



Operations Manual

Multi-II

10-Channel Mainframe

(Holds 1 to 10 Prime Image plug-in boards)

NTSC, PAL, or PAL-M

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Table of Contents

Section 1	
General Information	11
Scope of this Manual	11
Manual Improvements	11
Proprietary Information.....	11
Section 1.1 Product Description	11
Section 1.2 Processing Boards	12
Section 1.3 Transcoders	13
Section 1.4 Specifications.....	14
Interface.....	14
Performance	14
Operational Controls	14
Environmental.....	14
Options	14
Section 2	
Shipping and Assembly	15
Section 2.1 Unpacking	15
Section 2.2 Inspection	15
Section 2.3 Accessories	16
Section 2.4 Assembly	16
Section 2.5 Rear Panel Interface Modules	18
Configuration and Installation of Modules	18
Section 2.6 Packing	19
Section 3	
Installation	20
Section 3.1 Power and Environmental Requirements.....	20
Section 3.2 Mechanical Installation	20
Section 3.3 System Interconnection.....	21
Section 3.4 Genlock.....	22
GL1	22
GL2	22
Independent	22
Section 4	
Operation.....	23
Section 4.1 Controls and Indicators.....	23
Section 4.2 Function Keys	24
Programming Function Keys	24
Special Hot Key Menus	25
Section 4.3 Presets	25
Storing Presets.....	25
Recalling Presets	25

Section 5	
Component Processing Boards	26
Section 5.1 Model 10/2	26
Model 10/2 Specifications	26
Model 10/2 Board Configuration	28
Mono	28
Additional Jumpers	28
Model 10/2 Rear Panel Connections	29
Y/C Connector Pinout	30
Model 10/2 Board Menu Controls	30
Section 5.2 Model 10/2 I	32
Model 10/2 I Specifications	32
Model 10/2 I Board Configuration	34
DIP Switch Settings	34
â/MII Output Format	34
Model 10/2 I Rear Panel Connections	35
Video Connector Pinouts.....	36
Model 10/2 I Board Menu Controls	37
Section 6	
Distribution and Routing Boards	39
Section 6.1 Video Distribution Amplifier	39
Model 10X-DA Specifications	39
Model 10X-DA Board Configuration	40
Jumpers	40
Bypass	40
Model 10X-DA Rear Panel Connections	41
Model 10X-DA Board Menu Controls	42
Section 6.2 4 X 1 Vertical Interval Routing Switcher	43
Model 10X-4X1 Specifications	43
Model 10X-4X1 Rear Panel Connections	44
Model 10X-4X1 Board Menu Controls	45
Hot Keys.....	45
Section 7	
Audio Delay Board	46
Section 7.1 Audio Delay Board Specifications	46
Section 7.2 Audio Delay Board Features	47
VU Meters	47
Auxiliary Switch (Optional)	48
Audio Monitor (Optional)	48
Section 7.3 Audio Delay Board Configuration	48
Audio Delay Rear Panel Connections	50
Audio Connector Pinouts	51
Audio Delay Board Menu Controls	52

Section 8	
Standards Converter Boards	53
Section 8.1 Pass Through Model SC-10/2.....	53
Model SC-10/2 Specifications	53
Model SC-10/2 Board Configuration.....	55
Mono	55
Additional Jumpers	55
Model SC-10/2 Rear Panel Connections	56
Y/C Connector Pinout	57
Model SC-10/2 Board Menu Controls	57
Section 8.2 Penta Model 5F-10/2	59
Model 5F-10/2 Specifications	59
Model 5F-10/2 Board Configuration	61
Mono	61
Additional Jumpers	61
Model 5F-10/2 Rear Panel Connections	62
Video Connector Pinouts.....	63
Model 5F-10/2 Board Menu Controls	64
Section 8.3 Penta Model 5F-10/2-II	66
Model 5F-10/2-II Specifications	66
Model 5F-10/2-II Board Configuration.....	68
Mono	68
Additional Jumpers	68
Model 5F-10/2-II Rear Panel Connections	69
Video Connector Pinouts.....	70
Model 5F-10/2-II Board Menu Controls	71
Section 9	
Logo Insertion Still Card	73
Section 9.1 Still Card Specifications	73
Section 9.2 Still Card Features	74
Single Field Programmable	74
Auto Switch	74
Write Protection	74
Linear Keyer-Mixer	74
Example 1	75
Example 2	75
Section 9.3 Programming the Still Card.....	76
Section 9.4 Still Card Configuration.....	77
DIP Switch.....	77
Jumpers	77
Still Card Rear Panel Connections	78
Still Card Menu Controls	79

Section 10	
Remote Control.....	81
Section 10.1 Remote Unit Specifications	81
Section 10.2 Remote Unit Configuration	82
Configuration of Hand-Held Unit	82
Configuration of Standalone Unit	82
Section 10.3 Remote Unit Operation.....	83
Presets	84
Storing Presets.....	84
Recalling Presets	85
Function Keys	85
Programming Function Keys	85
Special Hot Key Menus	85
Section 11	
Transcoding Boards	86
Section 11.1 Composite to Component (YRB/YUV) Transcoder	86
Model 10X-TR1 Specifications	86
Model 10X-TR1 Board Configuration.....	87
Model 10X-TR1 Rear Panel Connections	88
Y/C Connector Pinout	89
Model 10X-TR1 Board Menu Controls	89
Section 11.2 Composite to RGB Transcoder	90
Model 10X-TR2 Specifications	90
Model 10X-TR2 Board Configuration.....	91
Model 10X-TR2 Rear Panel Connections	92
Y/C Connector Pinout	93
Model 10X-TR2 Board Menu Controls	93
Section 11.3 Component (YRB/YUV) to Composite Transcoder	94
Model 10X-TR3 Specifications	94
Methods of Genlocking	95
Black Burst	95
Continuous Subcarrier.....	95
No Genlock.....	96
Colorbar Generator	96
Model 10X-TR3 Board Configuration.....	96
Model 10X-TR3 Rear Panel Connections	97
Standard Rear Panel.....	97
Component Rear Panel.....	98
Video Connector Pinouts.....	99
Model 10X-TR3 Board Menu Controls	100
Section 11.4 RGB to Composite Transcoder	101
Model 10X-TR4 Specifications	101
Methods of Genlocking	102
Black Burst	102
Continuous Subcarrier.....	102
No Genlock.....	103
Colorbar Generator	103

Model 10X-TR4 Board Configuration.....	103
Model 10X-TR4 Rear Panel Connections	104
Standard Rear Panel.....	104
Component Rear Panel.....	105
Video Connector Pinouts.....	106
Model 10X-TR4 Board Menu Controls	107
Section 11.5 RGB to Component (YRB/YUV) Transcoder	108
Model 10X-TR5 Specifications	108
Model 10X-TR5 Board Configuration.....	109
Model 10X-TR5 Rear Panel Connections	110
Model 10X-TR5 Board Menu Controls	111
Section 11.6 Component (YRB/YUV) to RGB Transcoder	112
Model 10X-TR6 Specifications	112
Model 10X-TR6 Board Configuration.....	113
Model 10X-TR6 Rear Panel Connections	114
Model 10X-TR6 Board Menu Controls	115
 Section 12	
Servicing.....	116
Routine Maintenance	116
Unit Malfunction	116
Service Calls	116
Troubleshooting	117
 Appendix A	
RS232 Control Codes	118
A.1 RS232 Control Codes	118
Four-Byte Control Command	122
System Limitations	123
Examples	123
A.2 Remote Data	124
Acknowledges	124
Requesting Data	124
Prime Image Product Code List	125
 Appendix B	
External Control.....	126
INTERFACE Connector	126
GPI Ports	127
System Limitations	127
RS232 Configuration	128

List of Illustrations

Figure	Subject	Page
2-1.	Installing the Boards	17
2-2.	Connecting the Front Panel Cable	17
2-3.	Typical Rear Panel Interface Module	18
3-1.	Control Board Connectors	21
4-1.	Front Panel Display	23
4-2.	Front Panel Controls and Indicators	24
5-1.	Model 10/2 Rear Panel Module	29
5-2.	Y/C Connector Pinout	30
5-3.	S2 Slide Switch	34
5-4.	Model 10/2 I Rear Panel Module	35
5-5.	Y/U/V (Y/R/B) Connector Pinout	36
5-6.	Y/C Connector Pinout	36
6-1.	Model 10X-DA Rear Panel Module	41
6-2.	Model 10X-4X1 Rear Panel Module	44
7-1.	VU Meter Display Example	47
7-2.	A Typical Level Set Jumper	48
7-3.	Locations of Channels 1 and 2 Jumpers	49
7-4.	Locations of Channels 3 and 4 Jumpers	49
7-5.	Input Termination Jumper	49
7-6.	Audio Delay Board Rear Panel Module	50
7-7.	Audio Input Connector Pinout	51
7-8.	Audio Output Connector Pinout	51
8-1.	Model SC-10/2 Rear Panel Module	56
8-2.	Y/C Connector Pinout	57
8-3.	Model 5F-10/2 Rear Panel Module	62
8-4.	Y/U/V (Y/R/B) Connector Pinout	63
8-5.	Y/C Connector Pinout	63
8-6.	Model 5F-10/2-II Rear Panel Module	69
8-7.	Y/U/V (Y/R/B) Connector Pinout	70
8-8.	Y/C Connector Pinout	70
9-1.	Still Card DIP Switch SW2	77
9-2.	Still Card Jumpers	77
9-3.	Still Card Rear Panel Module	78
10-1.	Remote Model R-1 Front Panel Controls	83
10-2.	Remote Model R-2 Front Panel Controls	83
10-3.	Remote Display	84
11-1.	Model 10X-TR1 Jumper Location	87
11-2.	Model 10X-TR1 Rear Panel Module	88
11-3.	Y/C Connector Pinout	89
11-4.	Model 10X-TR2 Jumper Locations	91
11-5.	Model 10X-TR2 Rear Panel Module	92
11-6.	Y/C Connector Pinout	93
11-7.	Model 10X-TR3 Jumper Locations	96
11-8.	Model 10X-TR3 Standard Rear Panel Module	97

11-9.	Model 10X-TR3 with Component I/O Rear Panel Module	98
11-10.	CPON Connector Pinout	99
11-11.	Y/C Connector Pinout	99
11-12.	Model 10X-TR4 Jumper Locations	103
11-13.	Model 10X-TR4 Standard Rear Panel Module	104
11-14.	Model 10X-TR4 with Component I/O Rear Panel Module	105
11-15.	CPON Connector Pinout	106
11-16.	Y/C Connector Pinout	106
11-17.	Model 10X-TR5 Jumper Locations	109
11-18.	Model 10X-TR5 Rear Panel Module	110
11-19.	Model 10X-TR6 Jumper Locations	113
11-20.	Model 10X-TR6 Rear Panel Module	114
B-1.	25-Pin D Interface Connector	127
B-2.	Control Board DIP Switch SW1	128

List of Tables

Table	Subject	Page
1-1.	Features of the Video Processing Boards	12
1-2.	Transcoder Input and Output Formats	13
2-1.	List of Components and Accessories for Multi-II	16
5-1.	S1 DIP Switch Settings	28
5-2.	JP2 Jumper Settings	28
5-3.	Model 10/2 Interconnection Requirements	29
5-4.	Model 10/2 Board Menu Controls	30
5-5.	S1 DIP Switch Settings	34
5-6.	Model 10/2 I Interconnection Requirements	35
5-7.	Model 10/2 I Board Menu Controls	37
6-1.	Model 10X-DA Jumper Settings	40
6-2.	Model 10X-DA Interconnection Requirements	41
6-3.	Model 10X-DA Board Menu Controls	42
6-4.	Model 10X-4X1 Interconnection Requirements	44
6-5.	Model 10X-4X1 Board Menu Controls	45
7-1.	VU Meter Values and Tolerance Specifications	47
7-2.	Audio Delay Board Interconnection Requirements	50
7-3.	Audio Delay Board Menu Controls	52
8-1.	S1 DIP Switch Settings	55
8-2.	JP2 Jumper Settings	55
8-3.	Model SC-10/2 Interconnection Requirements	56
8-4.	Model SC-10/2 Board Menu Controls	57
8-5.	S1 DIP Switch Settings	61
8-6.	JP2 Jumper Settings	61
8-7.	Model 5F-10/2 Interconnection Requirements	62
8-8.	Model 5F-10/2 Board Menu Controls	64
8-9.	S1 DIP Switch Settings	68
8-10.	JP2 and JP9 Jumper Settings	68

8-11.	Model 5F-10/2-II Interconnection Requirements	69
8-12.	Model 5F-10/2-II Board Menu Controls	71
9-1.	Still Card Interconnection Requirements	78
9-2.	Still Card Menu Controls	79
11-1.	Model 10X-TR1 Jumper Settings	87
11-2.	Model 10X-TR1 Interconnection Requirements	88
11-3.	Model 10X-TR1 Board Menu Controls	89
11-4.	Model 10X-TR2 Jumper Settings	91
11-5.	Model 10X-TR2 Interconnection Requirements	92
11-6.	Model 10X-TR2 Board Menu Controls	93
11-7.	Model 10X-TR3 Jumper Settings	96
11-8.	Model 10X-TR3 Interconnection Requirements	97
11-9.	Model 10X-TR3 with Component I/O Interconnection Requirements.....	98
11-10.	Model 10X-TR3 Board Menu Controls	100
11-11.	Model 10X-TR4 Jumper Settings	103
11-12.	Model 10X-TR4 Interconnection Requirements	104
11-13.	Model 10X-TR4 with Component I/O Interconnection Requirements.....	105
11-14.	Model 10X-TR4 Board Menu Controls	107
11-15.	Model 10X-TR5 Jumper Settings	109
11-16.	Model 10X-TR5 Interconnection Requirements	110
11-17.	Model 10X-TR5 Board Menu Controls	111
11-18.	Model 10X-TR6 Jumper Settings	113
11-19.	Model 10X-TR6 Interconnection Requirements	114
11-20.	Model 10X-TR6 Board Menu Controls	115
12-1.	Troubleshooting	117
A-1.	RS232 Control Codes	118
A-2.	RS232 Format	122
A-3.	RS232 Data Descriptions	124
B-1.	Pinout for 25-Pin D Interface Connector	126
B-2.	Descriptions for SW1 Settings	128

Section 1

General Information

Scope of this Manual

This manual gives you the information necessary to install and operate the Multi-II, Model 10X-II, 10-channel mainframe, manufactured by Prime Image, inc. It includes descriptions of the various boards that can be inserted into the Multi-II.

Manual Improvements

Changes to this manual are documented by numbered engineering change orders. Individual users of this manual are encouraged to report any errors, omissions, or suggestions for improvement to the following address:

Publications Department
Prime Image, inc.
662 Giguere Court #C
San Jose, CA 95133
Phone: (408) 867-6519

Proprietary Information

The information in this manual is furnished solely for the purpose of providing instructions for installation and operation of the equipment described herein. Any other use of this information without the written consent of Prime Image, inc. is strictly prohibited.

Section 1.1 Product Description

The Multi-II can hold and control from 1 to 10 of the various Prime Image, inc. boards described in this manual, including:

Time Base Corrector	Logo Insertion Board
Audio Delay	Video Distribution Amplifier
Standards Converter	4 X 1 Vertical Interval Routing Switcher
Penta Standards Converters	Transcoders

Any combination of these boards can be inserted into the Multi-II professional rack mount frame through the tilt down front panel. Each of these boards, including future releases, can be completely controlled from the front panel. Remote control is optional. Genlock, RS232 port, and proc amp controls are standard.

Section 1.2 Processing Boards

Table 1-1 shows the features included in the following plug-in video processing boards:

Component Processing Boards

Multi/TBC· SYNC Model 10/2
Y/R/B (Y/U/V) Model 10/2 I

Table 1-1. Features of the Video Processing Boards

Feature	10/2	10/2 I
Y/R/B (Y/U/V) in and out		X
NTSC, PAL-BGI, PAL-M or NTSC-to-PAL-M/PAL-M-to-NTSC	X	X
Full proc amp	X	X
AGC (on/off)	X	X
3 Levels of enhancement	X	X
Composite in and out	X	X
Transcodes	X	X
Y/C (4-pin) in and out	X	X
Full frame synchronizer	X	X
Time base corrector	X	X
8-bit samples (chroma and luma)	X	X
Freeze: frame, field 1 or field 2	X	X
Strobe: field or frame, variable rate	X	X
Other features: H and V chroma-to-luma adjust B & W (on/off), H-position	X X	X X

Section 1.3 Transcoders

Table 1-2 shows the input and output formats of the various transcoding boards.

Table 1-2. Transcoder Input and Output Formats

	10X-TR1	10X-TR2	10X-TR3	10X-TR4	10X-TR5	10X-TR6
Inputs						
Composite	X	X				
Y/R/B (Y/U/V)			X			X
RGB				X	X	
Y/C						
Outputs						
Composite			X	X		
Y/R/B (Y/U/V)	X		X*	X*	X	
RGB		X	X*	X*		X
Y/C	X		X	X		
*Available with Component I/O option, selectable.						

Section 1.4 Specifications

Interface

Genlock In #1 & #2	Both are independently selectable for each channel, high impedance, looping 2 BNC (each) 525/60 or 625/50 standards
Monitor Out	1.0 Vpp, 75 Ω, BNC (observe selected video channel 1 - 10)
Audio Monitor (optional)	2 channels, unbalanced, 3-pin mini DIN
RS232 Interface Port	25-pin D connector
Remote Port	5-pin connector

Individual interface modules (provided free of charge with each board type) plug into the back of the Multi-II frame to provide appropriate connectors for each type of board. The connectors include but are not limited to BNC, 4-pin, and 6-pin.

Performance

Performance specifications for each board are contained in the section of this manual pertaining to that board.

Operational Controls

Operation controls for each board are listed in the section of this manual pertaining to that board.

Environmental

Operating Temperature	+32° to +113° F (0° to +45° C)
Operating Humidity	10% to 95% RH, non-condensing
Power Supply	117 VAC, ±10%, 60 Hz or 220 VAC, ±10%, 50 or 60 Hz
Power Dissipation	150 Watts maximum
Height	3U, 5.25 inches (13.34 cm)
Width	19 inches (48.3 cm)
Depth	15 inches (38.1 cm)
Weight	30 pounds (13.6 kg) empty add 14 oz. per board added

Options

Remote Control	Controls all parameters on all types of boards
----------------	--

All specifications subject to change without notice.

Section 2 Shipping and Assembly

This section contains the information necessary for you to unpack, inspect, assemble, repack, and ship the Multi-II.

Section 2.1 Unpacking

The Multi-II is shipped in a re-usable cardboard shipping carton which may be opened with a sharp, short-blade knife. Within the carton, the Multi-II frame is supported in foam packing material and wrapped in a poly bag. The power supply board and control board are wrapped separately in anti-static bags and supported in foam packing material in a space beside the frame. Accessories are also contained in a separate bag beside the frame. Each additional board (up to 10) is wrapped in an anti-static bag, and the boards are enclosed in foam packing material on top of the frame. An external pouch contains a packing list showing the contents of the carton. Shipping weight of the fully loaded Multi-II with carton is less than 50 lbs. It may be carried with care by one person.

Section 2.2 Inspection

The individual parts of your unit were inspected prior to shipment, and the unit should be in good operating order. Carefully inspect the unit and accessories for any physical damage sustained in transit. If the unit is received in a damaged condition, notify your dealer or the factory immediately, and file a claim with the carrier.

Please verify that you have received all the items that should accompany the unit. Refer to the accessory parts list in Section 2.3. If you have any difficulties with the unit, if it is not operating properly, or if accessories are missing, contact your dealer or the factory Customer Service Department.

Retain the carton and original packing materials in case the unit must be shipped.

Section 2.3 Accessories

Table 2-1 lists the components and accessories you should have received with your Multi-II system:

Table 2-1. List of Components and Accessories for Multi-II

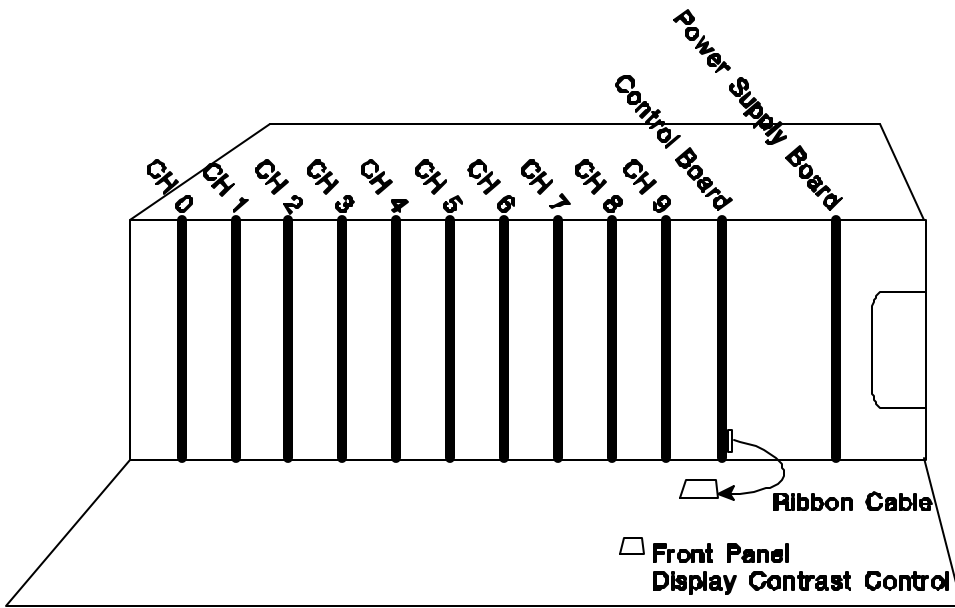
Description	Quantity
Multi-II frame	1
Power supply board	1
Control board	1
Prime Image plug-in boards	1-10
Line cord, AC power	1
Multi-II Operations Manual	1
Packing carton with spacers and bag	1

Section 2.4 Assembly

To assemble the Multi-II unit, perform the following steps:

1. Open the front panel by loosening the screws on both sides, and tilt the front panel toward you. Once the front panel is open, you can see a legend across the top that labels the slots.
2. Reseat the power supply board (the only board without a metal shield in the slot closest to the right side of the frame) and the control board (in the next slot).
3. Connect front panel cable (ribbon cable) to 10-pin connector on lower front edge of control board. Be sure the other end is connected to back of front panel (see Figures 2-1 and 2-2).
4. Verify that transformer and front panel cable (ribbon cable) connections are seated properly.
5. The video boards may be inserted into any of the remaining slots (0-9). Hold the board so that the attached metal shield is facing left and slide the shield into the slot.
6. Tilt up the front panel and secure with the screws you loosened in Step 1.

Note: To properly seat a board, slide it into the card cage as far as it will go, and give it a firm push to plug it into the frame.



Note: Be sure PIN 1 of the front panel (ribbon) cable is connected correctly on each end, as indicated in Figure 2-2.

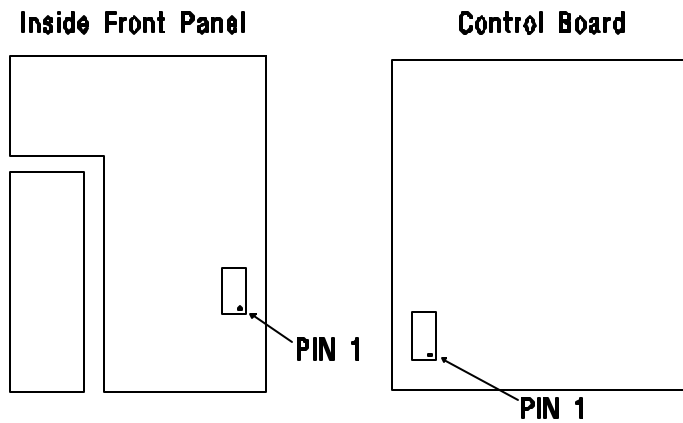


Figure 2-2. Connecting the Front Panel Cable

Section 2.5 Rear Panel Interface Modules

The Multi-II frame uses interchangeable rear panel modules for each channel. This flexibility allows various types of boards to be installed in the unit assuring that the proper connectors for each board will be available on the rear panel. The Multi-II is shipped with the modules pre-installed for all boards ordered with the unit. Rear panel slots for unused channels are covered with blank plates. When additional boards are ordered, appropriate rear panel modules will be shipped with the boards.

Note: Any type board with its corresponding module can be installed into any slot in the Multi-II.

Configuration and Installation of Modules

Rear panel modules for video boards have jumpers to configure the monitor output. The jumper selects between a "tap" off the actual output from the board or a special monitor output available on some boards. If the module is being used for a TBC Sync or Standards Converter board Rev. E through K, or a Still Card Rev. A, the "tap" position must be used for the monitor output to work.

When the tap setting is used, the actual output signal is displayed. This signal is useful for determining if there are problems with the cable, or if it is not terminated correctly. (An unterminated output will result in a 2-volt video signal at the monitor output.)

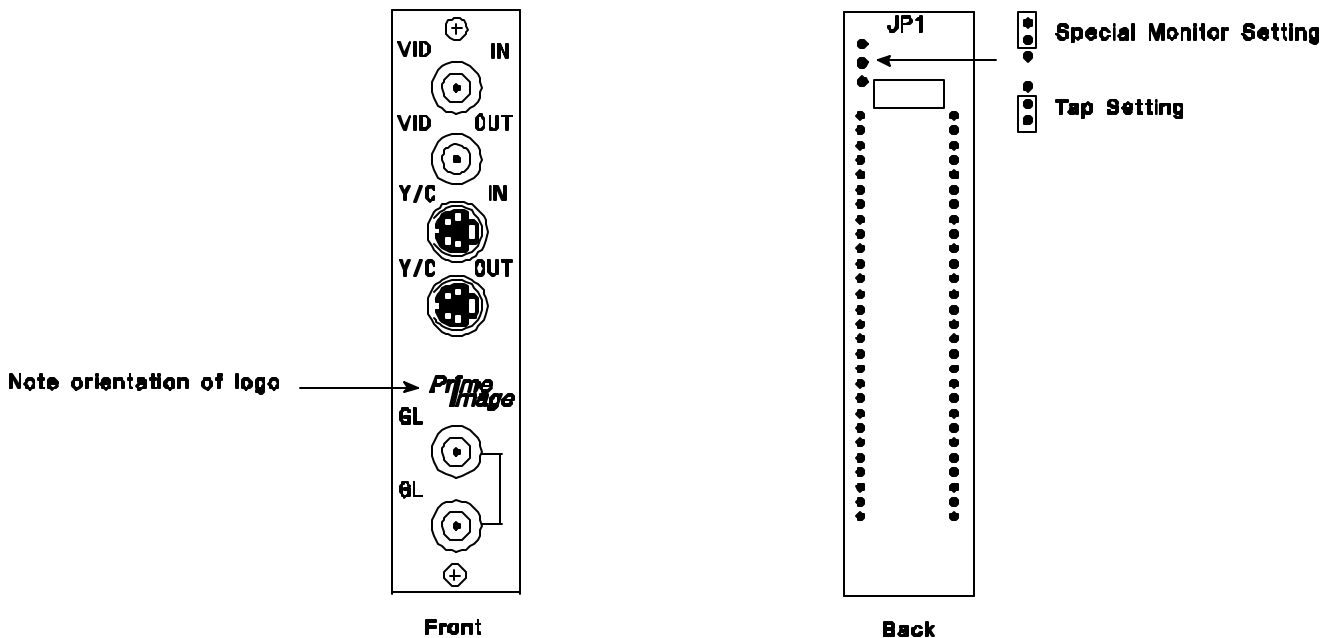


Figure 2-3. Typical Rear Panel Interface Module

Once the jumper has been configured, the module may now be installed, as follows:

1. Remove the two screws from the blank plate covering the desired slot.
2. Align the pins with the socket on the frame and press firmly.
3. Install the four screws supplied, one in each corner of the module.
4. Install the new cover plate, supplied, and secure with the two screws removed in step 1.

Section 2.6 Packing

When repacking the unit for shipping, be sure that the unit and accessories are secured in the configuration described in Section 2.1. Check that all seams are securely sealed with tape, and the carton is clearly marked.

Section 3 Installation

This section gives you the information necessary to properly install the Multi-II including power, environmental, mounting, and interconnection requirements.

Section 3.1 Power and Environmental Requirements

The Multi-II is designed to operate from a power source providing 117 VAC, single phase 60 Hz power (NTSC) or 220 VAC, single phase 50 or 60 Hz power (PAL).

To protect operating personnel and equipment, the unit should be connected only to a three-pronged grounded receptacle using the power cable provided. See Figure 3-1 for the location of the power cable connector and the main power switch.

Section 3.2 Mechanical Installation

The Multi-II is shipped ready for bench-top operation with four rubber feet on the case bottom. If rack mounting is desired, the unit may be mounted directly to the rack by screws through the mounting ears. If a unit is mounted directly below the Multi-II, remove the feet from the Multi-II case bottom to allow sufficient vertical clearance.

Section 3.3 System Interconnection

Each board ships with a rear panel module that adapts the connectors. All connections to the Multi-II System are made at the rear panel. For video board interconnection requirements, see the section for the board to be connected.

Slot #10 holds the control board. Figure 3-1 shows the RS232 connector (INTERFACE) and rear panel connectors for the control board as well as the power cable connector and main power switch.

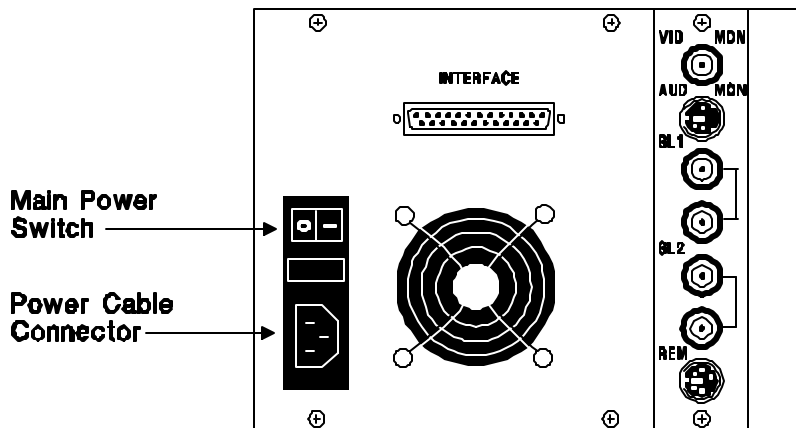


Figure 3-1. Control Board Connectors

The unit may be connected to your system according to the desired application using RG-59/U (or equivalent) coaxial cable terminated with BNC connectors.

Section 3.4 Genlock

Each channel may be connected to any of three possible Genlock signals:

GL1

The selected channel or channels can be connected to the Genlock #1 source. Any and all of the ten channels can be genlocked to this signal.

GL2

The selected channel or channels can be connected to the Genlock #2 source. Any and all of the ten channels can be genlocked to this signal.

Independent

Most Multi-II plug-in board options have an independent Genlock input. The selected channel can be connected to its own source through the GL connector(s) for that board on the rear panel. Each of the ten channels could be genlocked to a totally separate source.

Section 4 Operation

This section provides the information necessary to operate the Multi-II. It includes descriptions of the front panel controls and indicators. All the boards are operated from the front panel. When a channel is selected, the menu for the board corresponding to that channel is displayed on the LCD. For descriptions of the menu and features of an individual board, see the section for that board.

Section 4.1 Controls and Indicators

Front panel controls (see Figure 4-2) allow adjustments of various video signal parameters for each installed video board. Use the CHANNEL+ and CHANNEL- buttons to scroll through the ten channels. The front panel LCD displays the type of board installed for each channel (see Figure 4-1). The three rightmost characters of the display indicate which channel is selected. Menus are displayed only for installed boards. Unused channels are skipped.

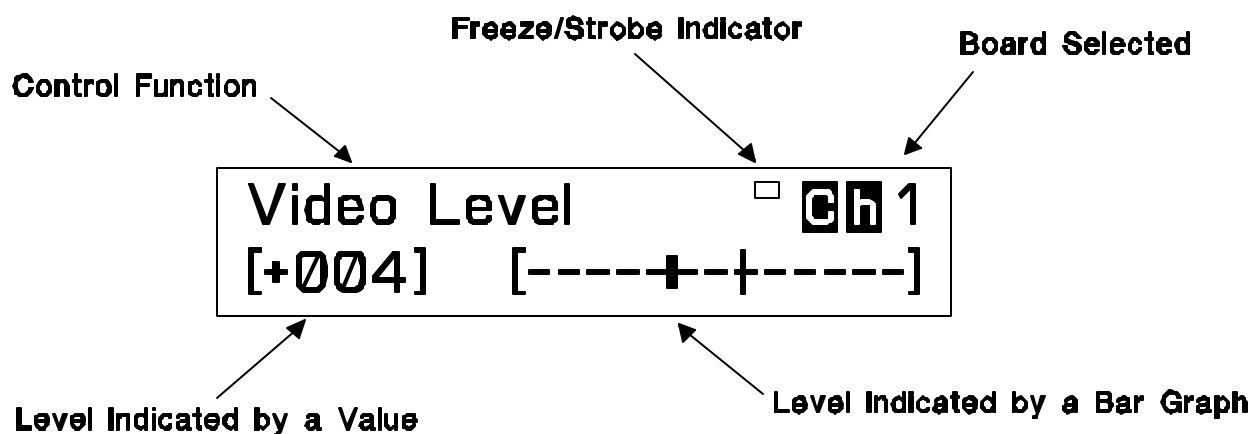


Figure 4-1. Front Panel Display

When the desired channel is selected, use the MODE+ and MODE- buttons to scroll through the parameters for the board installed in that channel slot. Adjust the parameter level using the SET+ and SET- buttons or the dial on the front panel. Pressing SET+ and SET- simultaneously sets the displayed parameter level to unity. Pressing the SHIFT button simultaneously with the MODE buttons provides access to additional parameters available for adjustment.

The Freeze/Strobe Indicator shows a Freeze with a steady illumination and indicates a strobe by flashing at the rate of the strobe.

Two LEDs are located in the lower right corner of the front panel. These green LEDs (GL) indicate the presence of external Genlock reference signals.

Figure 4-2 shows locations of the front panel controls and indicators. The Multi-II is shipped with all parameters set at unity.

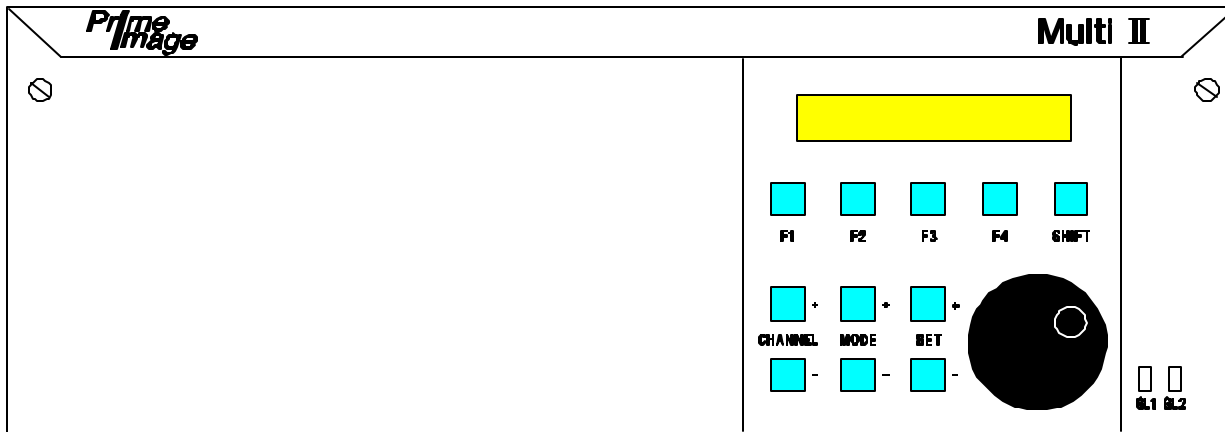


Figure 4-2. Front Panel Controls and Indicators

Section 4.2 Function Keys

Eight function keys (F1 through F8) can be programmed to go directly to the eight most frequently used parameters for quick adjustment. Use the **SHIFT** button with function keys **F1** through **F4** to access function keys **F5** through **F8**. To program the function keys, scroll through the menu for a channel using the **MODE+** and **MODE-** buttons until the LCD displays "Prog Fct Key," then follow the instructions on the display.

Programming Function Keys

The function keys are programmed separately for each channel, and the Multi-II recalls the settings every time that channel is selected. The upper right corner of the display shows the selected channel.

Note: At any time you may abort the process by pressing another function key.

1. Using the **MODE+** and **MODE-** buttons, select the menu "Prog Fct Key."
2. Select a function key to program by holding down **SET+** and pressing the desired F key (**F1** through **F4** or **SHIFT F1** through **SHIFT F4** for **F5** through **F8**).
3. Using the **MODE+** and **MODE-** buttons, select the desired menu.
4. Enter your selection by pressing the **SET-** button.

Note: All possible menus will be available without holding the **SHIFT** button, including additional menus called Hot Keys.

Special Hot Key Menus

Some functions, such as Freeze, can be programmed to activate when a function key is pressed. These special menus are indicated by an exclamation mark "!". For example, to designate F4 as the key to activate a Freeze and F3 to release the Freeze, follow these steps:

1. Under the menu "Prog Fct Key," select F4 (as explained in the previous section).
2. Using the MODE+ and MODE- buttons, select the menu "Freeze!" and enter by pressing SET-.
3. Under the same menu ("Prog Fct Key"), select F3.
4. Using the MODE+ and MODE- buttons, select the menu "Frz/Str OFF!" and enter by pressing SET-.

Now, pressing F4 should activate Freeze, and pressing F3 should release the Freeze.

Section 4.3 Presets

For each channel, all parameter levels and settings can be stored to one of three preset banks and recalled at a later time. When a preset is stored, current levels and settings for all menus in the selected channel are copied to the designated preset number. When a preset is recalled, the levels and settings stored in the preset are copied back, overwriting the existing settings.

Storing Presets

Use the following procedure to store presets:

1. Using SHIFT MODE+ and SHIFT MODE-, select the menu "Store Pst?"
2. Using SET+ and SET-, select preset 1, 2, or 3.
3. When the desired preset number is selected, hold down SHIFT and press SET+. The current settings will be stored.

Recalling Presets

Use the following procedure to recall presets:

1. Using SHIFT MODE+ and SHIFT MODE-, select the menu "Recal Pst?"
2. Using SET+ and SET-, select preset 1, 2, or 3.
3. When the desired preset number is selected, hold down SHIFT and press SET+. The reset will be recalled.

Note: Settings that were current before recalling a preset will be overwritten and lost when the preset is recalled.

Section 5

Component Processing Boards

This section describes the component processing plug-in boards for the Multi-II including the Models 10/2 and 10/2 I.

Section 5.1 Model 10/2

The Model 10/2 Component TBC/SYNC board is a full frame synchronizer and time base corrector for component applications. It transcodes between Y/C and composite inputs and outputs in NTSC, PAL, or PAL-M at technical standards that exceed broadcast specifications.

Note: For Model 10/2 board revisions below L, the DIP switch labeled RM must be set to ON. Revisions of the board below E will not work with the Multi-II mainframe. The revision number is found on the right bottom edge of the board when held with the connectors facing toward the right.

Model 10/2 Specifications

The following specifications apply to the Model 10/2 component board for NTSC, PAL, or PAL-M:

Interface

Inputs	Video (Composite) Y/C 3/4 DUB	1.0 Vpp, 75Ω, BNC 4-pin -C cable, option
Outputs	Video (Composite) Y/C Digital Interface (for Logo Inserter)	1.0 Vpp, 75Ω, BNC 4-pin 20-pin ribbon connector
Genlock In		High impedance/75Ω, BNC

Transcodes Y/C and Composite to Y/C and Composite.

Performance

Window	525 line (NTSC and PAL-M) 625 line (PAL)
Bandwidth	5.5 MHz (NTSC, PAL, and PAL-M)
Signal to Noise	58 dB
Differential Phase	<1°
Differential Gain	<1%
K-Factor (2T)	1%
Sampling	8-bit luma; 8-bit each chroma (4:2:2)
Residual time-base error	±15 nsec

Operational Controls

3-Way Adaptive Comb	On/Off
Input Select	Y/C or Composite
Freeze	Off/Field/Frame
Strobe	Variable rate
Enhance	Normal/Low/High
AGC	On/Off
Go to Black and White	On/Off
H-Position	±2 ì sec
V-Color Advance	1, 2, or 3 lines
H-Chroma/Luma Adjust	±1 ì sec
Video Level	±6 dB
Color Level	No Color to +6 dB
Setup Level	± 10 IRE
Hue (NTSC only)	±45°
H-Phase Adjust	±2 ì sec
Burst Phase Adjust	> 360°

Environmental

Operating Temperature	+32° F (0° C) to 113° F (45° C)
Operating Humidity	10% to 85% RH, non-condensing
Power Dissipation	15 Watts
Height	4.0 inches (10.2 cm)
Length	12.0 inches (30.5 cm)
Weight	14 ounces (0.4 kg)

Options

3-Way Adaptive Comb Filter	"E"
High Performance Encoder	HPE
U-Matic DUB input	-C

All specifications subject to change without notice.

Model 10/2 Board Configuration

DIP switch S1, located in the upper left corner of the board, allows you to select Mono or to set the default field for freeze. Bit 2, labeled CB, has no effect in this unit. Bits 4 through 8 are not used.

Table 5-1. S1 DIP Switch Settings

Bit	Label	Description	OFF	ON
4-8		Not used		
3	FL	Default field for freeze	Field 1	Field 2
2	CB	Not applicable		
1	MO	Mono	Forced color	Mono mode

Mono

For the transmission of black and white signals, broadcasters often turn off the subcarrier burst to reduce color noise in the picture. The Model 10/2 board always produces a subcarrier burst unless Mono is selected. Mono turns off burst at the output when the input is a black and white signal (no burst present).

Note: Many video boards need the subcarrier burst for proper timing.

Additional Jumpers

Table 5-2 shows the settings for jumper J2.

Table 5-2. JP2 Jumper Settings

Label	Description	No Jumper (OFF)	Jumper Installed (ON)
V	N/A		
W	N/A		
X	N/A		
Y	N/A		
Z	Vert interval blank	Narrow blanking	Wide blanking

Model 10/2 Rear Panel Connections

Figure 5-1 shows the rear panel connections of the Model 10/2 component processing board.

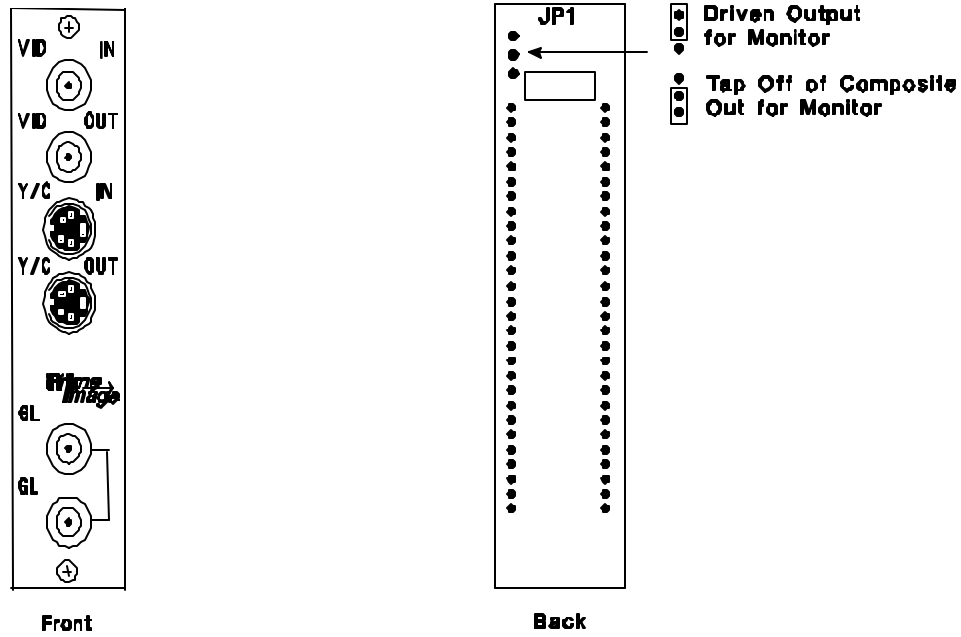


Figure 5-1. Model 10/2 Rear Panel Module

Table 5-3 shows the interconnection requirements for the Model 10/2 board.

Name	Characteristics	Function
Vid In	1 Vpp, 75Ω, BNC	Uncorrected video input.
Y In C In	1 Vpp, 75Ω 700 mVpp, 75Ω 4-pin S connector	Uncorrected video input.
Genlock In	High impedance	Reference sync input from external generator. If IND GL is selected, video outputs will be locked to this input.
Vid Out	1 Vpp, 75Ω, BNC	Corrected video output.
Y Out C Out	1 Vpp, 75Ω 700 mVpp, 75Ω 4-pin S connector	Corrected video output.

Y/C Connector Pinout

Figure 5-2 shows the Y/C IN/OUT— 4-pin mini DIN (SVHS) connector (female).

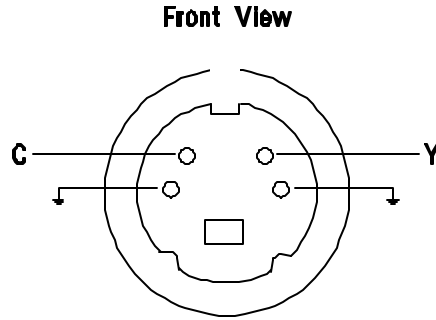


Figure 5-2. Y/C Connector Pinout

Model 10/2 Board Menu Controls

Table 5-4 shows controls available by menu with Model 10/2 component processing board installed.

Note: Controls indicated by * are accessed only by pressing the **SHIFT** button while scrolling with the **MODE** buttons.

Table 5-4. Model 10/2 Board Menu Controls

Menu Item (in order of appearance)	Adjust Using		Description
	SET +/-	Dial	
* GPI Port Select	X		Selects the function of the GPI port (see Appendix B): <ul style="list-style-type: none"> · Off · Freeze On/Off (field or frame determined by "Fld/FRM Select" menu)
Video Level	X	X	Adjusts luminance level (contrast).
* AGC			Automatic Gain Control. Adjusts the input level automatically by reference to the signal's sync amplitude.
Chroma	X	X	Adjusts color saturation.
Hue	X		Adjusts hue (tint).
Setup	X	X	Adjusts brightness.
* Field Video	X		Displays live video in a field-only mode determined by the "Fld/FRM Select" menu.
Freeze Mode	X		ON: Freezes a Field or Frame determined by the "Fld/FRM Select" menu (status shown on right side of display). ON+: Pressing again re-acquires new image if "Frz/Aquire" menu enabled. (Acquire mode indicated by "A" at display right.) OFF: Releases the freeze.

*Frz/Aquire Setup	X		Enables/disables Acquire mode (see Freeze mode).
Fld/FRM Select	X		Selects Display mode for Freeze and Strobe effects. "dft" = default setting (determined by DIP switch S1 bit 3 setting; see Table 5-1), "1" = field 1, "2" = field 2, "Frm" = Frame.
Strobe Mode	X		ON: Activates a "stop action" effect by freezing fields or frames (determined by "Fld.FRM Select" menu) at a periodic rate (determined by "Strobe Rate" menu). OFF: Releases Strobe mode.
Strobe Rate	X	X	Adjusts the rate of Strobe Mode.
Input Select	X		Selects between Composite and Y/C inputs.
*Comb Filter	X		Enables Comb Filter for Composite input. Note: "E" option must be present.
Detail	X		Selects among three levels of detail to enhance the picture (sharpness): Normal, low, high.
*B&W Mode	X		Turns off color signal to produce effect of black & white picture. Note: This effect does not turn off the subcarrier burst unless Mono is also selected by DIP switch (see Table 5-1).
*Horz Phase	X	X	Adjusts sync timing of output compared to Genlock reference.
*Subcarrier Phase	X	X	Adjusts subcarrier phase of output compared to Genlock ref.
*Genlock Select	X		Selects Genlock ref: Independent, Master 1, Master 2, or No.
Horz Position	X	X	Adjusts the picture position right or left.
Y/C Delay	X	X	Adjusts color position (with respect to luminance) right or left.
Advanced Chroma	X		Advances (shifts up) the color signal by one, two, or three lines. This shift helps counteract the effects of comb filters found in many VCRs, which shift the color down slightly.
*Audio Monitor Select	X		Selects as the audio monitor's source a neighboring channel that has an audio card.
*About Card			Displays information about the Card.
Program Function Key	X		Eight function keys (F1 – F4 and SHIFT F1– F4 [for F5 – F8]) can be programmed to go directly to the eight most frequently used parameters for quick adjustment (see Section 4.2).
*Store Preset	X		Stores parameter levels and settings to one of three preset banks (see Section 4.3).
*Recal Preset	X		Recalls parameter levels and settings from one of three preset banks (see Section 4.3).

Section 5.2 Model 10/2 I

The Model 10/2 I Component TBC/SYNC board is a full-frame synchronizer and time base corrector which transcodes between Y/U/V (Y/R/B), Y/C, and composite inputs and outputs. This product exceeds broadcast specifications and accommodates NTSC, PAL, and PAL-M standards.

Model 10/2 I Specifications

The following specifications apply to the Model 10/2 I component board for NTSC, PAL, or PAL-M:

Interface

Inputs	Video (Composite)	1.0 Vpp, 75 Ω , BNC
	YRB (YUV)	6-pin (6-pin to 3 BNC cable provided)
	Y/C	4-pin
	3/4 DUB	-C cable, option
Outputs	Video (Composite)	1.0 Vpp, 75 Ω , BNC
	YRB (YUV)	6-pin (6-pin to 3 BNC cable provided)
	Y/C	4-pin
	Digital Interface (for Logo Inserter)	20-pin ribbon connector
Genlock In		High impedance/75 Ω , BNC

Transcodes Y/U/V (Y/R/B), Y/C, and Composite to Y/U/V (Y/R/B), Y/C, and Composite.

Performance

Window	525 line (NTSC and PAL-M) 625 line (PAL)
Bandwidth	5.5 MHz (NTSC, PAL, and PAL-M)
Signal to Noise	58 dB
Differential Phase	<1 $^\circ$
Differential Gain	<1%
K-Factor	1%
Sampling	8-bit luma; 8-bit each chroma (4:2:2)
Residual time-base error	\pm 15 nsec

Operational Controls

3-Way Adaptive Comb	On/Off
Input Select	YRB (YUV), Y/C, or Composite
Freeze	Off/Field/Frame
Strobe	Variable rate
Enhance	Normal/Low/High
AGC	On/Off
Go to Black and White	On/Off
H-Position	± 2 ÷ sec
V-Color Adjust	1, 2, or 3 lines
H-Chroma/Luma Adjust	± 1 ÷ sec
Video Level	± 6 dB
Color Level	No Color to +6 dB
Setup Level	± 10 IRE
Hue (NTSC only)	$\pm 45^\circ$
H-Phase Adjust	± 2 ÷ sec
Burst Phase Adjust	$> 360^\circ$
MII and Beta in and out	Level Select

Provides digital interface for programming the Still Card (Logo Inserter).

Environmental

Operating Temperature	+32° F (0° C) to 113° F (45° C)
Operating Humidity	10% to 85% RH, non-condensing
Power Dissipation	15 Watts
Height	4.0 inches (10.2 cm)
Length	12.0 inches (30.5 cm)
Weight	14 ounces (0.4 kg)

Options

3-Way Adaptive Comb Filter	"E"
High Performance Encoder	HPE
U-Matic DUB input	-C

All specifications subject to change without notice.

Model 10/2 I Board Configuration

DIP switches S1 and slide switch S2 control some features of the Model 10/2 I board.

DIP Switch Settings

DIP switch S1, located in the upper left corner of the board, allows you to select Mono or to set the default field for freeze. Bit 2, labeled CB, has no effect in this unit. Bits 4 through 8 are not used.

For the transmission of black and white signals, broadcasters often turn off the subcarrier burst to reduce color noise in the picture. The Model 10/2 I board always produces a subcarrier burst unless Mono is selected. Mono turns off burst at the output when the input is a black and white signal (no burst present).

Note: Many video boards need the subcarrier burst for proper timing.

Table 5-5. S1 DIP Switch Settings

Bit	Label	Description	OFF	ON
4-8		Not used		
3	FL	Default field for freeze	Field 1	Field 2
2	CB	Not applicable		
1	MO	Mono	Forced color	Mono mode

YUV/MII Output Format

Component video has been defined by the industry to be one of two levels: Beta or MII. Beta is the more widely accepted and has color at 700 mV. MII equipment uses color at 483 mV. Slide switch S2 (Figure 5-3), located to the left of DIP switch S1, selects which level will be at the YRB (YUV) output (input selected with front panel menu).

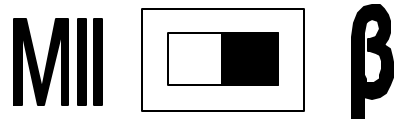


Figure 5-3. S2 Slide Switch

Model 10/2 I Rear Panel Connections

Figure 5-4 shows the rear panel connectors for the Model 10/2 I component processing board.

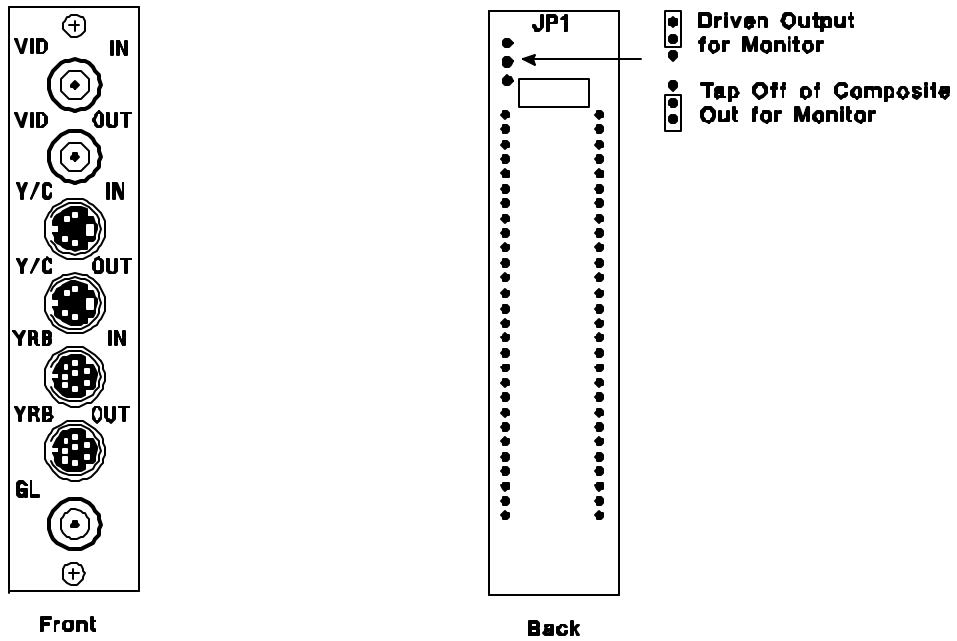


Figure 5-4. Model 10/2 I Rear Panel Module

Table 5-6 shows the interconnection requirements for the Model 10/2 I board.

Table 5-6. Model 10/2 I Interconnection Requirements

Name	Characteristics	Function
Vid In	1 Vpp, 75Ω, BNC	Uncorrected video input.
Y In C In	1 Vpp, 75Ω 700 mVpp, 75Ω 4-pin S connector	Uncorrected video input.
Component Y In U (R-Y) In V (B-Y) In	6-pin connector 1 Vpp, 75Ω 700 mVpp, 75Ω* 700 mVpp, 75Ω*	Uncorrected video input.
Genlock In	High impedance (JP9 open) 75Ω (JP9 installed)	Reference sync input from external generator. If IND GL is selected, video outputs will be locked to this input.
Vid Out	1 Vpp, 75Ω, BNC	Corrected video output.

Y Out C Out	1 V _{pp} , 75Ω 700 mV _{pp} , 75Ω 4-pin S connector	Corrected video output.
Component Y Out U (R-Y) Out V (B-Y) Out	6-pin connector 1 V _{pp} , 75Ω 700 mV _{pp} , 75Ω* 700 mV _{pp} , 75Ω*	Corrected video output.
*Levels shown are for Beta format.		

Video Connector Pinouts

Figure 5-5 shows the Y/U/V (Y/R/B) IN/OUT— 6-pin mini DIN connector (female).

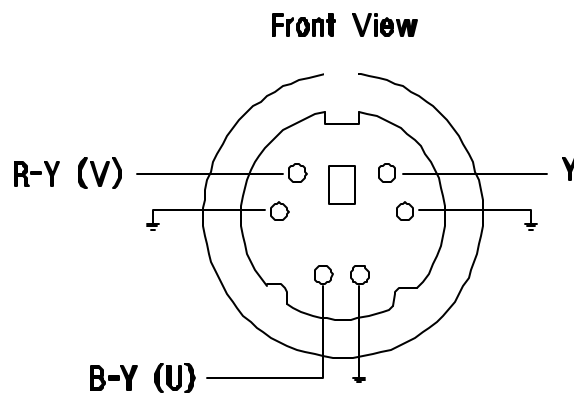


Figure 5-5. Y/U/V (Y/R/B) Connector Pinout

Figure 5-6 shows the Y/C IN/OUT— 4-pin mini DIN (SVHS) connector (female).

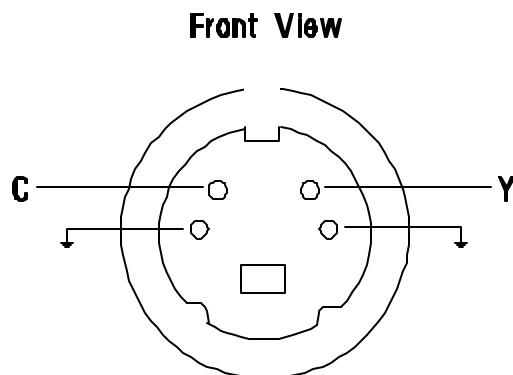


Figure 5-6. Y/C Connector Pinout

Model 10/2 I Board Menu Controls

Table 5-7 shows the controls available by menu when the Model 10/2 I component processing board is installed.

Note: Controls indicated by * are accessed only by pressing the **SHIFT** button while scrolling with the **MODE** buttons.

Table 5-7. Model 10/2 I Board Menu Controls

Menu Item (in order of appearance)	Adjust Using		Description
	SET +/-	Dial	
* GPI Port Select	X		Selects the function of the GPI port (see Appendix B): <ul style="list-style-type: none"> · Off · Freeze On/Off (field or frame determined by "Fld/FRM Select" menu)
Video Level	X	X	Adjusts luminance level (contrast).
* AGC			Automatic Gain Control. Adjusts the input level automatically by reference to the signal's sync amplitude.
Chroma	X	X	Adjusts color saturation.
Hue	X	X	Adjusts hue (tint).
Setup	X	X	Adjusts brightness.
* Field Video	X		Displays live video in a field-only mode determined by the "Fld/FRM Select" menu.
Freeze Mode	X		ON: Freezes a Field or Frame determined by the "Fld/FRM Select" menu (status shown on right side of display). ON+: Pressing again re-acquires new image if "Frz/Acquire" menu enabled. (Acquire mode indicated by "A" at display right.) OFF: Releases the freeze.
*Frz/Aquire Setup	X		Enables/disables Acquire mode (see Freeze mode).
Fld/FRM Select	X		Selects Display mode for Freeze and Strobe effects. "dft" = default setting (determined by DIP switch S1 bit 3 setting; see Table 5-5), "1" = field 1, "2" = field 2, "Frm" = Frame.
Strobe Mode	X		ON: Activates a "stop action" effect by freezing fields or frames (determined by "Fld.FRM Select" menu) at a periodic rate (determined by "Strobe Rate" menu). OFF: Releases Strobe mode.
Strobe Rate	X	X	Adjusts the rate of Strobe Mode.
Input Select	X		Selects among Composite, Y/C, and YRB (YUV) inputs.

*Comb Filter	X		Enables Comb Filter for Composite input. Note: "E" option must be present.
*YRB Input Format	X		Selects between \hat{a} and Mill.
Detail	X		Selects among three levels of detail to enhance the picture (sharpness): Normal, low, high.
*B&W Mode	X		Turns off color signal to produce effect of black & white picture. Note: This effect does not turn off the subcarrier burst unless Mono is also selected by DIP switch (see Table 5-5).
*Horz Phase	X	X	Adjusts sync timing of output compared to Genlock reference.
*Subcarrier Phase	X	X	Adjusts subcarrier phase of output compared to Genlock ref.
*Genlock Select	X		Selects Genlock ref: Independent, Master 1, Master 2, or No.
Horz Position	X	X	Adjust picture position right or left.
Y/C Delay	X	X	Adjusts color position (with respect to luminance) right or left.
Advanced Chroma	X		Advances (shifts up) the color signal by one, two, or three lines. This shift helps counteract the effects of comb filters found in many VCRs, which shift the color down slightly.
*Audio Monitor Select	X		Selects as the audio monitor's source a neighboring channel that has an audio card.
*About Card			Displays information about the Card.
Program Function Key	X		Eight function keys (F1 – F4 and SHIFT F1– F4 [for F5 – F8]) can be programmed to go directly to the eight most frequently used parameters for quick adjustment (see Section 4.2).
*Store Preset	X		Stores parameter levels and settings to one of three preset banks (see Section 4.3).
*Recal Preset	X		Recalls parameter levels and settings from one of three preset banks (see Section 4.3).

Section 6

Distribution and Routing Boards

This section describes the Video Distribution Amplifier, Model 10X-DA, and the 4 X 1 Vertical Interval Routing Switcher, Model 10X-4X1, for the Multi-II.

Section 6.1 Video Distribution Amplifier

The Video Distribution Amplifier can be configured for either one input looping with five outputs or a single input with 6 outputs.

Model 10X-DA Specifications

The following specifications apply to the Model 10X-DA board:

Interface

Inputs	Video (Composite)	1.0 Vpp, 75 Ω /Hi Z loop, BNC(s)
Outputs	Video (Composite)	1.0 Vpp, 75 Ω , BNC

Performance

Bandwidth	DC - 6 MHz, ± 0.05 dB DC - 12 MHz, ± 0.5 dB
Signal to Noise	70 dB
Differential Phase	$< 0.1^\circ$
Differential Gain	$< 0.7\%$
K-Factor (2T) (P&B)	$< 0.2\%$ $< 0.3\%$

Operational Controls

Video Level Frequency Compensation	± 3 dB
---------------------------------------	------------

Environmental

Operating Temperature	+32 $^\circ$ F (0 $^\circ$ C) to 113 $^\circ$ F (45 $^\circ$ C)
Operating Humidity	10% to 85% RH, non-condensing
Power Dissipation	3 Watts
Height	4.5 inches (11.43 cm)
Length	12.0 inches (30.5 cm)
Weight	10 ounces (0.3 kg)

All specifications subject to change without notice.

Model 10X-DA Board Configuration

Jumpers JP2 through JP7 control some features of the Model 10X-DA board.

Jumpers

The Video Distribution Amplifier can be configured for differential input or single-ended input terminating or looping as configured by jumpers JP2 through JP7 (Table 6-1). It can also be configured for single non-looping input, allowing one additional video output.

Table 6-1 shows jumper settings for desired configurations.

Table 6-1. Model 10X-DA Jumper Settings

Jumper	Hi-Z Looping Single-Ended Input	Hi-Z Looping Differential Input	Hi-Z Single-Ended Input* with I/O 1 as Output	Hi-Z Differential Input* with I/O 1 as Output	Terminated Single-Ended Input with I/O 1 as Output	Terminated Differential Input with I/O 1 as Output	Input AC Coupled	Input DC Coupled
JP2							A	B
JP3							A	B
JP4	B	B	B	B	A	A		
JP5	A	A	B	B	B	B		
JP6	B	A	B	A	B	A		
JP7	B	A	B	A	B	B		

*Requires an external T-connector.
Note: JP1 is not used.

Bypass

Normally VID IN and I/O 1 are looped for input (see Figure 6-1). If the board has been configured so that I/O 1 is an additional output (see Table 6-1, above) and the board is removed or the frame loses power, VID IN (input) will bypass to I/O 1 (output).

Model 10X-DA Rear Panel Connections

Figure 6-1 shows the rear panel connectors for the Model 10X-DA Video Distribution Amplifier board.

Note: The Model 10X-DA uses rear panel module #88171.

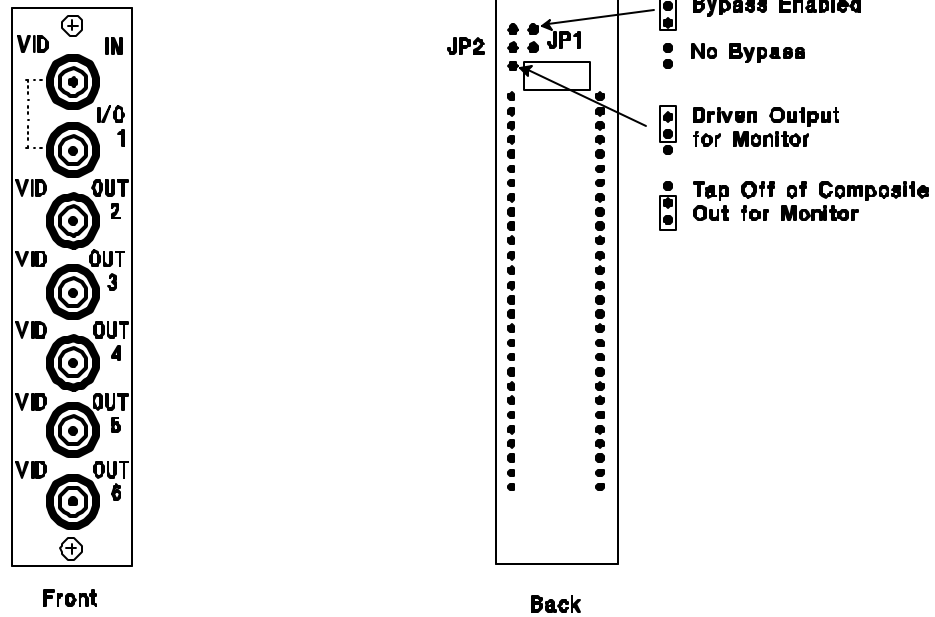


Figure 6-1. Model 10X-DA Rear Panel Module

Table 6-2 shows interconnection requirements for the Model 10X-DA Video Distribution Amplifier board.

Table 6-2. Model 10X-DA Interconnection Requirements

Name	Characteristics	Function
Vid In	1 Vpp, 75Ω, BNC	Video input.
Vid In Loop	Hi Z, BNC	Video input.
Vid Out	1 Vpp, 75Ω, BNC	Video output.

Model 10X-DA Board Menu Controls

Table 6-3 shows the menu controls available when the Model 10X-DA Video Distribution Amplifier board is installed.

Note: Controls indicated by * are accessed only by pressing the SHIFT button while scrolling with the MODE buttons.

Table 6-3. Model 10X-DA Board Menu Controls

Menu Item (in order of appearance)	Adjust Using		Description
	SET +/-	Dial	
Video Level	X	X	Adjusts luminance level (contrast).
Freq Comp Level	X	X	Adjusts amount of frequency compensation.
Freq Comp Curve	X	X	Adjusts pole or “breakpoint” of frequency compensation curve.
*Audio Monitor Select	X		Selects as the audio monitor's source a neighboring channel that has an audio card.
*About Card			Displays information about the Card.
Program Function Key	X		Eight function keys (F1 – F4 and SHIFT F1– F4 [for F5 – F8]) can be programmed to go directly to the eight most frequently used parameters for quick adjustment (see Section 4.2).
*Store Preset	X		Stores parameter levels and settings to one of three preset banks (see Section 4.3).
*Recal Preset	X		Recalls parameter levels and settings from one of three preset banks (see Section 4.3).

Section 6.2 4 X 1 Vertical Interval Routing Switcher

The 4 X 1 Vertical Interval Routing Switcher, Model 10X-4X1, allows you to select from four different inputs.

Model 10X-4X1 Specifications

The following specifications apply to the Model 10X-4X1 board:

Interface

Inputs	Video (Composite)	1.0 Vpp, 75Ω, BNC
Outputs	Video (Composite)	1.0 Vpp, 75Ω, BNC

Performance

Bandwidth	DC - 6 MHz, ±0.05 dB DC - 12 MHz, ±0.5 dB
Signal to Noise	70 dB
Differential Phase	<0.1°
Differential Gain	<0.7%
K-Factor	
(2T)	<0.2%
(P & B)	<0.3%
Output DC Offset	<10 mVDC

Operational Controls

Video Input Select	Inputs 1 through 4
--------------------	--------------------

Environmental

Operating Temperature	+32° F (0° C) to 113° F (45° C)
Operating Humidity	10% to 85% RH, non-condensing
Power Dissipation	7.5 Watts
Height	4.5 inches (11.43 cm)
Length	12.0 inches (30.5 cm)
Weight	10 ounces (0.3 kg)

All specifications subject to change without notice.

Model 10X-4X1 Rear Panel Connections

Figure 6-2 shows the rear panel connectors for the Model 10X-4X1 vertical interval routing switcher.

Note: The Model 10X-4X1 uses rear panel module #88172.

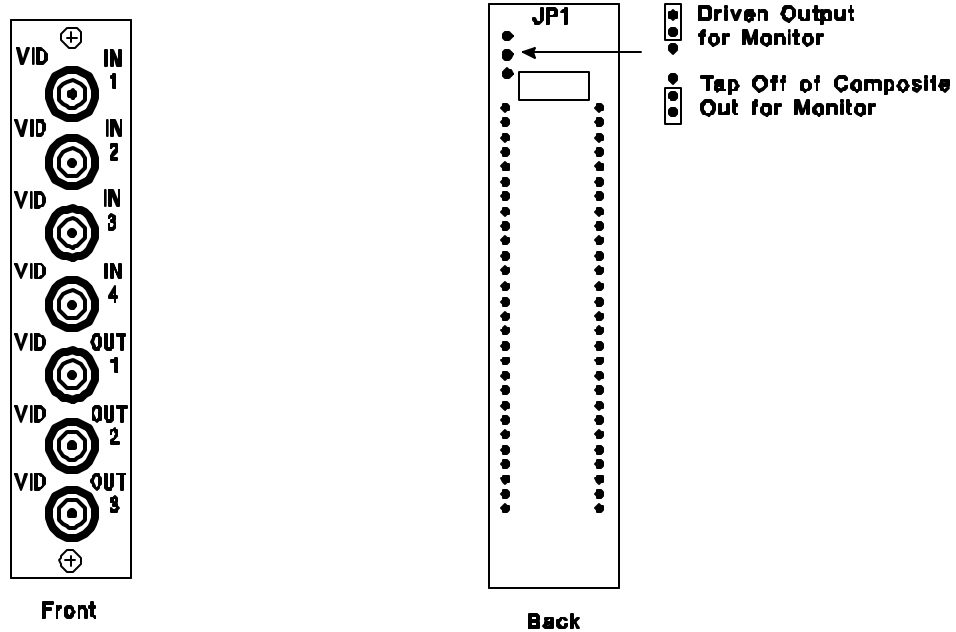


Figure 6-2. Model 10X-4X1 Rear Panel Module

Table 6-4 shows the interconnection requirements for the Model 10X-4X1 board.

Table 6-4. Model 10X-4X1 Interconnection Requirements

Name	Characteristics	Function
Vid In	1 Vpp, 75Ω, BNC	Video input.
Vid Out	1 Vpp, 75Ω, BNC	Video output.

Model 10X-4X1 Board Menu Controls

Table 6-5 shows the controls available by menu when the Model 10X-4X1 vertical interval routing switcher board is installed.

Note: Controls indicated by * are accessed only by pressing the **SHIFT** button while scrolling with the **MODE** buttons.

Table 6-5. Model 10X-4X1 Board Menu Controls

Menu Item (in order of appearance)	Adjust Using		Description
	SET +/-	Dial	
*GPI Port Select	X		Selects the function of the GPI port (see Appendix B): <ul style="list-style-type: none"> · Off · Select 2/1 (or 4/3). 1 (or 3) must be selected from front panel. GPI closure (LOW) will select 2 (or 4).
Channel Select	X	X	SET+ and SET- buttons move the selection in the direction indicated. The dial moves the pointer to where the next selection will be when the SET+ or SET- button is pressed.
*Audio Monitor Select	X		Selects as the audio monitor's source a neighboring channel that has an audio card.
*About Card			Displays information about the Card.
Program Function Key	X		Eight function keys (F1 – F4 and SHIFT F1– F4 [for F5 – F8]) can be programmed to go directly to the eight most frequently used parameters for quick adjustment (see Section 4.2).
*Store Preset	X		Stores parameter levels and settings to one of three preset banks (see Section 4.3).
*Recal Preset	X		Recalls parameter levels and settings from one of three preset banks (see Section 4.3).

Hot Keys

The function keys can be programmed (see Section 4.2, *Programming Function Keys*) to select input channels for this board. For example, to designate **F1** as the key to activate input channel 1, follow these steps:

1. Under the menu "Prog Fct Key," select F1.
2. Using the **SET+** button, scroll through the menu until "Channel 1!" is displayed and enter by pressing **SET-**.

Now, pressing **F1** should activate input channel 1. These steps can be repeated to program other function keys to activate the other three input channels.

Section 7

Audio Delay Board

This section describes the audio delay board, Model A/Del, which plugs into the Multi-II with full front panel control. With the Audio Delay board, two audio channels can be delayed up to 60 seconds (single board), and two channels of AUX audio may be switched in using GPI or RS232 control. Two additional channels of up to 60 seconds of audio delay are available on the same board.

Section 7.1 Audio Delay Board Specifications

The following specifications apply to the Audio Delay board:

Interface

Inputs	2 or 4*	15-pin D connector (15-pin to XLR cable provided)
AUX Input	2 channels**	15-pin D connector (15-pin to XLR cable provided)
Outputs	2 or 4* channels	15-pin D connector (15-pin to XLR cable provided)

Performance (all channels)

Test conditions: +4 dBm in and out, 1 KHz sine input

Input Level	0, +4, +8, or +16 dBm 600 Ω Bal or Hi-Z (each channel independent)
Output Level	0, +4, +8, or +16 dBm 600 Ω Bal (each channel independent)
Frequency Response	\pm 0.5 dB 20 Hz-20 KHz
Channel Separation	96 dB
S/N (A-st-filter)	86 dB
THD	.04%
Delay	8 mil to 60 seconds in 8 mil sec steps

Operational Controls

Input Select	2 CH regular input or 2 CH AUX input
Input to Output Delay	3 ms to maximum seconds (for 2 or 4 channels) in 5.33 ms steps
Level	\pm 16 dB (each channel) independent or in pairs
Master Level	+16 dB/-64 dB (all channels)

Environmental

Operating Temperature	+32 $^{\circ}$ F (0 $^{\circ}$ C) to 113 $^{\circ}$ F (45 $^{\circ}$ C)
Operating Humidity	10% to 85% RH, non-condensing
Power Dissipation	5 Watts
Height	4.0 inches (10.2 cm)
Length	12.0 inches (30.5 cm)
Weight	14 ounces (0.4 kg)

Options

2 AUX Input Channels	AUX**
----------------------	-------

*3rd and 4th channels of up to 60 seconds of audio delay available on the same single board.

**2 channels of AUX input is not available with 4 channels of input.

All specifications subject to change without notice.

Section 7.2 Audio Delay Board Features

Audio Delay board features include the standard VU meters which show input levels for each channel, the optional auxiliary switch, and the optional audio monitor, all described below.

VU Meters

In the Level Adjust menus, a VU meter is provided to show the actual levels of the inputs. Both channels 1 and 2 (or 3 and 4) are displayed. The highlighted (thicker) marker indicates the selected channel. Figure 7-1 shows an example of the VU meter display. Table 7-1 shows the tolerance specifications for each meter value.

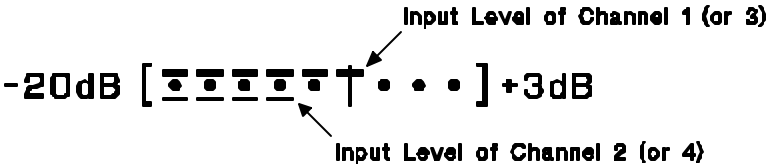


Figure 7-1. VU Meter Display Example

Table 7-1. VU Meter Values and Tolerance Specifications

Meter Value	Tolerance Specification
+3 dB	±0.5 dB
+2 dB	±0.5 dB
+1 dB	±0.5 dB
0 dB	±0.5 dB
-3 dB	±0.5 dB
-5 dB	±1.0 dB
-7 dB	±1.0 dB
-10 dB	±1.0 dB
-20 dB	±1.0 dB

Auxiliary Switch (Optional)

For a two-channel board, channels 3 and 4 may be used as an auxiliary source. The output of the board may be switched from the delayed signal to this auxiliary source from the front panel, with the remote, or via the GPI port.

Audio Monitor (Optional)

Audio boards Rev. C or greater are equipped with an audio monitor output which consists of two single-ended outputs (Channels 1 and 2 out) on a three-pin DIN connector (Aud Mon Out). This output is active only when the Audio Delay Board is selected either from the front panel or by the "Audio Monitor Select" menu of a neighboring video board.

Section 7.3 Audio Delay Board Configuration

The Audio Delay board has been configured at the factory to be +4 dB levels at all inputs and outputs. It is possible to change this configuration by changing solder-dot jumpers. To do so requires a soldering iron. By changing the jumpers (Figure 7-2), it is possible to have 0, +4, +8, and +16 dB levels at the inputs and 0, +4, +8, and +16 dB at the outputs. See Figures 7-3 and 7-4 for locations of the jumpers and their functions.

Note: Each channel, as well as inputs and outputs, can be configured differently.

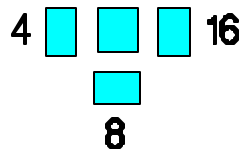


Figure 7-2. A Typical Level Set Jumper

- For 0 dB, the jumper should be open, as shown.
- For +4 dB, flow solder from the center pad to the pad labeled "4."
- For +8 dB, flow solder from the center pad to the pad labeled "8."
- For +16 dB, flow solder from the center pad to the pad labeled "16."

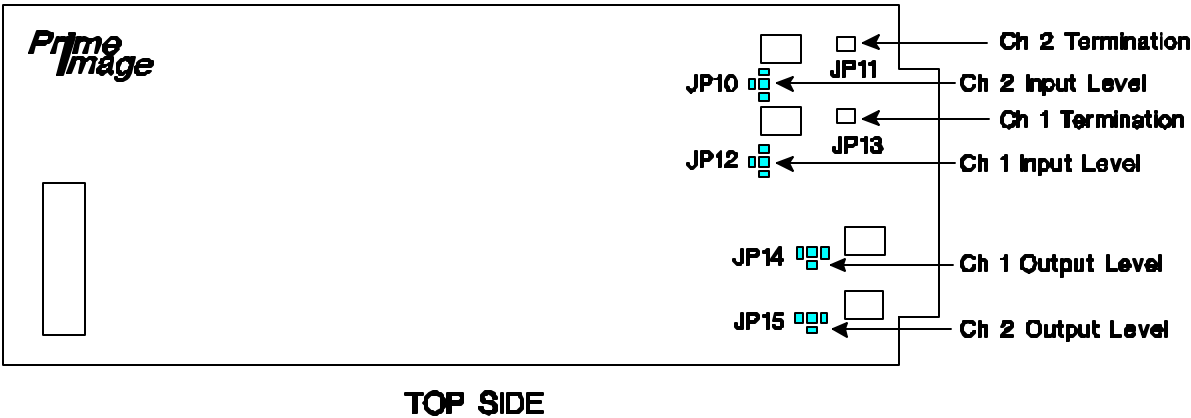


Figure 7-3. Locations of Channels 1 and 2 Jumpers

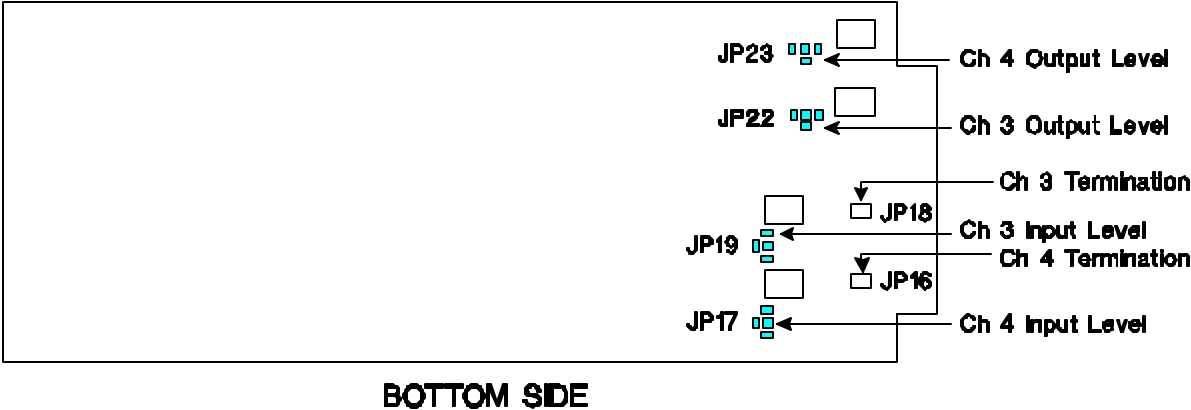


Figure 7-4. Locations of Channels 3 and 4 Jumpers

Input Impedance

The input impedance of 600 ohms can be changed to 15K ohms (Hi-Z) by removing the solder from the termination jumpers (see Figure 7-5).



Figure 7-5. Input Termination Jumper

Audio Delay Rear Panel Connections

Figure 7-6 shows the rear panel connector for the Audio Delay board. Cables are included with the Audio Delay board to connect the XLR connectors to the D connectors on the rear panel.



Figure 7-6. Audio Delay Board Rear Panel Module

Table 7-2 shows the interconnection requirements for the Audio Delay board.

Table 7-2. Audio Delay Board Interconnection Requirements

Name	Characteristics	Function
Inputs	3-pin XLR per input	Non-delayed audio input. Jumper on board selects input impedance.
Output	3-pin XLR per output	Delayed video output.

Audio Connector Pinouts

Figure 7-7 shows the AUDIO IN—15-pin D connector (female) pinout.

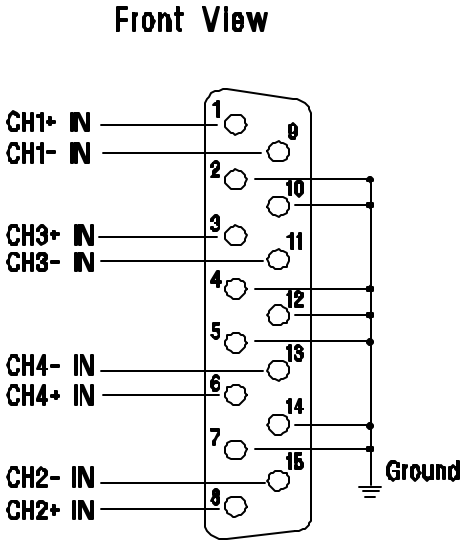


Figure 7-7. Audio Input Connector Pinout

Figure 7-8 shows the AUDIO OUT—15-pin D connector (male) pinout.

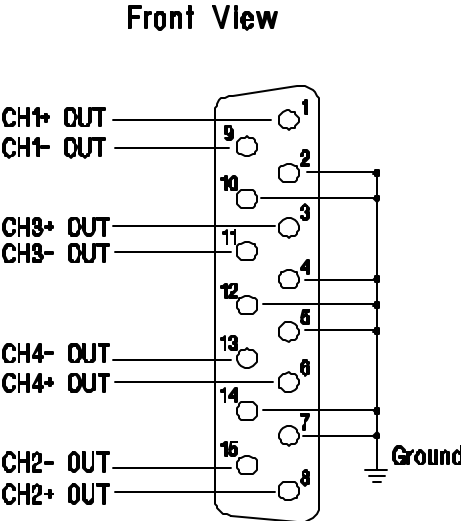


Figure 7-8. Audio Output Connector Pinout

Audio Delay Board Menu Controls

Table 7-3 shows the controls available by menu when the Audio Delay board is installed.

Note: Controls indicated by * are accessed only by pressing the **SHIFT** button while scrolling with the **MODE** buttons.

Table 7-3. Audio Delay Board Menu Controls

Menu Item (in order of appearance)	Adjust Using		Description
	SET +/-	Dial	
* GPI Port Select	X		Selects the function of the GPI port (Appendix B): <ul style="list-style-type: none"> · Off · Auxiliary switch On/Off
Audio Delay	X	X	Knob adjusts delay in 5.33 ms steps.
* Master Level	X	X	Adjusts levels of all inputs +16/-64 dB.
Channels 1 & 2 Levels	X	X	Adjusts levels of channels 1 and 2 together. Note: The displayed value is the higher of the two channels.
Channel 1 Level	X	X	Adjusts level of channel 1 input ± 16 dB. VU meter shows actual levels of channels 1 & 2, with CH 1 (top) highlighted.
Channel 2 Level	X	X	Adjusts level of channel 2 input ± 16 dB. VU meter shows actual levels of channels 1 & 2, with CH 2 (bottom) highlighted.
Channels 3 & 4 Levels	X	X	Adjusts levels of channels 3 and 4 together. Note: The displayed value is the higher of the two channels.
Channel 3 Level	X	X	Adjusts level of channel 3 input ± 16 dB. VU meter shows actual levels of channels 3 & 4, with CH 3 (top) highlighted.
Channel 4 Level	X	X	Adjusts level of channel 4 input ± 16 dB. VU meter shows actual levels of channels 3 & 4, with CH 4 (bottom) highlighted.
*Auxiliary Switch	X		Selects between delayed audio & auxiliary inputs (CH 3 & 4).
*Video Monitor Select	X		Selects as the video monitor's source a neighboring channel that has a video card.
*About Card			Displays information about the Card.
Program Function Key	X		Eight function keys (F1– F4 and SHIFT F1– F4 [for F5 – F8]) can be programmed to go directly to the eight most frequently used parameters for quick adjustment (Section 4.2).
*Store Preset	X		Stores parameter levels and settings to one of three preset banks (see Section 4.3).
*Recal Preset	X		Recalls parameter levels and settings from one of three preset banks (see Section 4.3).

Section 8 Standards Converter Boards

This section describes the standards converter plug-in boards for the Multi-II including the Models SC-10/2, 5F-10/2, and 5F-10/2-II.

Section 8.1 Pass Through Model SC-10/2

In addition to a standards converter, the Model SC-10/2 is also a full-frame synchronizer and time base corrector that transcodes between Y/C and Composite inputs and outputs. It takes in NTSC, PAL, PAL-M, PAL-N, SECAM, or NTSC 4.43 and sends out NTSC, PAL, PAL-M, PAL-N, or NTSC 4.43. The Model SC-10/2 exceeds broadcast specifications.

Model SC-10/2 Specifications

The following specifications apply to the Model SC-10/2 plug-in board:

Interface

Inputs	Video (Composite) Y/C 3/4 DUB	1.0 Vpp, 75Ω, BNC 4-pin -C cable, option
Outputs	Video (Composite) Y/C	1.0 Vpp, 75Ω, BNC 4-pin
Genlock In		High impedance/75Ω, BNC

Transcodes Y/C and Composite to Y/C and Composite.

Performance

Memory	2-Field plus
Interpolation System	Pass Through (non-blurring/non-averaging)
Bandwidth	5.5 MHz
Signal to Noise	58 dB
Differential Phase	<1.0°
Differential Gain	<1.0%
Sampling	8-bit luma; 8-bit each chroma (4:2:2)
Residual time-base error	±15 nsec

Operational Controls

3-Way Adaptive Comb	On/Off
Input Select	Y/C or Composite
Freeze	Off/Field/Frame
Strobe	Variable rate
Enhance	Normal/Low/High
AGC	On/Off
Go to Black and White	On/Off
H-Position	±2 ì sec
V-Color Adjust	1, 2, or 3 lines
H-Chroma/Luma Adjust	±1 ì sec
Video Level	±6 dB
Color Level	No Color to +6 dB
Setup Level	± 10 IRE
Hue (NTSC only)	±45°
H-Phase Adjust	±2 ì sec
Burst Phase Adjust	>360°
TV-Standards in and out	Input select NTSC, PAL, PAL-M, PAL-N, SECAM, or NTSC 4.43 Output select NTSC, PAL, PAL-M, PAL-N, or NTSC 4.43

Environmental

Operating Temperature	+32° F (0° C) to 113° F (45° C)
Operating Humidity	10% to 85% RH, non-condensing
Power Dissipation	15 Watts
Height	4.0 inches (10.2 cm)
Length	12.0 inches (30.5 cm)
Weight	14 ounces (0.4 kg)

Options

3-Way Adaptive Comb Filter	"E"
U-Matic DUB input	-C

All specifications subject to change without notice.

Model SC-10/2 Board Configuration

DIP switch S1, located in the upper left corner of the board, allows you to select Mono or to set the default field for freeze. Bit 2, labeled CB, has no effect in this unit. Bits 4 through 8 are not used.

Table 8-1. S1 DIP Switch Settings

Bit	Label	Description	OFF	ON
4-8		Not used		
3	FL	Default field for freeze	Field 1	Field 2
2	CB	Not applicable		
1	MO	Mono	Forced color	Mono mode

Mono

For the transmission of black and white signals, broadcasters often turn off the subcarrier burst to reduce color noise in the picture. The Model SC-10/2 board always produces a subcarrier burst unless Mono is selected. Mono turns off burst at the output when the input is a black and white signal (no burst present).

Note: Many video boards need the subcarrier burst for proper timing.

Additional Jumpers

Table 8-2 shows the settings for jumper JP2.

Table 8-2. JP2 Jumper Settings

Label	Description	No Jumper (OFF)	Jumper Installed (ON)
V	SC line interpolation	Normal	Disable line interpolation
W	SC Fld mode	Normal	Disable Fld mode video
X	Reserved		
Y	Reserved		
Z	Vert internal blank	Narrow blanking	Wide blanking

Model SC-10/2 Rear Panel Connections

Figure 8-1 shows the rear panel module of the Model SC-10/2 standards converter board.

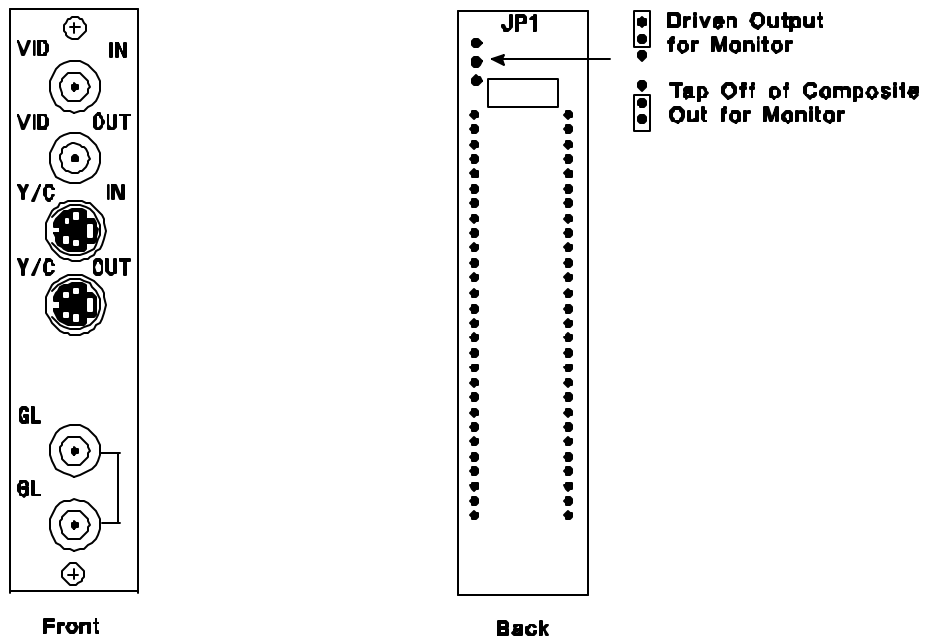


Figure 8-1. Model SC-10/2 Rear Panel Module

Table 8-3 shows the interconnection requirements for the Model SC-10/2 board.

Table 8-3. Model SC-10/2 Interconnection Requirements

Name	Characteristics	Function
Vid In	1 Vpp, 75Ω, BNC	Uncorrected video input.
Y In C In	1 Vpp, 75Ω 700 mVpp, 75Ω 4-pin S connector	Uncorrected video input.
Genlock In	High impedance	Reference sync input from external generator. If IND GL is selected, video outputs will be locked to this input.
Vid Out	1 Vpp, 75Ω, BNC	Corrected video output.
Y Out C Out	1 Vpp, 75Ω 700 mVpp, 75Ω 4-pin S connector	Corrected video output.

Y/C Connector Pinout

Figure 8-2 shows the Y/C IN/OUT— 4-pin mini DIN (SVHS) connector (female).

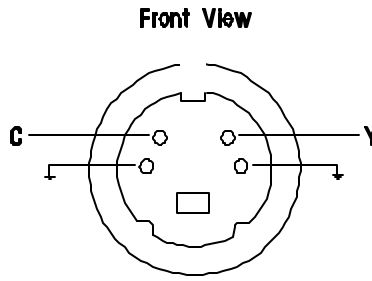


Figure 8-2. Y/C Connector Pinout

Model SC-10/2 Board Menu Controls

Table 8-4 shows menu controls available with Model SC-10/2 standards converter board installed.

Note: Controls indicated by * are accessed only by pressing the **SHIFT** button while scrolling with the **MODE** buttons.

Table 8-4. Model SC-10/2 Board Menu Controls

Menu Item (in order of appearance)	Adjust Using		Description
	SET +/-	Dial	
* GPI Port Select	X		Selects the function of the GPI port (see Appendix B): <ul style="list-style-type: none"> · Off · Freeze On/Off (field or frame determined by "Fld/FRM Select" menu)
Video Level	X	X	Adjusts luminance level (contrast).
* AGC			Automatic Gain Control. Adjusts the input level automatically by reference to the signal's sync amplitude.
Chroma	X	X	Adjusts color saturation.
Hue	X	X	Adjusts hue (tint).
Setup	X	X	Adjusts brightness.
* Field Video	X		Displays live video in a field-only mode determined by the "Fld/FRM Select" menu.
Freeze Mode	X		ON: Freezes a Field or Frame determined by the "Fld/FRM Select" menu (status shown on right side of display). ON+: Pressing again re-acquires new image if "Frz/Aquire" menu enabled. (Acquire mode indicated by "A" at display right.) OFF: Releases the freeze.

*Frz/Aquire Setup	X		Enables/disables Acquire mode (see Freeze mode).
Fld/FRM Select	X		Selects Display mode for Freeze and Strobe effects. "dft" = default setting (determined by DIP switch S1 bit 3 setting; see Table 8-1), "1" = field 1, "2" = field 2, "Frm" = Frame.
Strobe Mode	X		ON: Activates a "stop action" effect by freezing fields or frames (determined by "Fld/FRM Select" menu) at a periodic rate (determined by "Strobe Rate" menu). OFF: Releases Strobe mode.
Strobe Rate	X	X	Adjusts the rate of Strobe Mode.
Input Select	X		Selects between Composite and Y/C inputs.
*Comb Filter	X		Enables Comb Filter for Composite input. Note: "E" option must be present.
Detail	X		Selects among three levels of detail to enhance the picture (sharpness): Normal, low, high.
*B&W Mode	X		Turns off color signal to produce effect of black & white picture. Note: This effect does not turn off the subcarrier burst unless Mono is also selected by DIP switch (see Table 8-1).
*Horz Phase	X	X	Adjusts sync timing of output compared to Genlock reference.
*Subcarrier Phase	X	X	Adjusts the subcarrier phase of the output compared to the Genlock reference.
*Genlock Select	X		Selects Genlock ref: Independent, Master 1, Master 2, or No.
Horz Position	X	X	Adjusts picture position right or left.
Y/C Delay	X	X	Adjusts color position (with respect to luminance) right or left.
Advanced Chroma	X		Advances (shifts up) the color signal by one, two, or three lines. This shift helps counteract the effects of comb filters found in many VCRs, which shift the color down slightly.
Input Standard	X		Selects input standard: NTSC, NTSC 4.43, PAL-M, PAL-N, PAL-BGI, or SECAM.
Output Standard	X		Selects output standard: NTSC, NTSC 4.43, PAL-M, PAL-N, or PAL-BGI.
*Audio Monitor Select	X		Selects as the audio monitor's source a neighboring channel that has an audio card.
*About Card			Displays information about the Card.
Program Function Key	X		Eight function keys (F1 – F4 and SHIFT F1– F4 [for F5 – F8]) can be programmed to go directly to the eight most frequently used parameters for quick adjustment (see Section 4.2).
*Store Preset	X		Stores parameter levels and settings to one of three preset banks (see Section 4.3).
*Recal Preset	X		Recalls parameter levels and settings from one of three preset banks (see Section 4.3).

Section 8.2 Penta Model 5F-10/2

In addition to a five-field standards converter, the Model 5F-10/2 is also a full-frame synchronizer and time base corrector that transcodes between Y/U/V (Y/R/B), Y/C, and Composite inputs and outputs. It converts from NTSC, PAL, PAL-M, PAL-N, SECAM, or NTSC 4.43 input to NTSC, PAL, PAL-M, or PAL-N output. The Model 5F-10/2 exceeds broadcast specifications.

Model 5F-10/2 Specifications

The following specifications apply to the Penta Model 5F-10/2 plug-in board:

Interface

Inputs	Video (Composite)	1.0 Vpp, 75Ω, BNC
	YRB (YUV)	6-pin (6-pin to 3 BNC cable provided)
	Y/C	4-pin
	3/4 DUB	-C cable, option
Outputs	Video (Composite)	1.0 Vpp, 75Ω, BNC
	YRB (YUV)	6-pin (6-pin to 3 BNC cable provided)
	Y/C	4-pin
Genlock In		High impedance/75Ω, BNC

Transcodes Y/U/V (Y/R/B), Y/C, and Composite to Y/U/V (Y/R/B), Y/C, and Composite.

Performance

Memory	5-Field plus
Interpolation System	Penta-field Memory System
Bandwidth	5.5 MHz
Signal to Noise	58 dB
Differential Phase	<2°
Differential Gain	<2%
Sampling	8-bit luma; 8-bit each chroma (4:2:2)
Residual time-base error	±15 nsec

Operational Controls

3-Way Adaptive Comb	On/Off
Input Select	YUV (YRB), Y/C, or Composite
Freeze	Off/Field/Frame
Strobe	Variable rate
Enhance	Normal/Low/High
AGC	On/Off
Go to Black and White	On/Off
H-Position	±2 ì sec
V-Color Adjust	1, 2, or 3 lines
H-Chroma/Luma Adjust	±1 ì sec
Video Level	±6 dB
Color Level	No Color to +6 dB
Setup Level	± 10 IRE
Hue (NTSC only)	±45°
H-Phase Adjust	±2 ì sec
Burst Phase Adjust	>360°
MII and Beta in and out	Level Select
TV-Standards in and out	Input select NTSC, PAL, PAL-M, PAL-N, SECAM, or NTSC 4.43
	Output select NTSC, PAL, PAL-M, or PAL-N

Environmental

Operating Temperature	+32° F (0° C) to 113° F (45° C)
Operating Humidity	10% to 85% RH, non-condensing
Power Dissipation	15 Watts
Height	4.0 inches (10.2 cm)
Length	12.0 inches (30.5 cm)
Weight	14 ounces (0.4 kg)

Options

3-Way Adaptive Comb Filter	"E"
High Performance Encoder	HPE
U-Matic DUB input	-C

All specifications subject to change without notice.

Model 5F-10/2 Board Configuration

DIP switch S1, located in the upper left corner of the board, allows you to select Mono or to set the default field for freeze. Bit 2, labeled CB, has no effect in this unit. Bits 4 through 8 are not used.

Table 8-5. S1 DIP Switch Settings

Bit	Label	Description	OFF	ON
4-8		Not used		
3	FL	Default field for freeze	Field 1	Field 2
2	CB	Not applicable		
1	MO	Mono	Forced color	Mono mode

Mono

For the transmission of black and white signals, broadcasters often turn off the subcarrier burst to reduce color noise in the picture. The Model 5F-10/2 board always produces a subcarrier burst unless Mono is selected. Mono turns off burst at the output when the input is a black and white signal (no burst present).

Note: Many video boards need the subcarrier burst for proper timing.

Additional Jumpers

Table 8-6 shows the settings for jumper JP2.

Table 8-6. JP2 Jumper Settings

Label	Description	No Jumper (OFF)	Jumper Installed (ON)
V	SC line interpolation	Normal	Disable line interpolation
W	SC Fld mode	Normal	Disable Fld mode video (Full Frame mode) (only if X is installed)
X	SC motion interpolation	Normal	Disable motion interpolation (Switch to Fld mode video)
Y	Reserved		
Z	Vert internal blank	Narrow blanking	Wide blanking

Model 5F-10/2 Rear Panel Connections

Figure 8-3 shows the rear panel connectors of the Model 5F-10/2 standards converter board.

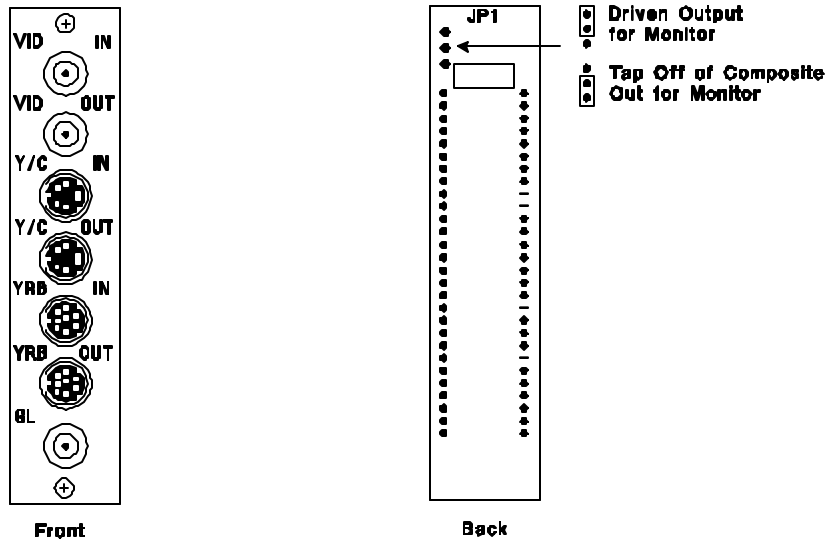


Figure 8-3. Model 5F-10/2 Rear Panel Module

Table 8-7 shows the interconnection requirements for the Model 5F-10/2 board.

Table 8-7. Model 5F-10/2 Interconnection Requirements

Name	Characteristics	Function
Vid In	1 Vpp, 75Ω, BNC	Uncorrected video input.
Y In C In	1 Vpp, 75Ω 700 mVpp, 75Ω 4-pin S connector	Uncorrected video input.
Component Y In U (R-Y) In V (B-Y) In	6-pin connector 1 Vpp, 75Ω 700 mVpp, 75Ω* 700 mVpp, 75Ω*	Uncorrected video input.
Genlock In	High impedance (JP9 open) 75Ω (JP9 installed)	Reference sync input from external generator. If IND GL is selected, video outputs will be locked to this input.
Vid Out	1 Vpp, 75Ω, BNC	Corrected video output.
Y Out C Out	1 Vpp, 75Ω 700 mVpp, 75Ω 4-pin S connector	Corrected video output.

Component	6-pin connector	Corrected video output.
Y Out	1 Vpp, 75Ω	
U (R-Y) Out	700 mVpp, 75Ω*	
V (B-Y) Out	700 mVpp, 75Ω*	
*Levels shown are for Beta format.		

Video Connector Pinouts

Figure 8-4 shows the Y/U/V (Y/R/B) IN/OUT— 6-pin mini DIN connector (female).

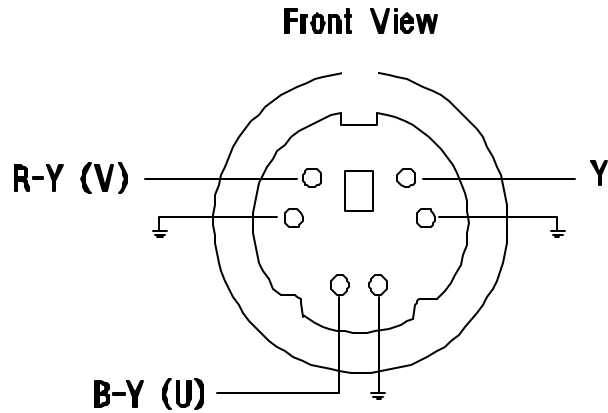


Figure 8-4. Y/U/V (Y/R/B) Connector Pinout

Figure 8-5 shows the Y/C IN/OUT— 4-pin mini DIN (SVHS) connector (female).

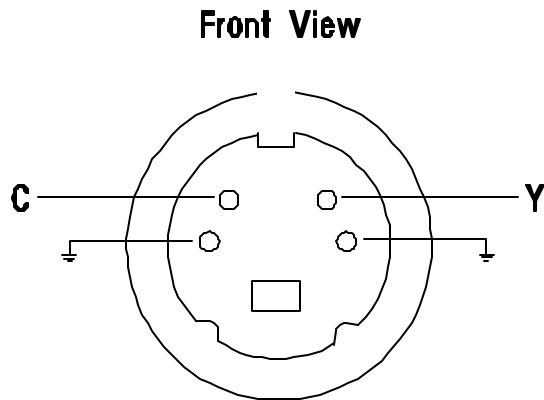


Figure 8-5. Y/C Connector Pinout

Model 5F-10/2 Board Menu Controls

Table 8-8 shows the controls available by menu when the Model 5F-10/2 standards converter board is installed.

Note: Controls indicated by * are accessed only by pressing the SHIFT button while scrolling with the MODE buttons.

Table 8-8. Model 5F-10/2 Board Menu Controls

Menu Item (in order of appearance)	Adjust Using		Description
	SET +/-	Dial	
* GPI Port Select	X		Selects the function of the GPI port (see Appendix B): <ul style="list-style-type: none"> Off Freeze On/Off (field or frame determined by "Fld/FRM Select" menu)
Video Level	X	X	Adjusts luminance level (contrast).
* AGC			Automatic Gain Control. Adjusts the input level automatically by reference to the signal's sync amplitude.
Chroma	X	X	Adjusts color saturation.
Hue	X	X	Adjusts hue (tint).
Setup	X	X	Adjusts brightness.
* Field Video	X		Displays live video in a field-only mode determined by the "Fld/FRM Select" menu.
Freeze Mode	X		ON: Freezes a Field or Frame determined by the "Fld/FRM Select" menu (status shown on right side of display). ON+: Pressing ON again re-acquires a new image if the "Frz/Acquire" menu is enabled. (Acquire mode is indicated by an "A" on the right side of the display.) OFF: Releases the freeze.
*Frz/Aquire Setup	X		Enables/disables Acquire mode (see Freeze mode).
Fld/FRM Select	X		Selects Display mode for Freeze and Strobe effects. "dft" = default setting (determined by DIP switch S1 bit 3 setting; see Table 8-5), "1" = field 1, "2" = field 2, "Frm" = Frame.
Strobe Mode	X		ON: Activates a "stop action" effect by freezing fields or frames (determined by "Fld/FRM Select" menu) at a periodic rate (determined by "Strobe Rate" menu). OFF: Releases Strobe mode.
Strobe Rate	X	X	Adjusts the rate of Strobe Mode.
Input Select	X		Selects input from Composite, Y/C, or YRB (YUV).

*Comb Filter	X		Enables Comb Filter for Composite input. Note: "E" option must be present.
*YRB Input Format	X		Selects between \hat{a} and MII.
Detail	X		Selects among three levels of detail to enhance the picture (sharpness): Normal, low, high.
*B&W Mode	X		Turns off color signal to produce effect of black & white picture. Note: This effect does not turn off the subcarrier burst unless Mono is also selected by DIP switch (see Table 8-5).
*Horz Phase	X	X	Adjusts sync timing of output compared to Genlock reference.
*Subcarrier Phase	X	X	Adjusts subcarrier phase of output compared to Genlock ref.
*Genlock Select	X		Selects Genlock ref: Independent, Master 1, Master 2, or No.
Horz Position	X	X	Adjusts the picture position right or left.
Y/C Delay	X	X	Adjusts color position (with respect to luminance) right or left.
Advanced Chroma	X		Advances (shifts up) the color signal by one, two, or three lines. This shift helps counteract the effects of comb filters found in many VCRs, which shift the color down slightly.
Input Standard	X		Selects input standard: NTSC, NTSC-4.43, PAL-M, PAL-N, PAL-BGI, or SECAM.
Output Standard	X		Selects output standard: NTSC, PAL-N, PAL-N, or PAL-BGI.
*Audio Monitor Select	X		Selects as the audio monitor's source a neighboring channel that has an audio card.
*About Card			Displays information about the Card.
Program Function Key	X		Eight function keys (F1 – F4 and SHIFT F1– F4 [for F5 – F8]) can be programmed to go directly to the eight most frequently used parameters for quick adjustment (see Section 4.2).
*Store Preset	X		Stores parameter levels and settings to one of three preset banks (see Section 4.3).
*Recal Preset	X		Recalls parameter levels and settings from one of three preset banks (see Section 4.3).

Section 8.3 Penta Model 5F-10/2-II

In addition to an enhanced five-field standards converter, the Model 5F-10/2-II is also a full-frame synchronizer and time base corrector that transcodes between Y/U/V (Y/R/B), Y/C, and Composite inputs and outputs. It converts from NTSC, PAL, PAL-M, PAL-N, SECAM, or NTSC 4.43 input to NTSC, PAL, PAL-M, PAL-N, SECAM, or NTSC 4.43 output. The Model 5F-10/2-II exceeds broadcast specifications.

Model 5F-10/2-II Specifications

The following specifications apply to the Penta Model 5F-10/2-II plug-in board:

Interface

Inputs	Video (Composite) YRB (YUV) Y/C 3/4 DUB	1.0 Vpp, 75 Ω , BNC 6-pin (6-pin to 3 BNC cable provided) 4-pin -C cable, option
Outputs	Video (Composite) YRB (YUV) Y/C	1.0 Vpp, 75 Ω , BNC 6-pin (6-pin to 3 BNC cable provided) 4-pin
Genlock In		High impedance/75 Ω , BNC

Transcodes Y/U/V (Y/R/B), Y/C, and Composite to Y/U/V (Y/R/B), Y/C, and Composite.

Performance

Memory Interpolation System	5-Field plus Penta-field Enhanced Memory System
Bandwidth	5.5 MHz
Signal to Noise	58 dB
Differential Phase	<2 $^{\circ}$
Differential Gain	<2%
Sampling	8-bit luma; 8-bit each chroma (4:2:2)
Residual time-base error	\pm 15 nsec

Operational Controls

3-Way Adaptive Comb	On/Off
Input Select	YRB (YUV), Y/C, or Composite
Freeze	Off/Field/Frame
Strobe	Variable rate
Enhance	Normal/Low/High
AGC	On/Off
Go to Black and White	On/Off
H-Position	± 2 μ sec
V-Color Adjust	1, 2, or 3 lines
H-Chroma/Luma Adjust	± 1 μ sec
Video Level	± 6 dB
Color Level	No Color to +6 dB
Setup Level	± 10 IRE
Hue (NTSC only)	$\pm 45^\circ$
H-Phase Adjust	± 2 μ sec
Burst Phase Adjust	$> 360^\circ$
MII and Beta in and out	Level Select
TV-Standards in and out	Input select NTSC, PAL, PAL-M, PAL-N, SECAM, or NTSC 4.43
	Output select NTSC, PAL, PAL-M, PAL-N, SECAM, or NTSC 4.43

Environmental

Operating Temperature	+32° F (0° C) to 113° F (45° C)
Operating Humidity	10% to 85% RH, non-condensing
Power Dissipation	15 Watts
Height	4.0 inches (10.2 cm)
Length	12.0 inches (30.5 cm)
Weight	14 ounces (0.4 kg)

Options

3-Way Adaptive Comb Filter	"E"
High Performance Encoder	HPE-II
U-Matic DUB input	-C

All specifications subject to change without notice.

Model 5F-10/2-II Board Configuration

DIP switch S1, located in the upper left corner of the board, allows you to select Mono or to set the default field for freeze. Bit 2, labeled CB, has no effect in this unit. Bits 4 through 8 are not used.

Table 8-9. S1 DIP Switch Settings

Bit	Label	Description	OFF	ON
4-8		Not used		
3	FL	Default field for freeze	Field 1	Field 2
2	CB	Not applicable		
1	MO	Mono	Forced color	Mono mode

Mono

For the transmission of black and white signals, broadcasters often turn off the subcarrier burst to reduce color noise in the picture. The Model 5F-10/2-II board always produces a subcarrier burst unless Mono is selected. Mono turns off burst at the output when the input is a black and white signal (no burst present).

Note: Many video boards need the subcarrier burst for proper timing.

Additional Jumpers

Table 8-10 shows the settings for jumpers JP2 and JP9.

Table 8-10. JP2 and JP9 Jumper Settings

Label	Description	No Jumper (OFF)	Jumper Installed (ON)	
JP2	V	SC line interpolation	Normal	Disable line interpolation
	W	SC Fld mode	Normal	Disable Fld mode video (Full Frame mode) (only if X is installed)
	X	SC motion interpolation	Normal	Disable motion interpolation (Switch to Fld mode video)
	Y	Reserved		
	Z	Vert internal blank	Narrow blanking	Wide blanking
JP9	IND GL termination	High impedance	75Ω termination	

Model 5F-10/2-II Rear Panel Connections

Figure 8-6 shows the rear panel connectors of the Model 5F-10/2-II standards converter board.

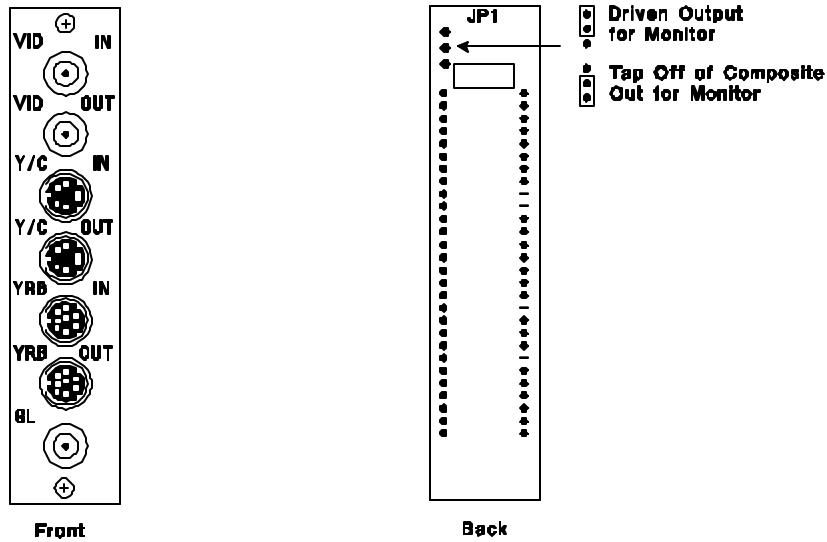


Figure 8-6. Model 5F-10/2-II Rear Panel Module

Table 8-11 shows the interconnection requirements for the Model 5F-10/2-II board.

Table 8-11. Model 5F-10/2-II Interconnection Requirements

Name	Characteristics	Function
Vid In	1 Vpp, 75Ω, BNC	Uncorrected video input.
Y In C In	1 Vpp, 75Ω 700 mVpp, 75Ω 4-pin S connector	Uncorrected video input.
Component Y In U (R-Y) In V (B-Y) In	6-pin connector 1 Vpp, 75Ω 700 mVpp, 75Ω* 700 mVpp, 75Ω*	Uncorrected video input.
Genlock In	High impedance (JP9 open) 75Ω (JP9 installed)	Reference sync input from external generator. If IND GL is selected, video outputs will be locked to this input.
Vid Out	1 Vpp, 75Ω, BNC	Corrected video output.
Y Out C Out	1 Vpp, 75Ω 700 mVpp, 75Ω 4-pin S connector	Corrected video output.

Component	6-pin connector	Corrected video output.
Y Out	1 Vpp, 75Ω	
U (R-Y) Out	700 mVpp, 75Ω*	
V (B-Y) Out	700 mVpp, 75Ω*	
*Levels shown are for Beta format.		

Video Connector Pinouts

Figure 8-7 shows the Y/U/V (Y/R/B) IN/OUT— 6-pin mini DIN connector (female).

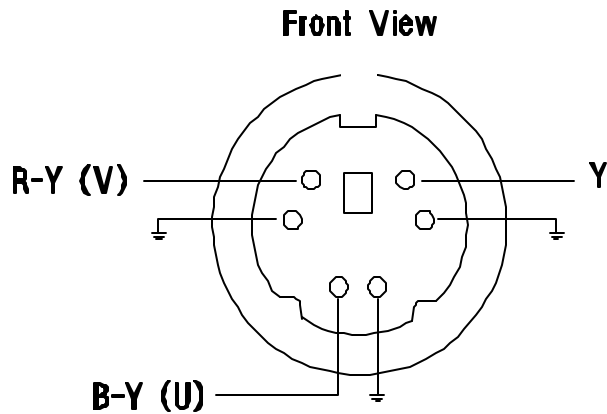


Figure 8-7. Y/U/V (Y/R/B) Connector Pinout

Figure 8-8 shows the Y/C IN/OUT— 4-pin mini DIN (SVHS) connector (female).

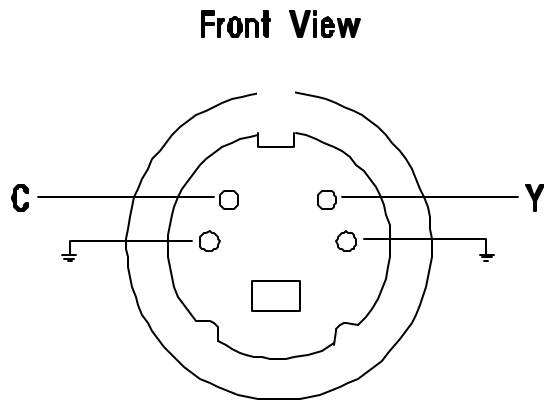


Figure 8-8. Y/C Connector Pinout

Model 5F-10/2-II Board Menu Controls

Table 8-12 shows the controls available by menu when the Model 5F-10/2-II standards converter board is installed.

Note: Controls indicated by * are accessed only by pressing the SHIFT button while scrolling with the MODE buttons.

Table 8-12. Model 5F-10/2-II Board Menu Controls

Menu Item (in order of appearance)	Adjust Using		Description
	SET +/-	Dial	
* GPI Port Select	X		Selects the function of the GPI port (see Appendix B): <ul style="list-style-type: none"> · Off · Freeze On/Off (field or frame determined by "Fld/FRM Select" menu)
Video Level	X	X	Adjusts luminance level (contrast).
* AGC			Automatic Gain Control. Adjusts the input level automatically by reference to the signal's sync amplitude.
Chroma	X	X	Adjusts color saturation.
Hue	X	X	Adjusts hue (tint).
Setup	X	X	Adjusts brightness.
* Field Video	X		Displays live video in a field-only mode determined by the "Fld/FRM Select" menu.
Freeze Mode	X		ON: Freezes a Field or Frame determined by the "Fld/FRM Select" menu (status shown on right side of display). ON+: Pressing ON again re-acquires a new image if the "Frz/Acquire" menu is enabled. (Acquire mode is indicated by an "A" on the right side of the display.) OFF: Releases the freeze.
*Frz/Aquire Setup	X		Enables/disables Acquire mode (see Freeze mode).
Fld/FRM Select	X		Selects Display mode for Freeze and Strobe effects. "dft" = default setting (determined by DIP switch S1 bit 3 setting; see Table 8-5), "1" = field 1, "2" = field 2, "Frm" = Frame.
Strobe Mode	X		ON: Activates a "stop action" effect by freezing fields or frames (determined by "Fld/FRM Select" menu) at a periodic rate (determined by "Strobe Rate" menu). OFF: Releases Strobe mode.
Strobe Rate	X	X	Adjusts the rate of Strobe Mode.
Input Select	X		Selects input from Composite, Y/C, and YRB (YUV).

*Comb Filter	X		Enables Comb Filter for Composite input. Note: "E" option must be present.
*YRB Input Format	X		Selects between \hat{a} and Mill.
Detail	X		Selects among three levels of detail to enhance the picture (sharpness): Normal, low, high.
*B&W Mode	X		Turns off color signal to produce effect of black & white picture. Note: This effect does not turn off the subcarrier burst unless Mono is also selected by DIP switch (see Table 8-9).
*Horz Phase	X	X	Adjusts sync timing of output compared to Genlock reference.
*Subcarrier Phase	X	X	Adjusts subcarrier phase of output compared to Genlock ref.
*Genlock Select	X		Selects Genlock ref: Independent, Master 1, Master 2, or No.
Horz Position	X	X	Adjusts the picture position right or left.
Y/C Delay	X	X	Adjusts color position (with respect to luminance) right or left.
Advanced Chroma	X		Advances (shifts up) the color signal by one, two, or three lines. This shift helps counteract the effects of comb filters found in many VCRs, which shift the color down slightly.
Input Standard	X		Selects input standard: NTSC, NTSC 4.43, PAL-M, PAL-N, PAL-BGI, or SECAM.
Output Standard	X		Selects output standard: NTSC, NTSC 4.43, PAL-M, PAL-N, PAL-BGI, or SECAM.
*Audio Monitor Select	X		Selects as the audio monitor's source a neighboring channel that has an audio card.
*About Card			Displays information about the Card.
Program Function Key	X		Eight function keys (F1 – F4 and SHIFT F1– F4 [for F5 – F8]) can be programmed to go directly to the eight most frequently used parameters for quick adjustment (see Section 4.2).
*Store Preset	X		Stores parameter levels and settings to one of three preset banks (see Section 4.3).
*Recal Preset	X		Recalls parameter levels and settings from one of three preset banks (see Section 4.3).

Section 9

Logo Insertion Still Card

This section describes the Logo Insertion Still Card, Model #CARD, plug-in board for the Multi-II. The Still Card, available in NTSC, PAL, or PAL-M standard, provides non-volatile storage of two high quality images (two fields/one frame, with an option for four fields/two frames). The built-in linear keyer-mixer with composite preview and program allows preview before going to program or on air without tying up other production equipment. And if video is lost, the Still Card image can be displayed automatically.

Section 9.1 Still Card Specifications

The following specifications apply to the Logo Insertion Still Card plug-in board:

Interface

Inputs	Video	1.0 Vpp, 75Ω, BNC
	Digital Interface	20-pin ribbon connector
Outputs	Program Video (Composite)	1.0 Vpp, 75Ω, BNC
	Still (Y/C)	4-pin
	Preview Video (Composite)	1.0 Vpp, 75Ω, BNC
Genlock In		High impedance/75Ω, BNC

Performance

Non-Volatile Memory	2-field or 1-frame (NTSC, PAL, PAL-M), 4-field/2-frame option
Bandwidth	5.5 MHz
Signal to Noise	58 dB
Differential Phase	<1.0°
Differential Gain	<1.0%
K-Factor	<1.0%
Sampling	(4:2:2)
Quantization	8-bit luma; 8-bit each chroma
Keyer/Mixer Spec	50 MHz, 0.1° Differential Phase 0.1% Differential Gain

Operational Controls

Picture Select	Frame or Field 1 or 2 (Optional 2 Frame/4 Field)
Mixer/Keyer	On/Off
Mixer/Keyer Dissolve Rate	4 Rates: Lo, Hi, Cut, Variable
Auto Switch to Still	On/Off
H-Position	±2 ì sec
V-Color Advance	1, 2, or 3 lines
Video Level	No Video to +6 dB
Color Level	No Color to +3 dB
Setup Level	± 10 IRE
H-Phase Adjust	±2 ì sec
Burst-Phase Adjust	>360°

Environmental

Operating Temperature	+32° F (0° C) to 113° F (45° C)
Operating Humidity	10% to 80% RH, non-condensing
Power Dissipation	10 Watts
Height	4.5 inches (11.43 cm)
Length	12.0 inches (30.5 cm)
Weight	10 ounces (0.3 kg)

All specifications subject to change without notice.

Section 9.2 Still Card Features

The following paragraphs describe the features of the Still Card.

Single Field Programmable

The Still Card contains a full frame of memory (field 1 and field 2). This memory can be programmed and displayed as a single image with full-frame quality, or two individual images, by programming fields 1 and 2 separately. If the 2-Frame option is installed, up to four different images may be programmed.

Auto Switch

The Still Card can be configured to automatically display the still, if the input signal (AUX) goes away. This can be useful for displaying a trouble slide in the event an incoming signal is lost. To enable the auto switch, turn DIP switch SW2 (see Figure 9-1) bit 4 to the ON position.

Note: The Still Card detects the presence of a signal by looking for composite sync at the AUX input.

Write Protection

The Still Card utilizes write protection circuitry to avoid accidentally overwriting a still. DIP switch SW2 (see Figure 9-1) bits 1 and 2 are write protect controls, which, if turned on, prevent the memory from being written to. Bit 1 controls field 1 memory, and bit 2 controls field 2 memory. In addition, a program cycle cannot be started unless the ribbon cable is connected to an operating Prime Image Rev. L TBC/Sync board (Model 10/2 or 10/2 I with 20-pin connector installed).

Linear Keyer-Mixer

The Still Card uses a linear Keyer-Mixer at the output, providing the flexibility to combine the still or logo with the incoming video. The Keyer-Mixer uses the still's luminance portion as the key signal.

Note: The Keyer-Mixer requires that the video input be synchronous with the Still Card.

The preview output allows you to see the output of the Keyer-Mixer before it goes out "On-Air." The program output is controlled by the "Dissolve" menu (and/or GPI port) and dissolves between the incoming video (Dissolve Out) and the output of the Keyer-Mixer (Dissolve In).

Example 1

To display a Full Frame Still, such as "Please Stand By:"

1. Connect a monitor to the preview output (PVW OUT).
2. Select the menu "Mix Level" using the front panel menu buttons and adjust level to maximum.
3. Select menu "Key Level" and adjust level to minimum.
4. With menu "Fld/FRM," select the field 1, field 2, or full frame setting. The still that is programmed into memory should now be displayed on the preview monitor.

To display the still on the program output:

- Select the "Dissolve" menu and activate "Dissolve In" with the SET+ button.
OR
- Enable GPI port (use menu "GPI Port Select") and control through external device.
OR
- Enable auto switch detect (see section *Auto Switch*, above) and remove any video signal from the AUX input.

The menu "Dissolve Rate" allows adjustment of the rate at which the still is switched in and out of the program output. The Auto Switch mode always switches instantly regardless of the rate setting.

Example 2

To insert a logo:

1. Connect a monitor to the preview output (PVW OUT).
2. Store an image of a logo on a black background (see Section 9.2).
3. With menu "Fld/FRM," select the field or frame that contains the logo image.
4. Select the menu "Mix Level" and adjust level to minimum.
5. Select the menu "Key Level." Adjust the key level to insert logo. Partially keying and varying the video level and setup of the logo can make the logo appear transparent. The inserted logo should now be displayed on the preview monitor.

To insert a logo into the program output:

- Select the "Dissolve" menu and activate "Dissolve In" with the SET+ button.
OR
- Enable GPI port (use menu "GPI Port Select") and control through external device.

The menu "Dissolve Rate" allows adjustment of the rate the logo is inserted and removed. The setting "Lo" has been designed for logo insertion, having a very gradual unobtrusive effect.

Section 9.3 Programming the Still Card

The Still Card can be programmed easily in a few seconds from a Prime Image Rev. L TBC/Sync board (Model 10/2 or 10/2 I with 20-pin connector installed), as follows:

1. Connect the 20-pin ribbon cable from the Still Card (see Figure 9-2) to the TBC/Sync board (Model 10/2).
2. Connect a monitor to the MON output of the Multi-II chassis.
3. Connect a monitor to the preview (PVW) output of the Still Card.
4. Select the TBC/Sync board (Model 10/2) with the channel buttons on the front panel of the Multi-II chassis.
5. Using the "Freeze" menu, freeze the image that will be transferred to the Still Card. The frozen image should be displayed on the monitor (MON) output.

Note: Regardless of whether the freeze is in field or frame mode, a full frame is always transferred to the Still Card.

6. Select the Still Card with the channel buttons on the front panel.
7. Select the menu "Mix Level" using the front panel menu buttons and adjust the level to maximum. Select menu "Key Level" and adjust level to minimum.
8. With the "Fld/FRM" menu, select the fields or frame that will be replaced (the card overwrites only the fields displayed). If a single field image is desired, select field 1 or field 2. If the full frame is desired, select Frame. If the Still Card has the 2-Frame option, select Frame A or B with the menu "Frame Select." The selected field(s) should now be displayed on the preview monitor.

Note: The images displayed will be lost once programming has begun.

9. Be sure the write protect DIP switches are set to OFF for the selected fields. (SW2 on the Still Card: Bit 1 = field 1, Bit 2 = field 2).
10. Open the front panel of the Multi-II chassis (see Section 2.4). Locate the Still Card and its Start button (see Figure 9-2). Press and hold down the Start button until the LED (above the Start button) lights. Release the button. The Program LED should remain lit until the program cycle is complete (approximately 5 seconds). If the Program LED flashes, an error has occurred; either the ribbon cable is not connected properly, or the write protect DIP switches are set to ON. If programming is successful, the field 1 and/or 2 LEDs (below the DIP switches) will flash as they are being programmed.

Section 9.4 Still Card Configuration

The Still Card can be configured using DIP switch SW2 and jumpers JP1, JP2, JP3, JP4, and JP5.

DIP Switch

Figure 9-1 shows DIP switch SW2 settings.

- 1 = field 1 write enable
- 2 = field 2 write enable
- 3 = not used
- 4 = auto switch enable

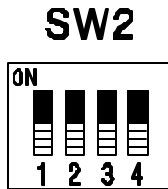


Figure 9-1 Still Card DIP Switch SW2

Jumpers

Figure 9-2 shows Still Card jumper settings for use in the Multi-II unit.

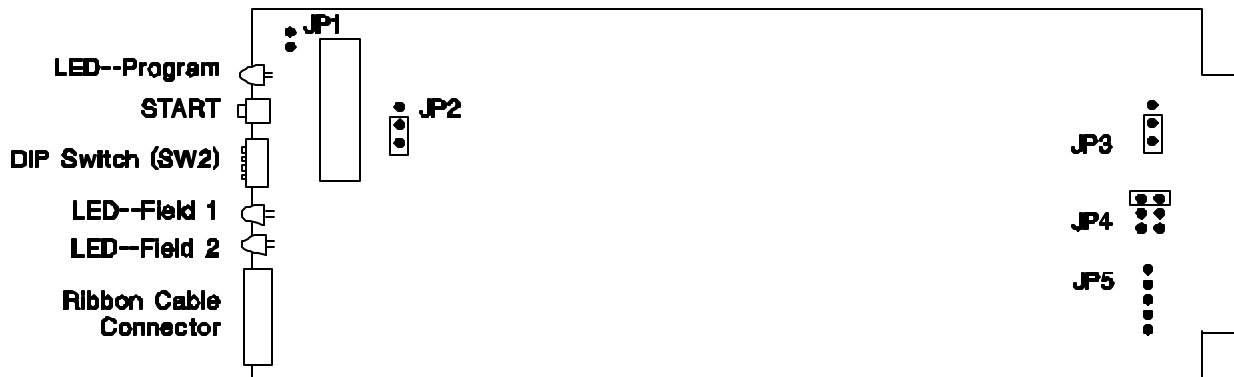


Figure 9-2. Still Card Jumpers

Still Card Rear Panel Connections

Figure 9-3 shows the rear panel connectors of the Still Card logo insertion board.

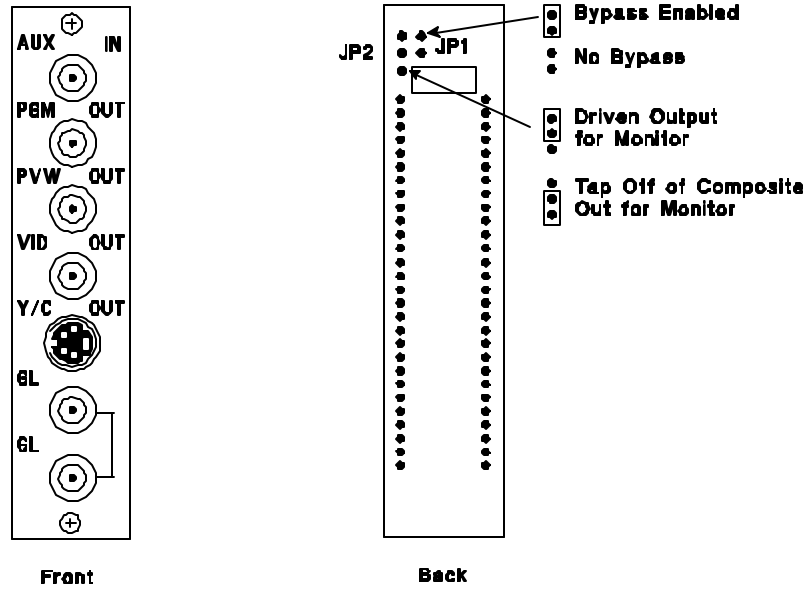


Figure 9-3. Still Card Rear Panel Module

Table 9-1 shows the interconnection requirements for the Still Card.

Table 9-1. Still Card Interconnection Requirements

Name	Characteristics	Function
AUX In	1 Vpp, 75Ω, BNC	Video input for mixer/keyer.
Digital Interface	20-pin ribbon connector	Video data input.
Genlock In	High impedance	Reference sync input from external generator. If IND GL is selected, still video will be locked to this input.
PGM (Program) Out	1 Vpp, 75Ω, BNC	Final video output. Same as Preview Out if dissolve is on.
VID Out	1 Vpp, 75Ω, BNC	Still video output.
Y/C Out Y C	4-pin S connector 1 Vpp, 75Ω 700 mVpp, 75Ω	Still video output.
PVW (Preview) Out	1 Vpp, 75Ω, BNC	Video output from mixer/keyer.

Still Card Menu Controls

Table 9-2 shows the controls available by menu when the Still Card is installed.

Note: Controls indicated by * are accessed only by pressing the SHIFT button while scrolling with the MODE buttons.

Table 9-2. Still Card Menu Controls

Menu Item (in order of appearance)	Adjust Using		Description
	SET +/-	Dial	
* GPI Port Select	X		Selects the function of the GPI port (see Appendix B): <ul style="list-style-type: none"> · Off · Dissolve On/Off (dissolve logo or still in or out with GPI signal).
Video Level	X	X	Adjusts luminance level (contrast).
Chroma	X	X	Adjusts color saturation.
Setup	X	X	Adjusts brightness.
*B&W Mode	X		Turns off color signal to produce effect of black & white picture. Note: This effect does not turn off the subcarrier burst unless Mono is also selected by DIP switch (see Table 5-1).
Dissolve	X		Dissolves the logo or still in/out of video input on Program Out.
Dissolve Rate	X	X	Select rate of dissolve: <ul style="list-style-type: none"> - Low - High - Variable in Frames (Select with knob) - X = Vertical interval cut.
Key Level	X	X	Adjust key level of linear Mixer/Keyer.
Mix Level	X	X	Adjusts mix level of linear Mixer/Keyer.
Fld/FRM Select	X		Selects Display mode for still/logo image. "1" = field 1, "2" = field 2, "Frm" = Frame.
Frame Select	X		Selects between Frame buffer A or B (requires 2-frame option).
*Horz Phase	X	X	Adjusts sync timing of still/logo compared to Genlock ref.
*Subcarrier Phase	X	X	Adjusts subcarrier phase of still/logo compared to Genlock ref.
*Genlock Select	X		Selects Genlock reference for still/logo: Independent, Master 1, Master 2, or No.
Horz Position	X	X	Adjust the still/logo position right or left.

Advanced Chroma	X		Advances (shifts up) the color signal of still/logo by one, two, or three lines. This shift helps counteract the effects of comb filters found in many VCRs, which shift the color down slightly.
*Output Standard	X		Selects board output standard (requires multi-standard option).
*Audio Monitor Select	X		Selects as the audio monitor's source a neighboring channel that has an audio card.
*About Card			Displays information about the Card.
Program Function Key	X		Eight function keys (F1 – F4 and SHIFT F1– F4 [for F5 – F8]) can be programmed to go directly to the eight most frequently used parameters for quick adjustment (see Section 4.2).
*Store Preset	X		Stores parameter levels and settings to one of three preset banks (see Section 4.3).
*Recal Preset	X		Recalls parameter levels and settings from one of three preset banks (see Section 4.3).

Section 10

Remote Control

This section provides information about the remote control units available with the Multi-II. Both Model R-1 (hand-held) and Model R-2 (standalone) remote units control all features of all Prime Image products that have an RS232 port.

Section 10.1 Remote Unit Specifications

The following specifications apply to the Model R-1 and Model R-2 remote control units:

Interface

Cable 6 feet, 25-pin D connector or 5-pin DIN (Model R-1 only)

Performance

Controls all variables for all boards described in this manual. See the section for each board installed.

Operational Controls

Display	LCD, 16 characters by 2 rows
Level Set	2 Buttons + and - or Dial
Mode Select	2 Buttons + and -
Channel Select	2 Buttons + and -
8 Preset Function Selects	8 Buttons
Shift	1 Button

Environmental

Operating Temperature	+32° F (0° C) to 113° F (45° C)
Operating Humidity	10% to 90% RH, non-condensing

Model R-1

Power Source	Supplied by Multi-II Mainframe
Power Dissipation	3 Watts
Height	2.25 inches (5.72 cm)
Width	4.0 inches (10.16 cm)
Length	7.5 inches (19.05 cm)
Weight	1 pound (0.46 kg)

Model R-2

Power Supply	110 VAC, ±10%, 60 Hz or 220 VAC, ±10%, 50 or 60 Hz
Power Dissipation	TBD
Height	1.75 inches (4.45 cm)
Width	19 inches (48.3 cm)
Depth	15 inches (38.1 cm)
Weight	16 pounds (13.6 kg)

All specifications subject to change without notice.

Section 10.2 Remote Unit Configuration

Configuration of the Model R-1 and Model R-2 units is slightly different, as described below.

Configuration of Hand-Held Unit

The Model R-1 hand-held remote unit can connect to the Multi-II in one of two ways:

- 5-pin DIN If the R1 remote unit has a 5-pin DIN plug, connect the R1 to the 5-pin DIN connector on the rear panel, just below the GL2 BNCs (see Figure 3-1).
- 25-pin D Connector If the R1 has a 25-pin D connector, or has been adapted to the 25-pin D, plug the R1 into the 25-pin "INTERFACE" connector on the rear panel just above the fan (see Figure 3-1). In addition, DIP switches on the control board (slot #10) must be set to configure the interface. DIP switch SW1 is located on the front edge of the control board. Switch bits 3 (RXDX) and 4 (REM+) to ON.

Configuration of Standalone Unit

The Model R-2 standalone remote unit connects to the Multi-II via the 25-pin D connector on the rear panel of the R-2 unit and the 25-pin "INTERFACE" connector on the rear panel of the Multi-II just above the fan (see Figure 3-1)

In the Multi-II, a DIP switch on the control board (slot #10) must be set to configure the interface with the R-2 remote unit. Locate DIP switch SW1 on the front edge of the control board. Switch bit 3 (RXDX) to ON.

Section 10.3 Remote Unit Operation

Operation of both remote units is done through the same selection of front panel buttons, function keys, and dial. All menus and functions available on the Multi-II can also be controlled by the R-1 and R-2 remote units.

Figure 10-1 shows the front panel of the R-1 hand-held remote unit.

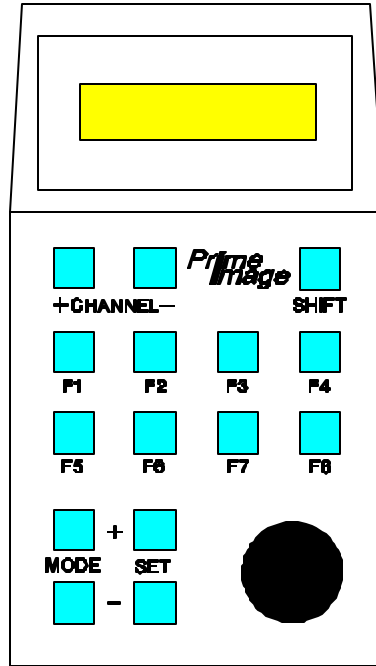


Figure 10-1. Remote Model R-1 Front Panel Controls

Figure 10-2 shows the front panel controls for the R-2 remote unit.

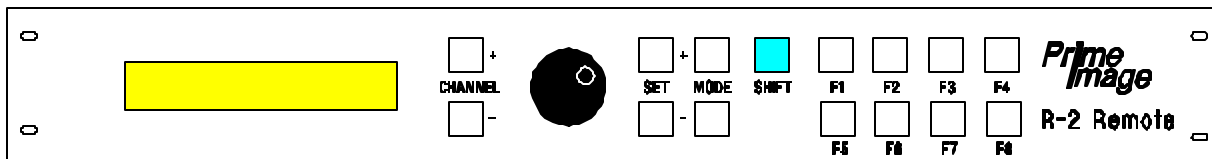


Figure 10-2. Remote Model R-2 Front Panel Controls

Both remote models use an LCD to display the video signal parameters for up to ten installed boards. Use the CHANNEL+ and CHANNEL- buttons to scroll through the ten channels (Boards #0 through #9). The LCD (Figure 10-3) displays the type of board installed for each channel. The three rightmost characters displayed indicate the selected channel. Menus are displayed only for those channels detected. Unused channels are skipped.

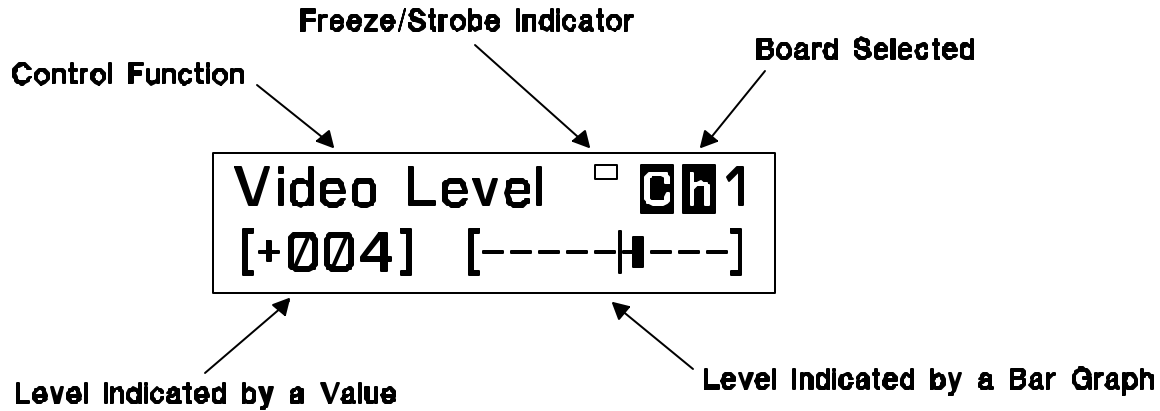


Figure 10-3. Remote Display

When the desired channel is selected, use the MODE+ and MODE- buttons to scroll through the parameters for the board installed in that channel slot. Adjust the parameter level using the SET+ and SET- buttons or the dial on the front of the unit. Pressing SET+ and SET- simultaneously sets the displayed parameter level to unity. Pressing the SHIFT button simultaneously with the MODE buttons provides access to additional parameters available for adjustment.

The Freeze/Strobe Indicator shows a Freeze with a steady illumination and indicates a strobe by flashing at the rate of the strobe

Presets

Various levels and settings can be stored to one of three preset banks, and recalled at a later time. This allows up to three custom settings for each board.

Storing Presets

Use the following procedure to store presets:

1. Using SHIFT MODE+ and SHIFT MODE-, select the menu "Store Pst?"
2. Select the preset bank with SET+ and SET-.
3. Enter the selection by pressing SHIFT SET+.
4. The display indicates when the settings have been stored.

Note: This process merely copies all settings from the "working" registers to a selected bank.

Recalling Presets

Use the following procedure to recall presets:

1. Using **SHIFT MODE+** and **SHIFT MODE-**, select the menu "Recal Pst?"
2. Select the preset bank with **SET+** and **SET-**.
3. Enter the selection by pressing **SHIFT SET+**.
4. The display indicates when the settings have been recalled.

Note: This process copies the settings from the selected bank to the "working" registers. The current settings, before recalling a preset, will be overwritten and lost.

Function Keys

The eight function keys (F1 through F8) can be programmed to go directly to the eight most frequently used parameters for quick adjustment. The function keys are programmed separately for each channel, and the remote unit remembers the settings every time that channel is selected. To program the function keys, scroll through the menu using the **MODE+** and **MODE-** buttons until the LCD displays "Prog Fct Key," then follow the instructions on the display.

Programming Function Keys

The upper right corner of the display shows the selected channel.

Note: At any time you may abort the process by pressing another function key.

1. Using the **MODE+** and **MODE-** buttons, select the menu "Prog Fct Key."
2. Select a function key (F1-F8) to program by holding down **SET+** and pressing the desired F key.
3. Using the **MODE+** and **MODE-** buttons, select the desired menu.
4. Enter your selection by pressing the **SET-** button.

Note: All possible menus will be available without holding the **SHIFT** button, including additional menus called Hot Keys.

Special Hot Key Menus

Some functions, such as Freeze, can be programmed to activate when a function key is pressed. These special menus are indicated by an exclamation mark "!".

For example, to designate F8 as the key to activate a Freeze and F7 to release the Freeze:

1. Under the menu "Prog Fct Key," select F8 (as explained in the previous section).
2. Using the **MODE+** and **MODE-** buttons, select the menu "Freeze!" and enter by pressing **SET-**.
3. Under the same menu ("Prog Fct Key"), select F7.
4. Using the **MODE+** and **MODE-** buttons, select the menu "Frz/Str OFF!" and enter by pressing **SET-**.

Now, pressing F8 should activate Freeze, and pressing F7 should release the Freeze.

Section 11

Transcoding Boards

This section describes the transcoding plug-in boards for the Multi-II including the Models 10X-TR1, 10X-TR2, 10X-TR3, 10X-TR4, 10X-TR5, and 10X-TR6.

Note: For proper operation of transcoding boards 10X-TR1 through 10X-TR6, the Multi-II chassis and remote should be versions 1.26/1.2 or higher. The version number is displayed at power up and can also be found under the Shift menu “About Card . . .” by pressing **SET-**. If your chassis or remote version number is less than version 1.26, contact Prime Image about obtaining an upgrade.

Section 11.1 Composite to Component (YRB/YUV) Transcoder

The Model 10X-TR1 transcodes from composite input to Y/R/B output (for NTSC input) or Y/U/V output (for PAL input). In addition, Y/C output is also present, but level controls do not apply.

The 10X-TR1 uses a 3-way digital adaptive COMB filter for high performance color separation. The color signal is digitally demodulated to eliminate phasing errors, employing a one-line delay for U/V separation in PAL.

Model 10X-TR1 Specifications

The following specifications apply to the Model 10X-TR1 transcoder board with conditions at 75% saturated color, 100% bar, Beta levels selected:

Interface

Inputs	Video (Composite)	1.0 Vpp, Hi Z loop or 75 Ω , BNC
Outputs	Y Out	1.0 Vpp, 75 Ω , BNC
	R-Y Out	700 mVpp, 75 Ω , BNC
	B-Y Out	700 mVpp, 75 Ω , BNC

Performance

Bandwidth	DC - 4.2 MHz, ± 0.1 dB DC - 5.5 MHz, ± 3 dB
K-Factor (2T)	<1%
(P&B)	<1%
Signal to Noise	58 dB
Sampling	4x f_{sc} , 8-bit
Processing Delay	1 line + 3.15 μ sec

Operational Controls

Luminance Level	±6 dB
Color Level	±6 dB

Environmental

Operating Temperature	+32° F (0° C) to 113° F (45° C)
Operating Humidity	10% to 85% RH, non-condensing
Power Dissipation	12 Watts
Height	4.0 inches (10.2 cm)
Length	12.0 inches (30.5 cm)
Weight	14 ounces (0.4 kg)

All specifications subject to change without notice.

Model 10X-TR1 Board Configuration

A jumper setting at JP5 on the 10X-TR1 board determines the input termination. Figure 11-1 shows the location of JP5.

Figure 11-1. Model 10X-TR1 Jumper Location



Table 11-1 shows jumper settings for the Model 10X-TR1 transcoding board.

Table 11-1. Model 10X-TR1 Jumper Settings

Jumper	Description	A Position	B Position
JP5	Input termination	Hi Z	75Ω terminated

Model 10X-TR1 Rear Panel Connections

Figure 11-2 shows the rear panel connections of the Model 10X-TR1 transcoding board. The module is identified by C-XXX and the number 88191, located in the bottom left corner of the module.

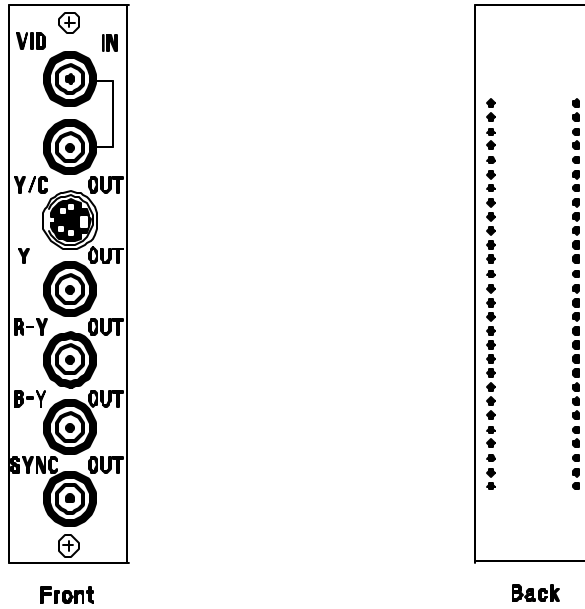


Figure 11-2. Model 10X-TR1 Rear Panel Module

Table 11-2 shows the interconnection requirements for the Model 10X-TR1 board.

Name	Characteristics	Function
Vid In	1 Vpp, Hi Z loop or 75Ω, BNC	Composite video input.
Y Out	1 Vpp, 75Ω, BNC	Component video output.
U (R-Y) Out	700 mVpp, 75Ω, BNC	Component video output.
V (B-Y) Out	700 mVpp, 75Ω, BNC	Component video output.
Y Out C Out	1 Vpp, 75Ω 700 mVpp, 75Ω 4-pin S connector	Video output.
Sync Out	3, BNC Vpp, 75Ω	Component sync signal output.

Y/C Connector Pinout

Figure 11-3 shows the Y/C IN/OUT— 4-pin mini DIN (SVHS) connector (female).

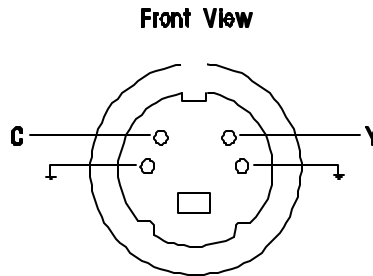


Figure 11-3. Y/C Connector Pinout

Model 10X-TR1 Board Menu Controls

Table 11-3 shows controls available by menu with Model 10X-TR1 transcoding board installed.

Note: Controls indicated by * are accessed only by pressing the **SHIFT** button while scrolling with the **MODE** buttons.

Table 11-3. Model 10X-TR1 Board Menu Controls

Menu Item (in order of appearance)	Adjust Using		Description
	SET +/-	Dial	
Luma Level	X	X	Adjusts luminance level (contrast).
Color Level	X	X	Adjusts color difference signal levels.
YRB Format Select	X		Selects between Beta, MII, and EBU levels at output.
Vert Detail Enhance	X		Vertical Detail Enhancement ON/OFF.
Monitor Select	X		Selects as video monitor's source the Y, R-Y, or B-Y output.
*Audio Monitor Select	X		Selects as the audio monitor's source a neighboring channel that has an audio card.
*About Card			Displays information about the Card.
Program Function Key	X		Eight function keys (F1 – F4 and SHIFT F1– F4 [for F5 – F8]) can be programmed to go directly to the eight most frequently used parameters for quick adjustment (see Section 4.2).
*Store Preset	X		Stores parameter levels and settings to one of three preset banks (see Section 4.3).
*Recal Preset	X		Recalls parameter levels and settings from one of three preset banks (see Section 4.3).

Section 11.2 Composite to RGB Transcoder

Model 10X-TR2 transcodes from composite input to RGB 3-wire or 4-wire output. In addition, Y/C output is also present, but level controls do not apply.

The 10X-TR2 uses a 3-way digital adaptive COMB filter for high performance color separation. The color signal is digitally demodulated to eliminate phasing errors, employing a one-line delay for U/V separation in PAL. A precision matrix is used to produce the Red, Green, and Blue outputs.

Model 10X-TR2 Specifications

The following specifications apply to the Model 10X-TR2 transcoder board with conditions at 75% saturated color, 100% bar:

Interface

Inputs	Video (Composite)	1.0 Vpp, Hi Z loop or 75 Ω , BNC
Outputs	Red	700 mVpp, 75 Ω , BNC
	Blue	700 mVpp, 75 Ω , BNC
	Green	700 mVpp, 75 Ω , BNC (no sync) or 1.0 Vpp 75 Ω , BNC (with sync)
	Sync	3 Vpp 75 Ω , BNC

Performance

Bandwidth	DC - 4.2 MHz, ± 0.1 dB DC - 5.5 MHz, ± 3 dB
K-Factor (2T)	<1%
(P&B)	<1%
Signal to Noise	58 dB
Sampling	4x f_{sc} , 8-bit
Processing Delay	1 line + 3.15 μ sec

Operational Controls

Luminance Level	± 6 dB
Color Level	± 6 dB

Environmental

Operating Temperature	+32 $^{\circ}$ F (0 $^{\circ}$ C) to 113 $^{\circ}$ F (45 $^{\circ}$ C)
Operating Humidity	10% to 85% RH, non-condensing
Power Dissipation	12 Watts
Height	4.0 inches (10.2 cm)
Length	12.0 inches (30.5 cm)
Weight	14 ounces (0.4 kg)

All specifications subject to change without notice.

Model 10X-TR2 Board Configuration

Jumper settings on the 10X-TR2 board determine the input termination and the 3/4-wire mode. Figure 11-4 shows locations of the corresponding jumpers, JP5 and JP6.

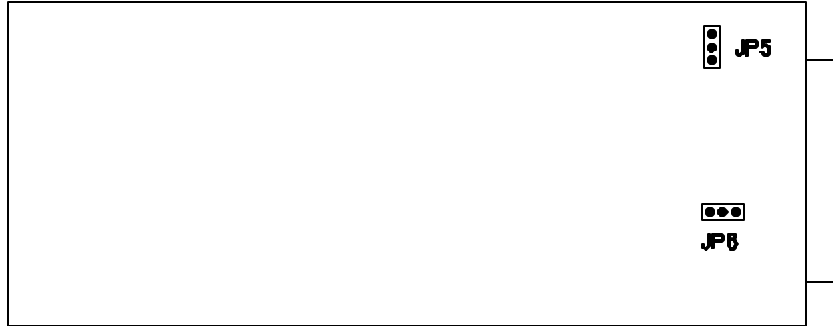


Figure 11-4. Model 10X-TR2 Jumper Locations

Table 11-4 shows jumper settings for the Model 10X-TR2 transcoding board.

Table 11-4. Model 10X-TR2 Jumper Settings

Jumper	Description	A Position	B Position
JP5	Input termination	Hi Z	75Ω terminated
JP6	3/4-wire mode	Sync on green	4-wire

Model 10X-TR2 Rear Panel Connections

Figure 11-5 shows the rear panel connections of the Model 10X-TR2 transcoding board. The module is identified by C-XXX and the number 88191, located in the bottom left corner of the module.

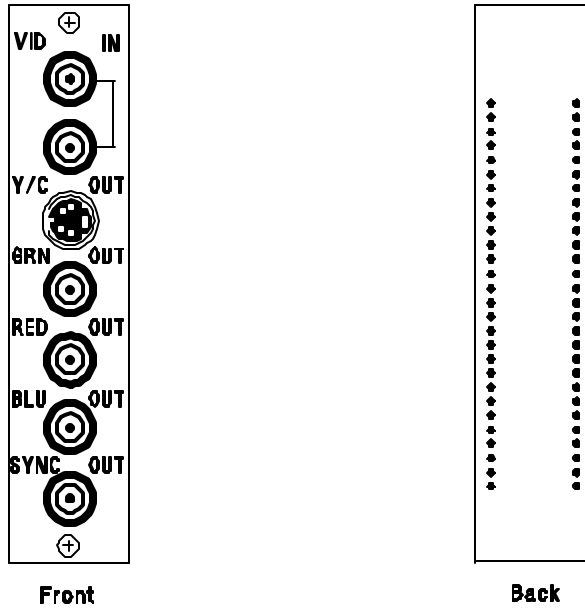


Figure 11-5. Model 10X-TR2 Rear Panel Module

Table 11-5 shows the interconnection requirements for the Model 10X-TR2 board.

Name	Characteristics	Function
Vid In	1 Vpp, Hi Z loop or 75Ω, BNC	Composite video input.
Y Out C Out	1 Vpp, 75Ω 700 mVpp, 75Ω 4-pin S connector	Video output.
Green Out	700 mVpp, 75Ω, BNC (no sync) or 1 Vpp 75Ω, BNC (with sync)	Video output.
Red Out	700 mVpp, 75Ω, BNC	Video output.
Blue Out	700 mVpp, 75Ω, BNC	Video output.
Sync Out	3 Vpp, 75Ω, BNC	Component sync signal output.

Y/C Connector Pinout

Figure 11-6 shows the Y/C IN/OUT— 4-pin mini DIN (SVHS) connector (female).

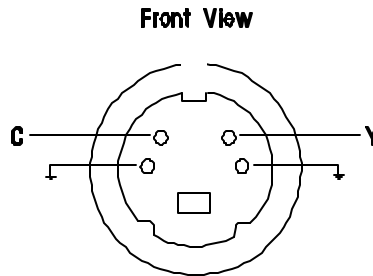


Figure 11-6. Y/C Connector Pinout

Model 10X-TR2 Board Menu Controls

Table 11-6 shows controls available by menu with Model 10X-TR2 transcoding board installed.

Note: Controls indicated by * are accessed only by pressing the **SHIFT** button while scrolling with the **MODE** buttons.

Table 11-6. Model 10X-TR2 Board Menu Controls

Menu Item (in order of appearance)	Adjust Using		Description
	SET +/-	Dial	
Luma Level	X	X	Adjusts luminance level (contrast).
Color Level	X	X	Adjusts color difference signal levels.
Vert Detail Enhance	X		Vertical Detail Enhancement ON/OFF.
Monitor Select	X		Selects as video monitor's source the green, red, or blue output.
*Audio Monitor Select	X		Selects as the audio monitor's source a neighboring channel that has an audio card.
*About Card			Displays information about the Card.
Program Function Key	X		Eight function keys (F1 – F4 and SHIFT F1– F4 [for F5 – F8]) can be programmed to go directly to the eight most frequently used parameters for quick adjustment (see Section 4.2).
*Store Preset	X		Stores parameter levels and settings to one of three preset banks (see Section 4.3).
*Recal Preset	X		Recalls parameter levels and settings from one of three preset banks (see Section 4.3).

Section 11.3 Component (YRB/YUV) to Composite Transcoder

Model 10X-TR3 transcodes from Y/R/B input (for NTSC) or Y/U/V input (for PAL) to composite output and Y/C outputs. The 10X-TR3 uses a high performance digital encoder with color genlocking capabilities. If no genlock signal is used, the encoder produces a standard zero-SCH color signal.

With the component I/O option, Y/R/B or RGB (selectable) outputs are also available.

Model 10X-TR3 Specifications

The following specifications apply to the Model 10X-TR3 transcoder board with conditions at 75% saturated color, 100% bar, Beta levels selected:

Interface (Standard)

Inputs	Luminance	1.0 Vpp, 75 \bar{U} , BNC
	R-Y	700 mVpp, 75 \bar{U} , BNC
	B-Y	700 mVpp, 75 \bar{U} , BNC
Outputs	Video (Composite)	1.0 Vpp, 75 \bar{U} , BNC
	Y/C	1.0 Vpp luma, 700 mVpp chroma, 75 \bar{U} , 4-pin
Genlock In	Master 1, Master 2	Black Burst, 75 \bar{U} , BNC
	Independent	Black Burst, 75 \bar{U} , BNC
		or 2.0 Vpp max. subcarrier, 75 \bar{U} , BNC

Interface (Optional Component I/O)

Inputs	Luminance	1.0 Vpp, 75 \bar{U} , BNC
	R-Y, B-Y	700 mVpp, 75 \bar{U} , BNC
		6-pin (6-pin to 3 BNC cable provided)
Outputs	Video (Composite)	1.0 Vpp, 75 \bar{U} , BNC
	Y/C	1.0 Vpp luma, 700 mVpp chroma, 75 \bar{U} , 4-pin
	Green/Y	700 mVpp (1.0 Vpp with sync), 75 \bar{U}
	Red/R-Y	700 mVpp, 75 \bar{U}
	Blue/B-Y	700 mVpp, 75 \bar{U} , BNC (no sync)
	6-pin (6-pin to 3 BNC cable provided)	
	Sync	3V/300 mV, 75 \bar{U} , BNC
Genlock In	Master 1, Master 2	Black Burst, 75 \bar{U} , BNC
	Independent	Black Burst, 75 \bar{U} , BNC
		or 2.0 Vpp max. subcarrier, 75 \bar{U} , BNC

Performance

Bandwidth	5.5 MHz
Signal to Noise	58 dB
K-Factor	<1%
Differential Phase	<1°
Differential Gain	<1%
Sampling	8-bit luma, 8-bit each chroma (4:2:2)
Sample Rate	13.5 MHz CCIR-601
Residual Time-Base Error	±15 nsec
Processing Delay	4.75 μsec

Operational Controls

Luma Level	0 to +6 dB
Setup	-7.5 IRE to +14 IRE
Chroma Levels	~0 to ±6 dB
Sync Level	±2.5 IRE
Burst Level	±10 IRE
Subcarrier Phase	>360°

Environmental

Operating Temperature	+32° F (0° C) to 113° F (45° C)
Operating Humidity	10% to 85% RH, non-condensing
Power Dissipation	10 Watts
Height	4.0 inches (10.2 cm)
Length	12.0 inches (30.5 cm)
Weight	14 ounces (0.4 kg)

All specifications subject to change without notice.

Methods of Genlocking

The 10X-TR3's output subcarrier can be genlocked to an external reference. The form of the reference can be either black burst or continuous subcarrier. When either reference is applied, the Subcarrier Phase menu allows the phase of output subcarrier to be adjusted.

Black Burst

If black burst is used as the reference, the phase of sync may need to be adjusted. The Genlock Sync Phase menu is used to compensate for any timing differences between the video and reference signals. This unit is NOT a synchronizer. The black burst reference must be synchronous with the input video. The output video is delayed from the input and reference signals. If the Genlock Sync Phase menu is not adjusted correctly, picture position will be affected.

Continuous Subcarrier

If continuous subcarrier is used as the reference, it must be applied to the independent reference input on the rear panel module. In this configuration, the Genlock Sync Phase menu has no effect.

No Genlock

If no genlock signal is applied, the output produces a standard zero-SCH color signal.

Colorbar Generator

The 10X-TR3 contains a built-in colorbar test signal generator. To activate the colorbar signal, use the Ouput Select menu and select ColorBars. The display flashes a black box to indicate that colorbars are selected instead of input video. When power is cycled on the unit, the output selection is automatically returned to video.

Model 10X-TR3 Board Configuration

Jumper settings on the 10X-TR3 board determine the optional component I/O modes and the genlock reference input determinaton. Figure 11-1 shows the locations of the corresponding jumpers, JP2, JP4, JP5, and JP6.

Figure 11-7. Model 10X-TR3 Jumper Locations

Table 11-7 shows jumper settings for the Model 10X-TR3 transcoding board.

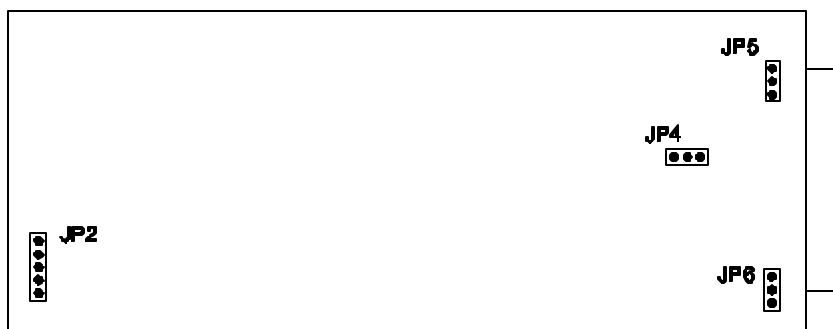


Table 11-7. Model 10X-TR3 Jumper Settings

Jumper	Description	Position
JP2	Component Output Select	B = Beta levels (700 mVpp) M = MII levels (485 mVpp) E = EBU levels (525 mVpp) G - RGB
JP4	3/4 Wire RGB	3 = 3-wire (sync on Green) 4 = 4-wire (no sync on Green)
JP5	Sync Output level	300 = 300 mVpp 3 = 3 Vpp
JP6	Genlock Ref Termination	TERM = 75Ω termination HI-Z = high impedance

Model 10X-TR3 Rear Panel Connections

The Model 10X-TR3 is available with either a standard rear panel or with an optional component I/O.

Standard Rear Panel

Figure 11-8 shows the standard rear panel connections of the Model 10X-TR3 transcoding board. The module is identified by XXX-C and the number 88193, located in the bottom left corner of the module.

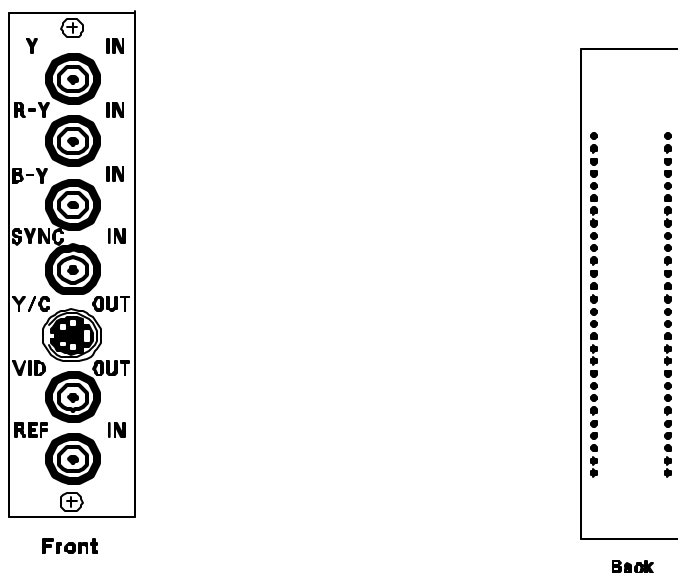


Figure 11-8. Model 10X-TR3 Standard Rear Panel Module

Table 11-8 shows the interconnection requirements for the Model 10X-TR3 board.

Table 11-8. Model 10X-TR3 Interconnection Requirements

Name	Characteristics	Function
Y In	1 Vpp, 75 Ω , BNC	Luminance input.
R-Y In	700 mVpp, 75 Ω , BNC	R-Y input.
B-Y In	700 mVpp, 75 Ω , BNC	B-Y input.
SYNC In	BNC	Not used.
Y Out C Out	1 Vpp, 75 Ω 700 mVpp, 75 Ω 4-pin S connector	Video output.
VID Out	1 Vpp, 75 Ω , BNC	Video output.
Ref In	75 Ω , BNC	Black burst or 2 Vpp max. subcarrier

Component Rear Panel

Figure 11-9 shows the rear panel connections of the Model 10X-TR3 transcoding board with optional component I/O. The module is identified by the number 88194, located in the bottom left corner of the module.

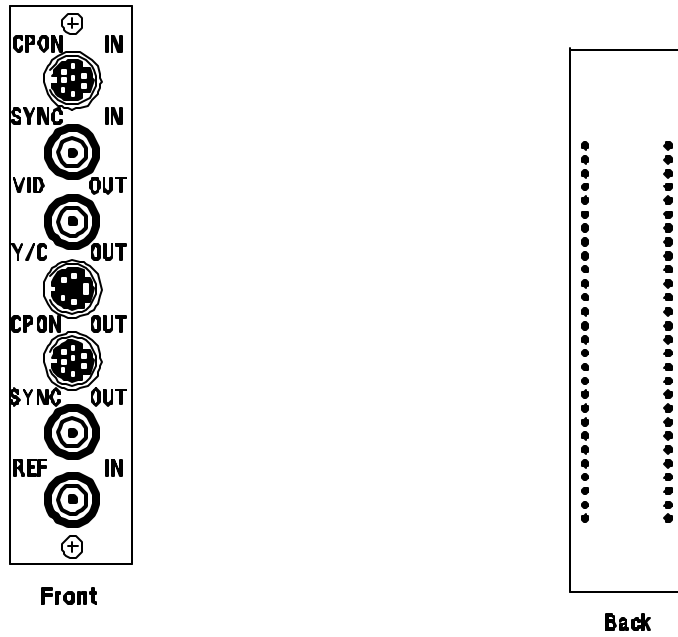


Figure 11-9. Model 10X-TR3 with Component I/O Rear Panel Module

Table 11-9 shows the interconnection requirements for the Model 10X-TR3 board with optional component I/O.

Table 11-9. Model 10X-TR3 with Component I/O Interconnection Requirements

Name	Characteristics	Function
CPON In	1 Vpp, 75Ω, BNC 700 mVpp, 75Ω, BNC 700 mVpp, 75Ω, BNC 6-pin mini DIN	Luminance input. R-Y input. B-Y input.
SYNC In	BNC	Not used.
VID Out	1 Vpp, 75Ω, BNC	Video output.
Y Out C Out	1 Vpp, 75Ω 700 mVpp, 75Ω 4-pin S connector	Video output.

CPON Out	700 mVpp (1 Vpp with sync), 75Ω 700 mVpp, 75Ω 700 mVpp, 75Ω 6-pin mini DIN	Green/Y output. Red/R-Y output. Blue/B-Y output.
SYNC Out	BNC	Sync output.
Ref In	75Ω, BNC	Black burst or 2 Vpp max. subcarrier

Video Connector Pinouts

Figure 11-10 shows the CPON IN/OUT— 6-pin mini DIN connector (female).

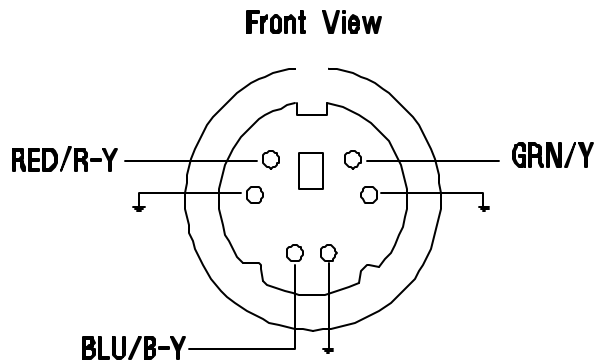


Figure 11-10. CPON Connector Pinout

Figure 11-11 shows the Y/C IN/OUT— 4-pin mini DIN (SVHS) connector (female).

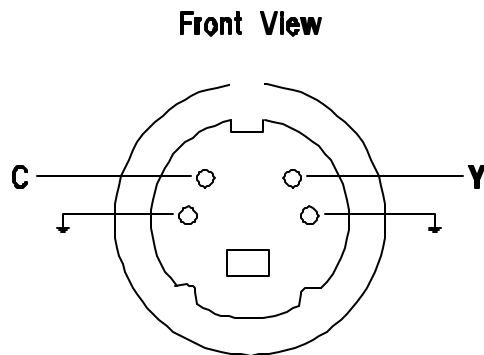


Figure 11-11. Y/C Connector Pinout

Model 10X-TR3 Board Menu Controls

Table 11-10 shows controls available by menu with Model 10X-TR3 transcoding board installed.

Note: Controls indicated by * are accessed only by pressing the SHIFT button while scrolling with the MODE buttons.

Table 11-10. Model 10X-TR3 Board Menu Controls

Menu Item (in order of appearance)	Adjust Using		Description
	SET+/ -	Dial	
Luma Level	X	X	Adjusts luminance level (contrast).
Setup	X	X	Adjusts setup (brightness).
*Black Level Clip	X		On/Off: Clips all luminance signals that go below blanking level.
Chroma Level	X	X	Adjusts input color difference signals.
*R-Y Level	X	X	Independently adjusts R-Y level.
*B-Y Level	X	X	Independently adjusts B-Y level.
YRB Format Select	X		Selects between Beta, MII, and EBU levels at input.
Y/C Delay	X	X	Adjusts color position (with respect to luminance) right or left.
*Genlock Sync Phase	X	X	Adjusts output sync timing with respect to genlock reference. Note: This will affect position of picture.
*Subcarrier Phase	X	X	Adjusts phase of output subcarrier with respect to genlock ref.
*Genlock Select	X		Selects Genlock Ref: Independent, Master1, Master2, or none.
*Output Standard	X		Selects output standard: NTSC, NT-443, PAL-M, SECAM, PAL-N, or PAL-BGI.
Output Select	X		Selects between Video or a Colorbar test signal.
*Sync Level	X	X	Adjusts output sync level.
*Burst Level	X	X	Adjusts output burst level.
*Audio Monitor Select	X		Selects as the audio monitor's source a neighboring channel that has an audio card.
*About Card			Displays information about the Card.
Program Function Key	X		Eight function keys (F1 – F4 and SHIFT F1– F4 [for F5 – F8]) can be programmed to go directly to the eight most frequently used parameters for quick adjustment (see Section 4.2).
*Store Preset	X		Stores parameter levels and settings to one of three preset banks (see Section 4.3).
*Recal Preset	X		Recalls parameter levels and settings from one of three preset banks (see Section 4.3).

Section 11.4 RGB to Composite Transcoder

Model 10X-TR4 transcodes from RGB input to composite output and Y/C outputs. The 10X-TR4 utilizes a high performance digital encoder with color genlocking capabilities. If no genlock signal is used, the encoder produces a standard zero-SCH color signal.

With the component I/O option, Y/R/B or RGB (selectable) outputs are also available.

Model 10X-TR4 Specifications

The following specifications apply to the Model 10X-TR4 transcoder board with conditions at 75% saturated color, 100% bar, Beta levels selected.

Interface (Standard)

Inputs	Green	700 mVpp (1.0 Vpp with sync), 75 Ω , BNC
	Red	700 mVpp, 75 Ω , BNC
	Blue	700 mVpp, 75 Ω , BNC
	Sync	300 mV - TTL, 75 Ω , BNC
Outputs	Video (Composite)	1.0 Vpp, 75 Ω , BNC
	Y/C	1.0 Vpp luma, 700 mVpp chroma, 75 Ω , 4-pin
Genlock In	Master 1, Master 2	Black Burst, 75 Ω , BNC
	Independent	Black Burst, 75 Ω , BNC
		or 2.0 Vpp max. subcarrier, 75 Ω , BNC

Interface (Optional Component I/O)

Inputs	Green	700 mVpp (1.0 Vpp with sync), 75 Ω , BNC
	Red	700 mVpp, 75 Ω , BNC
	Blue	700 mVpp, 75 Ω , 6-pin (6-pin to 3 BNC cable provided)
Outputs	Video (Composite)	1.0 Vpp, 75 Ω , BNC
	Y/C	1.0 Vpp luma, 700 mVpp chroma, 75 Ω , 4-pin
	Green/Y	700 mVpp (1.0 Vpp with sync), 75 Ω
	Red/R-Y	700 mVpp, 75 Ω
	Blue/B-Y	700 mVpp, 75 Ω , BNC (no sync), 6-pin (6-pin to 3 BNC cable provided)
	Sync	3V/300 mV, 75 Ω , BNC
Genlock In	Master 1, Master 2	Black Burst, 75 Ω , BNC
	Independent	Black Burst, 75 Ω , BNC
		or 2.0 Vpp max. subcarrier, 75 Ω , BNC

Performance

Bandwidth	5.5 MHz
Signal-to-Noise	58 dB
K-Factor	<1%
Differential Phase	<1°
Differential Gain	<1%
Sampling	8-bit luma, 8-bit each chroma (4:2:2)
Sample Rate	13.5 MHz CCIR-601
Residual Time-Base Error	±15 nsec
Processing Delay	4.75 μ sec

Operational Controls

Red, Green, and Blue Levels Setup	0 to +6 dB
Sync Level	-7.5 IRE to +14 IRE
Burst Level	±2.5 IRE
Subcarrier Phase	±10 IRE
	>360°

Environmental

Operating Temperature	+32° F (0° C) to 113° F (45° C)
Operating Humidity	10% to 85% RH, non-condensing
Power Dissipation	10 Watts
Height	4.0 inches (10.2 cm)
Length	12.0 inches (30.5 cm)
Weight	14 ounces (0.4 kg)

All specifications subject to change without notice.

Methods of Genlocking

The 10X-TR4's output subcarrier can be genlocked to an external reference. The form of the reference can be either black burst or continuous subcarrier. When either reference is applied, the Subcarrier Phase menu allows the phase of output subcarrier to be adjusted.

Black Burst

If black burst is used as the reference, the phase of sync may need to be adjusted. The Genlock Sync Phase menu is used to compensate for any timing differences between the video and reference signals. This unit is NOT a synchronizer. The black burst reference must be synchronous with the input video. The output video is delayed from the input and reference signals. If the Genlock Sync Phase menu is not adjusted correctly, picture position will be affected.

Continuous Subcarrier

If continuous subcarrier is used as the reference, it must be applied to the independent reference input on the rear panel module. In this configuration, the Genlock Sync Phase menu has no effect.

No Genlock

If no genlock signal is applied, the output produces a standard zero-SCH color signal.

Colorbar Generator

The 10X-TR4 contains a built-in colorbar test signal generator. To activate the colorbar signal, use the Output Select menu and select ColorBars. The display flashes a black box to indicate that colorbars are selected instead of input video. When power is cycled on the unit, the output selection is automatically returned to video.

Model 10X-TR4 Board Configuration

Jumper settings on the 10X-TR4 board determine the optional component I/O modes and the genlock reference input determination. Figure 11-12 shows the locations of the corresponding jumpers, JP2, JP4, JP5, and JP6.



Figure 11-12. Model 10X-TR4 Jumper Locations

Table 11-11 shows jumper settings for the Model 10X-TR4 transcoding board.

Table 11-11. Model 10X-TR4 Jumper Settings

Jumper	Description	Position
JP2	Component Output Select	B = Beta levels (700 mVpp) M = MII levels (485 mVpp) E = EBU levels (525 mVpp) G - RGB
JP4	3/4 Wire RGB	3 = 3-wire (sync on Green) 4 = 4-wire (no sync on Green)
JP5	Sync Output level	300 = 300 mVpp 3 = 3 Vpp
JP6	Genlock Ref Termination	TERM = 75Ω termination HI-Z = high impedance

Model 10X-TR4 Rear Panel Connections

The Model 10X-TR4 is available with either a standard rear panel or with an optional component I/O.

Standard Rear Panel

Figure 11-13 shows the standard rear panel connections of the Model 10X-TR4 transcoding board. The module is identified by XXX-C and the number 88193, located in the bottom left corner of the module.

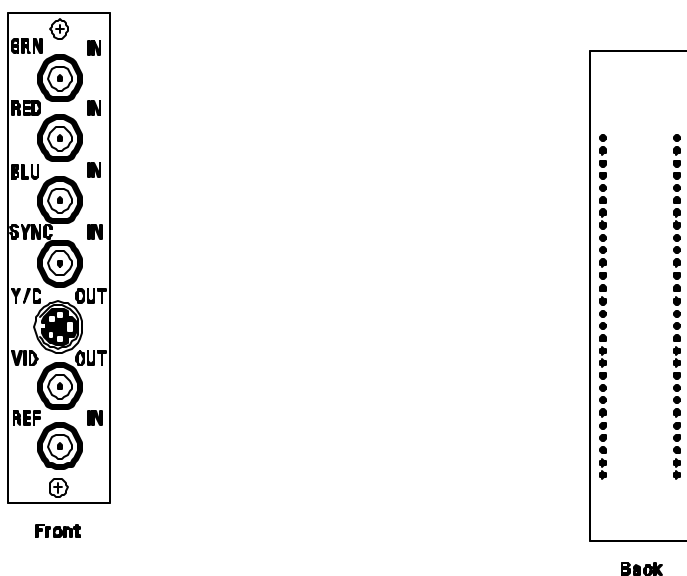


Figure 11-13. Model 10X-TR4 Standard Rear Panel Module

Table 11-12 shows the interconnection requirements for the Model 10X-TR4 board.

Table 11-12. Model 10X-TR4 Interconnection Requirements

Name	Characteristics	Function
GRN In	700 mVpp (1 Vpp with sync), 75Ω, BNC	Green input.
RED In	700 mVpp, 75Ω, BNC	Red input.
BLU In	700 mVpp, 75Ω, BNC	Blue input.
SYNC In	BNC	Sync input.
Y Out C Out	1 Vpp, 75Ω 700 mVpp, 75Ω 4-pin S connector	Video output.
VID Out	1 Vpp, 75Ω, BNC	Video output.
Ref In	75Ω, BNC	Black burst or 2 Vpp max. subcarrier

Component Rear Panel

Figure 11-14 shows the rear panel connections of the Model 10X-TR4 transcoding board with optional component I/O. The module is identified by the number 88194, located in the bottom left corner of the module.

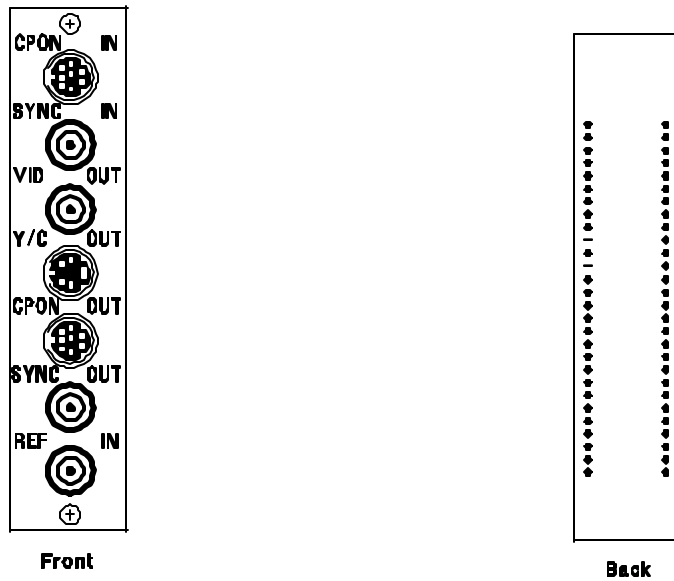


Figure 11-14. Model 10X-TR4 with Component I/O Rear Panel Module

Table 11-13 shows the interconnection requirements for the Model 10X-TR4 board with optional component I/O.

Table 11-13. Model 10X-TR4 with Component I/O Interconnection Requirements

Name	Characteristics	Function
CPON In	700 mVpp (1 Vpp with sync), 75Ω, BNC 700 mVpp, 75Ω, BNC 700 mVpp, 75Ω, BNC 6-pin mini DIN	Green input. Red input. Blue input.
SYNC In	BNC	Sync input.
VID Out	1 Vpp, 75Ω, BNC	Video output.
Y Out C Out	1 Vpp, 75Ω 700 mVpp, 75Ω 4-pin S connector	Video output.
CPON Out	700 mVpp (1 Vpp with sync), 75Ω 700 mVpp, 75Ω 700 mVpp, 75Ω 6-pin mini DIN	Green/Y output. Red/R-Y output. Blue/B-Y output.
SYNC Out	BNC	Sync output.
Ref In	75Ω, BNC	Black burst or 2 Vpp max. subcarrier

Video Connector Pinouts

Figure 11-15 shows the CPON IN/OUT— 6-pin mini DIN connector (female).

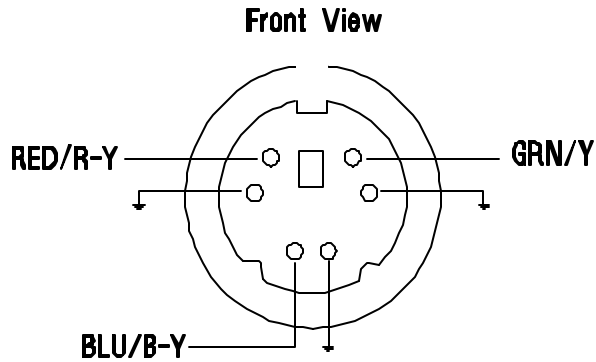


Figure 11-15. CPON Connector Pinout

Figure 11-16 shows the Y/C IN/OUT— 4-pin mini DIN (SVHS) connector (female).

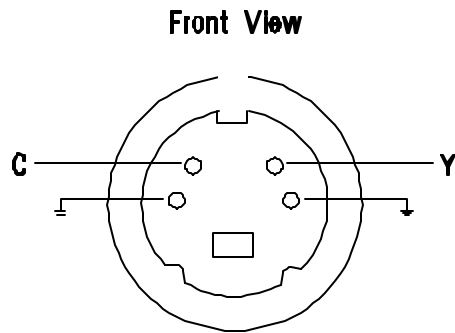


Figure 11-16. Y/C Connector Pinout

Model 10X-TR4 Board Menu Controls

Table 11-14 shows controls available by menu with Model 10X-TR4 transcoding board installed.

Note: Controls indicated by * are accessed only by pressing the SHIFT button while scrolling with the MODE buttons.

Table 11-14. Model 10X-TR4 Board Menu Controls

Menu Item (in order of appearance)	Adjust Using		Description
	SET+/ -	Dial	
Green Level	X	X	Adjusts Green level.
Red Level	X	X	Adjusts Red level.
Blue Level	X	X	Adjusts Blue level.
Setup	X	X	Adjusts setup (brightness).
*Black Level Clip	X		ON/OFF: Clips all luminance signals that go below blanking level.
Sync Input Select	X		Selects 3- or 4-wire sync input.
Y/C Delay	X	X	Adjusts color position (with respect to luminance) right or left.
*Genlock Sync Phase	X	X	Adjusts output sync timing with respect to genlock reference. Note: This will affect position of picture.
*Subcarrier Phase	X	X	Adjusts phase of output subcarrier with respect to genlock ref.
*Genlock Select	X		Selects genlock ref: Independent, Master 1, Master 2, or none.
*Output Standard	X		Selects output standard: NTSC, NT-443, PAL-M, SECAM, PAL-N, or PAL-BGI.
Output Select	X		Selects between Video or a Colorbar test signal.
*Sync Level	X	X	Adjusts output sync level.
*Burst Level	X	X	Adjusts output burst level.
*Audio Monitor Select	X		Selects as the audio monitor's source a neighboring channel that has an audio card.
*About Card			Displays information about the Card.
Program Function Key	X		Eight function keys (F1 – F4 and SHIFT F1– F4 [for F5 – F8]) can be programmed to go directly to the eight most frequently used parameters for quick adjustment (see Section 4.2).
*Store Preset	X		Stores parameter levels and settings to one of three preset banks (see Section 4.3).
*Recal Preset	X		Recalls parameter levels and settings from one of three preset banks (see Section 4.3).

Section 11.5 RGB to Component (YRB/YUV) Transcoder

Model 10X-TR5 transcodes from RGB 3-wire or 4-wire input to Y/R/B output (for NTSC input) or Y/U/V output (for PAL input). Each of the Red, Green, and Blue inputs has gain and pedestal adjustments. In addition, the Y/R/B matrix may be disabled, producing an RGB In to RGB Out Proc-Amp control.

Model 10X-TR5 Specifications

The following specifications apply to the Model 10X-TR5 transcoder board with conditions at 75% saturated color, 100% bar, Beta levels selected:

Interface

Inputs	Red	700 mVpp, 75 \bar{U} , BNC
	Blue	700 mVpp, 75 \bar{U} , BNC
	Green	700 mVpp, 75 \bar{U} , BNC (no sync) or 1.0 Vpp 75 \bar{U} , BNC (with sync)
	Sync	3 Vpp 75 \bar{U} , BNC
Outputs	Y Out	1.0 Vpp, 75 \bar{U} , BNC
	R-Y Out	700 mVpp, 75 \bar{U} , BNC
	B-Y Out	700 mVpp, 75 \bar{U} , BNC

Performance

Bandwidth	DC - 4.2 MHz, ± 0.05 dB DC - 12 MHz, ± 0.5 dB
K-Factor (2T)	<0.5%
(P&B)	<0.5%
Processing Delay	45 nsec

Operational Controls

Red, Green, and Blue Levels	0 to +6 dB
Red, Green, and Blue Pedestals	± 10 IRE

Environmental

Operating Temperature	+32 $^{\circ}$ F (0 $^{\circ}$ C) to 113 $^{\circ}$ F (45 $^{\circ}$ C)
Operating Humidity	10% to 85% RH, non-condensing
Power Dissipation	10 Watts
Height	4.0 inches (10.2 cm)
Length	12.0 inches (30.5 cm)
Weight	14 ounces (0.4 kg)

All specifications subject to change without notice.

Model 10X-TR5 Board Configuration

Jumper settings on the 10X-TR5 board determine the component output levels and the 3- or 4-wire sync mode. Figure 11-17 shows the locations of the corresponding jumpers, JP6 and JP9.

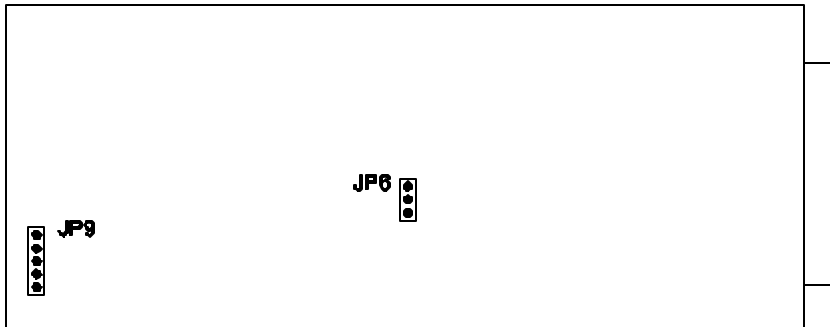


Figure 11-17. Model 10X-TR5 Jumper Locations

Table 11-15 shows jumper settings for the Model 10X-TR5 transcoding board.

Table 11-15. Model 10X-TR5 Jumper Settings

Jumper	Description	Position
JP6	3/4 Wire RGB	3 = 3-wire (sync on Green) 4 = 4-wire (no sync on Green)
JP9	Component Output Select	MII = MII levels (485 mVpp) EBU = EBU levels (525 mVpp) B = Beta levels (700 mVpp)

Model 10X-TR5 Rear Panel Connections

Figure 11-18 shows the rear panel connections of the Model 10X-TR5 transcoding board. The module is identified by X-X and the number 88291, located in the bottom left corner of the module.

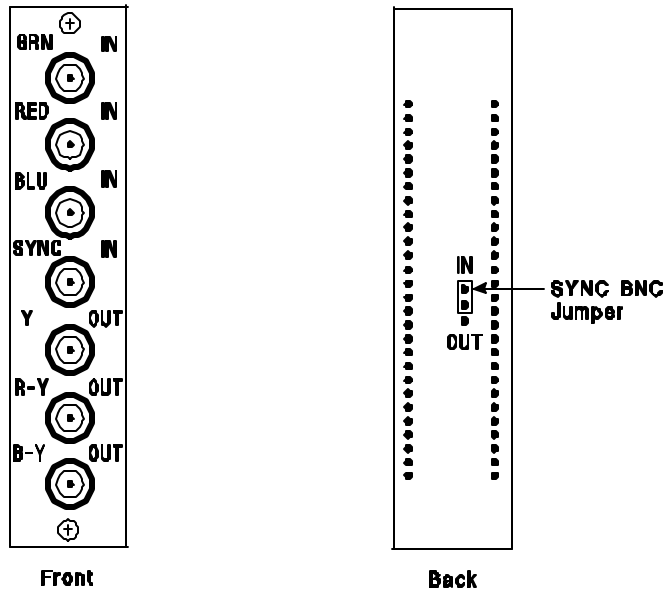


Figure 11-18. Model 10X-TR5 Rear Panel Module

The setting of the jumper on the back of the rear panel module determines whether the SYNC BNC is to be used as an input or an output. The default setting for the 10X-TR5 is IN (input).

Table 11-16 shows the interconnection requirements for the Model 10X-TR5 board.

Table 11-16. Model 10X-TR5 Interconnection Requirements

Name	Characteristics	Function
Red In	700 mVpp 75Ω, BNC	Video input.
Blue In	700mVpp, 75Ω, BNC	Video input.
Green In	700 mVpp, 75Ω, BNC (no sync) or 1 Vpp 75Ω, BNC (with sync)	Video input.
Sync In	3 Vpp 75Ω, BNC	Component sync signal input.
Y Out	1 Vpp, 75Ω, BNC	Component video output.
R-Y Out	700 mVpp, 75Ω, BNC	Component video output.
B-Y Out	700 mVpp, 75Ω, BNC	Component video output.

Model 10X-TR5 Board Menu Controls

Table 11-17 shows controls available by menu with Model 10X-TR5 transcoding board installed.

Note: Controls indicated by * are accessed only by pressing the **SHIFT** button while scrolling with the **MODE** buttons.

Table 11-17. Model 10X-TR5 Board Menu Controls

Menu Item (in order of appearance)	Adjust Using		Description
	SET +/-	Dial	
Green Level	X	X	Adjusts green channel video level.
Green Pedestal	X	X	Adjusts green pedestal.
Red Level	X	X	Adjusts red channel video level.
Red Pedestal	X	X	Adjusts red pedestal.
Blue Level	X	X	Adjusts blue channel video level.
Blue Pedestal	X	X	Adjusts blue pedestal.
Sync Input Select	X		Selects 3- or 4-wire sync input.
Output Format	X		Selects YRB or RGB output.
Monitor Select	X		Selects as the video monitor's source the Y (GRN), R-Y (RED), or B-Y (BLU) output.
*Audio Monitor Select	X		Selects as the audio monitor's source a neighboring channel that has an audio card.
*About Card			Displays information about the Card.
Program Function Key	X		Eight function keys (F1 – F4 and SHIFT F1– F4 [for F5 – F8]) can be programmed to go directly to the eight most frequently used parameters for quick adjustment (see Section 4.2).
*Store Preset	X		Stores parameter levels and settings to one of three preset banks (see Section 4.3).
*Recal Preset	X		Recalls parameter levels and settings from one of three preset banks (see Section 4.3).

Section 11.6 Component (YRB/YUV) to RGB Transcoder

Model 10X-TR6 transcodes from Y/R/B input (for NTSC) or Y/U/V input (for PAL) to RGB 3-wire or 4-wire output. The Y/R/B signals are converted to RGB, where gain and pedestal adjustments are available for each Red, Green, and Blue signal. The RGB signals may be passed to the outputs, or they may be converted back to Y/R/B, producing a Y/R/B In to Y/R/B Out colorizer.

Model 10X-TR6 Specifications

The following specifications apply to the Model 10X-TR6 transcoder board with conditions at 75% saturated color, 100% bar, Beta levels selected:

Interface

Inputs	Y Out	1.0 Vpp, 75 Ω , BNC
	R-Y Out	700 mVpp, 75 Ω , BNC
	B-Y Out	700 mVpp, 75 Ω , BNC
Outputs	Red	700 mVpp, 75 Ω , BNC
	Blue	700 mVpp, 75 Ω , BNC
	Green	700 mVpp, 75 Ω , BNC (no sync) or 1.0 Vpp 75 Ω , BNC (with sync)
	Sync	3 Vpp 75 Ω , BNC

Performance

Bandwidth	DC - 4.2 MHz, ± 0.05 dB DC - 12 MHz, ± 0.5 dB
K-Factor (2T)	<0.5%
(P&B)	<0.5%
Processing Delay	45 nsec

Operational Controls

R-Y, B-Y Levels	± 3 dB
Red, Green, and Blue Levels	0 to +6 dB
Red, Green, and Blue Pedestals	± 10 IRE

Environmental

Operating Temperature	+32° F (0° C) to 113° F (45° C)
Operating Humidity	10% to 85% RH, non-condensing
Power Dissipation	10 Watts
Height	4.0 inches (10.2 cm)
Length	12.0 inches (30.5 cm)
Weight	14 ounces (0.4 kg)

All specifications subject to change without notice.

Model 10X-TR6 Board Configuration

Jumper settings on the 10X-TR6 board determine the component output levels and the 3- or 4-wire sync mode. Figure 11-19 shows the locations of the corresponding jumpers, JP6 and JP9.

Figure 11-19. Model 10X-TR6 Jumper Locations

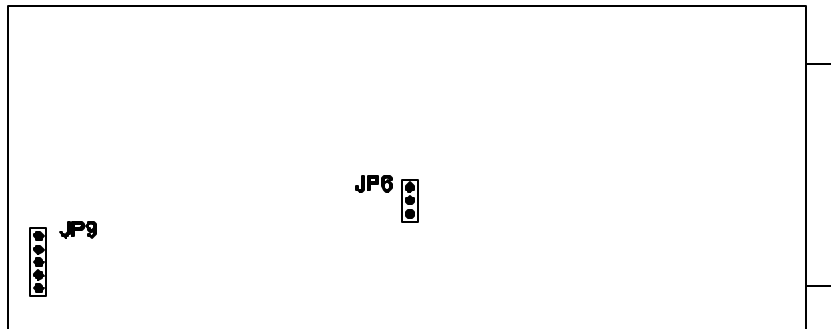


Table 11-18 shows jumper settings for the Model 10X-TR6 transcoding board.

Table 11-18. Model 10X-TR6 Jumper Settings

Jumper	Description	Position
JP6	3/4 Wire RGB	3 = 3-wire (sync on Green) 4 = 4-wire (no sync on Green)
JP9	Component Output Select	MII = MII levels (485 mVpp) EBU = EBU levels (525 mVpp) B = Beta levels (700 mVpp)

Model 10X-TR6 Rear Panel Connections

Figure 11-20 shows the rear panel connections of the Model 10X-TR6 transcoding board. The module is identified by X-X and the number 88291 located in the bottom left corner of the module.

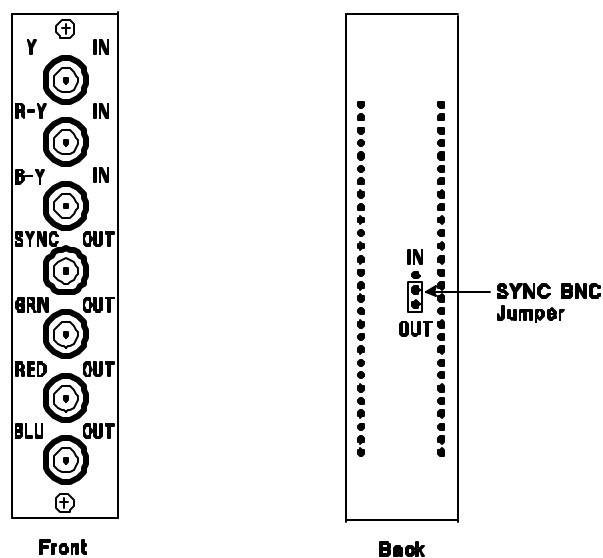


Figure 11-20. Model 10X-TR6 Rear Panel Module

The setting of the jumper on the back of the rear panel module determines whether the SYNC BNC is to be used as an input or an output. The jumper should be set to Out since the input function is not used for the 10X-TR6.

Table 11-19 shows the interconnection requirements for the Model 10X-TR6 board.

Table 11-19. Model 10X-TR6 Interconnection Requirements

Name	Characteristics	Function
Y In	1.0 Vpp, 75Ω, BNC	Luminance input.
R-Y In	700 mVpp, 75Ω, BNC	R-Y input.
B-Y In	700 mVpp, 75Ω, BNC	B-Y input.
Sync Out	BNC	Component sync signal output.
Green (GRN) Out	700 mVpp, 75Ω, BNC (no sync) or 1 Vpp 75Ω, BNC (with sync)	Video output.
Red Out	700 mVpp 75Ω, BNC	Video output.
Blue (BLU) Out	700mVpp, 75Ω, BNC	Video output.

Model 10X-TR6 Board Menu Controls

Table 11-20 shows controls available by menu with Model 10X-TR6 transcoding board installed.

Note: Controls indicated by * are accessed only by pressing the **SHIFT** button while scrolling with the **MODE** buttons.

Table 11-20. Model 10X-TR6 Board Menu Controls

Menu Item (in order of appearance)	Adjust Using		Description
	SET +/-	Dial	
R-Y Level	X	X	Adjusts R-Y level.
B-Y Level	X	X	Adjusts B-Y level.
YRB Format Select	X		Selects Beta, MII, or EBU input levels.
Green Level	X	X	Adjusts green channel video level.
Green Pedestal	X	X	Adjusts green pedestal.
Red Level	X	X	Adjusts red channel video level.
Red Pedestal	X	X	Adjusts red pedestal.
Blue Level	X	X	Adjusts blue channel video level.
Blue Pedestal	X	X	Adjusts blue pedestal.
Output Format	X		Selects YRB or RGB output.
Monitor Select	X		Selects which signal is fed to monitor output.
*Audio Monitor Select	X		Selects as the audio monitor's source a neighboring channel that has an audio card.
*About Card	X		Displays information about the Card.
Program Function Key	X		Eight function keys (F1 – F4 and SHIFT F1– F4 [for F5 – F8]) can be programmed to go directly to the eight most frequently used parameters for quick adjustment (see Section 4.2).
*Store Preset	X		Stores parameter levels and settings to one of three preset banks (see Section 4.3).
*Recal Preset	X		Recalls parameter levels and settings from one of three preset banks (see Section 4.3).

Section 12 Servicing

This section gives you information about maintaining your Multi-II mainframe, obtaining service, and troubleshooting.

Routine Maintenance

The Multi-II is inherently a low maintenance unit that requires only a periodic dusting internally, when used in an unfiltered environment.

Unit Malfunction

All Multi-IIs are designed and tested to perform as outlined previously in this manual. The manufacturer does not assume any responsibility for damage or malfunction resulting from operation of this unit outside the published environmental or interface specifications, or improper operation resulting from custom interfacing or any unauthorized internal modification.

If you encounter a malfunction during the warranty period, call your dealer or our Customer Service Department at the factory to arrange for service. **DO NOT** attempt to service this unit during the warranty period; to do so will void the warranty.

You may have out-of-warranty products repaired by your dealer or authorized repair facility.

Service Calls

For service, call Prime Image, inc. at (408) 867-6519. When you call for service, give the following information about your unit. It will help your dealer in diagnosis and repair:

1. The model and serial number of your unit.
2. The system configuration (including VCR types).
3. The problem you are having and the specific effect on the picture.

Troubleshooting

The following table provides troubleshooting information for frequently encountered problems:

Table 12-1. Troubleshooting

Condition	Possible Cause
Nothing happens at power ON.	Fuse blown. Line plug loose.
Fuse always blows at power ON.	Wrong line voltage (See Section 3.1).
Front panel does not find board in slot.	- Rear panel interface module not installed in same slot. - Module incorrectly installed.
Board not functioning correctly.	Check that the rear panel module matches the type of board in that slot.
R-1 remote unit does not work when connected to 25-pin D connector labeled "INTERFACE."	DIP switch SW1 bits 3 and 4 on the control board (slot #10) are not set to ON.
Output video not corrected.	Multi-II power supply is off. No board in slot for selected channel.
Output corrected but not synchronized.	Genlock input missing.
Output corrected but picture not framed horizontally.	Misadjustment of H _ö .

Appendix A

RS232 Control Codes

This appendix describes the RS232 control codes for the Multi-II. It assumes the reader is knowledgeable in decimal, HEX, binary, and two's complement numbering systems and has the ability to convert between any two of them.

A.1 RS232 Control Codes

Multi-II uses a standard RS232 (9-wire) 25-pin connector pinned out for and internally wired for handshaking. A valid control code is made up of 4 bytes transmitted sequentially over the RS232 port. This 4-byte packet contains board ID, a control function code, and control data. The board ID must match the channel number to be considered a valid signal by that board. The control function code determines the level or setting to be modified (i.e., video level, strobe, etc.). The control data code determines how the function will be modified. For varied level function, control data is an offset to the initial unity value. For other functions, specific bits of control data indicate settings (Table A-1).

Table A-1. RS232 Control Codes

Control Function		Control Data	Information
Code (F5-F0)	Name	D7 D6 D5 D4 D3 D2 D1 D0	Resolution (Range) or Format
00h	No Operation	X X X X X X X X	X = don't care (ignored)
01h			
General	Luma Level	D7(D7)(D7)D4 D3 D2 D1 D0	6-bit 2's comp -32(E0h) thru +31(1Fh)
TR1 – TR3	Luma Level	D7 D6 D5 D4 D3 D2 D1 D0	8-bit 2's comp -128(80h) thru +127(7h)
TR4 – TR6	Green Level	D7 D6 D5 D4 D3 D2 D1 D0	8-bit 2's comp -128(80h) thru +127(7h)
Dist. Amp.	Video Level	D7 D6 D5 D4 D3 D2 D1 D0	8-bit 2's comp -128(80h) thru +127(7h)
02h			
General	Chroma Level	D7 D6 D5 D4 D3 D2 D1 D0	8-bit 2's comp -128(80h) thru +127(7Fh)
Xpon/Rev L	Chroma Level	D7(D7) D5 D4 D3 D2 D1 D0	7-bit 2's comp -64(C0h) thru +63(3Fh)
TR1, TR2	Color Level	D7 D6 D5 D4 D3 D2 D1 D0	8-bit 2's comp -128(80h) thru +127(7h)
TR3, TR6	R-Y Level	D7 D6 D5 D4 D3 D2 D1 D0	8-bit 2's comp -128(80h) thru +127(7h)
Dist. Amp	Freq. Comp.	D7 D6 D5 D4 D3 D2 D1 D0	8-bit binary 0-255(FFh)

03h			
General	Hue	D7(D7)(D7)D4 D3 D2 D1 D0	6-bit 2's comp -32(E0h) thru +31(1Fh)
TR3, TR6	B-Y Level	D7 D6 D5 D4 D3 D2 D1 D0	8-bit 2's comp -128(80h) thru +127(7h)
Dist. Amp.	Freq. Comp. Curve	D7 D6 D5 D4 D3 D2 D1 D0	8-bit 2's comp -128(80h) thru +127(7h)
04h			
General	Setup	D7(D7)(D7)D4 D3 D2 D1 D0	6-bit 2's comp -32(E0h) thru +31(1Fh)
TR5, TR6	Green Pedestal	D7(D7)(D7)D4 D3 D2 D1 D0	6-bit 2's comp -32(E0h) thru +31(1Fh)
05h			
Rev E	Freeze/Strobe	Fz St X X X X F1 F0	Fz, St = mode F1, F0 = Field select 0,0 = off (live video) 0,0 = DIP switch setting 0,1 = Strobe 0,1 = field 1 1,0 = Freeze 1,0 = field 2 1,1 = Strobe 1,1 = frame
Rev F or greater	Freeze/Strobe	Fz St Fd X A X F1 F0 Note: F1 and F0 are observed only if Fz, St, or Fd is selected. (Fd & A effective 6-1-93)	Fd = Field mode A = Acquire 0 = off (normal) 0 = off (normal) 1 = Forces unit to display the F1,F0 selection in any mode 1 = Acquire new freeze Note: Fz must also be selected
Still Card	Display Select	X X X X X HL F1 F0	HL = Hi/Lo Frame Frm = Frame Select 0 = High frame 0 = fields 1 & 2 1 = Low frame 1 = fields 3 & 4
TR3, TR4	Color Bars	X X X CB X X X X	CB = Color Bars 0 = Video 1 = Colorbars
06h			
General	Input/AGC	AG X X X X X C In	AG =AGC In = Input Select C = Comb 0 = off 0 = comp 0 = off 1 = on 1 = Y/C 1 = on
Xpon/Rev L	Input/AGC	AG X X X M/B YRB C In	YRB, In =Input Select M/B =MII/â Select 0,0 = Composite 0 = Beta level for YRB In 0,1 = Y/C 1 = MII level for YRB In 1,X = YRB
TR1 — TR6	Format/Monitor	X 4/3H 4/3L Fmt1 Fmt0 OF M1 M0	M = Monitor Select 4/3=4/3 Wire Select M1, M0 H, L 0,0 = G/Y 0,0 = 3-wire format for RGB In 0,1 = R/R-Y 0,1 = 4-wire format for RGB In 1,0 = B/B-Y 1,0 = 4-wire TTL for RGB In
AudDlyCard	Aux Switch Control	X X X X X X X A	OF = Output Format Fmt = Format 0 = YRB Fmt1, Fmt0 1 = RGB 0,0 = Beta 0,1 = MII 1,0 = EBU 1,1 = RGB
4X/Sw.	Select	X X X X X X S1 S0	A = Aux Switch 0 = Delayed Out 1 = Aux source out S = Input Select S1, S0 S1, S0 0,0 = Input 1 1,0 = Input 3 0,1 = Input 2 1,1 = Input 4

07h General	Detail/Black & White	BW X X X X X D1 D0	BW = Blk & Wht D1,D0 = Detail 0 = off, 1 = on 0,0 = off 1,0 = high 0,1 = low 1,1 = undefined
Still Card	Keyer/Mixer Control	BW X KM S1 S0 X X X	KM=Keyer/Mixer S1,S0=Dissolve Speed 0 = off, 1 = on 0,0 = slow 1,0 = variable by (fct 14h) 0,1 = fast 1,1 = cut
TR1, TR2	Vert. Detail	X X X X X VD X X	VD = Vert. Detail 0 = off, 1 = on
TR3, TR4	Blk. Lev. Clip	X BC X X X X X X	BC = Black Level Clip 0 = off, 1 = on
08h	Genlock Select	X X X X X X G1 G0	G1,G0 = Genlock Select 0,0 = Master genlock 1,0 = AUX GL 0,1 = Independent Genlock 1,1 = Free run
09h General	Horiz. Phase	D7(D7)(D7)D4 D3 D2 D1 D0	6-bit 2's comp -32(E0h) thru +31(1Fh)
TR3, TR4	GL Sync Phase	D7(D7)(D7)D4 D3 D2 D1 D0	6-bit 2's comp -32(E0h) thru +31(1Fh)
0Ah	Subcarrier Phase	D7 D6 D5 D4 D3 D2 D1 D0	8-bit 2's comp -128(80h) thru +127(7Fh)
0Bh Still Card	Key Level (gain)	D7(D7)(D7)D4 D3 D2 D1 D0	6-bit 2's comp -32(E0h) thru +31(1Fh)
TR4 — TR6	Red Level	D7 D6 D5 D4 D3 D2 D1 D0	8-bit 2's comp -128(80h) thru +127(7Fh)
0Ch Still Card	Mix Level (offset)	D7(D7)(D7)D4 D3 D2 D1 D0	6-bit 2's comp -32(E0h) thru +31(1Fh)
TR6	Red Pedestal	D7(D7)(D7)D4 D3 D2 D1 D0	6-bit 2's comp -32(E0h) thru +31(1Fh)
0Eh AudDlyCard	Audio Delay	LH D6 D5 D4 D3 D2 D1 D0	14-bit word sent as two 7-bit bytes (5.3 ms steps). LH specifies data as Low byte (=0) or High byte (=1) The word is activated when High byte is received.
0Fh AudDlyCard	Audio Level	MC D6/C1 D5/C0 D4 D3 D2 D1 D0	M/C = 1 Master Level 7 bit (D6-D0) +16/-64 dB = 0 Channel Level 5 bit (D4-D0) +15/-16 dB C1,C0 = Channel Select 0,0 = Channel 1 1,0 = Channel 3 0,1 = Channel 2 1,1 = Channel 4 Note: For Master level, values > +16 will be limited to +16.
10h	Remote ID/Data (Board may not respond until 1 sec after power up)	R7 R6 R5 R4 R3 R2 R1 R0 There is a 15 ms. delay for response during which any transmission will be ignored.	R7,R0 = Remote data See section A.4
11h	Horiz. Position	D7(D7)(D7)D4 D3 D2 D1 D0	6-bit 2's comp -32(E0h) thru +31(1Fh)

12h	Y/C Delay	D7(D7)(D7)(D7)(D7)(D7)D1 D0	3-bit 2's comp -4(FCh) thru +3(03h)
13h General	Advanced Chroma	X X X X X X A1 A0	A1,A0 = Lines advanced 0,0 = 0 lines 1,0 = +2 lines 0,1 = +1 line 1,1 = +3 lines
TR4 — TR6	Blue Level	D7 D6 D5 D4 D3 D2 D1 D0	8-bit 2's comp -128(80h) thru +127(7Fh)
14h General	Strobe Rate	X X D5 D4 D3 D2 D1 D0	6-bit binary 0(00h) thru +63(3Fh)
Still Card	Dissolve Rate	X X D5 D4 D3 D2 D1 D0	6-bit binary 0(00h) thru +63(3Fh)
TR6	Blue Pedestal	D7(D7)(D7)D4 D3 D2 D1 D0	6-bit 2's comp -32(E0h) thru +31(1Fh)
15h General (with S.C. option)	Standards Select	X O2 O1 O0 X I2 I1 I0	O2,O1,O0 = Output I2,I1,I0 = Input 0,0,0 = NTSC 0,0,0 = NTSC 0,0,1 = NTSC 4.43-60 Hz* 0,0,1 = NTSC 4.43-60Hz 0,1,0 = Undefined 0,1,0 = Undefined 0,1,1 = PAL-M 0,1,1 = PAL-M 1,0,0 = SECAM** 1,0,0 = SECAM 1,0,1 = PAL-N 1,0,1 = PAL-N 1,1,0 = PAL B/G 1,1,0 = PAL B/G 1,1,1 = NTSC 4.43-50 Hz* 1,1,1 = NTSC 4.43-50Hz *Not available on Penta or HPE options **Available only on TR3, TR4, and Penta II
18h-1Fh		Factory Alignment	
18h General	Not Used		
Still Card	Board Status	Do NOT write. Read status only	
19h Rev E	Video Range	D7(D7)(D7)D4 D3 D2 D1 D0	6-bit 2's comp -32(E0h) thru +31(1Fh)
1Ah	Output Level	D7(D7)(D7)D4 D3 D2 D1 D0	6-bit 2's comp -32(E0h) thru +31(F1h)
1Bh HPE	Sync Level	D7(D7) D5 D4 D3 D2 D1 D0	7-bit 2's comp -64(C0h) thru +63(3Fh)
TR3, TR4	Sync Level	D7(D7)(D7)(D7)(D7) D2 D1 D0	4-bit 2's comp -8(F8h) thru +7(07h)
1Ch HPE	Burst Level	D7(D7) D5 D4 D3 D2 D1 D0	7-bit 2's comp -64(C0h) thru +63(3Fh)
TR3, TR4	Burst Level	D7(D7)(D7)D4 D3 D2 D1 D0	6-bit 2's comp -32(E0h) thru +31(F1h)
1Dh HPE	R-Y Level	D7(D7)(D7)D4 D3 D2 D1 D0	6-bit 2's comp -32(E0h) thru +31(1Fh)
1Eh	Factory Set	F7 F6 F5 F4 F3 F2 F1 F0	5Ah = Store current settings as unity A5h = Load default table as unity

30h-3Fh		Special Control Registers	
20h Multi-II Chassis	Port Control Note: There is one GPI per channel.	X X X X D3 D2 D1 D0	D3-D0 = Port Function 0h = GPI disabled 3h = Dissolve In/Out 1h = Freeze On/Off 4h = Encode On/Off 2h = Aux switch On/Off
2Ah-2Dh (Multi-II)	(Audio Level CH 0-3)		
2Eh Multi-II Chassis	Aux Monitor Select	A3 A2 A1 A0 V3 V2 V1 V0	V3-V0 = Vid chan displayed on monitor A3-A0 = Aud chan selected for monitor
Note: Unused function codes are reserved for future enhancements or other products and should not be used. X's indicate currently ignored bits, use 0's, if possible, to maintain future compatibility.			

Four-Byte Control Command

The board must receive all four bytes, or words, in the order 0 to 3 to be recognized as a valid control command. Each of the four words is composed of two bits to identify the word, zero to two bits as keys for the board to validate the word, and the remaining bits for data.

Table A-2 RS232 Format

9600 BAUD, 10-bit (Start, 8 bits of data, Stop)

The following four bytes must be received in order as a packet of information:

	Word #		Key		Data			
WORD 0	0	0	1	1	IDD	IDC	IDB	IDA
WORD 1	0	1	F5	F4	F3	F2	F1	F0
WORD 2	1	0	1	0	D7	D6	D5	D4
WORD 3	1	1	0	0	D3	D2	D1	D0

MSB LSB
 IDD-IDA = Board ID 0 - Fh
 F5 - F0 = Function code 0 - 3Fh
 D7 - D4 = Upper nibble of Control Data
 D3 - D0 = Lower nibble of Control Data

System Limitations

The control system requires up to 50 milliseconds to process a valid control command (4-byte packet). The system has a buffer capable of receiving 16 valid control commands before the first one has been processed. Therefore, there is a limit to the amount of control commands received in a given time. If more than 16 control commands are transmitted to the board at one time, all commands after the 16th must be separated by 50 milliseconds.

Examples

SETUP:

This is an example of transmitting a command to modify the value of the setup control. It has been determined that a data value of +13 is needed to correct the picture setup (brightness) of board #0.

WORD 0

The setting of IDD-IDA for board #0 is 0 0 0 0. Using Table A-2, WORD 0 is found to be the following:

WORD 0 = 0 0 1 1 0 0 0 0, equivalent to 30h in HEX.

WORD 1

The function code for setup is 04h or 0 0 1 0 0 converted to binary.

WORD 1 = 0 1 0 0 0 1 0 0, equivalent to 44h in HEX.

WORDS 2 and 3

The control data value +13 is converted to its two's complement binary equivalent:

0 0 0 0 1 1 0 1 (=0Dh).

The upper four bits are assigned to WORD 2 and the lower four bits to WORD 3:

WORD 2 = 1 0 1 0 0 0 0 0, equivalent to A0h in HEX.

WORD 3 = 1 1 0 0 1 1 0 1, equivalent to CDh in HEX.

Therefore, to send the command SETUP = +13 to board #0, the four bytes 30h 44h A0h CDh must be sent through the RS232 port.

For functions that are settings and do not have variable levels, Table A-1 shows the appropriate bits. For example, to perform a field 1 freeze, the control data is the following:

1 0 0 0 0 0 0 1 = 81h (use 0s for Xs).

FREEZE ON: To perform field 1 freeze on board #2, send 32h 45h A8h C1h through the RS232 port.

STROBE ON: To perform default field strobe on board #3, send 33h 45h A4h C0h through the RS232 port.

FREEZE OFF

STROBE OFF: To stop freeze or strobe on board #4, send 34h 45h A0h C0h through RS232 port.

A.2 Remote Data

Acknowledges

On receiving a valid transmission for an active channel number, the Multi-II sends an acknowledge back through the RS232 port (control board DIP switch SW1 bit 3, RXDX, must be set to ON). The acknowledge consists of a single byte transmission. The acknowledge will be the control function code of the received transmission with the MSB set HIGH, except function code 10h (data request).

Requesting Data

Data can be requested from the Multi-II from an external RS232 device. One purpose is to identify a board (if any) in each slot. The data can be information such as product type, board rev, board status, etc. Data is requested by sending a standard 4-byte transmission with the control data word specifying the type of information, and a control function code 10h. The acknowledge byte send back will contain 7 bits of requested data, with the MSB set HIGH.

Table A-3 RS232 Data Descriptions

Data	Description	MSB	LSB	Notes
00h	Board Slot ID	1 0 0 0 X X X X 1 1 1 1 1 1 1 1 none		Slot ID number Not ready . . . wait and re-send Board not present
F0h	Product Code	1 X X X X X X X		See Product Code List (below)
F1h	Board Rev	1 X X X X X X X		a=10001010, b=10001011, etc.
F2h	Micro-Controller Version	1 X X X . X X X X		Example: 2.1 = 10100001

F3h	Standards Key	1 0 0 0 0 1 1 1	O = Output Standards I = Input Standards (see RS232 Control Codes Fct 15h) (010 = multi standard)
F4h	Board Status	1 X X X X X X X	Data determined by type of board
F5h	Additional Status	1 X X X X X X X	Data determined by type of board
F8h	Audio Data CH 1, 2	2 2 2 2 1 1 1 1	2's comp number indicating position on VU meter
F9h	Audio Data CH 3, 4	4 4 4 4 3 3 3 3	2's comp number indicating position on VU meter
FFh	Release from Remote		

Prime Image Product Code List

00h = TBC/PCB	18h = Time Machine - RC0
01h = PCB+ TBC/Sync	19h = Time Machine - RC1
02h = PCB+ Stnd Conv	1Ah = Time Machine - RC2
03h = Rack TBC/Sync	1Bh = Time Machine - RC3
04h = Rack Stnd Conv	1Ch = A/V Delay (+AM)
05h = PCB Xpon-TBC/Sync	1Dh = A/V Delay - RC1
06h = PCB Penta	1Eh = A/V Delay - RC2
07h = PCB Xpon-Penta	1Fh = A/V Delay - RC3
08h = Rack Xpon-TBC/Sync	20h = Rack 4 x 1 Switcher
09h = Rack Penta	21h = Rack TR1
0Ah = Rack Xpon-Penta/Penta II	22h = Rack TR2
0Dh = Rack Still/Logo	23h = Rack TR3
0Eh = Model 50II	24h = Rack TR4
0Fh = Rack Audio Delay	25h = Rack TR6
10h = A/V Delay (original)	26h = Rack TR5
11h = Pipeline	27h = PCB Distribution Amp
12h = Rack RevE TBC/Sync	28h = PCB 4 x 1 Switcher
13h = PCB non-Xpon TBC/Sync	29h = PCB TR1
14h = Rack non-Xpon TBC/Sync	2Ah = PCB TR2
15h = Rack RevL NTSC→PALM	2Bh = PCB TR3
16h = Rack RevL PALM→NTSC	2Ch = PCB TR4
17h = Rack Distribution Amp	2Dh = PCB TR6
	2Eh = PCB TR5

Note: *Rack* designates boards designed for 10X, Multi-II, or Pick-2 chassis.

Appendix B External Control

INTERFACE Connector

The 25-pin D INTERFACE connector is located on the rear panel of the Multi-II chassis above the fan (see Figure 3-1). Table B-1 shows the pinout for the INTERFACE connector (Figure B-1).

Table B-1. Pinout for 25-Pin D Interface Connector

Pin #	Name	Function	Notes
1	FG	Frame Ground	
2	TD	Transmitted Data	From TD of control source.
3	RD	Received Data	To RD of control source (when SW1-3 is On).
4	RTS	Request To Send	Connected to CTS for handshaking.
5	CTS	Clear To Send	Connected to RTS for handshaking.
6	DSR	Data Set Ready	Connected to DTR and CD for handshaking.
7	SG	Signal Ground	
8	CD	Received Line Detect	Connected to DTR and DSR for handshaking.
9	Reserved (+V)	+12 Volt Source	From Multi-II when SW1-4 is On.
10	GPI-0	GPI port for Slot 0	Enabled from front panel.
11	GPI-1	GPI port for Slot 1	Enabled from front panel.
12	GPI-2	GPI port for Slot 2	Enabled from front panel.
13	GPI-3	GPI port for Slot 3	Enabled from front panel.
14	GPI-4	GPI port for Slot 4	Enabled from front panel.
15	GPI-5	GPI port for Slot 5	Enabled from front panel.
16	GPI-6	GPI port for Slot 6	Enabled from front panel.
17	GPI-7	GPI port for Slot 7	Enabled from front panel.
18	GPI-8	GPI port for Slot 8	Enabled from front panel.
19	GPI-9	GPI port for Slot 9	Enabled from front panel.
20	DTR	Data Terminal Ready	Connected to DSR and CD for handshaking.
21	N.C.		No connection.
22	RI	Ring Indicator	Used for Remote detect on Multi-II (see below).
23	N.C.		No connection.
24	N.C.		No connection.
25	N.C.		No connection.

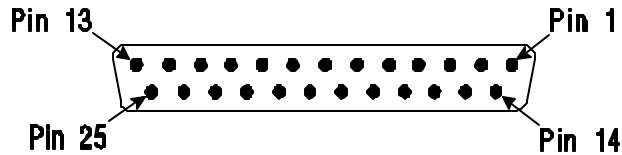


Figure B-1. 25-Pin D Interface Connector (female)

GPI Ports

Each channel has the capability of being controlled by a GPI port. The type of board determines what the possible functions of the GPI can be. For example, a Freeze On/Off can be externally controlled on a TBC/Sync board.

To activate a GPI port, select the menu "GPI Port Select." Using the SET +/- buttons, select the desired function.

Warning
Do NOT exceed 5 volts on the GPI pins.

Note: The GPI port control is "OR"ed with the front panel control. If either the front panel menu OR the GPI is activating a function, the action will occur. Conversely, if one of the two remains active, the other control cannot deactivate the function.

Each channel has its own GPI control port located on the 25-pin INTERFACE connector (see Table B-1). This port is designed to accept either a switch closure to ground (no pullup required), or a TTL/CMOS 5-volt logic input. The inputs are active LOW.

System Limitations

The timing of these ports cannot be specified with any accuracy. All ports are controlled by a "watchdog" controller which uses serial communications to control each board. For a single transition of a GPI port, the time should take approximately 5 to 11 milliseconds. However, if action is occurring from the front panel, a remote, through RS232 control, or another GPI port, the GPI control signal may be delayed significantly. The GPI control signal will be sent immediately after these extra signals which may vary from 5 to 13 ms. per action per channel. The worst case time should be $13 \text{ ms.} \times 10 \text{ channels} + 11 \text{ ms.} = 143 \text{ ms.}$ (This may occur each time the CHANNEL +/- buttons are pressed.)

RS232 Configuration

DIP switch settings on the control board affect the computer and remote control operations. For access to the control board, loosen the screws on both sides of the front panel of the Multi-II unit and tilt down the panel. The control board is the first board on the right (slot #10). The applicable DIP switch, labeled SW1, is located at the front edge of the board.

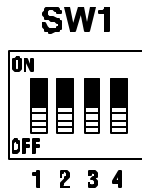


Figure B-2. Control Board DIP Switch SW1

Table B-2. Descriptions for SW1 Settings

Bit #	Label	Function	Description
1	MODE	For special applications.	
2	LINE	Line detect.	The system will monitor the RI line of the 15-pin D connector and hold unit in Remote mode if signal is present.
3	RXDX	RXD enable.	Enables return line to computer's RXD port.
4	REM+	Remote power.	Connects +12 volt to pin 9 of 25-pin D connector for powering Prime Image remotes.

Warning

SW1 position bit 4 set to On applies +12V to the INTERFACE port. Keep Off for computer operation.