MADRAS

(Muti-format Analog/Digital Rack-mount Adapter System)

Online Reference Manual

Pinnacle Systems, Inc.
280 N. Bernardo Avenue
Mountain View, CA 94043

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Official Notices and Warranties

FCC DECLARATION OF CONFORMITY

This equipment has been tested and found to comply with the limits for a Class A only 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 installation 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. Any changes or modifications not expressly approved by Pinnacle could void the user's authority to operate this device.

Note: To minimize emissions from your system, use only shielded interface cables.

CE

DECLARATION OF CONFORMITY

Application Of Council Directive 89/336/EEC

Standards to which Conformity is Declared:
EN 55022 and EN 50082-1

Manufacturer's Name:	Truevision Inc.
Manufacturer's Address:	2500 Walsh Avenue Santa Clara, CA 95051
Type of Equipment:	Break Out Box / Transcoder
Model Name:	MADRAS
Tested By:	EMCE Engineering, Inc. 44370 S. Grimmer Blvd. Fremont, CA 94538-6309 USA
Manufacturer's Test Engineer:	Bill Stutz

I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive and Standard.

Name (please print): Carl Calabria

Title: Senior VP of Engineering

Signature: Carl Calabria

Date: August 18, 1997

Important: As of March 12, 1999, Truevision is 100% owned by Pinnacle Systems, Inc.

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If you encounter problems with your MADRAS unit, contact your dealer or VAR first. They will provide you with assistance, or obtain an RMA number from Pinnacle for your product. Then you may arrange for service or for warranty repair by shipping your MADRAS unit to:

Pinnacle Systems, Inc.
280 N. Bernardo Avenue
Mountain View, CA 94043

There will be no charge for warranty service except for your prepaid shipping cost to our site. We suggest that you retain the original packing material in case you need to ship your MADRAS to us. When returning it to our site, please be sure to include:

Name
Address
Phone Number
Dated Proof of Purchase
RMA Number
Description of the Problem

We cannot assume responsibility for loss or damage during shipping. After we repair or replace (at our option) your MADRAS unit under warranty, it will be shipped back to you at no cost.

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Chapter 1 - Introduction

Contents

In this Chapter:

- MADRAS Overview
- System Requirements
- Unpacking
- Product Information
- Using This Manual

Chapter 1

Introduction

MADRAS Overview

Pinnacle's Multi-format Analog Digital Rack-mount Adapter System (MADRAS) is an intelligent hub for interfacing audio and video signals to and from the TARGA 2000 SDX based nonlinear video editing workstation. MADRAS transcodes all major analog and digital audio/video formats in real-time including SMPTE 259M Component and the new DV/1394 standard.

Designed to be used either as a stand-alone device or together with Pinnacle's new TARGA 2000 SDX, MADRAS provides the essential bridge between today's mixed-format analog and digital world and the end-to-end digital broadcast and post-production studio environment of the future.

By employing MADRAS, a DV camera can be connected via the IEEE 1394 port on MADRAS to transcode the compressed DV footage in real-time to the uncompressed 4:2:2 SMPTE 259M format. TARGA 2000 SDX can acquire this uncompressed serial digital video stream into nonlinear editing applications that would not otherwise be able to operate on DV content directly. The TARGA 2000 SDX can then be used for authoring at visually lossless quality with the final work laid off to any video tape format.

MADRAS can also operate as a stand-alone quality transcoder with input and output formats and conversion options controlled through the unit's front panel, or from a PC via RS-422 or RS-232 serial interface. MADRAS supports the following I/O formats:

- IEEE 1394 DV compressed bit stream
- SMPTE 259M Component Serial Digital Video
- YPbPr/GBR Component Analog Video
- Composite & Y/C Video
- AES/EBU Serial Digital Audio
- Balanced Analog Audio
- Unbalanced Analog Audio

System Requirements

Pinnacle highly recommends that you connect a TARGA 2000 SDX system to your MADRAS. MADRAS will work as a stand-alone device (controlled via its front panel) with a PC or Power Macintosh TARGA 2000 SDX system. If you do not have a TARGA 2000 SDX system, your input source must be time-based corrected. If you have a PC that uses Windows NT 4.0, you can operate MADRAS as a host-controlled device (controlled via the PC). An unused RS-422 or RS-232 serial port and serial cable, and the Setup Software, are needed for host control of MADRAS.

Unpacking

Make sure the following items are included in your MADRAS package:

- MADRAS
- Two Power Cables (120 or 240 volt)
- MADRAS CD-ROM
- CA-213 Cable (for TARGA 2000 SDX systems)
- Rack Mount Assembly

Product Information

The Warranty/Registration Card for your MADRAS can be found on the MADRAS CD-ROM. Please print the card file and follow the directions on the card to register your product. Also, please record the following information before you assemble your MADRAS system. This information will be needed by Pinnacle Technical Support if you should ever need help from them.

Purchased From: _____
Purchase Date: _____
Serial Number: _____

Chapter 1

Introduction

Using This Manual

Here is a quick overview of this manual's Chapters and Appendices:

- Chapter One discusses the MADRAS features, package contents, and system requirements.
- Chapter Two gives instructions for attaching the power cord, serial cable, TARGA 2000 SDX, and audio/video inputs and outputs (A/V I/O).
- Chapter Three describes controlling MADRAS A/V formats by way of the MADRAS front panel, or by way of a PC.
- Appendix A gives the MADRAS technical specifications.
- Appendix B contains the rack mount assembly instructions for MADRAS.
- Appendix C lists the MADRAS cable connector assignments.
- Appendix D contains instructions on how to connect MADRAS to Avid's Media Composer system.
- Appendix E contains information for contacting Pinnacle.

Chapter 2 - Setting Up MADRAS Hardware

Contents

In this Chapter:

- Safety Considerations
- Attaching The Rack Mount Hardware
- Attaching The Power Supply
- Connecting MADRAS To Avid’s Media Composer System
- Connecting The TARGA 2000 SDX
- Attaching The Host Serial Cable
- Audio And Video Input/Output Attachments

Chapter 2

Setting Up MADRAS Hardware

Safety Considerations For MADRAS

The following safety guidelines have been prepared by Pinnacle to avoid potential problems and to ensure safe operation of the MADRAS unit:

- The maximum recommended ambient temperature for MADRAS is 40˚ C. Recommended ambient relative humidity is 10-90%. These factors should be considered when determining the operating environment.
- If installed in a closed or multiunit assembly, care should be taken not to let the temperature around MADRAS exceed 40˚ C.
- Consideration should be given to the connection of equipment to the supply circuit and the effect that overloading of circuits might have on over current protection and supply wiring. Power requirements are listed on the MADRAS rear panel, and you should make certain that your power supply provides adequate power for MADRAS and any other units in the assembly.
- MADRAS attains proper grounding through its power cord, and power distribution in the assembly (e.g., use of power strips, etc.) should provide proper grounding to the power mains. Make sure that power distribution to the MADRAS power cord provides reliable grounding.
- When installing this device in a rack, consideration should be given to ensure ample flow of air around MADRAS and other devices in the assembly. This includes making sure the cooling vents on your MADRAS unit are not obstructed.
- When installing MADRAS in a rack mount, evenly distribute weight in the assembly to avoid top-heavy situations where the rack mount could tip.

Attaching The Rack Mount Hardware

The Rack Mount hardware is included with the MADRAS package. Rack Mount Assembly Instructions can be found in Appendix B of this manual.

Attaching The Power Supply

MADRAS uses a standard computer power cable. Power cords are provided for both 120-volt and 240-volt. MADRAS will automatically adjust to the power voltage and frequency used. Plug the appropriate cable into a wall socket (or properly grounded power strip) and into the MADRAS power connector (see Figure 2-1). The MADRAS front panel has a green power indicator that will be lit if power is on.

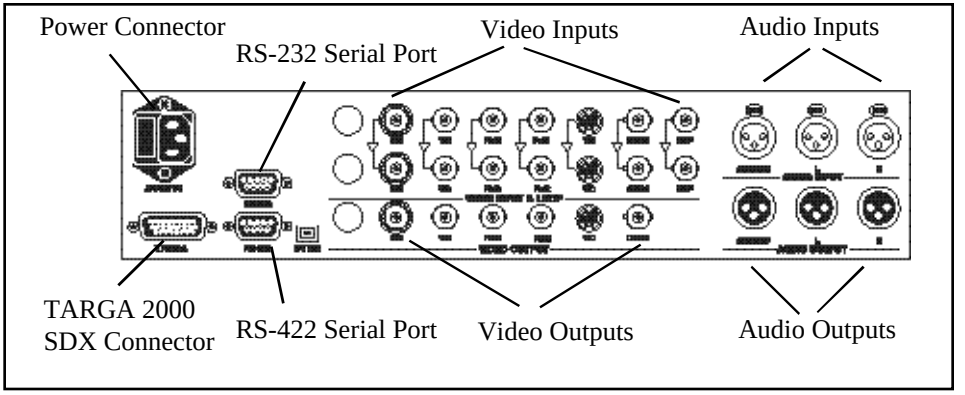


Figure 2-1 MADRAS Connector Layout

Connecting MADRAS To AVID's Media Composer System

Refer to Appendix D for instructions on how to connect MADRAS to an Avid® Media Composer® system.

Connecting The TARGA 2000 SDX

The CA-213 umbilical cable connects MADRAS to your TARGA 2000 SDX system. Attach the CA-213 26-Pin D-Type connector to the MADRAS TARGA connector (refer to Figure 2-1). Attach the CA-213 60-Pin D-Type connector to the Input/Output connector of your TARGA 2000 SDX (refer to TARGA 2000 SDX Installation Guide).

Chapter 2

Setting Up MADRAS Hardware

Attaching The Serial Cable

Note: Serial cable attachment to MADRAS is not applicable for Avid's Media Composer.

MADRAS host control is accomplished via serial connection from a RS-232 or RS-422 serial port on the host computer to the appropriate MADRAS serial port connector (see Figure 2-1). If you do not have a free serial port, you can either operate MADRAS through the LCD display or purchase a hardware card to expand your computer's I/O capabilities.

Input/Output Attachments

Your MADRAS unit supports Composite (CV), S-Video (Y/C), Component (Betacam, SMPTE/EBU, RGB), SMPTE 259M Component Serial Digital, and 1394 DV video signal formats. MADRAS also supports balanced analog, AES/EBU, and DV digital audio formats. Figure 2-2 shows the basic layout of the MADRAS connectors.

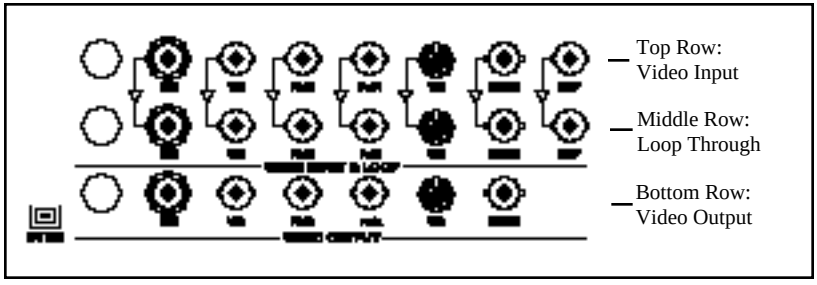


Figure 2-2 MADRAS Video Connector Layout

Video Input Connectors

The top row of MADRAS connectors are the Video Input and Reference connectors (refer to Figure 2-2). Use these to attach your video input signals and your master video synchronization reference. Use the following guide to identify the proper attachments for your equipment:

SDI: If you are using SMPTE 259M Component Serial Digital video equipment use the BNC labeled SDI.

Y/G,Pb/B,Pr/R: The MADRAS BNC connectors labeled **Y/G**, **Pb/B**, and **Pr/R** are used for Component Video. The first part of each labeling (Y,Pb, and Pr) represents a color difference labeling, while the second part of each labeling (G,B, and R) designates Green, Blue, and Red (RGB) labeling. Your Component Video input source will have similar labels, and generally the cables accompanying your input source will be color coded or otherwise labeled for easy setup.

The color difference labeling Pinnacle uses (Y/Pb/Pr) is a standard representation of a Component video signal format. You may encounter others, such as Y/B-Y/R-Y or Y/U/V. In these cases, attach the Y cable to the Y/G connector of the MADRAS, the B-Y or U cable to the Pb/B connector of the MADRAS, and the R-Y or V cable to the Pr/R connector of the MADRAS.

Y/C: If you are using an S-Video source, use the 4-pin Mini-DIN MADRAS connector labeled **Y/C.**

CV/CS: If you are using a Composite Video source or are attaching a sync signal, use the MADRAS BNC connector labeled **CV/CS** for Composite Video/Composite Sync.

Ref: The TARGA 2000 SDX can be synchronized, or genlocked, to a house reference for use with other video equipment through the Reference connector. This is done by either attaching a master timing device to each device to be synchronized or attaching a second device's video output to the MADRAS Ref input. *Do not use the Ref Loop as a pass through reference. Refer to the Loop Through section below.*

DV I/O: For IEEE 1394 DV compressed video streams, use the DV I/O port near the MADRAS serial port connectors.

Loop Through

The middle row of connectors on MADRAS are for buffered video loop through. Loop Through is a way to preview your input video stream ***before*** it is passed to the TARGA 2000 SDX (or independent of a TARGA system). To use Loop Through, simply attach your video preview device to the appropriate format connector. Loop Through connectors do not need to be terminated, but the video preview device should be.

Note: It is not recommended to use the Ref Loop as a signal timing source for other equipment due to a slight signal delay caused by the Loop Through active circuitry.

Video Output Connectors

The Bottom row of connectors on MADRAS are the Video Output Connectors. Use these to attach Video Output devices (e.g., Betacam deck) to your MADRAS and TARGA 2000 system. These are set up the same as the Video Input Connectors.

Audio Connectors

MADRAS has connectors for balanced analog and AES/EBU audio inputs and outputs (refer to Figure 2-3).

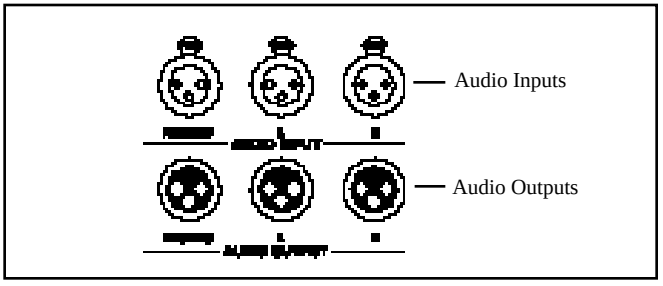


Figure 2-3 MADRAS Audio Connections

If you are using balanced analog input, use the XLR connectors labeled "L" and "R" for left and right. If you are using AES/EBU audio equipment, use the single XLR connector for AES/EBU.

Chapter 3 - Controlling MADRAS

Contents

In this Chapter:

- Overview
- Front Panel (Local) Control
- Installing MADRAS Software For Windows NT
- PC (Host) Control

Chapter Three

Controlling MADRAS

Overview

MADRAS can be controlled by way of its Front Panel (Local or MADRAS Control). MADRAS can also be controlled from any PC that uses Windows NT 4.0 and has a RS-232 or RS-422 serial port available (Host Control). MADRAS Setup Software for Windows NT 4.0 has been included in your package to provide host control functionality to your MADRAS.

Front Panel (Local) Control

If you are using MADRAS as a stand-alone video transcoder, or do not have a serial cable to connect a host computer, you can control MADRAS via the LCD display on the front panel. The LCD menus are similar to the host control panel menus, and are accessed with the control buttons beneath the LCD display. Figure 3-1 shows the LCD menu layout. To select a menu item, simply use the control buttons to display it, and press the Enter button. An asterisk (*) will appear in the corner, denoting it as the active item.

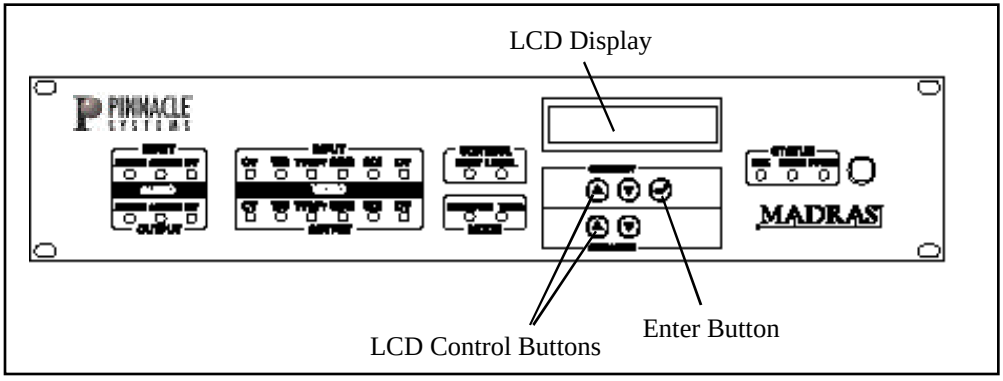


Figure 3-1 LCD Controls

The main LCD menu (Figure 3-2) is displayed below. This provides the same options as the host control panel interface and menus. The Category buttons are used to move between the items represented on the left, which are the same

as the host control menu options (Control Mode, TARGA/Transcode, Video In, Video Out, Audio In, Video Setup, Audio Setup, Errors, and Help). When you switch to a new Category, you will always start with the active item displayed. To move through Category's options (shown as left and right below), use the Selection buttons. Press the Enter button to select the desired function. An asterisk will appear in the corner to mark the active selection.

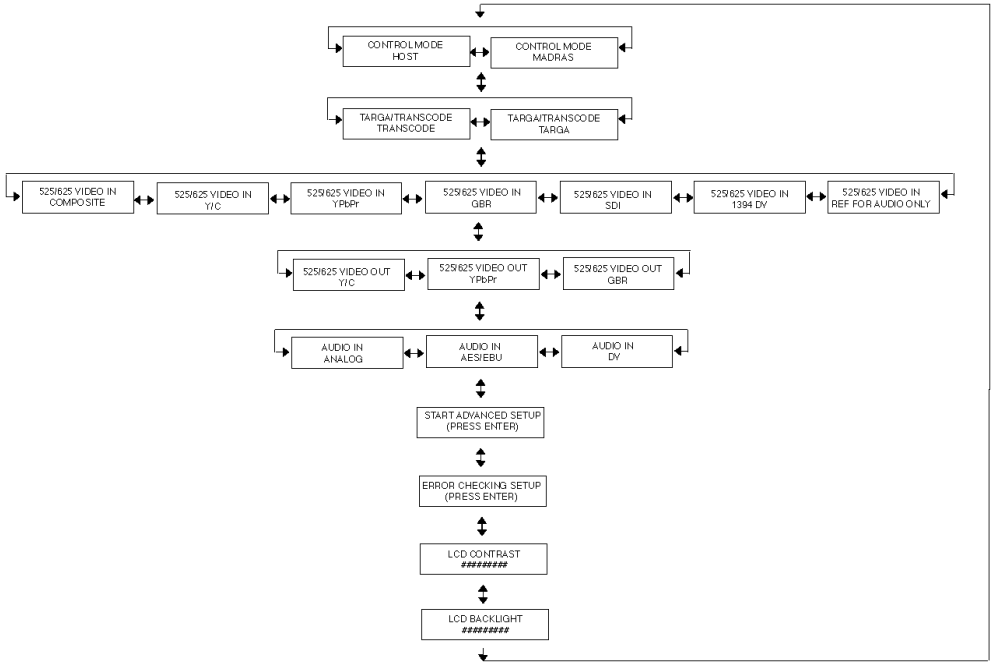


Figure 3-2 LCD Menu Contents

The LCD Menu contents are the same as the control panel contents, with three exceptions: LCD Contrast and LCD Backlight controls are provided to change the appearance of the LCD Display. Use the Category buttons to select the LCD option, and the Selection buttons to increase or decrease the setting.

Error Checking Setup currently lists one entry, Input EDH Checking. This setting can be enabled or disable.

Installing The MADRAS Setup Software For Windows NT 4.0

The Pinnacle CD-ROM contains an installation program that loads the MADRAS software for you. The software installation procedure is as follows:

1. Exit any open applications.

2. Place the Pinnacle CD into the CD-ROM drive of your computer (typically drive d:). The Pinnacle installation program will open automatically.

3. Click the Install MADRAS selection.

4. The installation will lead you through a number of screen prompts, including prompts for the creation of a MADRAS program folder and choices of communications ports. Simply answer the questions when prompted by the program. If you are not sure how to answer a prompt, accept the default.

Important: If you want to connect to MADRAS by way of communication ports 5-8, you must manually create the shortcut for the port within Windows NT.

Creating A Shortcut For Ports 5-8

1. Open the MADRAS program start folder.
   (Double left click on My Computer icon » Double left click on C: » Double left click on Winnt40 » Double left click on Profiles » Double left click on All Users » Double left click on Start Menu » Double left click on MADRAS » Close all windows just opened except MADRAS)

2. Open the MADRAS folder.
   (Double left click on My Computer icon » Double left click on C: » Double left click on MADRAS » Close all windows just opened except MADRAS)

3. Create shortcut in MADRAS program start folder.
   (Point to MADRAS icon in MADRAS folder » Press left mouse button and hold it while "dragging" MADRAS icon into MADRAS program start folder » Release left mouse button. A shortcut to MADRAS should be added to program start folder, it will have a small arrow on lower left side of icon)

4. Rename new shortcut.
   (Click right mouse button while pointing at new shortcut icon » Left click on Rename » Replace text "Shortcut to MADRAS.exe" in edit box with desired icon caption)

5. Edit command line in shortcut.
   (Click right mouse button while pointing at new shortcut icon » Left click on Properties » Left click on Shortcut tab » Left click while pointing to the blank area on the right of "C:\MADRAS.exe" in Target edit box » Append the text " /n "Your Title" " using the COM port number in place of the "n" and the text you want displayed on the title bar of the control panel in place of "Your Title." It is important to include the blank space in front of the "/n" and between the two items. The double quote marks surrounding "Your Title" should also appear in the text » Left click on OK)

6. Test the shortcut.
   (Double click on the new shortcut » Check that the MADRAS box is connected to the host computer via the COM port entered in the Target line and that the MADRAS is turned on » The MADRAS control panel should be displayed on the Host computer with the Link indicator green and the title bar should contain the correct text » If the control panel did not work as expected, repeat the steps to edit the command line and check the parameters)

7. Finish up.
   (Close MADRAS window and MADRAS program start window)

PC (Host) Control

To access the MADRAS control panel, open the folder you created with the setup software (e.g., MADRAS) and click on **MADRAS.exe**. The following control panel appears (Figure 3-3):

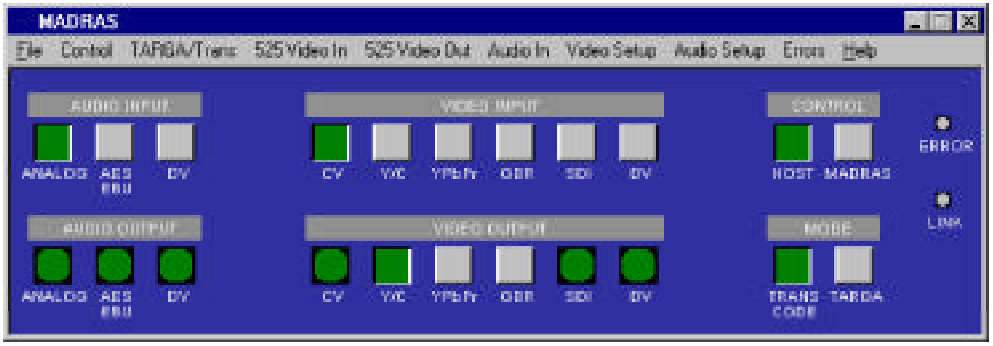


Figure 3-3 MADRAS Control Panel

The MADRAS control panel lets you make quick changes with a single click. Clicking on any button makes that selection active. The items in the Control Panel can also be set through the menus. Selectable items are defined as follow:

File Menu

Open -- lets you open a previously saved preset of A/V formats.

Save -- saves the current MADRAS configuration for future use.

Save As -- lets you change the name of the current MADRAS preset.

Print -- prints a list of the MADRAS preset (i.e., input and output settings.)

Print Preview -- lists the MADRAS preset settings without actually printing.

Print Setup -- allows you to configure for printing.

Recent File -- keeps track of the recently used MADRAS presets so you can select them without using the Open dialog.

Control Menu or Control Buttons

These items determine the MADRAS control mode.

MADRAS -- designates the MADRAS LCD as the control device.

Host -- slaves MADRAS control to host computer via serial port.

Off-line -- allows you to make changes in the MADRAS control panel without actually affecting the MADRAS unit.

TARGA/Trans Menu or Mode Buttons

This function sets MADRAS to send video information to a TARGA 2000 SDX system or to process video information and send it straight to output.

TARGA -- sets the MADRAS unit to work through the TARGA 2000 SDX.

Trans Code -- sets the MADRAS to function as a stand alone video signal transcoder.

Video In Menu or Video Input Buttons

The Video In settings determine what type of video signal is being input to MADRAS, and tells MADRAS which input to select if multiple signals are available. The options are:

Composite (C/V) -- select this if you are using a Composite Video input source.

Y/C -- select this for a S-Video input source.

YPbPr -- select this for a Betacam Component input source.

GBR -- select this for a GBR (RGB) Component input source.

SDI -- select this for a Serial Digital input source.

1394 DV -- select this for a IEEE 1394 DV input source.

Ref For Audio (menu only) -- select this to use the external Ref signal as a clock base for recording audio without video.

Video Out Menu or Video Output Buttons

Video Out sets the active video output type. (CV and SDI are always output.) The options are:

Y/C -- select this for a S-Video output source.

YPbPr -- select this for a BetaCam or MII Component output source.

GBR -- select this for a GBR (RGB) Component output source.

Note: CV and SDI will always be present during output, regardless of the video input. DV will also be present during output as long as DV is not selected as input. That is, DV can either be input or output but not both.

Audio In Menu or Audio Buttons

Analog -- select this for balanced analog audio input signals.

AES/EBU -- select this for a AES/EBU audio signal.

DV -- select this for DV audio equipment.

Video Setup Menu Options

MADRAS is designed to be compatible with most video formats. Because of this, settings are available to make changes to the input and output signal types set in the Video In and Video Out menus. Figure 3-4 shows the Video Setup Menu contents.

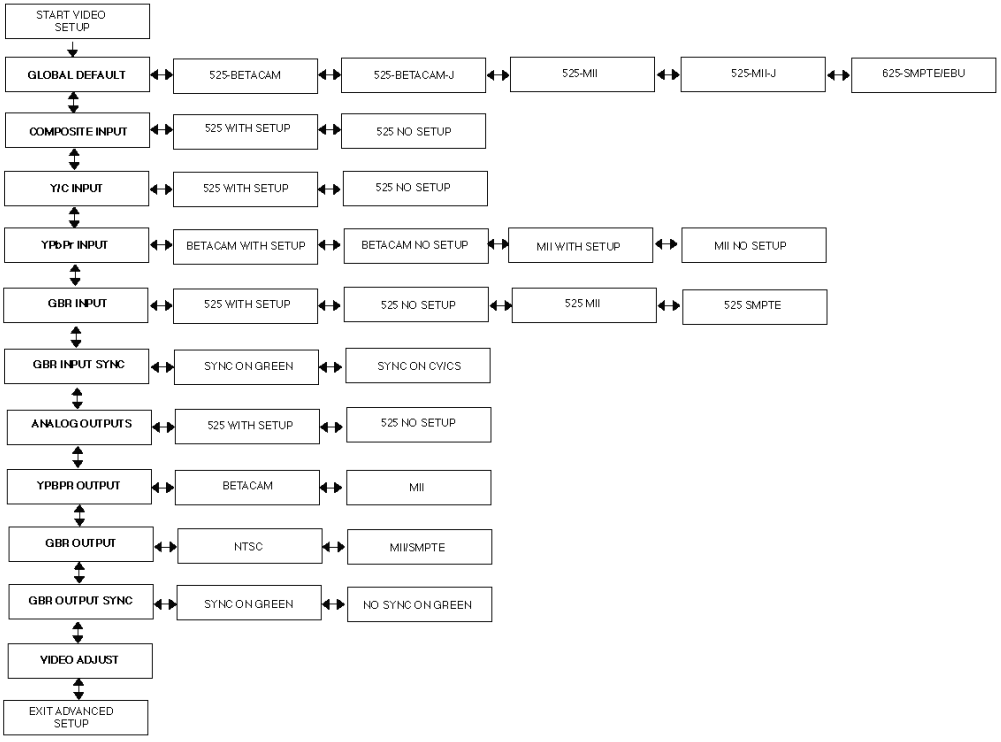


Figure 3-4 Video Setup Menu Items

The first item, Global Default, lets you select from a list of signal presets (e.g., 525-Betacam, 625-SMPTE/EBU) that automatically sets all of the MADRAS inputs and outputs to those specific levels.

In the diagram below (Figure 3-5), Global Defaults are listed across the top, with the various MADRAS inputs and outputs (e.g., Composite, Y/C, YPbPr) listed on the left. The row of inputs/outputs listed beneath a Global Default represent the settings that selecting that Global Default would give you.

	525-BETACAM	525-BETACAM-J	525-MII	525-MII -J	625-SMPTE/EBU
COMPOSITE INPUT	525 WITH SETUP	525 NO SETUP	525 WITH SETUP	525 NO SETUP	625-SMPTE/EBU
Y/C INPUT	525 WITH SETUP	525 NO SETUP	525 WITH SETUP	525 NO SETUP	625-SMPTE/EBU
YPbPr INPUT	BETACAM WITH SETUP	BETACAM NO SETUP	MII WITH SETUP	MII NO SETUP	625-SMPTE/EBU
GBR INPUT	525 WITH SETUP	525 NO SETUP	525 MII	525 SMPTE	625-SMPTE/EBU
ANALOG OUTPUTS	525 WITH SETUP	525 NO SETUP	525 WITH SETUP	525 NO SETUP	625-SMPTE/EBU
YPBPR OUTPUT	BETACAM	MII	BETACAM	MII	625-SMPTE/EBU
GBR OUTPUT	NTSC	MII/SMPTE	NTSC	MII/SMPTE	625-SMPTE/EBU

Figure 3-5 Global Default Settings

Of course, circumstances may arise where you need to change one individual input or output. Therefore, settings are also available for the individual MADRAS inputs and outputs to provide more specific control than a Global Default. In Figure 3-5 the individual signal types are listed on the left, with their options listed across. For example, you could select the 525-Betacam Global Default to set all NTSC levels, all with setup. If you had an input source that provided Y/C input without a setup signal, you could then use the Y/C Input Video Setup Menu item to select Y/C INPUT 525 NO SETUP, without affecting the other inputs or outputs.

When you change a setting in the Video Setup Menu, it will become the new setting. In the previous example, when you selected Y/C INPUT 525 NO SETUP, it became the setup setting for the S-Video input connection, and will remain as such until changed in the Video Setup Menu.

GBR Input & Output Sync

MADRAS allows you to select if CV/CS and/or the Green signal will carry Sync. For GBR Input, you can select either the Green signal or CV/CS to carry sync. For GBR Output if you select Sync On Green, the Sync signal will be available on both the Green signal and CV/CS; however, if you select CV/CS there will be no Sync on the Green signal.

Video Adjustments

Video adjustments can be made to the various inputs and outputs available on the MADRAS. In Figure 3-6 the part of the signal adjusted is shown on the left, and the signal format options are listed across the top.

	CV Input	Y/C Input	YPbPr Input	GBR Input	CV Output	Y/C Output	YPbPr Output	GBR Output
Brightness	*	*						
Contrast	*	*						
Saturation	*	*						
Y_Gain			*				*	
Y_Black			*					
Pb_Gain			*				*	
Pb_Black			*					
Pr_Gain			*				*	
Pr_Black			*					
G_Gain				*				*
G_Black				*				
B_Gain				*				*
B_Black				*				
R_Gain				*				*
R_Black				*				
CV_Gain					*			
Luma-Gain						*		
Chroma_Gain						*		
MII_Black							(1)	

(1) Only when using 525 MII

Figure 3-6 Valid Video Adjustments

When Video Adjust is selected from the Video Setup menu, a window similar to the one shown in Figure 3-7 will be displayed.

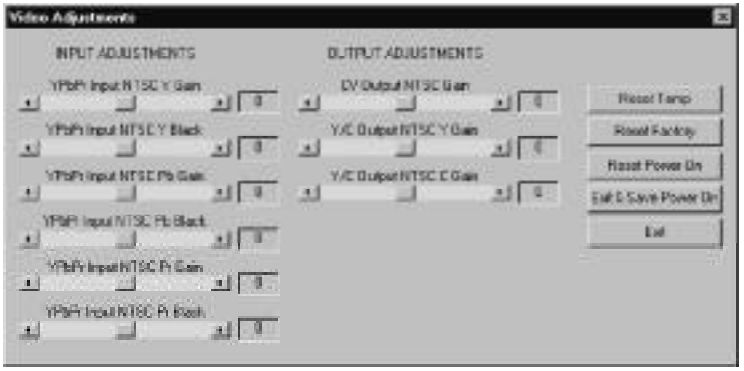


Figure 3-7 Valid Video Adjustments Window

For the example shown in Figure 3-7, MADRAS was set to have YPbPr as the video input and Y/C as the video output. Values can be placed to the various adjustments by using the sliders. The buttons on the far right are defined as follows:

Reset Temporary -- resets all settings to where they were when the Video Adjustments window was opened.

Reset Factory -- temporarily resets all settings to factory calibrations.

Reset Power On -- resets all settings to the values stored when the Save Power & Exit button was last used. These are also the values that the MADRAS will use when the power button on the MADRAS is activated.

Exit & Save Power On -- saves all MADRAS video adjustments and closes the window. These are the values that the MADRAS will use when the power button on the MADRAS is activated.

Exit -- closes the Video Adjustments window.

Audio Setup Menu

The Audio Setup settings allow you to select the audio sampling rate for Balanced Audio Input, DV Audio Input, and DV Audio Output. Selections are as follows:

Input Audio rate -- allows you to select the audio sampling rate for balanced audio input, and also DV audio input if Avid's Media Composer system is being used. Sampling rate selections are 48 kHz, 44.1 kHz, and 32 kHz. If the Media Composer is not present, the DV audio input sampling rate will follow the DV channel sampling rate.

Output DV Audio Rate -- allows you to set the audio sampling rate going out the DV channel if Avid's Media Composer system is being used. Sampling rate selections are 48 kHz, 44.1 kHz, and 32 kHz. If the Media Composer is not present, this option is not displayed on the front panel and disabled (grayed out) in the host control panel.

Errors Menu

Input EDH (Error Detection Handling) Checking -- activates error checking on input signal. The Error LED on the MADRAS front panel will light for the following reasons:

- If the SDI input has errors or no EDH packets
  (Note that Input EDH checking must be enabled.)
- If the Media Composer video FIFO over/underflows
  (Note that Avid's Media Composer system must be present and DV used for video.)
- If output SDI errors occur in transcode mode.

Help Menu

About MADRAS -- gives version number of MADRAS software.

Appendix A — Technical Specifications

MADRAS Hardware Specifications

General

Width	-- 16.5" (19.0" w/rack mount wings)
Height	-- 3.5"
Depth	-- 16.5"
Weight	-- 13.75 lb. (6.25 Kg.)
Input Voltage Range	-- 85 to 264 VAC, 100-120V 50/60 Hz 1.0A 220-240V 50/60 Hz 0.5A
Input Current	-- 1.5A RMS Max. @ 115 VAC -- 18A Inrush Peak @ 115 VAC -- 36A Inrush Peak @ 230 VAC
Leakage Current	-- < 0.5 ma. @ 264 VAC 50/60 Hz.
Hold Up Time	-- > 20 ms @ 115 VAC
Ambient Temperature	-- Operating at 5 to 40° C
Ambient Humidity	-- Operating at 0 to 90% non-condensing
Mounting Option	-- Detachable, side-mounted standard rack-mount brackets (hardware for mounting in a 19.0" wide rack)
Sampling Structure	-- I.T.U. 656, 10 Bit Ready, 4:2:2, Component
Sampling Frequency	-- Y: 13.5 MHz CbCr: 6.75 MHz

Video Input

CV, Y/C
- -- 8 bit, 4:2:2 spatial resolution.
- -- Input gain and offset controls.
- -- Input saturation controls
- -- CV input passes through a Chroma notch filter
- -- Y/C input passes through a Chroma comb filter

* CV 1.0 V p-p, 75 Ω, BNC with active loop through
* S-Video Y: 1.0V p-p
C: 627mV p-p
4 pin DIN with active loop-through

Component
(GBR and YPbPr)
- -- 8 bit, 4:4:4 to 4:2:2 spatial resolution.
- -- Input gain and offset controls.
- -- Supports major format levels.
- -- BNC's with active loop through
- -- 13 bit, 3x3 color space matrix coefficients (Used for GBR input to YCbCr conversion)

* GBRS 714/714/714/286 mV p-p, 75 Ω, BNC
* GsBR 1000 (714+286)/714/714 mV p-p, 75 Ω, BNC
* Y 1.0 V p-p, 75 Ω BNC
* Pb +/- 350mV p-p, 75 Ω, BNC
* Pr +/- 350mV p-p, 75 Ω, BNC

Genlock Reference
- -- Input is 1Vpp, 75 Ω, BNC (REF)
- -- Active loop-through is 1Vp-p, 75 Ω, BNC (REF)

SDI
(SMPTE 259M)
- -- 10 bit resolution.
- -- Performs EDH handling/checking
- -- 800mV p-p 75 Ω, BNC with reclocked loop through (SMPTE 259M, 270 MHz)

* Levels are based on NTSC 100% white, 75% fully saturated bars.

Appendix A

Technical Specifications

DV1394

-- 8 bit resolution.
-- 4:1:1 for NTSC sources
-- 4:2:0 for PAL sources
-- 200mV, 4-pin IEEE-1394 connector

Supported Formats:

-- Composite (NTSC, NTSC-J, PAL)
-- S-Video (NTSC, NTSC-J, PAL)
-- YPbPr (NTSC Betacam, NTSC Betacam-J, SMPTE/EBU, MII)
-- GsBR, GBRS (NTSC, NTSC-J, MII, PAL)
-- SDI (SMPTE 259M/ITU-BT.656-3)
-- DV1394 (IEEE1394, NTSC, PAL)

Video Output

Supported Formats

-- Composite (NTSC, NTSC-J, PAL)
-- S-Video (NTSC, NTSC-J, PAL)
-- YPbPr (NTSC Betacam, NTSC Betacam-J, SMPTE/EBU, MII)
-- GsBR, GBRS (NTSC, NTSC-J, MII, PAL)
-- SDI (SMPTE 259M/ITU-BT.656-3)
-- DV1394 (IEEE1394, NTSC, PAL)

Video Performance
(Analog Outputs)

-- Bandwidth: NTSC/PAL CV,Y, GBR:-3dB @ 5.65 MHz
NTSC PbPr: -3dB @ 2.05 MHz
PAL PbPr: -3dB @ 2.45 MHz

-- Filtering: Sinx/x compensation with -3dB @ 6MHz

Appendix A

Technical Specifications

CV, Y/C

-- Interpolates 8 bit data path to a 10 bit DAC resolution.
-- Supports NTSC, NTSC-J and PAL.
-- Software gain control.
-- Y/C Delay < 20 nS

CV	1.0 V p-p, 75 Ω, BNC
S-Video	Y: 1.0V p-p
	C: 627mV p-p
	4 pin DIN

Component
(GBR and YPbPr)

-- Interpolates 8 bit data path to a 10 bit DAC resolution.
-- Supports major format levels.
-- Software gain control.
-- GBR and Y/Pb/Pr Delay < 20nS

GBRS	714/714/714/286 mV p-p, 75 Ω, BNC
* GsBR	1000 (714+286)/714/714 mV p-p, 75 Ω, BNC
Y	1.0 V p-p, 75 Ω, BNC
Pb	+/- 350mVp-p, 75 Ω, BNC
Pr	+/- 350mVp-p, 75 Ω, BNC

SDI
(SMPTE 259M)

-- 800 mV p-p, 75 Ω, BNC
-- SMPTE 259M, 270 MHz
-- 10 bit, 4:2:2 resolution
-- EDH handling
-- Adds EDH to SDX output if desired
-- Adds EDH to 259M output when analog/DV1394 inputs are selected.

DV1394

-- 200mVp-p, 4 pin IEEE-1394 connector

* Levels are based on NTSC 100% white, 75% fully saturated bars.

Appendix A

Technical Specifications

Audio Input

Balanced Inputs
- -- Channel 1 (left) 1 x XLR, line level, +4dBu, nominal
- -- Channel 2 (right) 1 x XLR, line level, +4dBu, nominal
- -- Headroom 16 dBu above nominal
- -- Input Impedance 20 kΩ nominal
- -- 16 bit ADC resolution
- -- Audio to Video Sync < 1mS
- -- Sample Rate 32kHz / 44.1kHz / 48kHz selectable derived from pixel clock per SMPTE 272M.

AES/EBU
- -- 1 x XLR, line level 2-7 Vp-p across 110 Ω,
- -- 2 Channel (L & R), 16 bit ADC resolution
- -- +20 dBu Full-Scale Digital

DV1394
- -- 16/12 bit resolution

Audio Output

Balanced Outputs
- -- Channel 1 (left) 1 x XLR, line level, +4dBu nominal output into 600 Ω load
- -- Channel 2 (right) 1 x XLR, line level, +4dBu nominal output into 600 Ω load
- -- Headroom 16 dBu above nominal
- -- 16 bit DAC resolution
- -- S/N Ratio better than 80dB
- -- Separation better than 75dB
- -- Bandwidth 20 Hz to 20kHz, +/- 3dB @ 48KHz.

AES/EBU
- -- 1 x XLR, line level 2-7 Vp-p across 110 Ω
- -- 2 Channel (L & R), 16 bit DAC resolution
- -- +20 dBu Full-Scale Digital

DV1394
- -- 16/12 bit resolution

Audio/Video Sync

General

MADRAS does not perform A/V lock other than for balanced audio input. If MADRAS for AVID Media Composer is used MADRAS performs A/V lock on DV-1394 audio in/out.

Video delays through MADRAS are as follows:

CV/YC, input/output	7.368 uS nominal
GBR/YPbPr, in/out	5.254 uS nominal
SMPTE 259M, I/O	5.254 uS nominal
DV1394, I/O	NA

Balanced Audio

-- MADRAS will lock balanced INPUT audio to the selected video source.
-- Balanced output audio will follow selected input audio source.

--Balanced input to output delay is:

125uS	32KHz nominal
90.7uS	44.1KHz nominal
83.3uS	48KHz nominal

AES/EBU

--Does NOT perform any audio/video lock.
--Separate cable feed, i.e. does NOT utilize embedded video/audio within Serial Digital
--AES/EBU input to output delay is:

125uS	32KHz nominal
90.7uS	44.1KHz nominal
83.3uS	48KHz nominal

DV1394

-- 16/12 bit resolution

Appendix A

Technical Specifications

MADRAS Standard Unit

-- Input audio is unlocked from the DV1394 video source.
-- Output audio from the selected audio source is unlocked to DV1394.

MADRAS Avid Media Composer Unit

-- Input audio is locked to the DV1394 video pixel clock.
-- Output audio from the selected audio source is locked to the source pixel clock and fed to DV1394.
-- Sample rate converters are used for both DV-1394 input audio and output audio.

Controls

User can choose to control MADRAS from either of the following:

-- Front panel buttons.
-- RS-232 or RS-422 connection to host computer. (Software control panel provided with MADRAS for user interface)

Miscellaneous

-- Does NOT output 0 to - 4 Volt composite sync signal for GBRS, but utilizes CV.
-- Default GBR sync format is GsBR.
-- MADRAS can work with TARGA 2000 SDX unit or as a stand alone transcoder.
-- MADRAS requires a stable video source.
-- MADRAS has an output PLL which has an maximum inherent lock up time on power up, and a minimum time on locked-input source switching.

MADRAS Input/Output Audio Matrix (Avid Media Composer / Xpress Connectivity Kit)

The matrix below is for a MADRAS unit designed for Avid's Media Composer system. The matrix indicates which audio output sample rates are available for a given audio input sample rate. All sample rates are in kHz.

IN \ OUT		Balanced Analog	AES EBU			IEEE 1394 Digital Video (DV)				AVID System		
			48	44.1	32	48 / 16	44.1 / 16	32 / 16	32 / 12 †	48	44.1	32
Balanced Analog		√	√	√	√	√	√	√	ST1	√	√	√
AES EBU	48	√	√	—	—	√	√	√	ST1	√	—	—
	44.1	√	—	√	—	√	√	√	ST1	—	√	—
	32	√	—	—	√	√	√	√	ST1	—	—	√
IEEE 1394 Digital Video (DV)	48 / 16	√	√	√	√	X	X	X	X	√	√	√
	44.1 / 16	√	√	√	√	X	X	X	X	√	√	√
	32 / 16	√	√	√	√	X	X	X	X	√	√	√
	32 / 12 ‡	√	√	√	√	X	X	X	X	√	√	√
AVID System	48	√	√	—	—	√	√	√	ST1	√	—	—
	44.1	√	—	√	—	√	√	√	ST1	—	√	—
	32	√	—	—	√	√	√	√	ST1	—	—	√

Note: The Avid system referenced is Media Composer.

√ Supported.

— Not supported.

X Not applicable here because DV is either an input or output but not both.

‡ 32 /12 has 4 channels but only Stereo 1 is used.

ST1 Stereo 1.

The locked or unlocked nature of the output audio is determined by the input source. If the input audio is locked to video, then the output audio will be locked to video. If the input audio is not locked to video, then the output audio will not be locked to video. MADRAS will lock the balanced audio input to the selected video source.

Avid's Media Composer system provides DV-1394 audio I/O sample rate selection via MADRAS control. This sample rate selection is independent of the audio source. Media Composer also locks the DV-1394 audio data to the video clock.

Appendix A

Technical Specifications

MADRAS Input/Output Audio Matrix (Standard Unit)

The matrix below is for a standard MADRAS unit. The matrix indicates which audio output sample rates are available for a given audio input sample rate. All sample rates are in kHz.

IN \ OUT		Balanced Analog	AES EBU			IEEE 1394 Digital Video (DV)				TARGA 2000 SDX		
			48	44.1	32	48 / 16	44.1 / 16	32 / 16	32 / 12 ‡	48	44.1	32
Balanced Analog		√	√	√	√	√	√	√	ST1	√	√	√
AES EBU	48	√	√	—	—	√	—	—	—	√	—	—
	44.1	√	—	√	—	—	√	—	—	—	√	—
	32	√	—	—	√	—	—	√	ST1	—	—	√
IEEE 1394 Digital Video (DV)	48 / 16	√	—	—	—					√	—	—
	44.1 / 16	√	—	—	—					—	√	—
	32 / 16	√	—	—	—					—	—	√
	32 / 12 ‡	√	—	—	—					—	—	√
TARGA 2000 SDX	48	√	√	—	—	√	—	—	—	√	—	—
	44.1	√	—	√	—	—	√	—	—	—	√	—
	32	√	—	—	√	—	—	√	ST1	—	—	√

√ Supported.
— Not supported.
X Not applicable here because DV is either an input or output but not both.
‡ 32 /12 has 4 channels but only Stereo 1 is used.
ST1 Stereo 1.

The locked or unlocked nature of the output audio is determined by the input source. If the input audio is locked to video, then the output audio will be locked to video. If the input audio is not locked to video, then the output audio will not be locked to video. MADRAS will lock the balanced audio input to the selected video source. Any audio generated by the SDX board and output through MADRAS will have audio that is unlocked.

Appendix B — Rack Mount Assembly

The rack mounting hardware for MADRAS is designed to fit cabinets with 19-inch wide racks and a depth of about 18 to 24 inches. Pinnacle recommends that the provided rack mounting or similar hardware be used due to the potential excessive weight of the cables that could be hanging from the MADRAS unit.

WARNING: To avoid the possibility of electrical shock, use only the screws provided when attaching the inner slides to the sides of the MADRAS unit.

Rack Mounting Hardware:

- Mounting Slides
- Miscellaneous Items (screws, nuts, etc.)
- Mounting Brackets

Equipment Needed:

- Medium size flat-head screwdriver

Procedure:

1. **Separate both sets of slides into three pieces.**
   The inner slide should be pulled forward until it locks, and then the locking button should be depressed to remove the inner slide. Then depress the middle-slide locking button and remove the middle slide from the outer slide.

2. **Determine where to mount MADRAS.**
   Use the outer slide to determine where to mount MADRAS within the cabinet rack. The slides are designed for use with 1/2-inch spaced rack holes. (The slides will also work with 5/8-inch spaced holes, but the front panel screw holes will not be aligned with the front rack and thus not used.)

Appendix B

Rack Mount Assembly

3. Insert the middle slide into the outer slide.
Refer to Figure 1. Insert the middle slide into the back end of the outer slide. Adjust the middle slide so that it is in the middle of the outer slide. Repeat this step for the other set of slides.

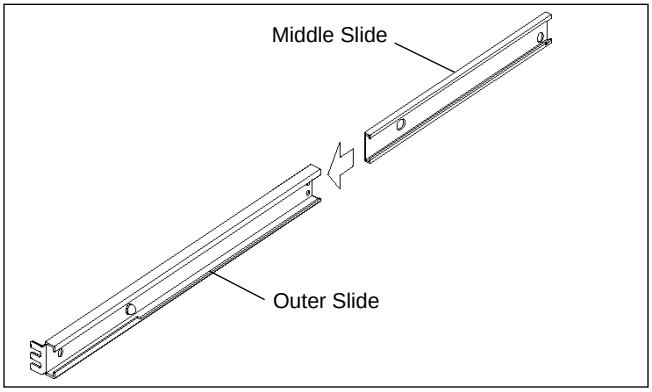


Figure 1. Middle Slide Into Outer Slide

4. Attach outer slide to front of cabinet rack.
Refer to Figure 2. Attach the front end of the outer slide to the front of the cabinet rack. If the front rack holes are not threaded for the screws, use the bar nuts. Attach the other outer slide to the other side of the cabinet.

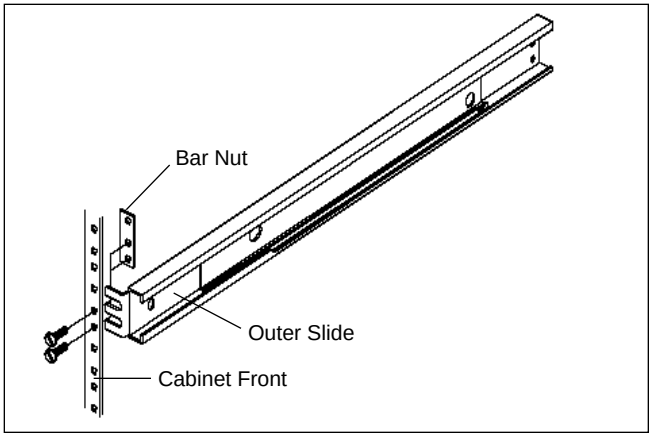


Figure 2. Outer Slide To Cabinet Rack

5. Attach brackets to rear cabinet rack holes.

Refer to Figure 3. Depending on the type of cabinet and depth of the rack when compared to the length of the outer slides, use either the extension brackets or the smaller end brackets. If the rack holes are not threaded for the screws, use the bar nuts.

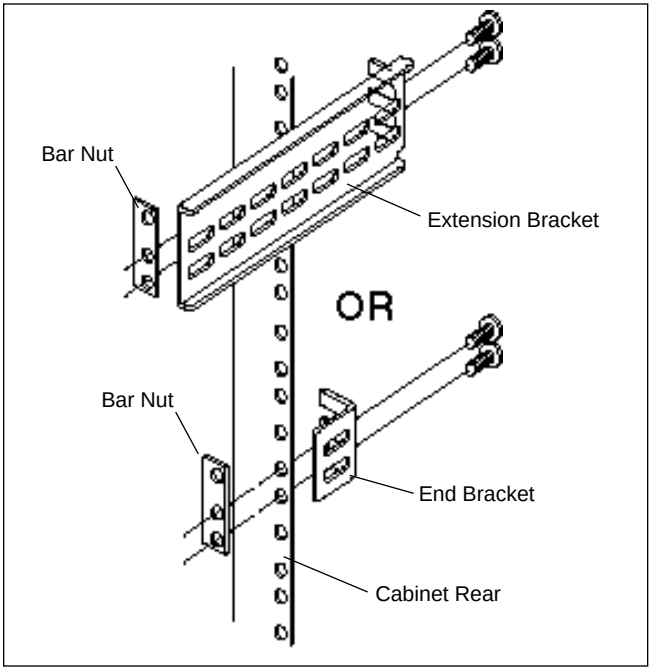


Figure 3. Bracket To Rear Cabinet

6. Attach rear of outer slides to each bracket.

Attach the rear of each outer slide to its corresponding bracket. Use the bar nuts to secure the screws. Refer to Figure 4.

Appendix B

Rack Mount Assembly

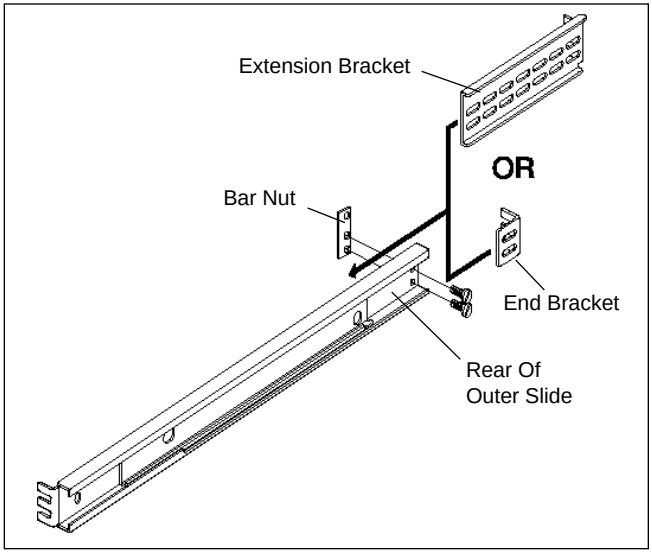


Figure 4. Attach Slide To Bracket

7. Attach inner slides to MADRAS.

Refer to Figure 5. Use screws that are provided to attach an inner slide to the side of the MADRAS. The locking button portion of the inner slide should be oriented towards the rear of the MADRAS. Attach the other inner slide to the other side of the MADRAS in the same way.

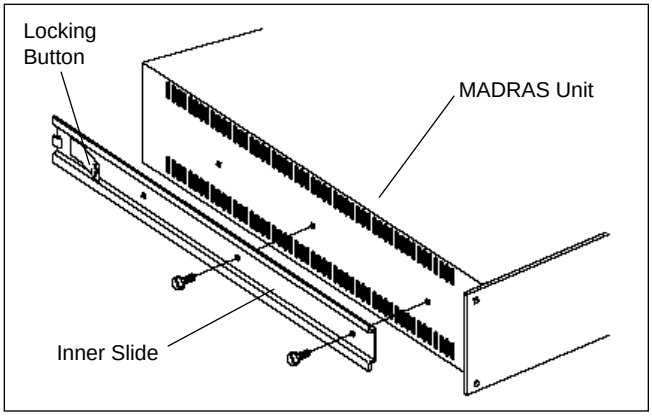


Figure 5. Attach Inner Slide To MADRAS

8. Place MADRAS into rack slides.

Refer to Figure 6. Extend middle slides in cabinet rack forward until they lock into place. Lift the MADRAS unit and guide the slides attached to the MADRAS into the middle extended slides on the rack. Depress the lock buttons on each side of the MADRAS, and push the MADRAS back into the middle slide. Then depress the middle-slide locking buttons to push the MADRAS back into the cabinet rack. The front of the MADRAS can be secured with 4 screws (not included).

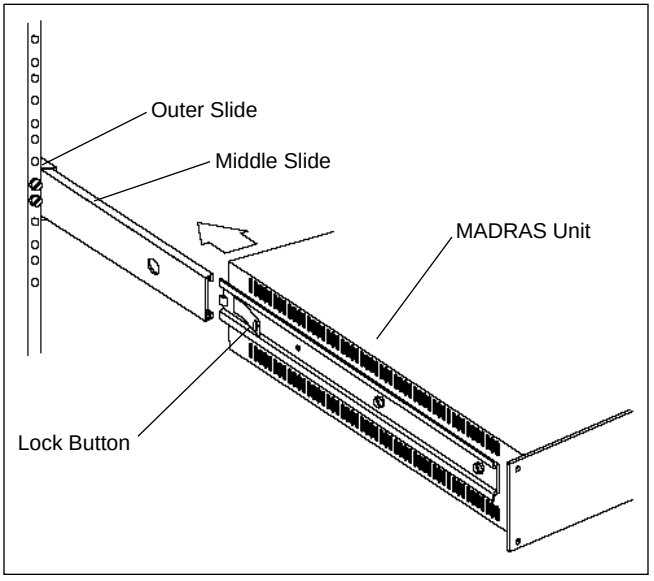
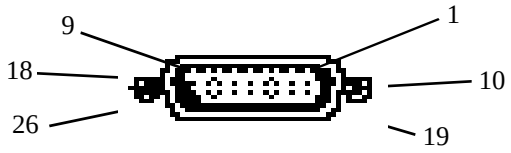


Figure 6. MADRAS Into Cabinet Rack

Appendix C — Cable Connectors

Pin assignments for the MADRAS 26-Pin TARGA connector are:



1 AES/EBU +
in from TARGA 2000

2 Ground

3 AES/EBU -
in from TARGA 2000

4 Ground

5 AES/EBU +
out to TARGA 2000

6 Ground

7 AES/EBU -
out to TARGA 2000

8 Ground

9 Genlock Reference
out to TARGA 2000

10 Ground

11 Ground

12 Ground

13 Ground

14 Ground

15 Ground

16 Ground

17 Ground

19 Reserved

20 Ground

21 SDI out to TARGA 2000 SDX

22Ground

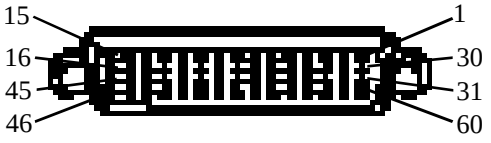
23 SDI in from TARGA 2000 SDX

24 Ground

25 Reserved

26 Ground

Pin assignments for the TARGA 2000 SDX connector are:



Pin	Signal	Pin	Signal
1	Not Used	31	Not Used
2	Digital Audio In (-)	32	Not Used
3	Digital Audio In (+)	33	Shield (Pins 58&59)
4	Not Used	34	Not Used
5	Genlock In	35	Not Used
6	Not Used	36	Not Used
7	Digital Video In	37	Shield (Pin 54)
8	Not Used	38	Not Used
9	Not Used	39	Shield (Pin 52)
10	Not Used	40	Not Used
11	Not Used	41	Shield (Pin 50)
12	Not Used	42	Not Used
13	Not Used	43	Not Used
14	Not Used	44	Not Used
15	Not Used	45	Shield (Pin 46)
16	Not Used	46	Digital Video Out
17	Not Used	47	Not Used
18	Not Used	48	Not Used
19	Not Used	49	Not Used
20	Not Used	50	Y Out (S-Video)
21	Not Used	51	Not Used
22	Not Used	52	C Out (S-Video)
23	Not Used	53	Not Used
24	Shield (Pin 7)	54	Analog Composite Video Out
25	Not Used	55	Not Used
26	Shield (Pin 5)	56	Not Used
27	Not Used	57	Not Used
28	Shield (Pins 2&3)	58	Digital Audio Out (+)
29	Not Used	59	Digital Audio Out (-)
30	Not Used	60	Not Used

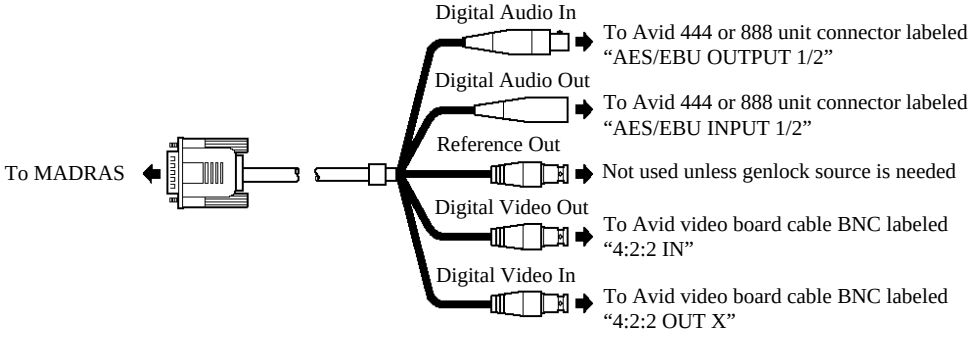
Appendix D — Avid's Media Composer

The MADRAS unit can be connected to an Avid® Media Composer® system with the MADRAS to Avid cable. The Avid system can be either the Avid/Digidesign 888 I/O™ or 444 I/O™ type Audio Interface.

Perform the following steps to connect MADRAS to the Avid system:

1. Connect the 26-pin connector on the supplied MADRAS to Avid cable to the connector labeled "TARGA" on the back of the MADRAS unit.

2. Connect the MADRAS to Avid cable leads as shown in the illustration below:



IMPORTANT: The MADRAS unit must be set to TARGA mode to work with the Avid system.

The following steps are only needed if the Avid board is not connected to house genlock:

1. Connect a genlock source, such as black burst, to the MADRAS rear-panel top-BNC input labeled "REF."

2. Connect the MADRAS to Avid cable lead labeled "REF OUT" (Female BNC) to the Avid video cable labeled "ANALOG GL IN."

Appendix E — Contacting Pinnacle

You can contact the Pinnacle Customer Satisfaction Center for additional help. Before contacting the Customer Satisfaction Center, please complete the Troubleshooting Questionnaire (below) and have the answers ready when you contact us.

On-line services are available 24 hours per day (next page). Customer Satisfaction Center personnel are available Monday through Friday 9:00 A.M. to 6:00 P.M. Eastern Time (1300 - 2200 Universal Time/GMT).

Troubleshooting Questionnaire

Please have answers to the following questions before calling for additional help:

1. What is your customer number or incident number (if available)?
2. What are the serial numbers, model numbers, and software version numbers of the Pinnacle products that you have installed on your computer?
3. Which computer system are you using with the product listed in item 1 of this questionnaire?
4. What version of DOS/Windows or Macintosh system software are you using?
5. How much memory (RAM) is installed in your computer?
6. What DOS/Windows Terminate and Stay Resident (TSR) programs or Macintosh INITs, control panels, and extensions do you have installed on your computer?
7. What other hardware is connected to your computer (multimedia cards, monitors, network cards, hard drives, etc.) and what resources do they use? Please include all relevant model numbers, ROM version numbers, and software version numbers, where applicable.
8. What are the steps to duplicate the problem?

Appendix E

Contacting Pinnacle

Contact Information

On-Line Services

E-mail: truevision-support@pinnaclesys.com

WWW Site: www.pinnaclesys.com

Fax Inquires

U.S. and Canada: (317) 576-7770
Worldwide: (317) 594-2900

Telephone Contact

Sales Information, Technical Support, FaxBack System
(The FaxBack System is an automated system that allows you to obtain immediate information on products, price lists, bulletins, and upgrades.)

U.S. and Canada: (800) 522-TRUE {8783}
Worldwide: (317) 577-8788

Note: This information is subject to change. Check www.pinnaclesys.com on the web for the latest contact information.

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