GRASS VALLEY GROUP

Instruction Manual

071810700
FIRST PRINTING: **JULY 2001**

7500 SERIES
7500NB/7500WB ROUTERS

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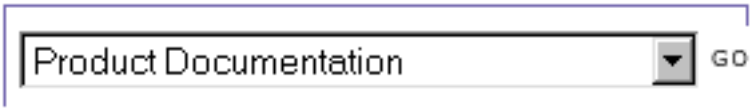
Online User Documentation

Current versions of product catalogs, brochures, data sheets, ordering guides, planning guides, manuals, and release notes may be downloaded via the Product Documentation link on the Grass Valley Group home page:



FAQ Database

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

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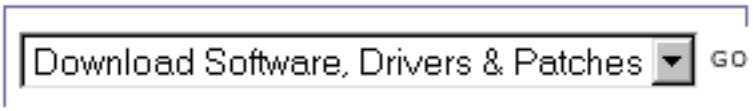

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Preface

About This Manual

This manual provides installation, operation, and service information specific to the 7500 Series Routing frames.

Additional Documentation

The 7500 Series Routing frames can be controlled by either the Series 7000 Signal Management System or the Encore Control System. Configuration information required for using the 7500 Series frames with either of these systems is contained in the control system's documentation set.

Electronic copies of all routing documentation is available on the documentation CD that came with your frame. A printed copy of the documentation set was provided with the system. Individual manuals may be ordered by contacting Customer Service.

Safety Summary

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

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

Safety Terms and Symbols

Terms in This Manual

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

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

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

Terms on the Product

The following terms may appear on the product:

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

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

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

Symbols on the Product

The following symbols may appear on the product:

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

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

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

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

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

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

Warnings

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Cautions

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

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

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

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

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

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

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

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

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

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

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

Regulatory Notices

Certifications and Compliances

FCC Emission Control

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

Canadian EMC Notice of Compliance

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

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

EN55022 Class A Warning

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

Canadian Certified Power Cords

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

Canadian Certified AC Adapter

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

Laser Compliance

Laser Safety Requirements

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

Laser Safety

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

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

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

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

FCC Emission Limits

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

Certification

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

Section 1

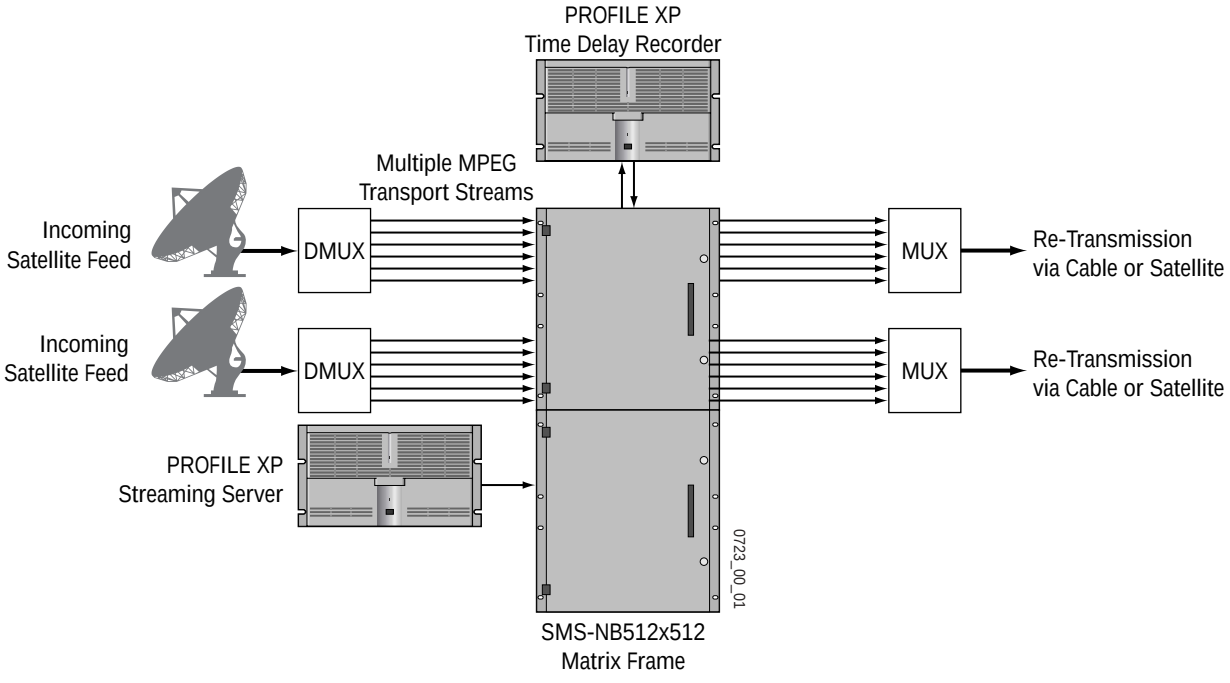
Overview

Introduction

The 7500 Series Routing frames can be controlled by either the Series 7000 Signal Management System or the Encore Control System. The 7500 Series Routing frames expand the multiformat routing capability of the Series 7000 Signal Management System and are compatible with existing Series 7000 matrices and control panels.

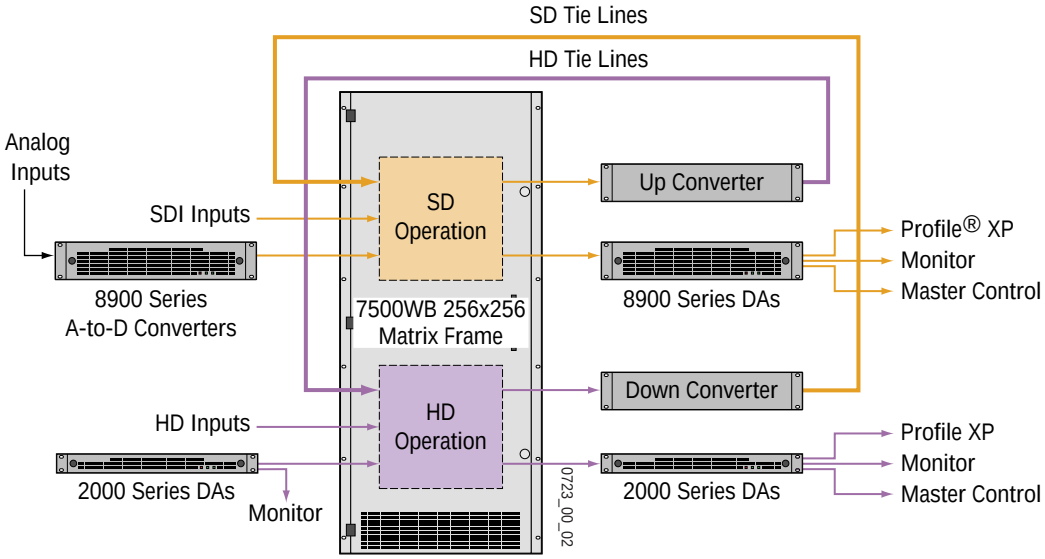
The 7500NB frame is designed to switch digital signals up to 50 Mbps. Figure 1-1 shows an example of MPEG signal routing using a SMS-NB512x512

Figure 1-1. 7500NB 512x512 MPEG Signal Routing



The 7500WB frame is designed to switch signals from 10 Mbps to 1.485 Gbps. Figure 1-2 shows an example of Standard Definition (SD) and High Definition (HD) signal routing using a 7500WB 256x256.

Figure 1-2. 7500WB 256x256 HD and SD Signal Routing



System Level Architecture

7500NB Architecture

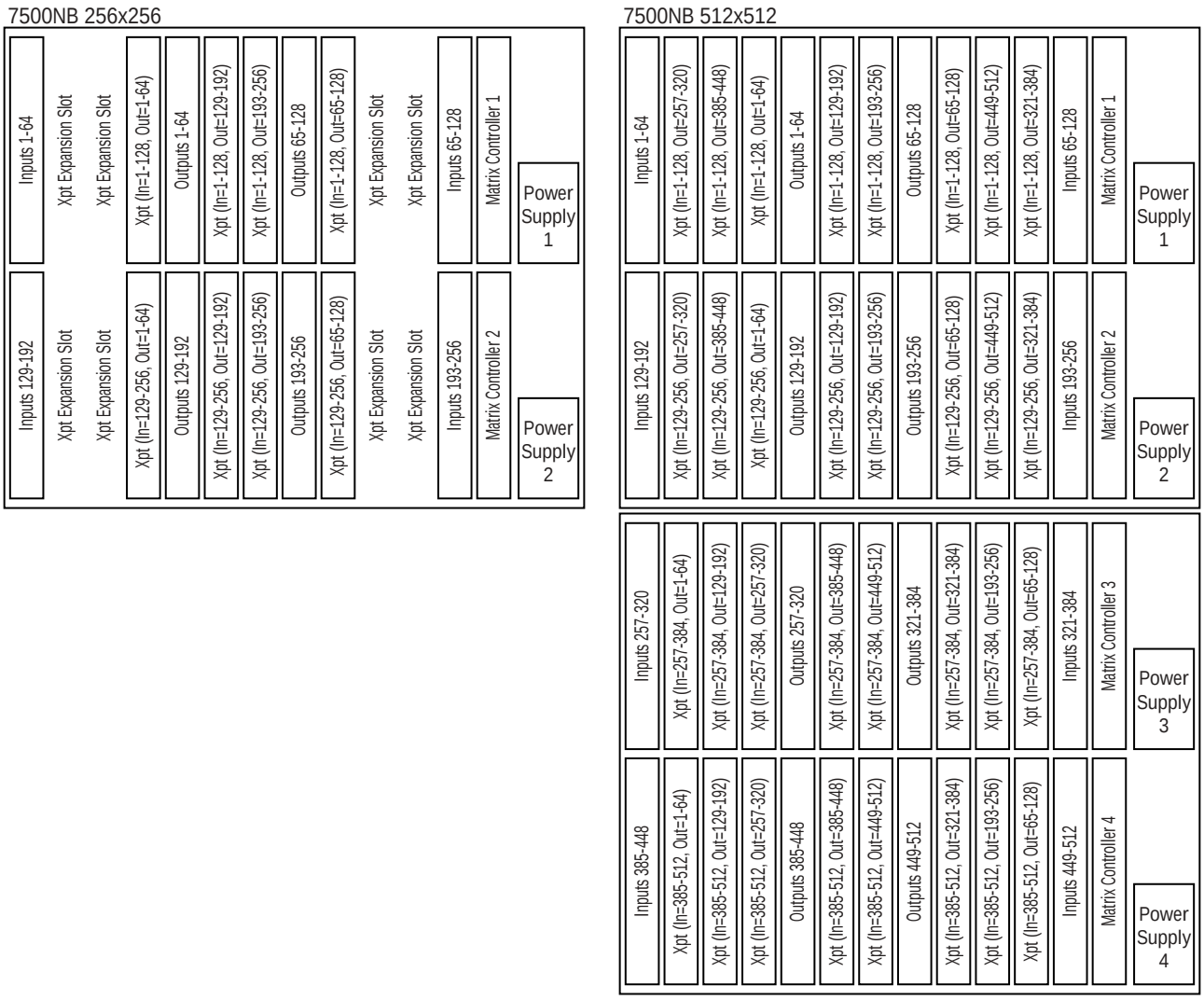
7500NB AES Audio Systems are built around a 256x256, two bay, 12RU matrix. The 7500NB 256x256 uses one matrix and the 7500NB 512x512 uses two matrices connected together at the backplanes with expansion connector modules. The 7500NB 1024x1024 uses eight matrices connected together.

Matrices are populated with crosspoint modules, input modules, output modules, and matrix controller modules. synchronous and asynchronous input and output modules are available. Both types of modules can be placed in the same matrix. The synchronous modules can be configured to allow an asynchronous signal to be passed through an input or an output.

The two bay, 12RU matrix uses four input modules, four output modules, and eight crosspoint modules for a fully configured 256x256 system. Each bay of the system contains a slot for a matrix controller and a power supply. The slot locations for the modules are shown in Figure 1-3. The empty slots are used for crosspoint modules in expansion systems larger than 256x256.

Two of the two bay, 12RU matrices are connected using expansion connectors to create a fully configured 512x512 system. The system uses eight input modules, eight output modules, and thirty-two crosspoint modules as shown in Figure 1-3. The top bay is always used for inputs 1-128, the second one for inputs 129-256, the third for 255-384, and the fourth bay is used for inputs 385-512.

Figure 1-3. 7500NB Module Placement



Inputs are routed by the Crosspoint modules to the Output modules to ensure that all Inputs are available to all Outputs. See Figure 1-4 for the 256x256 signal flow and Figure 1-5 for the 512x512 signal flow.

Figure 1-4. 7500NB 256x256 Signal Flow

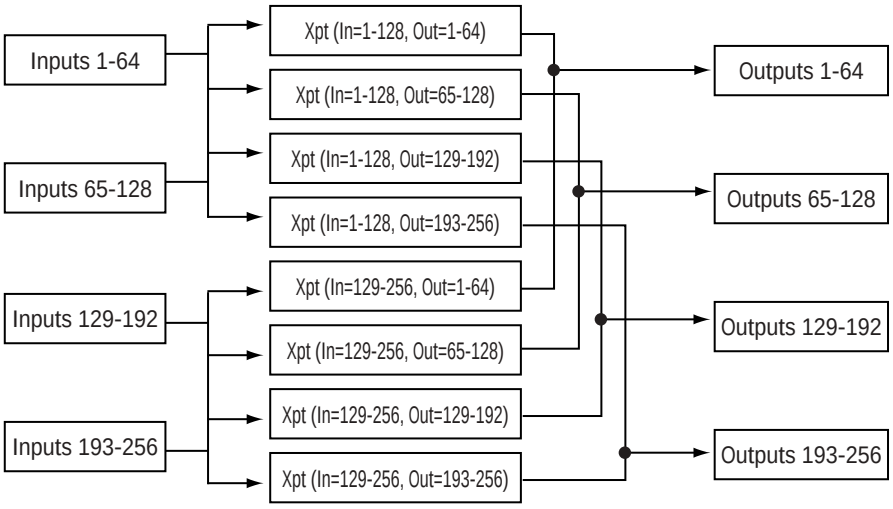
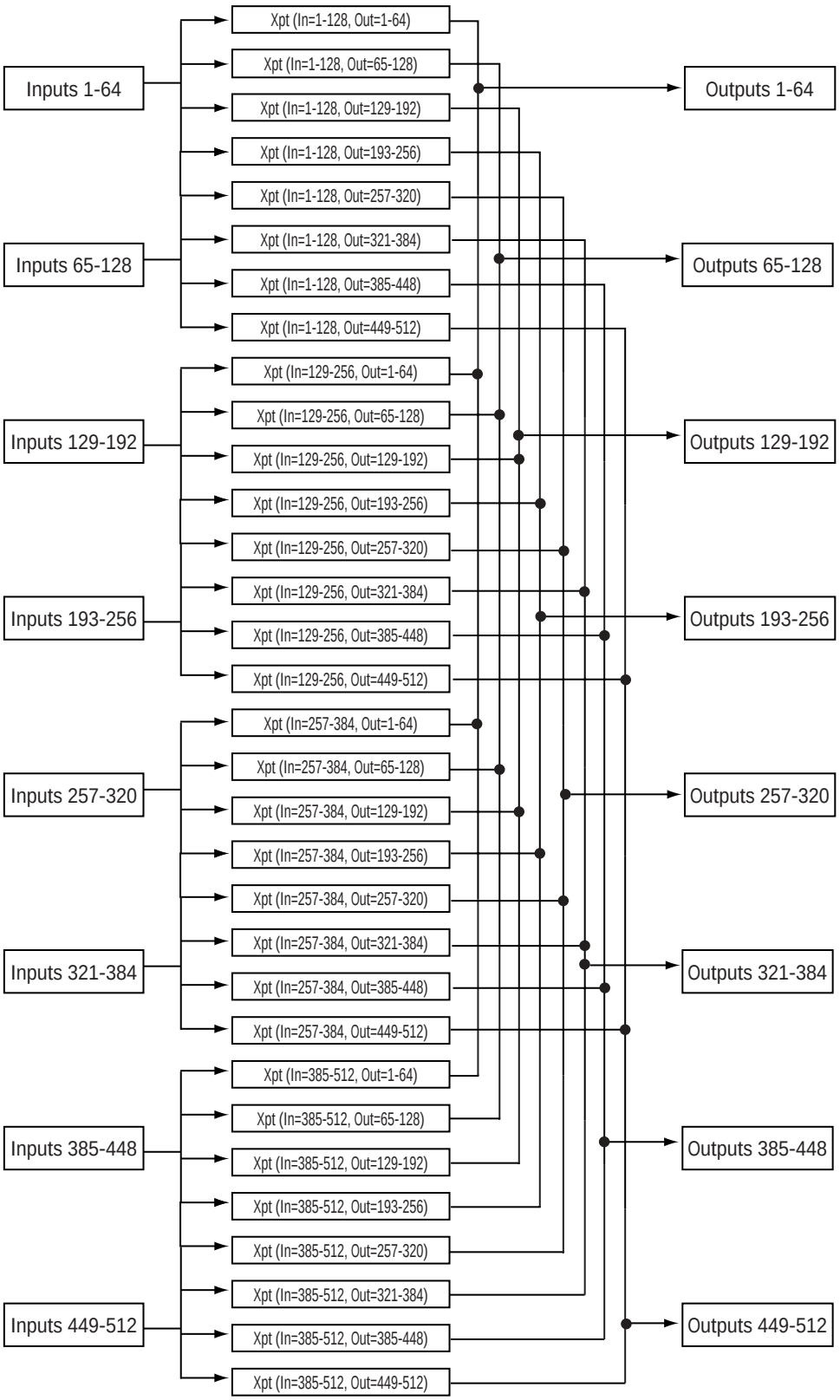


Figure 1-5. 7500NB 512x512Signal Flow



7500NB systems can be expanded in increments of 64 inputs / outputs to as large as 1024x1024. They are assembled using standard Grass Valley router frames, distribution amplifiers, Ethernet switches, and in some cases custom cables. Contact Customer Service for specifications and ordering details. Table 1-1 shows the number of crosspoint modules required to create configurations up to 1024x1024.Table 1-2 and Table 1-3 shows the number of input and output modules needed to create configurations up to 1024x1024.The number of input modules needed is affected by how many outputs the system contains.

Table 1-1. Required AES 128x64 Crosspoint Modules

Inputs	Outputs 64	128	192	256	320	384	448	512	576	640	704	768	832	896	960	1024
64	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
128	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
192	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32
256	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32
320	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48
384	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48
448	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64
512	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64
576	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80
640	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80
704	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96
768	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96
832	7	14	21	28	35	42	49	56	60	70	77	84	91	98	105	112
896	7	14	21	28	35	42	49	56	60	70	77	84	91	98	105	112
960	8	16	24	32	40	48	56	64	66	80	88	96	104	112	120	128
1024	8	16	24	32	40	48	56	64	66	80	88	96	104	112	120	128
	Crosspoint Modules Required															

Table 1-2. Required AES Input Modules

	Inputs 64	128	192	256	320	384	448	512	576	640	704	768	832	896	960	1024	Outputs
# of Input Boards Required	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	≤ 512
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	>512

Table 1-3. Required AES Output Modules

	Outputs 64	128	192	256	320	384	448	512	576	640	704	768	832	896	960	1024
# of Output Boards Required	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

7500WB Architecture

The 7500WB 256x256 matrix frame is configured with a Controller module, two Power Supply modules, eight Input modules, eight Crosspoint modules, eight Output modules, a two-piece backplane, an interconnect and an optional monitor module. The router has two Controller module slots and four Power Supply module slots to allow for redundancy. See Figure 1-6.

The 7500WB 128x128 matrix frame is configured with a Controller module, one Power Supply module, four Input modules, four Crosspoint modules, four Output modules, a backplane, an interconnect, a DC Distribution module, and an optional monitor module. The router has two Controller module slots and two Power Supply module slots to allow for redundancy. See Figure 1-6.

Inputs are routed by the Crosspoint modules to the Output modules to ensure that all Inputs are available to all Outputs. See Figure 1-7 and Figure 1-8 for the signal flow. Table 1-4 shows how many Crosspoint, Input, and Output modules are needed to create configurations in a 7500WB 256x256 from 32x32 to 256x256. Table 1-5 shows how many Crosspoint, Input, and Output modules are needed in a 7500WB 128x128 to create configurations from 32x32 to 128x128.

Figure 1-6. 7500WB Module Placement

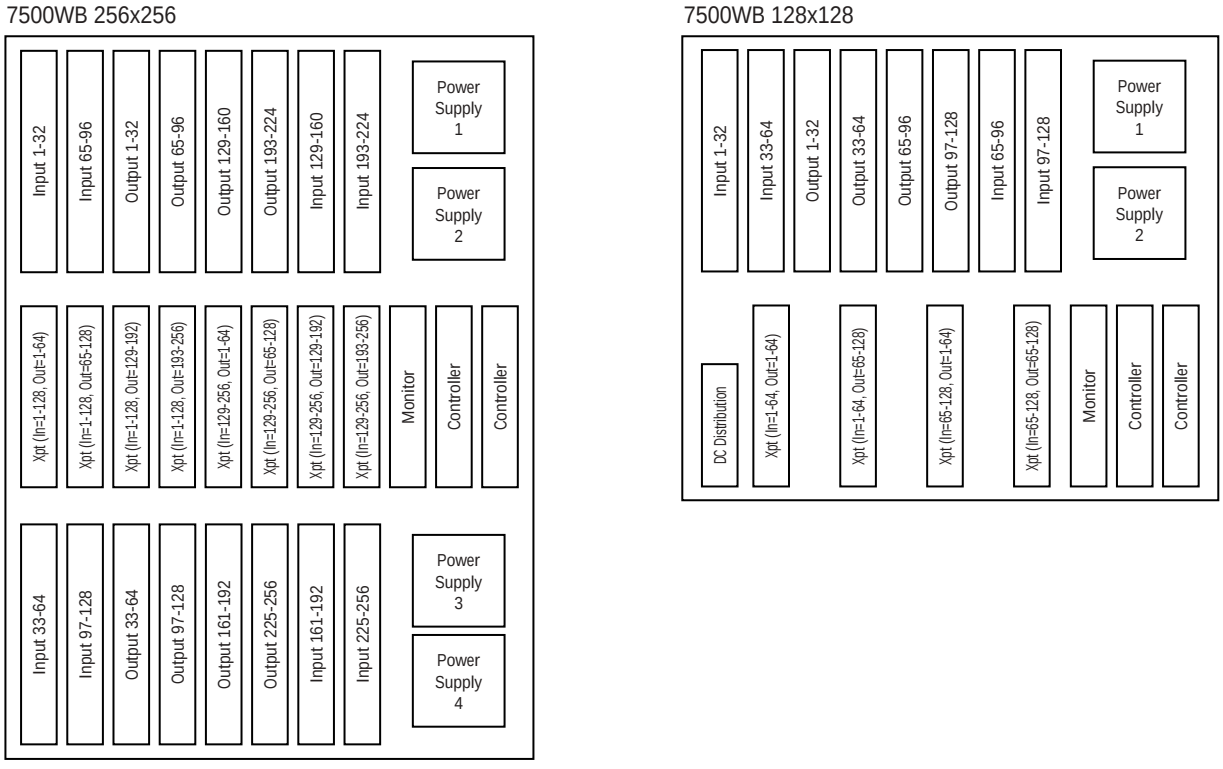


Figure 1-7. Signal Flow 7500WB 256x256

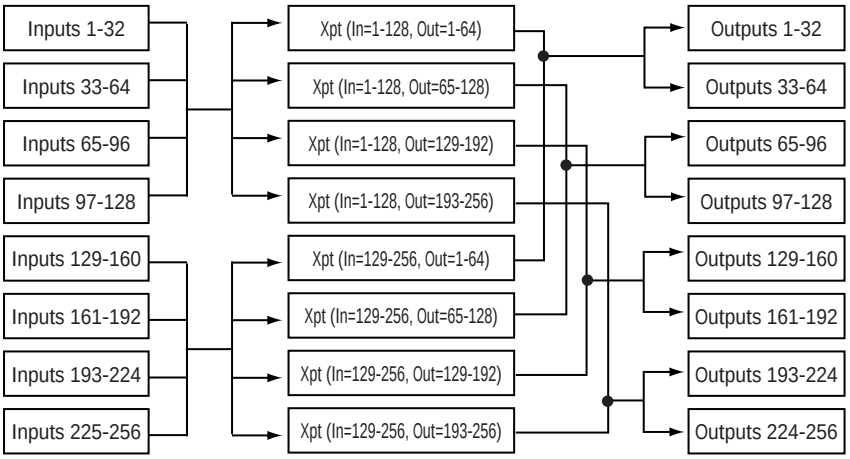


Figure 1-8. Signal Flow 7500WB 128x128

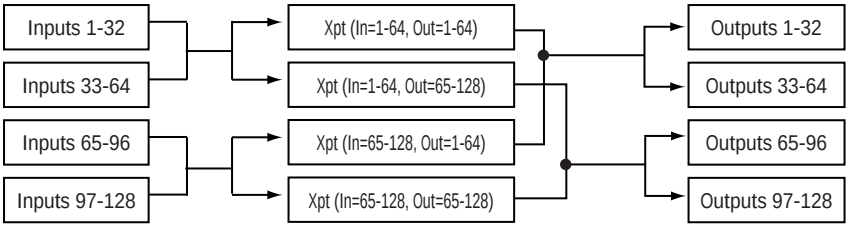


Table 1-4. Crosspoint Modules Required for 7500WB 256x256

		Outputs (# of Modules)							
		32 (1)	**64 (2)**	**96 (3)**	**128 (4)**	**160 (5)**	**196 (6)**	**224 (7)**	**256 (8)**
Inputs (# of Modules)	**32 (1)**	1	1	2	2	3	3	4	4
	64 (2)	1	1	2	2	3	3	4	4
	96 (3)	1	1	2	2	3	3	4	4
	128 (4)	1	1	2	2	3	3	4	4
	160 (5)	2	2	4	4	6	6	8	8
	196 (6)	2	2	4	4	6	6	8	8
	224 (7)	2	2	4	4	6	6	8	8
	256 (8)	2	2	4	4	6	6	8	8
		Crosspoint Modules Required							

Table 1-5. Crosspoint Modules Required for 7500WB 128x128

		Outputs (# of Modules)			
		32 (1)	**64 (2)**	**96 (3)**	**128 (4)**
Inputs (# of Modules)	**32 (1)**	1	1	2	2
	64 (2)	1	1	2	2
	96 (3)	2	2	4	4
	128 (4)	2	2	4	4
		Crosspoint Modules Required			

Section 2

Installation

Frame Installation

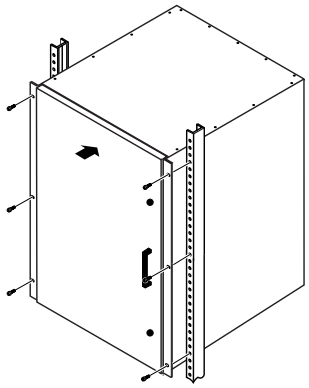


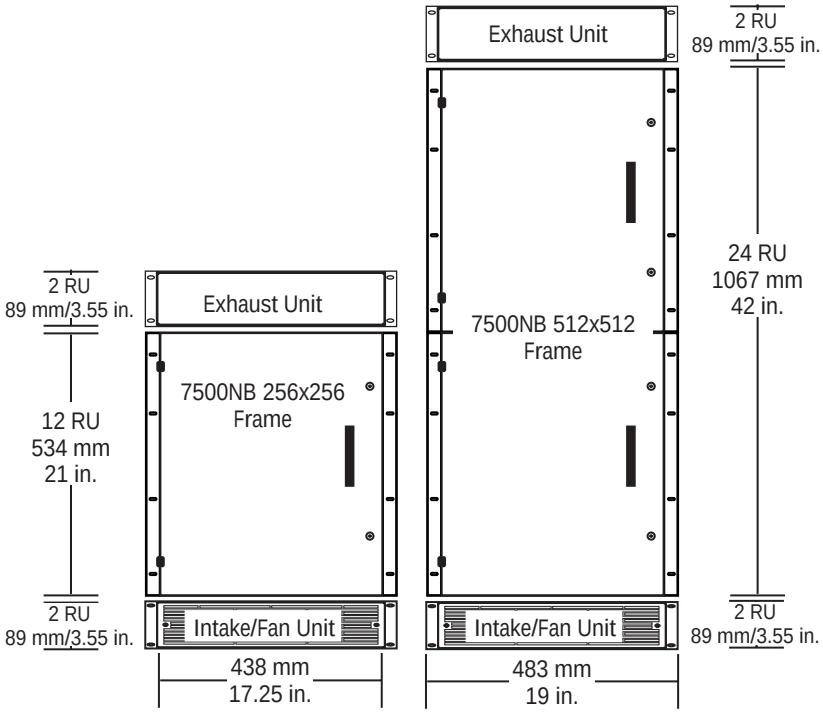
Figure 2-1. Rack Mount

The 7500 Series matrices are installed in a standard 483 mm (19-inch) rack. Rear frame support is not required.

7500 NB Frame Installation

The 7500NB 256x256 occupies 12 rack-units. Cooling is by vertical airflow using an external fan set. The 7500NB 512x512 is two 7500NB 256x256 frames connected by an Expansion module set. The 7500NB 512x512 occupies 24 rack-units. See Figure 2-2.

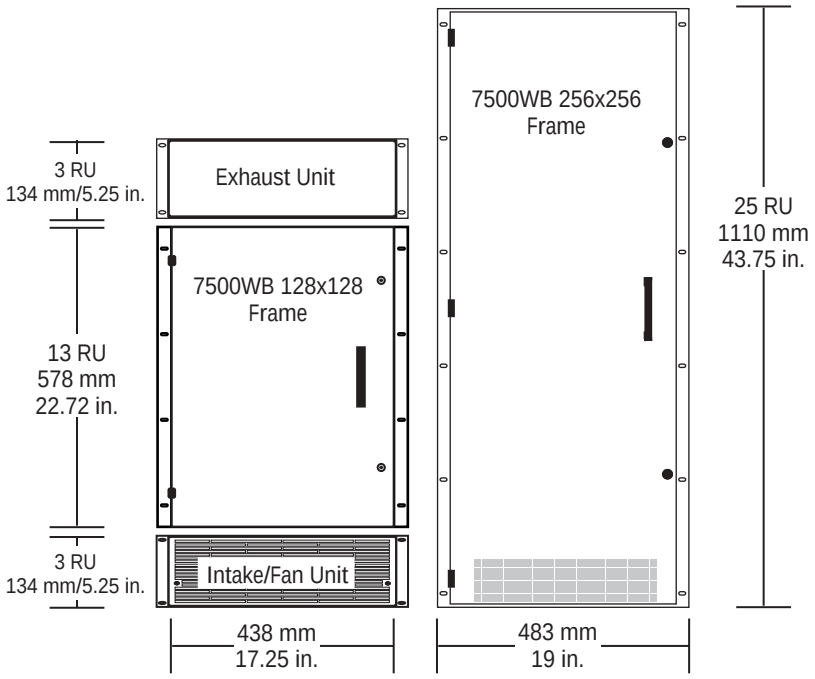
Figure 2-2. NB Rack Installation Front View



7500 WB Frame Installation

The 7500WB 256x256 router occupies 25 rack-units. Cooling is by vertical airflow using a fan mounted inside the top of the frame and an air filter on the front door. The 7500WB 128x128 router occupies 13 rack-units. Cooling is by vertical airflow using an external fan set. See Figure 2-3.

Figure 2-3. WB Rack Installation Front View



Module Installation

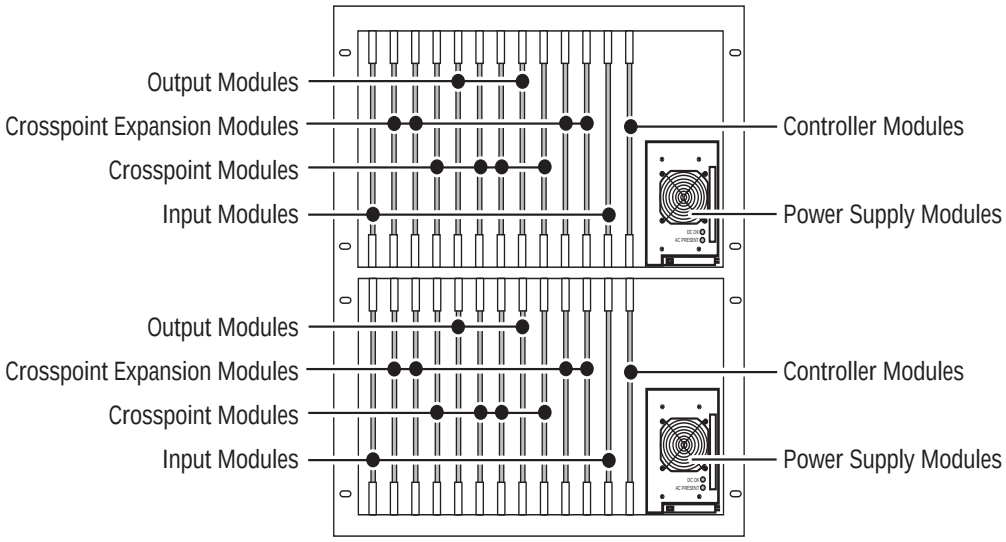
All the modules are vertically oriented in the frames, and edge guides aid insertion and removal.

CAUTION It is critical that the modules be placed in the proper slot and oriented correctly to prevent bent pins.

7500NB Module Placement

7500NB modules are oriented in the frame with the front (populated) side facing to the right. See Figure 2-4.

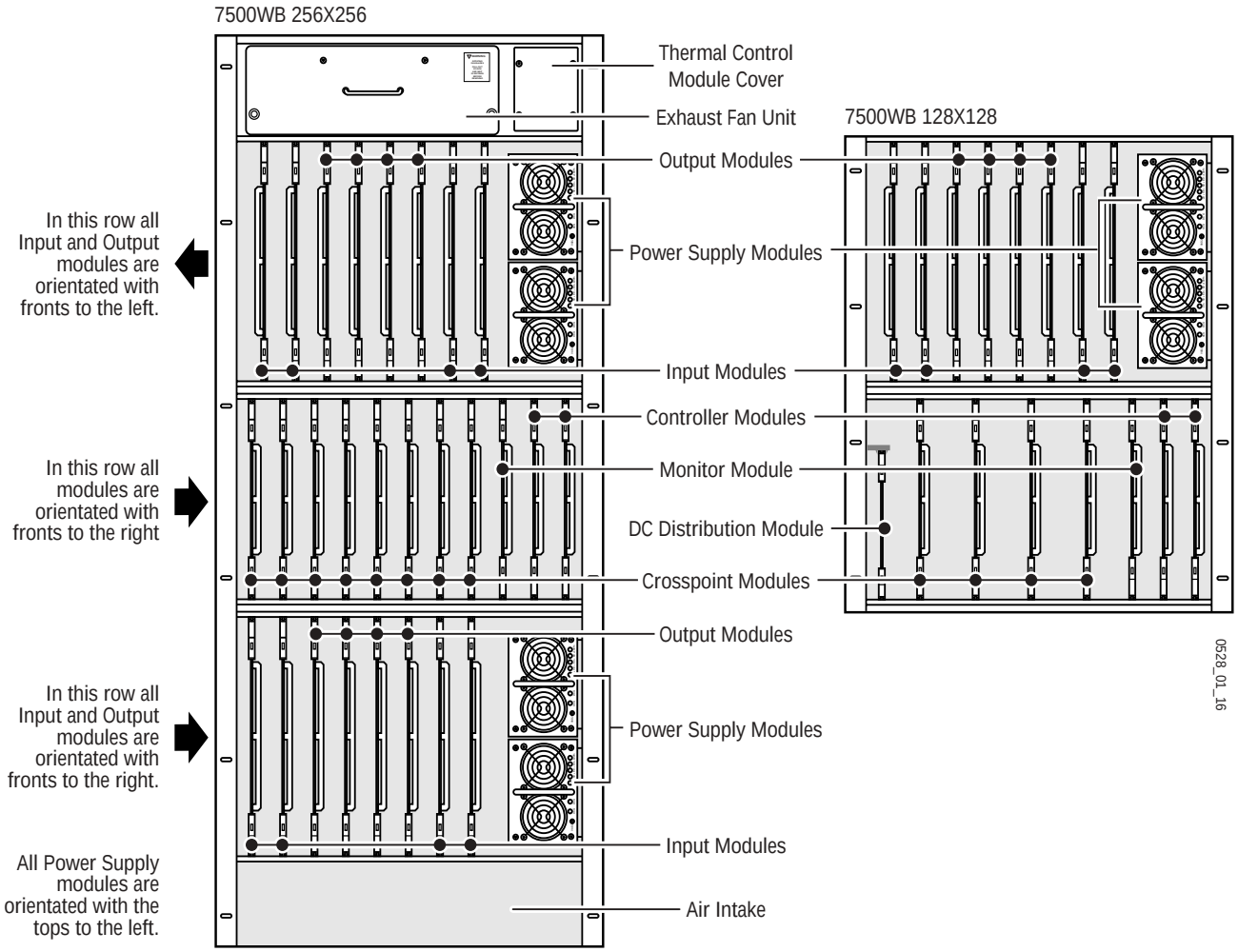
Figure 2-4. 7500NB Module Configuration and Alignment



7500WB Module Placement

In the top row of the 7500WB, Input and Output modules are oriented in the frame with the front (populated) side facing to the left. The other rows of modules are orientated in the frame with the front (populated) side facing to the right. See Figure 2-5.

Figure 2-5. 7500WB Module Configuration and Alignment



Cabling

Table 2-1 contains a compilation of the connectors and label variations found on 7500 matrices. The Gender column indicates the gender of the connector found on the 7500 matrix. The Details column contains information to assist in using the connector.

Table 2-1. Connectors Found on 7500 Matrices

Label	NB	WB	Connector		Details
			Type	Gender	
AES REF 1 and AES REF 2	√	-	BNC	Female	Synchronous audio references use unbalanced 75 Ohm connector, terminator, and coaxial cable. Loop-thru cabling supported.
ALARM	-	√	D-9 Pin	Female	Audio Alarm use serial/machine cable.
CONSOLE 1 and CONSOLE 2	√	√	D-9 Pin	Female	Terminal interface (factory use) use serial/machine cable.
DC PWR	√	-	Terminal Block	Male	Use 12 AWG (3.31 mm^2) wire and a 3-pin terminal block connector to establish a DC power connection.
	-	√	Wire	-	Use 6 AWG (13.30 mm^2) wire to establish a DC power connection.
DIGITAL VIDEO REF MC1(1), MC1(2), MC2(1), and MC2(2)	-	√	BNC	Female	Future use for digital video references use unbalanced 75 Ohm connector, terminator, and coaxial cable. Loop-thru cabling supported.
ETHERNET CONT 1 and ETHERNET CONT 2	√	-	RJ45	Female	Ethernet network communication interface is 10Base-T and 100Base-T compatible use category 5 cable, 8 conductor twisted pair. All Ethernet connections need to be routed through switches.
MC1 ETHERNET CONT 1, MC2 ETHERNET CONT 1, MC1 ETHERNET CONT 2, and MC2 ETHERNET CONT 2	-	√			
EXT-COM2	√	√	D-9 Pin	Female	External Control (factory use) use serial/machine cable.
FAN DC/ALARM	√	√	Terminal Block	Male	DC Fan and/or Audio Alarm use 12 AWG (3.31 mm^2) wire and a 10-pin terminal block connector
GSC	√	√	BNC	Female	Global Serial Channel Interface use unbalanced 75 Ohm connector, terminator, and coaxial cable. Loop-thru cabling supported.
INPUTS	√	√	BNC	Female	Use unbalanced 75 Ohm connector and coaxial cable.
	√	-	D-50 Pin	Female	Use balanced 110 Ohm connector and shielded twisted pair cable.
MC1 EXT-COM1 and MC2 EXT-COM1	√	√	D-9 Pin	Female	External Control (factory use) use serial/machine cable.
MON 1, MON 2, MON 3, MON 4, MON 5, MON 6, MON 7, and MON 8	√	-	BNC	Female	Monitor output use unbalanced 75 Ohm connector and coaxial cable.
MONITOR 1-8	√	-	D-25 Pin	Female	Monitor input use balanced 110 Ohm connector and shielded twisted pair cable
MONITOR IN	-	√	BNC	Female	Monitor input use an unbalanced 75 Ohm connector and coaxial cable.
MONITOR OUT 1, 2, 3, and 4	-	√	BNC	Female	Monitor output use an unbalanced 75 Ohm connector and coaxial cable.
OPTION	√	√	D-25 Pin	Female	Optional Interface use serial/machine cable.
OUTPUTS	√	√	BNC	Female	Use unbalanced 75 Ohm connector and coaxial cable.
	√	-	D-50 Pin	Female	Use balanced 110 Ohm connector and shielded twisted pair cable.
SMTE/LTC	√	√	D-9 Pin	Female	SMPTE Line Time Code use serial/machine cable.
VID REF	√	-	BNC	Female	Video reference use unbalanced 75 Ohm connector, terminator, and coaxial cable. Loop-thru cabling supported.
VIDEO REF 1 and 2	-	√	BNC	Female	Video reference use unbalanced 75 Ohm connector, terminator, and coaxial cable. Loop-thru cabling supported.

7500NB Backplane Cabling

See Figure 2-6 for the 7500NB 256x256 with a BNC backplane and Figure 2-7 for the 7500NB 256x256 with a D-50 pin connector backplane.

Figure 2-6. 7500NB Backplane Cabling with BNC Input and Output Connectors

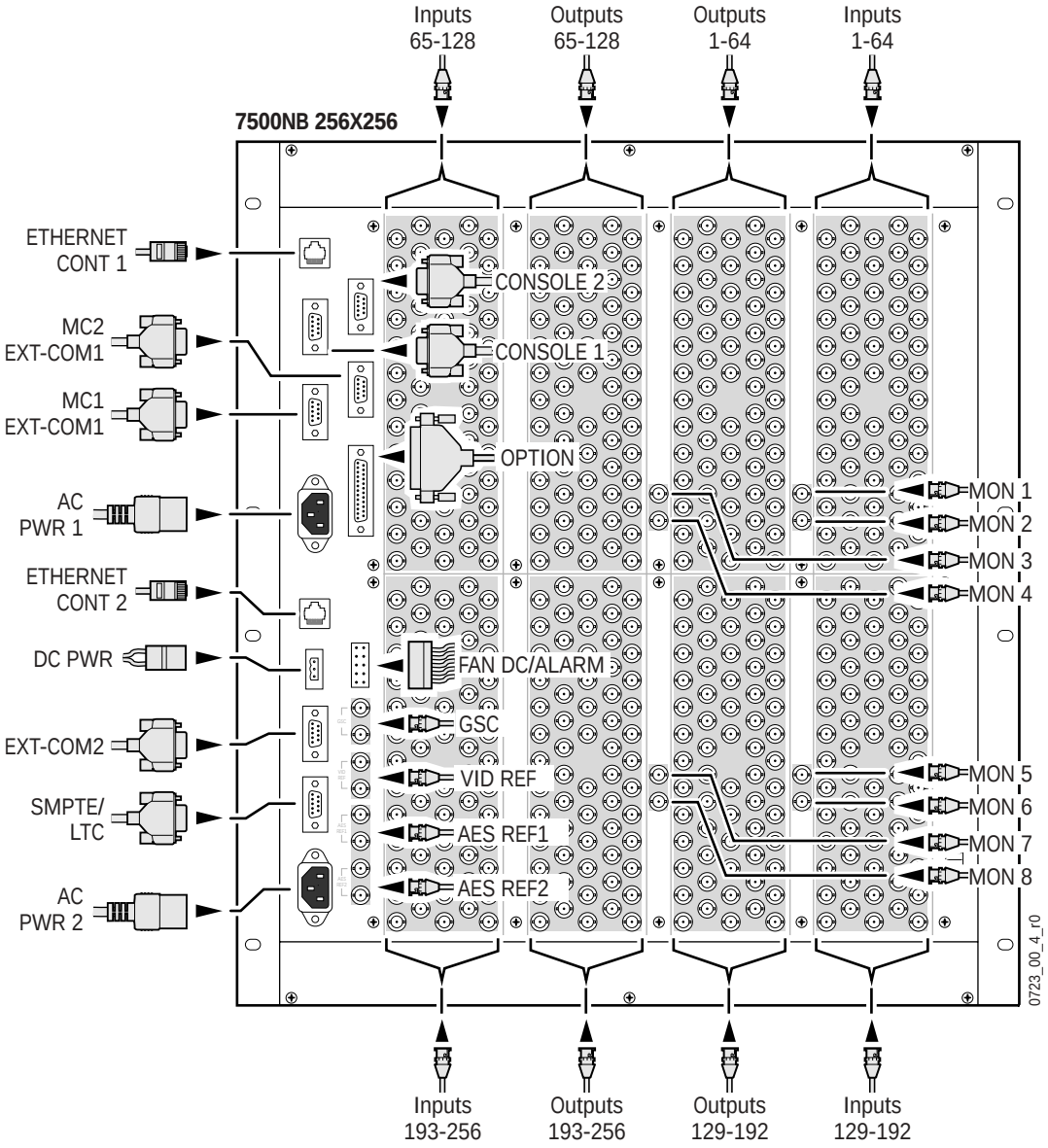


Figure 2-7. 7500NB Backplane Cabling with D-50 Pin Input and Output Connectors

7500NB 256X256
(D-50 pin connector version)

Note:
Refer to Figure 2-6 for other cabling.

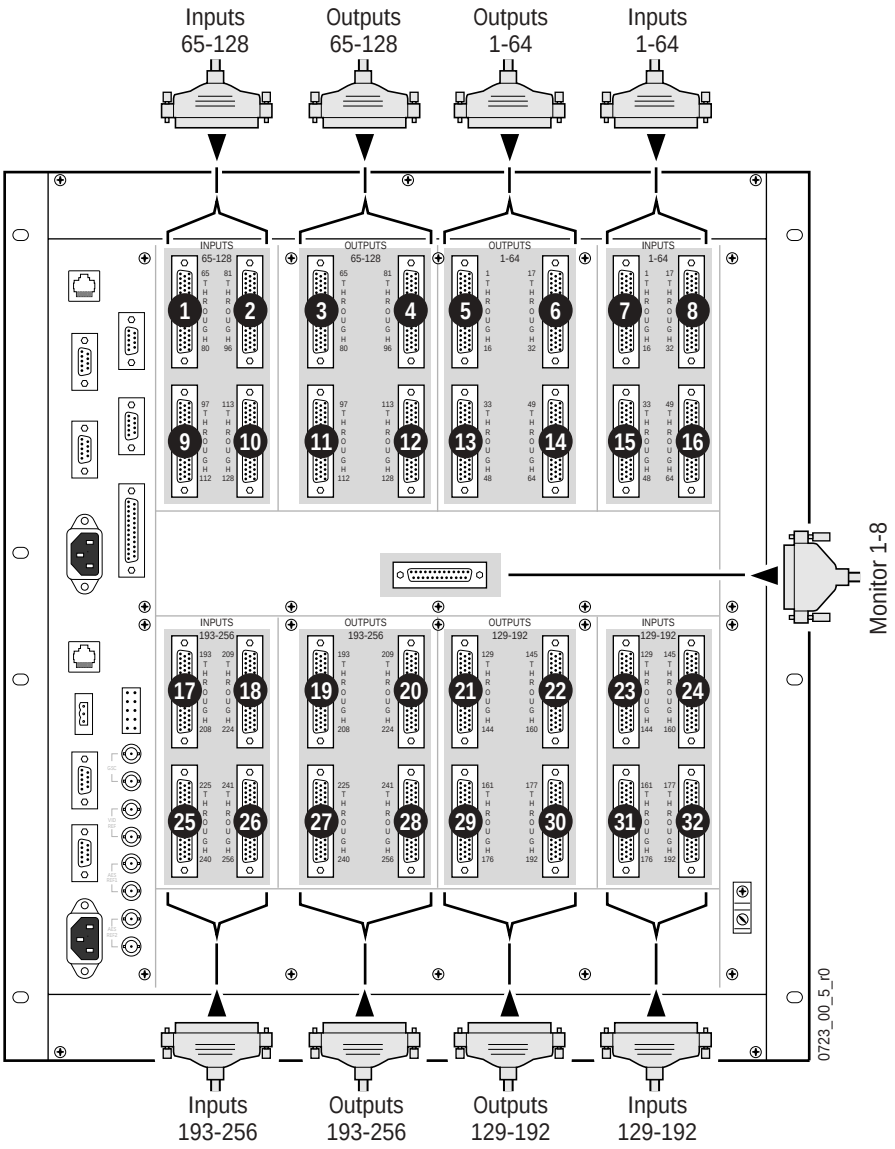


Table 2-2. Input and Output Groups for 7500NB with D-50 Pin Connectors

#	Inputs	#	Inputs	#	Outputs	#	Outputs	#	Outputs	#	Outputs	#	Inputs	#	Inputs
1	65-80	2	81-96	3	65-80	4	81-96	5	1-16	6	17-32	7	1-16	8	17-32
9	97-112	10	113-128	11	97-112	12	113-128	13	33-48	14	49-64	15	33-48	16	49-64
17	193-256	18	209-224	19	193-256	20	209-224	21	129-144	22	145-160	23	129-144	24	45-160
25	225-240	26	241-256	27	225-240	28	241-256	29	161-176	30	177-192	31	161-176	32	I77-192

7500NB Backplane Cabling

Figure 2-8 for the 7500WB 128x128, and Figure 2-9 for the 7500WB 256x256.

Figure 2-8. 7500WB 128x128 Backplane Cabling

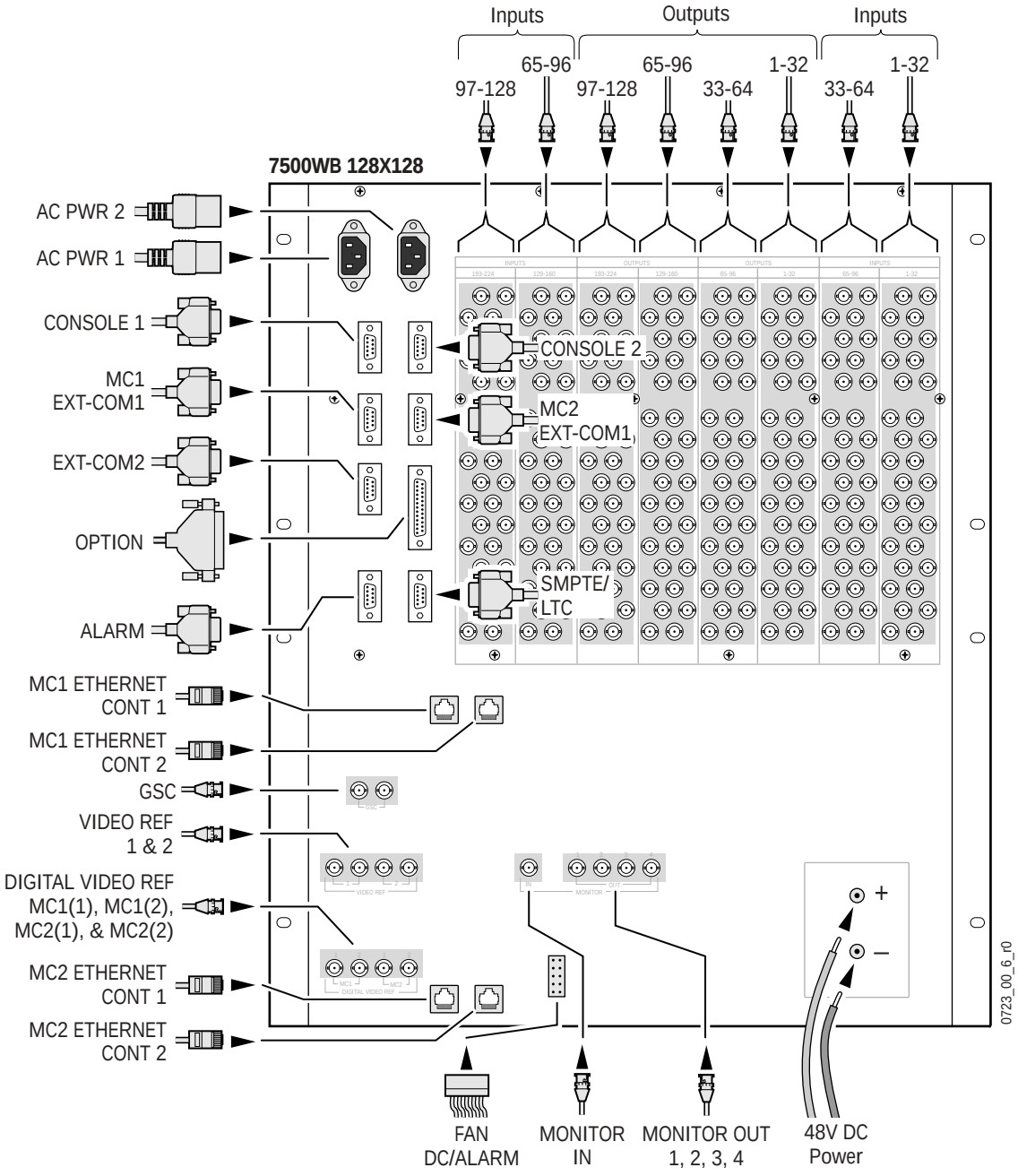
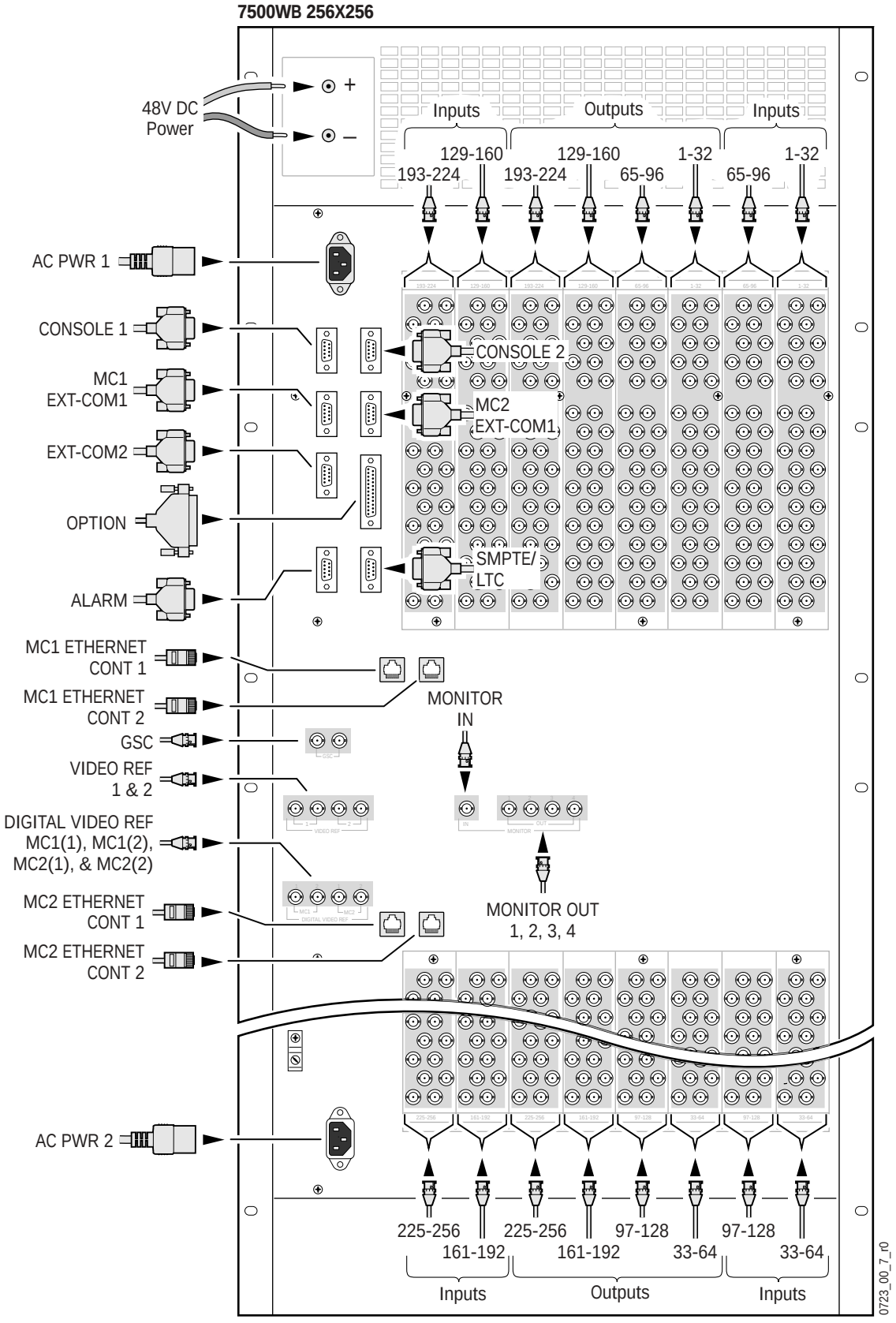


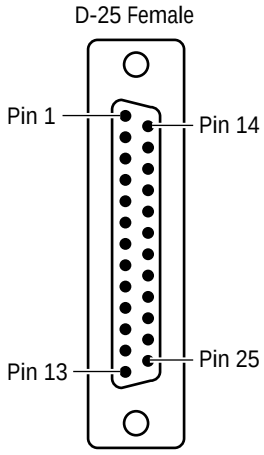
Figure 2-9. 7500WB 256x256 Backplane Cabling

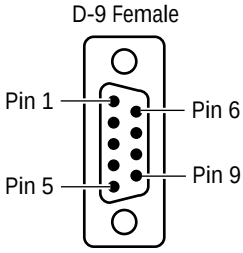


Pinouts

Table 2-3 contains pinout information for use with the 7500 matrices.

Table 2-3. Pinouts

OPTION	Pin	Function	Pin	Function
	1	OPT_1	14	OPT_14
	2	OPT_2	15	OPT_15
	3	OPT_3	16	OPT_16
	4	OPT_4	17	OPT_17
	5	OPT_5	18	OPT_18
	6	OPT_6	19	OPT_19
	7	OPT_7	20	OPT_20
	8	OPT_8	21	OPT_21
	9	OPT_9	22	OPT_22
	10	OPT_10	23	OPT_23
	11	OPT_11	24	OPT_24
	12	OPT_12	25	OPT_25
	13	OPT_13	-	-

SMPTE/LTC	Pin	Function	Pin	Function
	1	GND	6	NC
	2	LTC INPUT -	7	NC
	3	LTC INPUT +	8	NC
	4	NC	9	NC
	5	NC	-	-
	-	-	-	-
	-	-	-	-

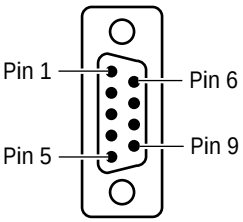
CONSOLE 1 and CONSOLE 2	Pin	Function	Pin	Function
	1	GND	6	NC
	2	RS-232_TX	7	NC
	3	RS-232_RX	8	NC
	4	NC	9	NC
	5	NC	-	-
	-	-	-	-
	-	-	-	-

Table 2-3. Pinouts - (continued)

MC1 EXT-COM1 and MC2 EXT-COM1	Pin	Function	Pin	Function
D-9 Female Pin 1 — Pin 6 Pin 5 — Pin 9	1	GND	6	TX_COM
	2	TX -	7	TX +
	3	RX +	8	RX -
	4	RX_COM	9	GND
	5	NC	-	-
	-	-	-	-
	-	-	-	-

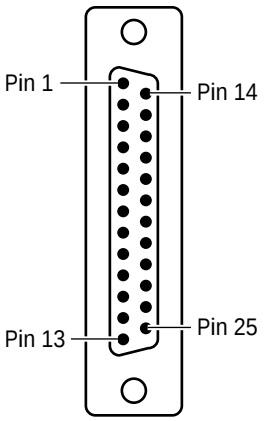
EXT-COM2	Pin	Function	Pin	Function
D-9 Female Pin 1 — Pin 6 Pin 5 — Pin 9	1	GND	6	MC1 & MC2_TX_COM
	2	MC1 & MC2_TX -	7	MC1 & MC2_TX +
	3	MC1 & MC2_RX +	8	MC1 & MC2_RX -
	4	MC1 & MC2_RX _COM	9	GND
	5	NC	-	-
	-	-	-	-
	-	-	-	-

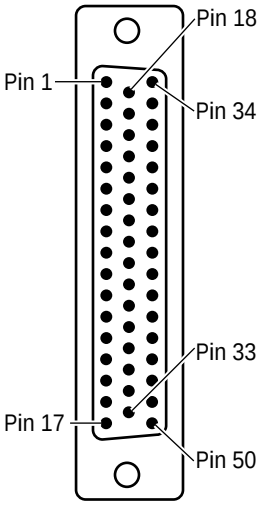
ALARM (7500WB)	Pin	Function	Pin	Function
D-9 Female Pin 1 — Pin 6 Pin 5 — Pin 9	1	GND	6	MC2_RLY_COM
	2	MC2_RLY_NO	7	NC
	3	NC	8	NC
	4	MC1_RLY_COM	9	MC1_RLY_NO
	5	GND	-	-
	-	-	-	-
	-	-	-	-

FAN DC/ALARM (7500NB 256x256)	Pin	Function	Pin	Function
Pin 6 — Pin 1 Pin 10 — Pin 5	6	FAN2_ALARM	1	MC1_RLY_NO
	7	FAN3_ALARM	2	MC1_RLY_NO_COM
	8	FAN4_ALARM	3	MC2_RLY_NO
	9	24 VDC	4	MC2_RLY_NO_COM
	10	GND	5	FAN1_ALARM

FAN DC/ALARM (7500WB 128x128	Pin	Function	Pin	Function
Pin 6 — Pin 1 Pin 10 — Pin 5	6	FAN2_ALARM	1	NC
	7	FAN3_ALARM	2	NC
	8	FAN4_ALARM	3	NC
	9	24 VDC	4	NC
	10	GND	5	FAN1_ALARM

Table 2-3. Pinouts - (continued)

MONITOR 1-8 (7500NB)	Pin	Function	Pin	Function
D-25 Female  Use 110 Ohm Shielded Twisted Pair Cable	1	Monitor 1+	14	Monitor 1-
	2	Ground	15	Monitor 2+
	3	Monitor 2-	16	Ground
	4	Monitor 3+	17	Monitor 3-
	5	Ground	18	Monitor 4+
	6	Monitor 4-	19	Ground
	7	Monitor 5+	20	Monitor 5-
	8	Ground	21	Monitor 6+
	9	Monitor 6-	22	Ground
	10	Monitor 7+	23	Monitor 7-
	11	Ground	24	Monitor 8+
	12	Monitor 8-	25	Ground
	13	Ground	-	-

Input/Output D Connector (7500NB)	Pin	Function	Pin	Function	Pin	Function
D-50 Female  Use 110 Ohm Shielded Twisted Pair Cable	1	Ground	18	1-	34	1+
	2	2+	19	2-	35	Ground
	3	Ground	20	3-	36	3+
	4	4+	21	4-	37	Ground
	5	Ground	22	5-	38	5+
	6	6+	23	6-	39	Ground
	7	Ground	24	7-	40	7+
	8	8+	25	8-	41	Ground
	9	Ground	26	9-	42	9+
	10	10+	27	10-	43	Ground
	11	Ground	28	11-	44	11+
	12	12+	29	12-	45	Ground
	13	Ground	30	13-	46	13+
	14	14+	31	14-	47	Ground
	15	Ground	32	15-	48	15+
	16	16+	33	16-	49	
	17	Not used	-	-	50	Not used

Communications

Communications between matrices and control systems use either Ethernet or Global Serial Channel (GSC) interfaces. The Encore Control System requires an Ethernet connection and Series 7000 requires a GSC connection. Communications between matrices in expanded systems requires Ethernet.

7500NB Ethernet

Ethernet is required for communication among the Encore Control Frame and 7500NB matrices. Ethernet is also required to communicate among matrices in 7500NB systems larger than 256x256.

Ethernet communications can be established between the Encore Control Frame and a 7500NB matrix using either **ETHERNET CONT 1** or **ETHERNET CONT 2**. One connection can be used as a primary connection and the other can be used as a redundant connection. See Figure 2-10

The multicast signals from the 7500NB matrices are routed through a managed Ethernet switch. Using the software and instructions that come with the managed Ethernet switch, Virtual Local Area Networks (VLANs) can be created to manage the communication between matrices, the Encore Control Frame, and other equipment connected to the switch. The managed switch must support IP multicast with Internet Group Management Protocol (IGMP).

Figure 2-10. NB and Encore Ethernet Connectors

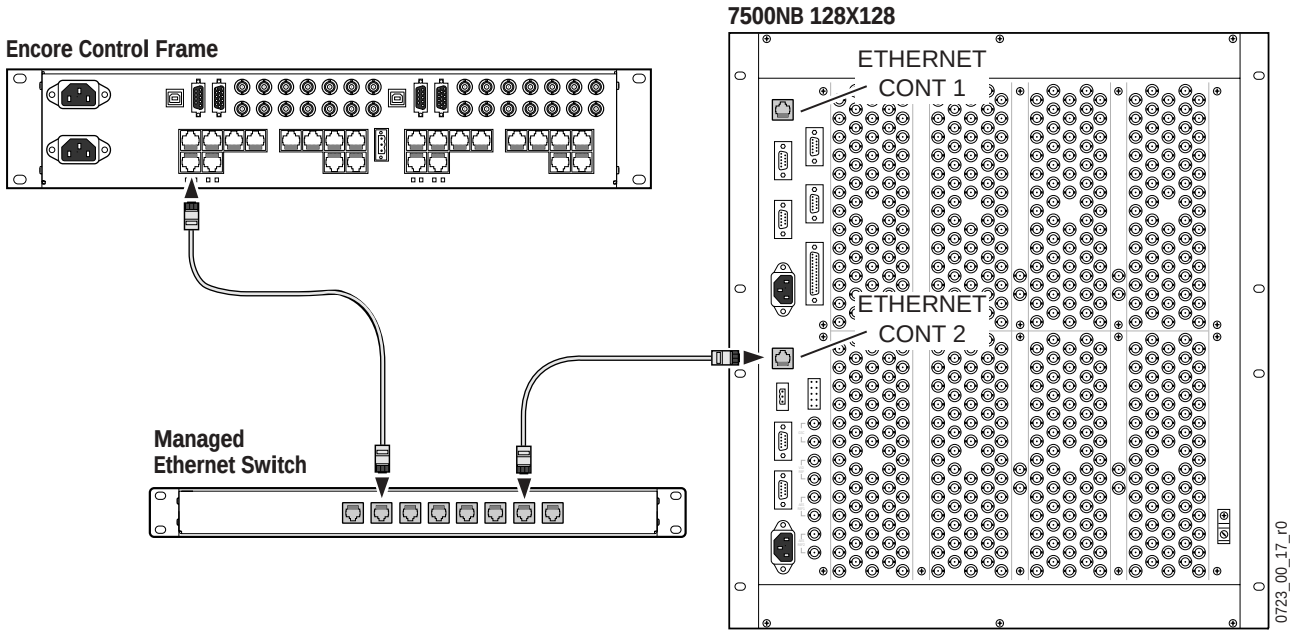


Figure 2-11 shows the Ethernet requirements for a 7500NB 512x512 that is controlled by a Series 7000 Control System. Dedicated Ethernet Switches are used to communicate between the matrices. One Ethernet Switch is required for each set of up to four matrices. The switches do not have to be in the same rack as the matrices and the standard cable length restrictions of 100 m (328 ft) apply.

Figure 2-11. Ethernet Communication Connections in Expanded NB Systems

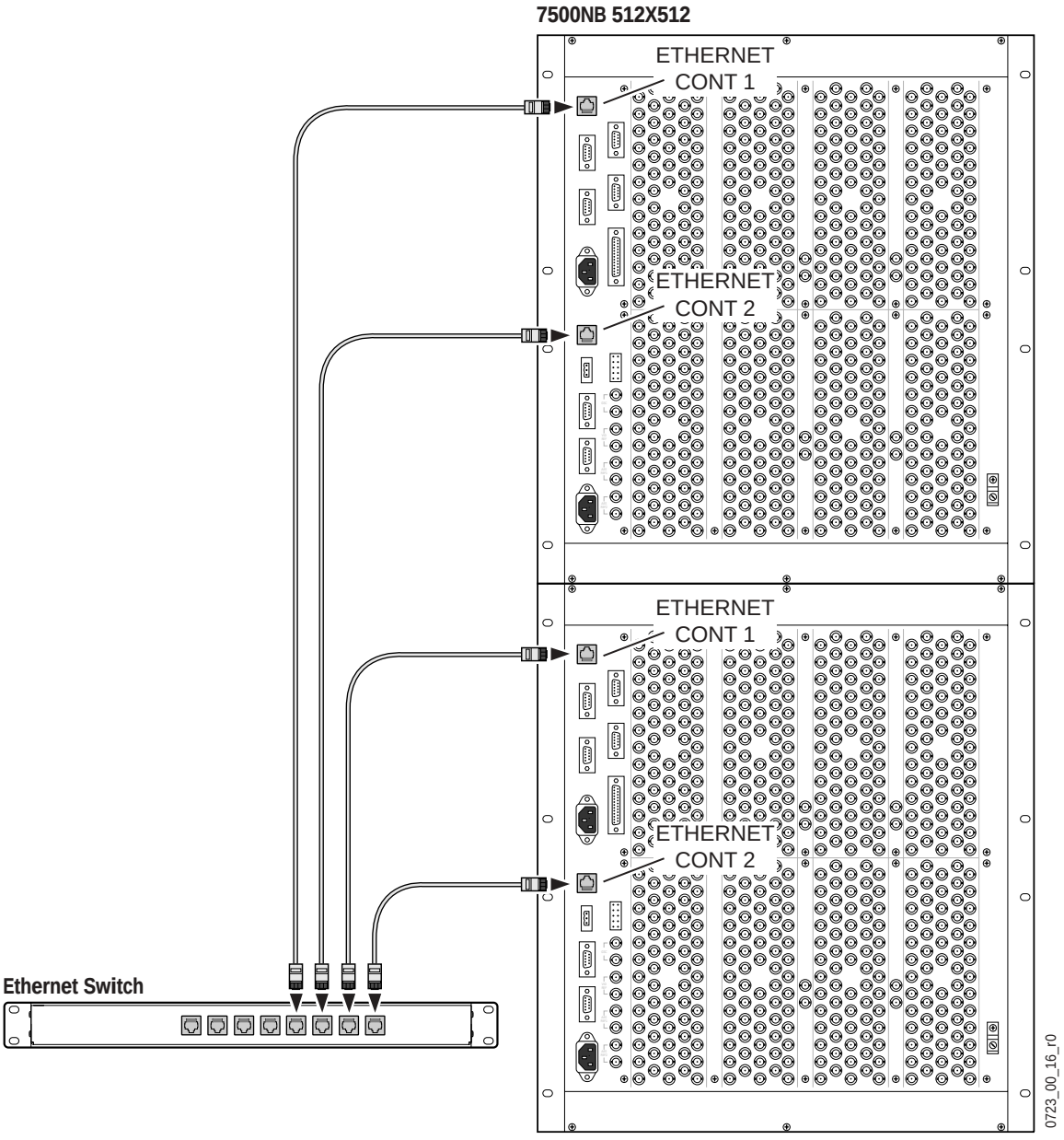
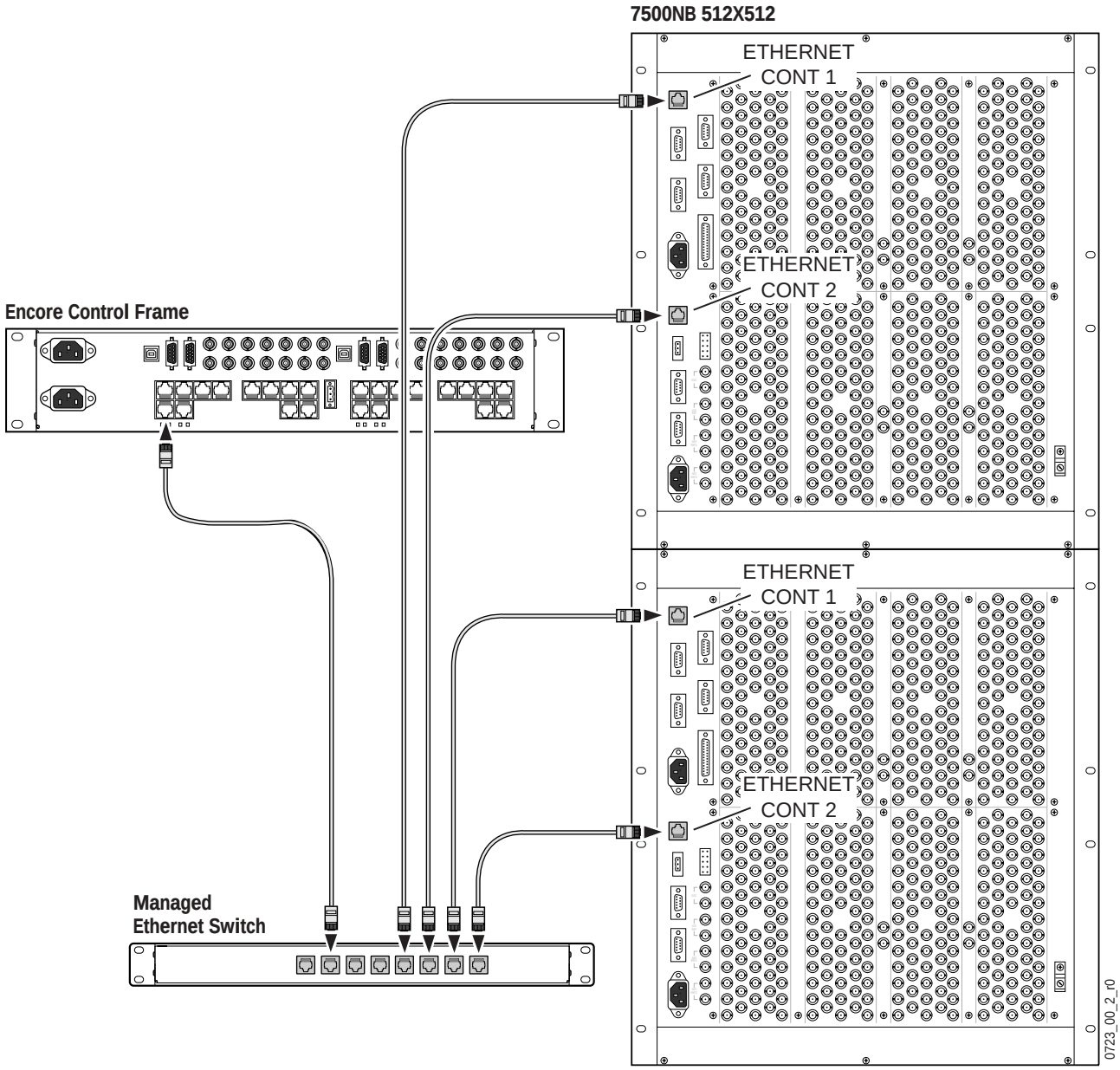


Figure 2-12 shows all the Ethernet connections for using a 7500NB 512x512 with an Encore Control System.

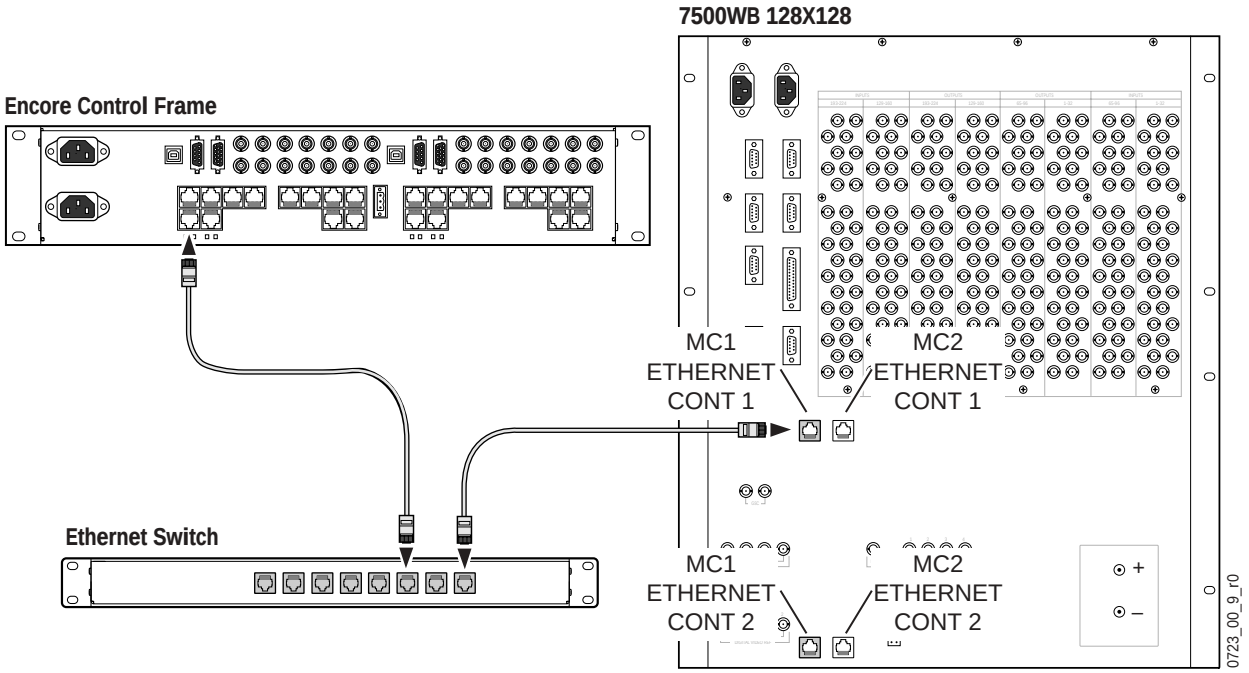
Figure 2-12. Ethernet Communication Connections Between Expanded 7500NB and Encore



7500WB Ethernet

Ethernet communications can be established between the Encore Control Frame and a 7500WB matrix using either **MC1 ETHERNET CONT 1** or **MC1 ETHERNET CONT 2**. One connection can be used as a primary connection and the other can be used as a redundant connection. **MC2 ETHERNET CONT 1** and **MC2 ETHERNET CONT 2** are reserved for future use.

Figure 2-13. WB and Encore Ethernet Connectors

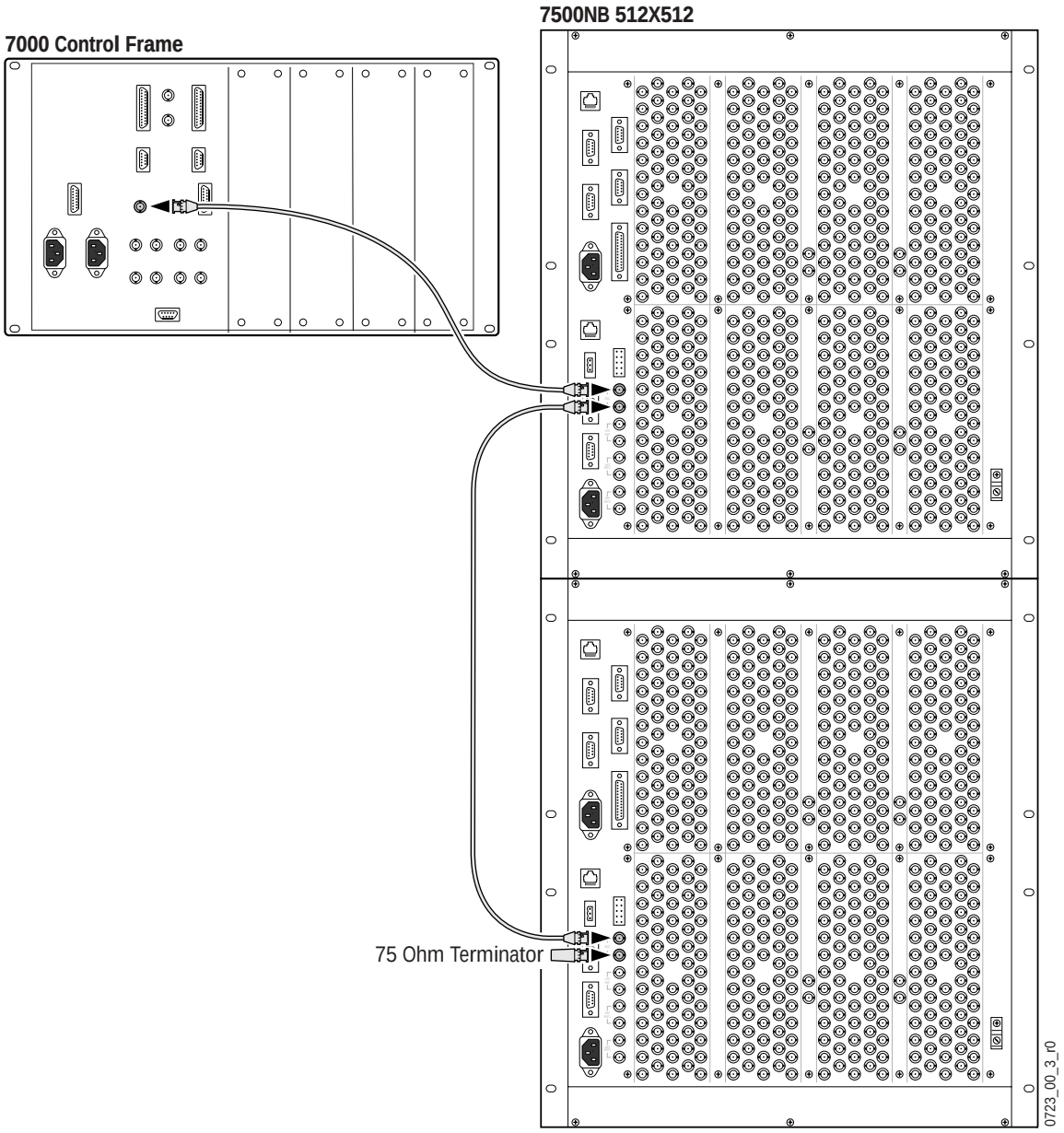


Global Serial Channel

The Global Serial Channel (node bus) must be daisy chained from the control frame, between matrices, and terminated at the end of the bus as shown in Figure 2-14.

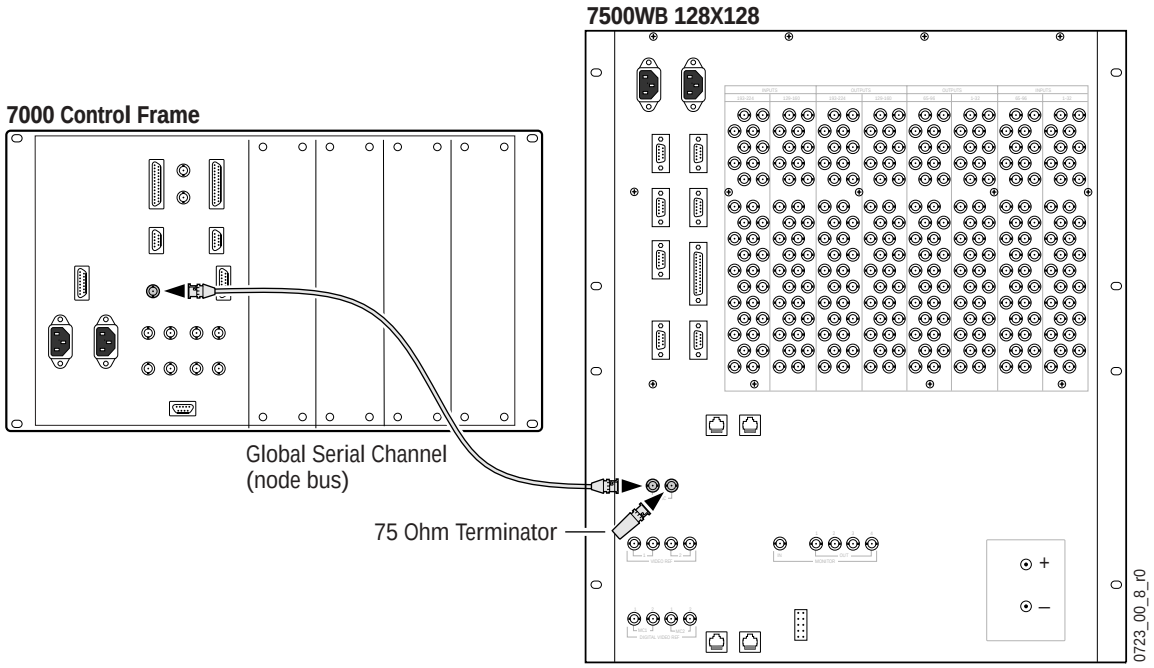
Note 7500NB systems 512x512 and larger require Ethernet cabling to communicate between matrices. See *7500NB Ethernet* on page 2-13 for Ethernet requirements.

Figure 2-14. NB Global Serial Channel Connectors



The 7500WB Global Serial Channel connection has the same requirements as the 7500NB. See Figure 2-15.

Figure 2-15. WB Global Serial Channel Connectors



References

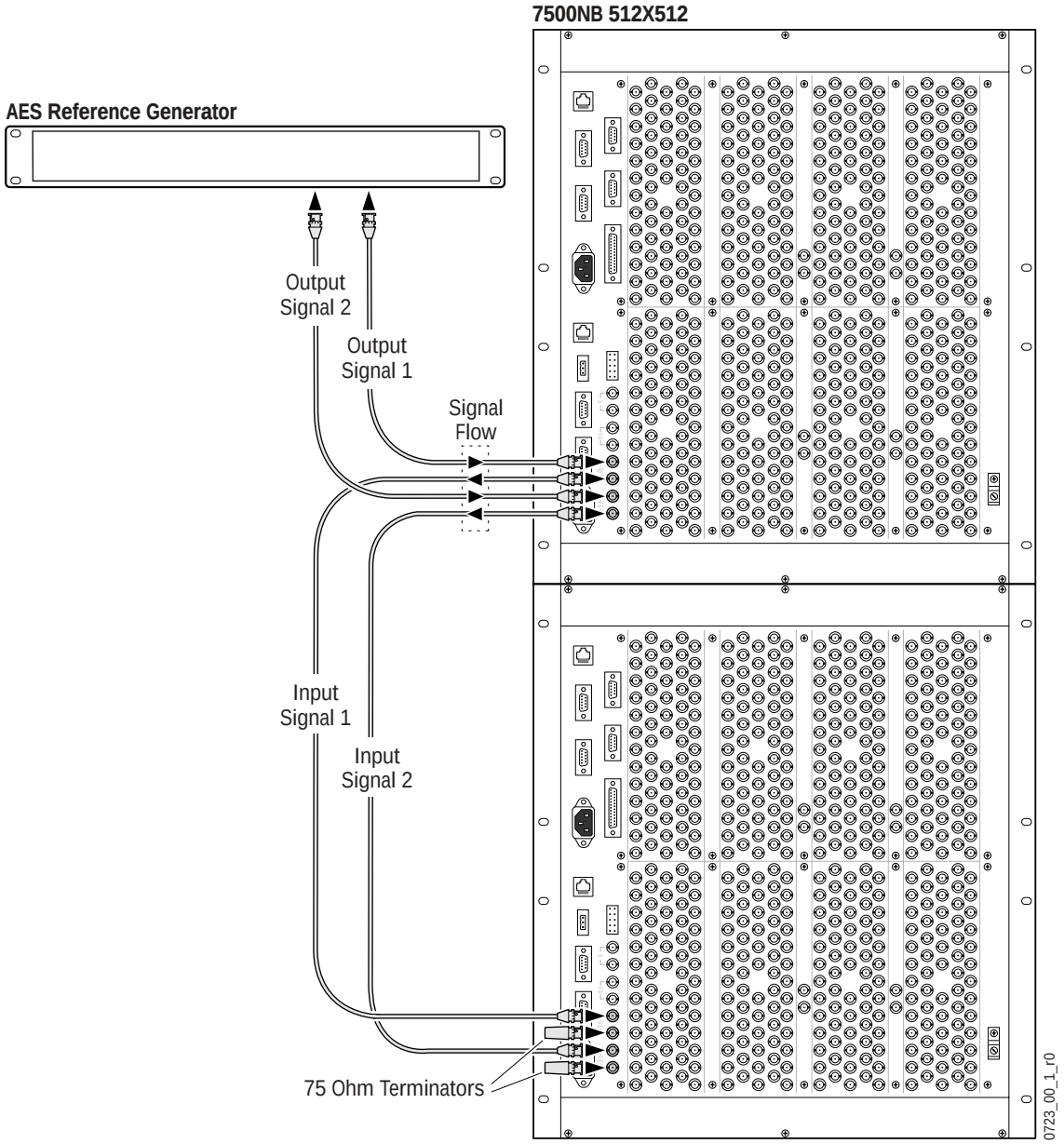
7500NB AES Reference

7500NB systems have dual AES reference inputs. Two AES sync reference loop-thru inputs provide a 48 kHz AES formatted signal upon which the router bases its re-synchronization to frame and block boundaries. This signal is assumed to be present for the router to be called synchronous. Two inputs are provided for redundancy. In the event of loss of one AES reference the router will default to the second reference if one is present, otherwise, it will default to asynchronous operation.

In systems with mixed module types (async and sync input and output modules) the reference signal is required for the synchronous modules to function properly. In systems that contain only asynchronous input and output modules the reference signal is not required.

Figure 2-16 shows the flow of the AES reference signal. All signals have to be terminated at the end of the flow. Cables must be as short as possible and each cable pair must be the same length. Input Signal 1 and Input Signal 2 is one cable pair. Output Signal 1 and Output Signal 2 is another cable pair.

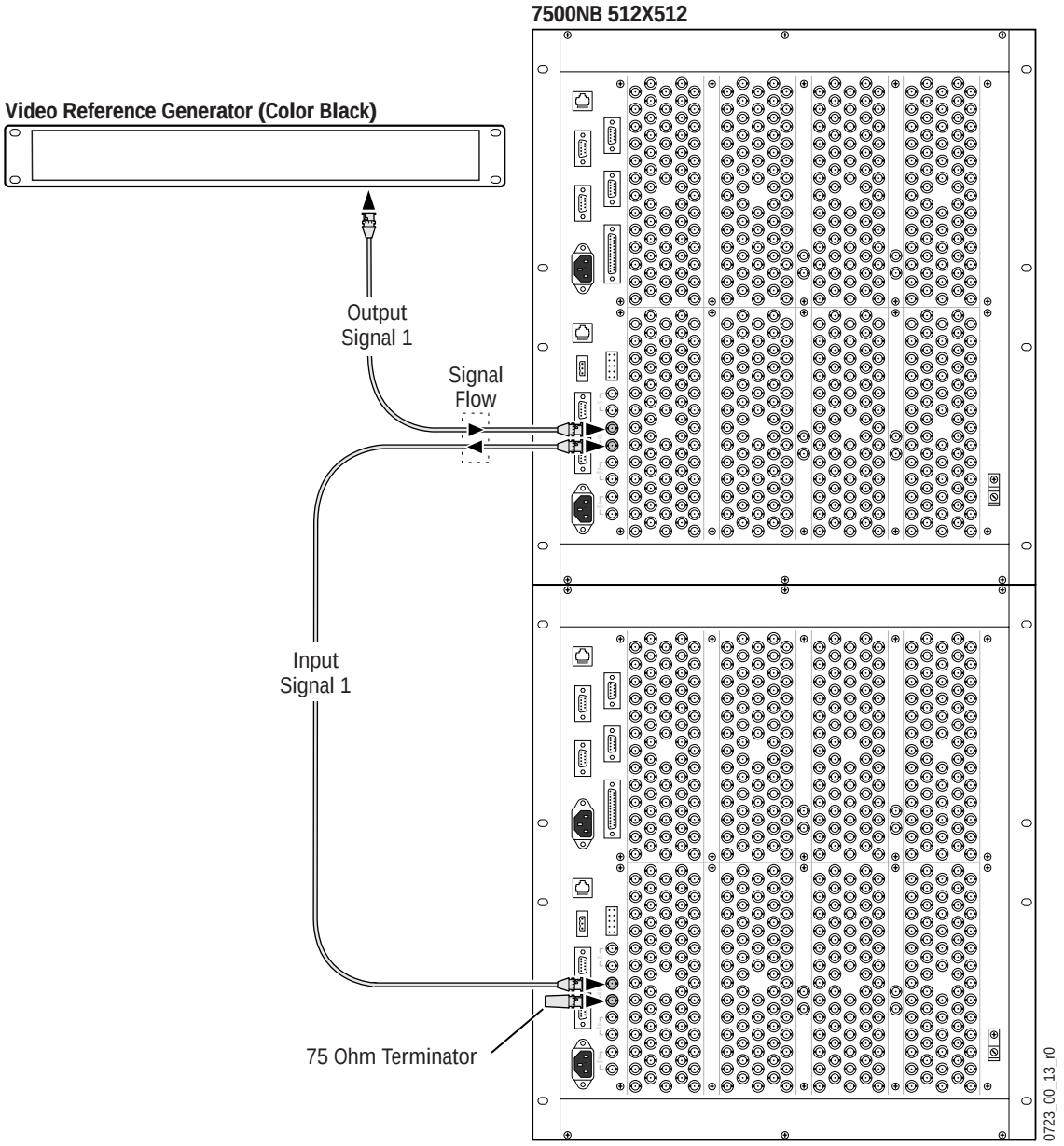
Figure 2-16. NB AES Reference Connectors



7500NB Video Reference

The 7500NB requires a Video Reference. Any Composite Analog Video Sync signal will work. Color Black is recommended. See Figure 2-17.

Figure 2-17. NB Video Reference Connectors

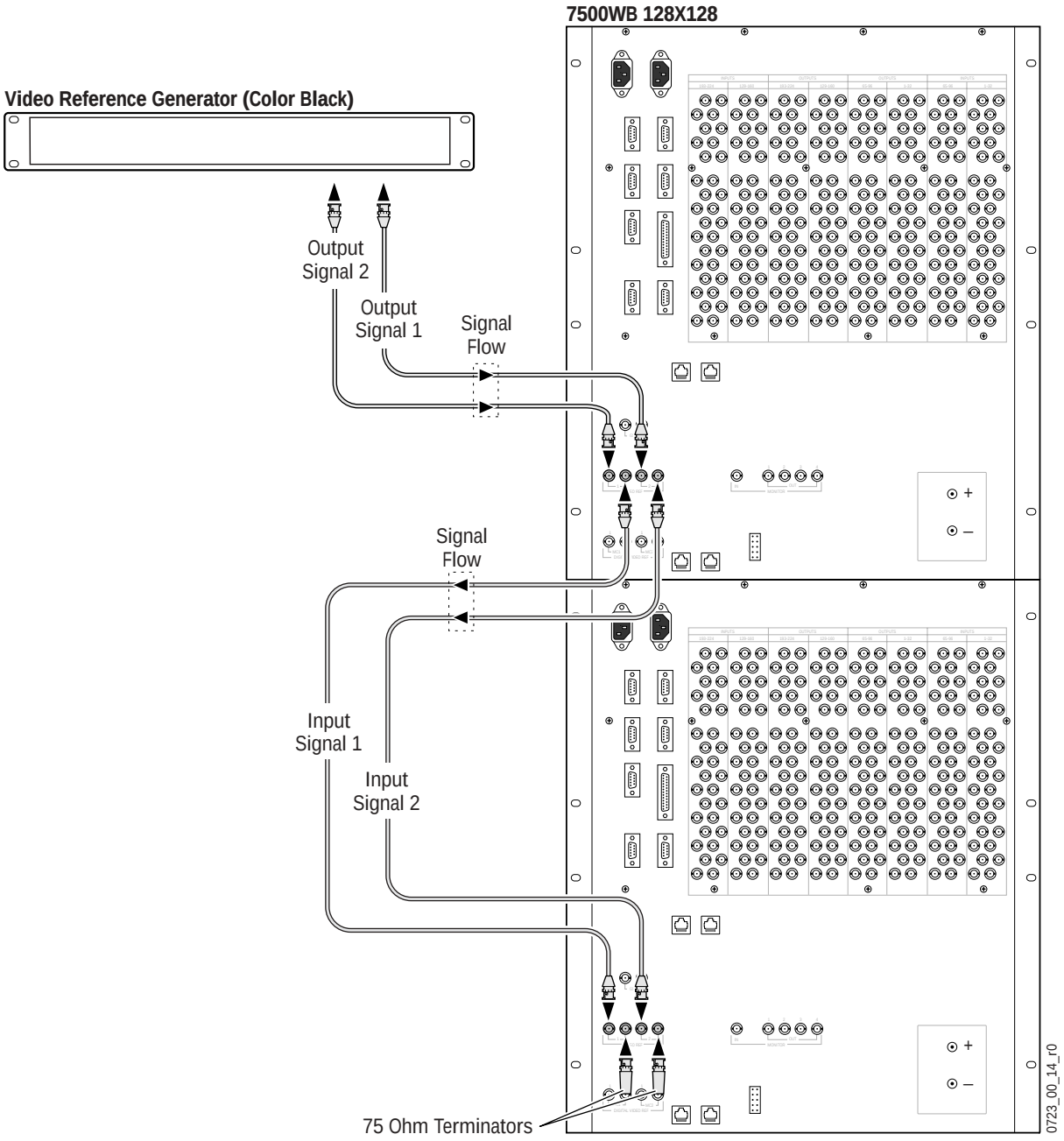


7500WB Video Reference

The 7500WB Video Reference is used to determine the router switch point. Two sets of video references allow the router to switch on two different vertical rates. Any Composite Analog Video Sync signal will work. Color Black is recommended. See Figure 2-18.

The 7500 WB Digital Video References are not currently used.

Figure 2-18. WB Video Reference Connectors



Power

Frames may be powered using either an AC power source, or a 48V DC power source. It is also possible to cable a matrix using an AC power source and a 48V DC power source at the same time. If a matrix has both AC and DC power sources available it will use whichever power source can meet its power level demand. So if the AC power source fails then the DC power source would feed the matrix, and if the DC power starts to fall the AC power would feed the matrix. AC and DC power sources are kept separate with no feedback, so the AC power source will not charge batteries used in a connected DC power source.

AC Connections

The 7500NB 256x256 and the 7500WB 128x128 come with one power supply. The 7500WB 256x256 comes with two power supplies. Redundancy is provided by adding additional power supplies.

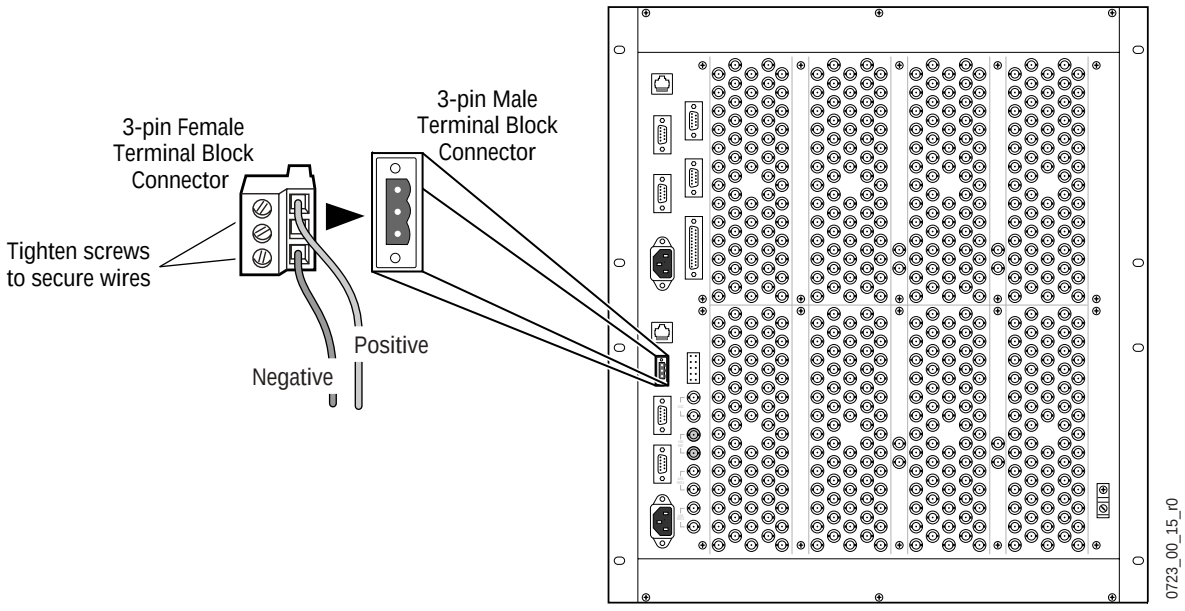
48V DC Connections

WARNING Do not apply a 48V DC power source until all 48V DC connections on the 7500 matrices are complete and secure.

7500NB 48V DC

The 7500NB 48V DC connection requires 12 AWG (3.31 mm^2) wire and a 3-pin female terminal block connector. See Figure 2-19.

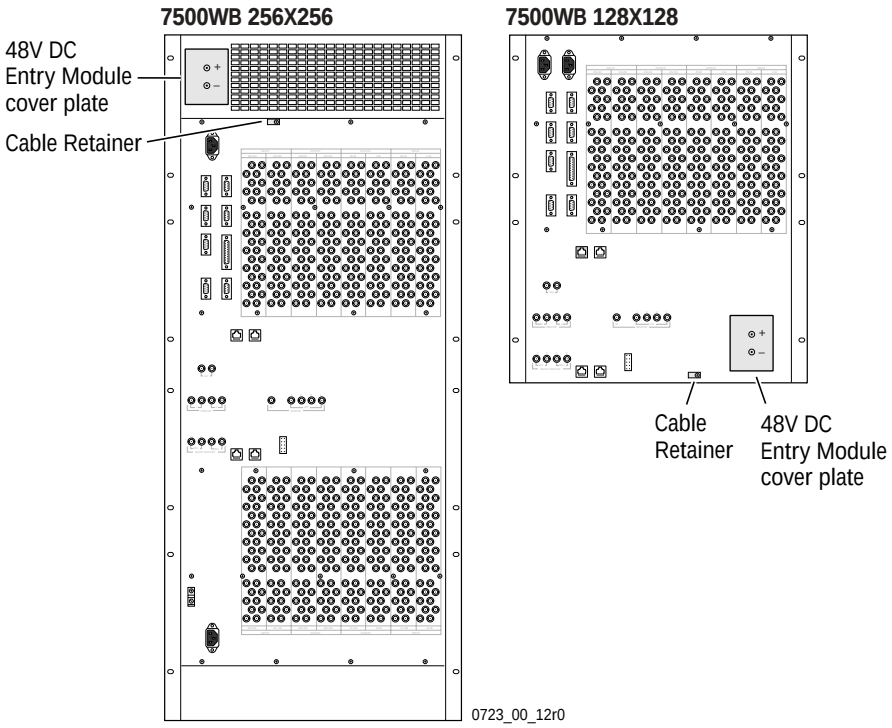
Figure 2-19. NB 48V DC Connection



7500WB 48V DC

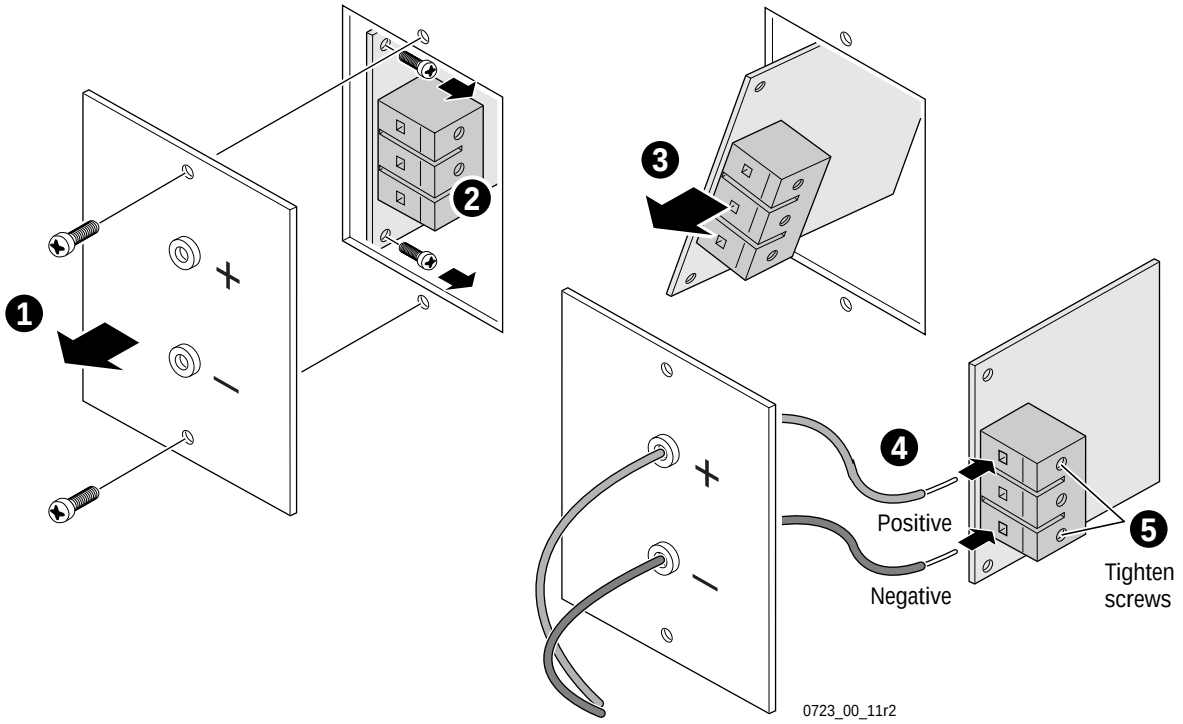
Refer to Figure 2-20, Figure 2-21, and Figure 2-22 when performing the following procedure.

Figure 2-20. WB 48V DC Cover Plate and Retainer Locations



1. Remove cover screws. Set cover aside.
2. Remove screws from 48V DC Entry module.
3. Remove 48V DC Entry module.
4. Thread a 6 AWG (13.30 mm^2) positive connector wire through the top hole on the cover.
5. Secure wire to 48V DC Entry module by inserting the wire in the top slot and tightening the retention screw.

Figure 2-21. WB 48V DC Connector



6. Thread a 6 AWG (13.30 mm^2) negative connector wire through the bottom hole on the cover.

7. Secure wire to 48V DC Entry module by inserting the wire in the bottom slot and tightening the retention screw. The middle slot is not used.

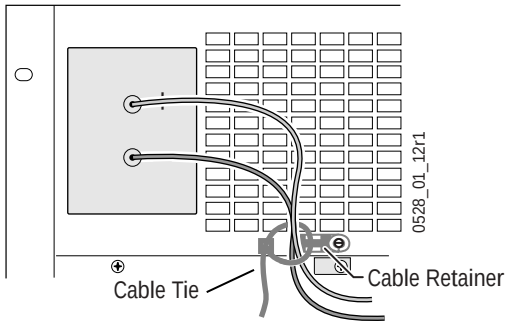
8. Reseat the 48V DC Entry module in the matrix.

9. Secure the 48V DC Entry module with screws.

10. Replace the cover and secure with screws.

11. Restrain wires using a cable tie looped through the retainer on the back of the frame.

Figure 2-22. WB 48V DC Cable Retainer and Tie



Section 3

Configuration

Matrix configuration procedures are dependent upon how the matrix fits within its resident system and how that system is controlled. If you are using a Series 7000 Control System you will generally need to follow the instructions for matrix configuration found in the Series 7000 *Configuration Manual*. In some cases, however, you must use 7500-specific settings. This section highlights those distinctions.

7500NB Configuration

The 7500NB matrices can be controlled by the Series 7000 Control System.

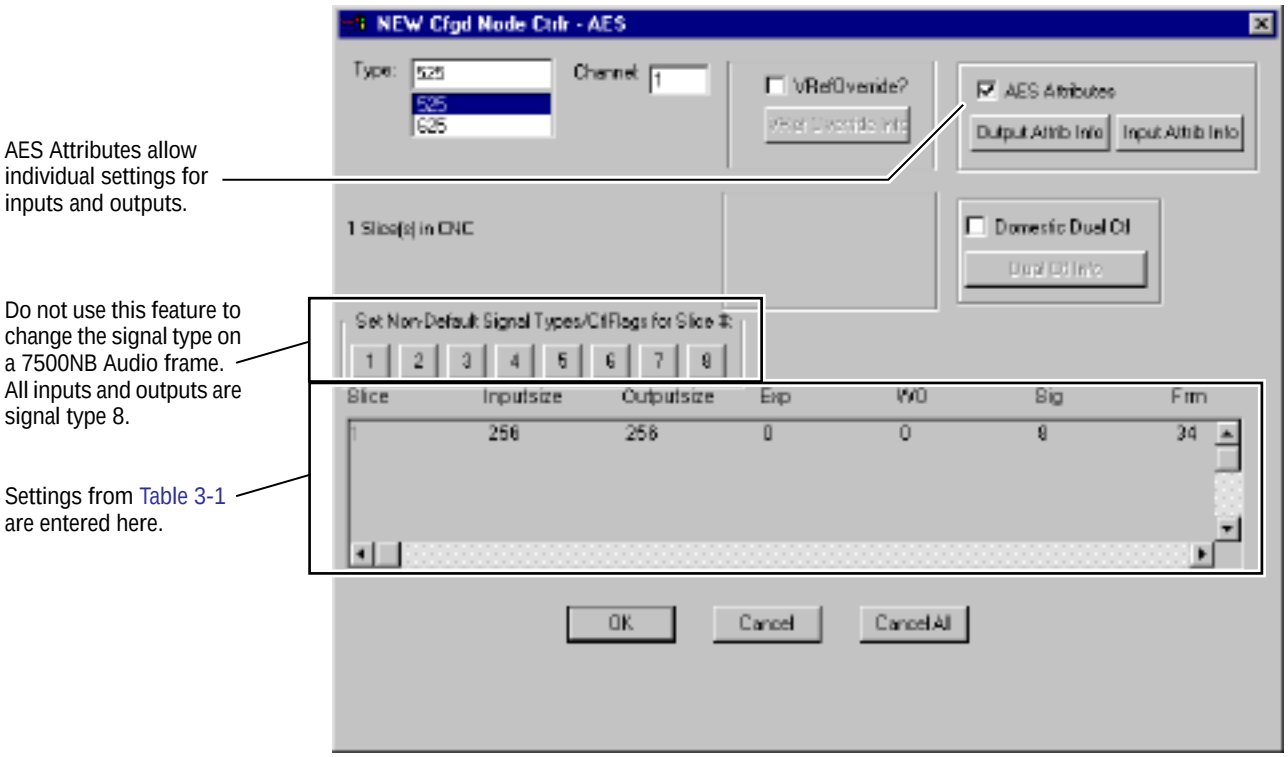
Series 7000 Control of 7500NB

The Matrix Controller in the 7500NB matrix communicates with the MCPU in the Series 7000 Control System. The configuration of the Matrix Controller is handled by the Series 7000 Configuration Editor GUI. The 7500NB-specific settings for the Matrix Controller are applied during the Configured Node Controller (CNC) and Physical Matrix procedures. A separate Configured Node Controller record is required for each 7500NB matrix in the system. In a single system, that has multiple 7500NB matrices, all of the CNCs for the 7500NB matrices must be combined into a single Physical Matrix. For example, a system that contains a 7500 NB 256x256 (1 matrix frame) would be configured with 1 CNC and 1 Physical Matrix. A system that contains a 7500 NB 1024x1024 (8 matrix frames) would be configured with 8 CNCs and 1 Physical Matrix.

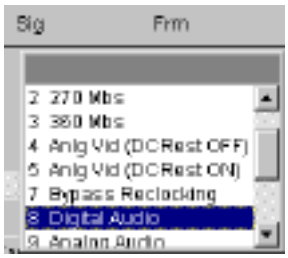
New AES Configured Node Controller Settings

Note 7500 Narrow Band matrices must have separate configured Node Controller (CNC) templates for each set of 256 Outputs. Do not configure a single CNC with multiple slices.

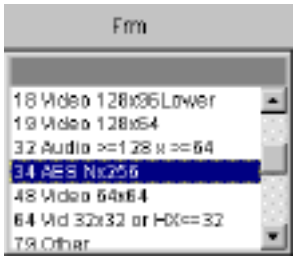
Figure 3-1. Cfgd Node Ctrlr Window With AES Settings



Sig = Signal type. All 7500NB matrices use selection 8, Digital Audio.



Frm = Frame type. All 7500NB matrices use selection 34, AES Nx256.



In the multi-column window, click the gray area immediately beneath a column heading and enter settings as indicated in Table 3-1.

Table 3-1. 7500 Narrow Band Series Matrix Settings

Matrix Size	CNC	Multiple Column Headings						
		Slice	Inputs	OutSize	Exp[a]	WO[a]	Sig	Frm
256x256	MC1	1	256	256	0	0	8	34
512x512	MC1	1	512	256	0	0	8	34
	MC2	1	512	256	0	0	8	34
768x512	MC1	1	768	256	0	0	8	34
	MC2	1	768	256	0	0	8	34
	MC3	1	768	0	0	0	8	34
1024x512	MC1	1	1024	256	0	0	8	34
	MC2	1	1024	256	0	0	8	34
	MC3	1	1024	0	0	0	8	34
	MC4	1	1024	0	0	0	8	34

Table 3-1. 7500 Narrow Band Series Matrix Settings - (continued)

Matrix Size	CNC	Multiple Column Headings						
		Slice	Inputs	OutSize	Exp[a]	WO[a]	Sig	Frm
1024x1024	MC1	1	1024	256	0	0	8	34
	MC2	1	1024	256	0	0	8	34
	MC3	1	1024	0	0	0	8	34
	MC4	1	1024	0	0	0	8	34
	MC5	1	1024	256	0	0	8	34
	MC6	1	1024	256	0	0	8	34
	MC7	1	1024	0	0	0	8	34
	MC8	1	1024	0	0	0	8	34

[a] Settings for **Exp** and **WO** must always be set to 0 (zero).

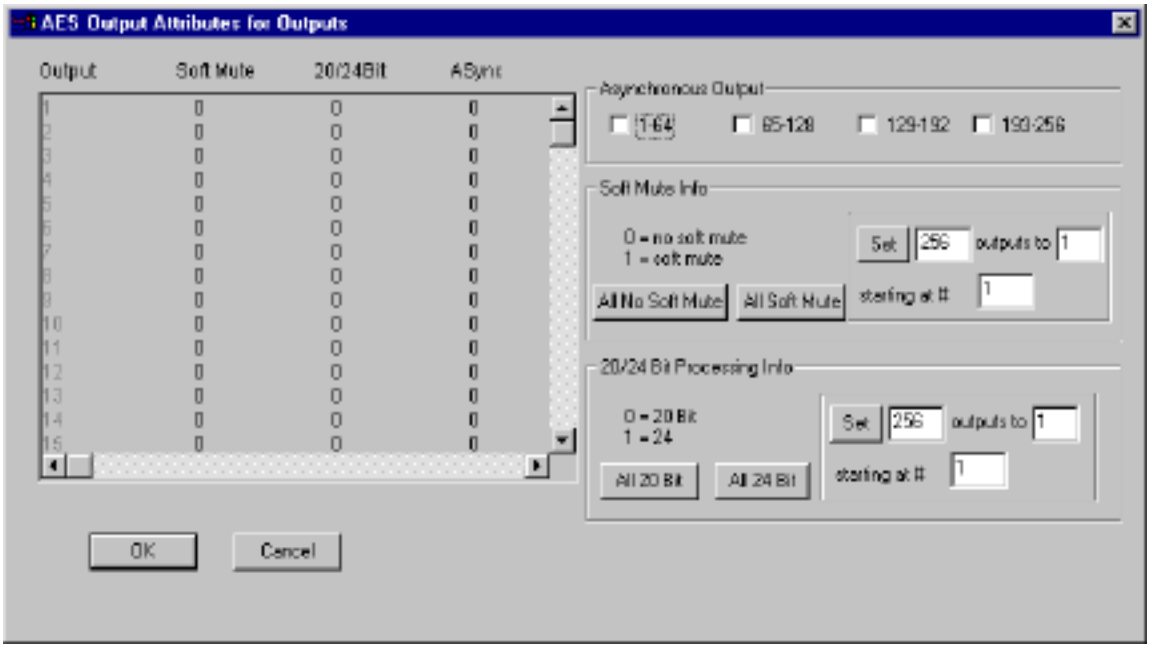
AES Attributes

This option in the Cfgd Node Ctrlr Window is used to apply AES Audio attributes to Inputs and Outputs in the 7500NB matrices.

If the frame you're configuring supports AES and this box is checked the **Output Attrib Info** and **Input Attrib Info** buttons are activated.

1. Click the **Output Attrib Info** button to bring up the AES Output Attributes for Outputs window.

Figure 3-2. AES Output Attributes for Outputs Window



This window allows the outputs to be set individually or in groups. If you were configuring a matrix that contained Asynchronous Output modules then you would use the check boxes under **Asynchronous Output**

to set groups of 64 outputs to Asynchronous. If you were configuring a system that had some Asynchronous Input modules (one or just a few) and wanted to assign a few Outputs on a Synchronous Output module to pass asynchronous signals, then use the individual settings under the **ASync** column.

Outputs can be assigned **Soft Mute/No Soft Mute** and **20/24 Bit** Processing individually, in groups, or by using the **All** buttons.

Soft Mute/No Soft Mute

The **Soft Mute/No Soft Mute** attribute is a soft mute or alignment of one signal's amplitude to another signal's amplitude at switching. This soft mute prevents a crack or pop at switching.

20/24 Bit

The **20/24 Bit** attribute determines how the signal bits are processed. A signal has 24 bits with the last four bits designated as auxiliary (AUX) bits.

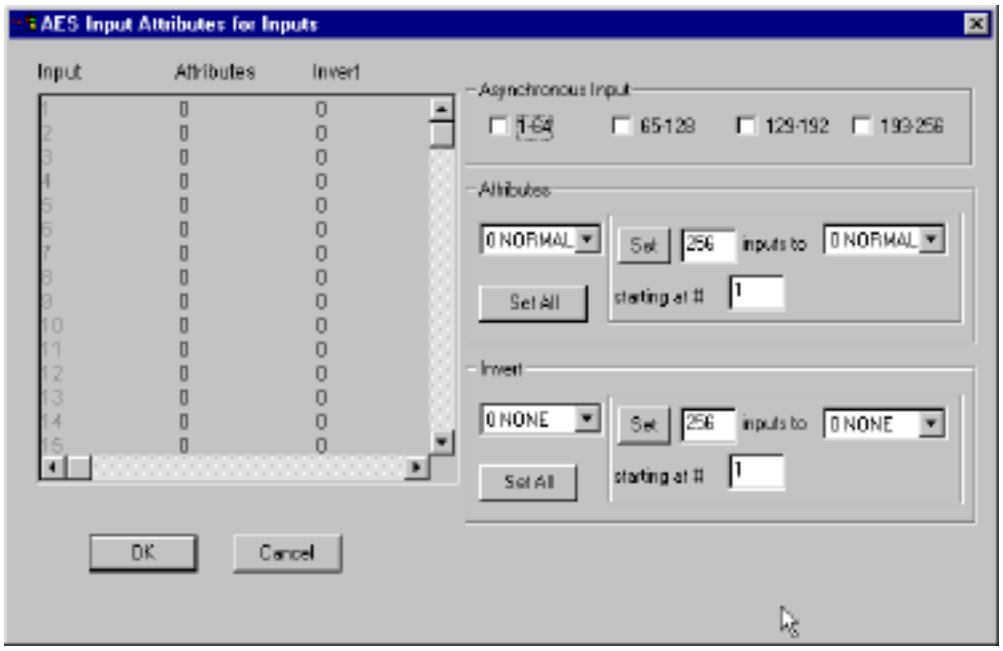
In **20 bit** mode the four AUX bits pass through the router unaffected by any processing. If left and right channels are swapped, the four AUX bits stay in the same place. If the signal is muted, the four AUX bits are not muted.

In **24 bit** mode the router will treat the four AUX bits as though they are part of the audio data. If left and right channels are swapped, the four AUX bits will swap locations. If the audio is muted, the four AUX bits will be muted.

2. After the Output attributes are assigned click **Ok** to return to the New Cfgd Node Ctrlr window.

3. Click the **Input Attrib Info** button to bring up the AES Input Attributes for Inputs window.

Figure 3-3. AES Inputs Attributes for Inputs Window



This window allows the inputs to be set individually or in groups. If you were configuring a matrix that contained Asynchronous Input modules then you would use the check boxes under **Asynchronous Input** to set groups of 64 inputs to Asynchronous.

Inputs can be assigned Attribute and Invert options, individually, in groups, or by using the **All** buttons.

Attributes affect the way the signal is routed through the matrix. Figure 3-4 and Figure 3-5, show how a signal is routed. Table 3-2 shows how it is affected by the attribute settings.

Figure 3-4. Audio Signal Splitting

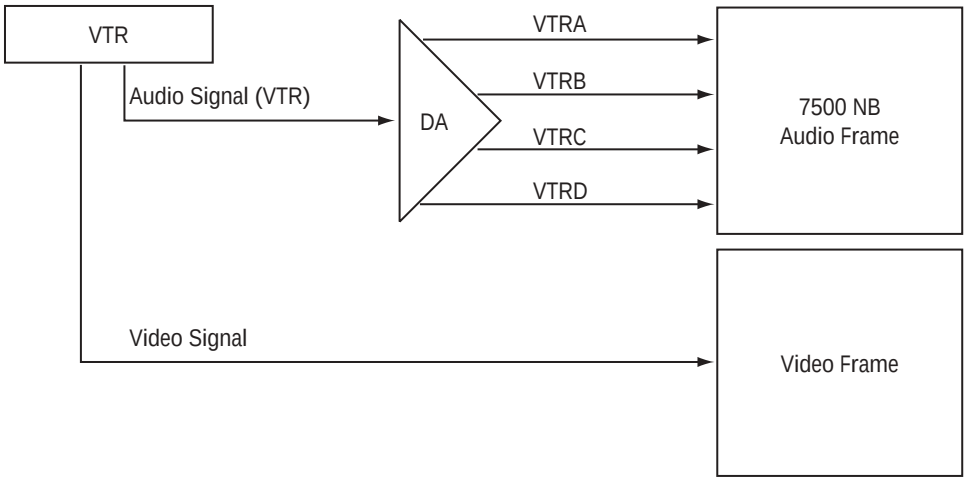


Figure 3-5. Signal Flow

Table 3-2. Attribute Options

Attribute	Definition	100 Hz (Right)	1000 Hz (Left)
Normal	Defaults are assigned to all Inputs.	100 Hz	1000 Hz
Right Only	Right Channel Audio will be routed to the assigned Input.	100 Hz	100 Hz
Left Only	Left Channel Audio will be routed to the assigned Input.	1000 Hz	1000 Hz
Sum	Frequencies of the Right and left Channel are added together.	1100 Hz (R+L)	1100 Hz (R+L)
Swap	Left and Right Channels are swapped.	1000 Hz	100 Hz
Async	Asynchronous signals are routed.		

Invert options assign the invert (opposite logic state) of the signal to an Input using the settings in Table 3-3.

Table 3-3. Invert Options

Attribute	Definition
None	Signal is not changed.
Invert Channel A	Channel A audio is inverted.
Invert Channel B	Channel B audio is inverted.
Both A & B	Channel A and Channel B audio is inverted.
Async	Asynchronous signals are routed.

4. After the Input attributes are assigned click **OK** to return to the NEW Cfgd Node Ctrlr window.

Physical Matrix

When configuring this, *remember that the 7500 NB Series must have one Physical Matrix that includes all of the 7500 NB matrices in the system*. For example, a system that contains a 7500 NB 256x256 (1 matrix frame) would be configured with 1 CNC and 1 Physical Matrix. A system that contains a 7500 NB 1024x1024 (8 matrix frames) would be configured with 8 CNCs and 1 Physical Matrix.

7500WB Configuration

The 7500WB matrices can be controlled by the Series 7000 Control System.

Series 7000 Control of 7500WB

The Matrix Controller in the 7500WB matrix communicates with the MCPU in the Series 7000 Control System. The configuration of the Matrix Controller is handled by the Series 7000 Configuration Editor GUI. The 7500WB-specific settings for the Matrix Controller are applied during the Configured Node Controller (CNC) procedures.

The 7500WB matrix can have a second Video Reference.

New 7500WB Configured Node Controller Settings

Figure 3-6. Cfgd Node Ctrlr Window With AES Settings

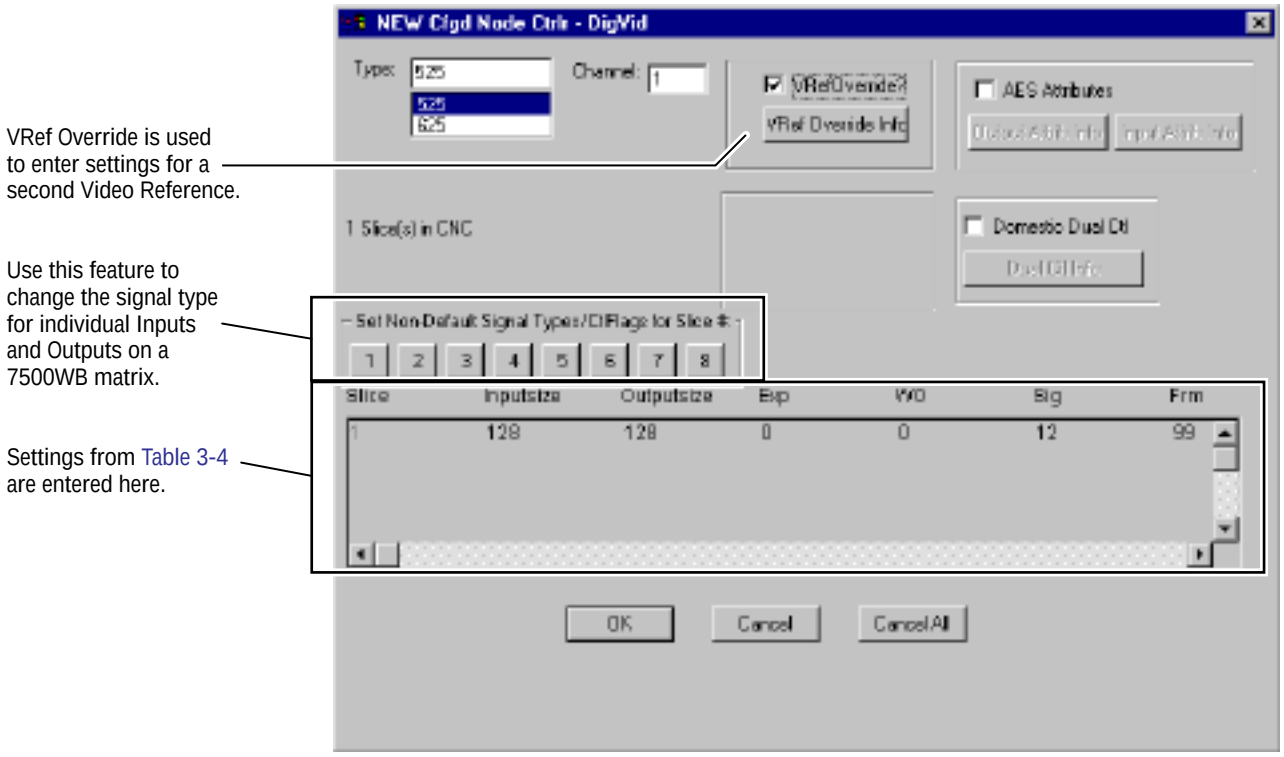


Table 3-4. 7500 Wide Band Series Matrix Settings

Matrix Size	Multiple Column Headings						
	Slice	Inputs	OutSize	Exp[a]	WO[a]	Sig[b]	Frm
128x128	1	128	128	0	0	12	98
256x256	1	256	256	0	0	12	99

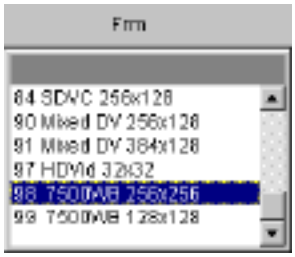
[a] Settings for **Exp** and **WO** must always be set to 0 (zero).

[b] Any Digital Video Signal type may be used

Signal types from the Sig column drop-down list that can be used with a 7500WB frames are **0 (143 MBS)**, **1 (177 MBS)**, **2 (270 MBS)**, **3 (360 MBS)**, **7 (BYPASS RECLOCKING)**, **10 (540 MBPS)**, **11 (1.485 GBPS)**, and **12 (AUTO RECLOCKING)**. Auto Reclocking will automatically reclock to any of the signal rates. Bypass reclocking will pass any signal rate without reclocking. Selecting a signal rate such as 270 will set the reclocker to 270.

Individual Inputs and Outputs can be configured with different signal types using the **Set Non-Default Signal Types: /CtlFlags: for Slice#** button number **1**.

Note Switching an Input configured with one type of signal to an Output configured with a different signal type will cause a conflict. The conflict is resolved by the matrix. If either one of the signal types is Bypass Reclocking then the matrix will bypass reclocking. If neither one of the signal types is Bypass Reclocking then the matrix will auto reclock the signal.



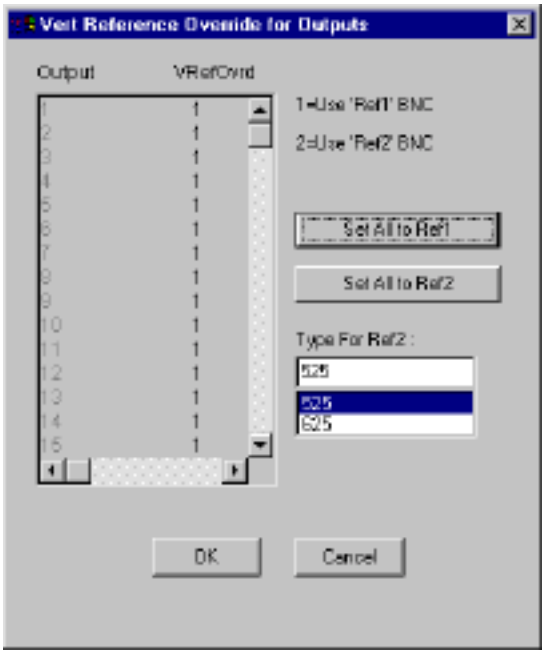
Frame types that can be used with a 7500WB frame are either **98 7500WB 256X256** or **99 7500WB 128X128**.

VRef Override

This option in the Cfgd Node Ctrlr Window is used to enter a setting for a second Video Reference in the 7500WB matrices.

1. Select **VREF OVERRIDE?** check box if Video Reference 2 is going to be used. The VRef Override is used to set 525 or 625 for Video Reference 2 and to assign Video Reference 1 or Video Reference 2 to each Output.
2. Click on **VREF OVERRIDE INFO** to access the Vert Reference Override window. See Figure 3-7.
3. Assign **1** or **2** to each Output. Outputs may have different VRef signal types within a slice.
4. Select 525 (NSTC) or 625 (PAL) as a setting for **TYPE FOR REF2**.

Figure 3-7. Vert Reference Override Window



5. Click **OK** to return to the Cfgd Node Ctrlr window.

6. Click **OK** to accept the Cfgd Node Ctrlr settings.

Section 4

Functional Description

Matrix Controller

The Matrix Controller (MC) modules are used in 7500 Series models. MCs are designed to work in pairs (one primary, one backup) to provide failure resistance. The primary MC provides all required functions; the backup is ready to take over should the primary unit fail. Control logic facilitates orderly change of control between the two modules and ensures that only one module at a time controls the external serial busses.

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

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

A 25-pin D connector labeled **OPTION** is connected to the MC for use as an optional interface.

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

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

Matrix Modules

The 7500 matrix modules are identified in Table 4-1.

Table 4-1. 7500 Matrix Modules

Label	NB	WB	Description
32 INPUT	-	√	Wide band digital video input module (page 4-2)
64X64 CROSSPOINT	-	√	Wide band digital video 64x64 crosspoint module 7500WB 128x128 (page 4-2)
128X64 CROSSPOINT	√	-	128x64 Audio crosspoint module (page 4-4)
128X64 CROSSPOINT	-	√	Wide band digital video 128x64 crosspoint module 7500WB 256x256 (page 4-2)
NB DIGITAL INPUT	√	-	Asynchronous audio input module (page 4-4)
NB DIGITAL OUTPUT	√	-	Asynchronous audio output module (page 4-4)
SD EXPANSION BYPASS	-	√	Serial digital video bypass switch (page 4-2)
SD OUTPUT	-	√	Wide band standard definition digital video output module (page 4-3)
SYNC AES INPUT	√	-	Synchronous AES audio input module (page 4-4)
SYNC AES OUTPUT	√	-	Synchronous AES audio output module (page 4-4)
WB 128 DC DISTRIBUTION	-	√	Wide band 48 VDC power distribution module (page 4-3)
WB EXPANSION SWITCH	-	√	Reclocking serial digital video 2x1, 4x1, 8x1, 16x1, and 32x1 switch (page 4-3)
WB MONITOR	-	√	Wide band digital video monitor module (page 4-3)
WB OUTPUT	-	√	Wide band digital video output module (page 4-3)
WB SD INPUT	-	√	Wide band standard definition digital video input module (page 4-3)

7500WB Modules

32 Input

The module labeled **32 INPUT** provides 32 equalized Input channels. The module supports data rates from 19 Mbps to 1.5 Gbps. There are no user adjustments on the module.

64x64 Crosspoint

The module labeled **64X64 CROSSPOINT** is a 64 Input by 64 Output Crosspoint array. This module is used in the 7500WB 128x128 frame. There are no user adjustments on the module.

128x64 Crosspoint

The module labeled **128X64 CROSSPOINT** is a 128 Input by 64 Output Cross-point array. This module is used in the 7500WB 256x256 frame.There are no user adjustments on the module.

SD Expansion Bypass

The module labeled **SD EXPANSION BYPASS** provides a path from Input 1 to Output 1, a second path from Input 2 to Output 2, a third path from Input 3 to Output 3, etc. for 32 signals. The main purpose of the SD Expansion

Bypass module is to allow the expansion frame to be pre-wired and tested for future expansion. The supported data rates are 143 Mbps, 177 Mbps, 270 Mbps, and 360 Mbps. There are no user adjustments on the module.

SD Output

The module labeled **SD OUTPUT** provides 32 reclocked output channels with selectable bypass mode for each channel. The supported reclocked data rates are 143 Mbps, 177 Mbps, 270 Mbps, and 360 Mbps. There are no user adjustments on the module.

WB 128 DC Distribution

The module labeled **WB 128 DC DISTRIBUTION** provides DC connections for the 48V DC Entry module. It also distributes the 48V power to the frame and processes the external fan alarm outputs. There are no user adjustments on the module.

WB Expansion Switch

The module labeled **WB EXPANSION SWITCH** is a reclocking serial digital video expansion switch that can be configured as a 2x1, 4x1, 8x1, 16x1, or 32x1. There are no user adjustments on the module.

WB Monitor

The module labeled **WB MONITOR** provides 4 channels of monitoring. It also provides for one channel of multi-standard CRC error detection. Five signals are sent from each Output Module to the Monitor Module for output monitoring. One signal is sent from each Crosspoint Module for Input monitoring. The **IN** connector for use with an external input signal is used between 7500WB matrices in expanded systems. There are four **OUT** connectors which can be used for monitoring. When used with a 7000 Series Control System the four connectors provide the same signal to different monitors. When used with an Encore Control System the four connectors can provide up to four different signals to four different monitors. A fifth video channel is used for CRC checking, but the signal does not leave the Monitor Module. There are no user adjustments on the module.

WB Output

The module labeled **WB OUTPUT** provides 32 reclocked output channels with selectable bypass mode for each channel. The supported reclocked data rates are 143 Mbps, 177 Mbps, 270 Mbps, 360 Mbps, 540 Mbps, 1.485 Gbps, and 1.485 / 1.001 Gbps. There are no user adjustments on the module.

WB SD Input

The module labeled **WB SD INPUT** provides 32 equalized input channels. The supported data rates are from 19 Mbps to 360 Mbps. There are no user adjustments on the module.

7500NB Modules

128x64 Crosspoint

The module labeled **128X64 CROSSPOINT** is a Narrow Band (NB) audio crosspoint module used in 7500 Series Narrow Band frames. This module inputs 128 single ended digital inputs and then outputs 64 single ended outputs. The module does not manipulate the data and can be used for data rates up to 50 Mbps. There are no user adjustments on the module.

NB Digital Output

The module labeled **NB DIGITAL OUTPUT** can be used as an asynchronous AES audio output module in 7500 Series Narrow Band frames. This module provides 64 outputs of any digital rate up to 50 Mbps. There are 2 monitoring channels on each module. There are no user adjustments on the module.

NB Digital Input

The module labeled **NB DIGITAL INPUT** can be used as an asynchronous AES audio input module in 7500 Series Narrow Band frames. This module provides 64 inputs of any digital rate up to 50 Mbps.There are no user adjustments on the module.

Sync AES Input

The module labeled **SYNC AES INPUT** is a synchronous AES audio input module used in 7500 Series Narrow Band frames. This module receives and reclocks 64 separate AES streams and synchronizes them to a 48 kHz system clock. A 27 MHz system clock is used as a sample clock for the input data. There are no user adjustments on the module.

Sync AES Output

The module labeled **SYNC AES OUTPUT** is a synchronous AES audio output module used in 7500 Series Narrow Band frames. This module provides 64 AES outputs that are reclocked and reformatted AES data streams. There are 2 monitoring channels on each module. There are no user adjustments on the module.

Section 5

Maintenance and Troubleshooting

Field Replaceable Units

Modules and Power Supplies are not serviced in the field. Replace faulty modules and Power Supplies with spares. Return faulty units to a designated repair depot. Use the information located on the back of the title page to contact Customer Service.

7500WB 256x256 The fan assembly can be replaced by a complete new assembly. The filter slides in and out of the door for cleaning or replacement.

Modules

Modules can be inserted or removed from the frame without powering down the system.

To Remove Modules

1. Lift the ejector tabs on the front of the module.
2. Pull the module gently to disengage it from the backplane.
3. Slide the module out of the frame.
4. Use anti-static precautions to protect the module.

To Insert Modules

1. Align the module in the appropriate frame slot.
2. Slide the module into the frame.
3. Gently push the module to engage the backplane.

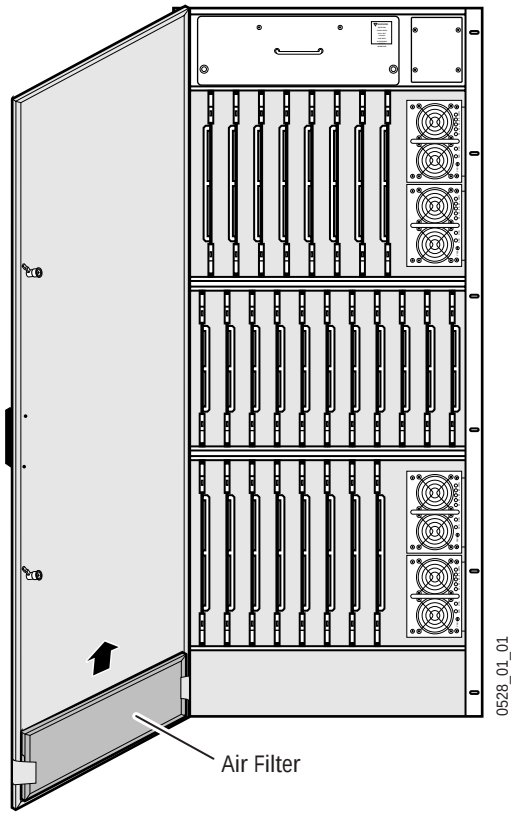
4. Close the ejector tabs. Replace the interconnect if removed, pin alignment is critical.

CAUTION Multi-pin module connectors can become misaligned and cause damage to the backplane and interconnect. Use caution when inserting modules. Do not force modules into slots.

Air Filter 7500WB 256x256

The air filter slides in and out for easy replacement. Refer to Figure 5-1.

Figure 5-1. Filter Replacement



Fan Assembly 7500WB 256x256

The Fan Assembly can be replaced as a complete unit.

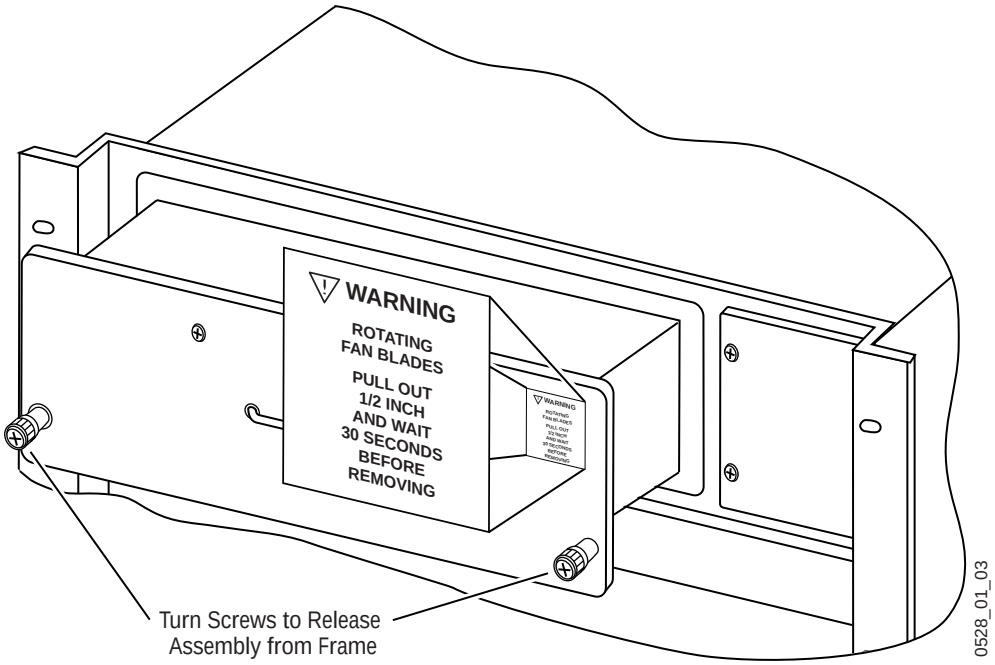
To Replace a Fan

Refer to Figure 5-2.

1. Loosen the screws on the front of the fan assembly.
2. Pull the assembly out one half inch and wait for the fan blades to stop.

3. Slide the fan assembly out of the frame.
4. Slide the new fan assembly into the frame.
5. Tighten the screws on the front of the fan assembly.

Figure 5-2. Fan Replacement



Service and Replacement Parts

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

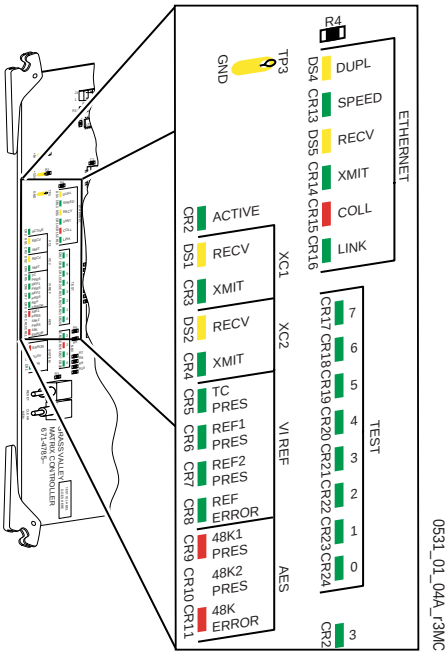
Troubleshooting

Each module has LEDs, testpoints, and switches along its front edge which are visible when the frame door is open. The LEDs indicate the operating condition of the module. Testpoints are used to check voltages and ground. Switches are used to reset the module. Testpoint and switch markings are self-explanatory.

Matrix Controller LEDs

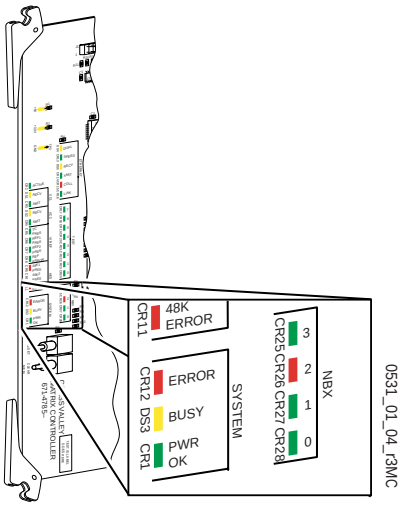
The LEDs found on the Matrix Controller module are shown in Table 5-1.

Table 5-1. Matrix Controller LEDs



Group		LED	Indication	Condition
Ethernet	DUPL	DS4 (yellow)	On	Ethernet-duplex half
			Off	Ethernet-duplex full
	SPEED	CR13 (green)	On	Ethernet-speed 100BaseT
			Off	Ethernet-speed 10BaseT
	RECV	DS5 (yellow)	On	Ethernet-receiving
			Off	Not receiving
	XMIT	CR14 (green)	On	Ethernet-transmitting
			Off	Not transmitting
	COLL	CR15 (red)	On	Ethernet-collision
			Off	Normal ethernet condition
	LINK	CR16 (green)	On	Ether-link
			Off	No Ether-link
ACTIVE		CR2 (green)	On	Normal - active control
			Off	Standby
XC1 & XC2	RECV	DS1 & DS2 (yellow)	On	XC1 - receiving data
			Off	XC1 - not receiving data
	XMIT	CR3 &CR4 (green)	On	XC1 -Transmitting data
			Off	XC1 - not transmitting data
VI REF	TC PRES	CR5 (green)	On	VI REF-time code present
			Off	Not present
	REF1 PRES	CR6 (green)	On	VI REF-reference 1 present
			Off	Not present
	REF2 PRES	CR7 (green)	On	VI REF-reference 2 present
			Off	Not present
	REF ERROR	CR8 (red)	On	VI REF-reference error
			Off	Normal
AES	48K1 PRES	CR9 (green)	On	Present
			Off	Not present
	48K2 PRES	CR10 (green)		Present
				Not present
	48K ERROR	CR11 (red)	On	AES-48K error
			Off	Normal
TEST	0-7	CR17-CR24 (green)	On	Not used - can be on or off
			Off	

Table 5-1. Matrix Controller LEDs - (continued)



Group		LED	Indication	Condition
Activity and Power	ERR	DS7 (red)	On	Circuit failure or reset
			Off	Normal
	BSY	DS8 (yellow)	On	Active Controller indication
			Off	Inactive
	PWR	DS9 (green)	On	Power on
			Off	Bad or unseated module
NBX (Node Bus Control)	CR25	3 (green)	On	Not used - can be on or off
			Off	
	CR26	2 (red)	On	Processor Event
			Off	Normal
	CR27	1 (green)	On	Not used - can be on or off
			Off	
	CR28	0 (green)	On	Node Controller okay (health check)
			Off	Bad or unseated module

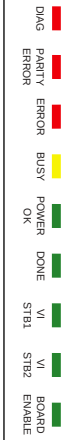
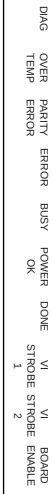
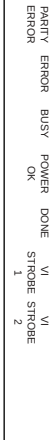
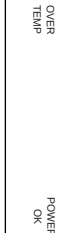
Matrix Modules

7500NB LEDs are identified in Table 5-2 and 7500 WB LEDs in Table 5-3.

Table 5-2. 7500NB Modules LEDs

Crosspoint	AES (Synchronous)		Digital (Asynchronous)		LEDs		
	Input	Output	Input	Output	Label	Indication	Condition
PAR ERROR ERROR BUSY PWR DONE VI STB DIAG	DIAG PAR ERROR ERROR BUSY PWR DONE REF1 REF2	OVER TEMP PAR ERROR ERROR BUSY PWR DONE VI STB AUD REF	PAR ERROR ERROR BUSY PWR DONE	OVER TEMP PAR ERROR ERROR BUSY PWR DONE	PAR ERR or PAR (red)	On	Parity error
						Off	Normal
					ERR or ERROR (red)	On	Error.
						Off	Normal
					BSY or BUSY (yellow)	On	Busy
						Off	Standby
					PWR (green)	On	Power on
						Off	Bad or unseated module
					DONE (green)	On	Done
						Off	Standby
					VI STB (green)	On	VI Strobe present
						Off	No VI Strobe
					DIAG (red)	On	Diagnostic in process
						Off	Normal
					REF1 (green)	On	Reference 1 present
						Off	No Reference 1
					REF2 (green)	On	Reference 2 present
						Off	No Reference 2
					OVER TMP (green)	On	Over temperature
						Off	Normal
					AUD REF (green)	On	Audio Reference present
						Off	No Audio Reference

Table 5-3. 7500WB Modules LEDs

Module							LEDs		
Input	Output & Expansion Switch	64x64	128x64	Monitor	DC	Expansion Bypass	Label	Indication	Condition
							PARITY ERROR (red)	On	Parity error
								Off	Normal
							ERROR (red)	On	Error.
								Off	Normal
							BUSY (yellow)	On	Busy
								Off	Standby
							POWER OK (green)	On	Power on
								Off	Bad or unseated module
							DONE (green)	On	Firmware loaded okay
								Off	Firmware load problem
							DIAG (red)	On	Diagnostic mode
								Off	Normal
							VI STROBE 1 (green)	On	Vertical Interval Strobe 1 present[a]
								Off	No Vertical Interval Strobe 1
							VI STROBE 2 (green)	On	Vertical Interval Strobe 2 present
								Off	No Vertical Interval Strobe 2
							OVER TMP (red)	On	Over temperature
								Off	Normal
							BOARD ENABLE (green)	On	Module is communicating with the Controller module
								Off	Module is not communicating with the Controller module
							EXTERNAL BATTERY PRESENT (green)	On	DC Battery is connected
								Off	DC Battery is not connected.

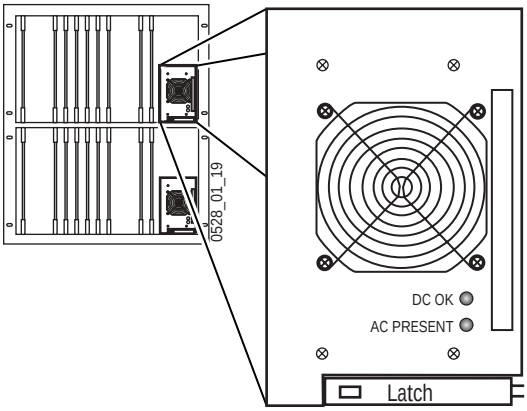
[a] Either VI STROBE 1 or VI STROBE 2 needs to on for proper timed switching.

Power Supply Modules

7500NB Power Supply Module

The 7500NB Power Supply module is a fully autoranging 400 W 48V DC Output module. LED indicators: **DC OK** (green light indicates satisfactory DC power when Illuminated), **AC PRESENT** (yellow light indicates AC power present when illuminated). See Figure 5-4.

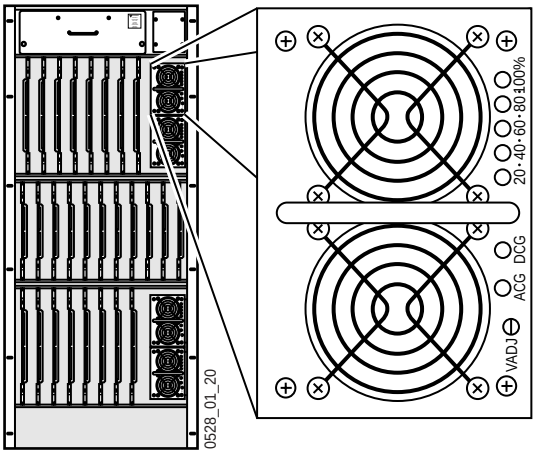
Figure 5-3. 7500NB Power Supply Module



7500WB Power Supply Module

The 7500WB Power Supply module is a fully autoranging 1000 W 48V DC Output module. LED indicators: **ACG** (green light indicates satisfactory DC power when Illuminated), **DCG** (green light indicates AC power present when illuminated), and the rest of the LEDs show percentage of available power usage. See Figure 5-4.

Figure 5-4. 7500WB Power Supply Module



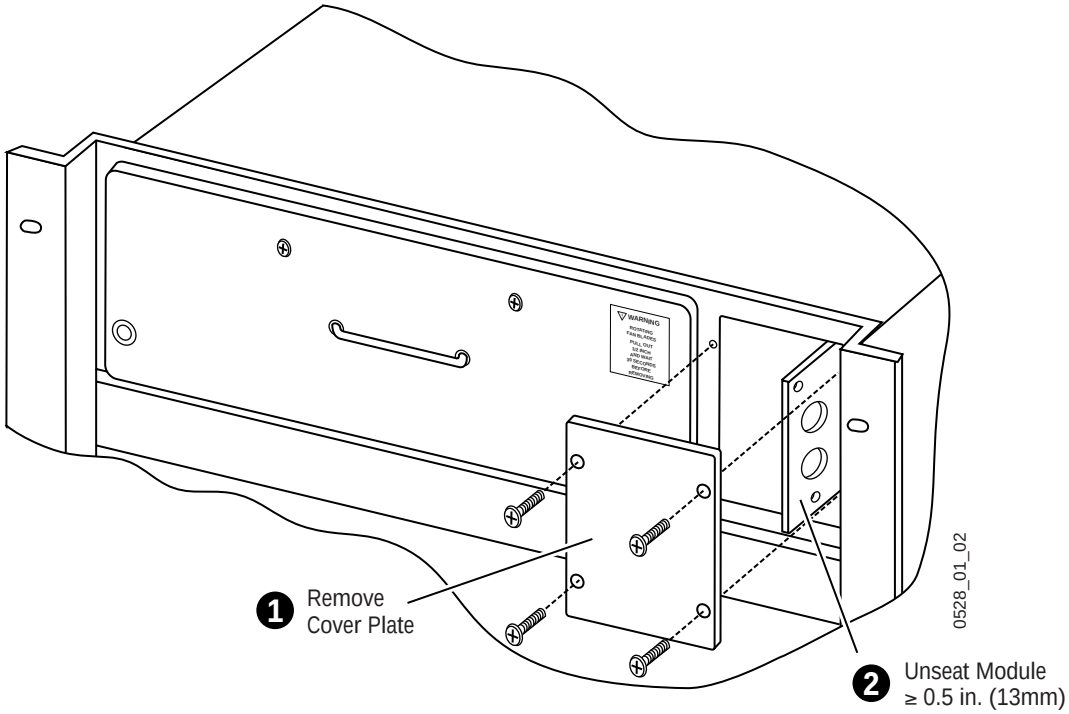
Thermal Control Module Reset 7500WB 256x256

The Thermal Control module monitors the temperature inside the matrix. It controls fan speed and will shutdown the matrix if a critical temperature condition occurs (temperature in excess of 80° C, 176° F). This is a fail-safe feature. If a shutdown does occur all modules within the matrix should be inspected. Once the cause of the critical temperature condition has been identified and corrected, the Thermal Control module must be reset. Refer to Figure 5-5.

To Reset the Thermal Control Module

1. Remove cover screws. Set cover aside.
2. Slide the module out at least one half inch to unseat the module.
3. Reseat the module into the frame.
4. Replace cover and secure with screws.

Figure 5-5. Thermal Control Module Reset



Note The Thermal Control module can also be reset by removal and replacement of all Power Supplies or unplugging and replugging the power cords.

Appendix — Specifications

Mechanical and Power Specifications

Table A-1. 7500 Mechanical and Power Specifications Maximum Configuration

Component	Depth[a]	Width	Height	Weight	Rack Units	Voltage Input	Power Consumption (Maximum)
7500NB256X256B/D	483 mm 19 in.	483 mm 19 in.	534 mm 21 in.	46.7 kg. 103 lbs.	12	100-240 V AC or 36-60 V DC	120 W
7500NB512x512B/D	483 mm 19 in.	483 mm 19 in.	1067 mm 42 in.	104.3 kg. 230 lbs.	24	100-240 V AC or 36-60 V DC	300 W
7500WB128x128	483 mm 19 in.	483 mm 19 in.	578 mm 22.72 in.	47.6 kg. 105 lbs.	13	100-240 V AC or 40-56 V DC	900 W
7500WB256x256	483 mm 19 in.	483 mm 19 in.	1110 mm 43.72 in.	81.7 kg. 180 lbs.	25	100-240 V AC or 40-56 V DC	1800 W

[a] Allow a minimum of four inches behind the frames for cabling

Performance and Environmental Specifications

7500NB

Table A-2. 7500NB256x256 and 512x512

AES Inputs		
Signal Format		SMPTE-276-M (AES/EBU)
Input Voltage		200 mV to 5V p-p
Impedance/Connector	BNC unbalanced	75 Ohms
	50-pin D balanced	110 Ohms
Return Loss		>15dB 0.1-1 MHz 25dB @ MHz
Cable EQ		None
Jitter Tolerance		+/- 1/2 UI

Table A-2. 7500NB256x256 and 512x512 - (continued)

AES Outputs - Including Monitors		
Signal Format		SMPTE-276-M (AES/EBU)
Output Voltage	Balanced	1V p-p
	Unbalanced	4V p-p
Impedance/Connector	BNC unbalanced	75 Ohms
	50-pin D balanced	110 Ohms
Rise-time		15-30 ns
Return Loss		>15dB 0.1-1 MHz 25dB @ MHz
Input-to-Output Delay		3-4 AES Frames
Output Jitter		TBD
Reference Video Input		
Type		NTSC or PAL color black
Impedance/Connector		High/looping BNC
Return Loss		>25dB 0.1-5 MHz, 75 ohm termination
Audio Reference Inputs 1 and 2		
Type		SMPTE-276-M (AES/EBU) audio black not necessary
Impedance/Connector		High/looping BNC
Return Loss		>15dB 0.1-6 MHz, 75 ohm termination
Node Bus Input		
Type		SMS-7000 Node Bus proprietary Global Serial Channel
Impedance/Connector		High/looping BNC
Return Loss		>25dB @ 1 MHz, 75 ohm termination
Environment		
Operating Temperature		0-to-40 degrees C

7500WB

Table A-3. 7500WB128x128 and 256x256

Video Inputs		
Format		SMPTE-259, SMPTE-292
Voltage		800 mV ± 10%
Impedance / Connector		75 ohms, unbalanced BNC
Return Loss		> 15 dB 1 MHz ≥ 1.5 GHz, self terminating, 20 dB typical
Cable Equalization	1694A	100 meters maximum all formats
	7731A	200 meters maximum all formats

Table A-3. 7500WB128x128 and 256x256 - (continued)

Video Outputs (including monitors)			
Format			SMPTE-259, SMPTE-292
Voltage			800 mV ± 10%
Rise time			SMPTE-292 R AC
Impedance / Connector			75 ohms unbalanced BNC
Return Loss			> 15 dB 1 MHz -> 1.5 GHz, self terminating, typical
Output Jitter (reclocked)			< 0.2 unit interval
Output Reclocking			143 Mbps, 177 Mbps, 270 Mbps, 360 Mbps, 540 Mbps, 1.485 Gbps
Output Non-reclocking Bypass			10 Mbps ≥ 500 Mbps
Input To Output Delay			28 nanoseconds ± 2 nanoseconds
Input To Output Delay Match			± 5 nanoseconds
Video Reference 1 & 2 Input			
Type			NTSC or PAL color black
Impedance / Connector			High looping BNC
Return Loss			> 25 dB @ 1 MHz, when terminated into 75 Ohms
Vertical Interval Switch			
VI1, Video Reference 1	525/625 Mode		Middle of the line ± 5 microseconds - 0, + 0, field latency
	Pulse Mode		2 microseconds or less from rising edge, - 0, + 1 field latency
VI1, Video Reference 2 Using SMS 7000 Control System	525/625 Mode		Middle of the line ± 12 microseconds - 0, + 0, field latency
	Pulse Mode		- 5.5 + 7.5 microseconds or less from rising edge, - 0, + 1 field latency
Impedance / Connector			High looping BNC
Return Loss			> 25 dB @ 1 MHz, when terminated into 75 ohms
Node Bus Input			
Type			SMS7000 Node Bus proprietary Global Serial Channel
Impedance / Connector			High, looping BNC
Return Loss			> 10 dB @ 1 MHz, when terminated into 75 ohms
Ethernet Port			
Connector			RJ45
Power Supply			
Mains AC Voltage			100-240 V 50/60 Hz
AC Current	128x128	100-120 V	8 amps maximum
		200-240 V	4 amps maximum
	256x256	100-120 V	16 amps maximum
		200-240 V	8 amps maximum
DC Voltage			48 V DC nominal (40-56 V DC)
DC Current	128x128		22 amps DC nominal @ 48 V in
	256x256		33 amps DC nominal @ 48 V in

Table A-3. 7500WB128x128 and 256x256 - (continued)

Environmental	
Operating Temperature	0-40 degrees C (32-104 degrees F)
Operating Humidity	10-90% non-condensing
Static Withstand	1.5 k V (330 ohms, 150 pF)

Glossary

AES

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

AES/EBU

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

Alarm

A signal indicating major or minor alarm conditions.

Alien Matrices

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

All-level Takes

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

Amezi

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

ANC

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

ANSI

American National Standards Institute.

Assignment

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

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

Backplane (Rear connector channel, Motherboard)

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

BNC

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

BPI

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

BPS

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

Breakaway

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

BSY

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

Bus

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

Chop

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

CIF

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

CLN

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

Coaxial Cable (coax)

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

Cold Start

A boot from power off.

Component Video

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

Composite Video

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

Control Device

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

Control Panel Bus (CP bus)

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

Controllers

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

COS

Cubicle or Studio. A custom configuration set.

CPO

Clear Protected Output.

Crosspoint (XPT)

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

DA

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

Data Matrix

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

Default

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

Destination (DEST or DST)

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

Destination Exclusion Set (DXS)

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

DGND

Digital Ground.

DST

See *Destination (DEST or DST)*.

DSVOM

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

Dumb Terminal

A conversational slave to a host computer.

EC I/F

External Control Interface.

EDP

Eight Destination Paging control panel.

EMI

Electromagnetic interference.

ENC

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

EPROM

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

ERR

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

Ethernet

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

Exclusion

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

FC

Frame Controller.

FET

Field Effect Transistor.

First Come First Served (FCFS)

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

Flag

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

Flash Memory

See: *EPROM*.

Flip-Flopping

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

GBR (Green, Blue & Red)

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

GPI

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

GSC

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

GUI

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

Hardware

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

HDTV

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

Heartbeat

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

Horizon

A Grass Valley line of routing switchers.

HX

Grass Valley Horizon Series Crosspoint Routing System.

IBOP

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

ID or IDENT

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

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

I/O

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

Input

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

Input Offset

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

J Number

Jack Number.

Jumper

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

Kadenza

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

Kaleidoscope

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

KISS

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

KScope

The collective name for Kadenza and Kaleidoscope.

Krystal

A Grass Valley Group digital video effects system.

LED

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

Level

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

Local

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

Master

A module that controls a subordinate (slave) module.

Matrices

Plural of matrix.

Matrix

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

MB4

Programmable Multibus 4 Control Panel.

MB8

Programmable Multibus 8 Control Panel.

MC

Matrix Controller. Controller module used in 7500 Series matrices.

MCO

Machine Control Only Control Panel.

MCPU

Master Control Processing Unit. This module provides:

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

MEC

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

MEDIC

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

Mezzanine

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

Module

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

Multiformat

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

Name(s)

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

NB (Node Bus)

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

NB (Narrow Band)

Identifies the 7500 Series AES Audio Matrices.

NC

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

Node Controller

See *NC*.

NTSC

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

Output

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

P32

32 Button-per-source Control Panel.

P48

48 Button-per-source Control Panel.

PAL

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

Panel Prefixes

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

Panel Suffix Set

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

Panel Template

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

Physical Matrix

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

PLD

Programmable Logic Device.

Port

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

Preset

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

Protect (PROT)

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

PROTOVRD

Protect Override.

PWR

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

PXD

X-Y Destination Control Panel.

PXS

Programmable X-Y Source Control Panel.

PXY

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

PXYE

Programmable X-Y Expansion Control Panel.

Rack

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

Rack Unit (RU)

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

RAM

Random access memory.

RAS

Remote Access Service.

Rear Connector Channel

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

Reboot (Reset)

To restart a computer, reloading the software.

Redundant Power Supply

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

Remote

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

Reserved

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

Reset

See reboot.

Resource Group

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

RGB (Red, Green & Blue)

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

ROM

Read Only Memory.

Room

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

RP

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

RS-232 or RS-232C

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

RS-485

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

RU

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

Salvo (SVO)

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

Salvo Elements

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

Salvo Permission Set

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

SCP

Simple Control Panel.

SDP

Single Destination Paging control panel.

SDV

Serial Digital Video.

SERIM

Serial Interface Module.

SID

Source Identification panel.

Slave

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

Slice

A group of inputs and outputs assigned to a Controller.

SLIP

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

SMS

Signal Management System.

Source

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

Source Exclusion

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

SMPTE

Society of Motion Picture and Television Engineers.

SRC

Source. See *Source*.

SS

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

Status

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

STB

Strobe.

Strap

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

STROPCHS

Store Operator Changes.

Submodule

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

SVO

See *Salvo (SVO)*.

SVR

Server.

System Controller

Another term for the MCPU.

Take

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

Tally

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

Tally Level, Active

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

Tally Level, Default

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

Tally Modules

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

TCI

Terminal Computer Interface.

Terminate, Termination

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

TieLine

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

TieLine Type

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

Tie Wire

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

Time Code

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

Timing Scatter

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

TLYLVL

Tally Level.

TM

Tally Module.

Toggle

To switch back and forth between two settings.

Twisted Pair

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

UART

Universal Asynchronous Receiver Transmitter.

UCP

Universal Control Panel.

UMD

Under Monitor Display.

VI

Vertical Interval.

Virtual Matrix

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

VISS

Video Input Source Select.

VITC

Vertical Interval Time Code.

VOM

Video Output Monitor

VSD

Visual Status Display.

VT100

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

Warm Start

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

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

WO

Which block of Outputs.

XPT

See Crosspoint.

YUV

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

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