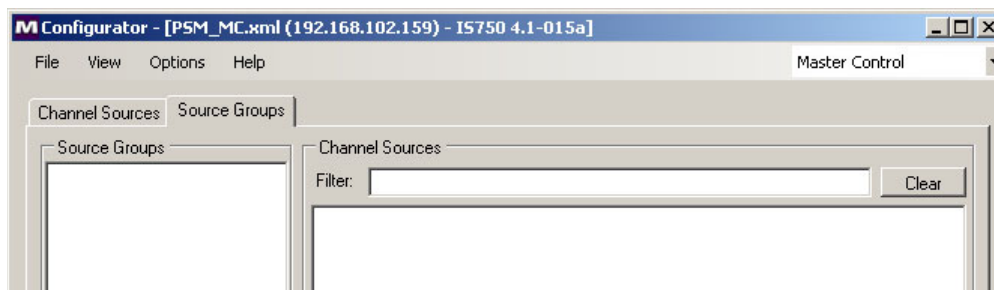


2 Then choose 'File > Open'. Specify the IP address of the Imagestore 750 and choose a master control configuration file:

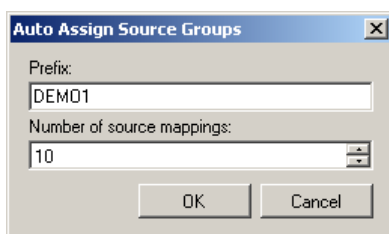


This file is one that you created in step 9.

Select the 'Source Groups' tab:



To create a new source group, right-click the 'Source Groups' region and select 'New' from the context menu that appears. A dialog appears:



Specify the name of the group and the number of sources in the group. The configurator now shows the sources of the group in the lower part of the display where you can add, remove, or change sources:

Src 1	Src 2	Src 3	Src 4	Src 5	Src 6	Src 7	Src 8
HD DTV4	HD BARS	HDCHROMA	HD RAMP		DTV	BARS	CHROMA

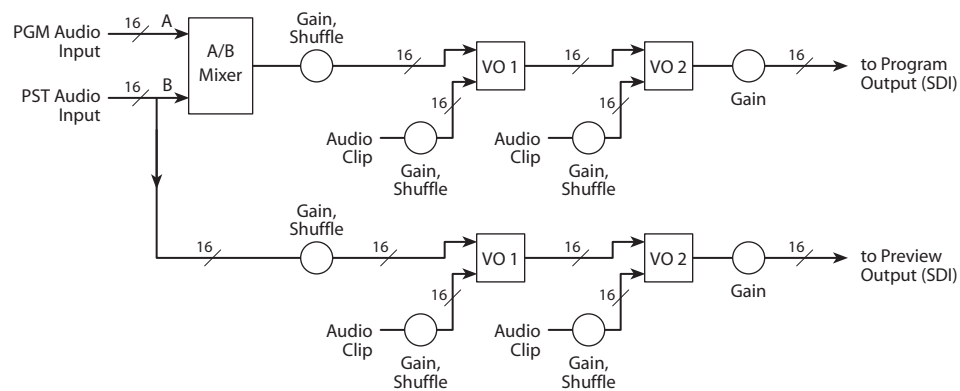
Gaps in the source list are allowed.

Keep in mind that the source groups are implicitly numbered, *starting at 0*. The group numbers are used in the assignment of 'Group Select' buttons in the MCS panel configuration editor.

The sources in the group are mapped to source buttons on panels in the order in which they appear in the group. That is, source 1 appears on the left-most source button, source 2 appears on button 2, and so on. If there is a gap in the source group, the gap maps to a source button (and the button is dark or disabled).

[Step 17] Audio Configuration

Audio configuration is more complex than other configuration tasks, but, even so, it is straightforward and logical. You can cope with its complexity if you keep the iMC Master Control model in mind. This drawing represents the iMC model:



Without correct audio configuration, the Imagestore 750, one or more features of your master control system might not work properly.

There are two methods by which you can configure the audio in an Imagestore 750:

- Construct an audio graph (using the tool in the Imagestore 750 Configurator).
- Use an audio template.

Here is a comparison of the methods:

Audio Graph	Audio Templates
Starting from an empty configuration is daunting unless you already have some experience with audio in Imagestore 750s.	It is very easy to choose an audio template. (Choose the one that is most appropriate for your system.)
The audio graph is very flexible. You can do what you want.	The template might not be exactly what you want. (You can modify your choice using the audio graph tool.)
Unless you do it right, the Imagestore 750 will not work properly, especially in the context of the iMC master control system.	Each template works as defined (as long as your Imagestore 750 has the needed components).

If you decide to start with an audio template, we recommend you choose

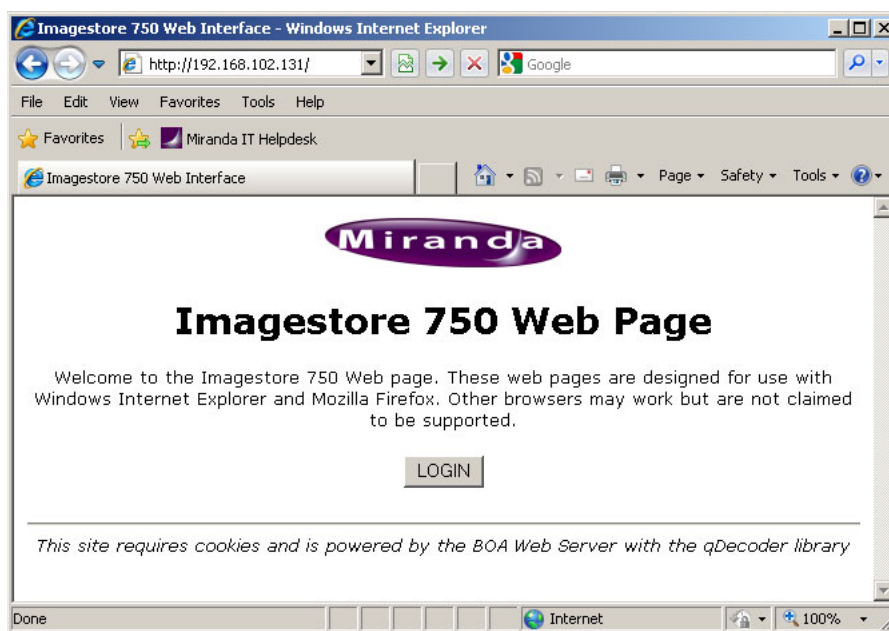
`abmix16_ep8_vo_pvw_aes16_vo_pvw.xml`

which seems to be the closest to the iMC master control model. Variations on this audio configuration are permissible to a degree. The criterion is whether the variation will work in your system. See [Selecting an Audio Template](#) on page 154.

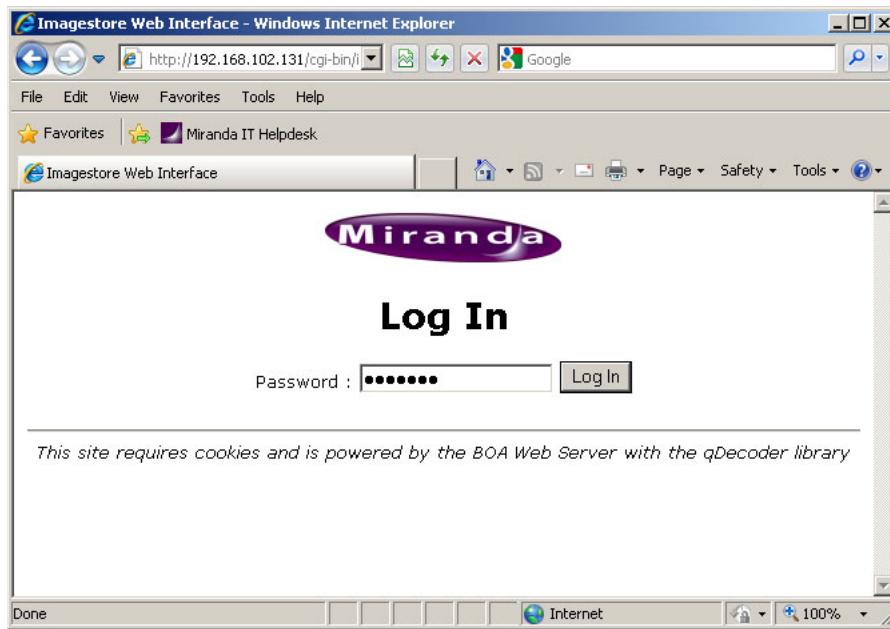
Browsing Audio Templates

Although template selections are made in the Imagestore 750 Configurator, you may examine the specifications for each of the templates in the Imagestore 750's browser application.

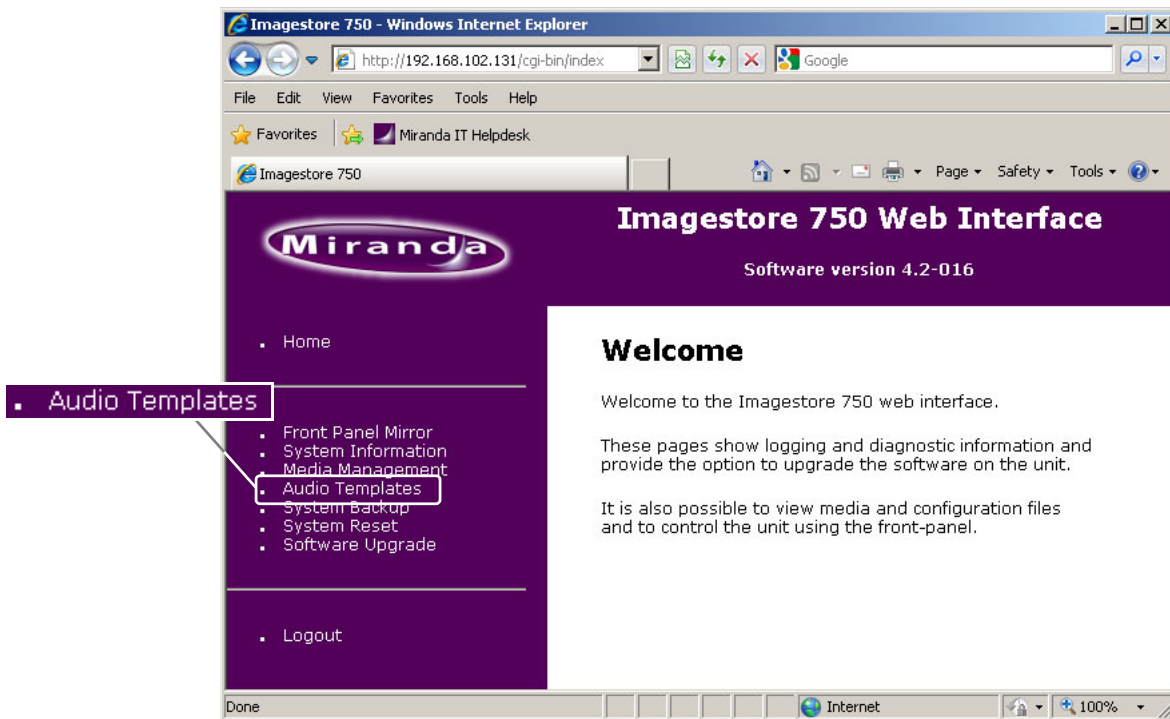
- 1 Launch your browser (e.g., Internet Explorer).
- 2 Enter the IP address of the Imagestore 750 in the address field. The initial page of the browser application appears:



3 Click 'Login' and then enter your password. The default password is 'miranda':

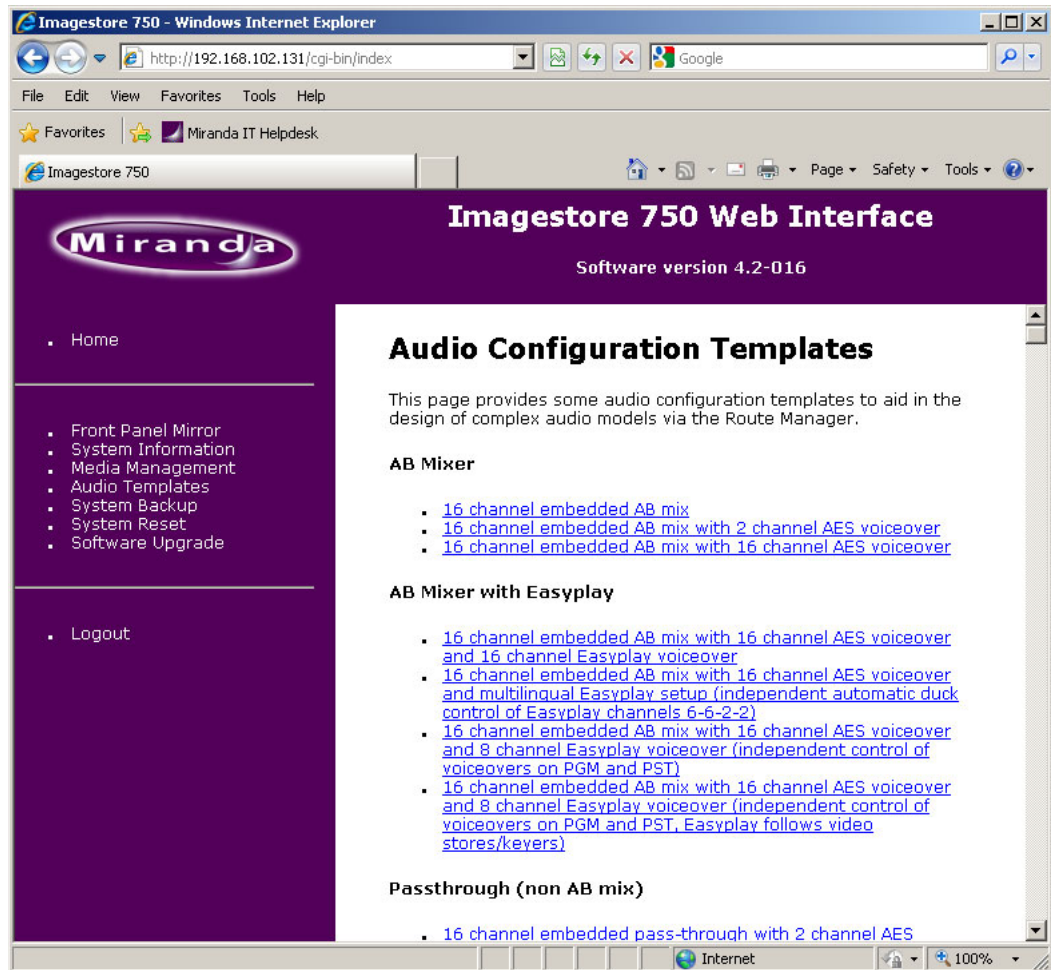


4 The 'Welcome' page appears:



Click 'Audio Templates' at the left.

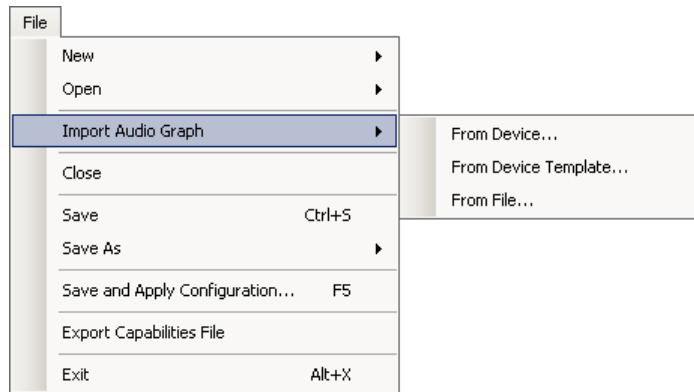
5 The audio templates page appears:



The templates are just listed at the top and described in detail further on. At present, there are 19 templates. Click on a template entry to jump to its details. When you are viewing the details, you can download the template if you want. It is not a necessary part of audio configuration to download the template. (The templates are .XML files.)

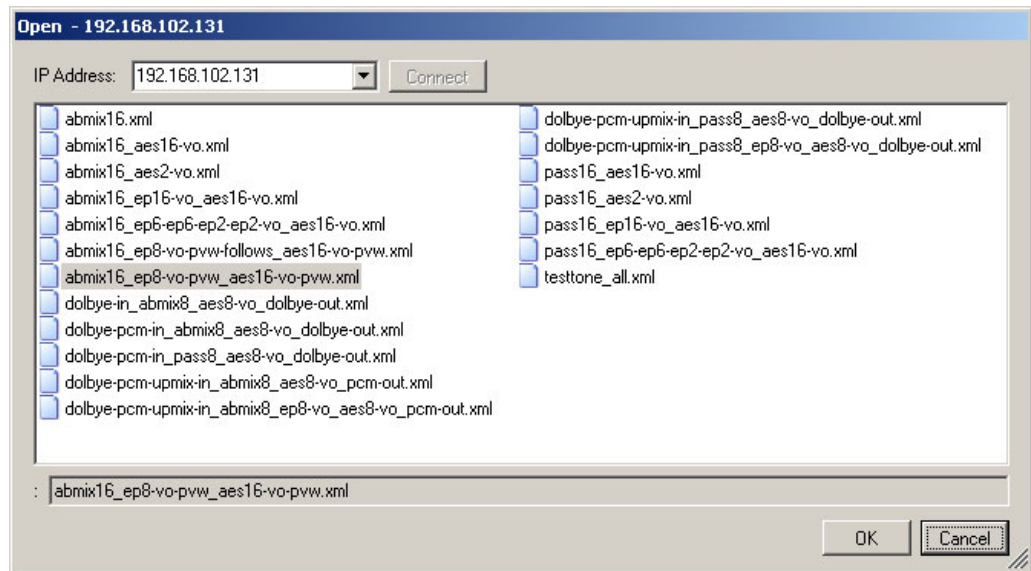
Selecting an Audio Template

- 1 Launch the Imagestore 750 Configurator. Either create a new configuration or open an existing configuration using the IP address of the Imagestore 750 you are configuring.
- 2 From the 'File' menu, click 'Import Audio Graph':



Choose 'From Device Template..' in the sub-menu.

- 3 The template list appears:

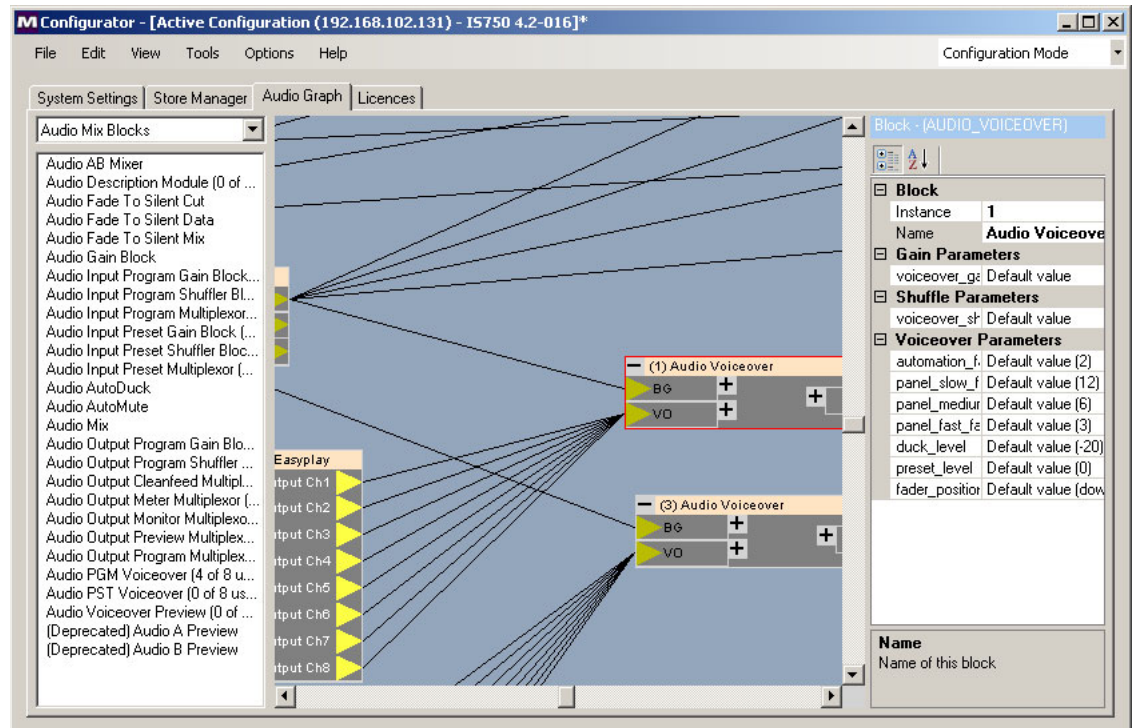


Choose one of the templates and click 'OK'. We recommend the one shown selected above, because it is nearest to the requirements of the iMC master control system.

- 4 At this point, the Imagestore 750 should pass audio (after you save the configuration and restart the Imagestore 750 with the new configuration). It probably will not do everything expected of an Imagestore 750 in an iMC master control system. You can modify the audio graph at a later time.

Details of the Recommended Audio Template

- 5 If you have imported the recommended template, click the 'Audio Graph' tab. The audio graph corresponding to that template appears:



The audio graph page has 3 sections. On the left is a list of components available (in a category) and a drop-down list of categories. On the right is a region in which you can change the parameters for a selected block or signal group.

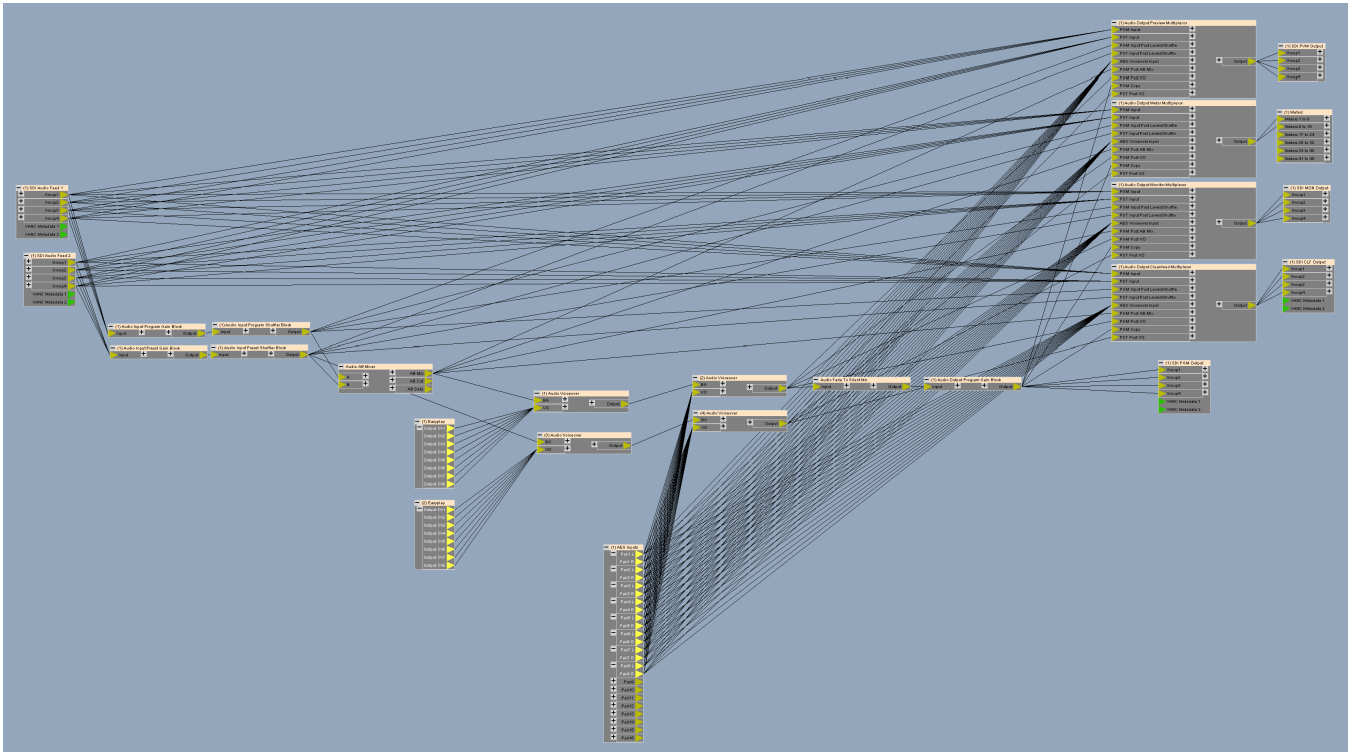
In the middle is a *portion* of the audio graph. You can view other portions of the audio graph by scrolling left and right or up and down. (It is not possible to see the entire audio graph.)

In the illustration above, one of the blocks is selected and highlighted with a red outline. Its parameters are listed in the right-hand section of the page.

Installing and Configuring Imagestore 750s

Imagestore 750 Configuration

Here we reproduce the full audio graph of the template
abmx16_ep8_vo_pvw_aes16_vo_pvw:



If you are viewing this page, in PDF, on your computer, you can zoom in to see better detail.

Figure 6-5 shows a more orderly view of that audio graph:

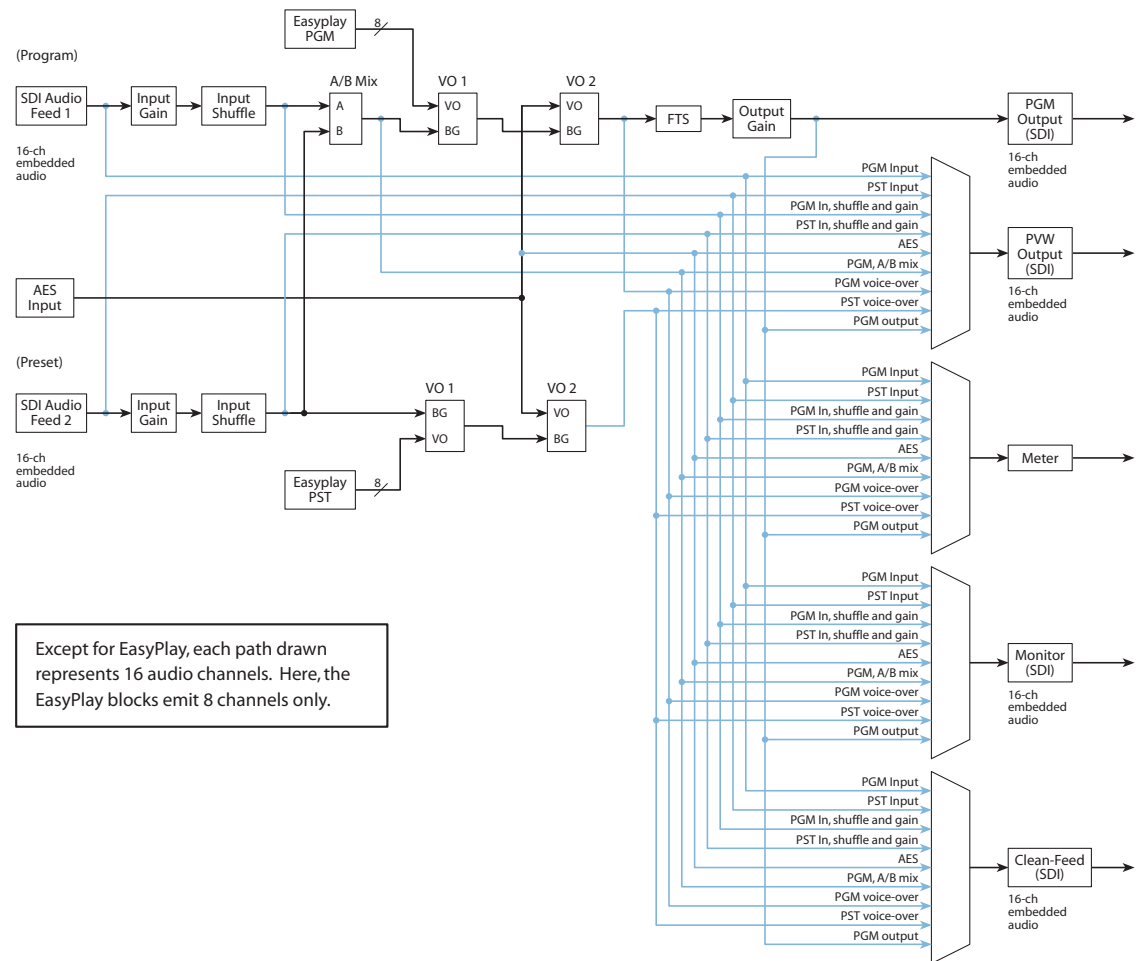


Fig. 6-5: A Schematic View of the Template's Audio Graph

Note certain details:

- The iMC system refers to the processing paths of the Imagestore 750 as *program* and *preset*. The Imagestore 750 terminology calls these the *program* and *preview*. Thus, within the Imagestore 750, the terms *preset* and *preview* mean the same thing.
- The EasyPlay devices in the template emit 8 channels of audio. If you use this template, you might want to add an additional 8 channels for a total of 16.
- The multiplexers in front of the preview, meter, clean-feed, and monitor outputs are not essential. If you always want to monitor the same signal, you can delete the multiplexer for the monitor output and connect the signal(s) to the monitor output block directly. Similarly, if you always want the output of the preset path to be present in the preview output, you can delete the multiplexer and connect the PST VO2 output(s) directly to the preview output block.
- This graph does not include audio delays at output. Audio delays are probably required in your system to compensate for timing differences. You can add them if you need them.
- The master control system's mute and invert functions are handled in the gain blocks. It is probably immaterial whether gain should precede shuffle or vice versa.

- The graph has no output shuffle block. Although you could add one, the master control system does not support output shuffle and the block would be useless.
 - The VO1 blocks accept input from (internal) EasyPlay blocks. The VO2 blocks accept input from (external) AES inputs. You could reverse this. You could also have additional EasyPlay blocks that feed VO2 instead of an AES block.
- Or you could have AES inputs feed both VO1 and VO2. However, there are only 16 AES inputs. You would have to assign some of the AES inputs to VO1 and others to VO2.

Here is an example of the preceding template having been modified:

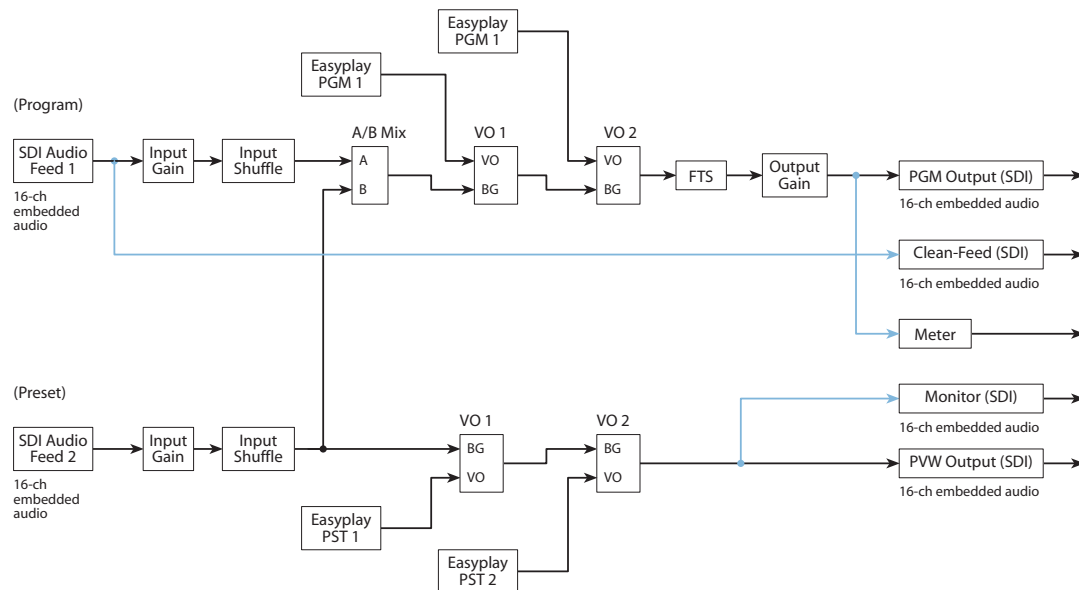


Fig. 6-6: Diagram of Audio Template Modified after Selection

In this modification, the various multiplexers are removed and the corresponding outputs have been connected directly to a point within the processing path. A second set of EasyPlay units drive VO2 instead of the AES inputs. The EasyPlay units now use all 16 audio channels.

- ▲ EasyPlay clips are managed and loaded into the Imagestore 750 using the Audio Builder application, part of the MCS software that ships with the Imagestore 750.

Effective Use of the Audio Graph Tool

Knowing a few techniques will help you to build or modify audio graphs efficiently.

What you do in the audio graph is to select audio blocks (i.e., components) from the left side of the audio graph page and place them, by dragging-and-dropping, onto the middle portion (the graphic portion) of the audio graph window. Then, when you have placed enough blocks to proceed, you draw lines connecting signals from one block to another. When you are done, you will have an audio processing path from input to output, for both program and preset, and possibly for other paths. The topology of the graph will probably resemble that shown in Figure 6-6 (or Figure 6-5), but of course there are very many options not represented in those figures.

You can rename the blocks and rename signals within the blocks.

The following list identifies the audio blocks from which you may choose. The blocks correspond to actual components in the Imagestore 750. The blocks available to you depend on what Imagestore 750 options you have purchased.

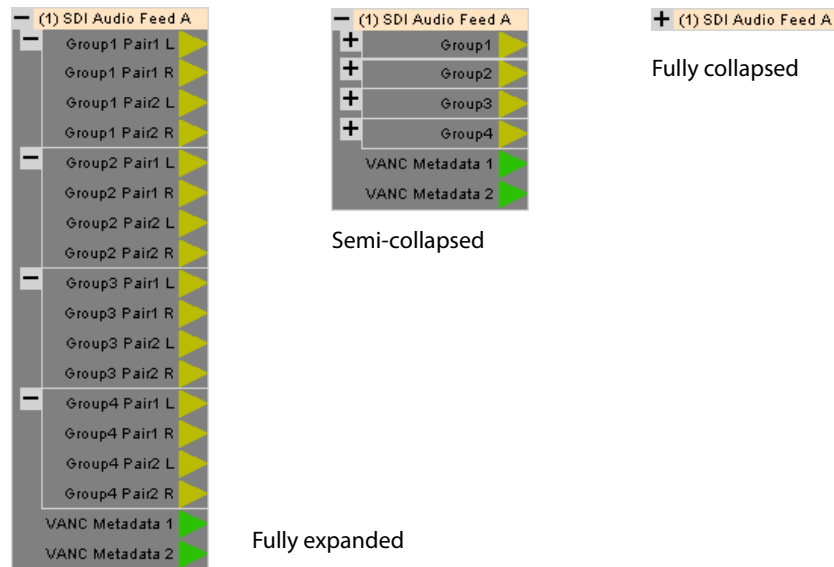
The number of blocks available are given in parentheses:

- Audio delay banks (6)
- Audio inputs
 - AES input (1), EasyPlay (4)
 - SDI audio feeds 1–4 (1 each)
 - Silence (1), test tone (1)
- Audio outputs
 - AES output (1)
 - Meters (1)
 - SDI PGM output (1), SDI PVW output (1), SDI CLF output (1), SDI MON output (1)
- Audio mix blocks
 - A/B mixer (1)
 - Audio description module (1)
 - Fade to silence cut (1), fade to silence data (1), Fade to silence mix (1)
 - Gain (1)
 - Program input gain (1), program input shuffle (1), program input multiplexer (1)
 - Preset input gain (1), preset input shuffle (1), preset input multiplexer (1)
 - Automatic duck (1), Automatic mute (1)
 - Audio mix (1)
 - Program output gain (1), program output shuffle (1), program output multiplexer (1)
 - Meter output multiplexer (1), monitor output multiplexer (1)
 - Preview output multiplexer (1), clean-feed output multiplexer (1)
 - PGM voice-over (8), PST voice-over (8), voice-over preview (8)
- Audio modules
 - Dolby decoder, AC-3 and E (1)
 - Dolby AC-3 encoder (1)
 - Dolby E encoder (1)
 - Upmix (1)
- Metadata modules
 - Metadata A/B mixer (1)
 - Metadata blank source (1)
 - Metadata processor (4)
 - Metadata UARTs (1)— 4 UARTs, RS-485, in this block

There are also some legacy block types which will not be discussed. Please call Miranda technical support if you need assistance with these.

Placing a Block

Click to select a block type in the left pane and drag the block onto the graphic area. The block will appear in its fully expanded form. You can collapse the block later if you prefer. However, to connect the signals from that block, it needs to be expanded so that you can see the individual signals. Here is an example:



Interconnect

Drag your cursor from an output of one block to an input of another block. A straight line then appears between the output and the input. You can make multiple connections as easily as you can make single connections. Follow these steps to make multiple connections:

- 1 Drag your cursor around the outputs you want to connect to some inputs. They become highlighted in red:



2 Point to one of the outputs and drag your cursor so that the lines (that now appear) connect to the appropriate inputs:



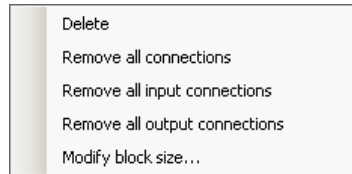
3 Release the cursor to make the connection. The interconnected ports become bright yellow:



Repeat these basic steps to interconnect all the blocks in your audio graph.

Block Options

Right-click a block to get a context menu for the block:



You can

- Delete the block entirely. (Connections to it are deleted as well.)
- Remove some or all of the block's connections.
- Modify the block's size, which is to change the number of channels in the block.

You can also right-click an individual port. A context menu appears:



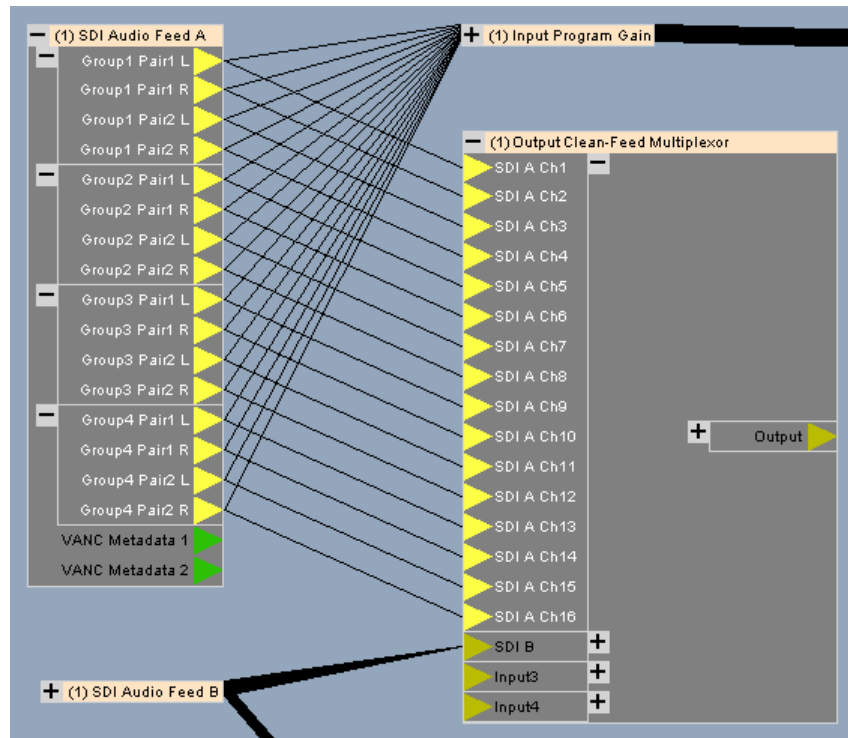
From this menu, you can

- Remove an individual connection to this signal.
- Remove all of the block's connections.
- Modify the block's size, which is to change the number of channels in the block.

If you have right-clicked an output port, you might have a choice of which connection to remove, depending on the fanout of the signal.

Fanout

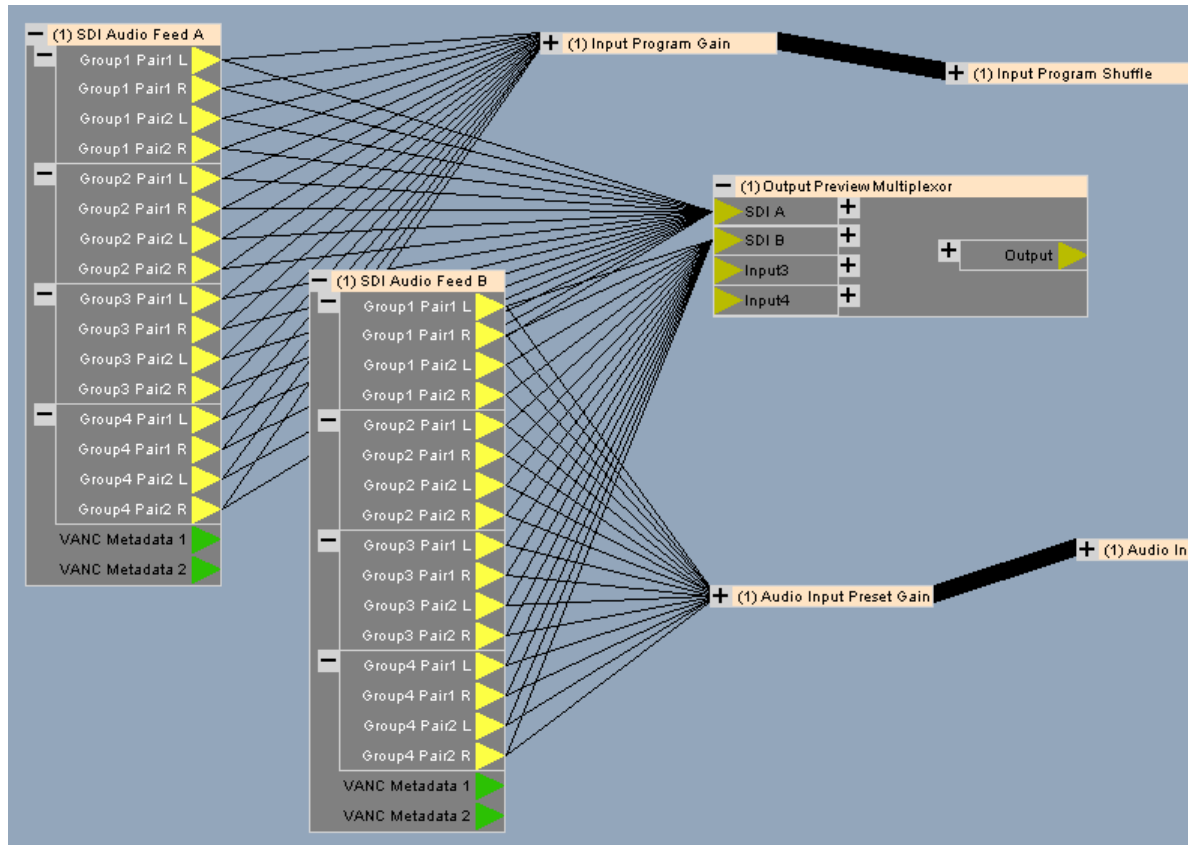
It is possible (and useful, even necessary) to connect the outputs of one block to the inputs of more than one block. For example, you might want the SDI inputs to go the next stage in the processing path (e.g., gain) and also to the clean-feed multiplexer.



Just select the outputs and drag your cursor from the outputs to the additional inputs.

Managing the Graph

As your graph becomes more fully populated with blocks and interconnect, you might want to collapse many of the blocks and adjust the position of the blocks more optimally:



You can select any block by clicking it. To select multiple blocks, drag your cursor across a region that completely contains all the blocks you want to select. (The graphic view does not pan automatically.) To select all blocks, choose 'Select all' from the 'Edit' menu (or press Ctrl-A).

You can drag select blocks to any position in the visible portion of the audio graph. The interconnect moves with the blocks as you move them.

Tips

Press the space bar to center the audio graph in the audio graph pane.

There is no zoom or pan. But you can adjust the view with the scroll bars.

You cannot make multiple selections by clicking. You must marquee drag around the signals or blocks you want to select. You cannot add entries to, or remove entries from, a selection.

You cannot connect a signal already connected. Delete the existing connection(s) first.

You cannot select signals that have been collapsed.

You cannot use copy and paste to create blocks in the graph.

'Select all' from the edit menu selects all blocks. Ctrl-A is its shortcut.

In the MCS Panel Configuration Editor

Perform these steps for each panel you are installing.

Tip: do not forget to choose the 'Imagestore 750' button in the 'General' configuration page.

[Step 18] Router Destinations

Here you identify the monitor wall destinations for a panel configuration:

- 1 Open a panel configuration. Go to the 'Monitor Wall' configuration page.
- 2 Select router destinations for each monitor source. These are the destinations you defined in step 4. If the panel you are configuring uses *N* sources, complete the first *N* entries.
- 3 Select router destinations for any of the 5 types of Imagestore 750 output you want to send to the monitor wall. These are also destinations you defined in step 4.

▲ Panels configurations that use the same monitor wall use the same router destinations.

This is an example of applying the destinations defined in NV9000-SE Utilities to the 'Monitor Wall' table in the MCS Panel Configuration Editor:

The screenshot shows the MCS Panel Configuration Editor interface. On the left, a 'Devices' window displays a table of devices filtered by 'MON'. A red arrow points from this table to a larger table on the right, which represents the 'Monitor Wall' configuration. Below this, two smaller tables show the mapping of channel outputs to destination IDs and mnemonics, with a dropdown menu showing the selection of 'KX MON: 2041' for the 'Monitor' output.

Device Filter:	LevelSet Filter:
MON	All

ID	Device	Level Set
2038	KX PGM	VID
2039	KX PST	VID
2040	KX CLFD	VID
2041	KX MON	VID
2042	KX AUX	VID
1136	MONITOR1	VID
1137	MONITOR2	VID
1138	MONITOR3	VID
1139	MONITOR4	VID
1140	MONITOR5	VID
1141	MONITOR6	VID
1142	MONITOR7	VID
1143	MONITOR8	VID
1144	MONITOR9	VID
1145	MONITR10	VID
1146	MONITR11	VID
1147	MONITR12	VID
1148	MONITR13	VID

Xpt Button	NV9000 Dest ID	Mnemonic
1	1136	MONITOR1
2	1137	MONITOR2
3	1138	MONITOR3
4	1139	MONITOR4
5	1140	MONITOR5
6	1141	MONITOR6
7	1142	MONITOR7
8	1143	MONITOR8
9	1144	MONITOR9
10	1145	MONITR10
11	1146	MONITR11
12	1147	MONITR12
13		
14		
15		
16		

Destination IDs applied in the MCS Panel Configuration Edi-

Channel Output	NV9000 Dest ID	Mnemonic
Program	2038	KX PGM
Preset	2039	KX PST
Cleanfeed	2040	KX CLFD
Monitor		
Aux	2042	KX AUX

Dropdown menu for Monitor output:

- [Clear Entry]
- 1080ST 1:1122
- 1080ST 2:1123
- 1080ST 3:1124
- 1080ST 4:1125
- 1080ST1:59
- 1080ST2:60
- 1080ST3:61

Dropdown menu for Aux output:

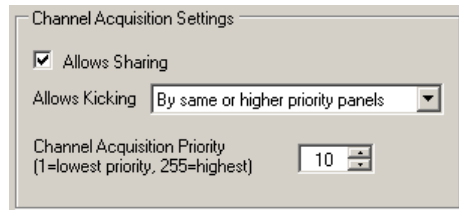
- KX MON: 2041
- KX PGM: 2038
- KX PST: 2039
- KX CLFD: 2040
- KX MON: 2041**
- KX AUX: 2042
- MONITR16: 1151
- PCS A: 1129
- PCS B: 1130

Monitor destinations as defined in NV9000-SE Utilities

[Step 19] Channel Acquisition

Imagestore 750s have sharing and “kick” options (step 11) and panels have sharing and kick options. A panel’s sharing and kick options are somewhat inter-related with those of the Imagestore 750s it can control.

These options define how panels can share Imagestore 750s, how panels that do not share may preempt other panels, and how panels may be permitted or denied access to Imagestore 750s. To configure sharing and kick options, go to the ‘Advanced’ page and use the ‘Channel Acquisition Settings’ section:



Check ‘Allow Sharing’ if the panel is to share control of any of its Imagestore 750s with other panels.

Designate the priority level of this panel for when other panels attempt to gain access to the Imagestore 750 controlled by this panel. Then choose a value for ‘Allow Kicking’. This value specifies how this panel reacts when another panel (that does not share) attempts to acquire its Imagestore 750. The choices are:

- ‘Never’ — this panel never allows another panel to preempt it.
- ‘By higher priority panels only’.
- ‘By same or higher priority panels’.
- ‘Always’ — this panel always allows another panel to preempt it.

[Step 20] Group Select Buttons

‘Group Select’ buttons are discretionary. How many such buttons you place on a panel depends on many factors. Typically, you will have one button for each source group.

To configure a group selection button, choose one of the various configurable button sections of the panel you are configuring. Then choose a button and make it ‘Group Select’ button:

Button	Type	Mnemonic	Group Number
7	Group Select	GROUP SELECT	0

(‘Group Select’ buttons are available from the ‘Utility’ branch of the button function tree.)

Assign a group number to the button. The source groups in the Imagestore 750 configurator are numbered implicitly, *starting at 0*. If you have many source groups, you’ll have to determine their numbers by inspection.

[Step 21] Salvos

Salvos execute upon an a channel change or when an operator presses a salvo button or through automation. The salvos that can execute are the ones you defined in step 8.)

Channels

A channel selection can cause an NV9000 salvo to execute.

To configure a salvo for a channel, go to the 'Channel Selection List' page. Enter a salvo ID (from among the salvos listed in the Imagestore 750 configuration) in the 'Salvo ID' field for the channel:

The screenshot shows a web interface titled 'Channel Selection List' with a sub-header 'Define Imagestore Channels'. Below the header is a table with the following data:

Mnemonic	IP Address	Salvo ID	Default Imagestore
IS 159	192.168.102.159	12	<input type="checkbox"/>
IS 131	192.168.102.131		<input type="checkbox"/>
			<input type="checkbox"/>

Leave the field blank for channels that do not trigger salvos.

Salvo Buttons

'Salvo' buttons are discretionary.

To configure a salvo button, choose one of the various configurable button sections of the panel you are configuring. Then choose a button and make it 'Salvo' button:

Button	Type	Mnemonic	Salvo ID
1	Salvo	Salvo	4

Enter a salvo ID (from among the salvos listed in the Imagestore 750 configuration).

[Step 22] Preset Tally Option

Panel configurations have an option that applies to panels when they are controlling Imagestore 750s. This option governs the way a panel's preset button row tallies before, during, and after transitions. Some operators like the "PresStation" method of arming DVEs, DSKs, and voice-overs on the preset bus. Other operators like the traditional method (which is used for MCEs and MCPMs).

The option—'Enable Traditional PST Tally'—is specified in the 'Advanced' configuration page of the MCS Panel Configuration Editor. If you enable the option, the panel will operate using the traditional method. Otherwise, the panel will use the "PresStation" method.

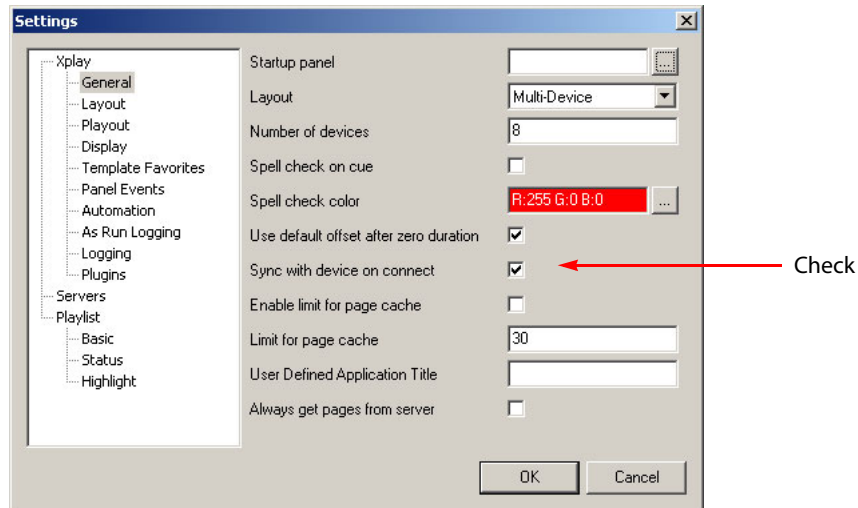
If you do enable the option, it is *imperative* that the 'Active Preview Keyers' parameter of the Imagestore 750 configuration be set to true. See step 14.

Intuition XG Settings

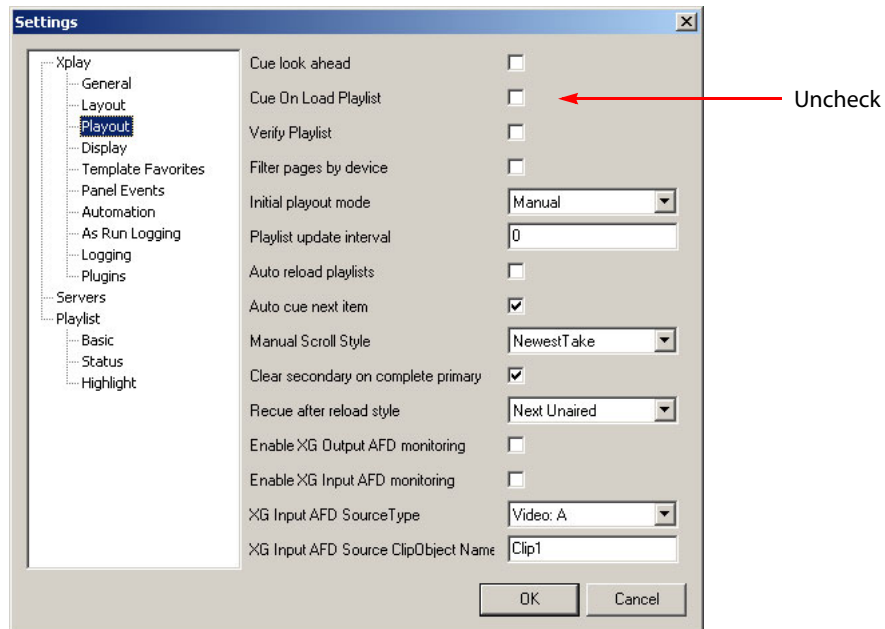
It is important to observe some particular settings in Xplay for the Intuition XGs connected to your Imagestore 750.

Choose 'Settings' under XPlay's Tools menu.

- 1 Under the 'General' category, ensure that the 'Sync with device on connect' is checked:



- 2 Under the 'Playout' category, ensure that the 'Cue on Load Playlist' is **unchecked**:

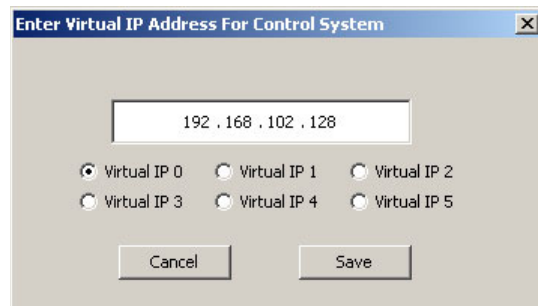


This is very important. XG clips will not function properly under master control unless this option is unchecked.

Other Matters

Virtual IP Address

If you have a redundant NV9000 system, it is advisable to create a virtual IP address (one that represents either the primary or secondary, whichever is active). Do this in the 'System Management' page of NV9000-SE Utilities:



Miscellaneous Connections

The use of all other Imagestore 750 signals is optional. Their ports are documented in the Imagestore 750 and Imagestore 750 Configurator manuals.

The GPIO connector is an HD44. A breakout device is available.

The AES connector is a SCSI VHDCI-68 female. Breakout boxes are available. The cable must have male connectors with 0.8 mm pin spacing.

There are four RJ-45 COM ports that support RS-232 or RS-422 for automation or serial control.

See [Imagestore 750 Connectors](#) on page 199 for details.

Key Signal Connections

In the context of the NV5100MC master control system, the Imagestore 750 supports up to 3 external key pairs (fill and key video inputs). You can connect these external key ports to any devices that are useful to your master control system.

Typically one of the pairs connects to the output of an Intuition XG processor.

7 Maintenance

Chapter 7 provides information about maintenance and trouble-shooting.

Topics

<i>NV5100MC Maintenance</i>	171
<i>NV5100MC Trouble-Shooting</i>	173
<i>NV5100MC Module Replacement</i>	174

NV5100MC Maintenance

The master control system requires very little in the way of routine or preventative maintenance. Other than cleaning the fan air intake filter, all that is required is periodic inspection of the system to make sure no failures have occurred.

Periodic Inspection

Periodically inspecting the master control system for signs of trouble is the best way to prevent unplanned outages. The following items will be helpful when performing this inspection. Begin the inspection at the front of the frame. Open the door to the master control frame and make these observations.

- 1 Check the +48VDC LEDs on the front of the PS6100 (or older PS6000) power supplies. An LED that is off or very dim indicates a failed or failing supply.
- 2 Place your hand lightly across the air intakes on the front of the power supplies. You should feel slight air movement, indicating that the internal cooling fans are running. These fans run at very low speed, so you will notice only slight air movement. You can use a flashlight to verify that the fan blades are rotating at the proper speed.
- 3 Look at each input/output module and verify that none of the red alarm LEDs are illuminated. Normally, the green and/or amber LEDs are illuminated. Refer to Table on page 173 to interpret the LED status indicators.
- 4 Look at the control card(s) and verify that the green and amber LEDs are illuminated on the active control card, and that the green LED is on for the standby controller (if present). Verify that the low battery LED is off on one or both control cards. Table describes the various LEDs and their meaning.
- 5 Inspect the air intake filter located inside the door. If the filter is dirty or clogged, refer to [Intake Filter Screen Cleaning](#) for information on how to clean it.
- 6 Verify that there are no missing backplane cover plates. Cover plates are required to ensure proper cooling in the frame.
- 7 Place your hand near the air exhausts. You should feel strong air pressure evenly across the entire opening.

- 8 Check all cable connectors for any sign of unseating.
- 9 Verify that one or both AC cords are firmly seated at both ends. Make sure that the spring bail power cord retainers on the rear of the frame are in place.

Intake Filter Screen Cleaning

The intake filter is located on the front door assembly of the master control frame. To access the filter, simply open the door by releasing the two thumbscrew locks. Slide the filter up and to the right to remove it. This process might be easier if you remove the entire door. To remove it, simply open the door and lift it straight up. The system can be operated safely with the door removed for short periods of time.

- ▲ Be sure to replace the door when you are done. This ensures that air entering the frame is properly filtered.

If the filter is only lightly contaminated with debris, clean it with a vacuum cleaner or dry compressed air. Remove loose debris and dirt with a vacuum cleaner or by blowing air from the clean side to the dirty side. For filters that are badly clogged, a rinse with cold water may prove effective. You can also wash the filter with warm water and mild detergent. In any case, make sure the filter is completely dry before reinstalling it.

Battery Replacement

A CR2330 lithium coin cell is located on the front edge of an EM0374 router control card and at the front edge of an MCPM-SD or -HD. These batteries provides power to maintain the RAM contents when power is lost.

- ▲ Other MCPMs have no battery. EM0414 clock cards do not have a battery.

Under continual power, the battery should last several years or more. If the module is frequently powered down, you should replace the battery every 6 months. A red LED, located directly above the battery holder in the control card illuminates if the battery is low. The MCPM-SD and -HD have no obvious battery LED.

The batteries can be replaced while the NV5100MC is powered up and operating. Simply pull the battery from its holder to remove the spent cell. Insert the replacement in the holder while carefully observing the polarity of the battery.

Reinstall the battery with positive (+) terminal facing *left* as you insert the battery (or facing *up* if you have taken the module out of the frame).

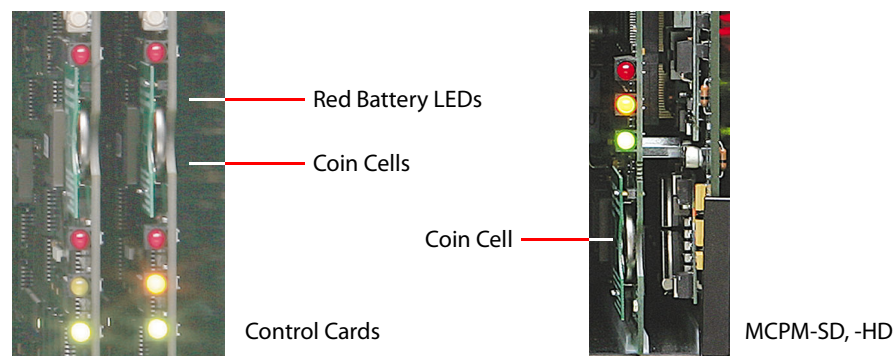


Fig. 7-1: Battery Replacement (Two Control Cards)

- ▲ **Warning:** Inserting the battery backwards may result in an explosion.

Fuse Replacement

All input and output modules, except for the SD output module, all HD modules and the control cards, include 1 A non-serviceable, self-resetting thermal fuses. These fuses open in the event of a serious overload, preventing major damage. They will self-reset if allowed to cool.

A replaceable AC fuse cartridge is used on the PS6100 power supply modules. The correct fuse is 15A (1.25" × 0.25" fast-blow).

The correct fuse for the older PS6000 power supply is given in this table:

90–130VAC	8.0A, 5×20 mm, slow-blow fuse
180–250VAC	6.3A, 5×20 mm, slow-blow fuse

If a fuse fails, locate the cause of the trouble rather than simply replacing the fuse blindly. While fuses that have been in service for years may fail due to cumulative stress, a fuse normally fails for a reason. Contact technical support for assistance if a fault problem cannot be isolated. Replacing the fuse without determining what caused it to open could cause equipment damage or fire by restoring power to a damaged unit.

NV5100MC Trouble-Shooting

LED Status Indicators

Every module has LEDs at its front that indicate the status of the module. The LEDs provide valuable visual clues about the cause of a failure. Table outlines the function of the most important LEDs:

NV5100MC Module Status LEDs

Module Type	LED	Function	Description
Control Card	Red (above battery holder)	Battery status	If red LED is ON, replace battery.
	Green	Healthy	Normal operation, successful boot, module power supplies OK. Ready to go active.
	Amber	Active	Module is active or in use.
	Red	Alarm	Fault State: <ul style="list-style-type: none"> • Bad or missing video or AES reference. • Bad on-module power supply. • Microprocessor failure. Try rebooting.
MCPM	Red (bypass)	Bypass	Indicates that the MCPM is in bypass mode
	Green	Healthy	Normal operation, successful boot, module power supplies OK
	Amber	Active	Module is active or in use
	Red	Alarm	Fault State: <ul style="list-style-type: none"> • Bad or missing video or AES reference. • Bad on-module power supply. • Microprocessor failure. Try rebooting.

NV5100MC Module Status LEDs

Module Type	LED	Function	Description
I/O	Red (upper)	Alarm	Indicates a fault condition. For example, an on-module power supply could be faulty.
	Green (upper)	Power	All power supplies are OK.
	Amber	FPGA loaded	Indicates that FPGA code is properly loaded. This LED must be ON for normal operation.
	Green (lower)	Comm. good	Communication with the controller is healthy,
	Red (lower)	Comm. failure	Communication with the controller has failed.

Other LED indicators may be present on some modules. For example, the control card and the MCPMs also have a “heartbeat” LED that blinks at an approximate 1 Hz. Some cards have LEDs that indicate the presence of data on the many communication ports. These indicators are located on the module PCB and are intended for more advanced troubleshooting.

Miranda customer support representatives might ask for the status of these indicators and will provide instruction on locating them on the specific module if necessary.

NV5100MC Module Replacement

I/O Modules

The power supplies and all front-loaded I/O modules may be removed or installed with the power applied or “hot swapped.” MCPMs and MCEs may be hot-swapped.

Prior to installing a replacement module, verify that any possible switch settings are configured correctly. Modules that receive and process serial data from the controller will automatically configure themselves at power up.

Ensure that a replacement MCPM or MCE has a correct IP address. Control panels will be unable to control the MCPM or MCE if it is not correctly identified. Also ensure that replacement MCPMs and MCEs have been given the correct configuration (including logos).

If any module appears to malfunction, first try re-seating it in the frame.

Backplane Modules

All but the HD input and output backplanes and the SD input backplanes are completely passive and may be removed at any time. Use the same cautions as with front-loaded modules. Be sure to match rear modules to the corresponding front modules. Those using BNC connectors are especially easy to install in the wrong location because, under casual observation, they look very similar. No damage will normally result from an unintentional mismatch.

HD Input, HD Output, and SD Input Modules

Unlike other backplanes, HD input and output backplanes and SD input backplanes contain active circuitry. Power to these modules is supplied by their associated front-mounted module. To remove one of these rear interface modules, first remove the front module. It is sufficient just to disconnect the module from the motherboard. Pull that module out a short distance if you wish to leave it in the frame slot.

A

References

Appendix A provides several useful reference sections.

Topics

<i>MCPM Comparison</i>	176
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MCPM Comparison

This table presents the important differences between the different MCPMS (including the MCEs):

	Slots	Formats	Preview		Analog Monitor Output		Logo Keyers	Logo Limit	Squeeze	Audio Channels	Dolby E Option	Video Ref.	Diagnostic Port
			Bus	Aux Bus	Output	Keyers							
MCPM-SD	2	SD			Y	2		Y		Y			
MCPM-HD	4 ^a	HD & SD			Y	2		Y		Y			
MCPM-MK-SD	1	SD			N	1	64	N	8	N	2, loop-through	DE9	
MCPM-MK-HD	2	HD ^b	N	N	N	1		N		N			
MCPM-SDHD/S	3 ^c	SD			Y	2		Enh.		Y			
MCPM-SDHD/H	3	HD & SD			Y	2		Enh.		Y			
MCE (Core only)	1		N							N		Phoenix 3-pin quick-connect ^e	
MCE (Core/PVW)	2	HD/SD ^d	Y		N	2	400	Enh.	16	N	1, terminating		
MCE (Core/AXM)	2		N							Y			
MCE (All)	3		Y							Y			

a. Includes 2 wing slots.

b. The -MK-HD obtains its sources from the 16 BNCs on its backplane module, and not from the motherboard.

c. Includes 1 wing slot.

d. MCEs are HD or SD, field-configurable. HD allows SD as well.

e. Requires a custom cable.

Other than these differences, the MCPMs (including MCEs) all have the same features, with few exceptions, if not the same number of features. MCEs have 2 clean feed outputs where MCPMs have one.

MCE outputs are primarily video outputs on coax (1.0/2.3) connectors, each having up to 16 embedded audio channels.

However, the MCE-AXM backplane module presents 24 AES outputs (on DB25 connectors).

MCPMs outputs vary.

Panel Comparison

This table presents the important differences between the different master control panels:

	Buttons Across	Source Buttons ^a	Preview Bus	Aux Bus	Audio Monitor Input ^b	Custom Button Sections	Joystick	Monitor/ Meter Buttons ^c	Level Knobs (Red)	Monitor knobs	TLA Support	Panel GPIO	IS 750
CECP	16	0-16	Y	Y	1	Y	Y	N	2	2	N	Y	N
CECP M1	16	0-16	N	Y	2	Y	N	N	2	2	N	Y	N
CECP GUI	16	0-16	Y	Y	n/a	Y	(slider)	N	0	2	N	N	N
Aux/Pvw GUI ^d	16	0-16	Y	Y	n/a	Y	(slider)	N	0	0	N	N	N
FECF	24	0-16	Y	Y	1	Y	Y	Y	2	2	N	Y	N
FFCF	24	16	N	N	no	Y	N	Y	3	2	Y	Y	N
CFCP	16	8-16	N	N	no	Y	N	N	3	2	Y	Y	N
PC GUI	24	16	N	N	n/a	Y	N	N	0	0	N	N	N
SCP	16	0-16	N	N	no	N ^e	(knob)	N	3	2	N	Y	N
iMC-Panel-100	16	0-16	Y	Y	n/a	Y	(slider and knob)	N	3	2	N	Y	Y
iMC-Panel-200	16	0-16	Y	Y	1	Y	Y	N	2	2	N	Y	Y
iMC-Panel-300	24	0-16	Y	Y	1	Y	Y	Y	0	2	N	Y	Y
iMC-Panel-GUI	16	0-16	Y	Y	n/a	Y	(slider)	N	0	2	N	N	Y

a. if you configure fewer than 16 source buttons, your panel might require bank selection.

b. Audio monitor inputs are coupled with a "live levels" display.

c. The audio monitor/meter button group includes "Dim" buttons.

d. The Aux/Preview GUI has no program or preset buttons.

e. Custom buttons may be created in the (hierarchical) menu.

Other than these differences, the panels have, with few exceptions, the same features.

The panels have different numbers of custom button functions.

The SCP lacks certain functions, such as router pre-select for overs (verify) and audio detail.

Control Card Jumpers

EM0374 Jumpers

The EM0374 router control card has several jumper sets:

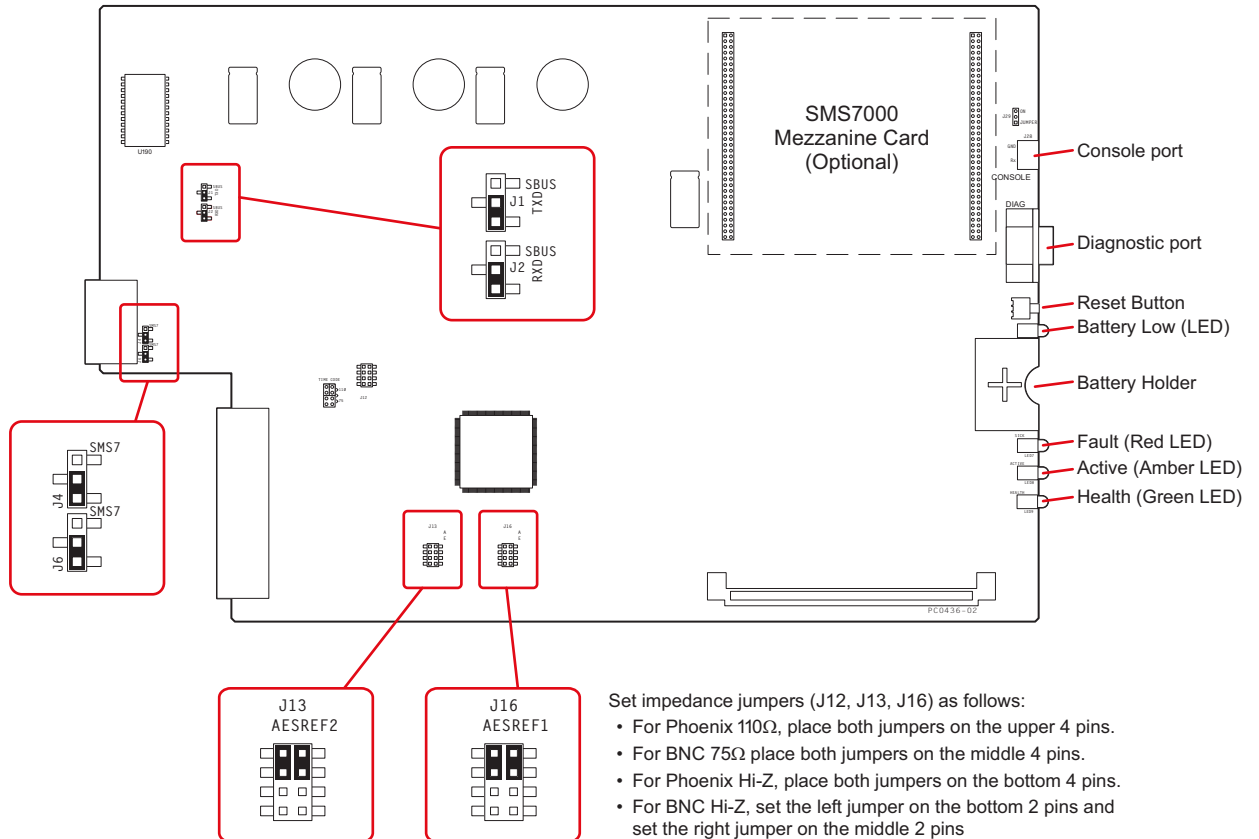


Figure A-1. EM0374 Router Control Card Jumpers

Table describes the jumpers. Jumpers not listed should be left in the factory position:

EM0374 Jumpers

Jumper	Settings
J1, J2	Leave these jumpers in the 10B2 position. The control card (and therefore the frame) does not support SBus yet.
J4, J6	SMS7000 option. Place the jumpers in the SMS7 position to use a SMS7000 control system and the Node Bus connectors. Otherwise, leave the jumpers in the SBus position. (SBus is not supported.) Note: Using an SMS7000 requires an SMS7000 mezzanine card to be installed.
J13, J16	AES reference termination options. See Figure A-1 above for the jumper settings.

EM0414 Jumpers

The EM0414 clock generator card also has several jumper sets:

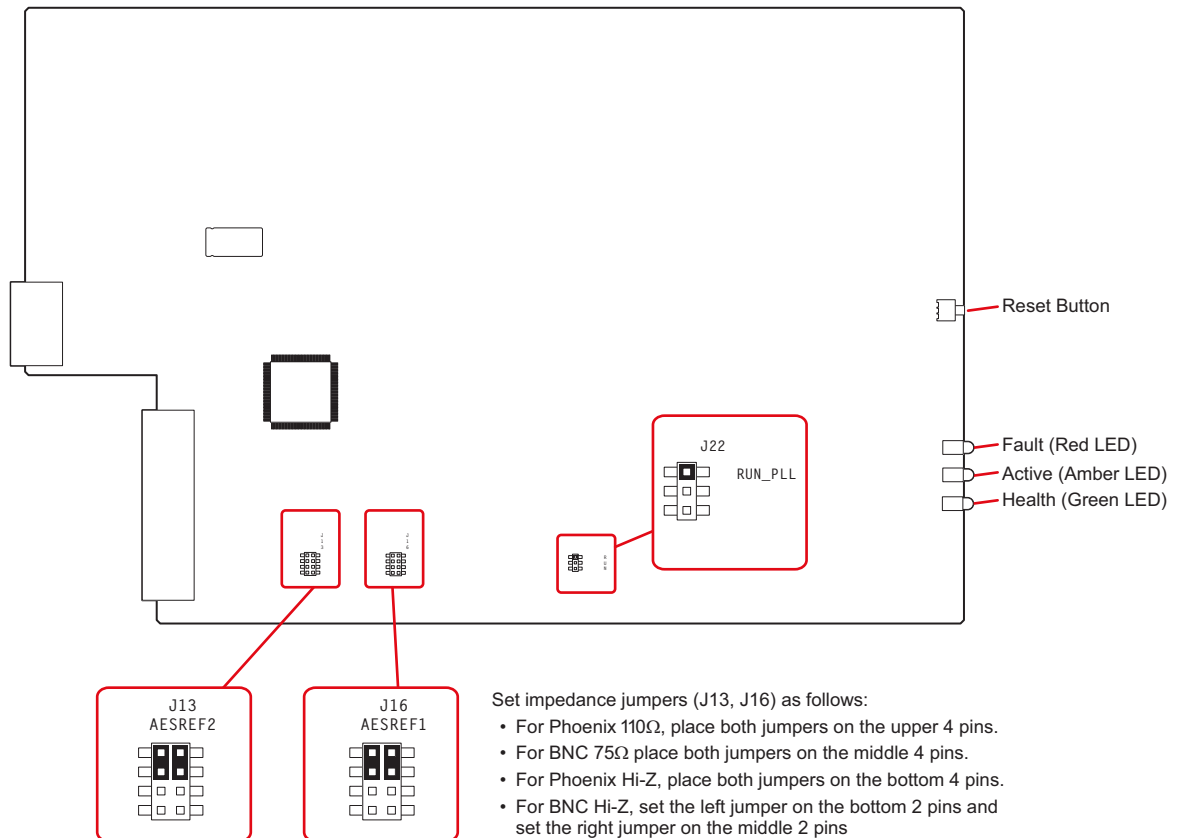


Fig. A-2: EM0414 Clock Generator Card Jumpers

Table describes the jumpers. Jumpers not listed should be left in the factory position:

EM0414 Jumpers

Jumper	Settings
J13, J16	AES reference termination options. See Figure A-2 above for the jumper settings. (The settings are the same for the EM0374 and EM0414.)
J22	Leave this jumper in the RUN_PLL position.

Analog Audio Switches and Jumpers

The analog audio input card (EM0585) has several jumper options. So does analog audio output card (EM0586. Options include:

- Setting the gain of individual channels.
If you are using single-ended inputs, you can double the input level by choosing a +6dB switch setting for those input channels.
- Activating mute detection.
- Setting operating levels to match facility production levels.

Individual Channel Gain

The analog audio input card has four 8-position DIP switches near the center of the board that allow the gain of each channel to be increased by 6 dB (doubled). These switches are labeled SW1, SW2, SW3, and SW5. (SW4 is elsewhere on the board.) Place the switch in the 0 dB position for normal gain. Otherwise, place the switch in the 6 dB position. There are 32 switches, one for each channel, 1L, 1R, 2L, 2R, and so on, up to 16L and 16R.

These switches affect *only* input gain. With the additional gain, source inputs are limited to +18 dB.

Mute Detection

The analog audio input card also has a mute detect enable jumper (J21), labeled 'Mute Control'. When the analog audio input level drops to -78 dB or lower for more than 0.25 per second, the output sample values are replaced with digital silence. This jumper affects *all* inputs on the card globally. The 'ON' position activates mute control; the 'OFF' position deactivates mute control.

Figure A-3 shows the location of the DIP switches for the analog audio input card.

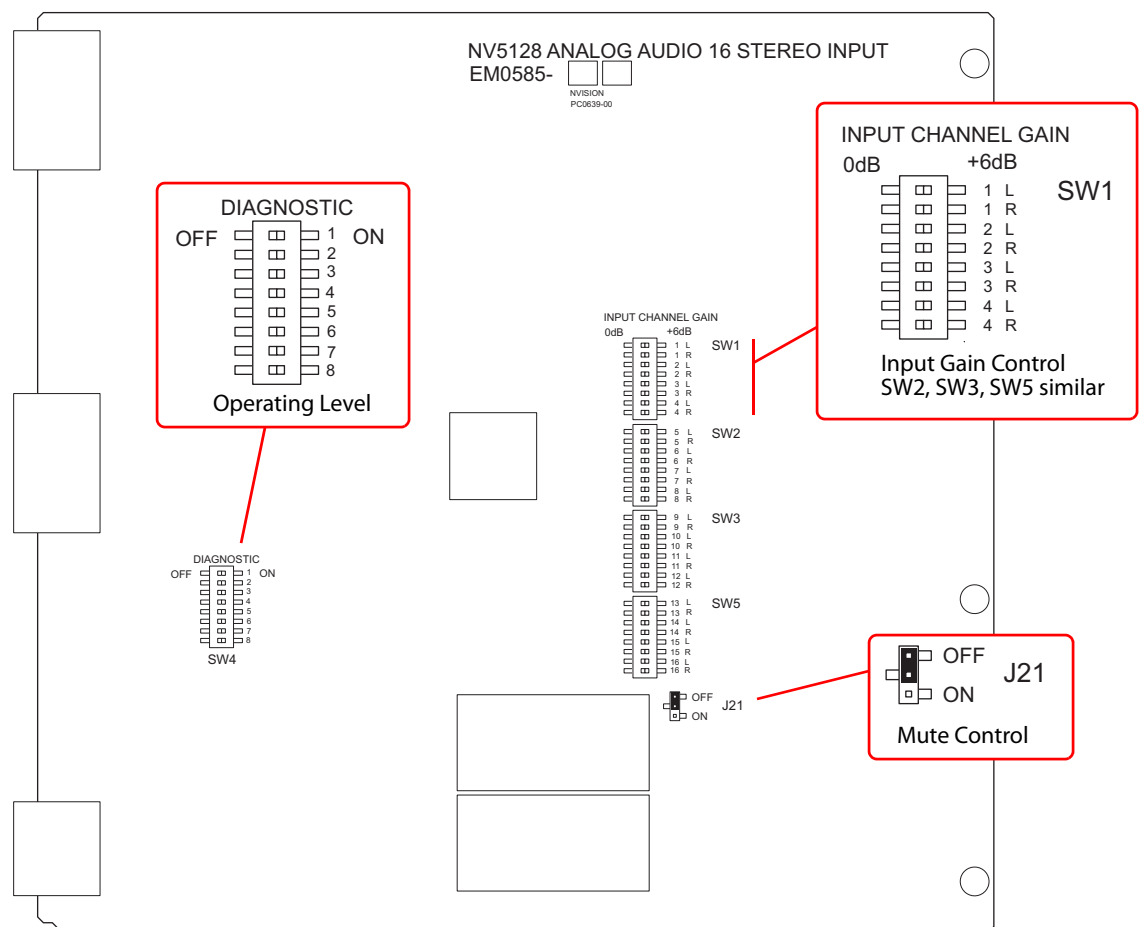


Figure A-3. Analog Audio Input Card Switch and Jumper Locations

Operating Levels

Both the analog input card and the analog output card have an additional DIP switch that can be used to match the operating level of your facility. For example, if the incoming signal operating level is +24 dBu, the card can be set to +24 dBu. By matching the incoming signal level, there is less degradation of the signal when it is converted to digital for internal routing in the router. Operating levels can be set for +15 dBu, +18 dBu or +24 dBu.

The DIP switch is SW4 on the input card and S1 on the output card. Only the first two switches on the DIP are used for the operating level. The following shows the switch positions for each operating level:

Switch 1	Switch 2	Operating Level (Max)
Off	—	+24 dBu
On	Off	+18 dBu
On	On	+15 dBu

By default, all switches are set to 'OFF' and the operating level set to +24 dBu.

Figure A-4 shows the location of the DIP switches for analog audio output card:

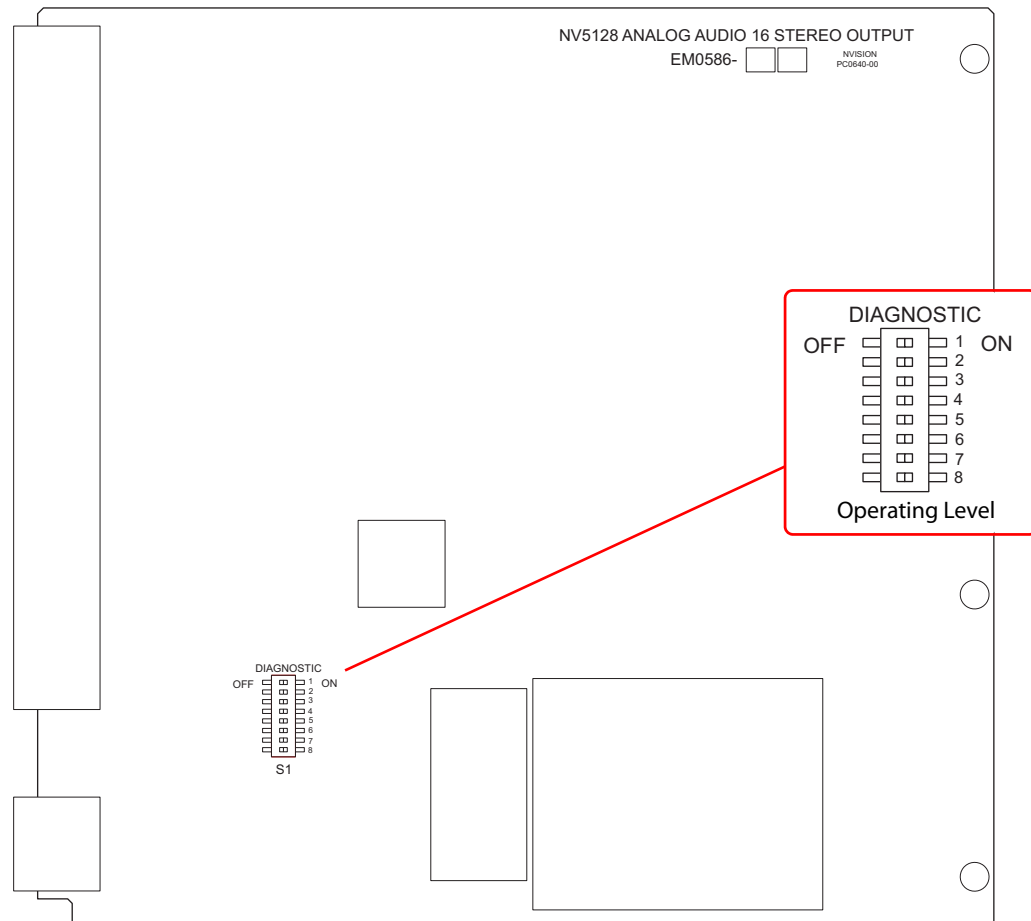


Fig. A-4: Analog Audio Output Card Switch Locations

Analog Video Conversion (AVC) Card Switches

AVC Input Card

The AVC input card (EM0432) receives composite analog video (NTSC or PAL) and converts the signal to SD format for delivery to the motherboard. The AVC output card (EM0433) receives SD formatted signals from the motherboard and converts them to composite analog video outputs in NTSC or PAL format. Because the color space for SD signals differs from that of composite signals, the absence or presence of *pedestal* in NTSC signals must be accommodated if color and luminance information is to be maintained. DIP switches are provided to preserve, as well as possible, the color and luminance integrity of signals processed by AVC cards.

Although composite PAL and NTSC inputs can be applied to and simultaneously routed by the AVC input card (EM0432), all NTSC signals must be in the same format (NTSC-M or NTSC-J). The 8-position DIP switch (S1) on the AVC input card configures the card to process NTSC signals correctly. If the incoming signals are NTSC-M formatted signals, set DIP Switch S1-1 to ON. If the incoming format is NTSC-J (no pedestal), set S1-1 to OFF. The ON position for S1-1 is determined by the markings on the body of the DIP switch.

Figure A-5 shows the location of the DIP switches for the analog video input card.

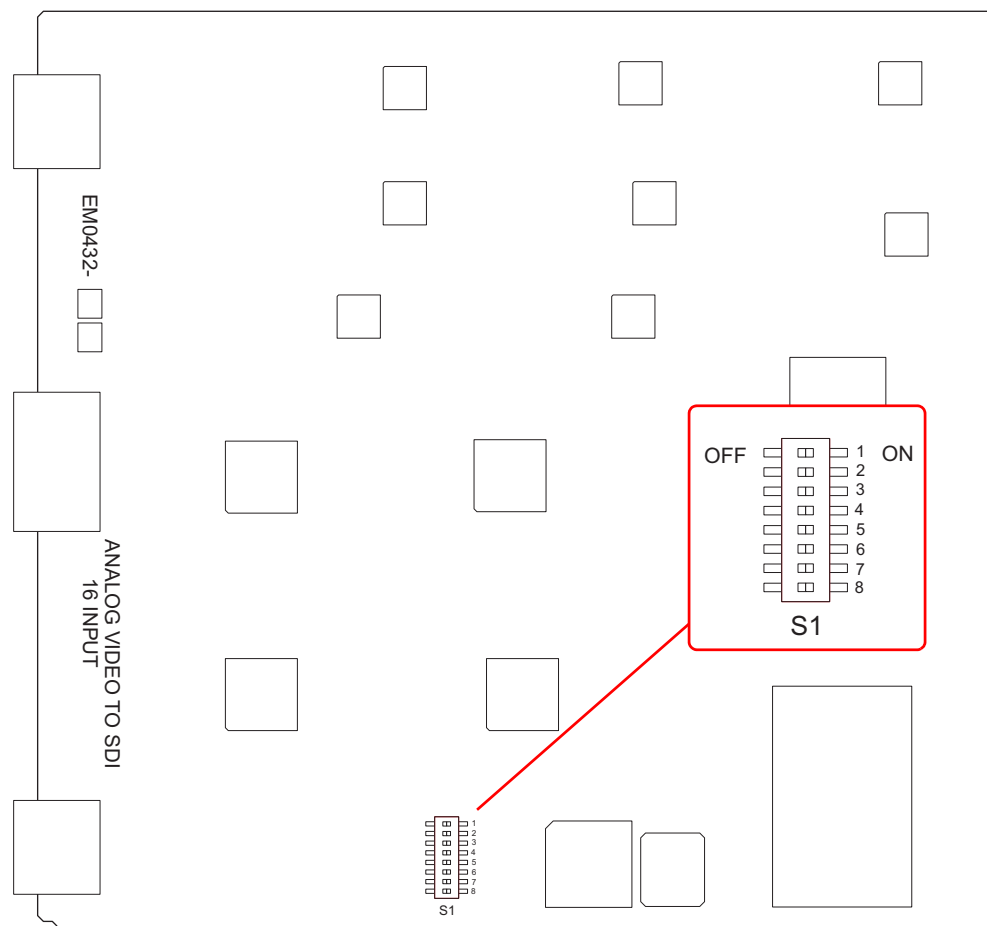


Fig. A-5: Analog Video Input Card Switch Locations

The remaining seven switch positions (S1-2 through S1-8) are not used. Switch S1-1 settings have no effect on PAL signal processing.

AVC Output Card

The AVC output card (EM0433) has three 8-position DIP switches, labeled S1, S2, and S3. Switch S2 is not used. The S1 and S3 switches (labeled 'User Settings') configure each of the 16 outputs for the correct NTSC output format (pedestal or no pedestal).

All 16 outputs on each output card must have pedestal settings that match the pedestal settings on the AVC input card. For example, if the input card's S1-1 is set to ON, then the output card's S1 and S2 must have all 16 switches set to ON. Refer to the silk screen markings on the AVC output card to identify and set switches to their proper positions. Do *not* use markings on the actual switch bodies.

Note

Attempting to convert NTSC-M signals to NTSC-J signals or *vice versa* results in large chroma/luma gain errors.

If signals fed to the AVC output card originate from SD input cards, then each output can be configured for pedestal or no pedestal (NTSC-M or NTSC-J) composite outputs. DIP switches S1 and S3 have no effect when handling PAL signals.

References

Analog Video Conversion (AVC) Card Switches

Figure A-6 shows the location of the DIP switches for the analog video output card.

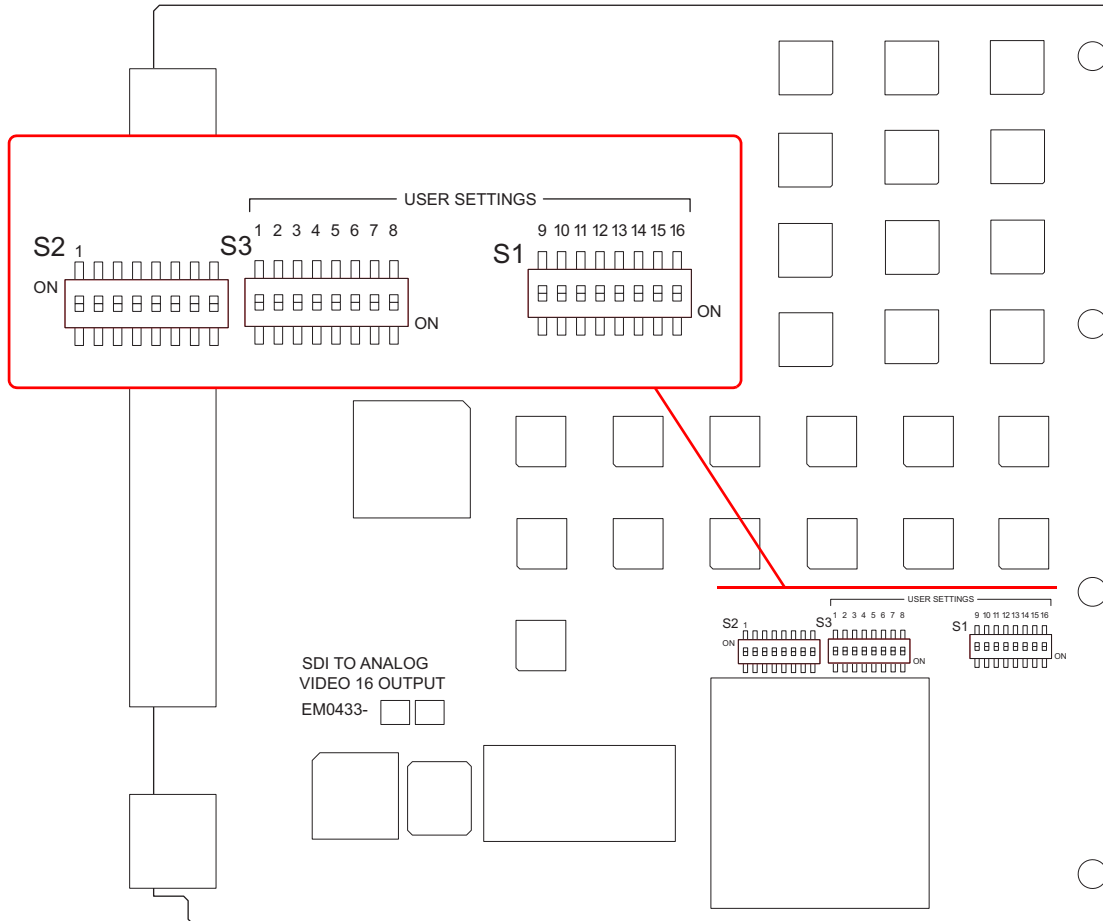
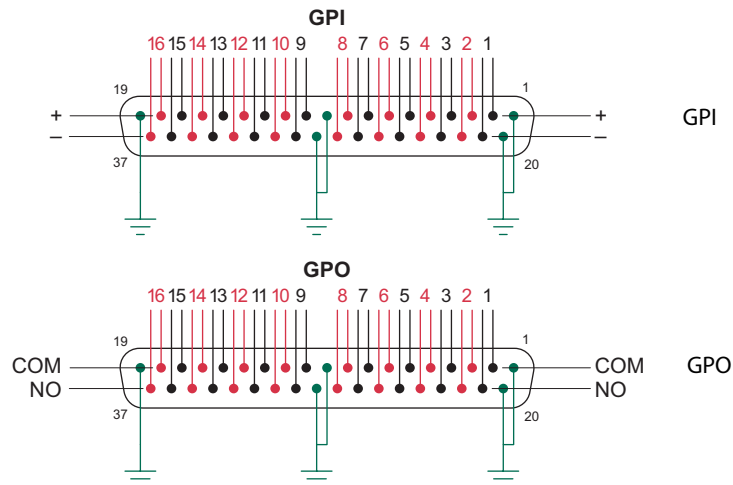


Fig. A-6: Analog Video Output Card Switch Locations

Tally Processor Connectors

GPIO

There are two GPI connectors (inputs 1–16 and inputs 17–32) and there are two GPO connectors (outputs 1–16 and outputs 17–32). These illustrations show the pin-out:



The input and output ranges 17–32 follow the same pattern.

GPI limits:

5VDC–12VDC (or 24VDC with a resistor of 680 to 820 ohms).

20mA maximum current.

GPO limits:

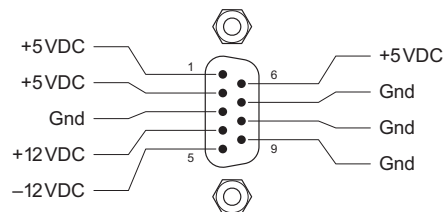
0.5 A at 125 VAC.

1.0 A at 24 VDC.

1.0 A maximum current.

Power

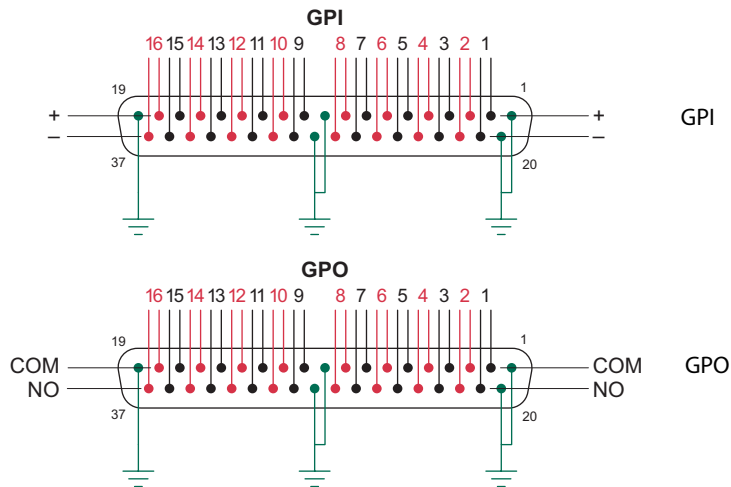
The tally processor's power connector is a DE9 to which you normally connect the product's external power supply. In case you need it, this is the pinout of the power connector:



Device Controller Connectors

GPIO

There are two GPI connectors (inputs 1–16 and inputs 17–32) and there are two GPO connectors (outputs 1–16 and outputs 17–32). These illustrations show the pin-out:



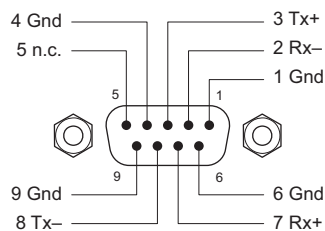
Inputs 17–32 and outputs 17–32 have the same ordering. These are the ratings:

Inputs	Outputs
5–12VDC	0.5 A at 125VAC
24VDC with ext. resistor 680–820Ω	1.0 A at 24VDC
20 mA max	1.0 A max

The inputs are not used by master control, but may be used for other purposes.

Serial Connectors

The DC21 device controller has 4 serial ports. Each of the 4 serial ports has this pinout:



The DC21 supports RS-422 or RS-232 communication.

I/O Connectors

BNC Connectors

The master control frames (and MCPMs) uses BNC connectors for analog video, digital video, and unbalanced AES audio signals. To connect your equipment to the NV5100MC, you should

use high quality connectors and cable, and install the connectors using the manufacturer's recommended methods and tools.

▲ **Note:** BNC connectors used to connect signals to the frame should have a characteristic impedance of 75Ω. This is especially critical for SD-SDI and HD-SDI video signals.

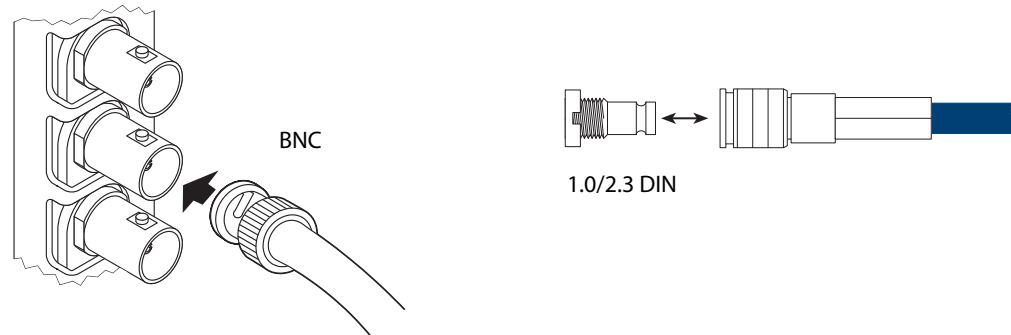


Fig. A-7: Connections (Unbalanced)

▲ MCE backplanes use 1.0/2.3 coax connectors for many signals. The coax connectors can be considered a miniature version of the BNC.

DB25 Connectors

Analog audio connections use DB25 connectors. The backplane receptacle has female sockets; the connector on the mating cable has male pins. Each DB25 connector accommodates 4 stereo pairs or 8 mono channels:

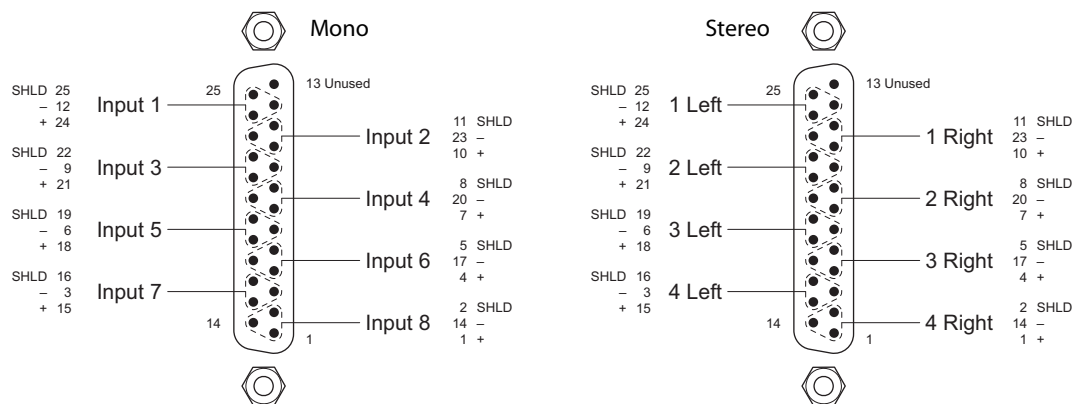


Fig. A-8: DB25 Connections

Each analog audio input card has four DB25 connectors. Thus there are 16 stereo channels or 32 monaural channels on each input card. (DB25s on output cards have the same pinouts.)

▲ Customers can use Miranda breakout cables (WC0053) or create their own cables.

Phoenix Connectors

Some backplanes use 3-pin Phoenix connectors. The backplane receptacle has female sockets; the connector on the mating cable has male pins:

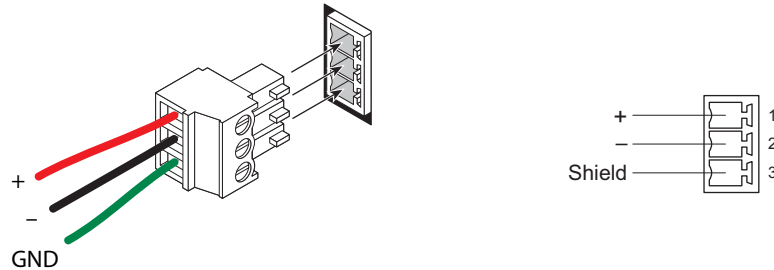


Fig. A-9: Phoenix Connectors (Balanced)

- ▲ These are also called twisted pair connectors because the + and – inputs are usually a twisted pair.
- ▲ NOTE: Although, for reliability reasons, it is not good practice, you can connect coaxial cable to balanced (Phoenix) input connectors. Connect the shield of the cable to the GND terminal of the plug connector, and the center conductor to the “+” terminal of the plug.

WC0053 Breakout Cable

You can use Miranda’s WC0053 DB25 breakout cable for any purpose that suits you. This table maps the color of the cable bundles to the pins of the connector:

Bundle	Jacket Color	DB25 Pin		
		Red (+)	Black (–)	Drain
1	Brown	24	12	25
2	Red	10	23	11
3	Orange	21	9	22
4	Yellow	7	20	8
5	Green	18	6	19
6	Blue	4	17	5
7	Violet	15	3	16
8	Gray	1	14	2

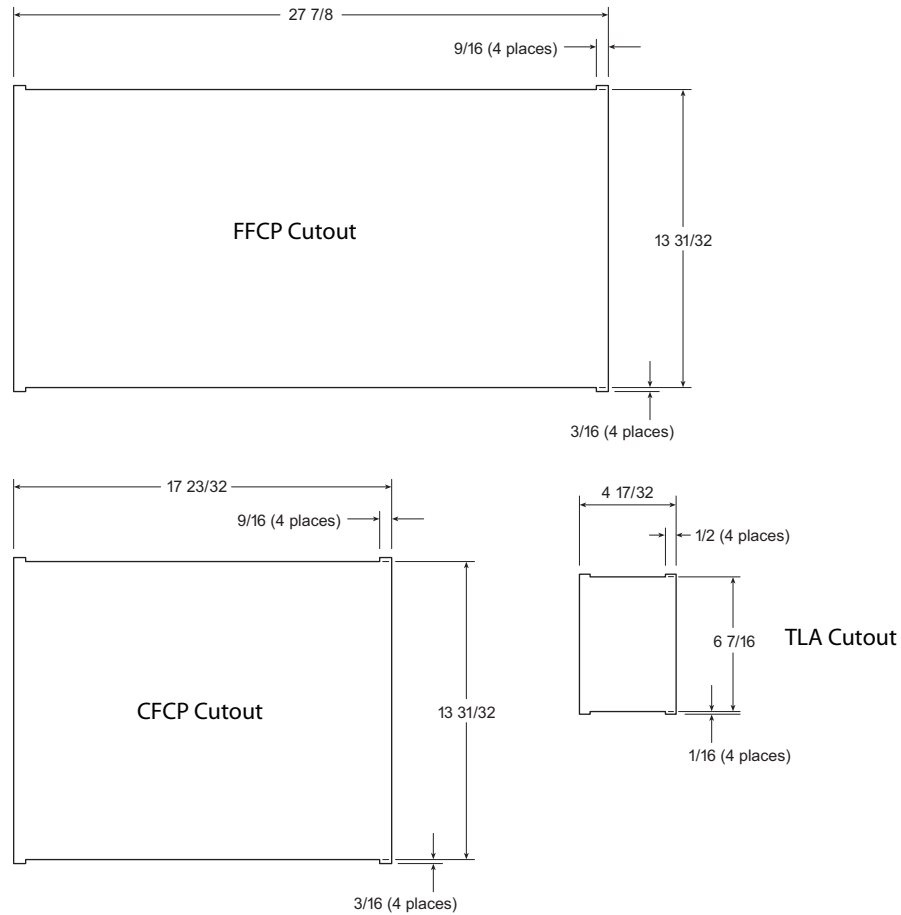
Pin 13 is not used

If you use the breakout cable for the GPI/Alarm connectors of control panels, Table on page 75 shows the mapping of the bundles to GPI and alarm functions.

Panel Cutouts

▲ These patterns are for legacy equipment.

If you want to cut a hole in your console top in which to recess the control panel, use these simple patterns for the cuts:



Your table surface must be about 1" thick and rigid. The control panel rests on the console surface. You do not have to fasten it to the console surface. A sheet metal console surface will not work well.

Figure A-10 shows the profile of the FFCP or CFCP as mounted in a recess:

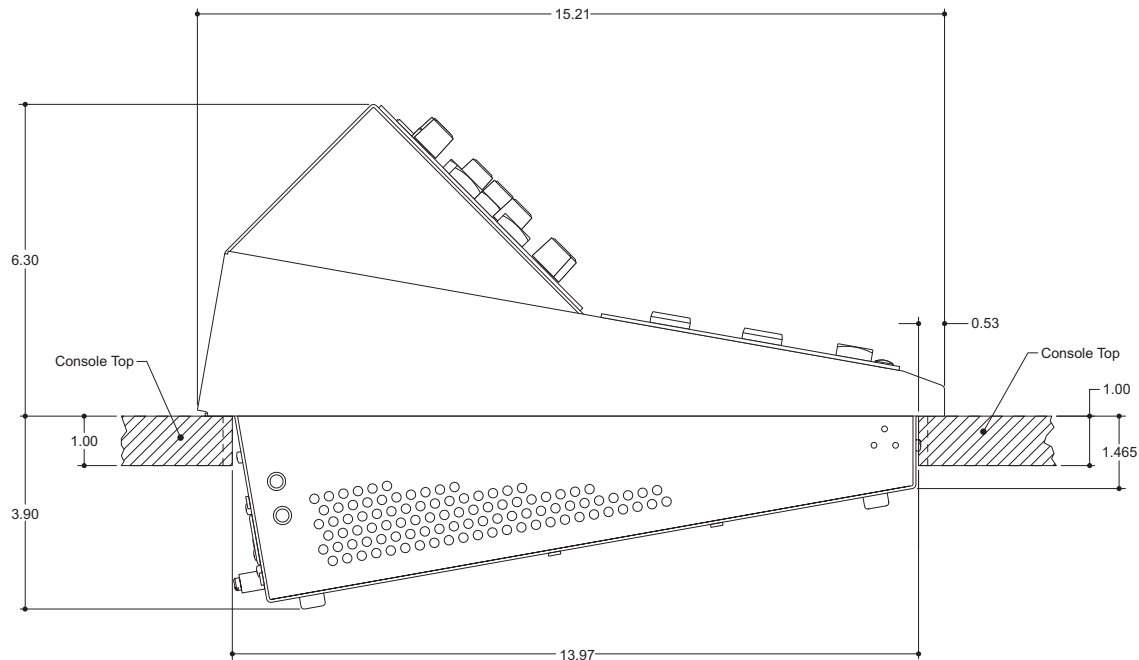


Fig. A-10: Side View of the FFCP, inset in the Console Surface.

NV9000 Integration

If master control is used with an NV9000 router control system, connected routers may be used as pre-selectors “ahead of” NV5100MC inputs.

The benefits of integrating the NV5100MC and an NV9000 system include:

- Thousands of inputs (depending on the external router sizes).
- Router source names appear on buttons (because of integration).
- The control panel can control the upstream pre-router. Router information is displayed on the control surface.
- The ability to fire router salvos (with or without channel change) from the control surface.
- SNMP monitoring for MCPMs and MCEs (a licensed option).

Generally, the following steps are required to link master control and NV9000:

- Establish a network connection between the NV9000 and the master control frame.
- Make the required configuration changes to the NV9000 database to support master control.
- Configure IP addresses for the NV9000 controller(s) in the master control panels.
- Add NV9000 source, destination, and salvo IDs to MCPM and MCE configurations.

The following MasterConfig pages include NV9000 settings:

- General Settings.
- Over Sources
- Main Sources.
- External Router Sources

In the MCS Panel Configuration Editor, use the 'NV9000 Settings' page to specify the NV9000's IP addresses. Its 'Channel Selection List' page uses NV9000 salvo IDs.

Application Tips

Multi-Channel Monitoring

With many stations running multiple channels of master control, video and audio monitoring can become an integration nightmare. One master control feature can help alleviate this issue. Because master control frames support internal multi-format routers, space can be allocated for a small monitor router in addition to the master control channels. The monitor outputs of the MCPM and MCEs can be "re-entered" into the system via router input modules. Router output cards then drive video and audio monitoring equipment. If you are using an NV9000 router control system, monitor switching can be integrated in the control panel, alleviating control system interfacing issues.

An NV9000 router control system, with an appropriately configured NV96xx control panels, allows operators to select individual channels for monitoring with the push of a button. Two or three channels of master control and the required routing hardware will easily fit into a single NV5100MC or NV5128-MC frame. Note that EM0374 router control card(s) are required, instead of EM0414 clock cards.

The router control cards support a wide range of interface protocols allowing operation with either the NV9000 router control system or those of several other manufacturers.

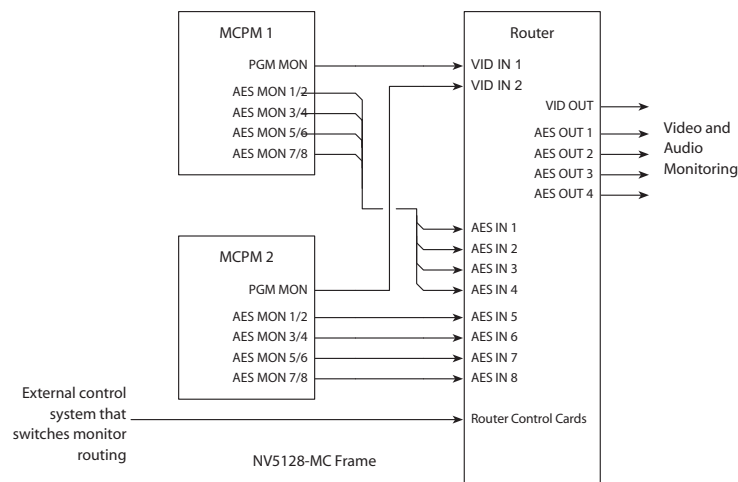


Fig. A-11: Multi-Channel Monitoring

Using Router Buses as Pre-Select for Master Control

Unused output slots within the master control frame can be used to expand the range of sources available for master control. Applications where the squeezeback background input changes often, or where there are large numbers of key sources to handle can be much easier to manage using router buses as pre-select for master control.

When used with an NV9000 router control system and larger external routers, such as the NV8256 for digital/analog video and NV7256 for digital/analog audio, access to all equipment

within your facility is possible. Control panel buttons will display source mnemonics pulled from the NV9000 database.

Each squeezeback configured can have its own unique background source. In most cases this will be single input. For applications where the background source changes frequently, setting all squeeze configurations to use the same source which is then driven by a router destination can simplify operation. NV9000 salvos can be set up to switch background sources as part of the squeeze function.

Driving the external key and fill inputs of one or more of the 3 master control keyers with router buses allows the operator simple access to a large number of sources. A hybrid mix—one or two of the keyers with fixed sources for quick access, and the remaining keyers fed from router outputs for versatility—can provide enhanced functionality without complexity.

Router outputs may be switched using the X-Y style router control panels. A NV96xx control panel can provide single-button access to external sources.

Linking Two MCPMs as Primary and Backup

You can use the external video and audio bypass inputs to provide a form of redundancy for the master control system, by cross-connect two MCPMs or MCEs, as shown in Figure A-12.

The bypass relay within the MCPM or MCE will switch to the bypass input when a fault occurs. (Or you can switch over manually using the toggle switch on the front of the MCPM or MCE.)

Control functions for the two MCPMs can be configured so that the two track each other as the operator performs transitions to air. If automation is used, a separate connection from the automation system to each MCPM or MCE is needed.

This approach does not prevent using the backup processor as a second channel occasionally. Its program outputs can be used to provide a second program feed when backup operation is not needed. Although this is not shown here, routing functions could be used to allow a single

MCPM or MCE to act as a backup for several others. A salvo within the control system could then route the appropriate video and audio signals as shown in Figure A-12.

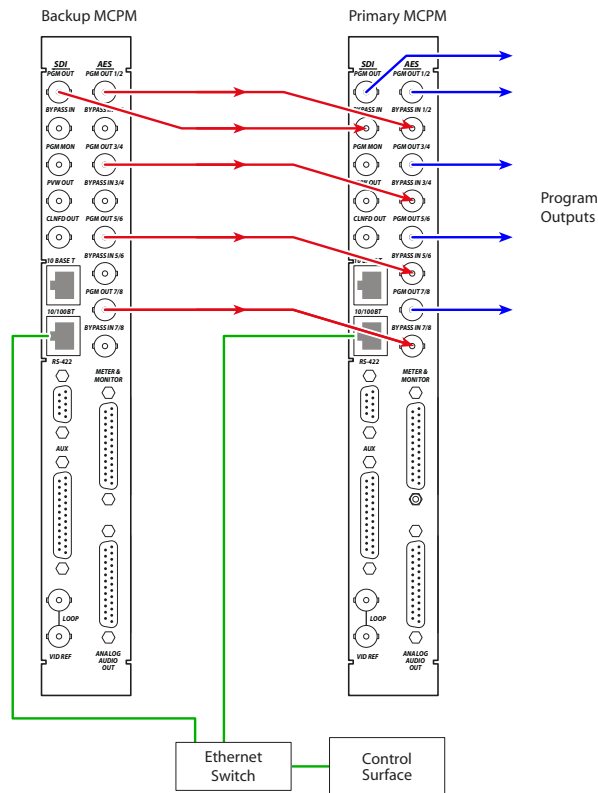


Fig. A-12: Connecting Two MCPM-SDs (or -HDs) as Primary and Backup

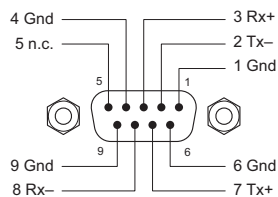
Misc. Connectors

Frame

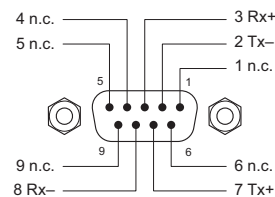
Control Port Connectors

The master control frame has two sets of these connectors — one for the primary control card and one for the redundant control card.

CTRL1, CTRL2

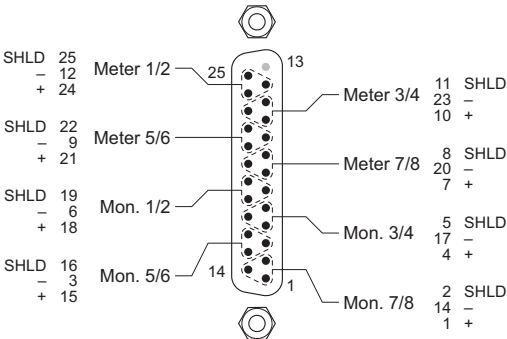


DIAG

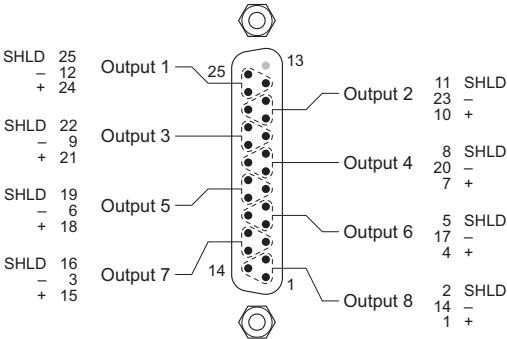


Meter and Monitor Connectors

All MCPMs have an digital output port for metering and monitoring:



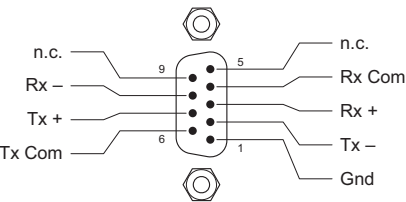
The MCPM-SD, -HD, -HD2, and -SDHD also have an analog output connector for metering and monitoring:



The MCPM-MK-SD and -HD do not.

Automation Connectors

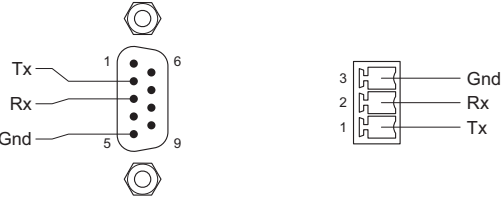
All MCPMs have an automation connector:



(The protocol is RS-422.)

Diagnostic/Configuration Connector

At the front of each MCPM is a DE9 diagnostic and configuration port:



The protocol is RS-232.

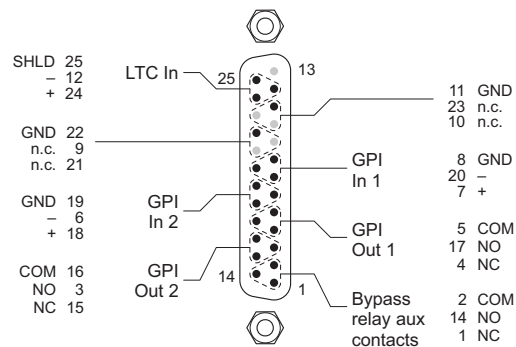
An alternative to the 9-pin diagnostic port is the Phoenix 3-pin "console" port, either above or below the DE9 connector. Note that GND is at the top and Tx is at the bottom of the Phoenix connector. (The pins are not labelled on the PCB.)

On the DE9, pins 1, 4, and 6 are tied together and pin 9 is not connected.

MCE Core Connectors

Aux Connectors

The MCE has a DB25 auxiliary connector:

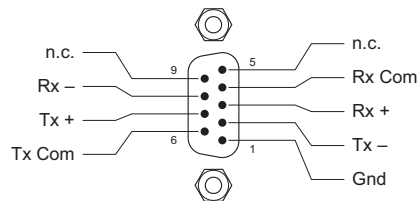


The LTC input is not presently in use.

GPI and GPO here stand for general purpose input and output, respectively. The bypass terminals are connected to the MCPM's emergency bypass relay. The LTC (linear time code) inputs are unused.

Automation Connectors

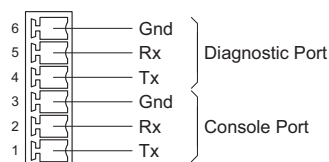
All MCPMs have an automation connector:



(The protocol is RS-422.)

Diagnostic/Configuration Connector

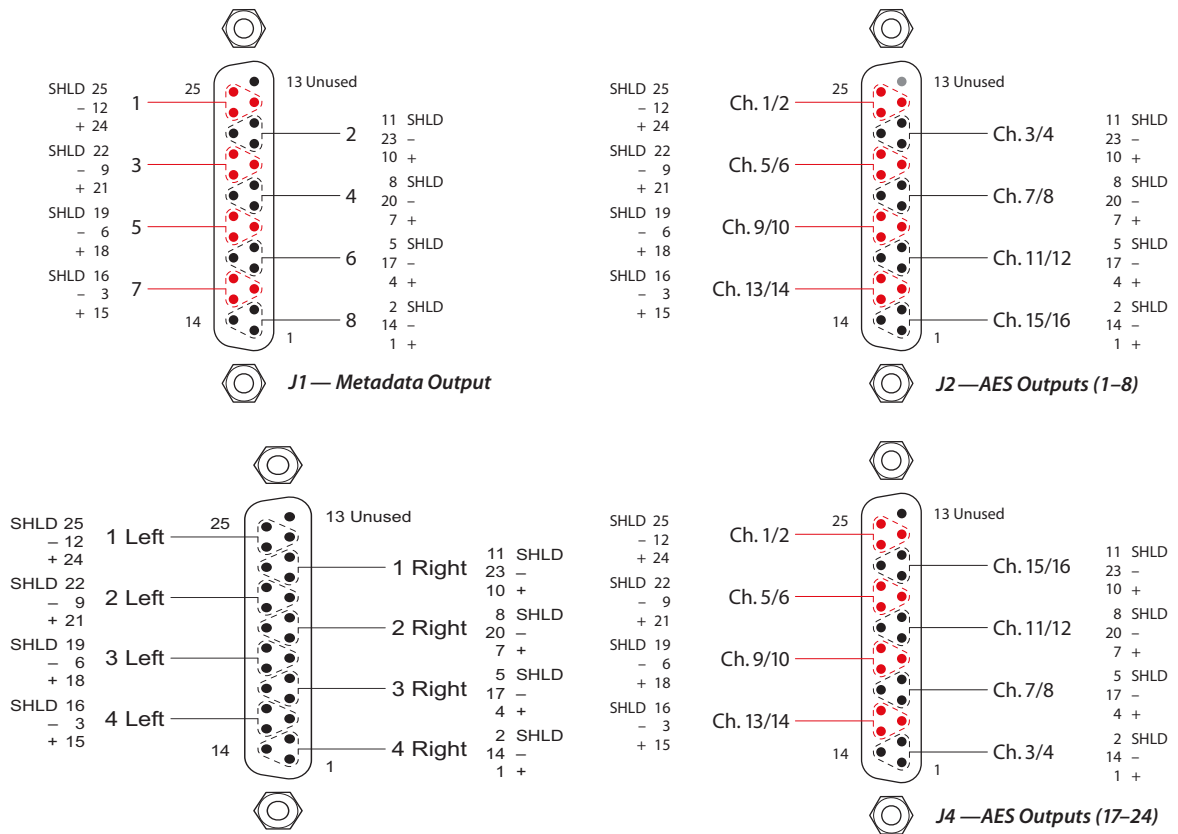
At the front of each MCE (-CORE card) is a 6-pin Phoenix connector that supports both the diagnostic and configuration ports:



The diagnostic protocol is RS-232. So is the console protocol, but the console is not used with MasterDiag. It is the diagnostic part of this port to which you connect when using MasterDiag.

MCE AXM Connectors

The MCE-AXM has unusual connectors. The signals on these 4 DB25 connectors will change at a later revision. The connectors are called J1–J4, J1 being at the top of the AXM backplane module:



The metadata connector J1 provides 8 metadata signals. The metadata pairs are compatible with RS-422 or RS-485 electrical characteristics. Each of the 8 metadata ports is configurable. The other 3 connectors provide 8 AES pairs each. The 24 outputs are configurable.

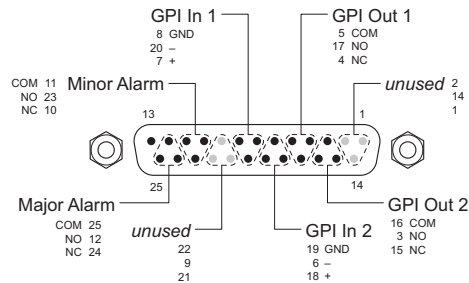
Control Panel Connectors

CP AUX

The CP AUX connector (DB15) is present, but unused, on the iMC-Panel-200 and iMC-Panel-300. Its pinout is not of any concern to customers.

GPI/Alarms

The GPI/Alarm connector (DB25) is the same for all hardware control panels:



A panel produces two levels of alarm output:

- Major alarm:
 - A failure of any circuit board.
 - Failure of both power supplies.
 - The internal panel temperature is greater than 60°C.
 - (FFCP, CFCP) A detected failure of an attached transition lever arm.
 - (SCP) The panel has been in one of the following states for greater than 5 minutes:
 - a Panel restarting or panel startup.
 - b Panel shutdown.
 - c Panel restarting.
 - d Internal panel communication problem.
- Minor alarm:
 - Failure of one power supply.
 - Fan failure or over temperature (> 50°C).

The alarm outputs are SPDT relay terminals (NC, NO, COM) as are the GPI output terminals. External GPI and alarm circuits are determined by the customer.

- ▲ An alarm will clear when all of the triggering conditions are off for 5–10 seconds continuously.

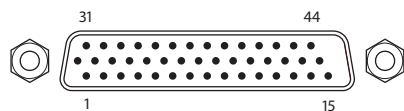
Power applied to the GPI inputs can be from 5 to 24VDC, and less than 30 mA. Typically, 5 V at 1 mA. Loads for the GPI and alarm outputs can be larger:

Max current:	1 A
Max voltage:	125 VAC, 110VDC.
Max capacity:	62.5 VA, 33 W.
Rated loads:	1 A at 30VDC; 0.3A at 110VDC; 0.5A at 125VAC.

Imagestore 750 Connectors

GPIO

This is a drawing of the GPIO connector:



There is a GPIO adapter for this connector. The part number is GPIO-44TBA. It is a small circuit board with Phoenix screw terminals.

Pinout

Pin	Signal	Pin	Signal	Pin	Signal
1	LTC-	16	RS485/1+	31	LTC+
2	LTC_GND	17	RS485/1-	32	GP_GND
3	TOTAL_DC_FAIL	18	RS485/2+	33	GPIO_16
4	GPIO_15	19	RS485/2-	34	GPIO_14
5	GPIO_13	20	RS485/3+	35	GPIO_12
6	GPIO_11	21	RS485/3-	36	GPIO_10
7	GP_+5V	22	RS485/4+	37	TOTAL_DC_FAIL
8	GP_+12V	23	RS485/4-	38	GPIO_9
9	GPIO_8	24	GND	39	GPIO_7
10	GPIO_6	25	GND	40	GPIO_5
11	GPIO_4	26	GND	41	GPIO_3
12	GPIO_2	27	RS232A_TX ^a	42	GPIO_1
13	GP_GND	28	RS232A_CTS	43	RS232A_RX
14	RS232B_TX	29	RS232A_RTS	44	RS232B_RX
15	RS232B_RTS	30	RS232B_CTS		

a. The RS-232 pins are reserved for future use.

There are 16 GPIO pins. Any of these can be an input or an output. There are two GPIO grounds and a +5V and +12V input for GPIO.

Each GPIO terminal can be configured in one of 4 ways:

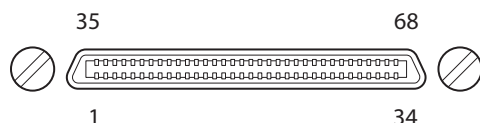
- GPI Input On—a positive voltage level triggers the GPI input, relative to the GPI ground pin(s).
- GPI Input Off—a (nominally) zero voltage level triggers the GPI input, relative to the GPI ground pin(s).
- GPI Output On—a zero voltage level, relative to the GPI ground pin(s), drives an output circuit.
- GPI Output Off—a positive voltage level, relative to the GPI ground pin(s), drives an output circuit.

GPI inputs can be configured to execute “macros.” (A macro is a sequence of commands, up to 2048 bytes, about 200 commands, such as ‘DSK 1 Fade Up’. A macro can also include GPI output commands.)

A GPI output can be associated with one (of several) internal conditions, such as ‘EAS Running’. The outputs can be configured to turn on or off when its associated condition arises.

AES I/O

This is a drawing of the AES connector:



Pinout:

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	AES_IN_1 (+)	35	AES_IN_1 (-)	18	AES_OUT_1 (+)	52	AES_OUT_1 (-)
2	AES_IN_2 (+)	36	AES_IN_2 (-)	19	AES_OUT_2 (+)	53	AES_OUT_2 (-)
3	AES_IN_3 (+)	37	AES_IN_3 (-)	20	AES_OUT_3 (+)	54	AES_OUT_3 (-)
4	AES_IN_4 (+)	38	AES_IN_4 (-)	21	AES_OUT_4 (+)	55	AES_OUT_4 (-)
5	AES_IN_5 (+)	39	AES_IN_5 (-)	22	AES_OUT_5 (+)	56	AES_OUT_5 (-)
6	GND	40	GND	23	AES_OUT_6 (+)	57	AES_OUT_6 (-)
7	AES_IN_6 (+)	41	AES_IN_6 (-)	24	AES_OUT_7 (+)	58	AES_OUT_7 (-)
8	AES_IN_7 (+)	42	AES_IN_7 (-)	25	AES_OUT_8 (+)	59	AES_OUT_8 (-)
9	AES_IN_8 (+)	43	AES_IN_8 (-)	26	AES_OUT_9 (+)	60	AES_OUT_9 (-)
10	AES_IN_9 (+)	44	AES_IN_9 (-)	27	AES_OUT_10 (+)	61	AES_OUT_10 (-)
11	AES_IN_10 (+)	45	AES_IN_10 (-)	28	AES_OUT_11 (+)	62	AES_OUT_11 (-)
12	AES_IN_11 (+)	46	AES_IN_11 (-)	29	AES_OUT_12 (+)	63	AES_OUT_12 (-)
13	AES_IN_12 (+)	47	AES_IN_12 (-)	30	GND	64	GND
14	AES_IN_13 (+)	48	AES_IN_13 (-)	31	AES_OUT_13 (+)	65	AES_OUT_13 (-)
15	AES_IN_14 (+)	49	AES_IN_14 (-)	32	AES_OUT_14 (+)	66	AES_OUT_14 (-)
16	AES_IN_15 (+)	50	AES_IN_15 (-)	33	AES_OUT_15 (+)	67	AES_OUT_15 (-)
17	AES_IN_16 (+)	51	AES_IN_16 (-)	34	AES_OUT_16 (+)	68	AES_OUT_16 (-)

These are balanced differential pairs. Cabling is up to customer.

However, breakout boxes are available for 110Ω and 75Ω BNCs. The part numbers are ABT-32-32-D110 and ABT-32-32-D75 respectively. Connect the breakout box to the AES port using a SCSI VHDCI-68 male-to-male cable. The cable must have connectors with 0.8 mm pin spacing.

COM Ports

There are 4 COM ports, all like this:

	RS-422	RS-232
1	Tx+	RTS
2	Tx-	Tx
3	Rx+	CTS
4	n.c.	n.c.
5	n.c.	n.c.
6	Rx-	Rx
7	n.c.	n.c.
8	Gnd	Gnd

The ports support RS-232 or RS-422. The pinout is non-standard. Rates 9600, 19,200, 38,400, 57,600, and 115,200. The factory default is 57,600.

There are 4 protocols: Oxtel automation, Intuition, and 2 EAS.¹

BNCs

The BNCs are all 75Ω connectors. The reference BNC is also 75Ω and is terminated internally. For the LAN ports you don't need detail.

Other Signals (on the GPIO Connector)

'Total DC Fail' is a pair of terminals. You can connect a lamp (or similar circuit) to this pair. There is a contact closure when DC fails within the Imagestore 750. Otherwise, the contacts are open. The limits are 400mA and 25VDC.

The connector supports 4 RS-485 ports (differential pairs). The ports operate at 115.2 kbps with 1 start bit, 8 data bits, 1 stop bit, and no parity. The ports can be configured as inputs or outputs.

The RS-485 ports are for Dolby metadata.

There are pins for two RS-232 ports, but the ports are disabled at present. They are for future use.

There are 3 LTC connectors (+, -, and GND).

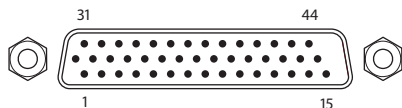
LGK-3901, DSK-3901, and ISM-3901

The LGK-3901, DSK-3901, and ISM-3901 are small transition processors that fit in 2 slots of a 3RU Densité frame. The master control system treats these units as if they were Imagestore 750s.

These units have a small backplane connector module with fewer connectors than an Imagestore 750.

GPIO, LTC, AES

This a drawing of the GPIO connector:



It supports LTC input and 4 AES inputs, 8 GPI inputs and 8 GPI outputs.

1. Emergency Alert Service.

There are 75 Ω and 110 Ω terminal block adapters for this connector. The part numbers are

- LGK-44-TBA-75, DSK-44-TBA-75

This part (the same part, but different names) has 5 BNC connectors, 4 for unbalanced AES, and 1 for LTC, and 2 terminal blocks for GPIO.

- LGK-44-TBA-110, DSK-44-TBA-110

This part (the same part, but different names) has 1 BNC connector for LTC, 1 terminal block for balanced AES, and 2 terminal blocks for GPIO.

There are 16 GPIO pins— 8 inputs and 8 outputs. There are 8 ground pins.

There are 4 AES input pairs (“+” and “-”).

Each GPIO terminal can be configured in one of 4 ways:

- GPI Input On—a positive voltage level triggers the GPI input, relative to the GPI ground pin(s).
- GPI Input Off—a (nominally) zero voltage level triggers the GPI input, relative to the GPI ground pin(s).
- GPI Output On—a zero voltage level, relative to the GPI ground pin(s), drives an output circuit.
- GPI Output Off—a positive voltage level, relative to the GPI ground pin(s), drives an output circuit.

GPI inputs can be configured to execute “macros.” (A macro is a sequence of commands, up to 2048 bytes, about 200 commands, such as ‘DSK 1 Fade Up’. A macro can also include GPI output commands.)

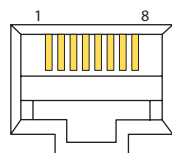
A GPI output can be associated with one (of several) internal conditions, such as ‘EAS Running’. The outputs can be configured to turn on or off when its associated condition arises.

GPIO Pinout for LGK-3901, DSK-3901, and ISM-3901

Pin	Signal	Pin	Signal	Pin	Signal
1	GPL_IN_2	16	GPL_IN_1	31	GPL_IN_0
2	GPL_IN_4	17	GPL_IN_3	32	GND
3	GPL_IN_6	18	GPL_IN_5	33	GPL_IN_7
4	AES_IN_P4	19	AES_IN_N4	34	GND
5	AES_IN_P3	20	AES_IN_N3	35	LTC_IN
6	AES_IN_P2	21	AES_IN_N2	36	GND
7	AES_IN_P1	22	AES_IN_N1	37	GND
8	n.c.	23	n.c.	38	GND
9	n.c.	24	n.c.	39	GND
10	n.c.	25	n.c.	40	n.c.
11	n.c.	26	n.c.	41	GND
12	n.c.	27	n.c.	42	GPL_OUT_7
13	GPL_OUT_5	28	GPL_OUT_6	43	GND
14	GPL_OUT_3	29	GPL_OUT_4	44	GPL_OUT_0
15	GPL_OUT_1	30	GPL_OUT_2		

COM Ports

COM ports: There are 2 like this:



	RS-422	RS-232
1	Tx+	RTS
2	Tx-	Tx
3	Rx+	CTS
4	n.c.	n.c.
5	n.c.	n.c.
6	Rx-	Rx
7	n.c.	n.c.
8	Gnd	Gnd

The ports support RS-232 or RS-422. The pinout is unusual.

Rates 9600, 19,200, 38,400, 57,600, 76,800 and 115,200. The factory default is 57,600.

There are 5 protocols: (OxTel) automation, Presmaster, Intuition, and 2 EAS.

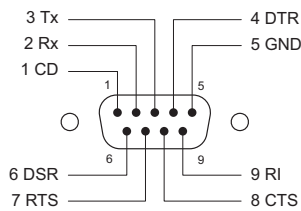
BNCs

The BNCs are all 75Ω connectors. The reference BNC is also 75Ω and is terminated internally.

For the LAN ports you don't need detail.

Intuition XG RS-232 Port

The Intuition XG processor's RS-232 port is a *male* DE9:



The port supports RS-232. The pinout is non-standard.

Configure the rate and settings for this port using Xplay. (Choose Tools > Configure Automation > CQB > Oxtel over Serial.) The rate should match that of the Imagestore 750's COM port if you connect the Imagestore 750 and the Intuition XG processor serially. You need a special cable or an RJ-45 cable with a special adapter (supplied with the Imagestore 750).

Things to Consider

Is your master control system operating under a router control system? Is it an NV9000 system? You will need to assign the controller(s) IP addresses on the master control network during master control software installation.

If you want your SNMP system to monitor MCEs and MCPMs, it is possible to do so through the NV9000 software. The NV5100MC MIB is available by license (part number EC9610). The NV9000 software does not (yet) support the Imagestore 750's SNMP option.

Up to 4 control panels may control a single MCPM or MCE. (The internal software ignores commands from any panel beyond four.)

A single control panel can control up to 4 channels (MCPMs or MCEs). The channels are said to be "ganged" in that case. A designated set of channels can be ganged automatically when the main channel of the gang is selected. A panel can be configured to start up with this gang selected.

Can your panel operators or system tolerate source bank selection? The smaller panels might have fewer than 16 main source buttons and therefore require a bank select button to map the 16 "virtual source buttons" onto their physical buttons.

Router pre-select *buttons* are defined in MasterConfig. Router pre-select *categories* are defined in the NV9000 configuration software and are selected in the MCS Panel Configuration Editor.

How many main sources do you need? SD MCPMs allow 128 main source *connections*. HD MCPMs allow 64. MCEs allow 64. The MCPM-MK-HD allows only 16 and those apply only to the MCPM-MK-HD.

A router pre-select mechanism extends the number of main sources to hundreds or thousands.

Do you need to handle analog video input? Do you need to handle analog audio input?

Do you need to handle video with embedded audio?

Do you need to output discrete (non-embedded) audio?

An MCE is almost certain to require a control panel that has preview buttons and aux buttons. The panels that support MCE features are the CECP, CECP GUI, FECF, iMC-Panel-200, iMC-Panel-300, and iMC-Panel-GUI. An automation system might be sufficient to control an MCE.

The panels that can control Imagestore 750s are the iMC-Panel-200, iMC-Panel-300, and iMC-Panel-GUI.

An important difference between GUIs and hardware panels — one that is easily overlooked — is the way GUI configurations are “loaded.” A hardware panel requires its configuration to be uploaded from the MCS Panel Configuration Editor. A GUI, on the other hand, requires a specifically named configuration file in the same folder as the GUI executable program.

For router pre-selection, master control can use up to 10 NV9000 device categories and the indexes within those categories. It does **not** recognize NV9000 category *suffixes*. The NV9000 configuration must accommodate this minor limitation of the master control software.

Although an NV5100MC frame allows up to 8 (new) SWB output cards, the older NV5128-MC frame also allows only one.

If you have an MCPM-HD2 or -SDHD, MasterConfig can configure their (optional) wing outputs to follow program video/audio. The wing outputs on the -SDHD have more options than on the -HD2. There are 16 independent outputs on every wing card, but the HD2 supports these options only in wing slot 1.

These are the configuration options for the wing outputs:

SDHD	HD2
Router controlled	Router controlled
Program video	Program video
Preset video	Preset video
Program audio	
Preset audio	

- ▲ Configurers might note that MasterConfig shows “Aux Bus 1” and “Aux Bus 2” as choices. These are invalid options.

An SMS7000 control system requires the master control frame to have a router control card with an added mezzanine SMS support card (and jumper settings). See [Control Card Jumpers](#) on page 178.

The tally processor functions as if it were a control panel and the presence of one or more tally processors limits the number of actual control panels that can control a single MCPM or MCE. (An MCPM or MCE can communicate with a maximum of 4 panels.)

MCEs do not accept analog video input. SD MCPMs do. Analog video input is not defined for HD, so HD MCPMs do not.

DIN-to-BNC breakout panels are available. The part number for these 1RU panels is NV5100MC-BOP. Each BNC connector on the panel is coupled to a 2 m cable with a 1.0/2.3 DIN connector.

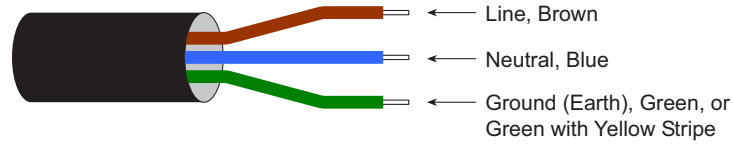
Power Cords

Power cords differ depending on your location. Note that the power cords supplied with this equipment provide the only means of AC power disconnection. The socket (outlet) must be near the equipment and must be easily accessible.

References

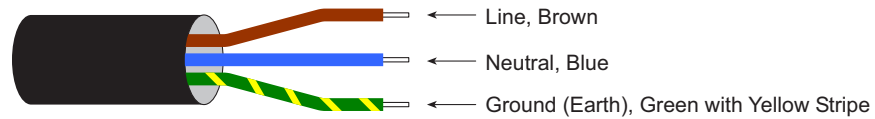
Power Cords

The North American power cords supplied with this equipment have a molded grounding plug (NEMA 5-15P) at one end and molded grounding receptacle (IEC 320-C13) at the other end. Conductors are CEE color-coded:



Operation of this equipment at voltages exceeding 130VAC will require power supply cords which comply with NEMA configurations.

The International power cords supplied with this equipment have a molded grounding receptacle (IEC 320-C13) at one end and stripped conductors (50/5 mm) at the other end. Conductors are CEE color-coded:



Other IEC 320-C13 type power supply cords can be used if they comply with the safety regulations of the country in which they are installed.

G

Glossary

Async AES, Sync AES	Synchronous AES occurs when all AES signals are tied to a common 48kHz reference signal. Asynchronous AES signals are not.
AVC	Analog Video Conversion. Certain NV5100MC devices perform simple conversion to create an SD-SDI digital output signal from a composite analog video input. The term also means the conversion of an SD-SDI signal into an analog composite video output signal. Path delay and subcarrier phase might not be precisely maintained in an AVC conversion path within an NV5100MC frame. AVC coding provides a cost-effective method to provide feeds to picture monitors without requiring an external conversion device. AVC modules are not a substitute for professional-grade format converters.
Backplane	Modular, rear-mounted assemblies containing NV5100MC input and output connectors.
Clean Feed	An output that contains program content minus some or all of the program layering. The clean feed signal is directed to a clean feed output at the rear of the MCPM.
CECP	Compact Enhanced Control Panel.
CFCP	Compact Full-Function Control Panel.
Control surface	An inclusive term representing any control panel, hardware or software.
DARS	Digital Audio Reference Signal.
DB25	A common 25-pin subminiature D connector.
DC21	A third-party device (1RU) used by master control systems to execute device control functions.
DE9, DB9	A common 9-pin subminiature D connector.
EIA-422	Sometimes called RS-422 or TIA/EIA-422-B. A bidirectional serial communications standard. The use of this term implies that Miranda references to the latest standard in effect at the time the product was developed.
FECP	Full-size Enhanced Control Panel.
FFCP	Full-Function Control Panel.
HD, HD-SDI	HD and HD-SDI are equivalent terms in our documents. An HD-SDI signal is a high-definition, serial digital video format that conforms to the SMPTE 292M standard.
Imagestore 750	A 1RU master control transition processor.
iMC-Panel-100	A 3RU rack-mountable control panel with separate display.
iMC-Panel-200	Compact control panel.
iMC-Panel-300	Full-size control panel.

iMC-Panel-GUI	Software control panel.
Intuition XG	Intuition XG is a combination of a video, audio, and graphics processor and Xmedia software.
IP address	A 32-bit number that identifies a device on a network. The address is usually expressed as 4 octets, in decimal notation, joined by periods (e.g., 192.168.7.20). (Although IP means “internet protocol,” here we just mean network address.)
Key, keyer	A video image (called the fill) generally coupled with another video image (the “cutter”) to be overlaid, possibly with transparency, on the program output. The cutter is a mask that hides or reveals pixels in the fill according to the brightness of the pixel in the cutter. Some keyers do not have separate key images. These keyers self-key, that is, the image is masked according to the luminance values in the fill image itself. Keyers are subject to transition type and transition rate.
Layer	One of the video output components (main source, 2 logos, 3 keyers, and squeezeback). The are called layers because of their visual priority. Functions to the right, on the control surface, have priority.
Logo	A graphics file (static or animated) that either contains a distinct key (or cut) layer or can “self-key” from its luminance data. Logo files acceptable to an MCPM are converted from files in common graphic formats (TIF, GIF, JPEG, TGA, BMP, PNG). Animation source files must be Targa (TGA) files.
MCE	<i>Master Control Engine</i> , an advanced MCPM model. The MCE is modular, occupying from 1 to 3 card slots.
MCPM	<i>Master Control Processing Module</i> . A master control switcher. There are several models: MCPM-SD, MCPM-HD, MCPM-HD2, MCPM-SDHD, MCPM-MK-SD, and MCPM-MK-HD, and MCE.
Module	In the NV5100MC, modules are input cards, output cards, or control cards that fit in the slots of the NV5100MC frame. Modules are inserted from the front of the frame and are distinguished from backplanes which are mounted at the rear of the frame.
Reference Signal	A timing signal used to synchronize events such as the switching of video signals during a specific portion of the vertical interval. Reference signals are externally applied. In their absence, signals generated internally (by a control card) are used to sustain operation.
RJ45, RJ-45	Registered jack, type 45. A common 8-pin modular plug and/or jack used in the telecommunications and broadcast industry to transport Ethernet or machine control signals.
SD, SD-SDI	SD and SD-SDI are equivalent terms in our documents. An SD-SDI signal is a standard definition, serial digital video format that conforms to the SMPTE 259M standard.
SDI	Serial digital interface.
Squeezeback	A process in which the program video is either (1) reduced in size or (2) cropped and possibly repositioned so that an additional video image (the background) can be displayed in the program output. Squeezeback is subject to transition type and transition rate.
Sync AES	See Async AES.
Transition	The process by which the MCPM moves the content of the preset bus (source and layers) to the program bus. Transitions are governed by transition type and transition rate. In flip-flop mode, the contents of the buses swap; In flip-only mode (so called), the buses are identical after the transition.
Vertigo XG	A single- or dual-channel HD/SD graphics processor.
XG Dashboard	Configuration tool for Intuition XG.

XMedia	A collection of configuration and creative software used with Intuition XG.
Xbuilder	“Template population” and “promo timeline control” software for Intuition XG.
XPlay	A “media event sequencer” used to configure the Intuition XG and to manage clips. Xplay must be running on the Intuition XG processor for correct operation under master control.
Xstudio	“Template creation” software for Intuition XG.

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