# VMFamily™

# Installation

# &

# User Guide


VMQuadra™


VMXpress™


VMConnect™

PACIFIC RESEARCH & ENGINEERING

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# IMPORTANT NOTICE:

In early 2017 PR&E (Pacific Research and Engineering) was acquired by Wheatstone Corporation of New Bern, North Carolina, from GatesAir Incorporated of Quincy, Illinois (formerly Harris Broadcast). Pursuant to this, Wheatstone now offers legacy technical documentation and owner/installation manuals for PR&E products from its pre.com website. As legacy documents however, references may be made within to historical GatesAir or Harris Broadcast technical support, copyrights, software, and/or trademarks. It is important to note that all technical support for PR&E products is now available solely from Wheatstone Corporation, its employees and designated official dealerships.

**If you require support or information in addition to the technical file downloads available from pre.com, please contact techsupport@wheatstone.com, or call Wheatstone at +1.252.638-7000 (weekdays 9-5pm eastern standard time USA) for assistance.** *References to other support sites or contact information contained within legacy documents (i.e., GatesAir or Harris Broadcast) are no longer valid.*

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# Safety Instructions

1. **Read All Instructions.** Read all safety and operating instructions before operating the product.

2. **Retain All Instructions.** Retain all safety and operating instructions for future reference.

3. **Heed All Warnings.** You must adhere to all warnings on the product and those listed in the operating instructions.

4. **Follow All Instructions.** Follow all operating and product usage instructions.

5. **Heat.** This product must be situated away from any heat sources such as radiators, heat registers, stoves, or other products (including power amplifiers) that produce heat.

6. **Ventilation.** Slots and openings in the product are provided for ventilation. They ensure reliable operation of the product and keep it from overheating. Do not block or cover these openings during operation. Do not place this product into a rack unless proper ventilation is provided and the manufacturer's recommended installation procedures are followed.

7. **Water and Moisture.** Do not use this product near water such as a bathtub, wash bowl, kitchen sink, or laundry tub, in a wet basement, or near a swimming pool or the like.

8. **Attachments.** Do not use any attachments not recommended by the product manufacturer as they may cause hazards.

9. **Power Sources.** You must operate this product using the type of power source indicated on the marking label and in the installation instructions. If you are not sure of the type of power supplied to your facility, consult your local power company.

10. **Grounding and Polarization.** This product is equipped with a polarized AC plug with integral safety ground pin. Do not defeat the safety ground in any manner.

11. **Power Cord Protection.** Power supply cords must be routed so that they are not likely to be walked on nor pinched by items placed upon or against them. Pay particular attention to the cords at AC wall plugs and convenience receptacles, and at the point where the cord plugs into the product.

12. **Lightning.** For added protection for this product, unplug it from the AC wall outlet during a lightning storm or when it is left unattended and unused for long periods of time. This will prevent damage to the product due to lightning and power line surges.

13. **Overloading.** Do not overload AC wall outlets, extension cords, or integral convenience outlets as this can result in a fire or electric shock hazard.

14. **Object and Liquid Entry.** Never push objects of any kind into this product through openings as they may touch dangerous voltage points or short out parts, which could result in a fire or electric shock. Never spill liquid of any kind on the product.

15. **Accessories.** Do not place this product on an unstable cart, stand, tripod, bracket, or table. The product may fall, causing serious injury to a child or adult and serious damage to the product. Any mounting of the product must follow manufacturer's installation instructions.

16. **Product and Cart Combination.** Move this product with care. Quick stops, excessive force, and uneven surfaces may cause the product and the cart combination to overturn.

17. **Servicing.** Refer all servicing to qualified servicing personnel.

18. **Damage Requiring Service.** Unplug this product from the wall AC outlet and refer servicing to qualified service personnel under the following conditions:
    a. When the AC cord or plug is damaged.
    b. If liquid has been spilled or objects have fallen into the product.
    c. If the product has been exposed to rain or water.
    d. If the product does not operate normally (following operating instructions).
    e. If the product has been dropped or damaged in any way.
    f. When the product exhibits a distinct change in performance. This indicates a need for service.

19. **Replacement Parts.** When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or that have the same characteristics as the original parts. Unauthorized substitutions may result in fire, electric shock, or other hazards.

20. **Safety Check.** Upon completion of any repairs to this product, ask the service technician to perform safety checks to determine that the product is in proper operating condition.

21. **Cleaning.** Do not use liquid or aerosol cleaners. Use only a damp cloth for cleaning.

# Hazard and Warning Label Identification


**WARNING:** TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THE PRODUCT TO RAIN OR MOISTURE.

The **Exclamation Point symbol**, within an equilateral triangle, alerts the user to the presence of important operating and maintenance (servicing) instructions in product literature and instruction manuals.

The **Lightning Flash With Arrowhead** symbol, within an equilateral triangle, alerts the user to the presence of uninsulated dangerous voltage within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock.

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

# 1 – INTRODUCING THE VM FAMILY

The VM Family of audio devices (VM*Xpress*™ and VM*Quadra*™ signal interfaces, and the VM*Connect*™ mini-cardframe) is the third generation of VistaMax Audio Management System devices.

The 1st generation was based upon using VistaMax cardframes—mounted in a TOC or terminal room, networked with BMX*digital* or RMX*digital* consoles, which also served as the in-room signal interfaces for the VistaMax system.

The 2nd generation of VistaMax devices introduced a less expensive networked solution—which followed the same paradigm for smaller markets, using a smaller Envoy™ cardframe and lower cost NetWave™ consoles.

The 3rd generation VM Family devices add the ability to create a distributed-architecture VistaMax system which no longer has to rely on central cardframes for signal interfacing.

## VISTAMAX SYSTEM OVERVIEW

A VistaMax system is a scalable routing system for audio signals and logic commands. It can be configured to support a small facility (like a program origination, single station, or syndication house) just as easily as it can be configured to support a major market multi-station facility (with several dozen networked consoles and thousands of discrete audio and logic connections).

The VM Family of devices are 100% interoperable with existing VistaMax devices, so they can not only be used to create a new VistaMax system, they can also be used to expand an existing VistaMax system or to easily integrate an analog console into a VistaMax system (one VM*Xpress* can be used to allow source selection on up to sixteen console inputs and to route up to sixteen console program and mix-minus outputs to any VistaMax system destination). Section 4 presents various application examples for the VM Family devices.

To expand an existing VistaMax system, one determines the number of new consoles, or discrete audio signals, along with their physical locations, that need to be connected in order to determine how many VM signal interfaces are required. Two VM devices are normally "cascaded" together so that each pair of devices tie into the VistaMax network through a single Hub card Facet (The Hub card is the routing engine of a VistaMax system. Each Hub card has six Facets that Link other VistaMax devices or cardframe I/O cards together, to form the VistaMax network).

Once the physical connections have been made, Harris-supplied software applications (VistaMax Control Center [VMCC], Network Manager [NetManager], and VMSupervisor) are used to add and configure the new devices, regardless of whether it is a new system or they are joining an existing VistaMax network. VMCC can also self-discover new devices after they are plugged into the VistaMax network.

All VistaMax and VM devices are convection cooled, thus they are completely silent, allowing them to be placed wherever discrete audio and logic signals connect in the facility—including control rooms, production studios, and talk studios.

Once the incoming audio signal, and associated logic if applicable, is connected to a cardframe I/O card, a VM*Quadra* or VM*Xpress* signal interface, or to a VistaMax-linked console (NetWave or RMX*digital*), that audio (and its associated logic) can be routed to any system destination (e.g., a physical VistaMax output or a console fader channel) anywhere in the facility.

Conversely, once a peripheral device is connected to a system output, any VistaMax source (e.g., a physical input signal, a signal on a fader channel, or a console bus signal) can be routed to that output.

VistaMax signal routing is done in a number of ways, including by manually selecting sources using a console channel or a hardware selector, through remote UDP commands from a Digital Delivery System or from one of the on-screen VistaMax control panels, or through route commands added to sessions or macros. Section 4 lists the top five ways to route signals in a VistaMax system.

### Audio

All audio moves throughout the VistaMax system devices (consoles, signal interfaces, and cardframes) using 24-bit digital words at a sample rate of 48 kHz. The highest quality A-D and D-A converters (each using 128x oversampling, Delta-Sigma conversion) and built-in digital sample rate converters (digital sample rates from 8 kHz to 96 kHz are supported) yield the most pristine audio possible.

Audio bit-compression is never used in VistaMax devices, and there are no variable delivery delays or special audio assignments required, as are inherent in AOIP-based audio routing systems.

Since the logic commands travel within the header of audio signals, they are also available in real time throughout the system. The audio and logic signal latency within a VistaMax system is 42 µsec, or two audio sample periods, for each Hub card that a signal is routed through. Since even the most complex, multi-station, major market VistaMax system does not have more than six Hub cards between any source and destination, the maximum latency—for a digital source to a digital destination, is typically well under twelve audio samples (252 µsec).

Note that this slight delay is completely overshadowed by the large amount delay which is intrinsic in the analog-digital conversion process since there is about 400 µsec of delay for every A-D or D-A conversion process.

## VMXPRESS OVERVIEW

The VM*Xpress* is a one RU general purpose signal interface with an equal number of inputs and outputs. It has two card slots to hold the four types of VM I/O cards available: a VM Analog I/O card (PRE95-1334) has 16 discrete ins and outs; two VM Digital I/O cards, one with 16 AES I/O (PRE95-1331-1) and one with 8 AES I/O (PRE95-1331-2); and a VM Logic I/O card (PRE95-1332) with 16 logic inputs and 16 logic outputs.

The VM*Xpress* is available in eight I/O configurations to yield various combinations of analog, digital and logic I/O. Each type of I/O is on a plug-in card for easy field substitution. The eight VM*Xpress* configurations have: 16 x 16 or 32 x 32 analog I/O; 8 x 8 or 16 x 16 AES digital I/O; and various combinations of audio and logic I/O. The VM*Xpress* can be ordered with the following combinations of I/O cards:

| VMXpress (standard) | VMXpress (optical) | Logic I/O | Analog I/O | Digital I/O |
|---|---|---|---|---|
| PRE99-1335-1 | PRE99-1336-1 | None | 16 | None |
| PRE99-1335-2 | PRE99-1336-2 | None | 32 | None |
| PRE99-1335-3 | PRE99-1336-3 | None | 16 | 8 |
| PRE99-1335-4 | PRE99-1336-4 | 32 ports | 16 | None |
| PRE99-1335-5 | PRE99-1336-5 | 32 ports | None | 8 |
| PRE99-1335-7 | PRE99-1336-7 | None | None | 8 |
| PRE99-1335-8 | PRE99-1336-8 | None | None | 16 |

Each audio input and output is independently configured with a unique name and a mode setting (mono, stereo, or discrete 5.1 surround) using the Harris VMCC (VistaMax Control Center) configuration software. Additional configuration settings, if needed, are made using the Harris VMSupervisor software which connects to each VM*Xpress* through a USB host cable.

A VM*Xpress* can mount in any studio or rack room to interconnect local analog and/or digital audio equipment. Refer to the VM*Xpress* Quick Guide (Harris document 71-1335), included with the device, for a more complete description of its features.


**Rear Panel View, VMXpress**

The standard VM*Xpress* (Harris p/n PRE99-1335-x) has two RJ-45 Link connectors. The Primary Link typically ties that VM*Xpress* to a Facet on a Hub card (in any cardframe or VM*Connect*), using a crossover CAT-6 cable of up to 100 meters in length. The Secondary Link connector can connect, or "cascade," a second VM*Xpress*, or a VM*Quadra* without any I/O cards, again using a CAT-6 cable of up to 100 meters in length. Cascading two devices in this fashion is recommended since this fully utilizes the signal carrying capacity of a Hub card Facet (which supports 64 input signals and 64 output signals) since each VM*Xpress* has a maximum of 32 input signals and 32 output signals.

A special order VM*Xpress* is available with optical Link connectors (Harris p/n PRE99-1336-x). It is only needed when a Link must extend beyond 100 meters. It uses two MT-RJ optical connectors and multi-mode fiber cabling so that a second VM device can be located up to 2 kilometers away from its host Hub card.

One unique application for a pair of VM*Xpress* devices is that they can be Linked together to create a stand-alone 32-channel bi-directional digital snake cable, which can also function as an A-D, or D-A, depending upon which version of VM*Xpress* is used at each end. With the optional optical fiber Link, these two devices could be spaced up to 2 km apart.

## VMQUADRA OVERVIEW

The VM*Quadra* is also a 1 RU signal interface with an equal number of inputs and outputs. The VM*Quadra* has four USB connectors to directly interface four audio servers (radio automation servers, news actuality servers, or other audio devices with USB connectivity) into the VistaMax system.

The VM*Quadra*'s USB connections offer the easiest way to interface radio automation systems with a VistaMax system. The only requirement is that the audio server vendor has developed the drivers for the VM*Quadra*. Most, if not all, of the major automation vendors have already done this.

The VM*Quadra* uses the same expansion boards as the VM*Xpress* and is available in nine configurations, eight of which match the VM*Xpress* I/O configurations. The ninth version does not have any discrete I/O cards installed; only the USB connections are present. Two VM*Quadra* devices, without discrete I/O, can also be cascaded together. When a VM*Quadra* has discrete I/O installed, it is already using all of the timeslots on a Hub card Facet, thus a second VM*Quadra* or VM*Xpress* cannot be cascaded.

Here are the VM*Quadra* Configurations, by Harris Part Number:

| VMQuadra (standard) | VMQuadra (optical) | Logic I/O | Analog I/O | Digital I/O |
|---|---|---|---|---|
| PRE99-1337-0 | PRE99-1338-0 | None | None | None |
| PRE99-1337-1 | PRE99-1338-1 | None | 16 | None |
| PRE99-1337-2 | PRE99-1338-2 | None | 32 | None |
| PRE99-1337-3 | PRE99-1338-3 | None | 16 | 8 |
| PRE99-1337-4 | PRE99-1338-4 | 32 ports | 16 | None |
| PRE99-1337-5 | PRE99-1338-5 | 32 ports | None | 8 |
| PRE99-1337-7 | PRE99-1338-7 | None | None | 8 |
| PRE99-1337-8 | PRE99-1338-8 | None | None | 16 |

Refer to the VM*Quadra* Quick Guide (Harris document 71-1330), which is included with the VM*Quadra*, for a more complete description of features.

A radio automation server, or other audio server, plugs into each VM*Quadra* USB connector using a standard USB host cable. Each USB cable can deliver four stereo playback channels from the server to the VM*Quadra* and returns two stereo record channels from the VM*Quadra* back to the server (two additional stereo record channels are normally reserved to carry the return logic signals, but they can alternately be used as two more stereo record channels when logic is not active). Incoming logic commands for Channel On, Channel Off, Cue and Ready, and return logic commands (Start and Stop pulse, or On and Off tallies) are carried over the same USB cable. Thus, no audio interface card, signal break-out box or logic GPI interface is required.


**Rear Panel View, VMQuadra (-0 version)**

If additional input and output audio channels are required, two USB cables can be connected between one audio server and two USB ports on the VM*Quadra* for eight channel interconnectivity. Alternately, additional audio channels could be connected discretely using audio I/O expansion cards.

Four local AES outputs, on the VM*Quadra* back panel, are available for signal confidence monitoring and as a method of getting a particular output (like a server's mix output or a summed output of any combination of the four audio inputs) to directly connect the VM*Quadra* to an air-chain switch in order to provide signal redundancy and to allow different parts of the VistaMax system to be bypassed for servicing.

The VM*Quadra* radio automation on-screen interface, designed in alliance with major automation developers, increases functionality, reduces complexity and creates new workflow options for automation servers, digital audio workstations and satellite systems. Steep cost reductions to deploy the VM*Quadra* are realized by eliminating expensive PCI bus audio cards for automation systems since each VM*Quadra* can directly connect (using one USB cable each) four automation computers. The complete solution provides greater flexibility in audio source and destination connectivity, and minimizes the complexity of the distributed computer network and the number of audio channels required for each automation computer.

## VMCONNECT OVERVIEW

The VM*Connect* (Harris p/n PRE99-1385) is a three RU mini-cardframe with four horizontal VistaMax card slots. Refer to the VMConnect Quick Guide (Harris

document 71-1385), that came with the VMConnect, for a more complete description of features.

The top card slot is reserved for a VistaMax Controller Card, which is the LAN and communications interface to the rest of the VistaMax devices in the network. The next slot (Slot 1) is reserved for a VistaMax Hub card, which is the Link interface to tie VM signal interfaces, VistaMax-enabled consoles or additional VM*Connect* or VistaMax cardframes together. The bottom two card slots can hold various combinations of VistaMax Hub, Analog I/O, and Digital I/O cards.


**Rear Panel View, VMConnect**

Since the most common VM*Connect* application is to route signals between VM signal interfaces and NetWave or RMX*digital* consoles, it most often has three Hub cards installed to allow up to 14 VM signal interfaces and consoles to be networked together. To go beyond this number of devices requires adding additional VM*Connect*s, or using a VistaMax cardframe, in order to increase the number of available Hub card Facets.

The VM*Connect* typically has one or two I/O cards installed (for 32 x 32 or 64 x 64 audio I/O) to connect local audio equipment. The middle slot (Slot 2) can hold a Digital I/O card or a Hub card, while the bottom slot (Slot 3) can hold an Analog I/O, a Digital I/O, or a Hub card. When two Hub cards are installed and Linked together, up to nine VM signal interfaces and consoles can be interconnected. If two I/O cards are installed, then only five Facets are available on the main Hub card to connect VM signal interfaces and consoles, or to Link to other VM*Connect* or VistaMax cardframes.

A VM*Connect* can also be used to create a stand-alone Intercom system, with up to 32 Intercom stations, by installing an Analog card in the bottom slot with a blank panel just above it. Any of the standard VistaMax hardware intercom panels, or virtual intercom panels (for special talkback use with two-way devices), can be used with a VM*Connect* Intercom system.

## VM FAMILY SPECIFICATIONS

*Test Conditions:*

- Each device is typically configured, with Analog, Digital or Logic I/O cards
- FSD = Full Scale Digital, +24 dBu
- Analog outputs measured with >1 k ohm load
- Total Harmonic Distortion (THD+N) is measured at +18 dBu, using a 1 kHz or a swept signal with a 22 kHz low pass filter
- 0 dBu corresponds to 0.775 volts RMS—regardless of the circuit impedance, which is equal to 0 dBm, as measured on a 600 ohm circuit.
- Noise specs use a 22 kHz measurement bandwidth. Using a 30 kHz bandwidth will increase the noise measurement by 1.7 dB.

### Analog I/O (All Inputs & Outputs are +4 dBu, balanced)

*Input Impedance:* >40 k ohms, balanced
*Nominal Input Level:* +4 dBu
*Maximum Input Level:* +24 dBu
*Output Source Impedance:* <3 ohms balanced
*Output Load Impedance:* 1 k ohms minimum
*Nominal Output Level:* +4 dBu
*Maximum Output Level:* +24 dBu
*Conversions:* A/D 24-bit, Delta-Sigma, 128x oversampling;
D/A 24-bit, Delta-Sigma, 128x oversampling
*Latency:* <1.6 ms, analog input to analog output

### Digital I/O (AES/EBU Inputs & Outputs)

*Reference Level:* -20 dB FSD = +4 dBu
*Signal Format:* AES-3, S/PDIF (inputs only)
*AES-3 Input Compliance:* 24-bit (uses sample rate conversion to support incoming sample rates of 8 – 96 kHz)
*AES-3 Output Compliance:* 24-bit
*Output Sample Rate:* 44.1 kHz, system referenced
*Processing Resolution:* 24-bit

### Logic I/O

*Logic Inputs:* Opto-isolated, floating or referenced to internal +5 VDC via DIP switch

*Logic Outputs:* Opto-isolated, floating or referenced to internal ground via DIP switch. Outputs are independently configured for pulse or continuous, open or closed operation.

### Audio Frequency Response

*Analog Input to Analog Output:* +0 dB/-0.5 dB, 20 Hz to 20 kHz

### Audio Dynamic Range (referenced to FSD)

*Analog Input to Analog Output:* 103 dB, 106 dB "A" weighted

*Analog Input to Digital Output:* 107 dB

*Digital Input to Analog Output:* 105 dB, 108 dB "A" weighted

*Digital Input to Digital Output:* 138 dB

### Audio Total Harmonic Distortion + Noise

*Analog Input to Analog Output:* <0.005%, 20 Hz to 20 kHz, +18 dBu input, +18 dBu output

*Digital Input to Digital Output:* <0.00016%, 20 Hz to 20 kHz, -20 db FSD input, -20 db FSD output

*Digital Input to Analog Output:* <0.005%, 20 Hz to 20 kHz, -6 db FSD input, +18 dBu output

### Audio Crosstalk Isolation

*Adjacent Analog Inputs or Outputs:* >95 dB, 20 Hz to 20 kHz

### VistaMax High Speed Link

*Copper:* CAT-5e or CAT-6 crossover cable
Maximum distance 330 feet (100 meters)

*Optical:* MT-RJ compliant, multimode fiber optic cable
Maximum distance 1.25 miles (2 km)

### Dimensions

*VMConnect:* 5.25" x 19.0" x 10" (H, W, D)

*VMXpress/VMQuadra:* 1.75" x 19.0" x 10" (H, W, D)

### Power Supply

*Type:* Internal, single output voltage, plug-in power supply (VM*Connect* includes space for optional redundant supply)

*Output voltage:* VMConnect: +48 VDC,
VMXpress & VMQuadra: +5 VDC

*Input voltage:* 100-240 VAC, 50/60 Hz

*AC input:* Detachable IEC cord.
*VMConnect:* C13 connector, ships with USA plug.
*VMXpress/VMQuadra:* C5 (Mickey Mouse) connector, ships with USA plug

### Power Requirements

*Fully Loaded VMConnect (three Hub cards):* <100 watts at 120 VAC / 60 Hz

*EMXpress/VMQuadra with optional I/O:* <40 watts at 120 VAC / 60 Hz

### Environment

*Ambient Temperature:* Less than 40°C at the rack face air inlets

*Cooling:* Convection cooled, no fans

**Harris Corporation reserves the right to change specifications without notice or obligation.**

## HARRIS DIGITAL STUDIO SOLUTIONS WARRANTY STATEMENT

### Equipment Warranty Claims and Procedures

1. The Standard Equipment Warranty Period is 15 months from date of equipment shipment from a Harris facility. The Customer's sole and exclusive remedy for any breach of the Standard Equipment Warranty will be, at Harris' sole discretion and option, repair or replacement of the defective Product. Components that Customer claims to be defective must be made available to Harris for inspection and evaluation. Unless otherwise agreed in writing by Harris, Customs clearance for all replacement parts under the warranty or otherwise will be Customer's sole responsibility. To be entitled to rights under the Standard Equipment Warranty, the Customer must notify Harris in writing within thirty (30) days after discovering a suspected defect in any Product or Services, but in any event prior to the expiration of the applicable Standard Warranty Period. Notice to a Harris dealer, system integrator, sales representative or other third party is not notice to Harris. Following its receipt of any such Customer notice, Harris will determine whether the reported problem is covered by this Standard Equipment Warranty. If Harris determines that

the problem is covered, Harris will authorize repair or replacement of the defective Product, as deemed appropriate by Harris in its sole discretion. For clarification purposes, any technical support provided by Harris will be for the sole purpose of fulfilling Harris' warranty obligations. If Harris determines that Customer is using technical support as a substitute for training of Customer's personnel, then such technical support will be subject to additional charges at Harris' prevailing unit rate for such services.

2. Before shipping any Product to Harris, the Customer must obtain a written Return Authorization from Harris, and provide any proof of warranty eligibility requested by Harris. Any Product received by Harris without a Return Authorization may, at Harris' option, be returned to the Customer collect. Once a Return Authorization is obtained, the Customer is responsible for packing and shipping the Product, to which its warranty claim relates, to a service facility designated by Harris, with all shipping charges prepaid by the Customer, within thirty (30) days after receipt of the Return Authorization. Harris will pay for return of the repaired or replacement Product to the Customer if the repaired or replacement Product is shipped to a designated Harris service facility. Harris will use commercially reasonable efforts to supply Equipment (or part thereof) from the geographical region of Customer's site, so as to minimize freight and duty. Harris bears the risk of loss or damage while the Equipment (or part thereof) is in transit to Customer from the Harris Service Center, and Customer bears the risk of loss or damage while the Equipment (or part thereof) is in transit back to the Harris Service Center.

3. Upon receipt of replacement Equipment (or a part thereof), Customer has thirty (30) days to tender the defective Equipment (or part thereof) to the return carrier for shipment to the service center designated by Harris. If Customer does not timely return the defective Equipment (or a part thereof), Harris shall invoice Customer for the list price of such Equipment (or part thereof), plus applicable shipping. Such failure to return the Equipment (or part thereof) may, in Harris' discretion, be grounds for termination of the Warranty and/or suspension of any future advance exchange privileges until such outstanding defective Equipment has been returned. Under the Standard Equipment Warranty Harris will provide Customer with new, rebuilt, refurbished or alternate Equipment (or a part thereof) of equal or improved quality, as the exchange Equipment (or part thereof) to replace eligible defective Equipment (or part thereof). Any alternate Equipment (or part thereof) will meet or exceed the specifications of the replaced Equipment (or part thereof). Rebuilt or refurbished Equipment may bear cosmetic blemishes that do not affect performance. Unless otherwise specified by Harris in writing, repaired or replaced Equipment (or parts thereof) are covered only for the remainder of the term of the applicable Standard Equipment Warranty. All defective Equipment (or parts thereof) replaced by Harris become the property of Harris. Harris has no obligation to (i) service, exchange or otherwise replace any Equipment (or part thereof) that has been damaged, modified, abused, misused or overused as determined by Harris or has been used with non-Harris supplies or products that have caused damage or malfunction; (ii) paint, refinish, refurbish, restore or exchange any Equipment (or part thereof) with cosmetic blemishes; (iii) service, exchange or otherwise replace any Equipment (or part thereof) if the same would interfere with, impede or be redundant with normal or scheduled maintenance of such Equipment (or part thereof); (iv) service, exchange or otherwise replace any Equipment (or part thereof) that is within sixty (60) days of the end of its production life; or (v) provide any application software support or service involving application hardware or replace any accessories. If Harris elects to perform any such services at Customer's request, then such services will be deemed a service call and all labor, parts and materials used for the service call will be charged at Harris' then-prevailing rates.

## Equipment Warranty Exclusions

Harris does not warrant nor guarantee, and is not responsible for:

1. Defects, failures, damages or performance limitations caused in whole or in part by (A) power failures, surges, fires, floods, snow, ice, lightning, excessive heat or cold, highly corrosive environments, accidents, actions of third parties, or other events outside of Harris' control, or (B) Customer's abuse, mishandling, misuse, negligence, improper storage, servicing or operation, or unauthorized attempts to repair or alter the Equipment in any way. Customer must provide qualified technical personnel to maintain and repair the Equipment.

2. Equipment built to Customer's specifications that are later found not to meet Customer's needs or expectations.

3. The performance of the Equipment when used in combination with equipment not purchased, specified, or approved by Harris.

4. Signal coverage delivered by antenna equipment whether or not supplied by Harris.

5. Batteries and other consumable goods.

## Additional Warranty Notes

1. OEM or Third Party equipment that is incorporated into Harris Equipment is covered under the applicable Harris Standard Equipment Warranty unless the OEM or Third Party equipment carries its own limited warranty, in which event the OEM or Third Party warranty will apply to such equipment incorporated into Harris Equipment. For example and not limitation, CRTs, LCDs, FSMs and Optical Test products are OEM products that have a limited 1 year manufacturer's warranty.

2. Items Sold As Resale. Items sold as resale are such items that are not manufactured by Harris but may be utilized in conjunction with or independently of Harris manufactured Equipment (such as tubes, printers and antenna transmission lines) and shall be covered only by the specific warranty terms of the supplier or original equipment manufacturer of those items. IF AN ORDER COVERS EQUIPMENT NOT OWNED BY HARRIS, IT IS SOLD SUBJECT TO HARRIS' ACQUISITION OF POSSESSION.

3. B-Stock Equipment. B-Stock Equipment for non-transmitter related Equipment is defined as any non-out-of-production product that is less than three (3) years old. B-Stock Equipment related to transmitters is defined as equipment repurchased by Harris that is reconditioned or refurbished for sale to a second generation owner by Harris or its reseller.

4. Used Equipment. IF THE EQUIPMENT SPECIFIED IN AN ORDER IS DESCRIBED AS USED, UNLESS OTHERWISE AGREED IN WRITING BY THE PARTIES, IT IS SOLD "AS IS" AND WITH NO WARRANTY.

## Services Warranty

Harris warrants that the Services will be performed in a professional manner (the "Services Warranty"). Notice of a breach of the Services Warranty must (i) specify in reasonable detail, the nature of the claim, and (ii) be received within ninety (90) days from the last day of performance of the Services. Upon notice of a breach of the Services Warranty and Harris' determination of the validity of such breach of the Services Warranty, Harris will re-perform the applicable Services at Harris' expense. If after reasonable opportunity Harris is unable to re-perform such Services to the reasonable satisfaction of Customer, Customer may, as its exclusive remedy, obtain a refund of the fees paid to Harris under the applicable Order for such Services.

## Software Warranty

1. Physical Media. Harris warrants all physical media ("software media") for the Licensed Programs, including without limit custom software and traffic translators, to be free of defects in material or workmanship for a period of ninety (90) days from the date of completed installation, or if Customer should assume responsibility for installation of the Software, for a period of ninety (90) days from the date of shipment of the Licensed Programs by Harris (the "Software Warranty Period"). This limited warranty extends only to Customer as the original licensee. Customer's sole and exclusive remedy under this limited warranty will be, at Harris' option, repair or replacement of the software media.

2. Licensed Programs. Harris warrants that during the Software Warranty Period (or such other time period as agreed in writing by the parties) the Licensed Programs shall operate substantially in compliance with Harris' specifications for the Licensed Programs (the "Software Warranty"). The entire liability of Harris under this limited warranty is to provide, free of charge, a corrected copy of any portion of the Licensed Programs which is found by Harris inspection not to be in substantial compliance with its specifications. If Harris is unable to provide a corrected copy of the Licensed Programs within a reasonable time, as Customer's sole and exclusive remedy, Harris will replace the same with a functionally similar program or refund to Customer the amounts Customer paid Harris to purchase or license such Licensed Programs. Harris does not warrant that such Programs are error free or that Customer will be able to operate such Programs without problems or interruptions. Corrections to the Licensed Programs beyond the Software Warranty Period will only be made by Harris pursuant to a separate software maintenance agreement.

3. Cost of Corrections. During the Software Warranty Period, Harris will bear the material cost and shipment of corrected or replacement Software at no charge to Customer. Software corrections will be sent via e-mail. In the rare event Customer requires a Harris customer support engineer to visit the site, related reasonable pre-approved on-site time and travel expenses will be billed at the prevailing daily rates, unless otherwise agreed to in writing prior to the visit. A ONE-DAY MINIMUM CHARGE APPLIES TO ALL ON-SITE VISITS.

4.Software Warranty Exclusions. The Software Warranty does not apply to any software media or Licensed Program that (A) has been altered or modified, except by Harris; (B) has not been installed, operated, repaired, or maintained in accordance with instructions supplied by Harris; (C) has been subjected to abnormal physical or electrical stress, misuse, negligence, or accident; or (D) is used in ultra hazardous activities.

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## Governing Law and Jurisdiction

Applicable Law, Venue and Jurisdiction. This Standard Warranty Policy Statement, and any disputes related hereto, shall be governed by and interpreted in accordance with the laws of the State of Florida, USA, regardless of any law principles requiring the application of any other law. The parties agree that the exclusive venue for any action related to the dispute or interpretation of this Agreement shall be in the courts with the appropriate jurisdiction located in Orlando, Florida, and each party irrevocably submits to the jurisdiction of each such court in any such action and waives any objection it may now or hereafter have to venue or personal jurisdiction in each such court. The prevailing party in any action related to the dispute or interpretation of this Agreement shall be entitled to recover its reasonable attorneys fees incurred in pursuing the action, including those fees incurred throughout all bankruptcy and appellate proceedings.

## Jury Waiver

THE PARTIES FURTHER AGREE, TO THE EXTENT PERMITTED BY LAW, TO WAIVE ALL RIGHTS TO A TRIAL BY JURY OF ANY ACTION RELATING TO THE DISPUTE OR INTERPRETATION OF THIS AGREEMENT, WHETHER SOUNDING IN CONTRACT, TORT, OR OTHERWISE. THE PARTIES SPECIFICALLY ACKNOWLEDGE THAT THIS WAIVER IS MADE KNOWINGLY AND VOLUNTARILY AFTER AN ADEQUATE OPPORTUNITY TO NEGOTIATE ITS TERMS.

# 2 - HARDWARE INSTALLATION

The VM*Quadra* and VM*Xpress* use one RU of rack space. Each device is 19" wide x 10" deep x 1.75" high. The VM*Connect* uses three RU of rack space and is 19" wide x 10" deep x 5.25" high.

All VM devices are convection cooled to allow for completely silent operation—no fan noise, and can be installed in air studios, production rooms, talk studios, or TOC equipment rooms.

## RACK MOUNTING

Each VM device has a front cosmetic cover which must be removed to rack mount the device. The front panel is held to the chassis using snap-on plastic ball sockets. Mount each VM device to the rack rails using two or four rack screws (not supplied). Note that the VM*Connect* front cover is made up of two separate panels.

Other rack equipment can be placed immediately above or below a VM*Quadra* or VM*Xpress* in the rack, but leave one rack space open above a VM*Connect* (a VistaMax selector panel, or other device, with a depth of less than 6" can be installed immediately above a VM*Connect*).

## CABLING

All audio, logic, Link, USB and VAC connections are made on the back panels of the VM devices. Allow sufficient rear access to each device so there is plenty of clearance to plug and unplug all wiring.

### AC Connections

Each VM device has a removable IEC AC cord that plugs into a power supply connector on the right side of the rear panel. VM*Quadra* and VM*Xpress* use a 5-volt commodity switching supply, held captive within the chassis. Their AC cords use an IEC C5 ("Mickey Mouse") connector. The VM*Connect* uses a 48-volt internal-mount plug-in supply with an IEC C13 AC cord. The VM*Connect* can also have a redundant supply installed, which has its own AC cord. See page 12 for installation instructions.

All VM devices have universal supply inputs (100 to 240 VAC, 50/60 Hz). The AC cords supplied with all devices have AC plugs for USA outlets. For international use, replace the AC cords with locally-sourced AC cords with the appropriate wall plug.

There is no power switch on any VM device since all are designed to be powered 24/7. Power-on indication is supplied by a large red front panel indicator.

### Links

Located to the left of the power connector on the VM*Quadra* and VM*Xpress* are two RJ-45 Link connectors. Typically, the Primary connection goes to a VistaMax Hub card Facet, although it may also go to the Secondary connection of another VM device in order to "cascade" the second VM*Xpress* or VM*Quadra* together in order to fully utilize a Hub card Facet signal capacity. In some special applications, like using two VM*Xpress* devices to create a "digital snake," two Primary Link connections are connected together.

Regardless, each CAT-6 Link is a crossover cable which uses two of the four pairs of wire in a CAT-6 cable:

| LINK CABLE WIRING | |
|---|---|
| 1568A END | 1568B END |
| 1 (WHT/GRN) | 3 (WHT/GRN) |
| 2 (GRN) | 6 (GRN) |
| 3 (WHT/ORG) | 1 (WHT/ORG) |
| 6 (ORG) | 2 (ORG) |

### AES Outputs

To the left of the Link connectors is the *AES Outputs* connector (a pinout is shown on page 12). This twelve-pin connector has four discrete AES outputs that can be used for confidence monitoring or as a system bypass of the USB input signals on the VM*Quadra* or the audio inputs on a VM*Xpress*.

On a VM*Quadra* the four outputs can be independently set (using the VMSupervisor application) to either output one input signal (e.g., the Mix Output from the audio server), or they can be a "summed output" from multiple inputs of each USB connector.

The VM*Xpress* is not as flexible: its four outputs simply contain a mix of Inputs 1–4; Inputs 5–8; Inputs 9–12; or Inputs 13–16, thus it is not often used but is available for confidence monitoring of the input signals.

| AES OUTPUTS SIGNALS | (+,-,GND) |
|---|---|
| INPUTS 1 - 4 | PINS 10, 11, 12 |
| INPUTS 5 - 8 | PINS 4, 5, 6 |
| INPUTS 9 - 12 | PINS 7, 8, 9 |
| INPUTS 13 - 16 | PINS 1, 2, 3 |

### USB Ports

The VM*Xpress has* a single USB port that is used to configure that device and to upload new FPGA (Field Programmable Gate Array) code. See the Device Configuration section for details on using this connection.

The VM*Quadra* has four USB ports, each of which is designed to connect to an audio server in order to interface its audio and logic in and out of the VM*Quadra*. In most applications, one USB connects to one audio server for four stereo playback and two stereo record channels. When additional play or record channels are required, then two USB cables can connect to one server for eight playback channels and four stereo record channels.

### RJ-45 Connectors

The four RJ-45 connectors located next to the four USB Server ports on the VM*Quadra* are reserved for future use and should not have any cabling plugged into them.

## VM I/O CARDS

There are four openings, on both the VM*Quadra* and VM*Xpress*, at the far left of the rear panel. These openings are for the input and output connectors on the two I/O cards that may be installed. The two left-hand connectors carry the audio and/or logic inputs, while the two right-hand connectors carry the audio and/or logic outputs. Each I/O card includes a colored LED in between the two card connectors to indicate the type of card installed:

GREEN = VM Analog I/O card
BLUE = VM Digital I/O card
RED = VM Logic I/O card

Each LED blinks (the card's heartbeat) to indicate it's operating properly. An error condition is indicated by a card's LED that is either lit solid or not lit at all.

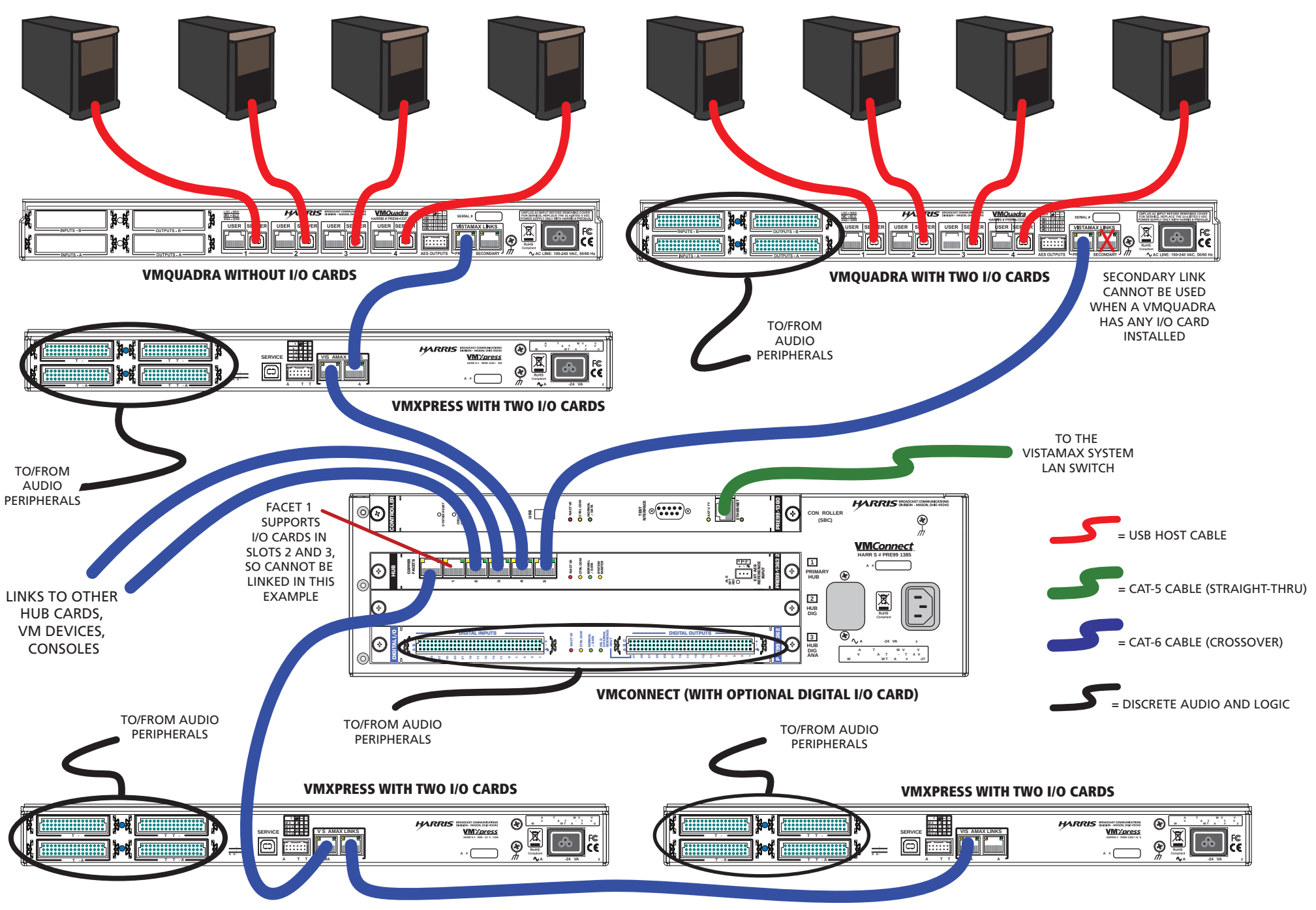
## VMCONNECT REDUNDANT POWER SUPPLY

If a VM*Connect* redundant power supply (PRE99-1206) will be installed, then it must be added before the VM*Connect* is rack mounted since the top cover must be removed to install the Redundant Supply. Verify the AC power cord is unplugged before removing the top cover.

1. Remove the top cover (nine #2 Phillips screws).
2. Remove the power supply retaining bracket (two #2 Phillips screws).
3. Remove the cover plate (two #2 Phillips screws) from the AC connector opening and discard.
4. Place the redundant power supply into the chassis so its AC connector aligns with the rear panel opening. It fits in between several stand-offs mounted to the chassis bottom.
5. Route the DC power cord through the upper chassis opening and plug it into motherboard connector J1. To gain better access to J1, the Controller and Hub cards can be unplugged from the motherboard.
6. Install the power supply retaining bracket to hold the two supplies in place.
7. Reinstall the top cover.
8. If the Controller and Hub cards were unplugged, reinstall them before installing the VM*Connect* into a rack following the guidelines presented on the previous page (page 11).

A Quick Guide is supplied with each VM*Quadra*, VM*Xpress*, VM*Connect* and for each VM I/O card and VistaMax card, which presents additional connection information, including the pinouts for all connectors on the VM devices. These Quick Guides (and other documentation) can also be downloaded from the Harris Studio Products FTP site or the Harris E-Service site. See the Service chapter (page 35) for details on accessing these Internet sites.

The following page presents an overview of how the various VM devices interconnect to form a VistaMax network.




VISTAMAX SYSTEM, OVERVIEW, USING VM DEVICES

# 3 – DEVICE CONFIGURATION

The VM devices are configured using VMCC (VistaMax Control Center), the engineering interface to create and edit the VistaMax community device settings, and VMSupervisor, an interface to assign and upload device-specific configuration settings to VM*Xpress* and VM*Quadra* devices. A summary of the various VistaMax software applications available is presented in the *System Admin Computer & Software* section, starting on page 19.

## OVERVIEW

VMCC is used to configure VistaMax devices, VM*Connect* mini-cardframes and most parameter settings on the VM signal interfaces. The VMSupervisor application configures VM Logic I/O card settings and Room Code (a logic setting used by RMX*digital* consoles to identify each mic input by its location so the console can properly mute monitor outputs and trigger the appropriate warning logic). Thus, VMSupervisor is not needed when configuring VM*Xpress* devices that do not have VM Logic I/O cards installed and which do not have any microphone signals connected that may be routed to an RMX*d* console.

VMCC performs these main functions:

1. Inspects the community to discover VistaMax and VM devices.
2. Adds them to the "VistaMax community," the list of VistaMax and VM devices that have been connected together.
3. Allows sources (audio inputs or bus signals) to be selectively included on each device in the community.
4. Allows signal names (of up to 10-characters) to be customized for each input and output, overwriting the default names
5. Sets the audio mode (mono/stereo/multichannel) for each audio signal
6. Provisions and Distributes updated configuration files to the VistaMax parent devices (the VM*Connect*, Envoy and VistaMax cardframes holding the Hub card Facets that the VM devices plug into).

VM*Xpress* devices with Logic I/O cards, or with mic signals when RMX*d* consoles are in the system, should be plugged into the admin computer, using a USB host cable, before being rack mounted so that VMSupervisor can be used to assign the logic settings and/or set the room code for each mic input. Refer to the section on using VMSupervisor (page 22) for details. The other VM devices can be rack mounted and powered up in preparation for being added into the VistaMax community, per the hardware Installation chapter (page 11).

It is assumed that the Harris applications: NetManager/Community Monitor, VMCC and VMSupervisor have already been installed on the admin computer. Each program has an overview later in this chapter, but it is beyond the scope of this document to cover how to install the programs (an installation guide, `readme.txt`, or other PDF is included with each program file when downloaded).

Since each Hub card Facet can support two cascaded VM devices, it should have been determined, during the system design phase of the project, which devices will be cascaded together, as shown in the VistaMax system example on page 13.

Once the VM devices are rack mounted per the hardware installation chapter and are powered up, the Link cables can be connected between devices to create the VistaMax network. Each pair of VM*Xpress* devices may be Linked together, by connecting the Primary Link connector of the cascaded VM device to the Secondary Link connector on its cascade partner, as shown at the bottom of the illustration on the previous page. A Link cable then goes from the Primary connector to a Hub card Facet.

VM*Quadra* devices with any VM I/O cards installed cannot use the Secondary Link, nor can they be cascaded thru another device, since that VM device is already consuming an entire Hub card Facet. Connect one Link cable directly from its Primary Link connector to a Hub Card Facet.

A VM*Quadra* without any VM I/O cards installed, as shown at the upper left of the illustration on the previous page, can be cascaded with another VM*Quadra* without I/O cards or with any VMXpress.

## VM DEVICE CONFIGURATION

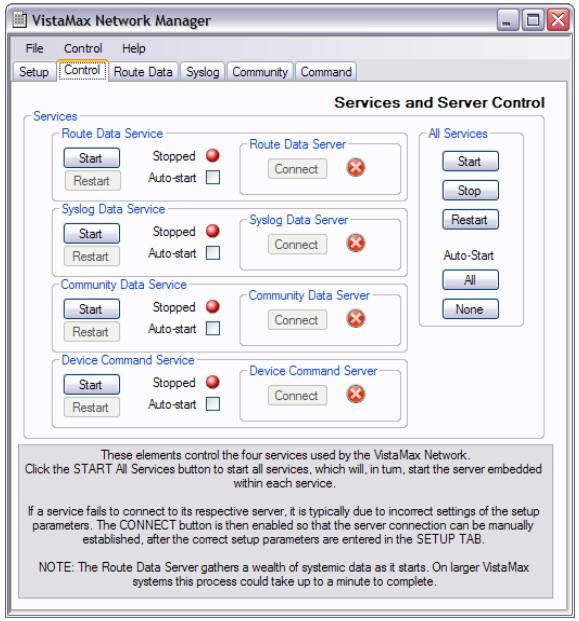
In order to set the configurations on the VM devices for a specific installation and application, the Harris software programs: NetManager, Community Monitor and VMCC, must be installed and running on the admin computer. The admin computer must be connected to the VM*Connect* (and other cardframes, consoles, and edge devices) through one or more LAN switches. It is assumed the default subnet (`192.168.100.XXX`) is being used and that the admin computer's IP address is set to `192.168.100.11`.

To get assistance with VM configuration, contact a Harris Studio Products Support engineer (contact information is in the Service chapter).

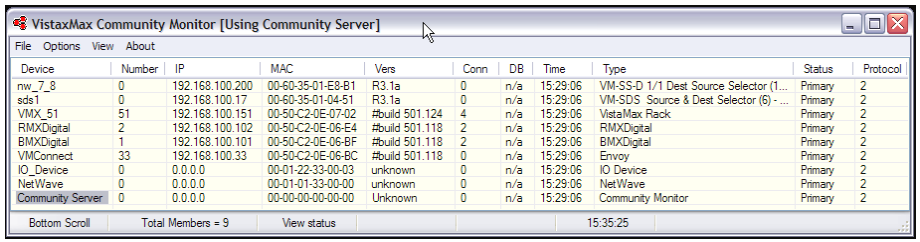
### 1 Start NetManager and Community Monitor (CM)

Double click the NetManager desktop icon (on the admin computer) to start the NetManager application. If the four services and servers are stopped (as shown below), then click the *Start All Services* button to start the services and servers. CM should start shortly after all of the servers are started. If this does not happen, double click its desktop icon to start the program. NetManager can then be minimized, or even closed, since the services and servers do not require the program window to remain open.






In CM, select View / Status, (an example is shown below). The VM*Connect* should be shown in the display, with the IP address of `192.168.100.33`, and the admin computer (named Community Server) should also be listed with an IP address of `0.0.0.0` since it connects via a service on the admin computer.




If the cardframe is not shown, but the Community Server is shown, then verify the admin computer is set to the correct IP address (192.168.100.11) and that all of the default settings are being used by NetManager. If neither the Community Server nor the cardframe are shown, verify the network switch used to create the VistaMax LAN is set to allow multicast messages to pass through the switches, and that Windows Firewall is unchecked for the NIC going to the VistaMax network.

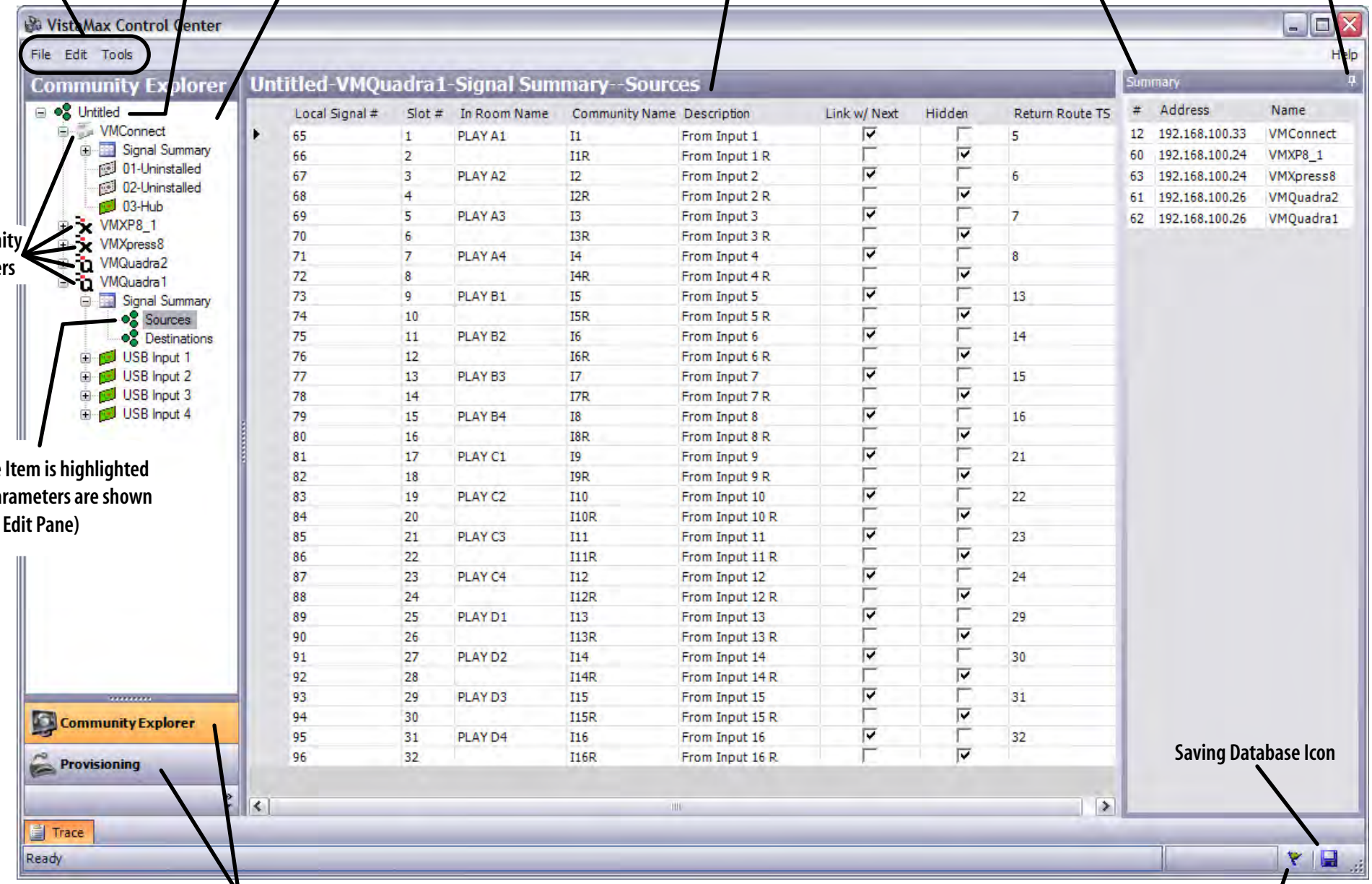
The admin computer is properly communicating with the network when all devices connected to the VistaMax LAN switch, and the Community Server, appear in the CM Status display. If other VM interfaces and VistaMax devices are connected, then they also appear in this list, as shown in the above illustration.

### 2 Start VMCC

If VMCC already has a VistaMax community, and you are adding new devices, select *File / Open Community* to select and open your community.

If VMCC is being run for the first time, select *Tools / Options / Administration,* then click the down arrow on the VistaMax Network Interface selection box and choose the NIC connected to the VistaMax Network (default: `192.168.100.11`). Click OK to select it and close the *Options* window. Then select *Tools / New Community* to create a new community.

The illustration on the next page identifies the main VMCC GUI features. In the illustration, the Signal *Source Summary* for device VMQuadra1 has been highlighted, thus the Edit pane shows the source signal settings for that device.


Menu items
(File, Edit, Tools)
Community Name
Community Explorer Pane
Allows you to select an item
to open up in the Edit Pane
(device, signal summary, etc.)
Edit Pane
Parameters for the highlighted
item are entered in this pane.
Community Summary Pane
Lists each device in the community
(by name, device # or IP address
Hide Summary
Pane icon
VistaMax Control Center
File Edit Tools
Help
Community Explorer
Untitled-VMQuadra1-Signal Summary--Sources
Summary
Untitled
VMConnect
Signal Summary
01-Uninstalled
02-Uninstalled
03-Hub
VMXP8_1
VMXpress8
VMQuadra2
VMQuadra1
Signal Summary
Sources
Destinations
USB Input 1
USB Input 2
USB Input 3
USB Input 4
Community
Members
Active Item is highlighted
(Its parameters are shown
in the Edit Pane)
Local Signal # | Slot # | In Room Name | Community Name | Description | Link w/ Next | Hidden | Return Route TS
65 | 1 | PLAY A1 | I1 | From Input 1 | 5
66 | 2 | | I1R | From Input 1 R
67 | 3 | PLAY A2 | I2 | From Input 2 | 6
68 | 4 | | I2R | From Input 2 R
69 | 5 | PLAY A3 | I3 | From Input 3 | 7
70 | 6 | | I3R | From Input 3 R
71 | 7 | PLAY A4 | I4 | From Input 4 | 8
72 | 8 | | I4R | From Input 4 R
73 | 9 | PLAY B1 | I5 | From Input 5 | 13
74 | 10 | | I5R | From Input 5 R
75 | 11 | PLAY B2 | I6 | From Input 6 | 14
76 | 12 | | I6R | From Input 6 R
77 | 13 | PLAY B3 | I7 | From Input 7 | 15
78 | 14 | | I7R | From Input 7 R
79 | 15 | PLAY B4 | I8 | From Input 8 | 16
80 | 16 | | I8R | From Input 8 R
81 | 17 | PLAY C1 | I9 | From Input 9 | 21
82 | 18 | | I9R | From Input 9 R
83 | 19 | PLAY C2 | I10 | From Input 10 | 22
84 | 20 | | I10R | From Input 10 R
85 | 21 | PLAY C3 | I11 | From Input 11 | 23
86 | 22 | | I11R | From Input 11 R
87 | 23 | PLAY C4 | I12 | From Input 12 | 24
88 | 24 | | I12R | From Input 12 R
89 | 25 | PLAY D1 | I13 | From Input 13 | 29
90 | 26 | | I13R | From Input 13 R
91 | 27 | PLAY D2 | I14 | From Input 14 | 30
92 | 28 | | I14R | From Input 14 R
93 | 29 | PLAY D3 | I15 | From Input 15 | 31
94 | 30 | | I15R | From Input 15 R
95 | 31 | PLAY D4 | I16 | From Input 16 | 32
96 | 32 | | I16R | From Input 16 R
# | Address | Name
12 | 192.168.100.33 | VMConnect
60 | 192.168.100.24 | VMXP8_1
63 | 192.168.100.24 | VMXpress8
61 | 192.168.100.26 | VMQuadra2
62 | 192.168.100.26 | VMQuadra1
Community Explorer
Provisioning
Trace
Ready
Saving Database Icon
Left Pane Activity
Selection Tabs
Community Device Abbreviations
R = RMXdigital
B=BMXdigital
E= Edge device
X = VMXpress
Q = VMQuadra
N=NetWave
Saved Status Flag

Clicking on the *Community Name* in the Community Explorer pane changes the Edit pane (in the middle of the VMCC window) to show the global parameters for the VistaMax community. This allows the community name to be changed and the administrator (admin computer) and Gateway IP addresses to be set (typically both are set to the admin computer's IP address, default: `192.168.100.11`). Typically, the other settings in this pane are left at their default settings.

Along the right side of the VMCC screen is a Community Summary pop-open window that lists the IP Address, Device Number and Device Name being used for each community member. It is typically only open when creating a community or when adding new community members. This pane can be hidden by clicking on the upper right push-pin icon. It can also be "floated" on-screen by double clicking on the title bar. To re-pin it to the upper right side, double click on the title bar again.

## 3 Inspect the VistaMax Community

To add new devices into the VistaMax community that is open, select *File / Inspect Community*. A community inspection window opens that shows all the VistaMax and VM devices that are detected. If you have not yet Linked the VM devices to the VM*Connect*, then the only device that would appear is the VM*Connect*.

Verify there is a check mark in the Inspect column for each device that should be inspected (click the box to add or remove a check mark). If a device is already part of the community it does not need to be inspected again, but there is no harm in doing so. Once the devices to be inspected are selected, click the *Inspect* button to inspect the devices. The information line shows *done* when the inspection is completed. Click *Continue*.

After a few seconds, the cardframe, and any other devices that were inspected, appear as new community members in the Community Explorer pane.

You can use Inspection anytime a new VistaMax and VM device is Linked and tied into the VistaMax LAN in order to add them to the VistaMax community.

The device order in the Community Explorer pane can be changed using *Tools / Options* to select between ordering devices by Device Number, Device Name or by Device type and name.

## 4 Edit the Device and Signal Settings

Clicking on a device name in the Community Explorer pane switches the Edit pane to display the configuration parameters for that cardframe, console, VM device, source selector or Intercom panel. Each type of device has its own Edit pane display, but there are many common parameters that need to be set: each device needs a unique Device Name; a unique IP address (where applicable); and a unique Device number. Any entry that requires changing will have a red Flag next to it. This will also appear if illegal characters are entered or if a signal name has more than ten characters.

Clicking a + icon to the left of each device name "opens up that device" to display various sub-items associated with that device. Clicking a – icon will collapse or close the device's sub-items. Some of the sub-items for a Device may include: Edge Devices (source selector and Intercom panels hosted by that device), Signal Summary (the source and destination signals on that device); and individual cards or modules on that device. Most sub-items also have a + icon to open them up as well. Clicking on a sub- item's name in the Community Explorer then switches the Edit pane to show that particular sub-item's parameters.

In the example on the previous page, the VMQuadra1 `Sources` is highlighted so the Edit Pane is showing the sources on that device, listed by Local Signal # (this is a number the system assigns). The sort order is normally by Local Signal #, but this can be changed by clicking any column heading (In Room Name, Description, Hidden, etc.). This pane allows most of the VM device signal parameters to be set (In Room Name, Community Name, Description, Link w/Next, Hidden boxes and Return Route TS). Additional details on editing these parameters is covered in the section on using VMCC, starting on page 26.

## 5 Provision the Files

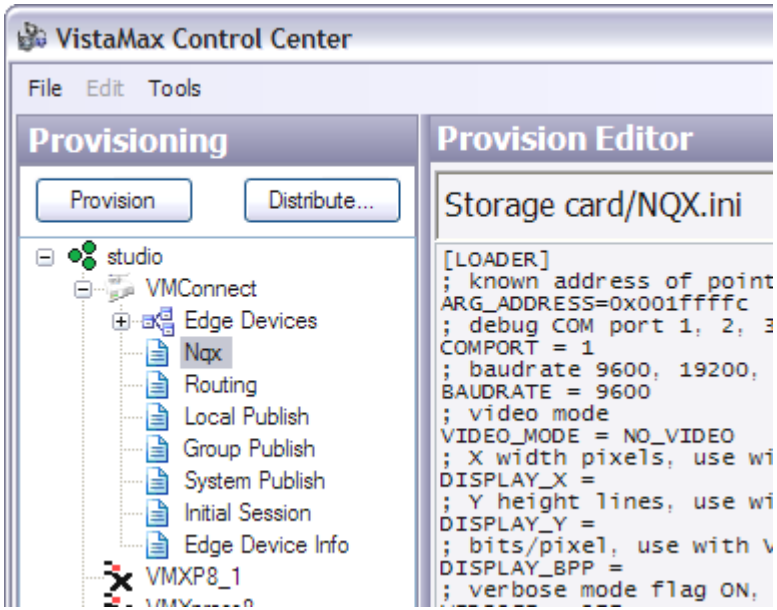
Once the device and signal parameters are edited, the updated settings must be uploaded to the VistaMax device servers on the VM*Connect* and other VistaMax cardframes and consoles. Creating these updated configuration and setup files from the parameter entries is called *File Provisioning*. Click the *Provisioning* tab (at the bottom of the Community Explorer pane) to change to the Provisioning window.

The Provisioning window has just two buttons at the top of the left pane: *Provision* and *Distribute...* Clicking the *Provision* button tells VMCC to create new setup and configuration files—using the parameters that were entered in the Edit pane, for all VistaMax community members. This will take from a few seconds to a minute or so to complete, depending upon the size of your VistaMax community.

The provisioned files can be reviewed for accuracy by clicking the + icon next to a device name. This drops down a list of the setup files that VMCC created for that

device (an example is shown below). Note that VM*Xpress*, VM*Quadra* and NetWave consoles do not have servers like VistaMax cardframes, thus they do not have files and no + icon. They, like edge devices, are simply listed under their parent devices for reference.

Clicking one of these configuration filenames (like Nqx) displays the file in the Provision Editor pane. Even though these files can be manually edited in the Provision Editor, this should NOT be done, except for testing or some other special purpose, since edits made here get overwritten the next time the *Provision* button is clicked and new files are created.




## 6 File Distribution

The final step in the configuration process is to distribute the updated files to the cardframes and other VistaMax devices. Clicking the *Distribute...* button opens a dialog box with the three distribution options that can be selected: *Normal Download* replaces only the config files that have changed; *Force Download* replaces all of the config files; *Local Download* backs up the config files to the admin computer's hard drive.

Click a radio button to select the distribution method, then click the *Next* button. If Local Download was selected, a save dialog box opens on the My Documents folder. If desired, you can select another folder to use, otherwise, click *Save*. A new folder is created for each device, named using the IP address for each device. Inside these folders is a sub-folder hierarchy that matches how files are actually stored on each VistaMax device (`Storage Card/Data/SysFiles`, etc.).

When Normal or Force Download is selected, VMCC opens a Device Specific Distribution window. VMCC communicates with each device (reading the `provisioned.hash` file that it created during the last distribution) to determine what action must be initiated after the updated files are distributed.

To send the files to a particular device, that device must be check marked (click the Enable box to add or remove a check mark). Clicking Distribute then uploads the new files to the checked devices.

If the `nqx.ini` file is changed, then the device will reset to read the new file. This also occurs when Force Download is selected since the device must "Reestablish Device Identity (RESET)" to read all of the new config files..

If names or signal modes were changed, then only the publish files are changed. To re-read these files the routing system must be re-initialized (Init Router).

If the source selector or Intercom panel included signals are changed, then the `edgedevice.ini` file was changed, which means the device must do an Init RCED (initialize Remote Control Edge Devices) to force the edge devices to re-connect to read the updated configuration settings.

### Adding New Community Members

Adding one or more new devices to an existing community is done in the same manner as used to create the VistaMax community. Start VMCC, open up the VistaMax community, connect the new devices to the VistaMax LAN and/or to an available Hub card Facet, then follow the six steps to add any new device.

### Exporting the Community

It is important to always maintain a backup of the VMCC community information since it contains all of the parameter settings for your community. This is done by Exporting the community. Select *Tools / Export* to export the community. The default save location is the My Documents folder. Since the VistaMax community is an Access database, it is saved by default as "`community name.xml`".

The size of this `.xml` file can be shrunk to about 1/5 of its size (handy for emailing and putting it onto a thumb drive) by right clicking on the filename and selecting *Send to Compressed (zipped) Folder*.

After unzipping, an exported community could then be Imported into VMCC running on an engineering computer, where it could be edited if desired. Once done editing, it would again be Exported and moved back to the admin computer for final distribution to the VistaMax community members.

## SYSTEM ADMIN COMPUTER & SOFTWARE

Before any VM device can be configured, several software programs must be installed onto a Windows-based computer (running WinXP service pack 3, Vista, or Windows 7) that has been designated as the System Administration computer (admin computer). This computer must have a minimum of 2 GB of RAM (4 GB is preferred when running VistaVue on the admin computer), two NICs (Network Interface Cards) and at least one USB port—other than two NICs, all pretty much are standard components of any desktop computer these days. A laptop can be used, but if you want to have 24/7 system logging data, it is best to dedicate a rack-mount or desk computer to this function, using the laptop for service or troubleshooting of the system.

One NIC connects the admin computer to the VistaMax system LAN switch (or switches in a large system), while the second NIC connects the admin computer to a facility LAN switch. This connection is used to both allow remote access to the admin computer by the engineering department or by Harris support engineers, and to allow the Harris WorkFlow software applications (VistaVue and VistaTouch) to be run on facility computers (these two programs allow station personnel to route signals right from their desk computers).

All of the software programs mentioned in this section are downloaded from the Harris PR&E Studio Products FTP site or from the Harris E-service website. See page 35 for details on accessing these file download sites.

Here are brief summaries of the various software programs available for use with a VistaMax audio management system.

### NetManager and Community Monitor

The VistaMax Network Manager software (NetManager) has four Windows services and four Servers to facilitate monitoring and control of a VistaMax system by Community Monitor, and other applications, running on the admin computer or other facility computers.

NetManager is typically set for auto-start operation so that it starts up and runs its services and servers automatically anytime the admin computer is started. The program also automatically starts up the Community Monitor (CM) application, which is installed as part of the NetManager installation.

Community Monitor includes several “views” into the VistaMax system to allow engineering to view VistaMax system operations. These views include: *Status*, which is a summary list of the VistaMax devices (device name, number, IP address, MAC address, Link connection count, device type); *Status Logger*, which shows real-time system status messages; *System Analysis*, which takes a snap-shot of all signals routed throughout a system as a troubleshooting aid; and *Metrics*, which shows at a glance (green = good, red ! = bad) the status of each Hub card Facet, and each Link connection in the VistaMax system.

### VistaMax Control Center (VMCC)

VMCC is used by engineering to create and edit the configuration files used by the VistaMax devices. The VMCC program allows for easy setup and maintenance of the configuration files found on VM*Connect* mini-cardframes as well as the other VistaMax community members like RMX*digital*, BMX*digital*, and NetWave consoles; the VM signal interfaces; other VistaMax or Envoy cardframes; and VistaMax edge devices (Intercoms and Source Selector Panels).

VMCC stores its data in an Access database so that changing one name or other signal definition automatically updates every interdependent configuration file on every community member. In addition, VMCC automatically keeps track of what changes were made to the config files so that, when you distribute the changes to the VistaMax devices, VMCC automatically identifies how each community member must react in order to use the updated configuration files after distribution.

VMCC can do staggered file distributions to allow separate updates to each production room, air studio or cardframe device so distribution can be scheduled to cause the least impact on the system users.

### FTP Voyager

FTP Voyager is a File Transfer Protocol (FTP) program that allows session and macro files to be transferred between the Single Board Computer (SBC) on cardframes and consoles and the admin computer. It also allows these files to be

easily opened in Notepad for manual editing. The program is also very useful for downloading files from the Harris PR&E Studio Products support FTP site.

### 3CDaemon

This program is a TFTP (Trivial File Transfer Protocol) program used to upload new operating system code to the VistaMax devices with SBCs. Each time a VistaMax device with an SBC is initialized (powered up or restarted), it broadcasts a "load new code request" call to the community. If 3CDaemon is running, and it detects this request, it uploads new code to the device, which then restarts again in order to run the new code. The only time 3CDaemon is required to be running is when new code is actively being uploaded to the VistaMax devices.

### VMSupervisor

The VMSupervisor application (see page 22 for use details) is a multi-use application specifically designed for VM*Xpress* and VM*Quadra* interfaces. It communicates with each VM device using USB. VMSupervisor is mainly used to enter, and then upload, logic configuration settings to a VM device. The setup configurations are also saved for each VM device, by serial number. When actually connected to a VM device, the VMSupervisor can also run signal diagnostics and upload new firmware code to that VM device.

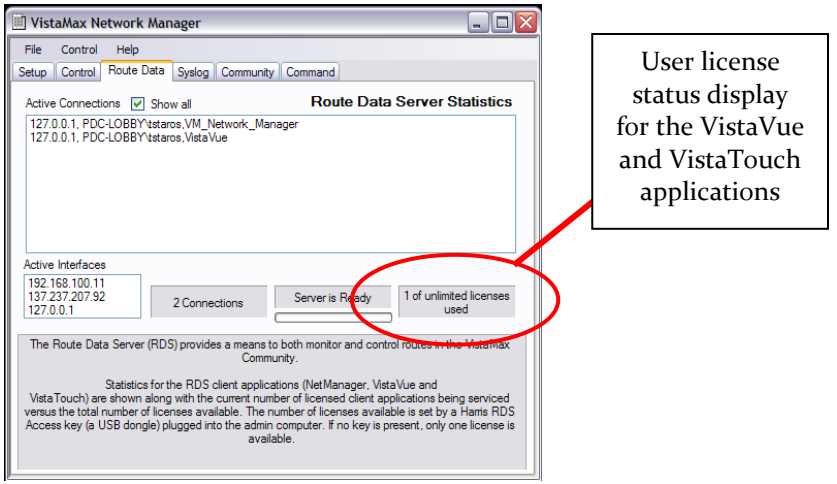
Typically, during system setup, VMSupervisor is installed and run on the admin computer to facilitate configuring VM devices before they are physically installed into the facility. Each VM device is temporarily connected (via USB) to the admin computer and VMSupervisor is used to set and upload the configuration settings for: Audio Input Room Code (only needed on mic signals that may be routed to RMX*digital* consoles in order to mute their control room, studio or external monitor outputs); Logic (associates logic inputs to specific audio inputs; sets the logic command on each active logic input and output; sets output logic triggering behavior—state change, on actuation, or multiple actuations); and on VM*Quadra* devices, which USB audio signals are fed to the AES Outputs connector.

Many VM*Xpress* devices (e.g., those without Logic I/O cards or mic inputs) will not need to be connected to the VMSupervisor application since all of the basic signal configurations are set using the VMCC application (signal Source and Destination names; and the signal mode).

After system installation, VMSupervisor can be installed onto an engineering laptop computer in order to update config file settings, perform device diagnostics or to upload new firmware code. This allows it to be taken to each VM device and connected via USB cable. VMSupervisor is also typically installed onto audio play/record servers for the same purpose.

### WorkFlow Software

There are two on-screen user interfaces, both of which are licensed applications, that allow remote control of the VistaMax system: VistaVue and VistaTouch. One User License, which allows a single copy of either program to be run on any one computer, is included with the NetManager program, which displays the status of the user licenses in its Route Data tab.




To run multiple copies of VistaVue and VistaTouch concurrently requires that a Harris Software License Key is plugged into the admin computer. The Software License Key is a USB dongle that adds five (PRE99-1442-1), ten (PRE99-1442-2), twenty (PRE99-1442-3), or an unlimited number (PRE99-1442-4) of concurrent VistaVue and/or VistaTouch users to the one user supplied with NetManager. Contact your Harris sales representative for prices on the various Software License Keys.

### VistaVue

VistaVue is used by engineering and other VistaMax "power users" to view real-time signal routing in an X-Y grid. Because a VistaMax system may have hundreds, if not thousands, of sources and destinations, VistaVue is typically setup to show various "Community Views," subsets of all VistaMax signals to show

signals associated with a specific function or application (e.g., only the sources and destinations used by a particular production room or air studio, only signals associated with logger feeds, only signals associated with streaming feeds, only signals associated with STLs, etc.). These same views also allow the VistaVue Administrator to change signal routing by double-clicking the grid "cross points."

Since it's such a powerful program, it's an access-controlled program that uses your existing network user names to set access privileges. Installing VistaVue adds two new Windows Users to that computer: VistaVue Administrators and VistaVue Users.

VistaVue Administrators have complete control over the entire VistaMax system. They set up the Community Views and assign which signals each VistaVue User can route between by creating a *User Scope* for each user. As a VistaVue User logs into the program, regardless of which computer the program is running on, they'll see the same *User Scope* display and have the same signal access, while still being allowed to view any Community View to display the real-time routing (whether or not they have any control over the signals).

VistaVue includes two main views: the X-Y grid display, mentioned above, and a smaller Source-Destination Selector display, called Compact View, which can be setup for less sophisticated users. For more details on setting up and using VistaVue, see the Harris customer document "71-2009 VistaVue Quick Guide."

### VistaTouch

VistaTouch is an easy-to-use *Hot Button* GUI interface for the general VistaMax user. It is often used in lieu of a hardware source selector panel. The engineering department installs and configures the program, assigning how many Hot Buttons are displayed on-screen (from two to 96); their size (small, medium or large); and their format (4 x 3 or 16 x 9). Which settings are used is often based on whatever program is the main user of the particular video monitor that VistaTouch is being shown on (e.g., the call screener computer, the transmission monitor screen, the digital playback system control monitor, etc.). VistaTouch can literally be "squeezed onto" any computer screen—as long as that computer is tied into the facility LAN, and the admin computer has two NICs installed.

Since VistaTouch is not a user-access program like VistaVue, there is no logging into the program. Each VistaTouch setup is saved as a desktop shortcut icon, labeled by its use, so that multiple VistaTouch setups can be available on any one computer since VistaTouch is most often used in shared-computer environments like air studios and news/sports edit stations.

During setup, each VistaTouch Hot Button gets a unique graphic and title to easily identify its use or function. A set of standard graphic images are supplied, but a photo, a graphics file like a station logo, or even a live webcam URL from an air or talk studio, can be set as a button's graphic.

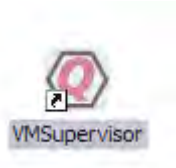
To use VistaTouch, a user clicks on, or with a touchscreen monitor taps, an on-screen button to accomplish some task—be it something simple like selecting a different monitor source, or something complicated like switching their console from being set for voice tracking to being set as an emergency back-up air console. For more details on setting up and using VistaTouch, see the Harris customer document "71-2007 Using VistaTouch."

To make VistaTouch easy to use, the "heavy lifting" must be done by engineering as each VistaTouch Hot Button actually commands a macro file to load to accomplish its task. This means someone in engineering has to write the macro files. Fortunately, a macro is a text-only file which most often only has one or two commands in it, so they are quick to create and edit. See the Harris Application Note, "AN07-02 Quick Guide to Session and Macro files" for details on creating and editing macro files.

Each of these Harris-supplied software programs have either a `readme.txt` file or a PDF document that covers their installation, setup and/or usage.

## USING VMSUPERVISOR

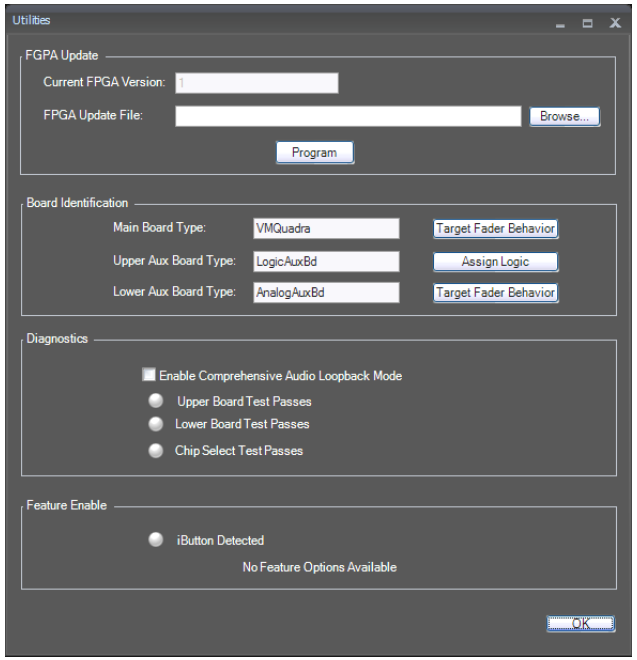
Double click the VMSupervisor desktop icon to start the program. The VMSupervisor Information screen (shown below) has a status line along the bottom that displays whether the program is connected to the NetManager RDS server ("No RDS Connection" is typically shown, unless the program is running on the admin computer) and what type of VM device is connected.




"No Device Connected" appears if no VM device is connected to the computer, but it may also appear when no Windows USB drivers have been installed (VM device drivers are typically installed on one USB port, so plugging a VM device into a different USB port will pop up a New Found Hardware window since the VM device will not be recognized on that port).

The Information screen shows the serial number for that VM device, along with diagnostic information (firmware revision, processor temperature and voltages) and information about the Hub card Facet that device is Linked to (0.0.0.0 indicates the device does not have a Link cable connected to a Facet). The VM device serial number (e.g., Y0100189) can be copied and pasted (if VMSupervisor is running on the admin computer), or manually entered, into VMCC to better identify each VM device. There is a serial number entry box at the top level of each VM device.


Click the *Utilities…* button to open the window to configure the VM I/O cards (shown below). This window has four sections: FPGA Update; Board Identification; Diagnostics; and Feature Enable.




The current version of FPGA code is shown in the top section. When updated code becomes available, it is downloaded to the laptop (from a Harris download site) and the *Browse* button is clicked to choose the folder holding the new FPGA code. Clicking the *Program* button then uploads the new code to the VM device.

The Board Identification section is the most used section in this window. It shows the type of main board (e.g., VM*Xpres*s or VM*Quadra*) and what type of I/O cards are installed (if any). The button(s) on the right side of this section open up setup windows to configure the Logic settings.

The Diagnostics section can be used during installation or test to verify device operations. Clicking the Enable Comprehensive Audio Loopback Mode check box runs a test routine to verify functionality and to route each input to each output (Input 1 to Output 1, Input 2 to Output 2 and so on). This is useful to check wiring and device functionality, but it should not be done on an active VM device since it will change signal routing to the VM I/O card outputs.

The Feature Enable section is for future product features which would require authorization through the use of an iButton security key.

## VMQuadra Connection

Connecting a VM*Quadra* shows the Information screen momentarily, but its default display is the Audio and Logic status screen (shown below). This screen's tab shows the device serial number (e.g., X0100100). The screen is divided into eight sections that display audio levels and logic status for each of the four playback and four record channels available on the active USB port.


The main selection in this window sets which of the four playback signals feed the AES Outputs connector. Click the AES Out Mix box to check or uncheck each of the four playback signals. When multiple channels are selected, they are summed to create a mixed AES Output signal. The AES Output can be used for confidence monitoring or to enable the playback signal to bypass the VistaMax system entirely (e.g., it can go to an air switcher so the playback channel, or channels, can be switched to directly feed the air chain). This may be used when servicing other parts of the VistaMax system that might interrupt the normal routing of the digital player's audio signals.

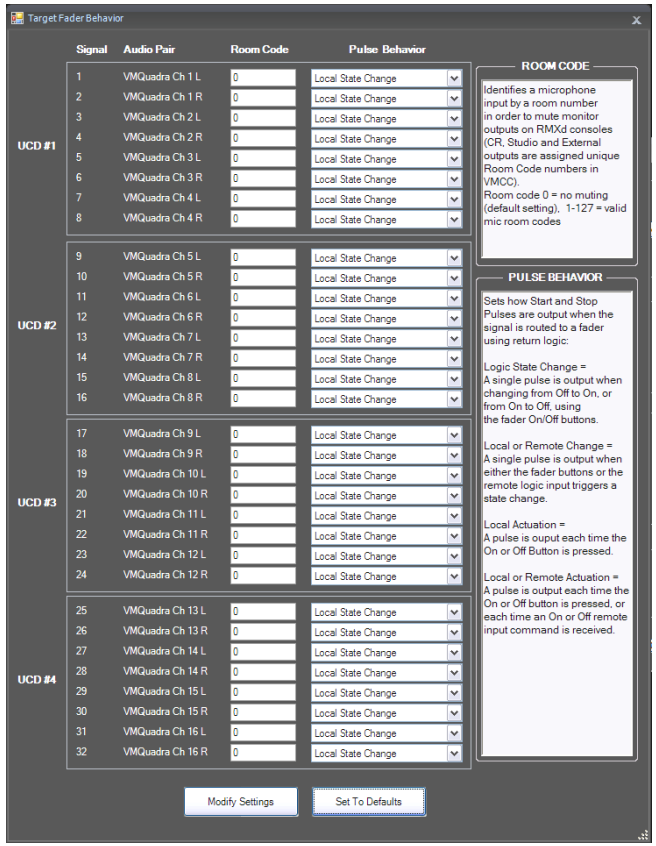
On the VM*Quadra*, click the Information tab to show the Information screen.

## Target Fader Behavior Window

To configure a device, on the Information tab, click the *Utilities…* button to open the Utilities window (shown on the previous page). In the Board Identification section of the screen, each installed board is listed with a button to its right. For a VM*Quadra* Main Board, and for a VM Analog or VM Digital I/O card, the button is labeled Target Fader Behavior. For a VM Logic I/O card the button is labeled Assign Logic.

Click the *Target Fader Behavior* button to open a window (shown below) where two settings for each audio signal on that board can be configured: Room Code and logic output Pulse Behavior (only applicable on a VM*Quadra* or when a VM Logic I/O card is installed in a VM*Xpress*).

The window is organized with Signal numbers along the left side of the window. These numbers equal the Slot # shown in VMCC for that VM device. In the example, the USB input signals for a VM*Quadra* are shown. The audio inputs are divided by USB port (UCD #1, UCD #2, etc.) and listed by signal number (Signals 1 – 32). The odd signal numbers are the left playback channels and the even numbers are the right playback channels (playback signals default as stereo, but can be set to mono in VMCC).




The Room Code default setting is 0. It is normally left like that unless there are mic processor inputs on the VM device and there are RMX*d* consoles in the VistaMax community—since that is the only VistaMax device

that uses Room Code. The Room Code number (1 – 127) identifies each mic as being in a particular studio or room. The RMX*d* console has a room code assigned in VMCC to its Control Room, Studio and External monitor outputs so that when a mic with a matching Room Code is routed to a console fader and turned on, the console mutes the correct monitor output.

The Pulse Behavior selection affects how channel logic output Start/Stop Pulses are activated. Start/Stop logic is used with peripherals like digital playback systems and CD players, thus the Pulse Behavior setting does not affect Tally outputs, which are typically used with mic control panels.

The four Pulse Behavior selections set how the Start and Stop Pulses are generated: only by channel On/Off button presses; or by button presses and when Remote On/Off commands are received. There is a summary description of the four Pulse Behaviors in the Target Fader Behavior window.

On stereo audio signals, the Pulse Behavior only needs to be set for the left channel of the stereo pair since that channel carries the logic signals. Since most playback systems output stereo signals, only the odd numbered Signal rows would have to be changed on a VM*Quadra*'s USB inputs if a setting other than the default setting (Local State Change) is required.

Once the settings are entered, click the *Modify Settings* button to save the new settings and close the window. To discard changes, click the Close Window button (upper right corner X) to close the window without saving changes.

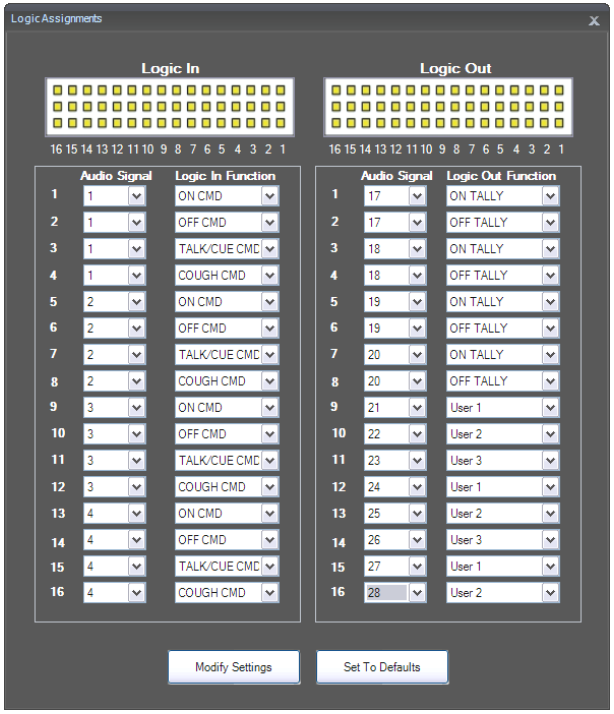
Note: Clicking *Set to Defaults* resets all entries to their default values. If clicked by mistake, click Close Window, then reopen the window to recover your settings.

## Logic Assignments Window

Click the *Assign Logic* button to open the Logic Assignments window. This window is where the logic function for each input and output is set using drop-down lists. The Logic In and Logic Out Function lists show standard fader channel logic functions (on, off; start, stop, etc.) and three custom commands (User 1, User 2, User 3) that can be used to route logic inputs directly to logic outputs.

The logic input configurations are set in the left half of the window and the logic output configurations are set in the right half of the window. Logic connectors above these entries graphically illustrate the logic signal numbering of each column.

Because logic signals travel through a VistaMax system in the header of audio signals, each logic input and output must therefore be assigned to some Audio Signal. This is done using a drop-down list of the Audio Signal numbers available on that VM device (Signals 1 – 32 are available on a VM*Xpress*). Note that the first sixteen numbers equal the Slot # shown in VMCC, so you can cross-reference to the actual signal names, whereas audio signals 17 – 32 are solely used to route logic from a console channel to a logic output, so they do not appear in any list. A graphical illustration of how the Logic Assignment window settings equate with entries in VMCC is presented on the next page.




Logic inputs are normally associated with a matching audio signal (e.g., CD player logic is assigned to the CD player's audio signal; mic remote panel's logic is assigned to the microphone audio) so that when the audio signal is routed to a console fader channel, the logic commands come along to control the channel via the remote functions on, off, reset, cough, cue, and talkback. Thus, the logic inputs are normally assigned to Audio Signals 1 – 16, but again, for stereo audio signals, the logic is assigned to the left channel (typically the odd numbered signal).

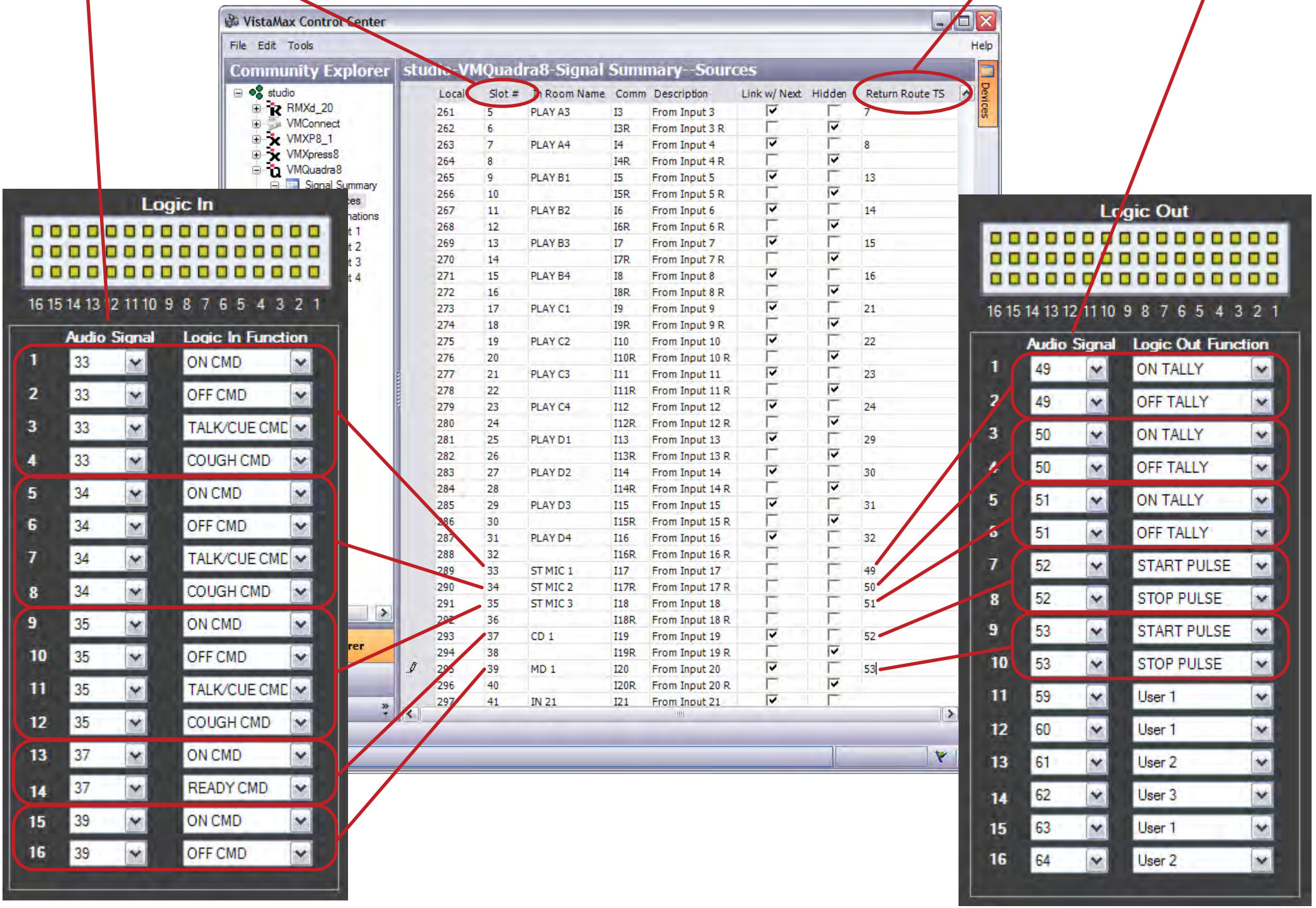
For channel return logic control (e.g., the commands to control starting or stopping a peripheral or lighting the tallies on a mic panel), the logic outputs can be assigned to any Audio Signal 17 – 32 on a VM*Xpress*.

Typically, multiple logic signals are associated with, and carried on, a single Audio Signal. For instance, a mic control panel , with four logic inputs (On, Off, Cough Talkback) and two logic outputs (On and Off Tally) would be associated with just two Audio Signals, like shown above, where the mic audio is Audio Signal 1 and has four commands assigned to it, while the return logic uses Audio Signal 17 and has two commands (On and Off Tally) assigned to it.

LOGIC IN SETTINGS:
AUDIO SIGNAL # = SLOT #

# VM LOGIC I/O CARD CONFIGURATION EXAMPLE (THREE MIC PANELS & TWO PERIPHERALS)

LOGIC OUT SETTINGS:
RETURN ROUTE TIMESLOT = AUDIO SIGNAL #



## USING VMCC TO CONFIGURE DEVICES

This section presents more details on the various VMCC parameters that are edited in the Edit Pane, and how they affect the device configuration files. The first group of parameters are global Device settings, which are displayed by clicking and highlighting a device name in Community Explorer.

### Device Name

The device name must be a unique name the VistaMax system uses to identify each device. It can be up to ten alphanumeric characters in length, but it cannot include any spaces or any special characters. VMCC uses this entry to set the `NAME=` parameter in the `nqx.ini` file.

### Device Number

This must be a unique number, from 1 to 63, that defines each VistaMax device. The number is typically related to the device's IP address (e.g., if the IP address is `192.168.100.41`, then the device number is normally 41). VMCC uses this entry to set the `Device_number=` parameter in the `nqx.ini` file.

Note that the VM signal interfaces and NetWave consoles also require a Device Number (also in the 1 – 63 range), but this number is only used by VistaVue so it can list signals from each VM Device as being separate from its parent device. These type of Device Number settings do not affect the `nqx.ini` file.

### Device Address

Each console and cardframe must have a unique fixed IP address. The first three octets (`192.168.100.xxx`) must be identical for all devices in a VistaMax system. The last octet identifies a specific device. VMCC uses this entry to set the `NET_IP=` parameter. See the table on this page for a suggested addressing scheme.

Note that VM signal interfaces and NetWave consoles will have an "IP address" assigned to them by VMCC (all VM*Quadras* without any I/O cards show up with 192.168.100.26). These are not true IP addresses, but are simply used by VMCC to identify different device types, so ignore the apparent "duplicate IP addresses" in the Community Summary pane.

### Subnet Mask & Gateway Address

Typically, the default subnet mask (`255.255.255.0`) is left as is. Check with a network administrator before making any changes to the subnet mask.

The Gateway defaults to the admin computer's address (`192.168.100.11`). Again, check with a network administrator before making any changes.

### License Code

The License Code entry is not used at this time.

### Chain to a Session or Macro File

The Chain Files section allows one or more session or macro files to be loaded after the `init.mac` file is taken. Typically, this is used to load a setup file to route standard signals within a cardframe. In some applications, a session or macro file on another device will also need to be loaded. That file can also be called from this entry box.

A Device # entry of `0` indicates the file is stored on that device. When a macro or session is stored on another device, then its device number has to be entered in the Device # column.

## Suggested VistaMax LAN IP Addressing

Here is how a VistaMax community is typically configured, when using the default subnet addressing scheme:

| *Networked Device* | *Assigned IP Addresses* * |
|---|---|
| LAN switches & local computers | 192.168.100.1 up to .10 |
| **TFTP server (admin computer)** | 192.168.100.11 |
| spare or use for Edge Devices | 192.168.100.12 up to .21 |
| **Console (default)** | 192.168.100.22 ** |
| spare or use for Edge Devices | 192.168.100.23 up to .32 |
| **Cardframe (default)** | 192.168.100.33 ** |
| spare or VistaMax Edge Devices | 192.168.100.34 up to .40 |
| VistaMax/Envoy/VMConnect cardframes | 192.168.100.41 up to .49 |
| VistaMax Intercom panels | 192.168.100.50 up to .100 |
| BMXd and RMXd Consoles | 192.168.100.101 up to .199 |
| VistaMax Edge Devices | 192.168.100.201 up to .255 |

* Use only Class C network addressing (first octet = 192 to 223).

** To avoid conflicts when adding a new console or cardframe to the system, do not assign these addresses to any LAN device.

## Signal Summary Settings

Most editing in VMCC involves changing source and destination signal parameters in the Edit Pane. Not all parameters listed in this section are available on the VM interfaces (being only available on cardframe or console I/O cards), but may be found on a VM*Connect* that has an audio I/O card installed.

Each signal parameter is listed in an overview format to mention entry details and how each parameter is used. On stereo-linked signals, only the left channel entry should be edited since the right channel is typically hidden and thus is typically left set to the default settings. However, on some signals (like mix-minus or two-way devices) that may be set as stereo but used as two mono signals, it may be worthwhile to edit both left and right entries so the default names do not get shown when routing just the right channel to some destination.

• Each audio signal has a default In Room Name, Community Name and Signal Description assigned by VMCC when the device is added to the community. The name of the active inputs and outputs should be edited to better reflect the real world signal that's connected. In Room Names can be up to ten characters long. Community Names, which can be up to four characters long , are only used when Naming Convention Tier 2 or Tier 3 are used (typically only used when multiple stations share one VistaMax system). The Signal Description is only shown in VMCC, so it is usually not edited except to add notes about specific connections.

• Every signal defaults to stereo Mode where all input and output signals are *stereo linked* with odd numbered signals set as left channels, linked with the next even numbered signals set as right channels. Any stereo-linked signal can be unlinked into two mono signals, by removing the Link w/Next checkmark on the left channel and the Hidden checkmark on the right channel. Likewise, for a surround signal, multiple inputs or outputs could be Linked sequentially. In the case of a a 5.1 signal, the first five signals would have Link w/Next checked. Signal two thru six would all have Hidden checked. The first signal would be the only one to appear in any include list.

• Any signal can be set as Hidden, which means it won't appear in any signal include select list. By default, the right channel of every stereo pair is set as Hidden, as are console signals that are normally only used internally by the console.

When using VistaVue, if you want to see what signals are routed to the fader channels on a console you must un-hide the left channels of each fader (uncheck Hidden) so that VistaVue will show these signals.

• Assign which audio signals are Logic Candidates. These are audio signals that come from a device that also has logic. Input from CD players, computer playback systems, and microphone inputs with mic control panels are typical Logic Candidates. When the audio is check marked as a Logic Candidate, its name appears in the available signals list in the cardframe Logic I/O card configuration Edit Pane. Audio signals with logic get routed from the audio card to the Logic I/O card so the logic commands can be added into the audio signal header for transport to the final destination (typically a console fader).

This setting is not available on VM interfaces since all audio signals are assumed to be Logic Candidates if a Logic I/O card is installed.

• Assign a Room Code for pre-amplified mic inputs. Room Code controls monitor muting on RMX*d* consoles. An RMX*d* console has three mute locations: the control room, a studio, and an external location. Each is assigned a room code. When a microphone signal is routed to a fader channel; assigned to a bus; turned on; and its room code matches one of the console room codes, then that monitor output is muted, and the appropriate warning tally is generated.

• Set the Logic Bindings for Logic I/O card inputs and outputs. Typical logic input commands are Channel On, Channel Off, Ready (to control off button lighting), Talk to Control Room, Studio, or External. Typical logic outputs are Start/Stop Pulse and On/Off Tally.

These are called Logic Input Function and Logic Output Function in a VM device and are set in VMSupervisor rather than in VMCC.

• On console and cardframe inputs and outputs, set any Gain adjustments or Invert the Phase on any signal.

The VM devices do not have any gain or trim adjustment ability. The are solely designed for balanced +4 dBu analog or AES digital inputs depending upon the card.

The first six settings (In Room Name, Community Name, Signal Description, Mode, Hidden and Logic Candidates) are typically set in the Signal Summary pane (shown on page 16).

Click the + icon next to the device name to open its tree, then click the Signal Summary + icon and highlight *Sources* to edit the input signals, or *Destinations* to edit the output signals (note that many outputs are not changed from their default names since the only time these are seen is on Source-Destination selector panels, although if you use VistaVue it is advantageous to name the active outputs).

Additional signal parameters, including some logic settings, are available in the card signal detail panes for the cardframe and console I/O. To view these panes, click the + icon next to the card name to expand the tree, then click the + icon next to *Sources* or *Destinations*, then click on a signal name to highlight it, which shows its parameters in the Edit pane.

### Signal Mode (Mono, Stereo, Multi-channel)

Each cardframe audio I/O card has 32 inputs and 32 outputs. By default, all signals are stereo-linked, with the odd numbered signal (the left channel) being linked to the next even signal number (the right channel).

To change a stereo signal into two mono signals, remove the check mark in the Link w/Next column. The two signals are now treated as two separate mono signals. When a mono signal is routed to a stereo destination (a console channel or an output), it is routed to both the left and right channels.

Multi-channel linking of signals can be done checking sequential Link w/Next columns for all but the last signal. For a 5.1 surround signal, signals 1 – 5 have Link w/Next checked while signals 2 -6 would have Hidden checked. Signal 1 would be the "published signal" who's name appears in the system.

### Hidden Signals

Hidden signals are those signals with check marks in their Hidden check box. A check mark indicates the signal is not available to add to any signal include list on any community member. Click the check mark to remove it, or click the empty Hidden check box to add a check mark to hide the signal.

Each stereo signal's right channel is hidden by default so that only one name (the left channel name) shows up in source selectors. When a stereo signal is changed into two mono signals, be sure to also uncheck Hidden on what was the right channel if the new mono signal will be added to any include lists.

To quickly set the check marks for all the signals in a Signal Summary window, click once to highlight any check box. Use the keyboard up and down arrow keys to step through each signal and the spacebar to check or uncheck the highlighted entry box.

### Gain or Trim (Inputs and Outputs)

Nominal I/O card inputs and outputs are +4 dBu for analog, -20 dBFS for digital. The Gain/Trim control allows any input or output to be independently raised by 15.5 dB, to compensate for an unbalanced analog input or low signal level, or trimmed by 16 dB, to compensate for hotter-than-nominal signals. Gain/trim is set in .5 dB steps, independently for each channel of a stereo pair.

### Invert Phase (Inputs and Outputs)

A check mark in the Invert Phase box inverts the phase of that signal. Phase inversion is independently set for each channel of a stereo pair. Invert phase can be set on inputs and outputs. The default setting is unchecked on all Invert Phase parameters.

### Ready Controls Off Lamp (Inputs only)

The *Enable* box should only be checked when the audio signal is from a peripheral device like a CD player or a computer playback system that has a Ready logic command output connected to a Logic I/O card. Only the left channel of a stereo pair needs to have its *Enable* box checked.

When the audio is routed to a console channel that is also set to respond to Ready logic commands, the peripheral can turn the channel off and then control the Off button lighting to indicate play status (no Off LED says the player's not ready; a solid Off LED says the player is ready; a blinking Off LED indicates the event has finished).

For VM Devices this is automatically set if Ready is set as a logic input command in the VMSupervisor Logic Assignments window.

### Start/Stop Pulse Control (Inputs Only)

This setting is only used on Logic Candidate audio signals. It sets how start and stop pulses are output from the channel strip or module that this signal is routed to. On VM devices this is set using the VMSupervisor Logic Assignments window.

There are four settings: Local State Change causes one pulse to be output whenever the channel On or Off buttons are used to change the channel from Off to On (one start pulse is output) or from On to Off (one stop pulse is output)—a

remote on/off command does not generate any pulses; Local or Remote Change performs the same actions but it also sends out pulses in response to remote on/off commands; Local Actuation causes a start or stop pulse to be output each time the On or Off button is pressed, regardless of the channel state; Local or Remote Actuation adds the multiple start or stop pulse outputs to remote on/off commands.

### Room Code (Inputs Only)

This setting is only used on preamplified mic inputs in order to associate the mic as being in a specific room in the facility in order to properly mute monitor outputs and trigger hot mic warning signs in RMX*digital* consoles.

A Room Code is a number, from 1 to 127, that is assigned to rooms in the facility that have microphones in them. The appropriate Room Code is then set on each mic's input so that when that mic is routed to a channel strip in the RMX*digital*, its room code is compared with the assigned room codes on that console so that the appropriate monitor output can be muted and the correct warning command can be output while the mic channel is On.

This feature is not available on BMX*digital* or NetWave consoles.

### Sample Rate Selection (Digital Outputs Only)

The sample rates for the first four digital output left channels on each Digital I/O card can be independently set to 44.1 kHz; be locked to an external reference signal; or be set for 48 kHz (the default setting). Click the down arrow to view the selections, then click on the selection to choose and set that sample rate. Both left and right channels are affected by this setting.

The other fourteen digital outputs use a fixed 48 kHz sample rate output and do not have a sample rate selection entry box.

The following entries are set in the Device parameter edit pane. Highlight the device name in Community Explorer to view these items.

### Source and Destination Include Lists

Only those signals without check marks in the Hidden column can be added to include lists. Two include lists are on each device: a Source Include list and a Destination Include list. These act as master include lists for that device. On consoles, the source include list also sets which signals are shown on router channels (although a channel-specific include list, set in the session file, will narrow the choices).

The source include list for each edge device sets which signals are shown in the source selector displays when Include All is not active.

The destination include list defines which destinations can have signals routed to them by the edge devices served by this cardframe. This setting affects the destinations shown on the Source-Destination selector panels.

To create the signal lists, first highlight one of the community members in the *Devices* selection box. All of the unhidden sources or destinations on that device are shown in the *Available Signals* box.

Use standard Windows selection techniques to select the desired signals, then click the double right arrow key (>>) to add these signals to the *Include Signals* box. Repeat for signals from the other devices.

To remove signals from the *Include Signals* box, highlight the signals, then click the double left arrow key (<<).

## SIGNAL ID NUMBER OVERVIEW

Each signal in the VistaMax system is uniquely identified by the operating system using a Global Signal ID number, which is a large number that only a computer can love! Because these are very large numbers, and because common signals (like PGM 1 on every console) has a different number on every console, it's much easier for humans to identify signals by using Local Signal ID numbers. This means that every VistaMax device of the same type has the same set of numbers. Thus, every PGM 1 bus on every console is signal 225 and the first signal on an I/O card in slot 1 of any cardframe will always be signal 65.

Also, because of computer control, the same set of numbers can be used for both inputs and outputs since the operating system easily differentiates between sources (inputs) and destinations (outputs).

Since every cardframe has the same set of local numbers, if you are routing signals between devices, then the Device Number is added to the local signal ID number in the form: `d22.65`, to uniquely identify it as the first signal on the I/O card in slot 1 of device 22.

Of course, the faster method to identify every possible signal in a VistaMax system—at least if you're the operating system, is to assign every possible input or output signal a unique Global ID number. For example, local signal number `65`, on device `22`, is Global signal ID number `1441857`. This number is also valid to use in route commands, but it's not very practical.

The easiest way to determine a signal's number is to look at the Signal Summary in VMCC. The first column lists the signal number as: Local Signal #. If you don't know the device number, it's listed in the Device Edit Pane, just below the Device Name. There are also PDF files for BMX*d*, RMX*d*, VistaMax, Envoy and VM*Connect* cardframes that list all the possible local signal numbers on each device.

## MACRO FILES

A macro file is a setup file like the session files used on consoles. Macro and session files are both text-only files that use a common set of commands.

Session files have the suffix `.ses` and are intended for board operator use to configure BMX*digital* and RMX*digital* consoles for specific dayparts and applications.

Macro files have the suffix `.mac` and, even though they can also be run on consoles, they are really designed to accomplish specific tasks, like routing a VistaMax input to an output, rather than to be a general purpose command file like a session file.

Macro files are manually created using Notepad or other text-only editor and are saved into the SesFiles folder on each VistaMax Server (`storage card/DATA/SesFiles`).

There is no limit to the number of macro files saved into this file, however, only active files should be keep in the folder. Periodically use the admin computer to delete old or unused macro files from the folder using FTP Voyager. Old macros and engineering test macros can also be saved for future reuse in folders created inside the SesFiles folder as well.

### Creating macro Files

Use a text-only editor (like Windows® Notepad) to create and edit macro files and to open up existing macro files. After editing an existing file, always use *Save As. . .* to give it a new descriptive name of up to ten characters plus a `.mac` suffix.

Macro files can also be renamed using standard Windows® functions (e.g., right-click the file name and choose *Rename,* or click, pause, click on the name to highlight it). This can be done while viewing the VistaMax Server using FTP Voyager.

Note: Limit macro names to ten alphanumeric characters (spaces and underlines are OK, but no special ASCII characters should be used). The file name must have `.mac` added to the name so it is recognized as a macro file by the system.

In FTP Voyager it is very handy to be able to double click on session and macro filenames and have Notepad automatically open the file for viewing and editing. To do this, associate the `.ses` and `.mac` extensions in Windows Explorer File Types to always open using Notepad.

#### Running macro files

Running a macro file can be done in a number of ways: chain the macro file from the `init.mac` or from a session file on a console; use VistaMax Command Client (the interface program that installs with NetManager) to manually take a macro from the admin computer; open a DOS command window and use FTP literal commands; assign it to a Hot Button in VistaTouch; or add a custom command to FTP Voyager to load specific macro files.

To add a load session file command to FTP Voyager, select Tools, then Custom Commands (or press ALT+C) in FTP Voyager. This opens up a menu of the current Custom commands. Click Define to open the Custom Commands dialog box (shown below). Click Add to open up a FTP Command entry window (also shown open below). In the Name entry box type in "`load macro.mac`" with `macro.mac` being the name of the macro file to load. In the Command entry box just type in the macro file's name (`macro.mac`). Click OK to close the windows.

To use the load macro function, press ALT+C to pop up a list of the commands and macro files to load on the cardframe, then click on the "`load macro.mac`" name to instantly load that macro on the cardframe.

### Macro Commands

Unlike console session files, a macro file loaded on a cardframe will typically only have routing commands in the file since the `init.mac` file handles card setup and logic routing for audio signals bound to logic.

Routing commands in macro files are made by specifying an input (source) and an output (destination) by their device number and local signal ID number.

## Routing Commands

A macro file begins with a section header. In most cases the macro will be defining routing commands. The section header: `[RouterCommand_1]` is used to define one or more take commands, as shown below:

```
[RouterCommand_1]
Take_1=65,65       ; input 65 > output 65
Take_2=65,d1.129   ; input 65 > fader 1, on console 1
Take_3=265,d2.131 ; signal 265 > fader 2, on console 2
Take_4=d2.225,67   ; console 2, PGM 1 > output 67
```

Each Take command (`take_x=source,destination`) is on a separate line and is listed in numerical order, starting with 1. There can be up to sixty-four Take commands in any one macro file. The routes are taken in Take number order after the macro file is loaded into the SBC memory.

Once a route is "taken," it is continuously maintained—even if the cardframe is turned off or loses power, by Hub persistence files files (`pf-xx.bin`). These are binary files that hold the routing information for each Hub card. They are automatically updated periodically as new routes are taken.

It is a good idea to add "comments" to your macros so that anyone viewing the macro can understand what the macro commands do. Text that follows a semicolon (like `; input 65 > output 65`) is a comment.

In the example above, one source (65) is shown being routed to multiple destinations, even in the same macro file, by simply adding separate Take command lines from that source to different destinations.

You cannot do the converse—route multiple sources to one destination. Routes cannot be *mixed* together. Instead, each new route would replace the previous signal that was just routed. Thus, if two sources were to be routed to the same destination in a macro file, when that macro is loaded, each route is taken in order, so the first source will be almost instantly replaced by the next route. The end result is that the highest numbered route in the file will seemingly be the "only route that was taken."

For a complete listing of every session or macro file command, see the Harris Application Note "AN07-01 Session and Macro files.pdf," available for downloading from any Harris support site.

# CONFIGURATION & SYSTEM FILE OVERVIEW

The VistaMax Controller Card (used on VistaMax, Envoy and VM*Connect* cardframes) and the RMX*digital* console KSU, use a WinCE-based Single Board Computer (SBC) as its VistaMax system server.

Two types of SBCs are in use: PRE99-1800, the original SBC is larger and has a socket-mount Disk-on-Chip (DOC) flash drive that stores the operating system code and all system files; and its newer, smaller, faster, replacement, the PRE99-1804 (known as a 9G20 board) SBC, which is a fraction of the size of the original SBC, plugging into a memory card socket on the Controller card.

The 9G20 contains on-board flash memory, but it's not removable (which means making backups of system files is even more important). The `nk.bin` files are different between the two SBCs, but the 9G20 cannot load the code for the original SBC, nor can the original SBC load the 9G20 code by mistake. Otherwise, they are identical in operation.

Each SBC stores these type of user files:

- Macros (`.mac` suffix)
- Device setup (`.ini` suffix)
- Device configuration (`.cfg` suffix)

The SBC also functions as an FTP (File Transfer Protocol) server. This allows files to be transferred between the admin computer and the SBC using an FTP program like FTP Voyager. The `.ini` and `.cfg` files are all created and maintained using VMCC, as is the `init.mac` file. All other `.mac` and `.ses` (session file suffix) are created and/or edited using Windows Notepad.

## Server File Structure

The VistaMax operating system requires the setup and configuration files be stored in specific folders on the SBC. Most files reside within the `Storage Card` folder. Inside that folder is a `Data` folder, an `nqx.ini` file, and three system files that should not be changed. Inside the `Data` folder are three more folders: `SesFiles`, `SysFiles` and `Ref` (the `Ref` folder is a WinCE system folder that is never changed).

The `SesFiles` folder holds user-created macro files and the VMCC-created file `init.mac`. The `SysFiles` folder holds these VMCC-created configuration and setup files: `routers.ini`; `local_publish.cfg`; `edgedevice.ini`; and a

`dx_publish.cfg` file from every other console and cardframe in the community, as well as several system-maintained files.

Each config and setup file, and each system-controlled file that may be used by an end user, are covered in this section. They are listed in order of their hierarchy in the VistaMax server's DOC.

### RELEASE.TXT

This text file—stored at the top level of the DOC, lists the operating code version, build number and build date. This can be compared to the latest operating system code available on the Harris support sites.

### NQX.INI

This essential setup file is in the `Storage Card` folder. It is read as the SBC initializes at power up; when the Controller Card Reset button is pressed; or when the SBC is reset via an FTP literal reset command.

This file has the cardframe's assigned IP address, server name, device number and several other start-up parameters. These file entries are edited using VMCC.

### PROVISIONED.HASH

This file is also in the `Storage Card` folder. It is created, and overwritten, each time VMCC distributes files to that community member. VMCC reads this file as the Distribute window opens up (which is why it can take some time for all of the devices names to appear—especially if one is off-line) so it can determine which files have been changed and thus what action the console or cardframe needs to take to use the new files.

If this file is not present (because it was manually deleted or because this is the first time VMCC is being used to distribute files), then VMCC replaces all of the files on that server. This is equivalent to selecting the *Force Download* option in VMCC. This action causes the server to be initialized after file distribution so deleting the `provisioned.hash` file (or selecting *Force Download*) should be used with caution.

### The SesFiles Folder

The `SesFiles` folder is where user-created macro files are stored, but it is also where the `init.mac` file, which is a special macro file created and maintained by VMCC, is stored.

The `init.mac` file is a critical system file that configures cardframe parameters. It loads each time the cardframe is powered up or when the Controller card is reset. Some of the functions this file configures are: taking hidden routes to bind audio inputs and logic inputs together (used when logic commands are *bound* to audio signals); assigns, on Logic I/O cards, which logic function activates each logic output, and what logic command is generated by each logic input; sets the sample rates for the first four outputs on each Digital I/O card; assigns room codes to the audio inputs; trims or boosts the gain on audio inputs and outputs; loads additional macro files to establish standard routings through the system.

### The SysFiles Folder

The `SysFiles` folder holds the remaining cardframe configuration and initialization files. Most of these are maintained by VMCC, but some files are created and maintained by the operating system and so are not edited. The route persistence files (`PF_xx.bin`) in this folder are continuously being updated by the operating system. They hold the cardframe routes so that if the cardframe power is lost all routes are automatically reestablished after power is restored to the cardframe and the Controller card finishes initializing.

### SERVERID.TXT

This text file lists the ID number of the Controller card's Single Board Computer (SBC). It consists of a single line of text:

```
Server ID is 123-456-789
```

Each SBC has a unique Server ID number. The number is used by Harris tech support representatives to create a License Code (which can be entered into VMCC) to unlock optional extended features on specific VistaMax devices.

### INVENTORY.TXT

This text file is controlled by the operating system. It identifies which cards are installed in the cardframe. Hub Cards are 0x, Analog I/O cards are 1x, Digital I/O cards are 2x and Logic I/O cards are 3x. The VistaMax cardframe has sixteen the Envoy cardframe has six slots and the VM*Connect* mini-cardframe has three slots.

## ROUTERS.INI

This file tells the system which sources and destinations are available for routing on that console or cardframe. There are three sections to the file: router definitions; available source list; and available destination list.

```
[Routers]
; Router type supported: VistaMax
Type_1=VistaMax
;
[SrcInclude]
Include_1_1=D3.225-233,241-255,289-297
Include_1_2=D9.65-95
Include_1_3=D11.225-233,257-291,337-351
[DstInclude]
Include_1_2=D9.65-95
Include_1_3=D11.241-25
```

Section headers (`[Routers]`, `[SrcInclude]`, `[DstInclude]`) define each section.

`[Routers]` defines the type of router (VistaMax or another type of router) that is networked with the cardframe.

`[SrcInclude]` (Source Include) lists the input signals—from all community members, that can be routed by edge devices served by the cardframe, or by session or macro files. In the example, only those signals listed from device 3 (D3), device 9 (D9) and device 11 (D11) appear on source selectors when the INCL ALL button is lit.

`[DstInclude]` (Destination Include) lists the destinations that are available to edge devices served by that device. In the example, the only destinations shown are those on devices 9 and 11. This limits the edge devices served by this cardframe to only being able to select sources for the destinations listed on these two devices (D9 and D11).

Each include statement line lists sources or destinations from one VistaMax device. When there are a lot of sources or destinations on one device, multiple `Include_x=` statement lines are valid. Each additional statement line has to include the device number.

### EDGEDEVICE.INI

This file configures the edge devices—Intercom panels, source selector panels, and source/destination selector panels, that receive their setup information from this server, which is termed their parent device.

An `edgedevice.ini` file defines the signals available to be selected and the signals assigned to the six hot buttons (identified as Button_1_1 thru _1_6) to quickly route a preassigned source to a destination. To choose other sources, the operator would use the source selector and *Take* button on the panel.

The six hot buttons can alternately be set to select between six destinations which means the operator first presses one of the hot buttons to choose the destination, then uses the source selector and *Take* button to manually dial up and take a source for the selected destination.

Each destination controlled by the edge device has a signal include list (identified by the Include_1 entry line, or the Include_2 entry line for a dual selector) that control which source names appear in the Next Source display when the source selector control is turned.

## SOFTWARE UPDATES

Harris Corporation may periodically issue operating system revisions and updates for the VistaMax Server. Updating the operating system involves uploading a single file (`nk.bin`) to the SBC using a TFTP Server (3CDaemon).

Use the Community Monitor View / Status window to view the current operating system running on each VistaMax device (see an illustration of this screen on page 15).

# 4 – VM DEVICE USE AND APPLICATIONS

VM devices are most often used to create a brand new VistaMax system but they can be used to expand an existing system or be used to accomplish some other specialized tasks as well, a few of which are outlined in this chapter.

## USING VM DEVICES

VM devices do not have any user controls on them since they simply interface inputs and outputs between peripherals and the VistaMax system, in the case of VM*Xpress* and VM*Quadra* devices, or in the case of a VM*Connect*, hold the routing engines (the Hub cards) for the system, although VM*Connect*s can also hold I/O cards. In all cases, their function is transparent to the board operators, production personnel, news room staff and other station personnel that use the VistaMax system.

Once the VM devices are configured using VMCC and VMSupervisor, users will want take or route their sources (peripheral inputs) to destinations (peripheral outputs) in the easiest or most convenient way possible. This can be done in literally dozens of ways, but here are the top five methods to route sources in a VistaMax system:

1. Board operators use console channel source selectors to manually "dial up" the sources they need, when they need them.
2. Source-to-destination routes can be included in a session or macro file, which can be taken on consoles, edge devices, or using VistaTouch.
3. A source (or a macro) can be "dialed up" on an edge device to route a source to the destination served by that panel.
4. A source can be taken directly using VistaVue or VistaTouch (requires a take command in a macro).
5. Sources can be commanded remotely by a digital playback system using VMCS commands.

## APPLICATIONS

The VM devices lend themselves to many applications beyond as signal interfaces for a VistaMax system.

### Digital Snake

A pair of VM devices (typically two VM*Xpress* devices) can be Linked to one another to create a bidirectional Digital Snake with either 16 x 16 or 32 x 32 signal carrying capacity.

Using one CAT-6 crossover cable, two VM devices can be up to 100 meters (330 feet) apart. If a pair of the special order optical VM devices are used, the two devices can be up to 2 km (1.2 miles) apart.

To use a pair of VM devices in this application requires that one device is set as the System Master. This is done by removing the top cover and putting a hard drive configuration jumper onto the two pins of J12 (on a VM*Xpress*) or J30 (on a VM*Quadra*). The two devices are then Linked together (using a crossover cable) between their two Primary Link connectors.

When Linked together like this, no other configuration is required. Each Input on one device simply goes to the same numbered Output on the other device. Depending upon the type of I/O cards installed at each end, signal format conversion can also be performed on the signals. Some of the typical applications for a snake would be to connect between a main building and a transmitter shack, between a performance stage and a mixing console, between a street-level talk studio and an air studio located several floors away, from a TOC up to the roof of a high-rise to connect incoming and outgoing feeds.

### Intercom System

A VM*Connect* can be used to create an Intercom System with up to 32 Intercom stations by installing one VistaMax Analog I/O card into a VM*Connect*. The VMConnect can still be used to connect VM devices and consoles (Facet 1 of the Hub card in slot 3 would be used by the Intercom system, but the other Facets can connect to other devices) when used in this application.

There are rack-mount Intercom panels (PRE99-1375) as well as turret-mount panels (a separate Intercom Selector, PRE99-1377 and Intercom Audio Expander, PRE99-1378) available. Up to 32 of these devices can be connected to one Analog I/O card to form an Intercom system, which is configured using VMCC. Note that "virtual Intercom panels" are supported to allow hardware Intercom panels to talk to 2-way devices.

### Digitizing an Analog Console

There still seem to be a few die-hard analog users, so if you have an analog console that you want to use with a VistaMax system, it is fairly easy to integrate it using a VM*Xpress* with one Analog I/O card and one Logic I/O card (PRE99-1335-4). This configuration has 16 inputs and outputs that can be configured as eight stereo ins and outs, or some combination of mono and stereo.

A typical usage would be to set up four stereo outputs as the feeds to four faders, with the remaining outputs being used for a monitor selector, Intercom feed, recorder input, etc. The main PGM buses would go to four stereo inputs while the other inputs could be used to connect mix-minus outputs and talkback audio.

The logic I/O would be used with the four stereo faders to control peripherals routed to the channels.

### Streaming Audio Control

If all four USB ports on a VMQuadra are not connected to automation servers, any unused USB ports can connect to computers in order to stream from one to four stereo signals to the Internet without having to use any audio conversion interface.

# 5 - SERVICE INFORMATION

All VM devices are designed to yield many years of trouble-free 24/7 operation. If a VM device does require service, this section covers service information and how to obtain service, technical documentation, and replacement parts.

## PARTS AND REPAIR SERVICES

There are only a handful of field-replaceable parts on the VM devices, which are listed in this section. Most boards and assemblies are not readily field-serviceable due to the use of surface-mount components, thus it is recommended that assemblies or their individual circuit boards be returned to Harris for repair.

VM device technical information (Quick Guides, selected schematics, software and firmware revision information, wiring diagrams, application notes and service bulletins) is available from the Harris E-service site as well as the Harris PR&E Digital Studio Products FTP site: `ftp://ftp.pre.com`.

To use the FTP site, log in (username) as: `customer` using the password: `pacific`. Most technical documentation and schematics are published in PDF format, so Acrobat Reader 6.0 or later is required.

## PARTS ORDERING AND OBTAINING REPAIR

Replacement circuit boards and assemblies can be purchased through a Harris sales representative; the Harris parts department in Quincy, IL; or through the Studio Products Technical Services Department in Vista, CA.

To expedite the ordering process, and to ensure the correct parts are ordered, have the Harris Product Number available when ordering. Some circuit boards and assemblies have long lead times, so order spares accordingly.

Circuit boards and assemblies returned to Harris for service, exchange, or credit must have an RA (Return Authorization) tracking number issued prior to their return. This number is issued by the Technical Services Department. Items received without an RA number written on the shipping label side of the packaging may be delayed or subject to additional handling fees.

Assemblies and circuit boards can be obtained by calling the Harris BCD parts department in Quincy, IL (217.221.7500) or the Vista, CA service department (760.936.4013).

To request an RA number to return a part for service, contact the Harris PR&E Technical Services Department:

*Harris, Pacific Design Center*
*Technical Services Department*
*1493 Poinsettia Ave, Suite 143*
*Vista, CA 92081 USA*

*Service Phone: 760.936.4013*
*Fax: 760.936.4001*
*E-mail: presupport@harris.com*

*www.broadcast.harris.com*

Serviced assemblies within the USA are shipped FOB Vista, CA using FedEx two-day service, unless otherwise specified.

## REPLACEMENT PARTS

Standard replacement product numbers are identified by the PRE prefix. Any part listed without this prefix can only be ordered through the Harris PR&E Technical Services department in Vista, CA.

### VMConnect Replacement Parts

| *Harris #* | *Description or Use* |
|---|---|
| PRE30-13 | AC power cord, IEC-type, for USA outlets |
| PRE50-27 | In-Line 48-volt Power Supply (no AC cord) |
| 95-1380 | Mother board PCA |
| PRE99-1206 | Redundant Supply (48-volt supply w/ power cord) |
| PRE99-1360 | Controller card |
| PRE99-1361 | Analog I/O card |
| PRE99-1362 | Digital I/O card |
| PRE99-1363-1 | Hub card (copper Facets only) |
| PRE99-1363-2 | Hub card (with optical and copper Facets) |
| PRE99-1366 | Card Slot Cover Panel |
| 90-1381 | Front panel assembly, lower |
| 90-1382 | Front panel assembly, upper |
| PRE99-1367 | MOD IV Adapter for VistaMax I/O card |

### VMQuadra / VMXpress Replacement Parts

| *Harris #* | *Description or Use* |
|---|---|
| 19-64 | Flex cable (board interconnect) |
| 19-343 | USB Host cable, 5 meters |
| PRE50-26 | 5-volt Power Supply, with AC cord |
| 90-1331 | Front panel assembly (VMQ) |
| 90-1334 | Front panel assembly (VMX) |
| PRE95-1330-1 | Main board, copper Facets (VMQ) |
| PRE95-1330-2 | Main board, optical Facets (VMQ) |
| PRE95-1335-1 | Main board, copper Facets (VMX) |
| PRE95-1335-2 | Main board, optical Facets (VMX) |
| PRE95-1331-1 | AES 16 I/O card |
| PRE95-1331-2 | AES 8 I/O card |
| PRE95-1332 | Logic I/O card |
| PRE95-1334 | Analog I/O card |

WMQ = VMQuadra-only
VMX = VMXpress-only

## INSTALLATION KITS

Each VM*Quadra* and VM*Xpress* includes one 76-1330 install kit. Each I/O card also has an install kit.

### 76-1330 VMQuadra/VMXpress Install Kit Parts

| *Harris #* | *Description* | *Qty* |
|---|---|---|
| 14-490 | 12-pin AMP MOD IV housing | 1 |
| 15-938-1 | AMP MOD IV contact receptacles | 12 |

### 76-1331 VM I/O card Install Kit Parts

| *Harris #* | *Description* | *Qty* |
|---|---|---|
| 15-964 | 48-pin EuroCard housing | 2 |
| 15-974-1 | AMP MOD IV contact receptacles | 96 |

## TROUBLESHOOTING VM INTERFACES

The VM interfaces have a built-in diagnostic utility that is included with the VMSupervisor application, but there are also various LEDs to indicate performance on the unit itself.

The health of the Link connections is indicated by two LEDs on the RJ-45 connectors. Both the green and yellow LEDs must be lit solid when the Link cable is connected to a Hub card Facet, or to another Link connector when two VM devices are cascaded. If either is blinking or is not lit, this indicates a failure with the Link.

On a VMQuadra, there are five red LEDs behind each USB connection (on the main board) that indicate the server connection is good. If these are not lit solid, then there is a problem with that USB port or with the USB cable.

If there are no audio outputs on a card, the unit may have experienced a power surge or EMP from a lightning strike. In most cases, power cycling the unit should restore all functions. To power cycle the VM devices, pull out the power cord and wait ten to fifteen seconds to allow all voltages to dissipate, then plug the AC cord back into the unit.

If the top cover is off of a VM interface, you should observe the Done LED turn on for about five seconds when first powered and then turn off (and remain off). If the Done LED is blinking rapidly, it indicates the device is in Loopback test mode. To exit the Loopback test mode requires that VMSupervisor be connected to the device, then uncheck the Loopback test mode selection in the Utilities window.

If any I/O cards are installed, the card ID LEDs should be blinking at a steady rate. If the I/O card ID LEDs are not lit, or are lit solid, it indicates a problem.

In this situation (done LED lit all the time or the I/O card LEDs not blinking), try disconnecting the main board from the I/O cards to see if the main board will power up OK. The lower I/O board connects to the main board using a flex cable. The flex cable is latched at each end using surface-mount connectors. Unplug power before using a thumbnail to “pop-open” the dark brown latches, then remove the flat cable. If an upper I/O card is installed, it can be removed (five #2 Phillips screws, then lift the board up and off of the dual row header that plugs into the lower I/O card) to allow better access to the I/O card connector.

Reapply power and observe that the Done LED lights for five seconds and then goes out. If it remains out, then possibly one of the I/O cards is defective. If it makes no difference, then the main board should be substituted.

If the I/O cards are not operating correctly, verify that the two connector latches on the main and lower boards are properly closed (the dark brown part is the latch and it sits over the end of the flex cable). With both latches open, the flex cable should sit squarely in the two connectors and it should be easy for the latches to be snapped closed using light finger pressure.

Verify that the upper board, if present, is firmly seated on the two row header and that all Phillips screws are tight. To reseat this board, undo the Phillips screws, then lift up the rear slightly to reseat the header into the board.

### VMSupervisor Tests

Connect a laptop, which has VMSupervisor installed on it, to the VM device using a USB cable. Start VMSupervisor and observe whether or not the VM device is detected (the bottom line will show No Device Connected until it detects a VM device, then it will show VM*Xpress* or VM*Quadra*). If no device is detected, and the laptop is able to connect to other VM devices using the same USB port and same USB cable, then this would indicate there is a main board USB problem with that VM interface.

If the front panel red indicator is lit, then the internal power supply is probably OK, but there are +5 and GND test points located near the connector to verify the supply voltage +5 volts is correct. There are also +3.3 and +1 volt test points.

If the VM device is shown in the bottom line of the VMSupervisor window, then click Utilities to open up the utilities window. Click (to checkmark) the Enable Comprehensive Audio Loopback Mode. This action will route each input to each output (Input 1 to Output 1, Input 2 to Output 2 and so on) to verify operation. This is useful to check the internal A/D and D/A converters on an Analog I/O card and the digital converters on a Digital I/O card.

Note that Loopback test mode should not be used on an active VM device that is routing signals through a VistaMax system since this mode will interrupt signal routing on the VM I/O cards.

## TROUBLESHOOTING THE VMCONNECT

The VM*Connect* uses the same plug-in cards as used in the VistaMax and Envoy cardframes. The Controller card (PRE99-1360) has a Windows CE computer on it (called an SBC or Single Board Computer), which is the VistaMax server for the VM*Connect*. It is always plugged into the top card slot in the VM*Connect*. A Hub card (PRE99-1363-1 or PRE99-1363-2) is always plugged into slot 1. Slots 2 and

3 can have any combination of Hub cards or Digital I/O cards (PRE99-1362) installed. Slot 3 also supports having an Analog I/O card (PRE99-1361) installed.

## Controller Card

In normal operations, the Controller card's green Normal/Data LED is lit solid and the yellow Control Comm LED is rapidly blinking.

When the Controller card is first powered up (by either powering up the VM*Connect* or hot-plugging the Controller card) the red Inactive LED will slowly blink for 30 – 90 seconds as the SBC starts up, loads a Windows CE shell and the VistaMax operating system, then reads the various configuration files into memory.

After the configuration files are read, the Inactive LED turns off and the Controller card scans the motherboard to identify which cards are in the frame and to then reestablish all routing that was active when the power was cut off.

If the Controller card's red Inactive LED blinks constantly, it indicates a failure with the SBC. Press the Controller Card Reset button to reboot the SBC (same as hot-plugging the card). If the Inactive LED does not turn off after 60 – 90 seconds, then it indicates the SBC did not complete booting up. Unplug the Controller card and check that the SBC is properly seated into its socket. It goes into a memory card socket so it can be unlatched and removed, and then reinserted into the socket. Hot plug the Controller card. If the red Inactive LED still blinks constantly, then it indicates the Controller card requires servicing.

All configuration files saved on the SBC are created and distributed by VMCC, but VMCC does not maintain a back-up of any user-created files (e.g., the macro and session files saved to the SesFiles folder). These files must be backed up to the admin computer periodically in order to be able to easily recover from an SBC failure. VMCC has a Local Download option to save the config files to the My Documents folder on the admin computer. The backup uses the same folder structure as used on the SBC with the top folder being labeled by the IP address of each device (e.g. 192.168.100.41). It is recommended that the provisioned.hash file and all user-created macro and session files in the SesFiles folder be backed-up to these My Documents folders so that you always maintain a complete backup of the SBC files in case of emergency.

## Hub Card

In normal operations, the Hub card's green Normal/Data LED is lit solid and the yellow Control Comm LED blinks periodically.

One Hub card in a VistaMax system must be set as a System Master. That Hub card will have its yellow System Master LED lit up. Each VM*Connect* ships with its Hub card set as a master, so if the VM*Connect* is connecting into an existing VistaMax system, its main Hub card (in slot 3) must be set to slave mode. The System Master selection is made on a hex rotary switch on the Hub card. Use a "greenie" to set the switch. The Master Hub card is set to "F" while all other Hub cards in the system are set to "0" (setting them as slave Hub cards).

Each of the six Facet "copper" RJ-45 connectors on a Hub card has yellow and green LEDs to indicate functionality. Both light up when a Link cable is connected. If the Hub card is not the System Master, it must connect thru other Hub cards that do connect to the System Master. When a Hub card is connected, the green LEDs will be lit on all open Facets. Note that on an optical Hub cards, because of the special scanning used on these cards, the unused copper Facets will typically show blinking green LEDs. When a valid connection (properly oriented cross-over cable) is made to a Facet, both yellow and green LEDs will be lit solid. There are software drivers at each end that may not be working correctly, so just because the LEDs are lit does not completely indicate that the Facet is truly "good."

The Hub card's red Inactive LED is lit solid anytime the Controller card is not active, indicating it cannot accept any new routes. However, all existing routes through the card are maintained for as long as the Hub card is powered. If power to the frame is cut off, the Hub card routes are lost. But, the routing data is maintained by a persistence file, one for each Hub card, which is saved in the SysFiles folder on the SBC. After power is applied to the frame, and the SBC boots up, it reads the persistence files to reestablish the routes on each Hub card. Note that the persistence files are not real-time backups, but are periodic backups (to minimize the nubmer of flash memory write cycles), thus routes established just prior to power being removed may not have been backed up and thus will not be reestablished upon repowering the frame.

The VMConnect uses one or two +48 VDC power supplies (PRE50-27) that plug into the motherboard on J1 and J2. Normally the right-hand supply (called the main supply) plugs into J2, while the left-hand supply (optional, redundant supply) plugs into J1. These two connectors are summed together through steering diodes CR1 and CR2 to supply the +48 volts used by the VM*Connect* cards.