

Horizontal Module Rack

HMR - 4000

User's Operation Manual

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The Media Pro® 4000 system is not intended for direct control in safety critical applications. It should be used in conjunction with a Programmable Logic Controller where safety is an issue.

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Preface

Welcome to the Media Pro® HMR - 4000 User's Operational Manual. Highlighted in this manual are the component features, installation, configuration, software operation, programming reference, examples of typical applications, and technical support information.

This document is provided so users of the Media Pro® 4000 can gain an understanding of the system design and implementation techniques. It is assumed the reader has a basic knowledge of typical show elements and their control requirements. In addition, a basic understanding of programming concepts will help the user understand Anitech System's powerful English based Media Pro® Control Language (MPCL).

For specific information about other Media Pro® 4000 products, please refer to the applicable user manual or on-line help system.

Related Publications

The following documents contain additional information concerning ASI Media Pro® 4000 products. To obtain a copy of any of the documents listed below, contact ASI or visit our website.

Document	Description
ABM – 4010	Allen Bradley Remote Input/Output Module (RIO)
AOM – 4010	Analog Output Module - 16 Channel
APC – 4020	Animation Programming Console
ASM – 4030/4020	Analog Servo Module - 8 Channel / 4 Channel with Compliance
DSM – 4020	Digital Sound Module with PCMCIA socket
HMR – 4000	Horizontal Module Rack - 5 Slot
ICM – 4020	Intelligent Control Module
IMC – 4020/4010	Integrated Module Controller
IOM – 4020	Input/Output Module - 16 Bit (24vdc)
LCM – 4020	Lighting Control Module (DMX 512)
SEM – 4020	Serial Expansion Module - 8 Channel (RS-232)
TCM – 4020	Time Code Module (SMPTE)
VMR – 4000	Vertical Module Rack - 18 Slot

System Requirements

- IBM PC compatible computer running Windows 95 / 98 environment with 1 serial port at 19.2Kbps.
- The PC should be at least Pentium 90 MHz, with a minimum of 16 Mbytes of Ram.
- The recommended minimum system is Pentium 400 MHz or faster with 32M RAM and a serial port at 115.2Kbps.
- An EPP 1284-1994 compatible parallel port is required for animation and is recommended for all other operations, but not required. Downloads for Animation and DSM sound files are much faster over the EPP parallel port.
- Approximately 12 Mbytes of disk space are required for the MP4000/APU4000 software. In addition, we recommend a minimum of 30 Mbytes storage for each show's application files. This size will vary depending on the show configuration and the size of the sound and animation files that may be required.

Getting Started

The Media Pro® 4000 Software is provided on a set of floppy disks. To install the files, follow these directions:

- Place disk 1 into the floppy drive. Open the Explorer and browse **FLOPPY [A:]**
- Double click on **SETUP... .EXE**
- Follow the on-screen installation instructions.
- The default directory **C:\MP4000** will be created and placed on the desktop.
- To enter the program, browse the directory and double click **MP4000.EXE**
- Current versions of the MP4000 software place an icon on the desktop, earlier versions (1998) do not.

Note: All files used by the Media Pro® 4000 Software must have Read/Write attributes. They must be installed on a drive that has both read and write capabilities. Refer to the Windows Manual for further information.

Operating Environment

All Media Pro® Products are manufactured to the highest standards. With proper care and maintenance, they should provide many years of trouble-free service.

To ensure that your equipment has the longest life possible, it should be placed in an area with good ventilation and low humidity, out of direct sunlight and away from heat sources or lamps. Never expose equipment to moisture of any sort. Always maintain a dust, dirt and smoke free environment.

Always remember that high temperature is the enemy of all electronic equipment.

Environmental Conditions:

Recommended Operating:	10° to 32° C (40° - 90° F)
Storage Temperature:	-40° to 60° C (-4° - 140° F)
Relative Humidity:	0 to 95% (Without Condensation)

Warranty

Anitech Systems warrants this product to be free of manufacturing defects for 1 year from the date of purchase. At Anitech System's discretion, Anitech Systems will repair or replace a module that fails due to manufacturing defects.

The warranty does not cover shipping charges or modules damaged due to improper configuration, misapplication, misuse, abuse, accidents, or shipping damage.

Service Options

Obtain a Return Materials Authorization by contacting Anitech Systems.

The contact information for customer support follows:

E-mail	Mail@Anitech-Systems.com
Web	http://www.Anitech-Systems.com
Telephone	(661)257-2184
Fax	(661)257-2025

Non-Warranty Modules Returned for Repair-

Charges will be based on parts used, labor, and shipping charges. Make sure the product is properly packed and insured. Anitech Systems is not responsible for damage that occurs during shipment.

1

Section 1 – Introduction

The Media Pro® rack chassis come in two configurations – the medium HMR-4000 and the large VMR-4000. Both module racks are described in this manual.

1.1 Parameters and Specifications –

The following list gives a concise overview of the system parameters and specifications:

RACK (CHASSIS/CARD CAGE)

- ✓ Every rack *MUST* contain an ICM (Intelligent Control Module), located in the “p” slot, referred to as slot 17.
- ✓ Power distribution on backplane – COM, CONSTANT, E/STOP bussed to every slot.

MEDIUM – Horizontal Module Rack

- ✓ HMR – 5 slots, (ICM and 4 modules)
- ✓ ICM is located in the top-most slot.
- ✓ Can be networked, 1M bit.

Also available for larger applications:

LARGE – Vertical Module Rack

- ✓ VMR – 18 slots, (ICM and 17 modules)
- ✓ ICM is located on the left-most slot.
- ✓ Can be networked, 1M bit.

2

Section 2 – HMR-4000 Rack Description

This section provides information for the installation of the Horizontal Module Rack. It is very important to have the unit configured correctly for the system to communicate.

2.1 HMR-4000 – Horizontal Module Rack

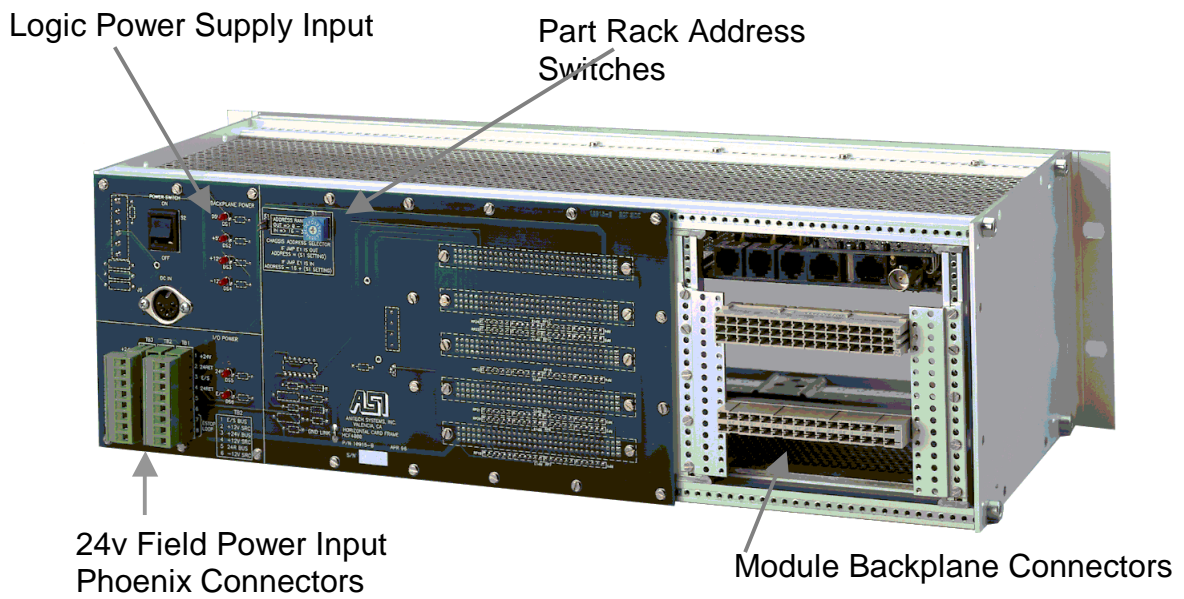
The Horizontal Module Rack provides an external 115/240 VAC Power Supply and motherboard for the Media Pro® 4000 Modules in a 5.25” vertical 19” Retma Rack package. This unit has the capacity to hold one (1) Intelligent Controller Module (ICM-4010) and up to four (4) Media Pro® 4000 Series interface/control modules. In addition, two (2) field power distribution busses are provided on the backplane for Constant and Emergency Stop connections. Refer to the following illustrations.

Preparation for Use

Figure 2-1. HMR-4000 Front view.



Figure 2-1. HMR 4000, Rear View.



2.2 Unpacking and Inspection

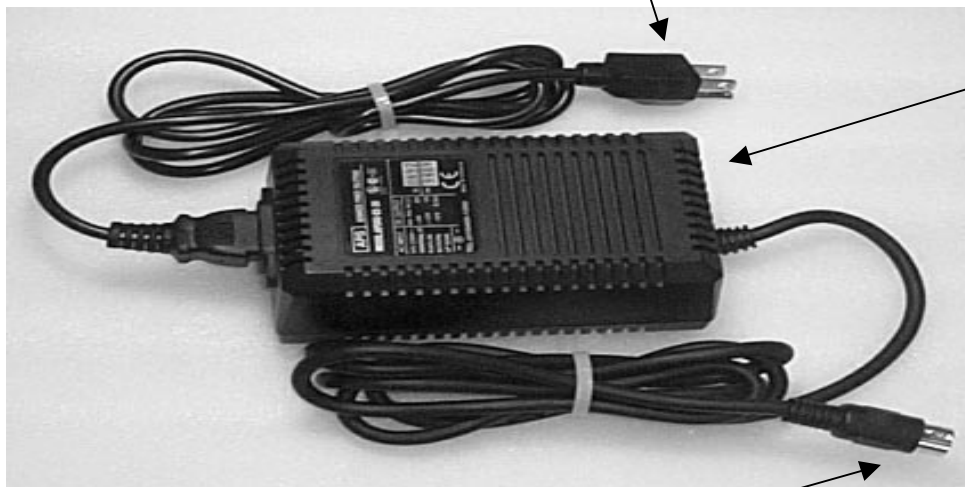
Inspect the shipping carton immediately upon receipt for evidence of mishandling during transit. If the shipping carton is severely damaged or water-stained, request that the carrier's agent be present when the carton is opened. If the carrier's agent is not present when the carton is opened and the contents are damaged, keep the carton and packaging materials for the agent's inspection.

It is recommended that all salvageable shipping cartons and packing material be retained for future use in the event the product must be shipped.

2.2.1 List of Items Received

- ✓ HMR-4000
- ✓ HMR-4000 User Manual
- ✓ APS-40ES30 Power Supply
- ✓ Power Cord

Detachable Power Cord w/ IEC Connector



Part APS-40ES30

60 Watt
+5 vdc

5 Pin Circular DIN Connector

2.3 Installation Considerations

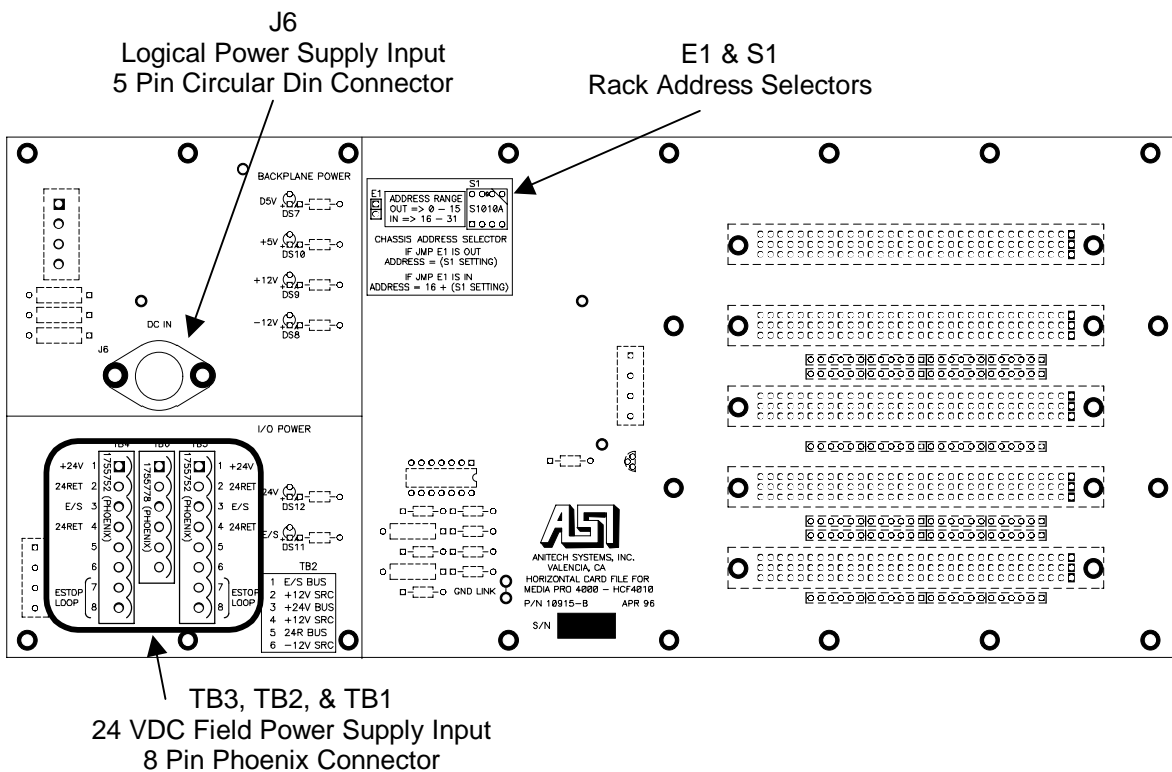
If any Power Output Modules (AOM, ASM, IOM) are used in the HMR, an external 24vdc supply will need to be connected to the TB1 and/or TB3, 8 Pin Phoenix connector. Refer to figure 2-1 for location.

A complete table of power usage and requirements is in section 6.3.

2.4 User-Configurable Jumpers and Options

The diagrams on the following pages provide information on user configurable jumpers and options.

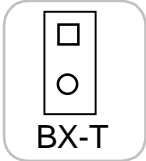
Figure 2-1. HMR – 4000 Connector and Jumper Locations



2.4.1 Jumper Setting Information

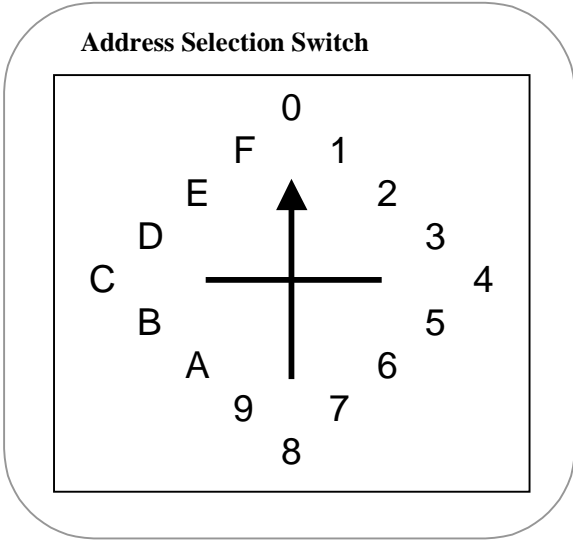
The following jumper and switch are used together to specify the Rack Address for each HMR in the system.

E1 Address Selection Jumper



- Refer to figure 2-2, Rack Address Selection Table, for jumper position.
- For Rack Addresses 0 to 15, E1: pins 1-2 should be open
 - For Rack Addresses 16 to 31, E1: pins 1-2 should be Jumpered

S1 Address Selection Switch



Refer to figure 2-2, Rack Address Selection Table, for the correct positioning of the switch for the desired rack address.

Preparation for Use

Figure 2-2. Rack Address Selection Table

Rack Address	S1 Switch Position	E1 Jumper
0	Set S1 to 0	Open
1	Set S1 to 1	Open
2	Set S1 to 2	Open
3	Set S1 to 3	Open
4	Set S1 to 4	Open
5	Set S1 to 5	Open
6	Set S1 to 6	Open
7	Set S1 to 7	Open
8	Set S1 to 8	Open
9	Set S1 to 9	Open
10	Set S1 to A	Open
11	Set S1 to B	Open
12	Set S1 to C	Open
13	Set S1 to D	Open
14	Set S1 to E	Open
15	Set S1 to F	Open
16	Set S1 to 0	Jumpered
17	Set S1 to 1	Jumpered
18	Set S1 to 2	Jumpered
19	Set S1 to 3	Jumpered
20	Set S1 to 4	Jumpered
21	Set S1 to 5	Jumpered
22	Set S1 to 6	Jumpered
23	Set S1 to 7	Jumpered
24	Set S1 to 8	Jumpered
25	Set S1 to 9	Jumpered
26	Set S1 to A	Jumpered
27	Set S1 to B	Jumpered
28	Set S1 to C	Jumpered
29	Set S1 to D	Jumpered
30	Set S1 to E	Jumpered
31	Set S1 to F	Jumpered

3

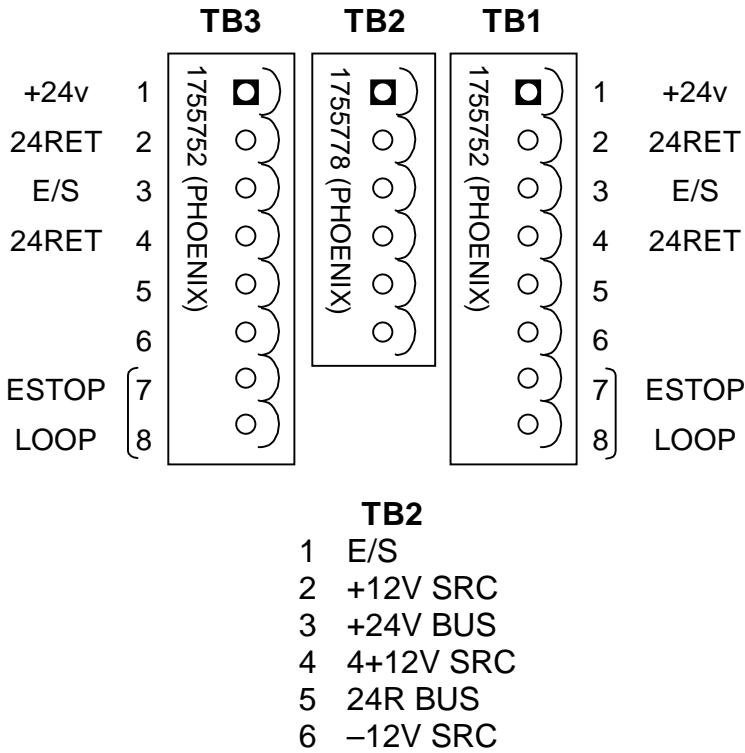
Section 3 – HMR-4000 Installation

This section describes the installation considerations and connections For the HMR-4000. Typical installation examples are provided, and a parts list is included in the section.

3.1 Typical Installation Example

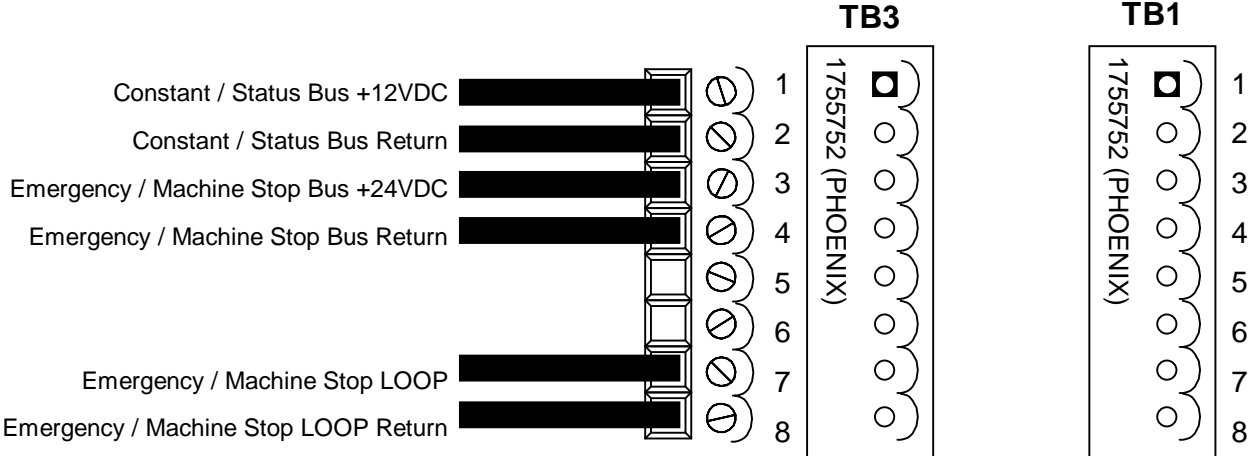
Refer to the following diagrams for typical power installation information. Figure 3-1 shows the pinout of the Field Power connector on the back panel of the HMR.

Figure 3-1. Field Power



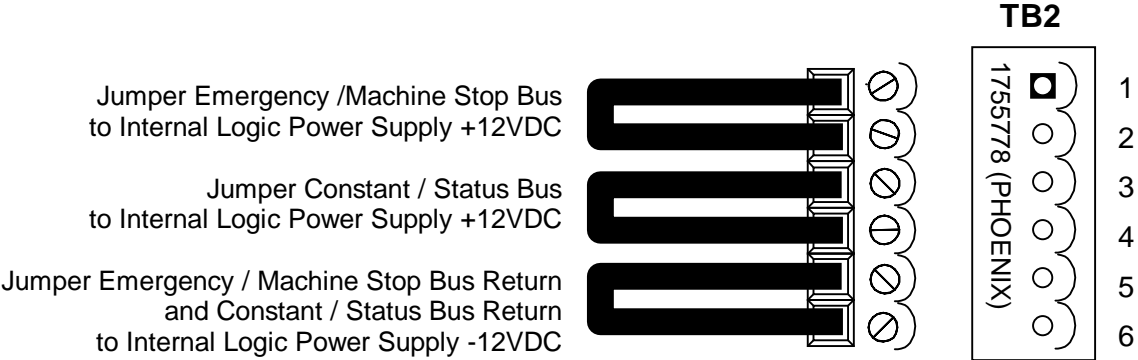
Installation

Figure 3-2. Field Power from External Power Bus Control System



Note: ESTOP LOOP will open whenever the Media Pro®'s Power is off, E/S LOOP isolated contact should not exceed 250ma @24VDC.

Figure 3-3. Field Power from Internal Logic Supply



Note: If the Internal Logic Power Supply is Jumpered to the Constant / Status and the Emergency / Machine Stop Busses, there is insufficient power on the 24VDC busses for Power Output Modules (AOM, ASM,IOM). For detailed power usage and requirements, see section 6.4.

Installation

3.1.1 Power Connector Information

To prevent the Internal and External Power from being tied together, Phoenix terminal socket TB2 cannot be connected at the same time as TB1 & TB3.

TB1 & TB3 can both be used at the same time to chain power to multiple racks.

Figure 3-2a. **TB1 & TB3 Pinout Information**

Pin	Function
1	+24VDC Field Power, Constant Bus Input
2	Return for 24VDC Constant Bus Input
3	+24VDC Field Power, Emergency Stop Bus Input
4	Return for 24VDC Emergency Stop Bus Input
5	Unused
6	Unused
7	Emergency Stop Loop
8	Return for Emergency Stop Loop

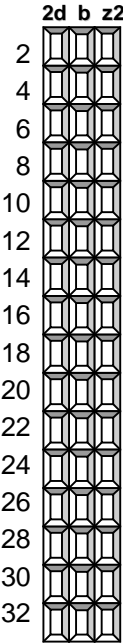
Figure 3-2b. **TB2 Pinout Information**

Pin	Function
1	Emergency Stop Bus Input
2	+12vdc from Internal Logic Supply
3	+24v Constant Bus Input
4	+12vdc from Internal Logic Supply
5	Return for Constant & Emergency Stop Buses
6	-12vdc from Internal Logic Supply

3.2 Installing Field Connector in Rack

The following instructions are for optional Modules requiring the Field Connector in the Rack. A connector kit (DIN-F48C) is available from Anitech Systems. If you need a connector, please refer to the parts list (section 3.3).

- 1) Place the connector on the *inside* of the z-rails on the rear of the chassis.
- 2) Be certain to position the connector with the top (labeled 2d b z2) UP, as viewed from the rear of the Rack.
- 3) Align the connector with the correct rack Z-rail slot.
- 4) Refer to the diagram below. Secure the connector with the screws provided in the connector kit (2.5mm x 6mm).



View from Rear Panel,
the top of the connector
to the Top of the bracket

Installation

3.3 Support Tools and Part Numbers

The following connectors or equivalents may be used:

Description	Manufacturer / Number
8 Pin Phoenix connector (24-12AWG)	MSTB2,5/8-ST-5,08 : 1757077
6 Pin Phoenix connector (24-12AWG)	MSTB2,5/6-ST-5,08 : 1757051
2 Pin Phoenix connector (24-12AWG)	MSTB2,5/2-ST-5,08 : 1757019
Din48F connector (Z-Rail mount) (Solder Tail)	Harting 09-06-248-6823
Din48F connector (Z-Rail mount) (Wire Wrap)	Harting 09-06-248-6821
Din48F connector (Z-Rail mount) (Crimp Pins required)	Harting 09-06-248-3201
(50) crimp pins (for above connector) 26-20 AWG	Harting 09-06-000-8481
(50) crimp pins (for above connector) 20-16 AWG	Harting 09-06-000-8482
Crimping tool for 26-20 AWG pins	Harting 09-99-000-0076
Crimping tool for 20-16 AWG pins	Harting 09-99-000-0077
Pin Locator (for above crimping tools)	Harting 09-99-000-0086
Crimp Pin Insertion Tool	Harting 09-99-000-0088
Crimp Pin Removal Tool	Harting 09-99-000-0087
*(2) M2.5X6 Screws *	Schroff 21100-146
Code Pin (metal key post)	Harting 09-06-000-9950
Code Pin Insertion Tool	Harting 09-99-000-0103

*These items are packed in bags of 100. Only 2 screws are needed per Module.

3.3.1 Field Connector Kit

A kit for the field connector is available from Anitech Systems which may be purchased separately. Refer to the Product Price List and/or contact ASI to order the item.

DIN-F48C – Contains the following items:

<u>Qty</u>	<u>Description</u>	<u>Part Number</u>
1	Din 48F Pin Connector	Harting 09-06-248-3201
50	Crimp Pins	Harting 09-06-000-8481
3	Mounting Screws	Schroff 21100-146

3.4 Field Connector Keying Information

Rear View, looking at the Male contacts on the connector of the module. The key is located between the column & row denoted by the module name on the table. A hole should be drilled in the designated indentation.

Front View, looking at the Female contacts on the connector of the rack. The key is located between the column & row denoted by the module name on the table. A pin should be installed in the designated indentation.

d	b	z	d	b	z
IOM (1)	SEM-4010 (2)		SEM-4010 (2)	IOM (1)	
2				2	
ASM-4010 (3)	DSM-4010 (4)		DSM-4010 (4)	ASM-4010 (3)	
4				4	
LCM-4010 (5)	TCM-4010 (6)		TCM-4010 (6)	LCM-4010 (5)	
6				6	
AOM-4010 (7)	ABM-4010 (8)		ABM-4010 (8)	AOM-4010 (7)	
8				8	
SEM-4020 (9)	ASM-4020 (10)		ASM-4020 (10)	SEM-4020 (9)	
10				10	
LCM-4020 (11)	DSM-4020 (12)		DSM-4020 (12)	LCM-4020 (11)	
12				12	
TCM-4020 (13)	ASM-4030 (14)		ASM-4030 (14)	TCM-4020 (13)	
14				14	
○	○		○	○	
16				16	
○	○		○	○	
18				18	
○	○		○	○	
20				20	
○	○		○	○	
22				22	
○	○		○	○	
24				24	
○	○		○	○	
26				26	
○	○		○	○	
28				28	
○	○		○	○	
30				30	
○	ICM		ICM	○	
32				32	

Installation

Legend: | = Contact Module Name = Pin / Hole Location ○ = Unused Position

4

Section 4 - Media Pro® Network

This chapter shows how to connect multiple racks together using the Media Pro® Network and how to connect the APC-4020 to a rack or series of racks.

4.1 Network Description

The Media Pro® Network is connected to the backplane of the ICM. It is hard-wired to the 48 pin backplane connector. The Racks and APC need to be addressed correctly in order for them to communicate. See the Jumpers Section (section 2.4.1) for details.

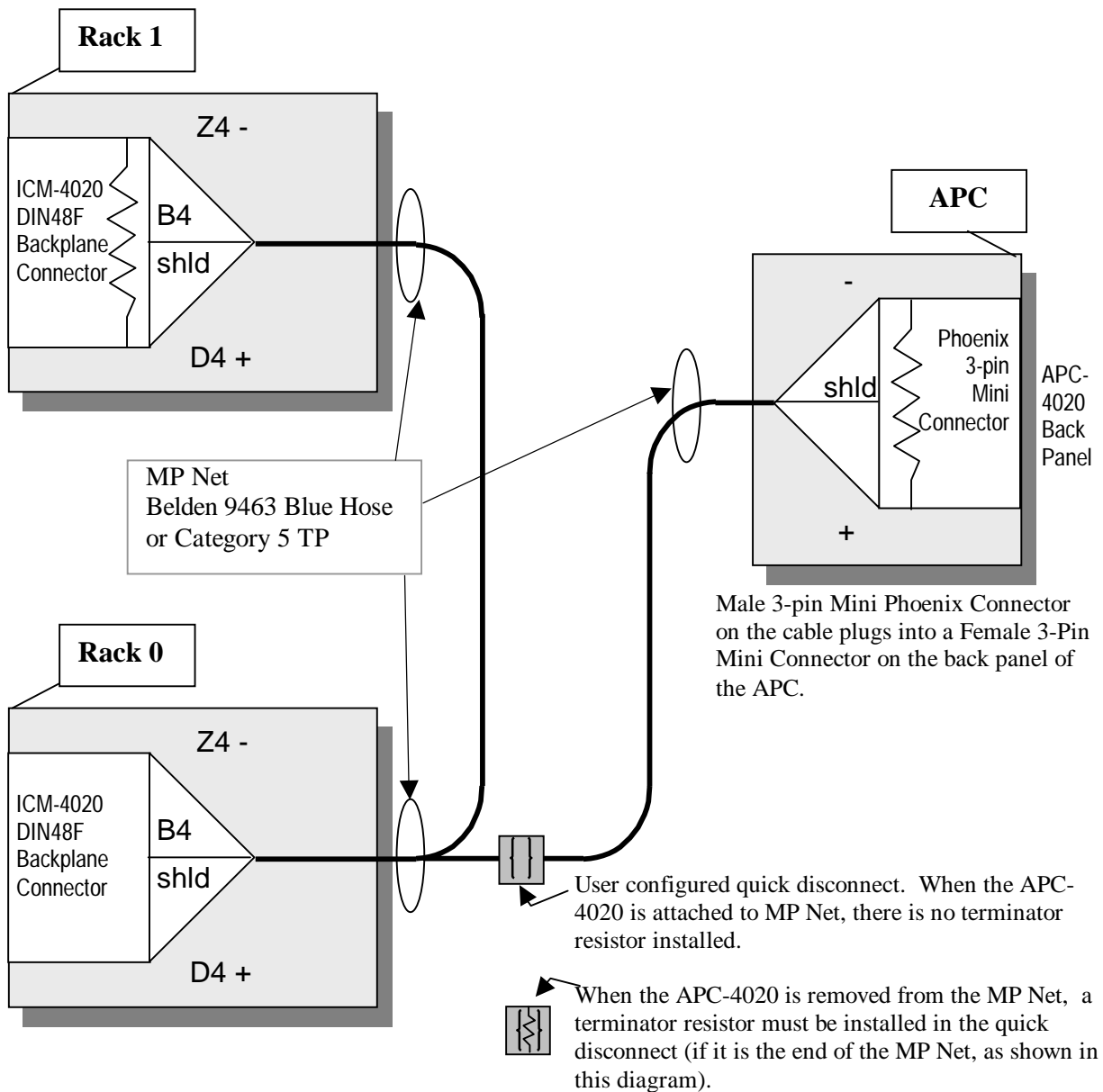
It is recommended to implement a quick disconnect for the APC, so the unit can be disconnected when not being used. Refer to the following diagram for an example setup using an Animation Program Controller. Notice that Rack 0 of this example is in the middle of the net and *does not* have a terminating Resistor.

- ❖ There are some important considerations when connecting the APC to the Media Pro® Net:
 - A 150 Ohm Terminating Resistor should be across the MP Net connector (+) and (-) pins at both *ends* of the network.
 - No Terminating Resistor on Racks in the *middle* of the Network.
 - When the APC is removed from the MP Net, a terminating resistor must be placed in the Rack at the *end* of the Network. (In the example diagram, Figure 3-2a, the resistor would be placed in Rack 0.)
 - The APC may be connected to any rack in the network, but the network may NOT be starred. The Media Pro® Net topography must be maintained. When a animation console is used with a rack in the middle of a net, the APC must be connected with a rack on both sides, having the net flowing through the APC.
 - The total network, including the connection to all racks may be up to 3000' of cable.
 - The connector for the APC end of the quick disconnect is supplied with the unit. Refer to figure 3-2c for details.

Figure 4-1a. APC-4020 to MP Net Wiring Pinout

<u>Rack0 Din48F</u>	<u>Rackn Din48F</u>	<u>APC</u>	<u>Wire color</u>
pin d4 (+)	d4 (+)	(+)	Clear
pin b4 (shld)	b4 (shld)	(shld)	Un-sleeved
pin z4 (-)	z4 (-)	(-)	Blue

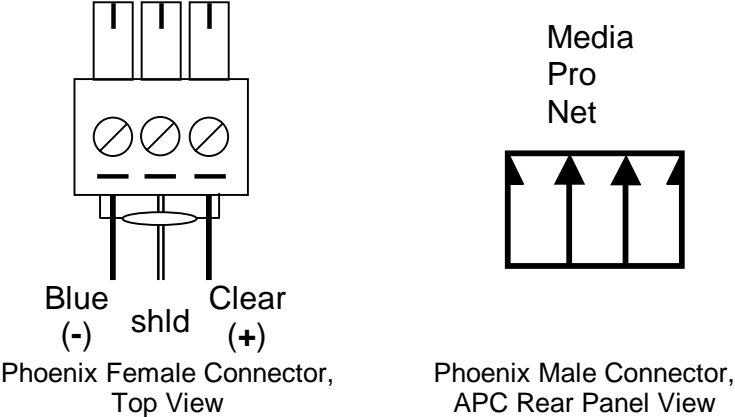
Figure 4-1b. MP Net Connections



4.1.1 APC Network Connectors

This diagram shows the Phoenix Connector wiring for the Media Pro® Network on the rear of the APC unit.

Figure 3-2c. APC-4020 Connectors for Media Pro® Network



5 Section 5 – Software Programming

The Horizontal Module Rack is configured using the Media Pro® 4000 Software. Please refer to the Media Pro® 4000 Operational Manual and Programming Reference. Every HMR requires an ICM installed which has its own User Manual. In addition, each module installed in the HMR has a User Manual to describe its features, installation, and operational information.

6 Section 6 – Appendix

The following pages contain technical briefs relating to this module. There are additional technical briefs on the ASI website and new briefs are added on an on-going basis. Please visit the website for updated information –

<http://www.Anitech-Systems.com>

Updated manuals are placed on the Web periodically. Please check to see if a more recent revision is available on the website. Revision numbers are located in the footer of the manual pages.

Also, a glossary of terms is in this section, for terms used by ASI as well as terms used in the Show Control Industry.

6.1 Saving Files from a Web Page without Displaying -

This is useful for retrieving a non-formatted page that is not intended for viewing:

From Internet Explorer® Browser

- 1 - Saving files from a Web page.
 - A) To save a file without opening it:
 - 1) **Right**-click on the link for the item you want, a pop-up menu appears,
 - (a) Select, then Left-click **Save Target As**
 - (b) Enter the desired folder and filenames and select **Save**

From Netscape® Communicator Browser

- 1 - Saving files without displaying them.
 - A) To save a file without viewing it:
 - 1) **Right**-click on the file's link to display a pop-up menu,
 - (a) Select, then Left-click **Save Link As**
 - (b) Enter the desired folder and filename and select **Save**

6.2 Approximate Dimensions for Media Pro 4000 Products

VMR-4000 Approximate Dimensions

- 19" EIA Standard Retma Rack Mount Package
 - Width 19"
 - Height 10.5"
- Overall Depth 8.5"
 - 7.75" Behind Rack Mount Surface
 - 1.5" Minimum additional depth necessary for cables
 - 0.75" in front of Rack Mount Surface
 - 10" in front of panel when using Panel Mount Sides

HMR-4000 Approximate Dimensions

- 19" EIA Standard Retma Rack Mount Package
 - Width 19"
 - Height 5.25"
- Overall Depth 8.5"
 - 7.75" Behind Rack Mount Surface
 - 1.5" minimum additional depth necessary for cables
 - 0.75" in front of Rack Mount Surface
 - 10" in front of panel when using Panel Mount Sides
- Recommended, 1 Rack Space (1.75") Vent Panel - Above, Below, and Between Racks

IMC-4020 Approximate Dimensions

- 19" EIA Standard Retma Rack Mount Package
 - Width 19"
 - Height 1.75"
- Overall Depth 8.5"
 - 7.75" Behind Rack Mount Surface
 - 2" minimum additional depth necessary for cables
 - 0.75" in front of Rack Mount Surface
- Recommended, 1 Rack Space (1.75") Vent Panel - Above, Below, and Between Racks

IMC-4010 Approximate Dimensions

- Table Top Package
 - Width 7.5"
 - Height 1.75"
- Overall Depth 8.5"
 - 2" minimum additional depth necessary behind IMC for cables

Modules Approximate Dimensions

- Width 0.8" (1 Slot)
- Height 10.25"
- Depth 7.5"
 - 0.75" in front of Rack Mount Surface

PSM-4020 Power Supply (Internal Logic) Approximate Dimensions. Included with VMR-4000

- Width 2.4" (occupies dedicated PSM slot in VMR-4000)
- Height 10.25"
- Depth 7.5"

APS-40ES30 Power Supply (Internal Logic) Approximate Dimensions. Included with HMR-4000, IMC-4010/4020, APC-4010/4020.

- Table Top Package
 - Width 3.25"
 - Height 2.5"
 - Depth 6.75"
 - 2" minimum additional depth necessary for cables

6.3 Power Load, Efficiency, Dissipation, Agency Approvals

The following sections provide the specifications for the power supplies used with the different modules and racks.

6.3.1 APS-40ES30 Specifications

Power Supply used on HMR-4000, APC-4010/20, IMC-4010, IMC-4020.

Description	Specification
Input, Voltage & Frequency Auto Switching	90 VAC to 260 VAC 47 HZ to 63 HZ
Input, Power	0.6 A @ 120 VAC, 60 Hz @ 40 Watt Load
Input, Inrush Surge Current	20 A peek
Efficiency	70% @ 115 VAC @ 40 Watt Load
Heat Dissipation	Approximately 12 Watts {40 watts * 30% }
Operating Temperature	0 to +40 Deg C @ 40 Watts

Agency Approvals	UL Listed 5T18 1950 TUV Licensed IEC 950 EN60950 EN55022 (Class B) CSA Certified C22.2 #234 C22.2 #950 FCC Part 15, Class B Other CE VFG234 (Class B) IEC 801-2 (ESD Level 3) IEC 801-4 (EFT Level 3)
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Note:

Power Load and Heat Dissipation greatly depend on external loads, use, and duty cycle.

6.4 Power Specifications for Continuous *Normal* Operation

The power usage and requirements for Media Pro® modules are depicted in the following tables. It is important that ***both*** of the following considerations are evaluated for proper system configuration:

- ✓ The power usage of the modules does not exceed any *individual* maximum current and wattage.
- ✓ The sum of the modules do not exceed the supply *overall* maximum wattage.

6.4.1 Media Pro® Module(s)

ABM-4010, PCB 10969-D

Voltage	Current Requirements (Amps)			Wattage Requirements (VA)		
	Min	Typical	Max	Min	Typical	Max
DC						
+ 5	0.400	0.500	0.600	2.00	2.50	3.0
+ 12	0.000	0.000	0.030	0.00	0.00	0.4
- 12	0.000	0.000	0.030	0.00	0.00	0.4
+ 24	0.000	0.000	0.000	0.00	0.00	0.0
				2.0	2.5	4.

AOM-4010, PCB 11043-C1

Voltage	Current Requirements (Amps)			Wattage Requirements (VA)		
	Min	Typical	Max	Min	Typical	Max
DC						
+ 5	0.200	0.250	0.300	1.00	1.25	1.5
+ 12	0.000	0.000	0.000	0.00	0.00	0.0
- 12	0.000	0.000	0.000	0.00	0.00	0.0
+ 24	0.100	0.900	7.000	2.40	21.60	168.0
				3.4	22.9	170.

ASM-4030, PCB 11106-B

Voltage	Current Requirements (Amps)			Wattage Requirements (VA)		
	Min	Typical	Max	Min	Typical	Max
DC						
+ 5	0.200	0.250	0.300	1.00	1.25	1.5
+ 12	0.000	0.000	0.000	0.00	0.00	0.0
- 12	0.000	0.000	0.000	0.00	0.00	0.0
+ 24	0.100	0.450	4.000	2.40	10.80	96.0
				3.4	12.1	98.

DSM-4020, PCB 11042-B

Voltage	Current Requirements (Amps)			Wattage Requirements (VA)		
	DC	Min	Typical	Max	Min	Typical
+ 5	0.350	0.500	0.650	1.75	2.50	3.3
+ 12	0.100	0.120	0.140	1.20	1.44	1.7
- 12	0.100	0.120	0.140	1.20	1.44	1.7
+ 24	0.010	0.015	0.030	0.24	0.36	0.7
				4.4	5.7	7.

ICM-4020, PCB 11045-A

Voltage	Current Requirements (Amps)			Wattage Requirements (VA)		
	DC	Min	Typical	Max	Min	Typical
+ 5	0.550	0.800	1.050	2.75	4.00	5.3
+ 12	0.010	0.090	0.230	0.12	1.08	2.8
- 12	0.010	0.015	0.030	0.12	0.18	0.4
+ 24	0.010	0.015	0.030	0.24	0.36	0.7
				3.2	5.6	9.

IOM-4020, PCB 11046-A

Voltage	Current Requirements (Amps)			Wattage Requirements (VA)		
	DC	Min	Typical	Max	Min	Typical
+ 5	0.050	0.100	0.200	0.25	0.50	1.0
+ 12	0.000	0.000	0.000	0.00	0.00	0.0
- 12	0.000	0.000	0.000	0.00	0.00	0.0
+ 24	0.000	3.000	8.000	0.00	72.00	192.0
				0.3	72.5	193.

LCM-4020, PCB 11047-A

Voltage	Current Requirements (Amps)			Wattage Requirements (VA)		
	DC	Min	Typical	Max	Min	Typical
+ 5	0.600	0.750	1.500	3.00	3.75	7.5
+ 12	0.010	0.015	0.230	0.12	0.18	2.8
- 12	0.010	0.015	0.030	0.12	0.18	0.4
+ 24	0.010	0.015	0.030	0.24	0.36	0.7
*				3.5	4.5	11.

SEM-4020, PCB 11153-0

Voltage	Current Requirements (Amps)			Wattage Requirements (VA)		
	DC	Min	Typical	Max	Min	Typical
+ 5	0.600	0.650	1.000	3.00	3.25	5.0
+ 12	0.000	0.030	0.350-1.95	0.00	0.36	4.2-23.4
- 12	0.000	0.030	0.150	0.00	0.36	1.8
+ 24	0.010	0.015	0.030	0.24	0.36	0.7
				3.2	4.3	11.7-30.9

TCM-4020, PCB 11105-A

Voltage	Current Requirements (Amps)			Wattage Requirements (VA)		
	DC	Min	Typical	Max	Min	Typical
+ 5	0.275	0.350	0.425	1.38	1.75	2.1
+ 12	0.010	0.015	0.030	0.12	0.18	0.4
- 12	0.000	0.015	0.030	0.00	0.18	0.4
+ 24	0.000	0.000	0.000	0.00	0.00	0.0
				1.5	2.1	3.

6.4.2 Media Pro® Control Units and Racks

APC-4020, PCB xxxxx-x

Voltage	Current Requirements (Amps)			Wattage Requirements (VA)		
	DC	Min	Typical	Max	Min	Typical
+ 5	1.200	1.300	1.400	6.00	6.50	7.0
+ 12	0.040	0.050	1.000	0.48	0.60	12.0
- 12	0.040	0.050	0.500	0.48	0.60	6.0
+ 24	0.000	0.000	0.000	0.00	0.00	0.0
				7.0	7.7	25.

IMC-4010, PCB 11066-B

Voltage	Current Requirements (Amps)			Wattage Requirements (VA)		
	DC	Min	Typical	Max	Min	Typical
+ 5	0.350	0.575	0.800	1.75	2.88	4.0
+ 12	0.025	0.015	1.000	0.30	0.18	12.0
- 12	0.026	0.015	0.500	0.31	0.18	6.0
+ 24	0.000	0.015	0.900	0.00	0.36	21.6
				2.4	3.6	44.

IMC-4020, PCB 11066-B

Voltage	Current Requirements (Amps)			Wattage Requirements (VA)		
	DC	Min	Typical	Max	Min	Typical
+ 5	0.725	0.850	0.975	3.63	4.25	4.9
+ 12	0.000	0.015	1.000	0.00	0.18	12.0
- 12	0.000	0.015	0.500	0.00	0.18	6.0
+ 24	0.000	0.015	0.900	0.00	0.36	21.6
				3.6	5.0	44.

VMR-4000, PCB 10760-D1

Voltage	Requires (A) Typical	Passes (A) Max/Slot	Passes (A) Backplane Max
+ 5	0.725	3.	
+ 12	0.000	3.	
- 12	0.000	3.	
+ 24	0.000	6.	24.

HMR-4000, PCB 10915-B

Voltage DC	Requires (A) Typical	Passes (A) Max/Slot	Passes (A) Backplane Max
+ 5	0.100	3.	
+ 12	0.015	3.	
- 12	0.015	3.	
+ 24	0.015	6.	24.

6.4.3 Power Supplies**PSM-4010, MAP 80-4001**

Voltage DC	Requires (A) Typ	Current Supply (Amps) Max	Wattage Supply (VA) Max
+ 5	0.015	14.000	70.0
+ 12	0.015	1.000	12.0
- 12	0.015	1.000	12.0
+ 24	0.015	2.000	48.0
			80
Voltage AC	Current Requirements (Amps)		Wattage Requirements (VA)
110	2.5		275.0
230	1.6		368.0

APS-40ES30, ASI

Voltage DC	Current Supply (Amps) Max	Wattage Supply (VA) Max
+ 5	6.000	30.0
+ 12	1.000	12.0
- 12	0.500	6.0
+ 24	1.600	0.0
		40.0
AC	Current Requirements (Amps)	Wattage Requirements (VA)
110	0.6	69.0
230	0.3	69.0

Glossary

ALIAS	English representation contained within single quotes that references an object.
.ani	Extension used for Animation files.
ASCII	A numeric code used by computers to represent characters.
BIT	A single logical or physical resource that can be either ON (true, 1) or OFF (false, 0).
COMMENT	Text following a semicolon on an event line within a cue, it is used to annotate the cue.
COMPLIANCE	Additional feedback applied according to the equations in the firmware and parameters supplied by the user that tends to reduce the output signal.
CONST	Constant
CONTACT CLOSURE	Completes a circuit. A voltage is applied to a reference pin of a bit's connector. When the switch is closed, the voltage is returned on another wire to the same bit, completing the circuit. When the switch is closed, the I/O pin gets voltage.
CUE	A list of up to 512 EVENTS containing verb, object, token, and variable items.
db	Decibel
E/S	Emergency Stop
EVENT	A single line of verb, object, token and parameter items contained in a CUE.
FET	Field Effect Transistor - an electronically controlled switch.
FLASH	Fast, electrically erasable, and programmable in the circuit non-volatile memory devices.
FW	Firmware
HMR	Horizontal Module Rack
HW	Hardware

ICM	Intelligent Controller Module
I/O	Input/Output
IOM	Input/Output Module
JMP	Push-on jumper, shunt - a small (approximately ¼” x 1/8” thick) piece of plastic with a metal insert. The jumper is set by pushing it down over a pair of pins.
KEY	A piece of hardware that keeps a module from being plugged into a slot that is wired and keyed for a different kind of module.
LABEL	A name, followed by a colon on a line of a CUE, used for a forward or backward jump.
LED	Light Emitting Diode (indicator, light, lamp)
MIDI	Musical Instrument Digital Interface
MPCL	Media Pro® Control Language
OBJECT	Term used to reference a resource within the Media Pro® system.
OFF	False, 0, Open
ON	True, 1, Closed
PARAMETER	The item that follows a token. The list of parameters is in section 3 of the MP4000 User’s Operation Manual.
PLC	Programmable Logic Controller
PORT	A resource on a module in case of the DSM. There are 2 ports.
P-P	Peak to Peak
RACK	A card cage containing Media Pro® 4000 Modules.
RESOURCE	A controllable device connected to or contained within the Media Pro® 4000 system.
RMS	Root Mean Squared
SLOT	A physical location in a RACK that contains a Media Pro® Module.

SMPTE	Refers to Society of Motion Picture & Television Engineers , and the standard for timing signals set by this group.
STRING	A collection of alphanumeric characters contained in double quotes, used with the DISPLAY command.
SW	Software
THD & N	Total harmonic distortion and noise
TOKEN	Reserved words for modifiers of the VERBs used in a cue event. The list of TOKENs is in section 3 of the MP4000 User's Operation Manual.
TYPE	The kind of OBJECT being referred to in a direct addressing statement. The list of TYPEs is in section 3 of the MP4000 User's Operation Manual.
VAC	Volts Alternating Current
VARIABLE	A 32-bit value that can contain a number used in a cue line. A variable may be assigned an ALIAS . There may be a maximum of 512 variables per cue.
VDC	Volts Direct Current
VERB	Reserved words for the actions used in a CUE EVENT . The list of VERBs is in section 3 of the MP4000 User's Operation Manual.
VMR	Vertical Module Rack.
.wav	Extension used for WAVE files, contains sound data.
Z-RAILS	Two Z-shaped rails on the back of the rack, adjacent and parallel to the space for the I/O connectors on the Modules when the modules are inserted. The field connectors attach to the Z-rails.