USER MANUAL

for

Version 8.3
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Customer Support

Fortel DTV hopes that this manual provides answers for nearly all your questions, but if it doesn't, please call or email us in Atlanta GA USA at +1 770 806-0234 for customer support.

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Important Safeguards and Regulatory Notices

Information on the following pages provides important safety guidelines for both Operator and Service Personnel. Specific warnings and cautions will be found throughout the manual where they apply, but may not appear here. Please read and follow the important safety information, noting especially those instructions related to risk of fire, electrical shock or injury to persons.

WARNING

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

Symbols and Their Meanings

The lightning flash with arrowhead symbol, within an equilateral triangle, alerts the user to the presence of "dangerous voltage" within the equipment's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle alerts the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the equipment.

The fuse symbol indicates that the fuse referenced in the text must be replaced with one having the ratings indicated.

This symbol represents an internal protective grounding terminal. Such a terminal must be connected to earth ground prior to making any other connections to the equipment.

This symbol represents an external protective grounding terminal. Such a terminal may be connected to earth ground as a supplement to an internal grounding terminal.

CAUTION

This equipment contains static sensitive components. Use anti-static grounding equipment whenever handling or servicing modules and components. When circuit modules are removed from the frame, place them on a flat static-controlled surface. Failure to follow this precaution can result in component damage due to electrostatic discharge.

Danger

- Electrical potential is still applied to some internal components even when power switch/breaker is in the off position. To prevent electrical shock when working on this equipment, disconnect the AC line cord source before working on any internal components.

- A residual voltage may be present immediately after unplugging the system due to slow discharge of large power supply capacitors. Wait 30 seconds to allow capacitors to discharge before working on the system.

Warnings

- Heed all warnings in the unit and in the operating instructions.

- Do not use this equipment in or near water.

- Disconnect AC power before installing any options unless explicitly told to do so in this manual.

- This equipment is grounded through the grounding conductor of the power cord. To avoid electric shock, connect the power cord to the equipment and plug it into a properly grounded receptacle before connecting the equipment inputs and outputs. Receptacle grounding conductor must be connected to earth ground at the service equipment.

- Dangerous voltages exist at several points within this equipment. To avoid personal injury, refer all servicing to qualified personnel.

- During installation, do not use the door handles or front panels to lift the equipment as they may open abruptly and injure you.

- To avoid fire hazard, use only components on the specified type, voltage and current rating as referenced in the appropriate parts list. Always refer fuse replacement to qualified service personnel.

- To avoid explosion, do not operate this equipment in an explosive atmosphere unless it has been specifically certified for such operation.

- Have qualified personnel perform safety checks after any completed service.

- To reduce the risk of electric shock, ensure that the two power supply cords (if so equipped) are each plugged into a separate branch circuit.

- If equipped with redundant power, this unit has two power cords. To reduce the risk of electric shock disconnect both power supply cords before servicing.

Cautions

- To prevent damage to equipment when replacing fuses, locate and correct the trouble that caused the fuse to blow before applying power.
- Verify that all power supply LEDs are off before removing the power supply or servicing equipment.
- Use only specified replacement parts.
- Follow static precautions at all times when handling this equipment.
- Leave the back of the frame clear for air exhaust cooling and to allow room for cabling. Slots and openings in the cabinet are provided for ventilation. Do not block them.
- The front door is part of the fire enclosure and should be kept closed during normal operation.
- To prevent damage to this equipment read the instructions in this manual for proper input voltage range.
- Circuit boards in this equipment are populated with surface mount and FPGA components. Special tools and techniques are required to safely and effectively troubleshoot and repair modules that use SMT or FPGA components. For this reason, service and repair of Fortel DTV products incorporating surface mount technology are supported only on a module exchange basis. Customers should not attempt to troubleshoot or repair modules that contain SMT components. Fortel DTV assumes no liability for damage caused by unauthorized repairs. This applies to both in-warranty and out-of-warranty products.

Power Cord Notices

North American Power Supply Cords

This equipment is supplied with a molded grounding plug (NEMA 5-15P) at one end and a molded grounding receptacle (IEC 320-C13) at the other end. Conductors are color coded: white (neutral), black (line) and green or green/yellow (ground).

International Power Supply Cords

This equipment is supplied with a molded grounding receptacle (IEC 320-C13) at one end and a molded grounding plug (EU1-16P) at the other end. Conductors are CEE color coded: light blue (neutral), brown (line) and green/yellow (ground). Other IEC 320-C13 type power supply cords can be used if they comply with the safety regulations of the country in which they are to be installed.

1. Introduction

Description
The Integrity System by Fortel DTV is a modular series of components which are mixed and matched to handle specific video and audio tasks in today's broadcast and post-production facilities. Currently, modules are combined in 1RU or 4RU frames then matched with local or remote control panels to fill a variety of needs of video and audio broadcast and production facilities, particularly in hybrid facilities using both analog and digital audio and video.

The System
Integrity cards handle analog and digital audio, analog and digital video, or combinations of these for use as converters, synchronizers, and to embed or de-embed audio.

The Frames
Cards are installed in either a compact 1RU frame or high-density 4RU frame depending on your application. The 1RU frame (FRM-501) holds up to 4 cards and can include a local control panel which is used for operation of the cards contained in that frame or any other frame on the LAN. The 4RU frame (FRM-304 or FRM-504) holds up to 18 cards and requires a remote control panel for operation of the cards contained in that frame. This same remote may also be used to control cards in other frames by changing a selection on its front panel. One control panel can access every synchronizer in the facility. The 4RU frames are recommended when many cards are needed in a single location in a minimal amount of space.

The Control Panels
Compatible control panels currently include the RCP-502, RCP-303 and RCP-503. These may be placed anywhere in the facility and control cards in multiple frames over a LAN. Control panels are connected to frames using local area network (LAN) hardware: Category 5 patch cables and a 100-base-T Ethernet switch. While the hardware may be the same type you use for other LAN components in your facility, it is recommended that you isolate the Fortel DTV hardware on a separate LAN. This is prudent in that other LAN traffic overhead is unpredictable and could overly task available bandwidth at a time when communications to the synchronizers is critical.

400 Series Video and Audio Synchronizers
The Integrity 400 Series of Video and Audio Synchronizers include six models: The FS-415, FS-414A, FS-414ACC, FS-412A, and FS-411A for video and the DAS-441A for audio.

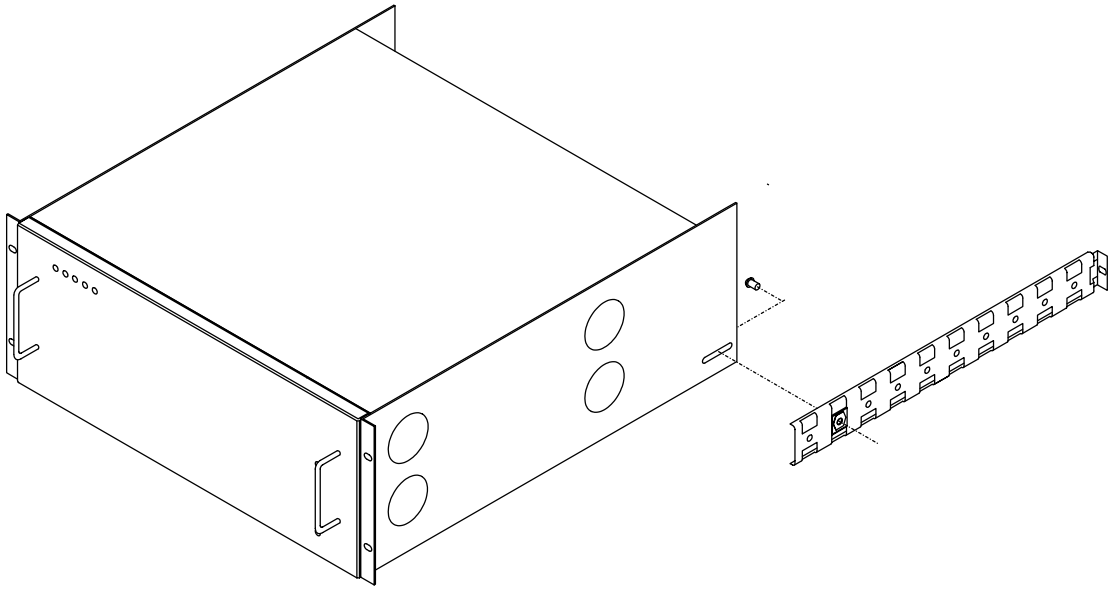
500 Series Video and Audio Synchronizers
The Integrity 500 Series of Video Synchronizers include five models: The FS-516, FS-514, FS-514CC, FS-512, and the FS-511 for video.

2. Installation

Rackmount the FRM-304 Integrity System Frame

The FRM-304 Integrity System Frame is a 4RU chassis designed for installation in EIA equipment racks. It is shipped with a rear rack rail extension kit. Install all cards in the frame prior to mounting the frame in the rack. Check for correct jumper settings on audio and video cards prior to installing them in the FRM-304 frame.

Remove the front outer cover. The FRM-304 is shipped with an outer cover which should be installed for normal operation of the product. Remove this cover when preparing to mount the FRM-304 in the rack and replace it when mounting is completed. Orient the frame so that the power supplies are on the right side when viewed from the face. The frame is mounted with four provided rack screws, attaching the frame ears to the front rack rails. Attach the rear extensions to the back rack rails and the rear frame slots as diagramed in Figure 2-1 below. Replace the front snap-on cover, insuring that the five LEDs are visible through the front cover.



Rackmounting the FRM-304 (B) series frame:

1. Attach the frame face to the rack using four 10x32 1" Pan Head screws (Black).

2. Use one 10x32 1/2" Pan Head screw (bright) to attach each long rail to the rear frame, selecting the hole based on the depth of the rack. (Holes are on 1-1/2" centers), aligning with the oblong slot as shown above.

3. Attach each long rail to the rear of rack using one 10x32 1" Pan Head screw (Black).

Figure 2-1 RACKMOUNT THE FRM-304 FRAME

Rackmount the RCP-502 Remote Control Panel

The RCP-502 Remote Control Panel is mounted by first removing the panel face from its chassis. Remove the panel face by unscrewing the two captive screws, one near each end of the panel face. Gently separate the panel from the chassis box. Disconnect the three cables from the panel, depressing the latches on each connector prior to extraction from the cable socket. Note the number and position of each cable for later reconnection. The chassis is then mounted with four provided screws, attaching it to the front rack rails. Reconnect the three cables (Power, ENET and USB) to the panel. Each of the three cables is labeled. A matching connector legend is adjacent to the mating jack located on the RCP-301. JP9 is a 6-pin power connector. JP10 is a 5-pin USB connector. JP12 is the REMOTE2 connector. JP13 is the REMOTE1 connector. Refer to Fig. 2-3 below for connector layout on the rear of the RCP-302 panel.

Warning! - Failure to connect these correctly will cause the unit to fail and void the warranty.

Press the panel into the chassis body and secure it using the two captive screws. Attach the "floor wart" DC power supply to the rear of the chassis. A retaining clip and screws are provided for securing the DC power connector in installations where vibration may cause the connector to unseat. There is no power switch on the RCP-302/RCP-302A which is powered as soon as the AC source is connected. See Fig. 2-2 below for view of RCP-302 external connections.

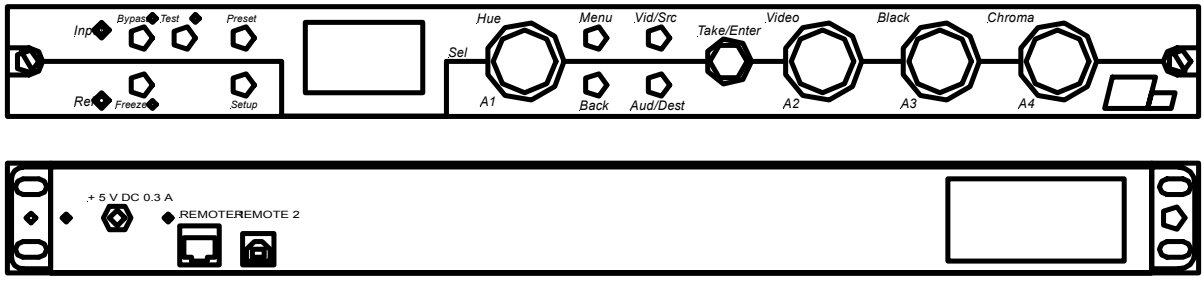
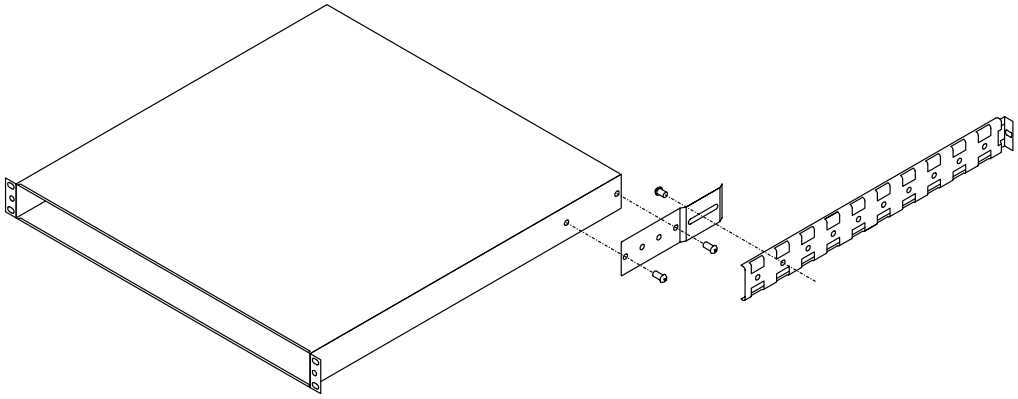


Figure 2-2 RCP-502 REMOTE CONTROL PANEL

Figure 2-3 RCP-502 INTERNAL CONNECTIONS

Rackmount the FRM-501 Integrity System Frame

The FRM-501 Integrity System Frame is a 1RU chassis designed for installation in EIA equipment racks. It may include a face-mounted RCP-502 as a local control panel, or be installed with the provided “blank” front panel. The RCP-502 control panel is usually shipped pre-installed on the FRM-501 as a tested assembly.



Rackmounting the FRM-501 series frame:

1. Use two 10x32 1/2" Pan Head screws (bright) to attach each short rail to the frame as shown, before mounting the frame in the EIA rack.

2. Attach the frame face to the rack using four 10x32 1" Pan Head screws (Black).

3. Use one 10x32 1/2" Pan Head screw (bright) to attach one long rail to each short rail, selecting the hole based on the depth of the rack. (Holes are on 1-1/2" centers).

4. Attach each long rail to the rear of rack using one 10x32 1" Pan Head screw (Black).

5. Replace front panel and secure with the captive thumbscrews.

Figure 2-5 RACKMOUNT FRM-501 FRAME

Adding cards to the FRM-304 Integrity System Frame

The FRM-304 Integrity System Frame accepts a maximum of 18 cards. These are loaded through the rear of the frame and secured using two captive screws attached to each card, securing the card to the top and bottom rail of each frame. Insert each card carefully. Card guides at the top and bottom of each slot are used to align the card with the mating connector on the midplane card as the card is inserted fully into the frame. Once the card is gently seated into the mating connector, secure it using the two captive screws. Card slot number one is nearest the power supply side. Card slot number eighteen is nearest the main fan, away from the power supplies.

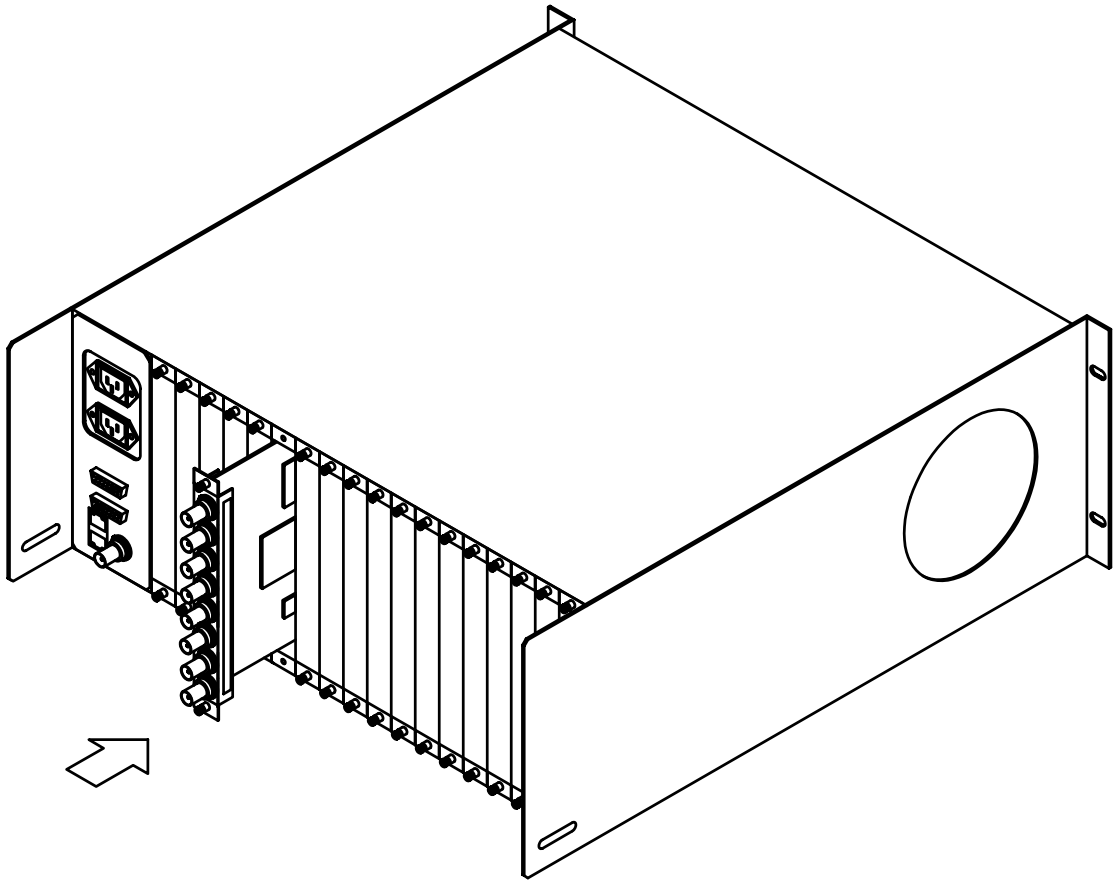


FIGURE 2-6 FRM-304 INTEGRITY SYSTEM FRAME CARD LOADING

Adding cards to the FRM-501 Integrity System Frame

The FRM-501 Integrity System Frame accepts a maximum of 4 cards. These are loaded through the rear of the frame using two captive screws attached to each card, securing the card at the side of each slot. Insert each card carefully. Card guides at the sides of each slot are used to align the card with the mating connector on the midplane card as the card is inserted fully into the frame. Once the card is gently seated into the mating connector, secure it using the two captive screws. Card slot number one is nearest the power supply side. Card slots numbers increment counterclockwise, so that slot four is in the upper right.

	1	**4**
	2	**3**

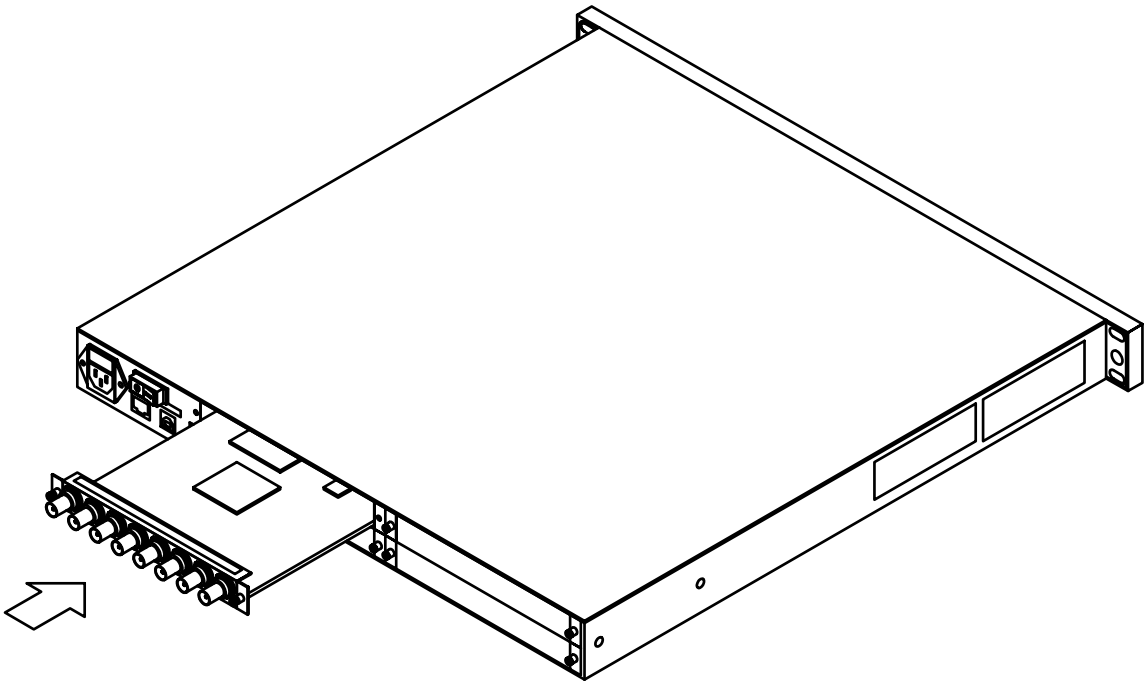


FIGURE 2-7 FRM-501 INTEGRITY SYSTEM FRAME CARD LOADING

3. Configuration

Setting the IP Address

Each Integrity frame or control panel must have a unique IP address in order to co-exist on the same LAN. If you have multiple groups, such as suites in different parts of the building, the same IP addresses could be reused *as long as the hardware is not going to exist on the same LAN*. If you are only connecting one frame to one control panel using a crossover cable, changing the IP address should be unnecessary.

Since an IP conflict could cause the entire network to lockup, the menu to change the IP address is hidden so that a user is unlikely to access it without first referring to this manual.

Naming Cards

Each card in every Integrity System frame has a default name assigned at the factory. You may also assign an alias name to each card. The name is stored on the card in non-volatile flash memory. *When a specific card is moved to a new slot or frame, the card, not the slot, retains the name.* The default name assigned at the factory depends on the card type. Every FS-412A card is assigned the default name FS-412A-#, where # is the slot number in which the card is presently installed. Example: FS-412A-01 is the default name of an FS-412A card installed in slot 01 in an FRM-304 frame. If that card were moved to slot 03, that card's default name would display as FS-412A-03. The card name appears in many control panel menus as an aid to navigation.

Alias names may be programmed by the installer in the field to supercede the default card name, so that the alias name appears in menus instead of the default card name. Example: The card with default name FS-412A-01 can be assigned an alias name of SAT27, for example. The alias name SAT27 will then appear in menus instead of the default name. This alias name, stored in non-volatile flash memory, will be presented to every control panel accessing that card. If the card is later moved to another slot or frame, the alias name is retained by the card, not the slot.

Assigning alias names to cards is recommended, particularly when multiple frames are used.

Assign a card an alias name by pressing the PRESET pushbutton to the left of the display window. A submenu appears with RESTORE PRESETS highlighted. Rotate the selector knob to highlight EDIT BOARD ALIAS. Press the MENU pushbutton to enter that submenu. The display window will change to show the current name for the currently selected card. Rotate the selector knob to change the character in the first (left most) position. Rotate the F1 knob clockwise to move the caret to the next character position. Rotate the selector knob to change the character in that position. Repeat these steps for up to eight characters. Insert a blank (space) character to the right of the last character by rotating the selector knob counterclockwise until the space character appears at the caret. Press the TAKE/ENTER pushbutton to save the new alias name and exit to the top menu. Your new alias name for that card is now stored in non-volatile flash memory.

Names should use the characters A – Z, 0 – 9, slash, or hyphen, plus a trailing space, for a total of up to eight characters.

Change an existing alias name by the same procedure, overwrite each character.

Delete an alias name, which restores the default name, by changing the alias name to "NONE". NONE is a reserve word that the card interprets as a command to clear the name.

Linking Cards

Integrity remote control panels have a feature that allows a video card and audio card to be treated as a linked pair for purposes of controlling audio and video together for each A/V signal path. Once configured this way, the operator can toggle between video and audio controls using two buttons on the control panel marked VIDEO and AUDIO. Before this feature can be used, an assignment must be made in each card, which causes it to toggle with one other card when VIDEO pushbutton or AUDIO pushbutton is pressed.

For each card: Navigate to the AV BUTTON menu.
Set the card slot number of the target card.
When you wish to unlink a card pair, set this control to the current card slot.
Press BACK to exit.

Example: If the current video card is in slot 3 and the audio card is in slot 4, set the video card AV BUTTON control to "4" and the audio card AV BUTTON control to "3".

Card Slot Rules

Adjacent slots have connectivity with each other via the midplane for certain functions: Embedded audio, lip-sync tracking TTL pulses, or SDI card-to-card routing in certain cases. As a rule, install video cards in "slot N" and the associated audio card in "slot N+1".

Jumper Settings

There are jumpers on the cards which are set at the factory if you filled out a configuration preference form. The purpose of the user-configurable jumpers and their settings are described below.

Jumper settings on the FS-514, FS-512, FS-511, FS-414A, FS-412A and FS-411A.
These cards haves two user configurable jumpers: JP1 and JP3. JP1 is used to configure SDI OUT2 to either the digital video output signal or a TTL pulse used to steer the audio delay in a companion DAS-441 or DAS-441A audio card. Normal setting for J1 is SDI output, as shown in Figure 3-1. JP3 is used to configure VID OUT 2 to either the analog video output signal or a TTL pulse used to steer the audio delay in a companion DAS-441 or DAS-441A audio card.

Jumper settings on the DAS-441 and DAS-441A.
This card has eight user configurable jumpers. JP1 – JP8. JP1, JP2, JP3 and JP4 are used to set the amount of audio headroom provided for when converting analog inputs to digital. JP5, JP6, JP7 and JP8 are used to set the amount of audio headroom when converting the digital back to analog at the output section of the card. These should be configured for unity, such that the output jumpers match the input jumpers. Each analog input channel can be set to either +12, +15, +16, +18, +20, +22, +24 or +28 dBu, depending on your "house standard" for audio and type of program content you typically process.

Most users will want the maximum available headroom to prevent clipping of high level transients, which would cause distortion in the program audio if clipped. If your facility uses compression hardware upstream to prevent such transients, a lower headroom setting is possible. Lower headroom settings will provide for greater resolution in converting analog to digital.

Example: Your facility sets +4 dBu as the analog "house reference" for 0 VU. You will probably choose +24 dB as the jumper setting.

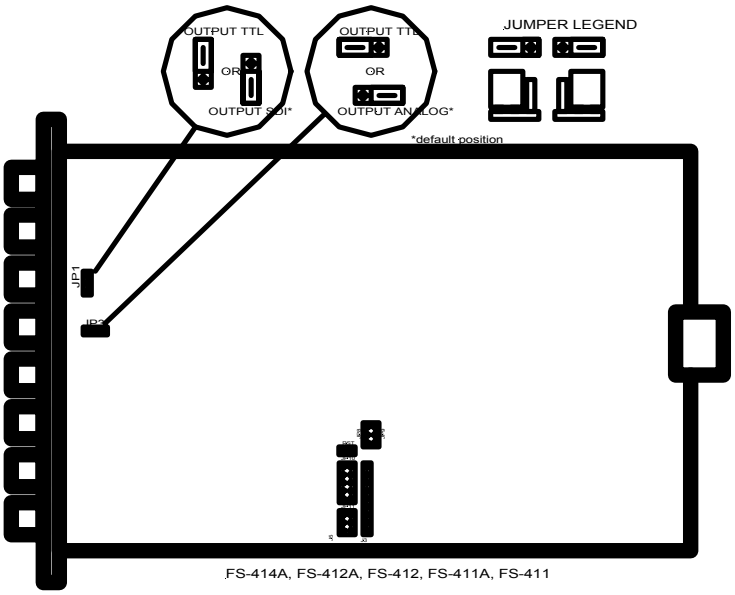


Figure 3-1 FS-400 SERIES TTL JUMPER CONFIGURATION

Video Reference Inputs

A genlock reference is required for each video board installed in the frame. Genlock reference must be connected to the REF IN connector on each frame. If desired, a reference signal may be connected to each video card, provided the menu election "CARD REFERENCE" is selected. If only the frame REF IN signal is to be used as a master reference, set each video card to "FRAME REFERENCE".

Video Timing

The output of each video synchronizer should be timed into your video system using an analog waveform monitor, vectorscope, such as the Tektronix® 1780R, and SDI monitor such as a Tektronix® WFM-601M. Access the timing adjustments by first selecting the card, then rotate the Selector Knob to scroll down the menu in the display window to TIMING. Press the MENU pushbutton to enter the Timing submenu. Use the Selector Knob to scroll down this menu to each item you wish to adjust: H Coarse, H Fine, SDI H Phase, V Phase, H Video Position and V Video Position. Align each with a known reference signal on the waveform monitor or vectorscope, using the MENU pushbutton to select a function, the F0 knob to adjust its value, and the BACK pushbutton to save and return to the previous menu level.

Configure the waveform monitor so that a valid reference signal is applied to the external reference input. Route a correctly timed source to input A and the output of the synchronizer to be timed to match it to input B of the waveform monitor.

Genlock Source – For each video card, rotate the Selector Knob to choose either the Frame Connector or Board Connector as the source of a connected black burst reference signal. If this reference signal is connected to the Frame Connector, all cards must be set to use this same reference and no signal cable should be connected to the REF LOOP connectors on any card in that FRM-304 frame. The system frame has a reference input connector, labeled REF IN, which may be used as the reference signal for all cards in the FRM-304 frame. If this connector is used, other reference signals should be removed from the REF LOOP connectors on each card. The frame REF IN connection is self-terminating into a 75 ohm load.

H Coarse – rotate the Selector Knob until the 50% point of the leading edge of H sync is closely aligned to the 50% point of the leading edge of the A input to the waveform monitor. Press the BACK pushbutton to return to the previous menu.

H Fine – rotate the Selector Knob until the 50% point of the leading edge of H sync is precisely aligned to the 50% point of the leading edge of the A input to the waveform monitor. Press the BACK pushbutton to return to the previous menu.

SDI H Phase – rotate the Selector Knob to offset the horizontal timing of the SDI output relative to the analog output. Press the BACK pushbutton to return to the previous menu.

V Phase – rotate the F0 knob to offset the video by 0 to 3 fields. Rotate the F1 knob to offset the video by one or more lines. Press the BACK pushbutton to return to the previous menu.

H Video Pos – rotate the F0 knob to offset the horizontal position of the video relative to sync.

V Video Pos – rotate the F0 knob to offset the vertical position of the video relative to sync. *Caution – misuse of this control will cause patterns in the VBI to appear on the incorrect line!*

SCH Phase – rotate the F0 knob to change the NTSC SCH phase from zero degrees. *Caution – this control should only be used by persons who understand WHY their house SCH reference is incorrect! It is NOT to be used as a subcarrier timing adjustment.* Press the BACK pushbutton to return to the previous menu.

Blank Width – rotate the F0 knob to change the blanking width using a waveform monitor. Press the BACK pushbutton to return to the previous menu.

Blank Pos – rotate the F0 knob to change the blanking position using a waveform monitor. Press the BACK pushbutton to return to the previous menu.

Repeat this process for each video synchronizer card in each frame. Press the BACK pushbutton to return to the previous menu.

Video/Audio Linking

The user can jump between a linked pair of cards - one audio and one video – to handle adjustments on both the audio and video of a program feed more rapidly than by using the SELECT BOARD method. You should set up AV Button link for each signal path during installation.

Press [AUDIO] pushbutton to jump to the paired audio card from the current video card.
The display window will update and take you to the audio gain controls for that pair.

Press [VIDEO] pushbutton to jump to the paired video card from the current audio card.
The display window will update and take you to the video proc amp controls for that pair.

Audio Reference Inputs

AES channels of each DAS-441 or DAS-441A audio synchronizer require a reference signal. This reference can be taken from the 27 MHz midplane clock, AES1 or AES2 input, or an external AES Black source. The AES Black source, if chosen as the reference, is connected to each card individually via its Phoenix connect utilizing pins 5 and 6. Select the AES reference type using the card menu as described in the operations section of this manual.

Audio Timing

Audio tracking delay maintains lip-sync between audio and video automatically. The card also provides for an additional manual offset delay that can be configured by the user to compensate for other video path delay not caused by the video synchronizer, such as through a reclocking DA or routing switcher.

Audio tracking delay is correctly maintained automatically by a TTL signal which provides tracking information to the DAS-441 or DAS-441A card from the associated video synchronizer. The TTL pulse tells the audio card whenever the video synchronizer drops or adds a frame of video, and stores the audio in memory, dropping or adding samples accelerate or stretch the audio so that it is realigns itself by compensating for the dropped or added video frame. The audio card from either an external or internal source can receive this TTL signal. Each channel must be assigned individually.

Select the TTL assignment by first selecting an audio card from the SELECT BOARD submenu. Rotate the Selector Knob until OUTPUT SETUP is highlighted in the display window. Press the MENU pushbutton to enter the output setup submenu. Select DELAY SETUP by pressing the MENU pushbutton. The display window will update to show OUTPUT, TRACKING, OFFSET and SLEW RATE. Rotate the F0 knob to change the output channel. Rotate the F1 knob to change the TRACKING to NONE, INTERNAL , EXT TTL1 or EXT TTL2. Rotate the F2 knob to change the OFFSET DELAY to a fixed delay value from 0.000 to 5.000 seconds in 1 mS increment. Rotate the F3 knob to change the SLEW RATE to SLOW, MEDIUM, or FAST.

Assigning INTERNAL – The most common choice for the TTL source will be INTERNAL. This utilizes a signal path on the chassis midplane to route the TTL tracking pulse from the video synchronizer in Slot “N” to the audio card in slot “N+1”, where the audio card must be in the next higher numbered slot in the same frame. Using this setting, neither J1 nor J3 on the video synchronizer should be set to TTL position.

Assigning EXT TTL1 – External TTL cables should be connected between any video synchronizer and any audio synchronizer. EXT TTL1 is located on pins 1 and 2 of the CONTROL Phoenix connector on each audio synchronizer. Either the SDI OUT2 or VID OUT2 BNC connector on the desired video synchronizer must be used to send the TTL pulse. This requires setting jumper JP1 or JP3 to substitute the TTL output pulse for the normal video output of that BNC connector.

Assigning EXT TTL2 – External TTL cables should be connected between any video synchronizer and any audio synchronizer. EXT TTL2 is located on pins 3 and 4 of the CONTROL Phoenix connector on each audio synchronizer. Either the SDI OUT2 or VID OUT2 BNC connector on the desired video synchronizer must be used to send the TTL pulse. This requires setting jumper JP1 or JP3 to substitute the TTL output pulse for the normal video output of that BNC connector.

4. A/V Card Operation

DAS-441A Audio Synchronizer Controls

The DAS-441A Audio Synchronizer is a modular card for Integrity system frames. It provides audio processing to correct channel gain (level), channel routing, phase inversion, summing, channel swapping, user adjustable delay of up to five seconds, and test tone generation. When configured with certain video synchronizers, it includes automatic delay tracking of the video synchronizer and embedding or de-embedding. See the video synchronizer sections for compatibility with the DAS-441A card.

Input Control
The DAS-441A Audio Synchronizer card accepts both four analog and two AES stereo pairs. The Input Control submenu provides user controls for INPUT GAIN, INPUT LINKING, and CHANNEL PHASE. INPUT GAIN is the control used to compensate for high or low audio source levels. INPUT LINKING is a user preference adjustment which configures the card to provide eight independent gain controls, one per input channel, or to configure the inputs as stereo pairs with gain and balance controls provided for each stereo source. CHANNEL PHASE provides a quick way to fix an out-of phase condition between two sources by inverting the phase of either channel.

Input Gain
Adjust your audio input levels using the INPUT GAIN control. All outputs routed from the same input will be affected. If channels are linked, forming a stereo pair, a GAIN and BALANCE adjustment can be made.

Navigate to the INPUT GAIN submenu.
The display window will show either individual channel gain controls, i.e.: ANALOG 1, ANALOG 2, etc., or a stereo pair, i.e.: ANALOG 1 /2 and the Gain/Balance settings for linked channel pairs.
BALANCE control only appears on linked pairs.
Press the BACK button to return to the previous menu.

Input Linking
Navigate to the INPUT LINKING submenu.
The display window will show either one channel, i.e.: INPUT ANALOG 1, or a stereo pair, i.e.: INPUT ANALOG 1 /2 and the link status for that channel or channel pair.
Press the BACK button to return to the previous menu.

Channel Phase
If a stereo audio pair appears to have one channel out of phase it can be corrected by using this control to reverse the phase of either channel.

Navigate to the CHANNEL PHASE submenu.
Select a channel, ANALOG 1 through DIGTAL 4.
Set the phase to NORMAL or INVERT.
Press the BACK button to return to the previous menu

Digital Source – *De-embed from SDI*
This control is used to change between de-embedding audio from SDI or using the external AES audio inputs. When embedded audio from the video synchronizer is to be used, the digital source must be changed using this control. Use this command to select either the AES inputs (the BNC connectors on the audio board) or to select Embedded Group1, Group 2, Group 3, or Group 4. Selecting any embedded group causes the on-board matrix router to substitute that embedded group's four channels for the AES external input channels. *Activating the De-embed function also requires a change in a setting on the video board.*

Navigate to the DIGITAL SOURCE submenu.
Select one group to de-embed, GROUP 1 through GROUP 4, or select BNC to use the external AES inputs as the source for digital audio.
Press the BACK button to return to the previous menu.

Mute/Bypass
Any audio output channel or group of audio output channels may be deliberately muted if desired. This is useful when you do not wish to change the configuration but need to suspend the audio output of certain channels for a brief time. Selecting Bypass will short each input directly to its "native" output: Analog 1 In will connect directly to Analog 1 Out, AES pair one input will connect directly to AES pair one output, "copper-to-copper", and so on for each analog channel or digital channel pair.

Navigate to the MUTE/BYPASS submenu.
Select a channel, ANALOG 1 through DIGITAL 3 / 4.
Select either MUTE OFF or MUTE ON.
MUTE OFF is the normal operating mode, MUTE ON will silence the selected channel.
Select BYPASS ON or BYPASS OFF.
BYPASS OFF is the normal operating mode, BYPASS ON will connect the input directly to the output.
Repeat the above procedure for each channel you wish to modify.
Press the BACK button to return to the previous menu.

Output Setup
The Output Setup submenu is used to configure A/V delay tracking and to configure the channel mapping. An on board audio router on each card can assign any input channel to any or all unused output channels. Channel summing is also assignable, so that any two input channels may be summed to form a monaural channel. Reference quality tone generators are also selectable in this menu and are used to verify the integrity of the output signal path even when an input is not present.

Delay Setup
The Delay Setup control configures delay TRACKING relative to the associated video signal in an A/V synchronizer application to correct lip-sync errors. Integrity DAS-400 Series cards can also correct fixed path delays that accumulate as the signal passes through reclocking DAs, production effects devices, etc., by providing a fixed OFFSET delay from zero to five seconds in 1 mS increments. The offset delay duration is selectable by the user, independently for each channel. Finally, a SLEW RATE control is provided to set the rate at which the audio card compensates for a dropped frame of video. *Actually, it is two dropped frames when the video synchronizer is in 4-field mode.* SLOW, MEDIUM or FAST controls affect a tradeoff between the rate at which the audio is realigned perfectly to the video and how likely the associated pitch change will be noticed by the audience during the correction.

Navigate to the DELAY SETUP submenu.
Select a channel, ANALOG 1 through DIGITAL 4.
Tracking is configured during initial configuration only. See Configuration Guide.
Add a fixed OFFSET delay of 0.0 to 5.000 sec.
Set the SLEW RATE to SLOW, MEDIUM or FAST.
Slew rate determines how aggressively the tracking correction will occur.
Press the BACK button to return to the previous menu.

Output Source
The OUTPUT SOURCE command is used to change the channel mapping using the on-card audio router. Each output can be assigned to receive a signal from any one input, plus a second input may be summed with the primary selection to create a monaural sum of the two signals. This is a very powerful feature which can be used to assign one input pair to an analog output pair, a digital output pair, plus a monaural

sum to another output if needed. There are eight input channels and they can be mapped to any unused output channel. SUM WITH NONE is the normal setting, meaning that you are not summing two channels.

Navigate to the OUTPUT SETUP submenu.
Select one OUTPUT CHANNEL, ANALOG 1 through DIGITAL 4.
Select the primary SOURCE for that output channel, ANALOG 1 through DIGITAL 4 or TONE.
The test tone appears in the menu as the last choice after DIGITAL 4 when this knob is rotated fully CW .
Select a second source you would like the SOUCE to SUM WITH on that one output channel.
If channel summing is not needed, rotate F2 fully CCW to display SUM WITH NONE.
Press the BACK button to return to the previous menu.

Embed Group – *Embed to SDI*
This control is used to turn on embedding to SDI, or to turn embedding off if it is not desired. The embedded audio channels will always follow the AES 1-4 outputs, sending these four channels to the video synchronizer for embedding in the selected Embed Group in the SDI signal. *Activating the Embed function also requires setting EMBED ON in the video board controls menu.*

Navigate to the EMBED GROUP submenu.
Select one group to embed, GROUP 1 through GROUP 4, or select NONE.
Set the CHANNEL PAIRS control to BOTH, Channels 1/2 only, or Channels 3/4 only.
Press the BACK button to return to the previous menu.

Configuration
The CONFIGURATION submenu includes choices for HEADROOM, TEST TONE, and AES CONFIG. Headroom is set once during installation setup. TEST TONE is used to configure a tone level and frequency for each output channel. AES CONFIG is used to set up the Sample Rate, Word Length and Sample Reference for the digital audio channels.

Headroom
See Section 3 – Configuration for instructions.

Test Tone
Each output channel can have a unique test tone assigned to it, or they may all use the same tone level and frequency. The level and frequency are assigned here. Default values for analog channels are 0.0 dBu and 1000 Hz. Default values for digital channels are -20.0 dBFS and 400 Hz.

Select the TEST TONE submenu.
Select an output channel, ANALOG 1 through DIGITAL 4.
Set the LEVEL for the selected channel .
Set the FREQUENCY of the tone, typically 400 Hz for SDI and 1000 Hz for analog.
Press the BACK button to return to the previous menu.

Digital Config
The Digital Config control should be used to configure all digital channels for SAMPLE RATE, WORD LENGTH and SAMPLE REFERENCE source. The Sample Rate is selectable as 32 kHz, 44.1 kHz, 48 kHz, or 96 kHz. In broadcast video, 48 kHz is the default. The Word Length may be set to 16, 20 or 24 bits. The Sample Reference may be Video (the genlock reference), AES 1 / 2, AES 3 / 4, or an external AES Black Reference.

Note: Whenever an embed group is selected as the digital source, the digital output Sample Rate is forced to 48 kHz and the Sample Reference will be forced to VIDEO. Changes are disabled when embedding is on. Turning off embedding will restore control of Sample Rate and Sample Reference to the user. The Word Length may be changed even when embedding is selected.

Navigate to the DIGITAL CONFIG submenu.
Set the SAMPLE RATE to 32, 44.1, 48(default) or 96 KHz.
Set the WORD LENGTH to 16, 20 (default) or 24 bit.
Set the SAMPLE REF to AES1/2, AES 3/4, AES BLK or VIDEO (default).
Press the BACK button to return to the previous menu.

Embed Master/Slave
The Embed Master/Slave control is only used when multiple audio boards are grouped with one video synchronizer to allow embedding of multiple groups in one SDI signal. When only one audio card is paired with each video card, this control should be set to ON.

See the Configuration Guide for information on embedded audio and multiple groups.

Navigate to the EMBED MASTER/SLAVE submenu.
Select EMBED MASTER FLAG ON or EMBED MASTER FLAG OFF.
Press the BACK button to return to the previous menu.

Version Info
The Version Info command allows the user to view the software releases currently installed in the control panel and in the currently selected card. This is used to verify compatibility of hardware and software upgrades installed.

Rotate the selector knob to select VERSION INFO.
The display window will show the software level of the Microprocessor and the FPGA
Press the BACK button to exit to the previous menu.

FS-514 Video Synchronizer Controls

Video Input

The video synchronizer card accepts both one composite analog and one SDI input. The VIDEO INPUT control should be used to select an input/output configuration from the choices below.

ANALOG - The analog video input (VID-IN BNC) will be processed and appear at both the analog and digital video outputs.

DIGITAL - The digital video input (SDI-IN BNC) will be processed and appear at both the analog and digital video outputs.

DUPLEX - The analog video input (VID-IN BNC) will be processed and appear at the digital video outputs. The digital (SDI-IN BNC) will be transcoded and appear at the analog video outputs only.

Rotate the Selector Knob to highlight the VIDEO INPUT submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select ANALOG, DIGITAL or DUPLEX as the input.
Press BACK to exit the submenu.

Bypass
BYPASS ON indicates that the VID OUT 1 connector on the rear of the card is currently a looping output of the VID IN analog video input connected via a relay directly to the VID OUT 1 analog output. This is useful to temporarily monitor a satellite or microwave receiver's analog output without reprocessing sync, so that the receive antenna may be steered to peak the signal. In typical operation, this analog output is routed to a monitor bridge used for this purpose. All other outputs on the card are "live" and fully processed at all times. Bypass ON is indicated by a red light on the control panel.
VID OUT 1 must always be terminated with a 75 ohm BNC terminator if it is not used.

BYPASS OFF indicates that the VID OUT 1 connector on the rear of the card is currently processed identically to the VID OUT 2 analog output. Normal operating selection is BYPASS OFF. The alarm will be turned off when Bypass is off.

If near the frame containing this card, you will hear the internal relay click when the bypass state is changed.

Rotate the Selector Knob to highlight the BYPASS submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select BYPASS ON or BYPASS OFF.
Press BACK pushbutton to exit to the previous menu.

TBC
The Time Base Corrector can be disabled by setting this control to OFF, which increases frequency response above 5 MHz by 0.25 dB. Turn the TBC mode ON if you are using helical scan VCRs without time base correction as the analog video source. The TBC is disabled whenever the SDI input is selected.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select TBC submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select either TBC ON or TBC OFF.
Press the BACK button to exit to the previous menu.

Video AGC
The VIDEO AGC command can automatically compensate for low video levels by automatically adjusting the video gain by looking at sync levels of the analog input and adjusting the overall signal level until sync is corrected to –40 IRE. This is often used for half-transponder satellite feeds or signals from degraded sources. Normal operating mode is AGC OFF.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select AGC submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select either AGC ON or AGC OFF mode.
Press the BACK button to exit to the previous menu.

Proc Presets
Video Proc Amp Controls (Gain, Black Level, Chroma Level and NTSC Hue) can be reset to their default (or unity) positions by pressing PROC PRESETS.

Legalize
The FS-414A board includes the Perfect-Palette™ Legalizer. This video legalizer allows the operator to set separate thresholds for Luminance, Encoded Chroma, and RGB color space. If one component of the signal, such as the R-Y component, is producing an illegal value in NTSC (or PAL) color space, the Perfect Palette Legalizer adjusts the R-Y plus the B-Y and Y channels in SDI to correct the error while preventing a hue shift. A hue shift occurs in legalizers which do not adjust all three components! In addition, the user may select to legalize all lines in the VBI in the same manner as the active picture lines, or to disable the legalizer in the VBI.

Rotate the Selector Knob to highlight the LEGALIZE submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select ENCODED LIMIT.
Rotate the Selector Knob to choose OFF, TIGHT, NOMINAL or LOOSE threshold.
Rotate the Selector Knob to select LUMA LIMIT.
Rotate the Selector Knob to choose OFF, TIGHT, NOMINAL or LOOSE threshold.
Rotate the Selector Knob to select RGB LIMIT.
Rotate the Selector Knob to choose OFF, TIGHT, NOMINAL or LOOSE threshold.
Rotate the Selector Knob to select VBI LEGALIZER.
Rotate the Selector Knob to choose OFF or FOLLOWS MAIN.
Press BACK pushbutton to exit to the previous menu.

Color Correct – FS-514CC option

The FS-514 board may include the Color Corrector (CC) option. The color corrector is used to adjust white balance, gamma balance, black balance, black stretch and total black level. This adjustment is upstream of the legalizer, so any adjustments of the color corrector will be within correct color space. This menu is only accessible if the CC option was included.

Rotate the Selector Knob to highlight the COLOR CORRECT submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to SET CC TO UNITY.
Press the TAKE/ENTER pushbutton to return all color corrector variables to unity.
Press BACK pushbutton to exit to the previous menu.

Rotate the Selector Knob to select WHITE BALANCE.
Rotate the F1 knob to adjust the R level.
Rotate the F2 Knob to adjust the G level.
Rotate the F3 Knob to adjust the B level.
Rotate the Selector Knob to adjust all three simultaneously.
Press BACK pushbutton to exit to the previous menu.

Rotate the Selector Knob to select GAMMA BALANCE.
Rotate the F1 knob to adjust the R level.
Rotate the F2 Knob to adjust the G level.
Rotate the F3 Knob to adjust the B level.
Rotate the Selector Knob to adjust all three simultaneously.
Press BACK pushbutton to exit to the previous menu.

Rotate the Selector Knob to select BLACK BALANCE.
Rotate the F1 knob to adjust the R level.
Rotate the F2 Knob to adjust the G level.
Rotate the F3 Knob to adjust the B level.
Rotate the Selector Knob to adjust all three simultaneously.
Press BACK pushbutton to exit to the previous menu.

Rotate the Selector Knob to select BLACK STRETCH.
Rotate the Selector Knob to adjust.
Press BACK pushbutton to exit to the previous menu.

Rotate the Selector Knob to select BLACK LEVEL.
Rotate the Selector Knob to adjust.
Press BACK pushbutton to exit to the previous menu.

Test Signals
Full frame test signals can be substituted for all outputs simultaneously from the internal test signal generator.

Rotate the Selector Knob to highlight the TEST SIGNALS submenu.
Press the MENU pushbutton to select.
The display window will update to show the name of the current test signal or NONE.
If NONE is displayed, the currently selected analog or digital video INPUT should appear on all outputs.

Rotate the Selector Knob to select TEST SIGNALS.
Press the MENU pushbutton to select.
Rotate the Selector Knob to turn the currently selected pattern OFF or ON.
Rotate the F1 Knob to select a test pattern from the available library.
Press BACK pushbutton to exit to the previous menu.

Timing
See Video Timing under Section 3 – Configuration

VBI Insert
The VBI Insert menu allows a very flexible selection on a line-by-line basis. Each line may be passed from the input, passed as luminance only, blanked to eliminate the information on that line from the input, or to insert a test signal on that line. Data services, Nielsen or Arbitron ratings data, closed captioning, or time code, should all be "passed as luma" with "comb off" for best transparency. You may also choose to turn "setup off" by setting BLACK to 0.0 IRE out, or add setup to a line in the vertical blanking interval.

Rotate the Selector Knob to select VBI INSERT.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select a line and field, i.e.: Line 19 Field 1
Rotate the F1 knob to set SIGNAL to either PASS INPUT, LUMA ONLY, BLANK or a Test Pattern.
Rotate the F2 knob to set BLACK to 7.5 IRE or 0 IRE for the analog input and output levels desired.
Rotate the F3 knob to turn the Comb Filter ON or OFF.
Rotate the Selector Knob to select a different line to configure.
Press the BACK pushbutton to exit to the previous menu.

Black Level Setup
The Setup command is used to adapt the analog video input and analog video output to accept either a black level at 7.5 IRE (normal in NTSC in the United States and many other countries), or a black level at 0.0 IRE without setup (normal in PAL and in some NTSC countries). It can also be used to add or remove setup from an analog signal path.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select SETUP submenu.
Press the MENU pushbutton to select.
Rotate the F0 knob to select either 7.5 IRE IN/ 7.5 IRE OUT ; 7.5 IRE IN / 0.0 IRE OUT ; 0.0 IRE IN / 7.5 IRE OUT ; or 0.0 IRE IN / 0.0 IRE OUT.
Press the BACK button to exit to the previous menu.

Comb Mode
The Comb command is used to change from the NORMAL comb mode to one type of comb filter only.

NORMAL processes in multiple dimensions and dynamically changes as needed on a pixel by pixel basis and optimizes performance on-the-fly as the picture content changes. It is the best mode for nearly every application. LINE ADAPTIVE, FIELD ADAPTIVE and FRAME ADAPTIVE are alternate choices selectable in this menu. Selecting them should only be done by engineers who fully understand the nature of comb filters and the special conditions under which selecting one of these would be better than the NORMAL mode. It is recommended that the NORMAL mode be selected at all times.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select COMB submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to change the comb filter mode.
Press the BACK button to exit to the previous menu.

Sync Mode
The SYNC MODE command configures the card as either a 2-field or 4-field video synchronizer. The 2-FIELD mode will minimize any apparent lip-sync delay. The 4-FIELD mode will increase the lip-sync delay, but provide better overall performance.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select SYNC-MODE submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select either 4-FIELD or 2-FIELD mode.
Press the BACK button to exit to the previous menu.

Video Standard
This card will operate in either NTSC/525 or PAL/625 video standard. When NTSC/525 is selected, valid inputs are analog NTSC or 525 line SDI. When PAL/625 is selected, valid inputs are analog PAL or 625 line SDI. The card is not a standards converter! Outputs will always be of the same video standard as the inputs. The genlock reference must also be of the same video standard for the card to operate correctly.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select VIDEO STANDARD submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select either NTSC/525 or PAL/625.
Press TAKE/ENTER only if you wish to change standard (a screen prompt will appear).
Press the BACK button to exit to the previous menu.

Embed Audio Out (Embedding)
When paired with a DAS-441A card in the adjacent slot in the frame during installation, audio embedding from the audio card to the SDI video signal is possible. This menu setting allows the video synchronizer to accept or block the audio embedding function. Setting Embed Out to OFF stops all embedding in SDI.

OFF The audio tracks selected with the audio synchronizer card are NOT embedded.
ON The audio tracks selected with the audio synchronizer card are embedded.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select EMBED AUDIO OUT submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select either OFF or ON mode.

Press the BACK button to exit to the previous menu.

Embed Audio to DAS (De-embedding)
Embedded audio present on the SDI input may be de-embedded and routed to the AES or analog audio outputs of the DAS-441A card. If the embedded audio is present, and you wish to include it in the SDI video output, you must use this control to process one Embed Group containing the embedded audio. There are four possible embed groups in an SDI source. A group contains up to four active channels. This control provides for two groups to be de-embedded and sent to the Integrity frame midplane bus for use in one or two DAS-441A audio cards in synchronization of these audio channels. Each DAS-441A audio card can only process one group. Up to two DAS-441A audio cards can be cascaded in the frame to allow up to two total groups to be synchronized and embedded back into the SDI signal output.

Rotate the Selector Knob to select EMBED AUDIO TO DAS submenu.
Press the MENU pushbutton to select.
Select OFF, GROUP 1, GROUP 2, GROUP 3 or GROUP 4.
Press the BACK button to exit to the previous menu.

See the Audio menu tree for additional settings required for embedding.

Hot Switch
The HOT SWITCH command determines what will happen when a video signal is lost or degrades below the level required for the synchronizer to maintain a lock on the signal. Hot Switch can be turned off completely, so that the input is always passed. If Hot Switch is turned on, a choice can be set on what to do upon that loss: FREEZE on the last good frame or field; cut to BLACK; TIMEOUT to black; or KILL OUTPUTS.
TIMEOUT will first freeze the last good field, then cut to black after a two second delay. The freeze type can be frame, field one or field two.

CUT TO BLACK will switch the output immediately to an internally generated black frame.

FREEZE will freeze the last good field and hold on that field until the input video is restored, a different input is selected, or power is cycled to the card.

KILL OUTPUTS will "flat line" the output, as if the card outputs have been disconnected.

Version Info
The Version Info command allows the user to view the software release currently installed on the control panel and the current card. This is used in comparing compatibility of hardware and troubleshooting.
The display window will show the software level in the card's Microprocessor and FPGA.
Press the BACK button to exit to the previous menu.

FS-512 Video Synchronizer

Video Input

The video synchronizer card accepts both one composite analog and one SDI input. The VIDEO INPUT control should be used to select an input/output configuration from the choices below.

ANALOG - The analog video input (VID-IN BNC) will be processed and appear at both the analog and digital video outputs.

DIGITAL - The digital video input (SDI-IN BNC) will be processed and appear at both the analog and digital video outputs.

Bypass
BYPASS ON indicates that the VID OUT 1 connector on the rear of the card is currently a looping output of the VID IN analog video input connected via a relay directly to the VID OUT 1 analog output. This is useful to temporarily monitor a satellite or microwave receiver's analog output without reprocessing sync, so that the receive antenna may be steered to peak the signal. In typical operation, this analog output is routed to a monitor bridge used for this purpose. All other outputs on the card are "live" and fully processed at all times. Bypass ON is indicated by a red light on the control panel.
VID OUT 1 must always be terminated with a 75 ohm BNC terminator if it is not used.

BYPASS OFF indicates that the VID OUT 1 connector on the rear of the card is currently processed identically to the VID OUT 2 analog output. Normal operating selection is BYPASS OFF. The alarm will be turned off when Bypass is off.

If near the frame containing this card, you will hear the internal relay click when the bypass state is changed.

Rotate the Selector Knob to highlight the BYPASS submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select BYPASS ON or BYPASS OFF.
Press BACK pushbutton to exit to the previous menu.

TBC
The Time Base Corrector can be disabled by setting this control to OFF, which increases frequency response above 5 MHz by 0.25 dB. Turn the TBC mode ON if you are using helical scan VCRs without time base correction as the analog video source. The TBC is disabled whenever the SDI input is selected.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select TBC submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select either TBC ON or TBC OFF.
Press the BACK button to exit to the previous menu.

Video AGC
The VIDEO AGC command can automatically compensate for low video levels by automatically adjusting the video gain by looking at sync levels of the analog input and adjusting the overall signal level until sync is corrected to –40 IRE. This is often used for half-transponder satellite feeds or signals from degraded sources. Normal operating mode is AGC OFF.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select AGC submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select either AGC ON or AGC OFF mode.
Press the BACK button to exit to the previous menu.

Proc Presets
Video Proc Amp Controls (Gain, Black Level, Chroma Level and NTSC Hue) can be reset to their default (or unity) positions by pressing PROC PRESETS.

Test Signals
Full frame test signals can be substituted for all outputs simultaneously from the internal test signal generator.

Rotate the Selector Knob to highlight the TEST SIGNALS submenu.
Press the MENU pushbutton to select.
The display window will update to show the name of the current test signal or NONE.
If NONE is displayed, the currently selected analog or digital video INPUT should appear on all outputs.

Rotate the Selector Knob to select TEST SIGNALS.
Press the MENU pushbutton to select.
Rotate the Selector Knob to turn the currently selected pattern OFF or ON.
Rotate the F1 Knob to select a test pattern from the available library.
Press BACK pushbutton to exit to the previous menu.

Timing
See Video Timing under Section 3 – Configuration

VBI Insert
The VBI Insert menu allows a very flexible selection on a line-by-line basis. Each line may be passed from the input, passed as luminance only, blanked to eliminate the information on that line from the input, or to insert a test signal on that line. Data services, Nielsen or Arbitron ratings data, closed captioning, or time code, should all be "passed as luma" with "comb off" for best transparency. You may also choose to turn "setup off" by setting BLACK to 0.0 IRE out, or add setup to a line in the vertical blanking interval.

Rotate the Selector Knob to select VBI INSERT.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select a line and field, i.e.: Line 19 Field 1
Rotate the F1 knob to set SIGNAL to either PASS INPUT, LUMA ONLY, BLANK or a Test Pattern.
Rotate the F2 knob to set BLACK to 7.5 IRE or 0 IRE for the analog input and output levels desired.
Rotate the F3 knob to turn the Comb Filter ON or OFF.
Rotate the Selector Knob to select a different line to configure.
Press the BACK pushbutton to exit to the previous menu.

Black Level Setup
The Setup command is used to adapt the analog video input and analog video output to accept either a black level at 7.5 IRE (normal in NTSC in the United States and many other countries), or a black level at 0.0 IRE without setup (normal in PAL and in some NTSC countries). It can also be used to add or remove setup from an analog signal path.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select SETUP submenu.
Press the MENU pushbutton to select.
Rotate the F0 knob to select either 7.5 IRE IN/ 7.5 IRE OUT ; 7.5 IRE IN / 0.0 IRE OUT ; 0.0 IRE IN / 7.5 IRE OUT ; or 0.0 IRE IN / 0.0 IRE OUT.
Press the BACK button to exit to the previous menu.

Comb Mode
The Comb command is used to change from the NORMAL comb mode to one type of comb filter only. NORMAL processes in multiple dimensions and dynamically changes as needed on a pixel by pixel basis and optimizes performance on-the-fly as the picture content changes. It is the best mode for nearly every application. LINE ADAPTIVE, FIELD ADAPTIVE and FRAME ADAPTIVE are alternate choices selectable in this menu. Selecting them should only be done by engineers who fully understand the nature of comb filters and the special conditions under which selecting one of these would be better than the NORMAL mode. It is recommended that the NORMAL mode be selected at all times.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select COMB submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to change the comb filter mode.
Press the BACK button to exit to the previous menu.

Analog Output
This is used to change the analog output signal path between the analog encoder downstream of the component digital synchronizer and a secondary path through the card which bypasses the decoder, synchronizing a composite digital signal created from the composite analog input, then converting that signal back to analog via a 12-bit D-to-A converter, sending it to both VID OUT1 and VID OUT 2. This avoids the decoder/encoder completely, eliminating conversion artifacts and improving multi-generation performance. Selecting UNDECODED uses this secondary path for the analog outputs while continuing to provide a clean SDI output from the Fortel DTV decoder and SDI synchronizer. Selecting RE-ENCODED uses the primary SDI path to encode the analog outputs. If you are using an SDI input, the analog output will always be via the encoder, not the un-decoded path. If you are using the analog input, you should set this control to your preferred path through the card to the analog outputs.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select OUTPUT submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select either UN-DECODED or RE-ENCODED path.
Press the BACK button to exit to the previous menu.

Sync-Mode
The SYNC-MODE command configures the card as either a 2-field or 4-field video synchronizer. The 2-FIELD mode will minimize any apparent lip-sync delay. The 4-FIELD mode will increase the lip-sync delay, but provide better overall performance.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select SYNC-MODE submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select either 4-FIELD or 2-FIELD mode.
Press the BACK button to exit to the previous menu.

Video Standard
This card will operate in either NTSC/525 or PAL/625 video standard. When NTSC/525 is selected, valid inputs are analog NTSC or 525 line SDI. When PAL/625 is selected, valid inputs are analog PAL or 625 line SDI. The card is not a standards converter! Outputs will always be of the same video standard as the inputs. The genlock reference must also be of the same video standard for the card to operate correctly.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select VIDEO STANDARD submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select either NTSC/525 or PAL/625.
Press TAKE/ENTER only if you wish to change standard (a screen prompt will appear).
Press the BACK button to exit to the previous menu.

Embed Audio Out (Embedding)
When paired with a DAS-441A card in the adjacent slot in the frame during installation, audio embedding from the audio card to the SDI video signal is possible. This menu setting allows the video synchronizer to accept or block the audio embedding function. Setting Embed Out to OFF stops all embedding in SDI.

OFF The audio tracks selected with the audio synchronizer card are NOT embedded.
ON The audio tracks selected with the audio synchronizer card are embedded.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select EMBED AUDIO OUT submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select either OFF or ON mode.
Press the BACK button to exit to the previous menu.

Embed Audio to DAS (De-embedding)
Embedded audio present on the SDI input may be de-embedded and routed to the AES or analog audio outputs of the DAS-441A card. If the embedded audio is present, and you wish to include it in the SDI video output, you must use this control to process one Embed Group containing the embedded audio. There are four possible embed groups in an SDI source. A group contains up to four active channels. This control provides for two groups to be de-embedded and sent to the Integrity frame midplane bus for use in one or two DAS-441A audio cards in synchronization of these audio channels. Each DAS-441A audio card can only process one group. Up to two DAS-441A audio cards can be cascaded in the frame to allow up to two total groups to be synchronized and embedded back into the SDI signal output.

Rotate the Selector Knob to select EMBED AUDIO TO DAS submenu.
Press the MENU pushbutton to select.
Select OFF, GROUP 1, GROUP 2, GROUP 3 or GROUP 4.
Press the BACK button to exit to the previous menu.

See the Audio menu tree for additional settings required for embedding.

Hot Switch
The HOT SWITCH command determines what will happen when a video signal is lost or degrades below the level required for the synchronizer to maintain a lock on the signal. Hot Switch can be turned off completely, so that the input is always passed. If Hot Switch is turned on, a choice can be set on what to do upon that loss: FREEZE on the last good frame or field; cut to BLACK; TIMEOUT to black; or KILL OUTPUTS.
TIMEOUT will first freeze the last good field, then cut to black after a two second delay. The freeze type can be frame, field one or field two.

CUT TO BLACK will switch the output immediately to an internally generated black frame.

FREEZE will freeze the last good field and hold on that field until the input video is restored, a different input is selected, or power is cycled to the card.

KILL OUTPUTS will "flat line" the output, as if the card outputs have been disconnected.

Version Info
The Version Info command allows the user to view the software release currently installed on the control panel and the current card. This is used in comparing compatibility of hardware and troubleshooting.
The display window will show the software level in the card's Microprocessor and FPGA.
Press the BACK button to exit to the previous menu.

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FS-511 Video Synchronizer

Video Input

The video synchronizer card accepts both one composite analog and one SDI input. The VIDEO INPUT control should be used to select an input/output configuration from the choices below.

ANALOG - The analog video input (VID-IN BNC) will be processed and appear at both the analog and digital video outputs.

DIGITAL - The digital video input (SDI-IN BNC) will be processed and appear at both the analog and digital video outputs.

DUPLEX - The analog video input (VID-IN BNC) will be processed and appear at the digital video outputs. The digital (SDI-IN BNC) will be transcoded and appear at the analog video outputs only.

Rotate the Selector Knob to highlight the VIDEO INPUT submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select ANALOG, DIGITAL or DUPLEX as the input.
Press BACK to exit the submenu.

Bypass
BYPASS ON indicates that the VID OUT 1 connector on the rear of the card is currently a looping output of the VID IN analog video input connected via a relay directly to the VID OUT 1 analog output. This is useful to temporarily monitor a satellite or microwave receiver's analog output without reprocessing sync, so that the receive antenna may be steered to peak the signal. In typical operation, this analog output is routed to a monitor bridge used for this purpose. All other outputs on the card are "live" and fully processed at all times. Bypass ON is indicated by a red light on the control panel.
VID OUT 1 must always be terminated with a 75 ohm BNC terminator if it is not used.

BYPASS OFF indicates that the VID OUT 1 connector on the rear of the card is currently processed identically to the VID OUT 2 analog output. Normal operating selection is BYPASS OFF. The alarm will be turned off when Bypass is off.

If near the frame containing this card, you will hear the internal relay click when the bypass state is changed.

Rotate the Selector Knob to highlight the BYPASS submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select BYPASS ON or BYPASS OFF.
Press BACK pushbutton to exit to the previous menu.

TBC
The Time Base Corrector can be disabled by setting this control to OFF, which increases frequency response above 5 MHz by 0.25 dB. Turn the TBC mode ON if you are using helical scan VCRs without time base correction as the analog video source. The TBC is disabled whenever the SDI input is selected.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select TBC submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select either TBC ON or TBC OFF.
Press the BACK button to exit to the previous menu.

Video AGC
The VIDEO AGC command can automatically compensate for low video levels by automatically adjusting the video gain by looking at sync levels of the analog input and adjusting the overall signal level until sync is corrected to –40 IRE. This is often used for half-transponder satellite feeds or signals from degraded sources. Normal operating mode is AGC OFF.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select AGC submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select either AGC ON or AGC OFF mode.
Press the BACK button to exit to the previous menu.

Proc Presets
Video Proc Amp Controls (Gain, Black Level, Chroma Level and NTSC Hue) can be reset to their default (or unity) positions by pressing PROC PRESETS.

Test Signals
Full frame test signals can be substituted for all outputs simultaneously from the internal test signal generator.

Rotate the Selector Knob to highlight the TEST SIGNALS submenu.
Press the MENU pushbutton to select.
The display window will update to show the name of the current test signal or NONE.
If NONE is displayed, the currently selected analog or digital video INPUT should appear on all outputs.

Rotate the Selector Knob to select TEST SIGNALS.
Press the MENU pushbutton to select.
Rotate the Selector Knob to turn the currently selected pattern OFF or ON.
Rotate the F1 Knob to select a test pattern from the available library.
Press BACK pushbutton to exit to the previous menu.

Timing
See Video Timing under Section 3 – Configuration

VBI Insert
The VBI Insert menu allows a very flexible selection on a line-by-line basis. Each line may be passed from the input, passed as luminance only, blanked to eliminate the information on that line from the input, or to insert a test signal on that line. Data services, Nielsen or Arbitron ratings data, closed captioning, or time code, should all be "passed as luma" with "comb off" for best transparency. You may also choose to turn "setup off" by setting BLACK to 0.0 IRE out, or add setup to a line in the vertical blanking interval.

Rotate the Selector Knob to select VBI INSERT.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select a line and field, i.e.: Line 19 Field 1
Rotate the F1 knob to set SIGNAL to either PASS INPUT, LUMA ONLY, BLANK or a Test Pattern.
Rotate the F2 knob to set BLACK to 7.5 IRE or 0 IRE for the analog input and output levels desired.
Rotate the F3 knob to turn the Comb Filter ON or OFF.
Rotate the Selector Knob to select a different line to configure.
Press the BACK pushbutton to exit to the previous menu.

Black Level Setup
The Setup command is used to adapt the analog video input and analog video output to accept either a black level at 7.5 IRE (normal in NTSC in the United States and many other countries), or a black level at 0.0 IRE without setup (normal in PAL and in some NTSC countries). It can also be used to add or remove setup from an analog signal path.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select SETUP submenu.
Press the MENU pushbutton to select.
Rotate the F0 knob to select either 7.5 IRE IN/ 7.5 IRE OUT ; 7.5 IRE IN / 0.0 IRE OUT ; 0.0 IRE IN / 7.5 IRE OUT ; or 0.0 IRE IN / 0.0 IRE OUT.
Press the BACK button to exit to the previous menu.

Comb Mode
The Comb command is used to change from the NORMAL comb mode to one type of comb filter only. NORMAL processes in multiple dimensions and dynamically changes as needed on a pixel by pixel basis and optimizes performance on-the-fly as the picture content changes. It is the best mode for nearly every application. LINE ADAPTIVE, FIELD ADAPTIVE and FRAME ADAPTIVE are alternate choices selectable in this menu. Selecting them should only be done by engineers who fully understand the nature of comb filters and the special conditions under which selecting one of these would be better than the NORMAL mode. It is recommended that the NORMAL mode be selected at all times.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select COMB submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to change the comb filter mode.
Press the BACK button to exit to the previous menu.

Analog Output
This is used to change the analog output signal path between the analog encoder downstream of the component digital synchronizer and a secondary path through the card which bypasses the decoder, synchronizing a composite digital signal created from the composite analog input, then converting that signal back to analog via a 12-bit D-to-A converter, sending it to both VID OUT1 and VID OUT 2. This avoids the decoder/encoder completely, eliminating conversion artifacts and improving multi-generation performance. Selecting UNDECODED uses this secondary path for the analog outputs while continuing to provide a clean SDI output from the Fortel DTV decoder and SDI synchronizer. Selecting RE-ENCODED uses the primary SDI path to encode the analog outputs. If you are using an SDI input, the analog output will always be via the encoder, not the un-decoded path. If you are using the analog input, you should set this control to your preferred path through the card to the analog outputs.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select OUTPUT submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select either UN-DECODED or RE-ENCODED path.
Press the BACK button to exit to the previous menu.

Sync-Mode
The SYNC-MODE command configures the card as either a 2-field or 4-field video synchronizer. The 2-FIELD mode will minimize any apparent lip-sync delay. The 4-FIELD mode will increase the lip-sync delay, but provide better overall performance.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select SYNC-MODE submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select either 4-FIELD or 2-FIELD mode.
Press the BACK button to exit to the previous menu.

Video Standard
This card will operate in either NTSC/525 or PAL/625 video standard. When NTSC/525 is selected, valid inputs are analog NTSC or 525 line SDI. When PAL/625 is selected, valid inputs are analog PAL or 625 line SDI. The card is not a standards converter! Outputs will always be of the same video standard as the inputs. The genlock reference must also be of the same video standard for the card to operate correctly.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select VIDEO STANDARD submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select either NTSC/525 or PAL/625.
Press TAKE/ENTER only if you wish to change standard (a screen prompt will appear).
Press the BACK button to exit to the previous menu.

Embed Audio Out (Embedding)
When paired with a DAS-441A card in the adjacent slot in the frame during installation, audio embedding from the audio card to the SDI video signal is possible. This menu setting allows the video synchronizer to accept or block the audio embedding function. Setting Embed Out to OFF stops all embedding in SDI.

OFF The audio tracks selected with the audio synchronizer card are NOT embedded.
ON The audio tracks selected with the audio synchronizer card are embedded.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select EMBED AUDIO OUT submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select either OFF or ON mode.
Press the BACK button to exit to the previous menu.

Embed Audio to DAS (De-embedding)
Embedded audio present on the SDI input may be de-embedded and routed to the AES or analog audio outputs of the DAS-441A card. If the embedded audio is present, and you wish to include it in the SDI video output, you must use this control to process one Embed Group containing the embedded audio. There are four possible embed groups in an SDI source. A group contains up to four active channels. This control provides for two groups to be de-embedded and sent to the Integrity frame midplane bus for use in one or two DAS-441A audio cards in synchronization of these audio channels. Each DAS-441A audio card can only process one group. Up to two DAS-441A audio cards can be cascaded in the frame to allow up to two total groups to be synchronized and embedded back into the SDI signal output.

Rotate the Selector Knob to select EMBED AUDIO TO DAS submenu.
Press the MENU pushbutton to select.
Select OFF, GROUP 1, GROUP 2, GROUP 3 or GROUP 4.
Press the BACK button to exit to the previous menu.

See the Audio menu tree for additional settings required for embedding.

Hot Switch
The HOT SWITCH command determines what will happen when a video signal is lost or degrades below the level required for the synchronizer to maintain a lock on the signal. Hot Switch can be turned off completely, so that the input is always passed. If Hot Switch is turned on, a choice can be set on what to do upon that loss: FREEZE on the last good frame or field; cut to BLACK; TIMEOUT to black; or KILL OUTPUTS.
TIMEOUT will first freeze the last good field, then cut to black after a two second delay. The freeze type can be frame, field one or field two.

CUT TO BLACK will switch the output immediately to an internally generated black frame.

FREEZE will freeze the last good field and hold on that field until the input video is restored, a different input is selected, or power is cycled to the card.

KILL OUTPUTS will "flat line" the output, as if the card outputs have been disconnected.

Version Info
The Version Info command allows the user to view the software release currently installed on the control panel and the current card. This is used in comparing compatibility of hardware and troubleshooting. The display window will show the software level in the card's Microprocessor and FPGA.
Press the BACK button to exit to the previous menu.

FS-415 Video Synchronizer

Video Input

The video synchronizer card accepts both one SDI input only.

Video AGC
The VIDEO AGC command can automatically compensate for low video levels by automatically adjusting the video gain by looking at sync levels of the analog input and adjusting the overall signal level until sync is corrected to –40 IRE. This is often used for half-transponder satellite feeds or signals from degraded sources. Normal operating mode is AGC OFF.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select AGC submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select either AGC ON or AGC OFF mode.
Press the BACK button to exit to the previous menu.

Proc Presets
Video Proc Amp Controls (Gain, Black Level, Chroma Level and NTSC Hue) can be reset to their default (or unity) positions by pressing PROC PRESETS.

Test Signals
Full frame test signals can be substituted for all outputs simultaneously from the internal test signal generator.

Rotate the Selector Knob to highlight the TEST SIGNALS submenu.
Press the MENU pushbutton to select.
The display window will update to show the name of the current test signal or NONE.
If NONE is displayed, the currently selected analog or digital video INPUT should appear on all outputs.

Rotate the Selector Knob to select TEST SIGNALS.
Press the MENU pushbutton to select.
Rotate the Selector Knob to turn the currently selected pattern OFF or ON.
Rotate the F1 Knob to select a test pattern from the available library.
Press BACK pushbutton to exit to the previous menu.

Timing
See Video Timing under Section 3 – Configuration

VBI Insert
The VBI Insert menu allows a very flexible selection on a line-by-line basis. Each line may be passed from the input, passed as luminance only, blanked to eliminate the information on that line from the input, or to insert a test signal on that line. Data services, Nielsen or Arbitron ratings data, closed captioning, or time code, should all be "passed as luma" with "comb off" for best transparency. You may also choose to turn "setup off" by setting BLACK to 0.0 IRE out, or add setup to a line in the vertical blanking interval.

Rotate the Selector Knob to select VBI INSERT.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select a line and field, i.e.: Line 19 Field 1
Rotate the F1 knob to set SIGNAL to either PASS INPUT, LUMA ONLY, BLANK or a Test Pattern.
Rotate the F2 knob to set BLACK to 7.5 IRE or 0 IRE for the analog input and output levels desired.
Rotate the F3 knob to turn the Comb Filter ON or OFF.
Rotate the Selector Knob to select a different line to configure.
Press the BACK pushbutton to exit to the previous menu.

Black Level Setup
The Setup command is used to adapt the analog video input and analog video output to accept either a black level at 7.5 IRE (normal in NTSC in the United States and many other countries), or a black level at 0.0 IRE without setup (normal in PAL and in some NTSC countries). It can also be used to add or remove setup from an analog signal path.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select SETUP submenu.
Press the MENU pushbutton to select.
Rotate the F0 knob to select either 7.5 IRE IN/ 7.5 IRE OUT ; 7.5 IRE IN / 0.0 IRE OUT ; 0.0 IRE IN / 7.5 IRE OUT ; or 0.0 IRE IN / 0.0 IRE OUT.
Press the BACK button to exit to the previous menu.

Comb Mode
The Comb command is used to change from the NORMAL comb mode to one type of comb filter only. NORMAL processes in multiple dimensions and dynamically changes as needed on a pixel by pixel basis and optimizes performance on-the-fly as the picture content changes. It is the best mode for nearly every application. LINE ADAPTIVE, FIELD ADAPTIVE and FRAME ADAPTIVE are alternate choices selectable in this menu. Selecting them should only be done by engineers who fully understand the nature of comb filters and the special conditions under which selecting one of these would be better than the NORMAL mode. It is recommended that the NORMAL mode be selected at all times.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select COMB submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to change the comb filter mode.
Press the BACK button to exit to the previous menu.

Video Standard
This card will operate in either NTSC/525 or PAL/625 video standard. When NTSC/525 is selected, valid inputs are analog NTSC or 525 line SDI. When PAL/625 is selected, valid inputs are analog PAL or 625 line SDI. The card is not a standards converter! Outputs will always be of the same video standard as the inputs. The genlock reference must also be of the same video standard for the card to operate correctly.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select VIDEO STANDARD submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select either NTSC/525 or PAL/625.
Press TAKE/ENTER only if you wish to change standard (a screen prompt will appear).
Press the BACK button to exit to the previous menu.

Embed Audio Out (Embedding)
When paired with a DAS-441A card in the adjacent slot in the frame during installation, audio embedding from the audio card to the SDI video signal is possible. This menu setting allows the video synchronizer to accept or block the audio embedding function. Setting Embed Out to OFF stops all embedding in SDI.

OFF The audio tracks selected with the audio synchronizer card are NOT embedded.
ON The audio tracks selected with the audio synchronizer card are embedded.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select EMBED AUDIO OUT submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select either OFF or ON mode.
Press the BACK button to exit to the previous menu.

Embed Audio to DAS (De-embedding)
Embedded audio present on the SDI input may be de-embedded and routed to the AES or analog audio outputs of the DAS-441A card. If the embedded audio is present, and you wish to include it in the SDI video output, you must use this control to process one Embed Group containing the embedded audio. There are four possible embed groups in an SDI source. A group contains up to four active channels. This control provides for two groups to be de-embedded and sent to the Integrity frame midplane bus for use in one or two DAS-441A audio cards in synchronization of these audio channels. Each DAS-441A audio card can only process one group. Up to two DAS-441A audio cards can be cascaded in the frame to allow up to two total groups to be synchronized and embedded back into the SDI signal output.

Rotate the Selector Knob to select EMBED AUDIO TO DAS submenu.
Press the MENU pushbutton to select.
Select OFF, GROUP 1, GROUP 2, GROUP 3 or GROUP 4.
Press the BACK button to exit to the previous menu.

See the Audio menu tree for additional settings required for embedding.

Hot Switch
The HOT SWITCH command determines what will happen when a video signal is lost or degrades below the level required for the synchronizer to maintain a lock on the signal. Hot Switch can be turned off completely, so that the input is always passed. If Hot Switch is turned on, a choice can be set on what to do upon that loss: FREEZE on the last good frame or field; cut to BLACK; TIMEOUT to black; or KILL OUTPUTS.
TIMEOUT will first freeze the last good field, then cut to black after a two second delay. The freeze type can be frame, field one or field two.

CUT TO BLACK will switch the output immediately to an internally generated black frame.

FREEZE will freeze the last good field and hold on that field until the input video is restored, a different input is selected, or power is cycled to the card.

KILL OUTPUTS will "flat line" the output, as if the card outputs have been disconnected.

Version Info
The Version Info command allows the user to view the software release currently installed on the control panel and the current card. This is used in comparing compatibility of hardware and troubleshooting.
The display window will show the software level in the card's Microprocessor and FPGA.
Press the BACK button to exit to the previous menu.

FS-414A Video Synchronizer Controls

Video Input

The video synchronizer card accepts both one composite analog and one SDI input. The VIDEO INPUT control should be used to select an input/output configuration from the choices below.

ANALOG - The analog video input (VID-IN BNC) will be processed and appear at both the analog and digital video outputs.

DIGITAL - The digital video input (SDI-IN BNC) will be processed and appear at both the analog and digital video outputs.

Rotate the Selector Knob to highlight the VIDEO INPUT submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select ANALOG, or DIGITAL as the input.
Press BACK to exit the submenu.

Bypass
BYPASS ON indicates that the VID OUT 1 connector on the rear of the card is currently a looping output of the VID IN analog video input connected via a relay directly to the VID OUT 1 analog output. This is useful to temporarily monitor a satellite or microwave receiver's analog output without reprocessing sync, so that the receive antenna may be steered to peak the signal. In typical operation, this analog output is routed to a monitor bridge used for this purpose. All other outputs on the card are "live" and fully processed at all times. Bypass ON is indicated by a red light on the control panel.
VID OUT 1 must always be terminated with a 75 ohm BNC terminator if it is not used.

BYPASS OFF indicates that the VID OUT 1 connector on the rear of the card is currently processed identically to the VID OUT 2 analog output. Normal operating selection is BYPASS OFF. The alarm will be turned off when Bypass is off.

If near the frame containing this card, you will hear the internal relay click when the bypass state is changed.

Rotate the Selector Knob to highlight the BYPASS submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select BYPASS ON or BYPASS OFF.
Press BACK pushbutton to exit to the previous menu.

TBC
The Time Base Corrector can be disabled by setting this control to OFF, which increases frequency response above 5 MHz by 0.25 dB. Turn the TBC mode ON if you are using helical scan VCRs without time base correction as the analog video source. The TBC is disabled whenever the SDI input is selected.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select TBC submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select either TBC ON or TBC OFF.
Press the BACK button to exit to the previous menu.

Video AGC
The VIDEO AGC command can automatically compensate for low video levels by automatically adjusting the video gain by looking at sync levels of the analog input and adjusting the overall signal level until sync is corrected to –40 IRE. This is often used for half-transponder satellite feeds or signals from degraded sources. Normal operating mode is AGC OFF.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select AGC submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select either AGC ON or AGC OFF mode.
Press the BACK button to exit to the previous menu.

Proc Presets
Video Proc Amp Controls (Gain, Black Level, Chroma Level and NTSC Hue) can be reset to their default (or unity) positions by pressing PROC PRESETS.

Legalize
The FS-414A board includes the Perfect-Palette™ Legalizer. This video legalizer allows the operator to set separate thresholds for Luminance, Encoded Chroma, and RGB color space. If one component of the signal, such as the R-Y component, is producing an illegal value in NTSC (or PAL) color space, the Perfect Palette Legalizer adjusts the R-Y plus the B-Y and Y channels in SDI to correct the error while preventing a hue shift. A hue shift occurs in legalizers which do not adjust all three components! In addition, the user may select to legalize all lines in the VBI in the same manner as the active picture lines, or to disable the legalizer in the VBI.

Rotate the Selector Knob to highlight the LEGALIZE submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select ENCODED LIMIT.
Rotate the Selector Knob to choose OFF, TIGHT, NOMINAL or LOOSE threshold.
Rotate the Selector Knob to select LUMA LIMIT.
Rotate the Selector Knob to choose OFF, TIGHT, NOMINAL or LOOSE threshold.
Rotate the Selector Knob to select RGB LIMIT.
Rotate the Selector Knob to choose OFF, TIGHT, NOMINAL or LOOSE threshold.
Rotate the Selector Knob to select VBI LEGALIZER.
Rotate the Selector Knob to choose OFF or FOLLOWS MAIN.
Press BACK pushbutton to exit to the previous menu.

Color Correct – FS-414ACC option

The FS-414 board may include the Color Corrector (CC) option. The color corrector is used to adjust white balance, gamma balance, black balance, black stretch and total black level. This adjustment is upstream of the legalizer, so any adjustments of the color corrector will be within correct color space. This menu is only accessible if the CC option was included.

Rotate the Selector Knob to highlight the COLOR CORRECT submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to SET CC TO UNITY.
Press the TAKE/ENTER pushbutton to return all color corrector variables to unity.
Press BACK pushbutton to exit to the previous menu.

Rotate the Selector Knob to select WHITE BALANCE.
Rotate the F1 knob to adjust the R level.
Rotate the F2 Knob to adjust the G level.
Rotate the F3 Knob to adjust the B level.
Rotate the Selector Knob to adjust all three simultaneously.
Press BACK pushbutton to exit to the previous menu.

Rotate the Selector Knob to select GAMMA BALANCE.
Rotate the F1 knob to adjust the R level.
Rotate the F2 Knob to adjust the G level.
Rotate the F3 Knob to adjust the B level.
Rotate the Selector Knob to adjust all three simultaneously.
Press BACK pushbutton to exit to the previous menu.

Rotate the Selector Knob to select BLACK BALANCE.
Rotate the F1 knob to adjust the R level.
Rotate the F2 Knob to adjust the G level.
Rotate the F3 Knob to adjust the B level.
Rotate the Selector Knob to adjust all three simultaneously.
Press BACK pushbutton to exit to the previous menu.

Rotate the Selector Knob to select BLACK STRETCH.
Rotate the Selector Knob to adjust.
Press BACK pushbutton to exit to the previous menu.

Rotate the Selector Knob to select BLACK LEVEL.
Rotate the Selector Knob to adjust.
Press BACK pushbutton to exit to the previous menu.

Test Signals
Full frame test signals can be substituted for all outputs simultaneously from the internal test signal generator.

Rotate the Selector Knob to highlight the TEST SIGNALS submenu.
Press the MENU pushbutton to select.
The display window will update to show the name of the current test signal or NONE.
If NONE is displayed, the currently selected analog or digital video INPUT should appear on all outputs.

Rotate the Selector Knob to select TEST SIGNALS.
Press the MENU pushbutton to select.
Rotate the Selector Knob to turn the currently selected pattern OFF or ON.
Rotate the F1 Knob to select a test pattern from the available library.
Press BACK pushbutton to exit to the previous menu.

Timing
See Video Timing under Section 3 – Configuration

VBI Insert
The VBI Insert menu allows a very flexible selection on a line-by-line basis. Each line may be passed from the input, passed as luminance only, blanked to eliminate the information on that line from the input, or to insert a test signal on that line. Data services, Nielsen or Arbitron ratings data, closed captioning, or time code, should all be "passed as luma" with "comb off" for best transparency. You may also choose to turn "setup off" by setting BLACK to 0.0 IRE out, or add setup to a line in the vertical blanking interval.

Rotate the Selector Knob to select VBI INSERT.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select a line and field, i.e.: Line 19 Field 1
Rotate the F1 knob to set SIGNAL to either PASS INPUT, LUMA ONLY, BLANK or a Test Pattern.
Rotate the F2 knob to set BLACK to 7.5 IRE or 0 IRE for the analog input and output levels desired.
Rotate the F3 knob to turn the Comb Filter ON or OFF.
Rotate the Selector Knob to select a different line to configure.
Press the BACK pushbutton to exit to the previous menu.

Black Level Setup
The Setup command is used to adapt the analog video input and analog video output to accept either a black level at 7.5 IRE (normal in NTSC in the United States and many other countries), or a black level at 0.0 IRE without setup (normal in PAL and in some NTSC countries). It can also be used to add or remove setup from an analog signal path.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select SETUP submenu.
Press the MENU pushbutton to select.
Rotate the F0 knob to select either 7.5 IRE IN/ 7.5 IRE OUT ; 7.5 IRE IN / 0.0 IRE OUT ; 0.0 IRE IN / 7.5 IRE OUT ; or 0.0 IRE IN / 0.0 IRE OUT.
Press the BACK button to exit to the previous menu.

Comb Mode
The Comb command is used to change from the NORMAL comb mode to one type of comb filter only. NORMAL processes in multiple dimensions and dynamically changes as needed on a pixel by pixel basis and optimizes performance on-the-fly as the picture content changes. It is the best mode for nearly every application. LINE ADAPTIVE, FIELD ADAPTIVE and FRAME ADAPTIVE are alternate choices selectable in this menu. Selecting them should only be done by engineers who fully understand the nature of comb filters and the special conditions under which selecting one of these would be better than the NORMAL mode. It is recommended that the NORMAL mode be selected at all times.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select COMB submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to change the comb filter mode.
Press the BACK button to exit to the previous menu.

Analog Output
This is used to change the analog output signal path between the analog encoder downstream of the component digital synchronizer and a secondary path through the card which bypasses the decoder, synchronizing a composite digital signal created from the composite analog input, then converting that signal back to analog via a 12-bit D-to-A converter, sending it to both VID OUT1 and VID OUT 2. This avoids the decoder/encoder completely, eliminating conversion artifacts and improving multi-generation performance. Selecting UNDECODED uses this secondary path for the analog outputs while continuing to provide a clean SDI output from the Fortel DTV decoder and SDI synchronizer. Selecting RE-ENCODED uses the primary SDI path to encode the analog outputs. If you are using an SDI input, the analog output will always be via the encoder, not the un-decoded path. If you are using the analog input, you should set this control to your preferred path through the card to the analog outputs.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select OUTPUT submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select either UN-DECODED or RE-ENCODED path.
Press the BACK button to exit to the previous menu.

Sync-Mode
The SYNC-MODE command configures the card as either a 2-field or 4-field video synchronizer. The 2-FIELD mode will minimize any apparent lip-sync delay. The 4-FIELD mode will increase the lip-sync delay, but provide better overall performance.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select SYNC-MODE submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select either 4-FIELD or 2-FIELD mode.
Press the BACK button to exit to the previous menu.

Video Standard
This card will operate in either NTSC/525 or PAL/625 video standard. When NTSC/525 is selected, valid inputs are analog NTSC or 525 line SDI. When PAL/625 is selected, valid inputs are analog PAL or 625 line SDI. The card is not a standards converter! Outputs will always be of the same video standard as the inputs. The genlock reference must also be of the same video standard for the card to operate correctly.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select VIDEO STANDARD submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select either NTSC/525 or PAL/625.
Press TAKE/ENTER only if you wish to change standard (a screen prompt will appear).
Press the BACK button to exit to the previous menu.

Embed Audio Out (Embedding)
When paired with a DAS-441A card in the adjacent slot in the frame during installation, audio embedding from the audio card to the SDI video signal is possible. This menu setting allows the video synchronizer to accept or block the audio embedding function. Setting Embed Out to OFF stops all embedding in SDI.

OFF The audio tracks selected with the audio synchronizer card are NOT embedded.
ON The audio tracks selected with the audio synchronizer card are embedded.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select EMBED AUDIO OUT submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select either OFF or ON mode.
Press the BACK button to exit to the previous menu.

Embed Audio to DAS (De-embedding)
Embedded audio present on the SDI input may be de-embedded and routed to the AES or analog audio outputs of the DAS-441A card. If the embedded audio is present, and you wish to include it in the SDI video output, you must use this control to process one Embed Group containing the embedded audio. There are four possible embed groups in an SDI source. A group contains up to four active channels. This control provides for two groups to be de-embedded and sent to the Integrity frame midplane bus for use in one or two DAS-441A audio cards in synchronization of these audio channels. Each DAS-441A audio card can only process one group. Up to two DAS-441A audio cards can be cascaded in the frame to allow up to two total groups to be synchronized and embedded back into the SDI signal output.

Rotate the Selector Knob to select EMBED AUDIO TO DAS submenu.
Press the MENU pushbutton to select.
Select OFF, GROUP 1, GROUP 2, GROUP 3 or GROUP 4.
Press the BACK button to exit to the previous menu.

See the Audio menu tree for additional settings required for embedding.

Hot Switch
The HOT SWITCH command determines what will happen when a video signal is lost or degrades below the level required for the synchronizer to maintain a lock on the signal. Hot Switch can be turned off completely, so that the input is always passed. If Hot Switch is turned on, a choice can be set on what to do upon that loss: FREEZE on the last good frame or field; cut to BLACK; TIMEOUT to black; or KILL OUTPUTS.
TIMEOUT will first freeze the last good field, then cut to black after a two second delay. The freeze type can be frame, field one or field two.

CUT TO BLACK will switch the output immediately to an internally generated black frame.

FREEZE will freeze the last good field and hold on that field until the input video is restored, a different input is selected, or power is cycled to the card.

KILL OUTPUTS will "flat line" the output, as if the card outputs have been disconnected.

Version Info
The Version Info command allows the user to view the software release currently installed on the control panel and the current card. This is used in comparing compatibility of hardware and troubleshooting.
The display window will show the software level in the card's Microprocessor and FPGA.
Press the BACK button to exit to the previous menu.

FS-412A Video Synchronizer

Video Input

The video synchronizer card accepts both one composite analog and one SDI input. The VIDEO INPUT control should be used to select an input/output configuration from the choices below.

ANALOG - The analog video input (VID-IN BNC) will be processed and appear at both the analog and digital video outputs.

DIGITAL - The digital video input (SDI-IN BNC) will be processed and appear at both the analog and digital video outputs.

Bypass
BYPASS ON indicates that the VID OUT 1 connector on the rear of the card is currently a looping output of the VID IN analog video input connected via a relay directly to the VID OUT 1 analog output. This is useful to temporarily monitor a satellite or microwave receiver's analog output without reprocessing sync, so that the receive antenna may be steered to peak the signal. In typical operation, this analog output is routed to a monitor bridge used for this purpose. All other outputs on the card are "live" and fully processed at all times. Bypass ON is indicated by a red light on the control panel.
VID OUT 1 must always be terminated with a 75 ohm BNC terminator if it is not used.

BYPASS OFF indicates that the VID OUT 1 connector on the rear of the card is currently processed identically to the VID OUT 2 analog output. Normal operating selection is BYPASS OFF. The alarm will be turned off when Bypass is off.

If near the frame containing this card, you will hear the internal relay click when the bypass state is changed.

Rotate the Selector Knob to highlight the BYPASS submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select BYPASS ON or BYPASS OFF.
Press BACK pushbutton to exit to the previous menu.

TBC
The Time Base Corrector can be disabled by setting this control to OFF, which increases frequency response above 5 MHz by 0.25 dB. Turn the TBC mode ON if you are using helical scan VCRs without time base correction as the analog video source. The TBC is disabled whenever the SDI input is selected.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select TBC submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select either TBC ON or TBC OFF.
Press the BACK button to exit to the previous menu.

Video AGC
The VIDEO AGC command can automatically compensate for low video levels by automatically adjusting the video gain by looking at sync levels of the analog input and adjusting the overall signal level until sync is corrected to –40 IRE. This is often used for half-transponder satellite feeds or signals from degraded sources. Normal operating mode is AGC OFF.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select AGC submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select either AGC ON or AGC OFF mode.
Press the BACK button to exit to the previous menu.

Proc Presets
Video Proc Amp Controls (Gain, Black Level, Chroma Level and NTSC Hue) can be reset to their default (or unity) positions by pressing PROC PRESETS.

Test Signals
Full frame test signals can be substituted for all outputs simultaneously from the internal test signal generator.

Rotate the Selector Knob to highlight the TEST SIGNALS submenu.
Press the MENU pushbutton to select.
The display window will update to show the name of the current test signal or NONE.
If NONE is displayed, the currently selected analog or digital video INPUT should appear on all outputs.

Rotate the Selector Knob to select TEST SIGNALS.
Press the MENU pushbutton to select.
Rotate the Selector Knob to turn the currently selected pattern OFF or ON.
Rotate the F1 Knob to select a test pattern from the available library.
Press BACK pushbutton to exit to the previous menu.

Timing
See Video Timing under Section 3 – Configuration

VBI Insert
The VBI Insert menu allows a very flexible selection on a line-by-line basis. Each line may be passed from the input, passed as luminance only, blanked to eliminate the information on that line from the input, or to insert a test signal on that line. Data services, Nielsen or Arbitron ratings data, closed captioning, or time code, should all be "passed as luma" with "comb off" for best transparency. You may also choose to turn "setup off" by setting BLACK to 0.0 IRE out, or add setup to a line in the vertical blanking interval.

Rotate the Selector Knob to select VBI INSERT.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select a line and field, i.e.: Line 19 Field 1
Rotate the F1 knob to set SIGNAL to either PASS INPUT, LUMA ONLY, BLANK or a Test Pattern.
Rotate the F2 knob to set BLACK to 7.5 IRE or 0 IRE for the analog input and output levels desired.
Rotate the F3 knob to turn the Comb Filter ON or OFF.
Rotate the Selector Knob to select a different line to configure.
Press the BACK pushbutton to exit to the previous menu.

Black Level Setup
The Setup command is used to adapt the analog video input and analog video output to accept either a black level at 7.5 IRE (normal in NTSC in the United States and many other countries), or a black level at 0.0 IRE without setup (normal in PAL and in some NTSC countries). It can also be used to add or remove setup from an analog signal path.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select SETUP submenu.
Press the MENU pushbutton to select.
Rotate the F0 knob to select either 7.5 IRE IN/ 7.5 IRE OUT ; 7.5 IRE IN / 0.0 IRE OUT ; 0.0 IRE IN / 7.5 IRE OUT ; or 0.0 IRE IN / 0.0 IRE OUT.
Press the BACK button to exit to the previous menu.

Comb Mode
The Comb command is used to change from the NORMAL comb mode to one type of comb filter only. NORMAL processes in multiple dimensions and dynamically changes as needed on a pixel by pixel basis and optimizes performance on-the-fly as the picture content changes. It is the best mode for nearly every application. LINE ADAPTIVE, FIELD ADAPTIVE and FRAME ADAPTIVE are alternate choices selectable in this menu. Selecting them should only be done by engineers who fully understand the nature of comb filters and the special conditions under which selecting one of these would be better than the NORMAL mode. It is recommended that the NORMAL mode be selected at all times.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select COMB submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to change the comb filter mode.
Press the BACK button to exit to the previous menu.

Analog Output
This is used to change the analog output signal path between the analog encoder downstream of the component digital synchronizer and a secondary path through the card which bypasses the decoder, synchronizing a composite digital signal created from the composite analog input, then converting that signal back to analog via a 12-bit D-to-A converter, sending it to both VID OUT1 and VID OUT 2. This avoids the decoder/encoder completely, eliminating conversion artifacts and improving multi-generation performance. Selecting UNDECODED uses this secondary path for the analog outputs while continuing to provide a clean SDI output from the Fortel DTV decoder and SDI synchronizer. Selecting RE-ENCODED uses the primary SDI path to encode the analog outputs. If you are using an SDI input, the analog output will always be via the encoder, not the un-decoded path. If you are using the analog input, you should set this control to your preferred path through the card to the analog outputs.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select OUTPUT submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select either UN-DECODED or RE-ENCODED path.
Press the BACK button to exit to the previous menu.

Sync-Mode
The SYNC-MODE command configures the card as either a 2-field or 4-field video synchronizer. The 2-FIELD mode will minimize any apparent lip-sync delay. The 4-FIELD mode will increase the lip-sync delay, but provide better overall performance.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select SYNC-MODE submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select either 4-FIELD or 2-FIELD mode.
Press the BACK button to exit to the previous menu.

Video Standard
This card will operate in either NTSC/525 or PAL/625 video standard. When NTSC/525 is selected, valid inputs are analog NTSC or 525 line SDI. When PAL/625 is selected, valid inputs are analog PAL or 625 line SDI. The card is not a standards converter! Outputs will always be of the same video standard as the inputs. The genlock reference must also be of the same video standard for the card to operate correctly.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select VIDEO STANDARD submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select either NTSC/525 or PAL/625.
Press TAKE/ENTER only if you wish to change standard (a screen prompt will appear).
Press the BACK button to exit to the previous menu.

Embed Audio Out (Embedding)
When paired with a DAS-441A card in the adjacent slot in the frame during installation, audio embedding from the audio card to the SDI video signal is possible. This menu setting allows the video synchronizer to accept or block the audio embedding function. Setting Embed Out to OFF stops all embedding in SDI.

OFF The audio tracks selected with the audio synchronizer card are NOT embedded.
ON The audio tracks selected with the audio synchronizer card are embedded.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select EMBED AUDIO OUT submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select either OFF or ON mode.
Press the BACK button to exit to the previous menu.

Embed Audio to DAS (De-embedding)
Embedded audio present on the SDI input may be de-embedded and routed to the AES or analog audio outputs of the DAS-441A card. If the embedded audio is present, and you wish to include it in the SDI video output, you must use this control to process one Embed Group containing the embedded audio. There are four possible embed groups in an SDI source. A group contains up to four active channels. This control provides for two groups to be de-embedded and sent to the Integrity frame midplane bus for use in one or two DAS-441A audio cards in synchronization of these audio channels. Each DAS-441A audio card can only process one group. Up to two DAS-441A audio cards can be cascaded in the frame to allow up to two total groups to be synchronized and embedded back into the SDI signal output.

Rotate the Selector Knob to select EMBED AUDIO TO DAS submenu.
Press the MENU pushbutton to select.
Select OFF, GROUP 1, GROUP 2, GROUP 3 or GROUP 4.
Press the BACK button to exit to the previous menu.

See the Audio menu tree for additional settings required for embedding.

Hot Switch
The HOT SWITCH command determines what will happen when a video signal is lost or degrades below the level required for the synchronizer to maintain a lock on the signal. Hot Switch can be turned off completely, so that the input is always passed. If Hot Switch is turned on, a choice can be set on what to do upon that loss: FREEZE on the last good frame or field; cut to BLACK; TIMEOUT to black; or KILL OUTPUTS.
TIMEOUT will first freeze the last good field, then cut to black after a two second delay. The freeze type can be frame, field one or field two.

CUT TO BLACK will switch the output immediately to an internally generated black frame.

FREEZE will freeze the last good field and hold on that field until the input video is restored, a different input is selected, or power is cycled to the card.

KILL OUTPUTS will "flat line" the output, as if the card outputs have been disconnected.

Version Info
The Version Info command allows the user to view the software release currently installed on the control panel and the current card. This is used in comparing compatibility of hardware and troubleshooting. The display window will show the software level in the card's Microprocessor and FPGA.
Press the BACK button to exit to the previous menu.

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FS-411A Video Synchronizer

Video Input

The video synchronizer card accepts both one composite analog and one SDI input. The VIDEO INPUT control should be used to select an input/output configuration from the choices below.

ANALOG - The analog video input (VID-IN BNC) will be processed and appear at both the analog and digital video outputs.

DIGITAL - The digital video input (SDI-IN BNC) will be processed and appear at both the analog and digital video outputs.

DUPLEX - The analog video input (VID-IN BNC) will be processed and appear at the digital video outputs. The digital (SDI-IN BNC) will be transcoded and appear at the analog video outputs only.

Rotate the Selector Knob to highlight the VIDEO INPUT submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select ANALOG, DIGITAL or DUPLEX as the input.
Press BACK to exit the submenu.

Bypass
BYPASS ON indicates that the VID OUT 1 connector on the rear of the card is currently a looping output of the VID IN analog video input connected via a relay directly to the VID OUT 1 analog output. This is useful to temporarily monitor a satellite or microwave receiver's analog output without reprocessing sync, so that the receive antenna may be steered to peak the signal. In typical operation, this analog output is routed to a monitor bridge used for this purpose. All other outputs on the card are "live" and fully processed at all times. Bypass ON is indicated by a red light on the control panel.
VID OUT 1 must always be terminated with a 75 ohm BNC terminator if it is not used.

BYPASS OFF indicates that the VID OUT 1 connector on the rear of the card is currently processed identically to the VID OUT 2 analog output. Normal operating selection is BYPASS OFF. The alarm will be turned off when Bypass is off.

If near the frame containing this card, you will hear the internal relay click when the bypass state is changed.

Rotate the Selector Knob to highlight the BYPASS submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select BYPASS ON or BYPASS OFF.
Press BACK pushbutton to exit to the previous menu.

TBC
The Time Base Corrector can be disabled by setting this control to OFF, which increases frequency response above 5 MHz by 0.25 dB. Turn the TBC mode ON if you are using helical scan VCRs without time base correction as the analog video source. The TBC is disabled whenever the SDI input is selected.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select TBC submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select either TBC ON or TBC OFF.
Press the BACK button to exit to the previous menu.

Video AGC
The VIDEO AGC command can automatically compensate for low video levels by automatically adjusting the video gain by looking at sync levels of the analog input and adjusting the overall signal level until sync is corrected to –40 IRE. This is often used for half-transponder satellite feeds or signals from degraded sources. Normal operating mode is AGC OFF.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select AGC submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select either AGC ON or AGC OFF mode.
Press the BACK button to exit to the previous menu.

Proc Presets
Video Proc Amp Controls (Gain, Black Level, Chroma Level and NTSC Hue) can be reset to their default (or unity) positions by pressing PROC PRESETS.

Test Signals
Full frame test signals can be substituted for all outputs simultaneously from the internal test signal generator.

Rotate the Selector Knob to highlight the TEST SIGNALS submenu.
Press the MENU pushbutton to select.
The display window will update to show the name of the current test signal or NONE.
If NONE is displayed, the currently selected analog or digital video INPUT should appear on all outputs.

Rotate the Selector Knob to select TEST SIGNALS.
Press the MENU pushbutton to select.
Rotate the Selector Knob to turn the currently selected pattern OFF or ON.
Rotate the F1 Knob to select a test pattern from the available library.
Press BACK pushbutton to exit to the previous menu.

Timing
See Video Timing under Section 3 – Configuration

VBI Insert
The VBI Insert menu allows a very flexible selection on a line-by-line basis. Each line may be passed from the input, passed as luminance only, blanked to eliminate the information on that line from the input, or to insert a test signal on that line. Data services, Nielsen or Arbitron ratings data, closed captioning, or time code, should all be "passed as luma" with "comb off" for best transparency. You may also choose to turn "setup off" by setting BLACK to 0.0 IRE out, or add setup to a line in the vertical blanking interval.

Rotate the Selector Knob to select VBI INSERT.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select a line and field, i.e.: Line 19 Field 1
Rotate the F1 knob to set SIGNAL to either PASS INPUT, LUMA ONLY, BLANK or a Test Pattern.
Rotate the F2 knob to set BLACK to 7.5 IRE or 0 IRE for the analog input and output levels desired.
Rotate the F3 knob to turn the Comb Filter ON or OFF.
Rotate the Selector Knob to select a different line to configure.
Press the BACK pushbutton to exit to the previous menu.

Black Level Setup
The Setup command is used to adapt the analog video input and analog video output to accept either a black level at 7.5 IRE (normal in NTSC in the United States and many other countries), or a black level at 0.0 IRE without setup (normal in PAL and in some NTSC countries). It can also be used to add or remove setup from an analog signal path.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select SETUP submenu.
Press the MENU pushbutton to select.
Rotate the F0 knob to select either 7.5 IRE IN/ 7.5 IRE OUT ; 7.5 IRE IN / 0.0 IRE OUT ; 0.0 IRE IN / 7.5 IRE OUT ; or 0.0 IRE IN / 0.0 IRE OUT.
Press the BACK button to exit to the previous menu.

Comb Mode
The Comb command is used to change from the NORMAL comb mode to one type of comb filter only. NORMAL processes in multiple dimensions and dynamically changes as needed on a pixel by pixel basis and optimizes performance on-the-fly as the picture content changes. It is the best mode for nearly every application. LINE ADAPTIVE, FIELD ADAPTIVE and FRAME ADAPTIVE are alternate choices selectable in this menu. Selecting them should only be done by engineers who fully understand the nature of comb filters and the special conditions under which selecting one of these would be better than the NORMAL mode. It is recommended that the NORMAL mode be selected at all times.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select COMB submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to change the comb filter mode.
Press the BACK button to exit to the previous menu.

Analog Output
This is used to change the analog output signal path between the analog encoder downstream of the component digital synchronizer and a secondary path through the card which bypasses the decoder, synchronizing a composite digital signal created from the composite analog input, then converting that signal back to analog via a 12-bit D-to-A converter, sending it to both VID OUT1 and VID OUT 2. This avoids the decoder/encoder completely, eliminating conversion artifacts and improving multi-generation performance. Selecting UNDECODED uses this secondary path for the analog outputs while continuing to provide a clean SDI output from the Fortel DTV decoder and SDI synchronizer. Selecting RE-ENCODED uses the primary SDI path to encode the analog outputs. If you are using an SDI input, the analog output will always be via the encoder, not the un-decoded path. If you are using the analog input, you should set this control to your preferred path through the card to the analog outputs.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select OUTPUT submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select either UN-DECODED or RE-ENCODED path.
Press the BACK button to exit to the previous menu.

Sync-Mode
The SYNC-MODE command configures the card as either a 2-field or 4-field video synchronizer. The 2-FIELD mode will minimize any apparent lip-sync delay. The 4-FIELD mode will increase the lip-sync delay, but provide better overall performance.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select SYNC-MODE submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select either 4-FIELD or 2-FIELD mode.
Press the BACK button to exit to the previous menu.

Video Standard
This card will operate in either NTSC/525 or PAL/625 video standard. When NTSC/525 is selected, valid inputs are analog NTSC or 525 line SDI. When PAL/625 is selected, valid inputs are analog PAL or 625 line SDI. The card is not a standards converter! Outputs will always be of the same video standard as the inputs. The genlock reference must also be of the same video standard for the card to operate correctly.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select VIDEO STANDARD submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select either NTSC/525 or PAL/625.
Press TAKE/ENTER only if you wish to change standard (a screen prompt will appear).
Press the BACK button to exit to the previous menu.

Embed Audio Out (Embedding)
When paired with a DAS-441A card in the adjacent slot in the frame during installation, audio embedding from the audio card to the SDI video signal is possible. This menu setting allows the video synchronizer to accept or block the audio embedding function. Setting Embed Out to OFF stops all embedding in SDI.

OFF The audio tracks selected with the audio synchronizer card are NOT embedded.
ON The audio tracks selected with the audio synchronizer card are embedded.

Rotate the Selector Knob to select MODE.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select EMBED AUDIO OUT submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select either OFF or ON mode.
Press the BACK button to exit to the previous menu.

Embed Audio to DAS (De-embedding)
Embedded audio present on the SDI input may be de-embedded and routed to the AES or analog audio outputs of the DAS-441A card. If the embedded audio is present, and you wish to include it in the SDI video output, you must use this control to process one Embed Group containing the embedded audio. There are four possible embed groups in an SDI source. A group contains up to four active channels. This control provides for two groups to be de-embedded and sent to the Integrity frame midplane bus for use in one or two DAS-441A audio cards in synchronization of these audio channels. Each DAS-441A audio card can only process one group. Up to two DAS-441A audio cards can be cascaded in the frame to allow up to two total groups to be synchronized and embedded back into the SDI signal output.

Rotate the Selector Knob to select EMBED AUDIO TO DAS submenu.
Press the MENU pushbutton to select.
Select OFF, GROUP 1, GROUP 2, GROUP 3 or GROUP 4.
Press the BACK button to exit to the previous menu.

See the Audio menu tree for additional settings required for embedding.

Hot Switch
The HOT SWITCH command determines what will happen when a video signal is lost or degrades below the level required for the synchronizer to maintain a lock on the signal. Hot Switch can be turned off completely, so that the input is always passed. If Hot Switch is turned on, a choice can be set on what to do upon that loss: FREEZE on the last good frame or field; cut to BLACK; TIMEOUT to black; or KILL OUTPUTS.
TIMEOUT will first freeze the last good field, then cut to black after a two second delay. The freeze type can be frame, field one or field two.

CUT TO BLACK will switch the output immediately to an internally generated black frame.

FREEZE will freeze the last good field and hold on that field until the input video is restored, a different input is selected, or power is cycled to the card.

KILL OUTPUTS will "flat line" the output, as if the card outputs have been disconnected.

Version Info
The Version Info command allows the user to view the software release currently installed on the control panel and the current card. This is used in comparing compatibility of hardware and troubleshooting.
The display window will show the software level in the card's Microprocessor and FPGA.
Press the BACK button to exit to the previous menu.

DEC-510 NTSC Decoder

The DEC-510 is a decoder, not a synchronizer, for use in transcoding composite NTSC sources to SDI in applications where synchronization is either unnecessary or performed elsewhere in the signal path.

Video Input

The decoder card accepts one composite analog input.

Proc Presets
Video Proc Amp Controls (Gain, Black Level, Chroma Level and NTSC Hue) can be reset to their default (or unity) positions by pressing PROC PRESETS.

Timing
An H DELAY control is provided increase the throughput delay of the card by up to 1023 clocks as an aid to timing to a digital production switcher.

VBI Config
The VBI CONFIG menu can eb set to blank or pass the contents of the Vertical blanking interval on a line-by-line basis. Each line may be passed from the input, passed as luminance only, or blanked to eliminate the information on that line at the output. Data services, Nielsen or Arbitron ratings data, closed captioning, or time code, should all be "passed as luma" with "comb off" for best transparency.

Comb Mode
The Comb command is used to change from the NORMAL comb mode to one type of comb filter only. NORMAL processes in multiple dimensions and dynamically changes as needed on a pixel by pixel basis and optimizes performance on-the-fly as the picture content changes. It is the best mode for nearly every application. LINE ADAPTIVE, FIELD ADAPTIVE and FRAME ADAPTIVE are alternate choices selectable in this menu. Selecting them should only be done by engineers who fully understand the nature of comb filters and the special conditions under which selecting one of these would be better than the NORMAL mode. It is recommended that the NORMAL mode be selected at all times.

Navigate to the COMB MODE.
Set the mode to NORMAL (Full Adaptive), Line Comb or Frame Comb.
Press the BACK button to exit to the previous menu.

Video Standard
This card will operate in either NTSC/525 or PAL/625 video standard. When NTSC/525 is selected, valid inputs are analog NTSC or 525 line SDI. When PAL/625 is selected, valid inputs are analog PAL or 625 line SDI. The card is not a standards converter! Outputs will always be of the same video standard as the inputs. The genlock reference must also be of the same video standard for the card to operate correctly.

Navigate to VIDEO STANDARD menu.
Select either NTSC/525 or PAL/625.
Press TAKE/ENTER only if you wish to change standard (a screen prompt will appear).
Press the BACK button to exit to the previous menu.

Version Info
The Version Info command allows the user to view the software release currently installed on the control panel and the current card. This is used in comparing compatibility of hardware and troubleshooting. The display window will show the software level in the card's Microprocessor and FPGA.
Press the BACK button to exit to the previous menu.

ADC-531 YUV/RGB to SDI Converter

The Integrity System ADC-531 YUV/RGB to SDI Converter is a modular card for Integrity system frames. It converts one component analog video source to serial digital video and then produces four identical SDI outputs conforming to SMPTE 259M Part C standards for 270 Mb 4:2:2 component serial digital video. The CAV input may be any one of several formats: RGB (with sync on green channel), RGBS (with separate sync), YUV Beta, YUV M-II, EBU-1 or EBU-2. This election is performed in a software user menu accessible via the RCI-300 Setup Tool for PC, or from any RCP series control panel during operation.

INSTALLATION

Install the card in any FRM-301, FRM-304, FRM-501 or FRM-504 system frame. The card may be hot-plugged.

CONNECTIONS

Connect video cables as described.

For RGB sources:

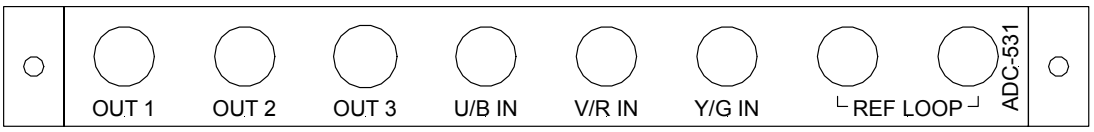
Y/G IN GREEN channel, with sync on green
U/B IN BLUE channel
V/R IN RED channel

For RGBS sources:

Y/G IN GREEN channel
U/B IN BLUE channel
V/R IN RED channel
SYNC SYNC channel (Composite Sync or black Reference)

For YUV sources: (Y Cr Cb or Y R-Y B-Y)

Y/G IN Y channel luminance
U/B IN **U,** B-Y or Cb channel
V/R IN **V,** R-Y or Cr channel



Rear Connector View

MENU FUNCTIONS

The ADC-531 controls described below are menu-driven. The menu layout and order may change on different model control panels. The functional descriptions below apply to all control panels.

Input Format
Set the INPUT FORMAT control to match the type of the analog video source signal.

Input Format
- **RGB**
- **RGBS**
- **YUV EBU 1**
- **YUV EBU 2**
- **YUV BETA**
- **YUV M-II**

Component Proc
Selecting Component Proc presents the video "Proc Amp" controls as YUV (or RGB) channel gains. This provides direct management of each input channel gain. In addition, a digital HUE control is presented, allowing the user to rotate the composite hue, even though you are still operating in 4:2:2 component color space. This function provides the means to correct a composite hue error present in the original VTR recording when played back on a component analog VTR output.

COMPONENT PROC
- **Y/G GAIN**
- **U/B GAIN**
- **V/R GAIN**
- **HUE**

Standard Proc
Selecting Standard Proc presents the video "Proc Amp" controls as Video Gain, Black Level, Chroma Level and Hue instead of YUV (or RGB) channel gains. This is easier for some users to operate, with more predictable results, when looking at a waveform monitor and vectorscope downstream of the outputs.

STANDARD PROC
- **GAIN**
- **BLAC**
- **CHROMA**
- **HUE**

Restore Presets
Select RESTORE PRESETS to snap all video proc amp controls back to their default (unity gain) settings.

RESTORE PRESETS

Configure
Select CONFIGURE to access advanced user menus.

CONFIGURE

Timing

Select TIMING submenu to adjust the Horizontal and Vertical video position controls.
Note: the AC-531 is NOT a synchronizer. The source must be genlocked to house reference and H and V timing adjusted at the source.

TIMING
H VIDEO POS
V VIDEO POS

A/V Button
Select A/V BUTTON to set a relationship between this card and an audio card in an adjacent slot in the frame. This setting configures the AUDIO button on RCP-503, RCP-502 and RCP-303 control panels to navigate to the selected audio board. This is used to create a "logical pair" when audio is associated with this video card.

A/V BUTTON
Audio Slot 1-18

Name Card
Select NAME CARD to set an "alias name" for this card, such as "VTR 5". Names may be up to eight characters in length, and characters may include A-Z, a-z, 0-9, space, and hyphen.

NAME CARD

Card Info

Select CARD INFO to view the model name and software version installed in the card. Please review this information when calling the factory for support or adding updates to control panels.

CARD INFO
VERSION

5. Maintenance

Card Removal and Replacement

(FS-414A, FS-412A, FS-411A, FS-412, FS-411, DAS-441A, DAS-441, DEC-312S, DEC-322, ENC-301, ADC-331)
The modules in the frame can be removed for maintenance, even while powered. Facing the rear of the FRM301 or FRM304 frame, disconnect all signal cables from the card to be removed. Unscrew the two retaining screws which secure the card in the frame. Gently pull the card rearward until it clears the internal mating connector, then continue to slide the card out until it clears the frame. To replace, align the card with the two guide rails inside each slot and slide the card in until it contacts the mating connector body at the rear of the slot. Press firmly to seat the card and secure it using the two captive screws.

The FRM-304 frame includes a front-mounted CPU card, the CB-486. This card interprets commands received via the REMOTE 1, REMOTE 2, GPI BANK A or GPI BANK B connectors, then sends commands via the frame midplane to the cards in slots 1-18 using USB protocol.

Warning - removing this card in the FRM-304 frame will disconnect all external control from the cards in slots 1-18. The cards will continue to function in their current state, but no changes may be made to that state until a CB-486 card is replaced.

To remove the CB-486, first remove the front cover from the frame using the two chrome handles attached to the cover. Pull the handles with equal pressure. The cover pops off. Behind this cover is a three section compartment. On the left is the fan drawer. In the center is an inner cover which is removed using a Philips screwdriver. This section contains the CB-486 CPU card. On the right are two power supplies. The right side card ejector is secured by the factory with a tie wrap before shipment.

Warning - This tie wrap must be permanently removed prior to attempting to eject the card!

The CB-486 is replaced by first removing the center compartment cover and then releasing the CB-486 card using the two card ejectors. When replacing the CB-486, be sure that the card is placed in the lower pair of card guides. If this is a mobile application or if trans-shipping the frame, secure the right side card ejector using a small tie-wrap through the adjacent hole in the PCB provided for this purpose. See Fig. 5-1 on following page for correct replacement of CB-486 in the frame.

Warning – Removing the center compartment cover will result in a loss of cooling air to all cards. Extended operation in this state will cause overheating and board failure.

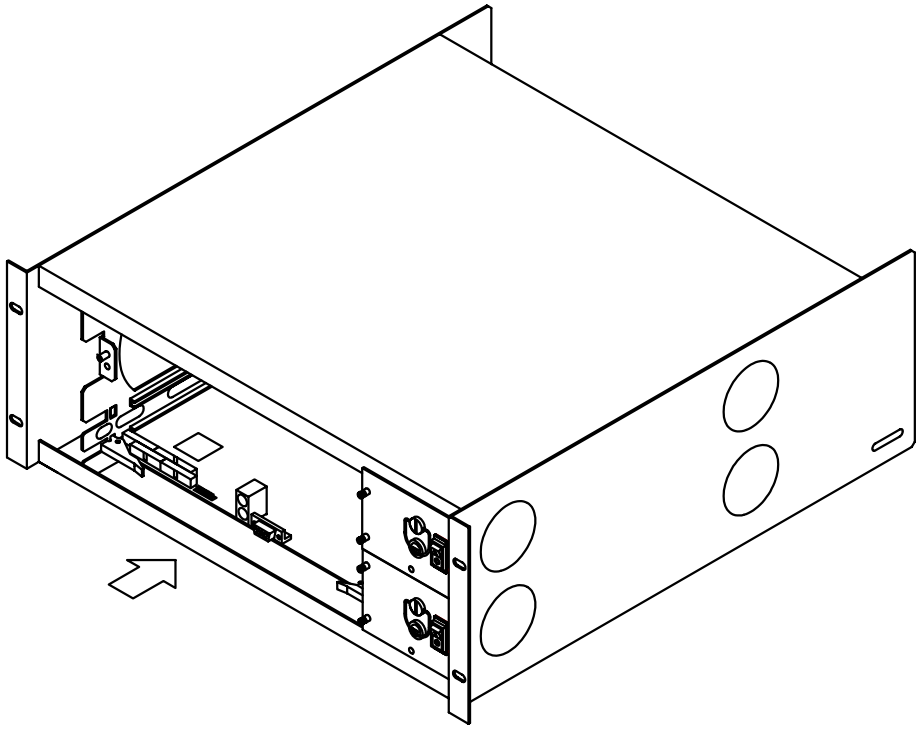


Figure 5-1 FRM-304 INTEGRITY SYSTEM FRAME ZFCB

Fan Removal and Replacement

The FRM-304 frame has a removable fan assembly which includes a dust filter. The filter reduces the infiltration of particulates into the main chassis. Periodically, this filter should be removed, cleaned and replaced. The interval between cleanings depends on your environment. Remove the fan by unscrewing the securing screw and pulling the assembly outward through the front of the frame.

The fan assembly includes a square snap-off cover which should be removed. This exposes the filter material, which can be vacuumed, blown, or rinsed to clean. Replace the filter only when dry and snap the cover back onto the fan assembly, making sure that the filter and cover face the left side of the frame. Reinstall the fan by attaching the pigtail cable to the two-pin connector in the rear of the fan area, then slide the assembly into the slot until fully seated and secure with the captive screw.

Warning – Removing the center compartment cover will result in a loss of cooling air to all cards. Extended operation in this state will cause overheating and board failure.

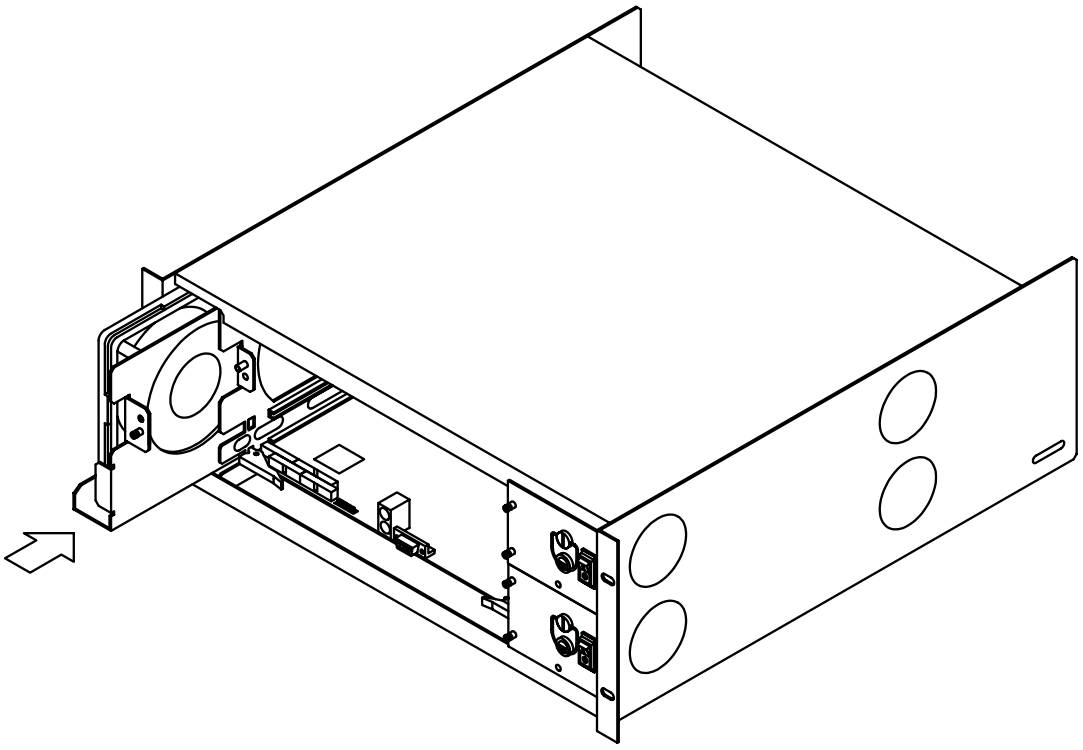


Figure 5-2 FRM-304 INTEGRITY SYSTEM FRAME FAN LOADING

Power Supply Removal and Replacement

The FRM-304 contains one or two modular power supplies. The power supplies are accessed by removing the snap-off front cover. The power supplies, model PSU-304 are identical and interchangeable. If only one power supply was purchased, a model BLK-304 should be installed in the unused position. Turn off the power switch on the face of the power supply prior to proceeding. Remove that PSU-304 power supply by unscrewing the two captive screws located on the face of the supply. Grasp the D-ring and pull firmly outward until the rear connector has loosened, then slide the power supply out. Replace the front cover on the FRM-304.

Warning – NEVER remove a live power supply. Sytem damage will result. Always turn off the power switch on the face of the power supply before removing the supply from the frame.

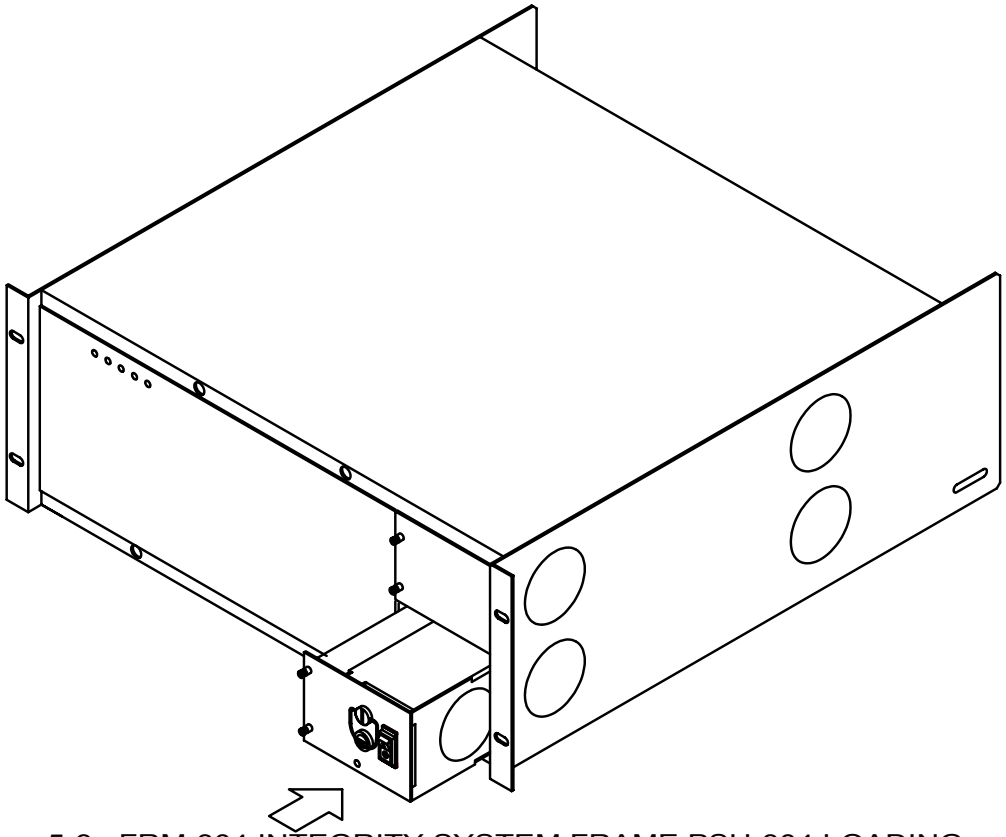


Figure 5-3 FRM-304 INTEGRITY SYSTEM FRAME PSU-304 LOADING

Card Removal and Replacement in the FRM-501

(FS-414A, FS-412A, FS-411A, FS-412, FS-411, DAS-441A, DAS-441, DEC-312S, DEC-322, ENC-301, ADC-331)

The boards in the frame can be removed for maintenance, even while powered. Facing the rear of the FRM301 or FRM304 frame, remove the signal cables from the card to be removed. Unscrew the two retaining screws which hold the card in the frame. Gently pull the card rearward until it clears the internal mating connector, then continue to slide the card out until it clears the frame. To replace, align the card with the two guide rails inside each slot and slide the card in until it contacts the mating connector body at the rear of the slot. Press firmly to seat the card and secure it using the two captive screws. The slots are numbered 1 – 4 starting with the top slot adjacent to the power supply and progressing counterclockwise ending with slot 4 in the top position away from the power supplies.

	1	**4**
	2	**3**

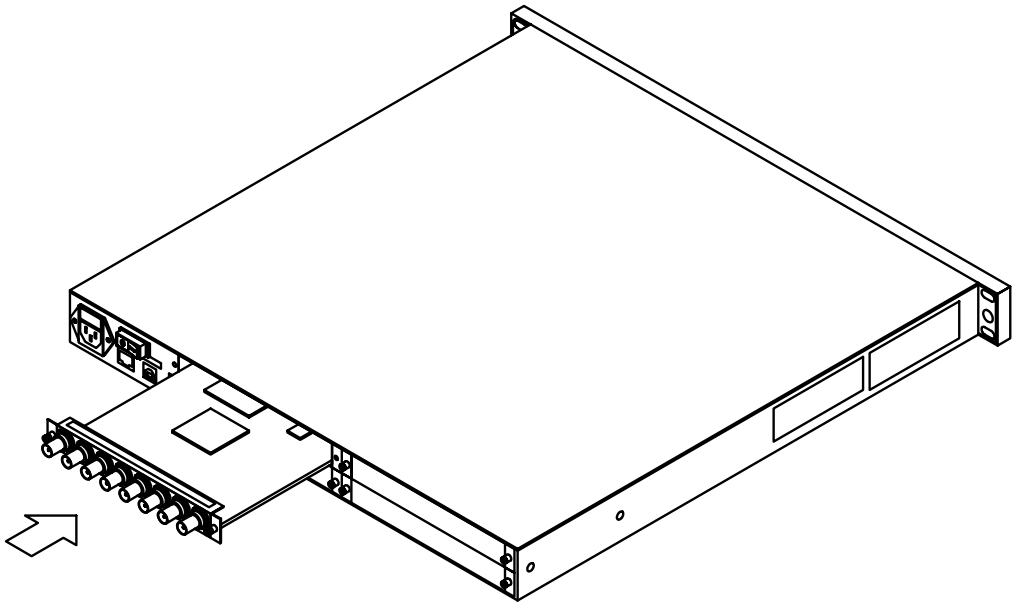


Figure 5-4 FRM-501 INTEGRITY SYSTEM FRAME CARD LOADING

Fan Removal and Replacement in the FRM-501

The fan assembly in the FRM-301 is integral to the chassis and not removable without disassembling the entire chassis on a service bench. The fan is accessed by removing the top cover of the chassis.

Power Supply Removal and Replacement in the FRM-501

The P/S assembly in the FRM-301 is integral to the chassis and not removable without disassembling the entire chassis on a service bench. The P/S is accessed by removing the top cover of the chassis.

6. Troubleshooting

Network Communication Errors

This guide was developed to assist you in identifying a control communications problem when using remote control panels with Integrity™ system frames.

Overview: Integrity is designed to transmit and receive data between control panels and cards via the Ethernet on a Local Area Network (LAN). There are several potential causes of problems which are identified here with ways to isolate them and render a solution.

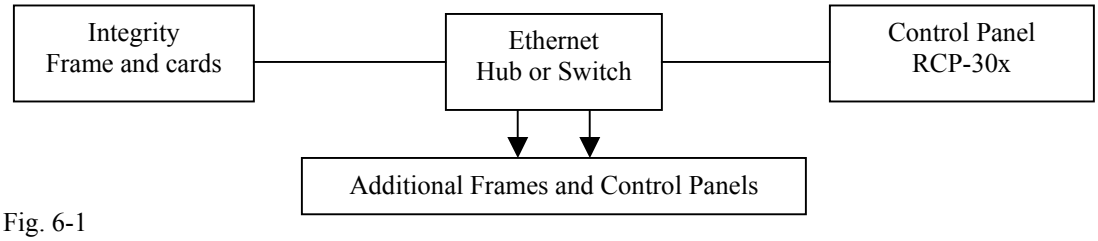


Fig. 6-1

Recommended network configuration

The recommended configuration for Integrity is to use an off-the-shelf Ethernet Switch to connect all frames and remote control panels together. For large systems, multiple switches may be cascaded. All devices are connected using Ethernet patch cables, such as are used to connect a PC to a switch or patch panel. Each control panel must be assigned a unique IP address and unique MAC address. Assignments may be changed via a menu in the remote control panel. There is a specific range of addresses which are considered "valid". Invalid values will cause system communication failure. See Table C for valid combinations.

When things don't work

Isolating the fault is the key step in locating a network communications problem. Integrity remote control panels are designed to communicate over a network using patch cables, or directly connected to an Integrity system frame using an Ethernet crossover cable, not a patch cable. This will allow you to determine if the fault is either the frame or a particular control panel. See cable wiring specifications in Table A.

Connect one control panel (via the Remote 1 port on the back panel) to one end of the crossover cable. Connect the frame (via the Remote 1 port on the back panel) to the other end of the same crossover cable. Apply power to both the frame and control panel. Observe the two LED indicators on the front of the frame marked "Remote 1". The first LED should flicker rapidly indicating traffic over the remote port. The second LED should illuminate steady indicating a correctly connected cable. Observe the display window on the RCP, which should indicate "polling" when searching for a frame, followed by the list of resources it finds within the frame. The resource list scrolls automatically until complete. Example: "Slot 01 – FS-412-01". If the display window of the RCP remains in polling mode for a long interval, the RCP could not find the frame.

Polling (cannot find the frame)

When an RCP cannot find a frame via a crossover cable, it means one of several things has happened:

1. The controller card (CB-486) in the frame is not seated in its card socket properly or completely, resulting in the inability of the frame to receive communications. If the Remote 1 status LEDs are both extinguished, this is possibly the cause of the communication failure. Remove the pop-off front cover, turn the power supplies off, then remove the inner center cover to access the CB486

card. Using the card ejectors, gently re-seat the card in its socket and lock the card ejectors to secure the card. Replace the inner cover (required for proper ventilation and RF shielding), turn the power supplies on, then replace the pop-off front cover. The Remote 1 LEDs on the front cover should now illuminate. If not, call the factory for further assistance.

2. Change the cable. There is always a chance that you have a defective crossover cable. Try a second one to be sure that you don't have a defective one.

3. Try another remote control panel (RCP). If you have more than one remote control panel, try each one in turn connected via the same crossover cable directly to the frame. If other control panels work, then the problem has been isolated to a faulty control panel. If no RCP works, try another crossover cable again.

4. Once you have determined that one control panel is at fault, set it aside and continue the tests with one or more "good" control panels. Now that an RCP communicates successfully over a crossover cable, it is time to reconnect and test the rest of the network hardware.

5. Remove the crossover cable and connect one and only one RCP via an Ethernet patch cable to an Ethernet switch. Use a second Ethernet patch cable to connect the Ethernet switch to the Integrity frame. Do not connect any other devices to the Ethernet switch at this time. Verify that the RCP is able to re-establish communications with the frame over the Ethernet. If not, and we have verified that the frame and control panel communicate successfully via a crossover cable, then the problem must be either a bad patch cable or bad Ethernet switch or hub. Change cables and hubs to see if this corrects the problem. The best way to verify the cable is correct – substitute it for another "known good" patch cable which is in active use elsewhere in the facility. If that device still communicates with its network, then the cable must be good. If both cables are good, try another switch or hub. Network traffic is best handled over a switch, not a hub, when multiple control panels and frames are to be installed. If you are using a hub, try using a switch instead.

   Note: Some inexpensive hubs do not re-shape signals as well as a switch and therefore can be the source of additional communication problems. We strongly recommend the use of Ethernet switches and discourage the use of low cost hubs. We've tested LinkSys®, Netgear®, and 3Com® as good choices for this application.

6. Once a single control panel is able to communicate over the network, substitute remaining control panels for the first one, one at a time, using the same cable and switch path. This will verify that each panel works with the frame. After ALL control panels have been tested this way, one at a time, you are ready to connect multiple panels for the first time in this fault isolation process.

7. Connect a second control panel in the same manner as the first to the Ethernet switch. Verify that it communicates correctly with the Integrity system frame over the Ethernet. Continue to add one RCP at a time, verifying each one before adding the next. If adding an RCP causes the network to lockup so that other panels cannot continue to operate normally, disconnect that panel and set it aside, continuing with the next panel until all panels have either been successfully added or set aside.

8. Panels which were set aside in Step 7 may in fact be working panels, but have an address conflict with another panel on the network. This step provides the means for checking the address of each panel and how to change an address if it is causing a conflict.

9. Each Integrity RCP has an IP address and MAC address which must be unique on that network. The IP addresses are in the format of 192.168.0.xxx, where xxx is a value in the range of 100-125, inclusive. Each RCP must have a unique value in this range, giving you a maximum of 26 possible panels on a network. The MAC addresses are in the format of 0.0.0.12.34.xx, where xx is a value in the range of 55-80, inclusive for each RCP. Each RCP must have a unique value in this

range, giving you a maximum of 26 possible on a network. There is a relationship between the IP and MAC values, requiring that both the IP and MAC values be incremented by the same amount as you add the next panel. Changing the IP and MAC addresses incorrectly can cause the entire system to lockup, so the menu to do this is "hidden" in an unlikely spot so that a curious operator is not likely to take your system down while you are on vacation.

Setting the IP and MAC address on the RCP-302

On the front panel of the RCP-302, begin by pressing the BACK pushbutton until the Video Proc Amp Levels display appears: Video 100%, Black 0 IRE, Chroma 100%, Hue 0.0° (The current values do not have to match these). While this appears in the display window, press the PRESET pushbutton to the left of the display. The display will change to a new submenu: Restore Presets, Edit ENET address, Set Video Audio Button. Rotate CW the selector knob to the right of the display window to scroll down to "Edit ENET Address". Press the MENU pushbutton to select Edit ENET Address. The display will change to a new submenu: IP (value) and MAC (value), where value is the currently configured address for each. To change the IP address, rotate the selector knob CW to increment the IP address to a higher value, rotate the selector knob CCW to decrement the address to a lower value. To change the MAC address, rotate the F1 knob CW to increment the MAC address to a higher value, rotate CCW to decrement the address to a lower value. Press the BACK button to exit once the desired values have been set.

Selecting Ethernet cables

There are varieties of cables with RJ-45 connectors on the ends in the marketplace. The correct pin outs are listed in Table A. Integrity system products use Ethernet patch cables when connected through a switch or hub and crossover cables when connected one-to-one without a switch or hub. Cables should be compliant with IEEE 803.2 specifications.

Fortel DTV Inc.
3305 Breckinridge Blvd. Suite 118
Duluth GA 30096-4932 USA