

### Product Summary

Your master control shipment contains one or more master control products, power cords, miscellaneous cabling, a software and documentation CD (SB0221) and this printed Quickstart Guide. Depending on you order options, the shipment might also include a GUI CD (SB0222).

Frames ship with the I/O cards and master control processors you ordered already installed and tested.

You should, of course, inspect the shipment for content and damage. You should also copy all the documentation from the SB0221 CD to a secure place in your facility's file system.

It is to your advantage to become familiar with the documentation at an early point in your system development.

In addition to this Quickstart Guide, there are several manuals and user's guides in the NV5100MC documentation set:

#### Configuration Guides and Technical Information

UG0008	MasterConfig User's Guide
UG0009	MasterDiag User's Guide
UG0010	MasterLogo User's Guide
UG0011	<i>Master Control Installation Guide</i>
UG0013	<i>Master Control Reference Manual</i>
UG0029	MCS Panel Configuration Editor User's Guide
UG0036	Tally Processor User's Guide
UG0038	Device Controller User's Guide

#### Panel Operators' Guides

UG0016	SCP Operator's Guide
UG0026	CECP GUI Operator's Guide
UG0027	CECP Operator's Guide
UG0028	FECP Operator's Guide
UG0052	Aux/Preview GUI Operator's Guide

### QuickStart Roadmap

The goal of this Quickstart Guide is for you to be able to hookup everything in your Master Control system and get it to the point where you can start configuring and cabling.

One of the major hurdles you are facing is that to be able to set up and configure any one portion of master control, you must understand everything about master control and (possibly) much about NV9000 router control systems.

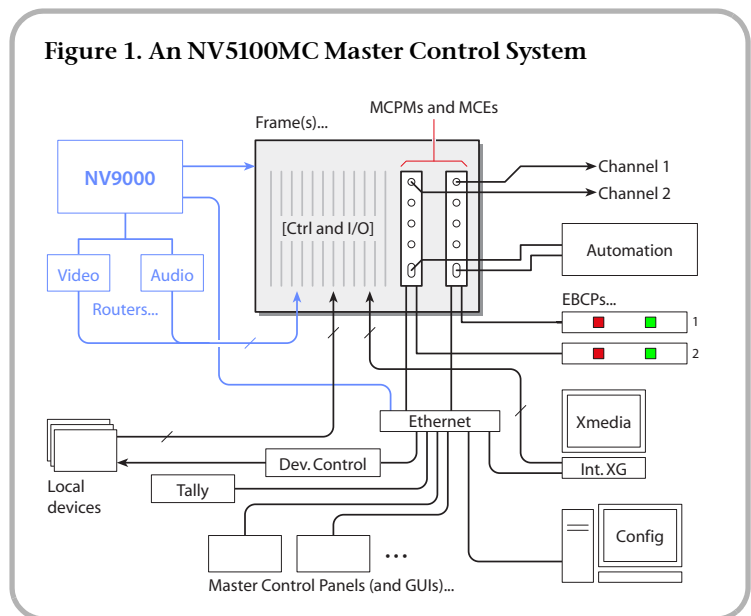
Survey the documentation to become acquainted with all the concepts and then focus on individual tasks.

Topics covered here, in order, are

#### 1 Master control feature set.

What the Master Control devices are, where the connectors are and what they do, etc.

Figure 1. An NV5100MC Master Control System



#### 2 Hardware connections.

How to make control and network connections and how to make I/O connections.

#### 3 Software installation.

How to install the software and documentation.

#### 4 Configuration software.

A brief survey of what the configuration applications do.

#### 5 Details.

More detail about master control features.

### Master Control Features

A master control system is moderately complex, involving a number of hardware components, software applications, documentation, computers, networks, and several options.

Figure 1 represents the principal components of an NV5100MC master control system.

### Master Control Processors

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

- MCPMs — master control processing modules.
- MCEs — master control engines.

Each MCPM or MCE is considered a channel. The main output of a channel is called “program output.”

### Frames

MCPMs and MCEs reside in a master control *frame*. A master control system can include one or more master control

frames. The two types of frames, NV5100MC and the older NV5128-MC, look the same except for the door legends. 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).

A master control frame has an I/O backplane. Each input card and output card has a corresponding backplane module that provides 16 signal connections. MCPMs and MCEs also have backplane modules.

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

## Panels

Master control operators use control panels to control MCPMs and MCEs. The MCPMs, MCEs, and control panels communicate on an Ethernet LAN. Hardware control panels and software control panels (GUIs) are available.

MCPMs and MCEs can also be controlled by an automation system.

## NV9000

A master control system can operate in the context of a NV9000 router control system. The routers in the NV9000 system supply inputs to the master control system.

The NV9000 control system communicates with the control card(s) in the master control frame. An NV9000 *must* be connected if the frame contains an MFR. The NV9000 system provides 2 services important to master control: execution of salvos and routing of video and audio signals.

## Emergency Bypass

All MCPMs and MCEs have an *emergency bypass* capability. This mechanism route alternate programming to program output when the MCPM or MCE detects a critical problem. The product line includes an emergency bypass control panel (EBCP) that can be used to force an emergency switch.

## Machine Control and Pre-Roll

MCEs can perform machine control and pre-roll operations. (Other MCPMs do not.) Control panels correspondingly have several machine control and pre-roll button functions.

Machine control and pre-roll functions are carried out by a DC21 Device Controller on the master control network. Each device controller can control up to 4 VTRs (or similar devices) with a serial protocol (Sony, Odetics, or VDCP) and has the capability of controlling up to 16 other devices with start and stop pulses.

Any main source can be assigned pre-roll and machine control characteristics. Any squeeze source that is also a main source can have assigned pre-roll and machine control characteristics.

When not used for master control, the DC21's 32 GPIs and 32 GPOs can be used for other purposes.

## Intuition XG

Miranda's Intuition XG system, and its associated Vertigo XG graphics processor and Xmedia software can be integrated with the Master Control system. Although Intuition XG stands alone on its own merits, it can also be used as a master control subsystem. It includes a graphics processor that stores, and plays out, video keys. It can access "live" data including feeds from wire services and data bases.

The Intuition XG processor can deliver one or two keys simultaneously to an MCE. An Intuition XG key is processed by one of the MCE's keys. The Intuition XG processor can also control an MCE's squeezeback, audio overs, and main source. Additional Intuition XG subsystems might be required for multiple MCEs.

The newer control panels may have "XG layer" buttons in addition to their other video effects buttons.

## Installation Process in Brief

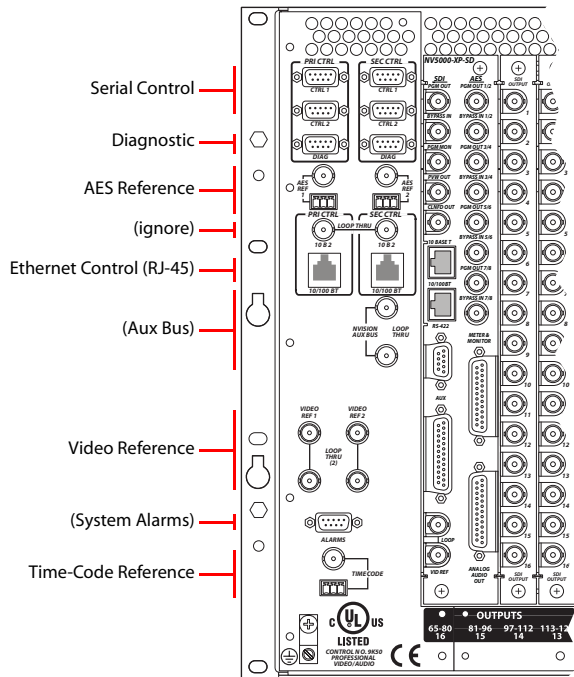
The installation process follows these basic steps:

- 1 Unpack your master control 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 PCs.
- 3 Establish how you want to connect *everything*. This means compiling a very detailed list. Included in the list are
  - Relevant NV9000 sources, destinations, and salvos.
  - Which signals use which master control port numbers.
 Do not neglect this step. Refer to the *Reference Manual*.
- 4 Put master control frame(s) and control panels in place.
- 5 Connect your MCPMs, MCEs, control panels, and PCs on a master control LAN. Assign IP addresses to all the devices on the LAN. (Connect NV9000 controllers to the LAN if the NV9000 and master control will communicate.)
- 6 Connect video and audio cabling at the back of the master control frame.
- 7 Create a configuration file for each MCPM and MCE and upload it.
- 8 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.)
- 9 Power up the equipment. Test your setup.

10 Adjust and complete your configurations as required. 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.

## Making Control Connections

At the rear of the master control frame are a variety of control and status connectors. The control connectors are at the left at the rear of the frame:



Most of the connectors are used only when a router is present in the frame.

The master control frame has one or two control cards. They are at the right if you are viewing the frame from the front. 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 an MFR. Otherwise, a clock card is sufficient.

▲ The control cards have switch settings. See the *Reference Manual* for how to set the switches.

If the frame contains an MFR, an external router control system will 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 NVISION Ethernet protocol (NVEP).

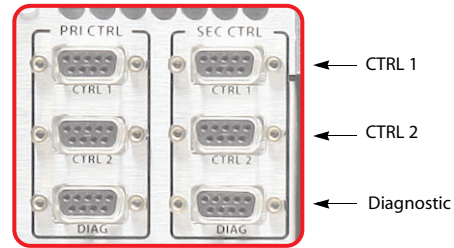
### Serial Control Ports

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.

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

for Primary Control Card      for Secondary Control Card

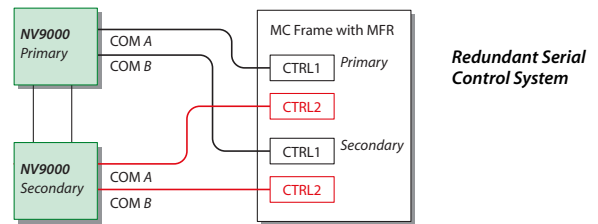
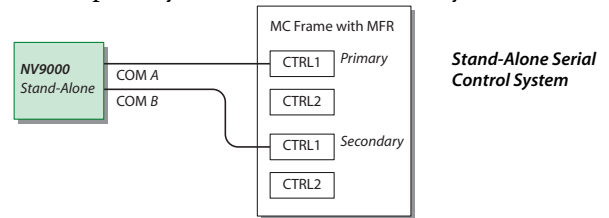


Use these connectors for control using a serial protocol from (1) a primary or secondary NV9000 router control system, (2) a primary or secondary third-party router control system, or (3) a router automation system.

These connection uses straight-through serial cable.

Cases:

- 1 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 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. (SMS7000 systems connect at the 'Aux' ports.)
- 3 Redundant NV9000 (with a serial protocol) Connect the primary CTRL2 port to a COM port on the redundant system controller. Also connect the secondary CTRL2 port if your frame has a secondary control card.



- 4 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.

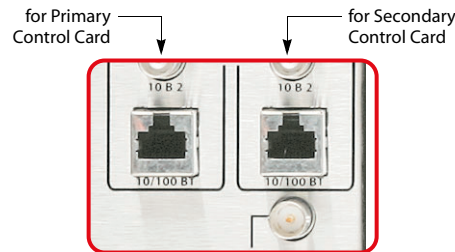
## Diagnostic Ports

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 are not used during normal operation. See [UniConfig](#).

## Ethernet Control Ports

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



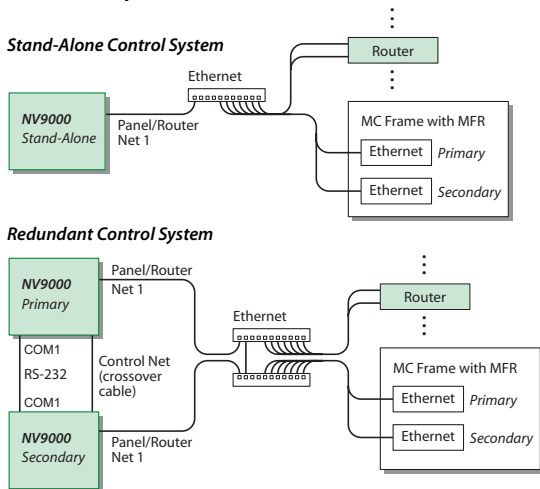
The Ethernet connectors (RJ-45) are needed only when a router is present in the frame and an Ethernet control protocol is in use.

- ▲ Before you can use the Ethernet ports, the control card(s) must be assigned IP addresses in UniConfig. See [UniConfig](#) for details.

Use CAT5 Ethernet cable to make Ethernet connections.

Cases:

- NV9000 control system with 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 MC frame if it has a secondary control card.
- 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.

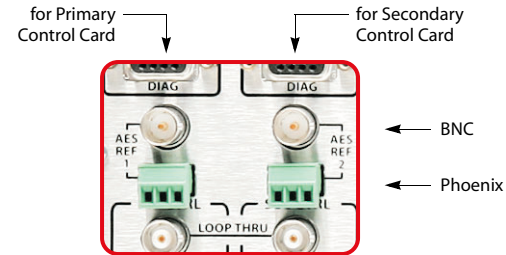


Note that a crossover cable is required between the two Ethernet switches in the redundant connections.

See [Details](#) for information about the NV9000 connectors.

## 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 48kHz 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 (but not both):

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

Both accept AES audio signals at a 48kHz sample rate (3.072 MHz bit rate).

The master control frames support “near-sync” operation. That is, an unlocked 48kHz AES source can be routed by a synchronous AES input/output module pair.

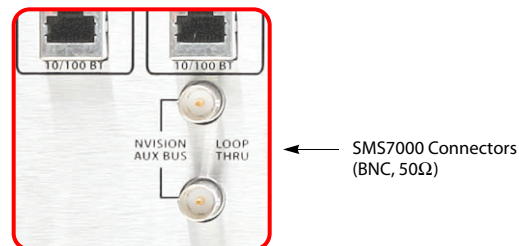
An acceptable reference is any 48 kHz AES signal. Typically, digital silence is used as a house AES reference.

- ▲ At software revision 6.1.0, MCEs derive AES reference from the video reference.

## Aux Bus

- ▲ 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.

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.

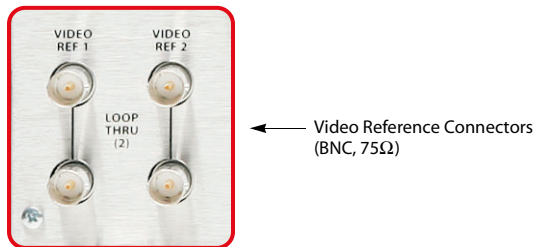
The frame has two aux bus connections. The connection is loop-through: you can pass the SMS7000 “node bus” control signals on to another device. You can connect a redundant control system on the “node bus.”

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. See the *Reference Manual*.

## Video Reference

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



These references affect only the MFR, if present, **not** the MCPM and MCEs in the frame. Each MCPM or MCE also requires a video reference.

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 75Ω termination is required on the frame if you do not feed the reference to another device. You can feed multiple MCPM references from these connectors, but only one MCE reference.

- ▲ Some MCEs and MCPMs support Dolby E audio. 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 in case one fails.

## 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.

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

- ▲ Remember that the EM0414 clock-generator cards do not accept video reference signals. Video reference to the frame is not needed if there is no MFR present.

## Making I/O Connections

Determine *all* your cabling connections before actually making any connections. There are many trade-offs to make.

See [Card Slots](#) on page 19.

## Important Points to Remember

The frame’s inputs must be shared by all the MCPMs and MCEs in the frame.

Each input card provides 16 inputs. (Each audio input is a signal pair.)

The various MCPMs allow different numbers of main sources. (Main sources generally use more than one input.)

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

The various MCPMs and MCEs impose these limits on video effects and audio overs:

Key fill	8	Squeeze background	32	Over channels, MCPM	32	
Key cut	8	Squeeze image	2	32	Over channels, MCE	64

(There are 4 audio overs, with up to 8 channels each on MCPMs and up to 16 channels each on MCEs.)

Intuition XG connections require either 2 or 4 BNCs of an SWB backplane (and at least one MCE in the frame).

You can mix MCPMs and MCEs in a frame. The following points affect where you place MCPMs and MCEs.

- An MCE, MCPM-HD, -HD2, or MCPM-SDHD expect video inputs in the range 1–64 (i.e, input slots 5–8).
- In the same vein, an MCE, MCPM-HD, -HD2, MCPM-MK-HD, or MCPM-SDHD will **not** allow audio inputs in the range 1–64 (i.e, slots 5–8).
- The MCPM-SD and MCPM-MK-SD allow video or audio inputs in any position in any slot.

- The MCPM-MK-SD and -MK-HD do not have squeeze generators.

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

DB25 connectors (analog audio) require breakout cable. Miranda's WC0053 is a suitable cable.

MCEs do not accept analog video or analog audio inputs.

## Connecting (Local) Main Sources

*Local* main sources are those connected directly at the master control backplane. You have 2 choices: video alone or video with embedded audio and/or discrete audio.

### Video

For MCPMs, video can be analog, SD, or HD. MCEs do not accept analog video input.

Connect your analog video source to a BNC of one of your analog video 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 AES. Dolby E audio is possible. An MCPM can accept up to 8 individual channels (or 4 channel pairs) for each main source. An MCE can accept up to 16 individual channels (or 8 channel pairs) for each main source.

Connect an analog audio source to a set of DB25 terminals using a breakout cable such as the WC0053. An analog audio input card and backplane are required. Each DB25 supports 8 individual channels. See the *Reference Manual* for pinouts.

Connect an AES source to a BNC or Phoenix connector. An AES input card and backplane are required. See the *Reference Manual* for Phoenix pinouts.

### Embedded Audio

Video for embedded audio is either SD or HD. Its audio is either AES or Dolby E. MCPMs accept up to 4 AES pairs (8 channels) for each main source. MCEs accept up to 16 channels (8 pairs) for each main source.

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

## Connecting (Local) Key Sources

*Local* key sources are those connected directly at the master control backplane.

For MCPMs, keys can be analog, SD, or HD. MCEs do not accept analog keyer inputs. You **cannot** mix an SD key with HD program output or vice versa.

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

Connect your SD key source to a BNC of one of your SD (or SWB) input backplane modules.

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

## Connecting (Local) Squeeze Background Sources

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

For MCPMs, local squeeze backgrounds can be analog, SD, or HD. MCEs do not accept local squeeze background sources. Squeeze backgrounds in MCEs can be main sources or internal black.

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 (or SWB) input backplane modules.

Connect your HD squeeze source to a BNC of one of your SWB 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 are taken from the set of main sources and do not have separate connections.

## Connecting (Local) Over Sources

*Local* audio over sources are those connected directly at the master control backplane.

For MCPMs, an audio over source is a set of up to 8 discrete AES inputs. For MCEs, an audio over source is a set of up to 16 discrete AES inputs. In either case, Dolby is not supported.

Connect each over source input to a BNC or Phoenix connector of a suitable backplane.

## Connecting (Local) Audio Sources

Local audio sources are auxiliary audio signals that may be directed to the audio meters or monitors. They are not 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 in.” Each MCPM source uses a set of up to 8 AES inputs. Each MCE source uses a set of up to 16 AES inputs.

Connect each audio source input to a BNC or Phoenix connector of a suitable backplane.

## Connecting Intuition XG Sources

Vertigo XG processors produce one or two key channels. Each channel comprises fill and cut video streams (with embedded audio). The fill and cut sources originate at an 8-BNC breakout connector at the rear of the Vertigo XG processor.

Connect these 2 (or 4) cables at SWB inputs at the master control backplane.

- ▲ A tri-level video reference must be connected to the Vertigo XG reference input also on the breakout connector.

## 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, key sources, squeeze sources, and over sources. The behavioral difference between router pre-select and external router sources is described in the *Reference Manual*. In brief:

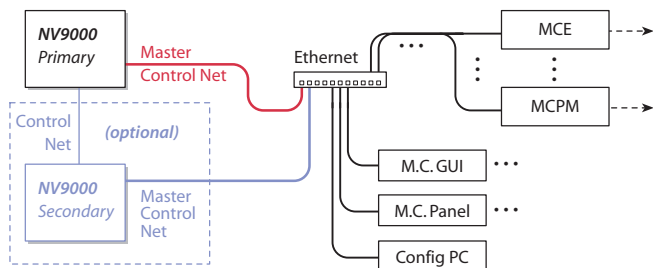
- Router pre-select sources are explicitly selected by the operator by browsing NV9000 device categories. There is no real limit to the number of these sources.
- External router sources are preselected during configuration. The operator needs no knowledge of which sources are external and which are not.

The number of these sources is limited to the number of sources that can be configured. These sources all use the same connectors.

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 requirement for router sources is a connection between the NV9000 controller(s) and the master control system:



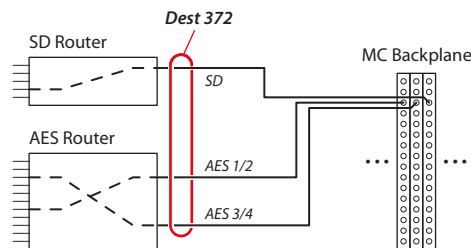
The connection is fairly simple: it is just an Ethernet cable from each NV9000 controller’s master control port to the master control Ethernet switch. If you have a stand-alone NV9000 system, make only one such connection.

## Router Pre-Select

Router pre-selection applies to main sources and over sources. At least one main source button must be “operator modifiable” (in MasterConfig). At least one over source button must be “operator modifiable.” A control panel configuration specifies the NV9000 device categories that a connected MCPM or MCE can use. Over sources and main sources share the same NV9000 device categories.

Under router pre-select, the MCPM or MCE 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 make this work, you must perform appropriate configuration settings in NV9000-SE Utilities.*

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:



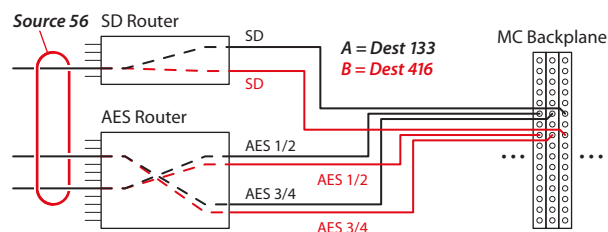
The router *destination* ID is specified, during MCPM or MCE configuration, for the main or over source.

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

It is possible to have more than one router pre-select source “button” defined for an MCE or MCPM. If you have more than one MCPM or MCE in a frame, they may use the same 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.

External squeeze image sources do not require a pool of connectors. A single connector suffices for each.

For MCEs, a set of external router connections can be defined for the program and preset buses and for the preview and aux buses.

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 128 (or 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 effect is that the operator selects the external router source without knowing whether the source is external. During MCPM or MCE configuration, it is the router **source ID** that is specified for the source.

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

## Creating a Master Control Network

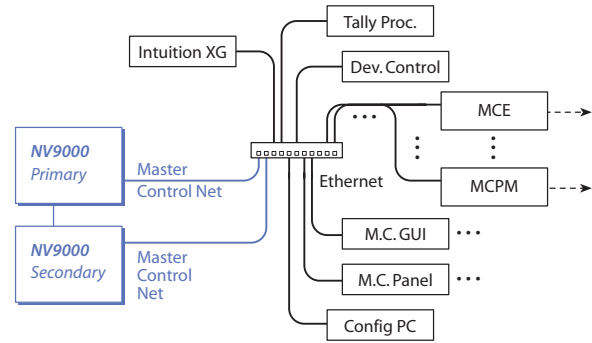
The master control network connects MCPMs, MCEs, master control panels, and (optionally) configuration PCs and tally processors. If you are using an NV9000 control system, it is also connected on the master control network. Notably, the master control frame is **not** on the network.

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 master control configuration software execute on PCs which connect on the master control network. Ensure that the PCs have IP addresses on the master control network.

This is a sketch:



▲ **Important:** All MCPM 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 or MCE or more than one control panel, do not connect and power them on all at the same time until you have configured unique IP addresses for all devices.

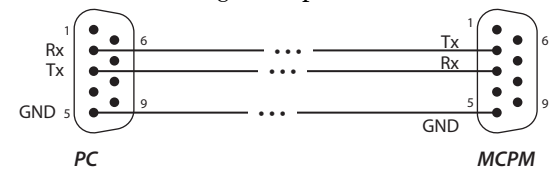
## Run MasterDiag

Before you can place an MCPM or MCE on the master control network, you must assign it an IP address with MasterDiag.

### MCPM Setup

Follow these steps:

- 1 Connect a straight-through serial cable from a COM port of your PC to the diagnostic port at the front of the MCPM. The diagnostic port is a female DE9.



- 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. 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 serial cable at this point, because you can use Ethernet communication through the master control network for all further modifications.
- 5 Repeat these steps for all MCPMs you want to be in your master control network. Each device on the network must have a unique IP address.

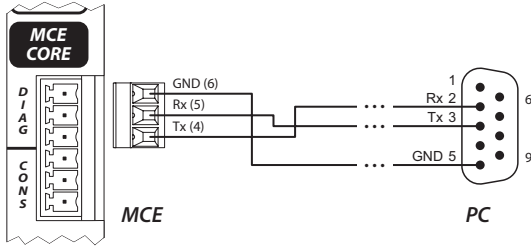
### MCE Setup

The task is the same as for MCPMs, but the cable is different. If you have not done so, obtain or fabricate a DE9-to-Phoenix cable.



Then, follow these steps:

- 1 Connect the DE9-to-Phoenix cable from a COM port of your PC to the diagnostic port of the MCE. The diagnostic port is the upper 3 pins of the 6-pin Phoenix connector.



- 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. 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 serial cable at this point, because you can use Ethernet communication through the master control network for all further modifications.
- 4 Repeat these steps for all other MCEs you want in your master control network. Each must have a unique IP address.

## Making MCPM/MCE Connections

The various MCPM and MCE backplane modules have somewhat different connectors. MCEs in particular use 1.0/2.3 Din connectors for video and audio signals. Other MCPMs use BNC connectors.

- ▲ DIN-to-BNC conversion panels (1RU) are available.

What is important during the “quickstart” period are the video reference, Ethernet, and possibly automation connections. Other connections you can make later include audio monitor, GPI, emergency bypass, and Dolby metadata.

### Ethernet

Use a CAT5 Ethernet cable to connect each MCPM and MCE to an Ethernet switch that supports the master control network. You will have previously used MasterDiag to assign each MCPM and MCE an IP address on that network.

### Video Reference

Connections differ for MCPMs and MCEs.

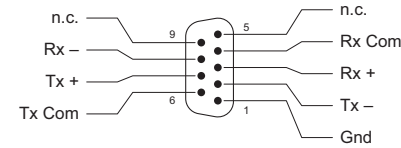
Connect an MCPM’s video reference (BNC) to a suitable video reference signal. An MCPM’s reference can be daisy-chained to other reference inputs. Terminate the reference chain with a 75Ω terminator.

Connect an MCE’s video reference (BNC) to a suitable video reference signal. An MCE’s reference is internally terminated and cannot be daisy-chained to other reference inputs. If you

have multiple MCEs, use a DA or similar device to send a reference signal to each MCE.

### Automation

Each MCPM and MCE has an automation port (DE9, RS-422):



This guide does not address automation. But if you are planning master control automation, this is where to make the connection. Use a suitable serial cable.

## Hardware Control Panels

Power up your hardware control panels. Each panel accepts two power sources for redundancy. Only one is required.

### 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 might have a “LAN 2” option. Use LAN 1 and ignore LAN 2.

(The SCP’s menu is on its lower left 8 buttons and might be difficult to understand at first. Consult the SCP operator’s guide if you need instructions.)

- ▲ 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.

Make sure that each panel has a unique IP address.

### Mounting

The SCP is a 3RU control panel that is meant to be rack-mounted. A CFCP could also be rack-mounted because it has rails that are designed for it.

The FFCP and CFCP may be recessed in a console surface. Each of these devices has a lid that you can open to service internal components. The movement of the lid is not inhibited when the device is recessed. There are panel cutout diagrams in the *Reference Manual*.

The FECF, CECP, and CECP M1 simply rest on a console surface.

### GPI

All hardware panels have GPI/Alarms connectors that support 2 optically isolated GPI inputs and 2 GPI relay outputs.

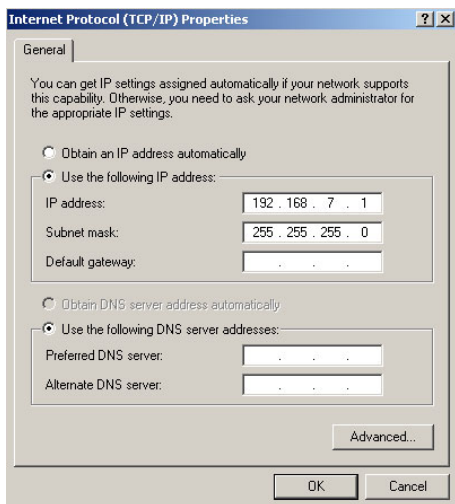
Alarm signals on the connector represent the health of the panel. You can connect these to circuits of your own.

## GUI and Configuration PCs

Windows users' accounts must be set to 'Standard User' or better. Master control software does not function properly when users have 'Restricted User' access or less.

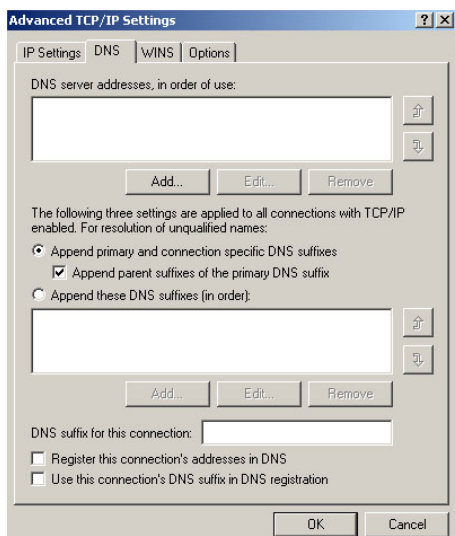
Your GUI PCs and configuration PCs must reside on the master control network. (Your PCs can belong to more than one Ethernet LAN.) Follow these steps to configure IP addresses on each PC.

- 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.



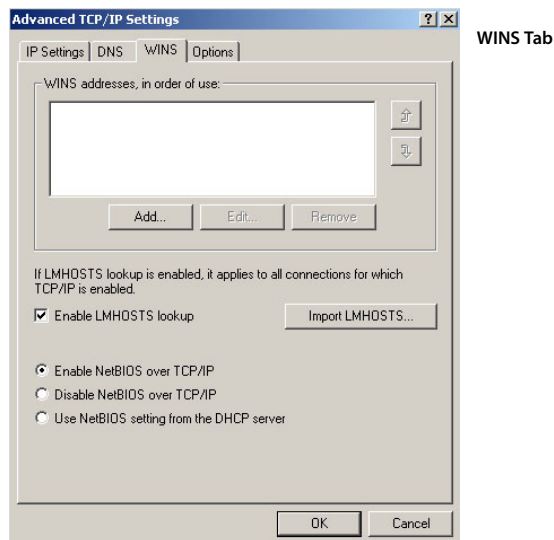
The subnet address should be 255.255.255.0.

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



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

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



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).

You will eventually have to fabricate cables to the tally processor's 32 GPIs and 32 GPOs connecting them to the appropriate switches and circuits at your facility.

You can connect the GPIs of control panels, MCPMs, and MCEs to the tally processor.

Configuration and wiring of the Tally Processor is well beyond the scope of this guide. Refer to the *Installation Guide* and the *Tally Processor User's Guide*.

## Device Controllers

Like the tally processor, the DC21 device controller is a third-party device. It has 4 serial ports supporting machine control protocols (Sony, Odetics, or VDCP) and 16 pairs of GPO relay outputs that carry 100 ms start and stop pulses.

First, connect the device controller to the master control Ethernet switch. The port is 'E-net #1' on the device controller. Use the front panel "menu" of the device controller to define its IP address (which must be unique on the master control network). You'll enter the IP address of the device controller in the configuration of each MCE that uses it.

Then connect the serial ports to VTRs and other devices you want to control. You might have to make custom cables depending on the serial connectors of your devices.

Determine the pre-roll and device latency timing values for the device. Include the pre-roll time in the configuration of the main source that represents the device. Include the device latency value in the port configuration of the DC21.

It is possible to use the GPOs (in pairs) for machine control. You can use the GPIs and you can use GPOs for other purposes. This guide cannot address those connections.

Refer to the *Installation Guide* and the *Device Controller User's Guide*.

## Intuition XG

Connect the Vertigo XG processor to the master control Ethernet switch. (It has only one Ethernet port.)

You must enter the IP address of the Vertigo XG processor in the configuration of each MCE that uses it. You may change the IP address of the Vertigo XG processor using Windows tools. Refer to Miranda's Vertigo XG documentation.

## Software Installation

The software and documentation CD is SB0221. The SB0222 CD provides the optional CECP GUI.

We recommend you copy all the documentation from the CD to your file system, print it, and read it.

## Preliminary Steps

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

The PC(s) you use must be connected on the master control network.

If your master control system is part of an NV9000 control system, you are advised to enter the IP addresses of the NV9000 controller(s) — stand-alone, primary or secondary — during installation.

You might need to pre-configure the NV9000 controller(s) to change the IP addresses of their master control ports.

One or more of your configuration PCs should be connected on the NV9000's house network.

The NV9000 router software and documentation CD is SB0033. It contains the NV9000-SE Utilities installer and the UniConfig installer. Both are requirements for configuring an NV9000 router control system.

## Installing Configuration Applications

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

- 1 Insert the software and documentation CD (SB0221) in your CD-ROM drive. The CD will "auto-play." The master control software and documentation screen displays:



Click the 'Installer' button. The installer will launch.

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



Click 'OK' and go to the Windows "control panel." Choose 'Add or Remove Programs'. Select and delete 'NVI-SION Master Control Configuration SW'.

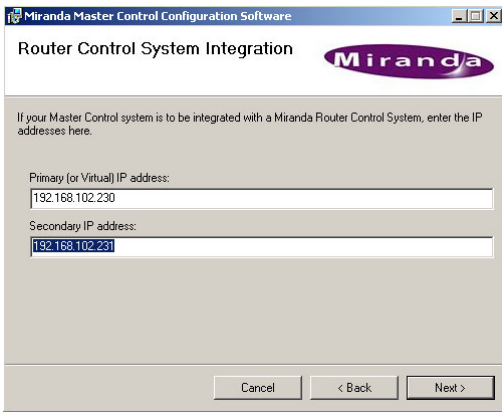
Then click the 'Installer' button again, as in step 1, and proceed to step 3.

- 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 master control system, 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.

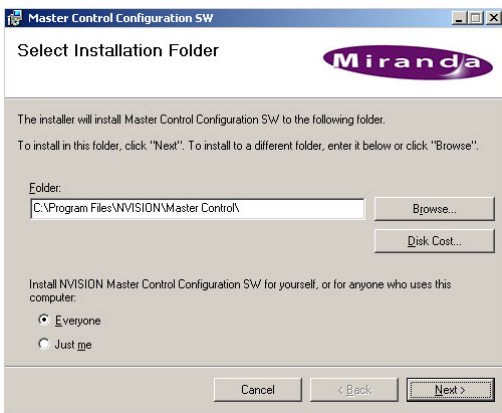
If your NV9000 system uses a virtual IP address (specified in NV9000-SE Utilities) it is preferable to use that instead of the primary address.

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

If you do not have an NV9000, leave these fields empty.

Click 'Next' to proceed.

5 The "Select Installation Folder" screen displays:



The default folder for the installation is C:\Program Files\NVISION\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.

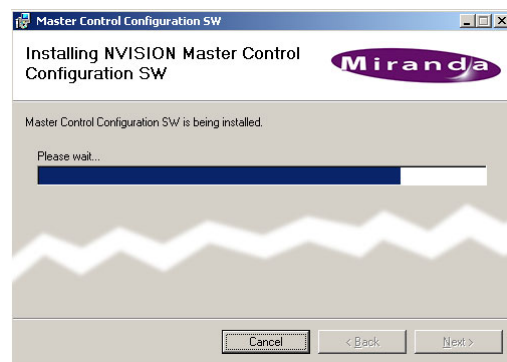
Click 'Next' to proceed.

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 Start menu. The Start menu path is:

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

These are the default pathnames of the four configuration programs:

```
C:\Program Files\Miranda\Master Control\bin\MasterConfig.exe
C:\Program Files\Miranda\Master Control\bin\MasterDiag.exe
C:\Program Files\Miranda\Master Control\bin\MasterLogo.exe
C:\Program Files\Miranda\Master Control\bin\MCSPanelConfig.exe
```

We recommend 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.

You may make copies of the installation files (as a folder) and any other files (including documentation) in your file system. (To do so, open the CD as a folder and browse.)

## Installing Documentation

Miranda provides several user's guides, operator's guides, and reference manuals (including this one) on the software and documentation CD (SB0221). Follow these steps to install documentation:

- 1 Insert the CD in your CD drive. When the CD "auto-plays," click the 'Documentation' button.
- 2 The Documentation screen displays:



Click any of the document names to open the document. They are searchable PDF documents and you must have some form of Acrobat running on your computer to do so. (Acrobat Reader is free software.)

When you have opened a document, you can save it on your computer or print it as you wish.

You can also simply browse the installation disk to locate files in which you might be interested.

## Installing the GUI

Miranda provides the GUI software, as a separate purchase item, on the GUI CD (SB0222). The GUI operator's guide, however, is on the software and documentation CD (SB0221).

Ensure that your PC is running Windows® XP Professional® or Vista.®

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 will not run properly until you have connected your PC on the master control network.

Follow these steps to install the GUI software:

- 1 Insert the GUI CD in your CD-ROM drive. The CD will "auto-play."



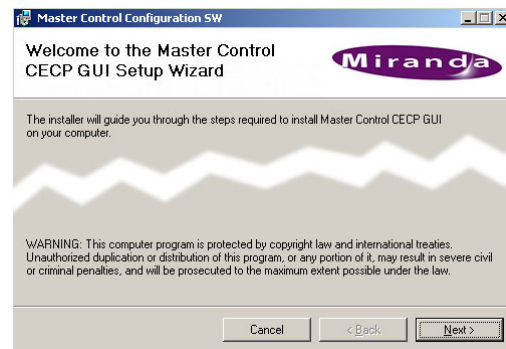
- 2 Click the 'Installer' button. The GUI installer will launch.
- 2 If you already have the GUI software installed, you will see an add/remove message screen:



Click 'OK' and go to the Windows "control panel." Choose 'Add or Remove Programs'. Select and delete 'NVI-SION Master Control GUI SW'.

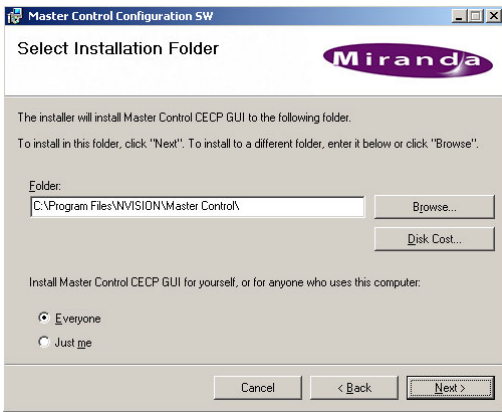
Then click the 'Installer' button again, as in step 1, and proceed to step 3.

- 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\NVISION\Master Control\1. 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:



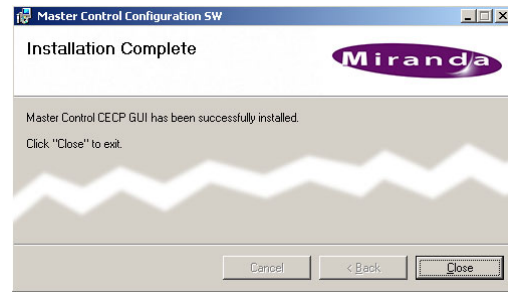
Click ‘Next’ to proceed. Click ‘Cancel’ to cancel the installation. Click ‘Back’ to change your installation parameters.

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’.

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

Start>Programs>Miranda>Master Control\Master Control CECP GUI

The default pathname is:

C:\Program Files\Miranda\Master Control\bin\cecp\_gui.exe

NVISION 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.

## Other Software

NV9000-SE Utilities and UniConfig are available on the router configuration and documentation CD (SB0033). Contact Miranda if you need to obtain that CD.

The SB0033 CD also contains compact router configuration software and documentation. If compact routers are deployed in your system, this software and documentation will be useful.

The Tally Processor’s configuration application is self-contained. The Device Controller’s configuration application is also self-contained.

The Intuition XG software is extensive. Some of it is configuration software, some of it is image management software, and some of it is creative software. Some of it is loaded in the Vertigo XG processor. Contact Miranda to obtain the software (and documentation) that you need and do not have.

## Configuration

The configuration phase follows the “quickstart” phase but we’ll address some points. If you read this section, you’ll be more prepared to use the configuration tools.

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

NV9000 system configuration is far outside the scope of this guide.

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 requires a connected configuration PC. **GUI configuration files require special handling.**

## Configuration Tools

Master control includes 4 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 guides carefully. You need to read only the portions you want to understand.

## MasterConfig

When approaching MCPM and MCE configuration you should keep in mind that the different MCPM and MCE models are in fact *different*, sometimes in subtle ways. Features available in one might not be available in others. All MCPMs and MCEs are independent.

MCEs are "next generation" master control processors and differ from 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.

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

## MCPM and MCE Characteristics

MCPMs and MCEs have some characteristics of interest during initial setup.

### Assumption of Source Buttons

MCPMs and MCEs assume that a control panel has 16 main source buttons. Some have fewer, but all have 16 "virtual buttons." It is in MasterConfig that you specify how the main

source buttons are used. Similarly, MasterConfig specifies how over source buttons are used.

### 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."

External router sources require nothing of the operator or of a control panel. However, external router sources are limited in number.

### Automation

MasterConfig presents a few minor automation options. The term "system modifiable" applies to source buttons that can be controlled by automation.

### 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.

Only new control panels support the aux buses: the CECP, CECP M1, CECP GUI, Aux/Preview GUI, and FECP. These panels also support the MCE's preview bus, except for the CECP M1.

### General Settings

There is a 'General Settings' page in which you define fundamental characteristics (such as the number of audio channels) of the MCE or 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.

### 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 video inputs in the range 1-64 and 64 audio inputs in the range 65-128.

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

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.

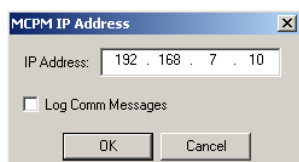
### Misc.

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 or analog video.

### Choosing an MCE or MCPM

There is a list of MCPMs and MCEs at the left side of the MasterConfig window. Click to choose (or redefine or delete) any entry in this list. (This list is shared by MasterConfig, MasterDiag, and MasterLogo.)

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

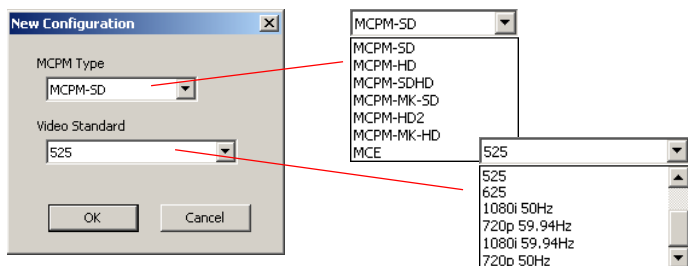


It is not necessary to select an existing MCPM or MCE to create a configuration. After you create a configuration, you can associate it with any of the MCPMs or MCEs in the list.

- ▲ 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:



### MasterDiag

MasterDiag is a relatively small utility program, but nonetheless important. It is not a configuration program. With MasterDiag, you can do the following:

- Set the IP addresses of MCPMs and MCEs.
- Update MCPM and MCE firmware. There are two cases: MCPMs. At times, you will be directed by tech support to update firmware in an MCPM. The firmware files are not

directly available. You must obtain them from tech support.

MCEs. Use the file `MCESoftwarePackage_6_1_0.nvz` in the 'setup' subfolder of the master control installation folder. If it becomes necessary — as when you receive new firmware — you can load this firmware in 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. Like MasterDiag, it is not a configuration program. MasterLogo converts graphic files (.TIF, .BMP, .JPG, .TGA, .PNG, .GIF) to the internal form (10-bit YCrCb) required by Master Control.

Logos may be static or animated.

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.)

There are constraints on logo usage that are described in the *Reference Manual*.

### Logo Limits

#### MCPMs

MCPMs have up to 128 MB or up to 512 MB of RAM in which to store logos, depending on the model. HD MCPMs have the larger memory. The maximum number of logos of any type is 64.

#### MCEs

MCEs have up to 2 GB (or more) of memory in which to store logos. The maximum number of logos of any type is presently 400.

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) configures all control panels, hardware and software.

A panel configuration does the following:

- Defines what channels (MCPMs or MCEs) a master control operator can select.
- 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 an MCPM. For example: the squeezeback button is disabled on a panel



that controls an MCPM-MK-SD or -MK-HD. These MCPMs have no squeeze function.

A panel might lack support for 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.

The SCP has menu pages that are not present for any other panel. Some panels (CECP for instance) have “virtual button” assignment pages.

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.

You can develop configuration files “off-line.” It is not actually necessary to select a panel unless you want to read (or write) 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 characteristics of interest during initial setup. The SCP is quite different from other panels.

### GPI

All hardware panels have 2 GPI inputs and 2 GPI outputs. A hardware control panel can control and sense MCPM and MCE GPIs as well as its own GPIs.

The GUIs (software control panels) do not have GPIs but they can control and sense MCPM and MCE GPIs.

### Button Sets

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

Panel configurations 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.

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 automation temporarily.

## 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 newer control panels (CECP, CECP GUI, and FFCP) 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 quite different functions. 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 CECP 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.

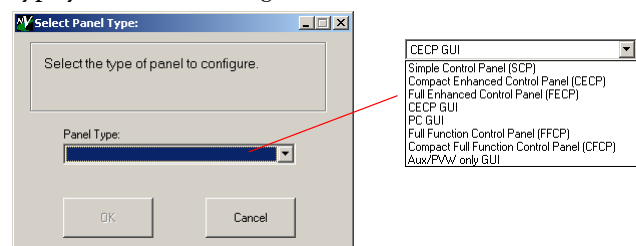
## Choosing a Panel

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.

It is not necessary to select an existing panel to create a panel configuration. After you create a configuration, you can associate it with any of the panels in the list.

## Editing

A new configuration starts with a dialog asking what panel type you want to configure:

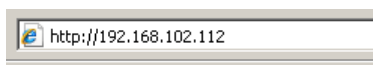


## Tally Processor

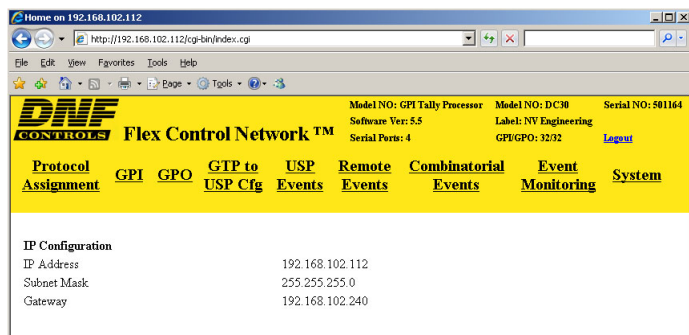
The master control tally processor is third-party equipment. Its configuration application is built-in and requires no separate installation. It communicates with a designated MCPM or MCE using NVEP. It senses and controls a certain set of master control events.

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 main page presents 9 options (sub-pages) listed across the top in the yellow region. Seven of them are applicable:

Protocol assignment	GPI
Remote events	GPO
Combinational events	Event monitoring
System	

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.

Read the *Tally Processor User's Guide* for further information.

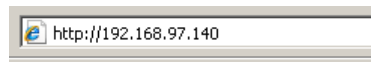
## Device Controller

The master control device controller is third-party equipment. Its configuration application is built-in and requires no separate installation. It receives machine control commands

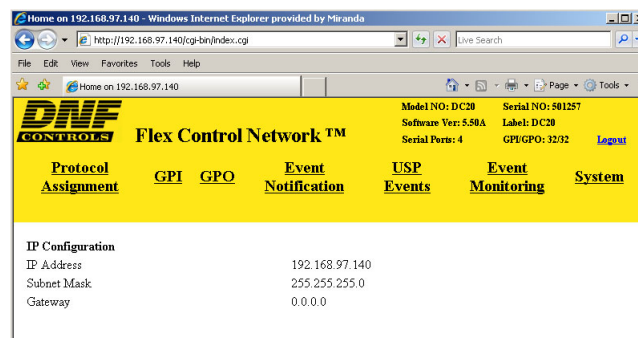
from an MCE through NVEP over the master control network.

Prior to configuration, you must have assigned the device controller an IP address on the master control network. That assignment is made through the device controller'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 main page presents 7 options (sub-pages) listed across the top in the yellow region. Five of them are applicable:

Protocol assignment	GPI
Event monitoring	GPO
System	

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.

You may ignore the 'Event Monitoring' table unless you want to trigger GP outputs based on certain inputs. **This table is not used for master control.**

It is in the 'Protocol Assignment' table that you define the serial port connections.

### Summary

The device controller issues machine control commands to various devices in the protocol (Sony, Odetics, VDCCP) appropriate to the device. It does so when an MCE configured for machine control or pre-roll sends it a machine control "command."

The device controller also has 32 GPI inputs and 32 GPI outputs. These can be connected to various devices in your facility. It is theoretically possible to use the GPOs for machine control.

Read the *Device Controller User's Guide* for further information.

## 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 (wherein 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 remains in bypass mode. If it has reset properly, the MCPM configuration will have been copied from flash to RAM.

For MCPMs, any logos previously in RAM will have been lost, and must be reloaded from the configuration PC. For MCEs, logos are not lost because they remain in flash memory.

### MCPM and MCE Health

At the front of an MCPM or MCE, there is a green LED labeled "HEALTH" and a red LED labeled "ALARM." 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 'Update Config' or 'Restart Panel' from the Panel Status submenu.

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 menu lights up, the control panel has restarted successfully. You should check the messages on the menu.

### Panel Shutdown

Be careful not to cycle power until an control panel has shut-down completely.

### Control Panel Health

The control panel has alarm outputs (relays) which can be used to signal problems:

- Major alarm:
  - A failure of any circuit board.
  - Failure of both power supplies.
- Minor alarm:
  - Failure of one power supply.
  - Fan failure or over temperature.

## Details

### Frames

The master control frame is a metal case 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 those input signals to the outputs, MCPMs, and MCEs.

The two frames available (NV5100MC and NV5128-MC) are nearly identical. 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, however, is newer and *provides greater throughput for master control*.

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). Use 2 control cards (or clock cards) for redundancy. If one fails, the other takes over.

Each frame has control system connectors (Ctrl1, Ctrl2, Diag) and AES reference, video reference, system alarm, and power supply alarm connectors. They also have connectors that are used when the frame is controlled by an SMS7000 system. The frame's time-code reference connector does not apply under master control, but might be used by the MFR.

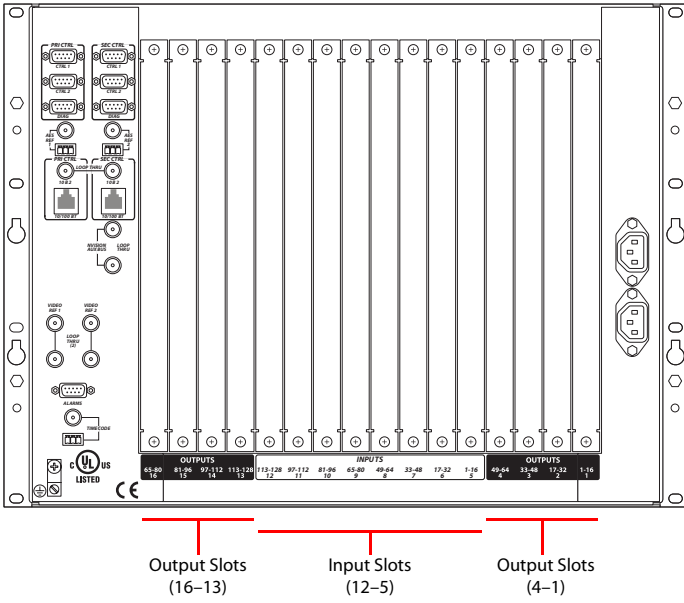
▲ An SMS7000 requires a mezzanine addition to the router control card.

Each frame has two power supply bays. One power supply is sufficient. Use two for power supply redundancy.

### Card Slots

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:



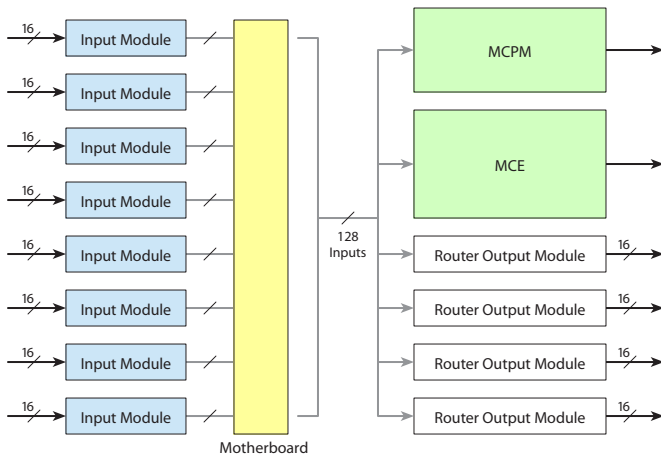
Be aware the connector numbers in slots 13–16 are in reverse order. For details regarding the connector numbers, see the *Reference Manual*.

Some backplane modules use DB25 connectors, some use Phoenix 3-pin quick-release connectors, and some use BNCs. Each DB25 handles 8 signals (4 audio pairs).

MCPMs and MCEs have a variety of connector types, including coaxial (1.0/2.3 DIN), RJ-45, and D-type connectors. A 16-signal DIN-to-BNC converter panel is available for systems that cannot use DIN connectors.

## Motherboard

The motherboard distributes the 128 input signals from the backplane to the router output cards (if any) and to the MCPMs and MCEs. This is a simplified block diagram of a 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, although the master control (MC) system does not

recognize signals of these types. (MCEs do not accept analog audio or video input.)

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

## Master Control Processors

All MCPMs and MCEs have common characteristics, such as audio meter/monitor outputs, general-purpose I/O, and emergency bypass capability. There are several different models. This is a summary:

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.

## MCEs

MCEs perform all the functions of the (earlier) MCPMs and provide additional capabilities. The most prominent new features are the *preview bus*, 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, preset, and preview buses and presents Dolby E metadata and AES output at its backplane.
- 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. Up to 8 third-party Dolby cards mount on the MCE-AXM board, depending on your needs.

MCEs have features that work in conjunction with the “next generation” control panels: the CECP, CECP M1, CECP GUI,

and the FECP. MCEs also work in conjunction with the (new) video and audio timing page of MasterDiag.

## 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.
- MCEs have 16-channel audio. MCPMs have 8 channels.
- MCEs have 2 clean feed outputs; MCPMs have one.
- MCEs have 2 aux outputs and 2 (video) source inputs; MCPMs do not have these.
- MCE outputs (video or audio) carry 16 embedded audio channels. The exception to this is that the MCE-AXM backplane provides 24 discrete AES outputs (12 pairs). 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 less important differences.

## Control Panels

There are 3 hardware control panels and 1 software control panels:

NV5128-MC-SCP	Simple Control Panel. The SCP is a 3RU rack-mount unit. It has function buttons and audio control knobs but no touchscreen. Its menu is encoded on buttons. The SCP has reduced size, reduced cost, and a reduced function set.
NV5100MC-GUI	(New) software control panel, called the “CECP GUI.” This GUI is a software emulation of the <i>CECP</i> . The GUI can operate with a touchscreen. The Aux/Preview GUI is a configuration option of the CECP GUI. It is not a separate product.
NV5100MC-CECP	Compact enhanced control panel. A console similar in size and function to the CFCP, but with features that support Miranda’s “next generation” of master control. The CECP includes a joystick and an audio metering input.  The CECP M1 is a variant of the CECP: it does not have a joystick or preview buttons. It does have an extra audio metering input.
NV5100MC-FECP	“Full-size” enhanced control panel. A console similar in size and function to the FFCP, but with features that support Miranda’s “next generation” of master control. The FECP includes a joystick, audio controls, and an audio metering input.

\* Older panels are the FFCP, CFCP, and PC GUI.

In most cases, a panel’s function buttons have dynamic legends and change color and brightness as required to indicate the function state. The SCP uses color coding heavily.

Software control panels (GUIs) are capable of executing on touch-screen PCs as well as traditional PCs (or laptop PCs) that use keyboards and pointing devices such as a mouse.

The smaller panels (CECP, CFCP, CECP GUI, Aux/Preview GUI, SCP) usually have fewer than 16 main source buttons. Such panels have a set of 16 “virtual buttons” that can be mapped to physical buttons by the use of a “bank selection” button.

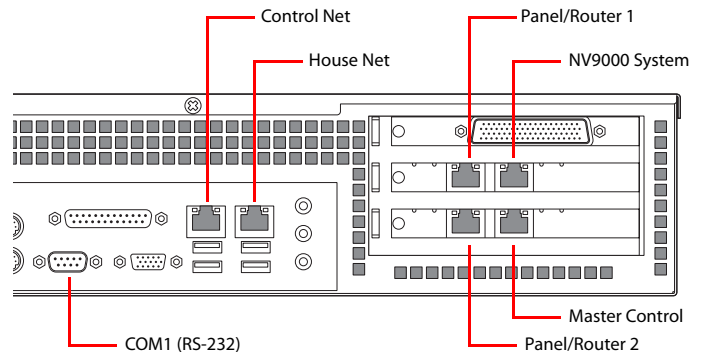
## NV9000

A master control system can operate in the context of a NV9000 router control system.

The NV9000 control system itself is *software* that 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 *system controller*, either in a stand-alone system or on one of the two system controllers in a redundant system.

Master control configurations reference the source devices, destination devices, and salvos defined in the NV9000 configuration.

The NV9000 system controller is a 2RU device that has multiple connectors at the rear. This diagram identifies the default Ethernet ports:



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. In addition, the COM1 ports of the two controllers must be connected.)

## UniConfig

UniConfig is the application for configuring router partitions either in the MFR in the master control frame or in external routers controlled by the NV9000 system.

(The Uniconfig installer is on the SB0033 software and documentation CD.)

## MFR

Skip this if you have no MFR in your master control frame. If you have an MFR, you must also have a router control card (EM0374) in the frame.

Follow these steps 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.
- 2 Launch UniConfig. Choose serial mode.
- 3 In UniConfig, set the IP address and subnet mask of the control card. 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 read the data from the control card first and then to write the new data to the control card.

- 4 In UniConfig, define the partitions and switchpoint settings of the MFR (if it is present).

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.

Thereafter, it is possible to use UniConfig through the card's Ethernet port which is at the rear of the master control frame.

## Other Routers

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

## 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 for the MFR (if present) under 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. Important as these concepts are, they are outside the scope of this document.

Master control systems that communicate with an NV9000 system controller make use of source and destination IDs, device categories and indexes, and salvo IDs.

## I/O Cards

The master control system uses *input* cards. Its MCPMs and MCEs are its *output* modules. Some MCPMs (-HD, -HD2, and -SDHD) accommodate "wing output cards." A multi-format

router (MFR) uses output cards and the wing output cards of MCPMs that have them.

These are the I/O modules that relate specifically to master control:

Analog Audio	Old SWB Video (input)
AES Audio	Old SWB Video (output) <sup>a</sup>
Analog Video	New SWB Video (input)
SD Video	New SWB Video (output) <sup>b</sup>

- a. These SWB output cards fit in the wing slots of an MCPM-HD, -HD2, or -SDHD.
- b. These newer output cards are for the MFR, if it is present in the frame.

## Control Cards

A master control frame requires at least one control card.

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 specifically **do not** communicate through the control card. They are independent modules although they receive clocking from the control card and video and audio from the motherboard.

The EM0414 is just an AES clock generator card. It does not support a router in the frame.

The EM0414 has a number of switches and jumpers that you can set. The EM0374 also has a number of switches and jumpers that you can set. See the *Reference Manual* for details.

## Power Supply

The frame can hold two PS6000 power supplies. The power supply senses the AC input voltage (90–130 or 180–250 VAC, 50 or 60 Hz) and adjusts itself to maintain a relatively constant DC output. You do not have to make a voltage selection. Each of its 48V outputs powers one of the five green LEDs and output test points on the front of the power supply.

*Connect the ground lug at the rear of the frame to earth ground using AWG 8–14 copper wire.*

## Other Hardware

### EBCP

All MCPMs have emergency bypass capability.

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 a channel in *bypass* mode. Pressing the green "Main" button enables *normal* mode. The buttons are also status lamps.

(The EBCP controls only the channel to which it is connected.)

### Tally Processor

Miranda offers a third-party "tally processor"—a 1RU device that provides 32 optically isolated inputs and 32 relay outputs, also optically isolated. Through Miranda's NVISION Ethernet protocol (NVEP), the tally processor can sense master control events such as main source selections and transitions. It can also trigger master control actions and make relay closures according to a configurable event list.

Multiple tally processors can be added to a master control network.

### Device Controller

Miranda offers a third-party "device controller"—a 1RU device that provides 4 serial ports for machine control under 3 selectable protocols (Sony, Odetics, and VDCP). It also has 32 optically isolated inputs and 32 optically isolated relay outputs. The outputs can be used in pairs for machine control. The odd-numbered outputs produce 100 ms 'start' pulses. The even-numbered outputs produce 100 ms 'stop' pulses.

Multiple device controllers can be added to a master control network.

## Other Topics

### GPIO

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

Certain events can cause an MCPM's GPI output relay transition. An MCPM's GPI inputs, if enabled, control its emergency bypass relay. GPI inputs and outputs can be assigned to a panel button. The button color reflects the state of the GPI input or output.

### Reference

A master control frame's router control cards can receive video reference signals for the MFR (if one is present). Indi-

vidual MCPM and MCEs need video reference also. The MCPMs and MCEs *do not* receive video reference through the frame's video reference connectors, but through their own.

The frame can also accept an AES reference for the MFR (if present) and for master control.

### Video Reference

MCE video reference must be NTSC or PAL only. MCE video reference is self-terminating. You will need a DA to supply video reference to multiple MCEs. 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. Otherwise, the control card (EM0374 or EM0414) generates a 48 kHz reference internally.

### Automation

*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 is independent of master control automation.

### Monitoring

MCPMs and MCEs provide a number of monitoring ports for video and audio. The various MCPMs differ in the way it is handled. See the *Reference Manual*.

An NV9000 system supports SNMP for an attached master control system. The master control agent is in the NV9000 system. The agent can be unlocked with the purchase of a license (part number EC9610).

### 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 of 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 master control 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
NV9000 System Net	192.168.3.1	192.168.3.2
<b>Master Control Net</b>	<b>192.168.7.201</b>	<b>192.168.7.202</b>
House Net	192.168.20.1	192.168.20.2

Please refer to the NV9000-SE Utilities documentation.



## Contact Information

Contact Miranda if you need information about NVISION router control systems or third-party automation systems.



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