USER MANUAL

FS-516 and FS-516CC

Frame Synchronizers

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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.

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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.

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

FS-516 Product Description

Synchronizer - Decoder - Encoder - Legalizer - Color-Corrector

The single card solution for signal ingest. This digital synchronizer/embedder accepts either an SDI input or uses Fortel DTV's proprietary 12-bit adaptive QuadraComb™ comb filter to decode the composite input and generate the SDI output. Integral to the card is an audio embedder, which embeds eight channel pairs (four groups) into the SDI output. Audio may be sourced from any of the following: Four balanced analog audio inputs, two AES-3id inputs, deembed groups from the SDI input, or from a separate Dolby E input.

QuadraComb decoding produces a cleaner, more accurate SDI signal by eliminating quantizing errors and unwanted comb artifacts. QuadraComb uses 3 frames and 5 lines of video and 21 linear error detectors to minimize cross color, hanging dots, motion artifacts and flickering in the video picture. Dual Band Processing and Dynamic Threshold Modification preserve luminance detail and reduce chroma crawl and false chroma.

The built-in Perfect-Palette™ Legalizer fixes out-of range colors better by first analyzing "what it was supposed to be" and then correctly adapting each pixel to a legal value without causing a hue shift or relative saturation errors. A soft knee is applied to uniform Y, RY and BY compression where necessary to minimize clipping effects. The legalization makes a seamless correction where it is almost impossible to tell the picture was not shot correctly. The legalizer can be set for independent legal RGB, Composite and Luma ranges.

The optional Color Corrector provides digital adjustments for White Balance, Gamma Balance and Black Balance plus Black Stretch for both SDI and composite analog inputs. The color corrector is upstream of the legalizer, assuring that illegal colors will not be produced by user adjustments.

The FS-516 has several forms of video noise reduction. The most effective is the frame recursive noise reduction. The proprietary linear error detector and linear control of the percentage of recursion gives very good noise reduction without creating motion smearing. Most recursive noise reducers produce a lot of smearing when the noise level is moderate to high. The recursive noise filter has user settings of OFF, LOW, HIGH and AUTOS The Auto mode measures the noise in the horizontal interval and adjusts the noise reduction level. It is not useable when the input has been processed and a new sync and blanking interval inserted. The QuadraComb comb filter also offers several forms of noise reduction. The first is averaging of multiple lines with adaptation to reduce smearing. The second is averaging over 3 frames with adaptation to minimize motion smearing. The third is automatic bandwidth limitation depending on the comb filter error detection. All of these noise reducers have user settings. A user adjustable nonlinear processing is downstream of the other noise reducers to minimize remaining small amplitude noise levels in the video.

Video path features include proc amp controls, video and chroma AGC, video noise reduction, full-frame test signals, pass input, strip or insert VITS on lines 10-22 (NTSC/525). When video is lost from the input, different output options are available; hot-switch to a captured frame, test pattern with text overlay, freeze, cut-to-black or timeout to black, test signal or a captured frame with text overlay.

Audio features include automatic tracking of the video delay with audio stretch or compression to eliminate audio pops at dropped frames, manual offset delay of up to five seconds, audio compressor limiter, channel summing or swapping, manual channel phase invert, channel output group assignment, and Dolby E pass-through to the embedder.

The two AES BNCs may be independently configured as AES outputs or AES inputs. The FS-516CC is a modular card for Integrity system frames. Choose either a 1RU standalone frame or a 4RU high-density frame with optional redundant power supply.

The Frames

The FS-516 cards must be mounted into 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 that is used for operating 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 up to 299 separate Fortel DTV cards. The 4RU frames are recommended when many cards are needed in a single location in a minimal amount of space.

The Control Panels

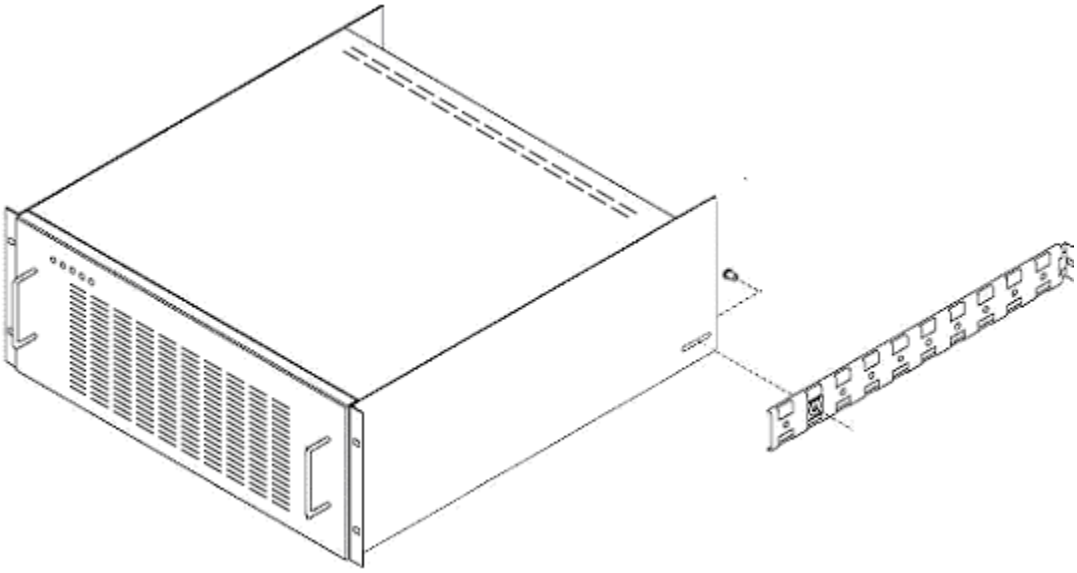
Compatible control panels currently include the RCP-502, RCP-303 and RCP-503. These may be placed anywhere in the facility and control cards in multiple frames over a LAN. Control panels are connected to frames using local area network (LAN) hardware: Category 5 patch cables and a 100-base-T Ethernet 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.

2. Installation

Rack mount the FRM-504 Integrity System Frame

The FRM-504 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-504 frame.

Remove the front outer cover. The FRM-504 is shipped with an outer cover that should be installed for normal operation of the product. Remove this cover when preparing to mount the FRM-504 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.



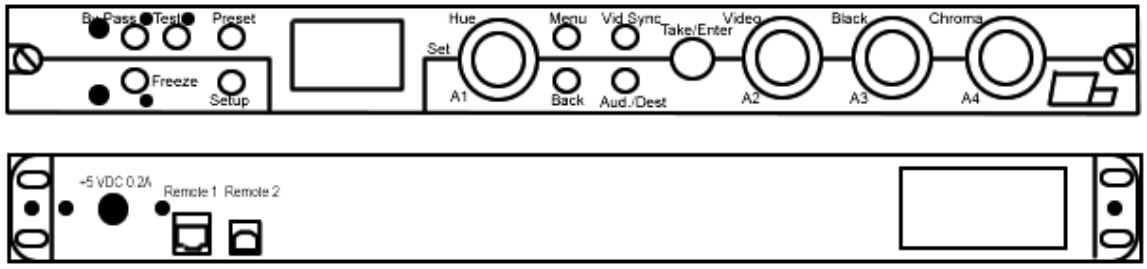
1. Attach the frame face to the rack using for 10x32 1” pan head screws (black).
2. Use one 10x32 ½” pan head screw (bright) to attach each long rail to the rear frame, selecting the hole based on the depth of the rack (holes are on 1-1/2” centers), aligning with the oblong slot as shown above.
3. Attach each long rail to the rear of the rack using one 10x32 1” pan head screw (black).

Rack mount 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.

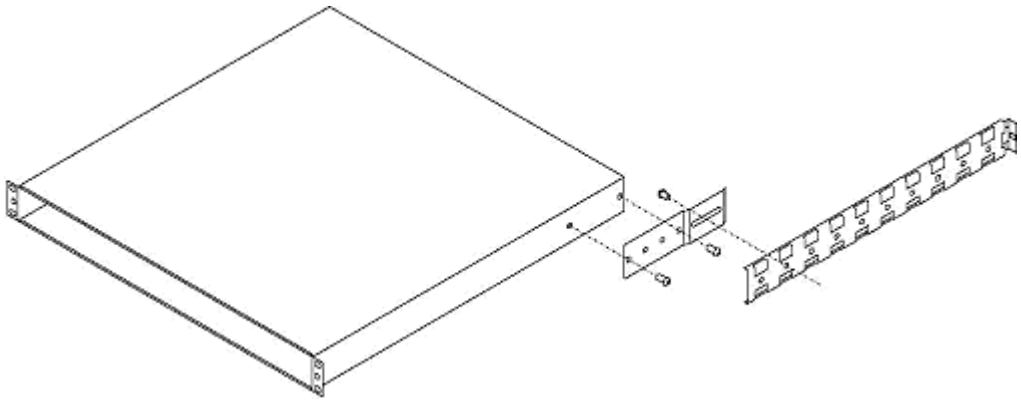
Press the panel into the chassis body and secure it using the two captive screws. Attach the "floor wart" DC power supply to the rear of the chassis. A retaining clip and screws are provided for securing the DC power connector in installations where vibration may cause the connector to unseat. There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



RCP-502 Remote Control Panel

Rack mount the FRM-501 Integrity System Frame

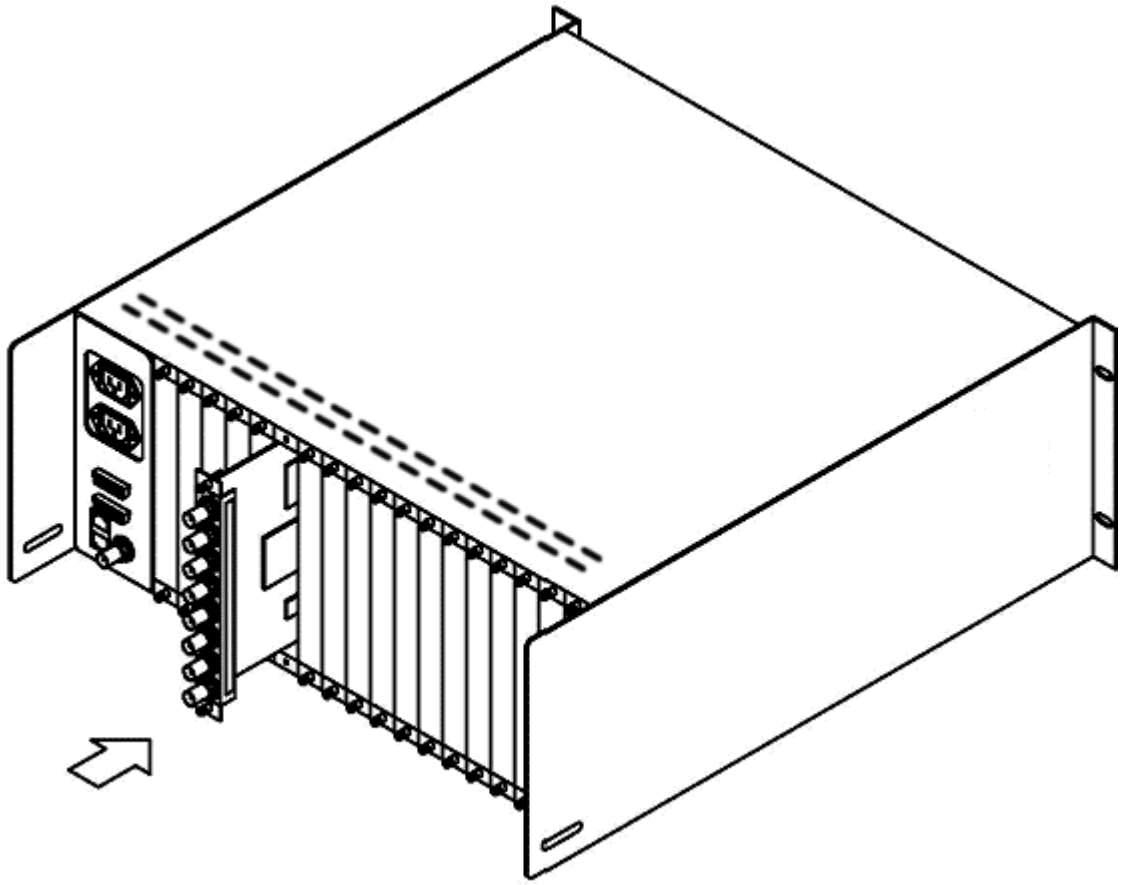
The FRM-501 Integrity System Frame is a 1RU chassis designed for installation in EIA equipment racks. It may include a face-mounted RCP-502 as a local control panel, or be installed with the provided “blank” front panel. The RCP-502 control panel is usually shipped pre-installed on the FRM-501 as a tested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



1. Use 2 10x32 ½” pan head screws (bright) to attach each short rail to the frame as shown before mounting the frame to the EIA rack.
2. Attach the frame faceplate to the rack using 4 10x32 ½” pan head screws (black).
3. Use 1 10x32 ½” pan head screws (bright) to attach one long rail to one short rail, selecting the appropriate hole based on the depth of the rack.
4. Attach the back rail to the rack using 1 10x32 ½” pan head screw (black).
5. Replace the front panel and secure with the provided thumbscrews.

Adding cards to the FRM-504 Integrity System Frame

The FRM-504 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 mid-plane 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, away from the power supplies.



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 mid-plane 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**

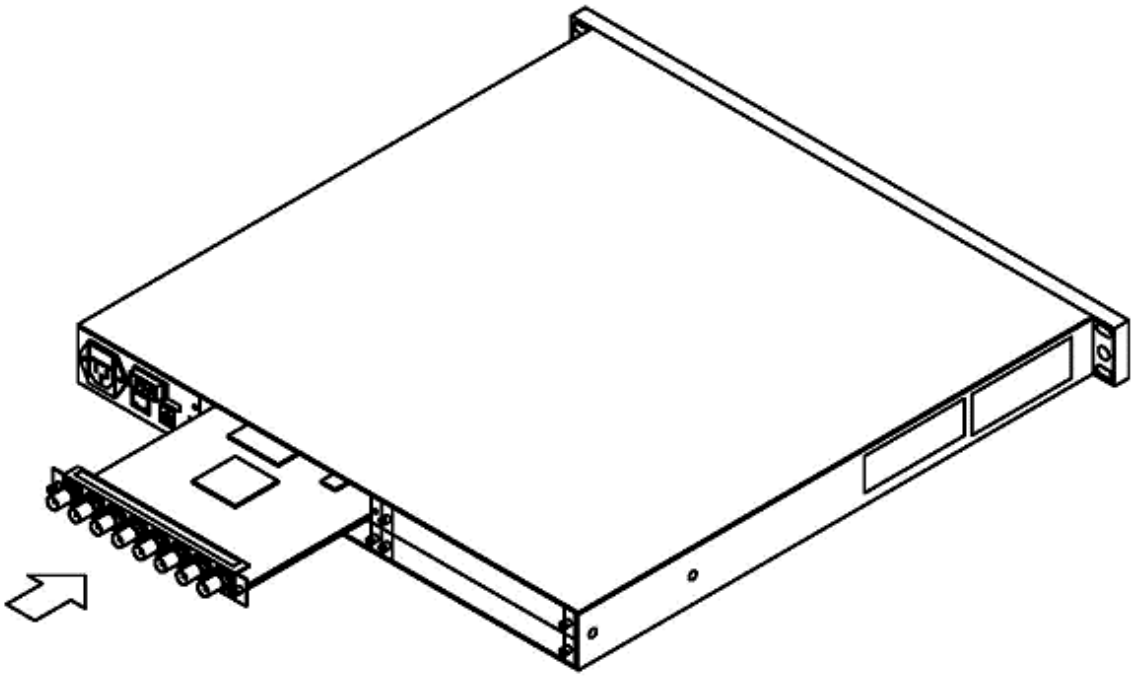


FIGURE 2-7 FRM-501 INTEGRITY SYSTEM FRAME CARD LOADING

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.

RCP-503
At any menu, press 770enter on the keypad.
The knobs at the bottom of the screen will allow you to set an IP address.
Note: The first three blocks on the address should be the same as the cards you are controlling. Default is 192.168.0. The fourth group should be unique. If the fourth group shares a number there will be a conflict and the control panel will not be able to communicate.

Updating the IP address on the card frame is generally not necessary. If there is an IP addressing conflict please download the FRM-504 IP Addressing supplement manual from the Fortel DTV website.

Card Connections

Connections to the FS-516 are seven BNC connections and two phoenix style analog audio connections.

The analog audio inputs are high impedance and can accept levels ranging from 0 to +28dBu selectable. The conversion to digital is done with 24-bit, 96 KHz processing. The audio then can be routed and output via AES digital or embedded into the SDI video stream.

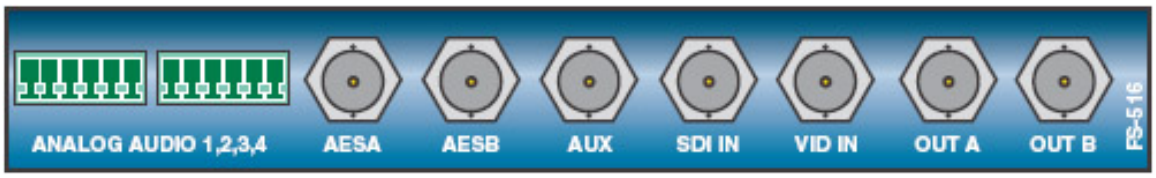
AES A and AES B connections can be set to either input or output status. Using the connection as an input, the user can embed AES streams into the SDI video stream. Using the AES connections as an output, analog audio can be encoded to digital and sent to the facility or can be used to de-embed the SDI stream and output to AES for facility routing.

AUX input can be set to either composite VIDEO B or Dolby/AES input. In the VIDEO mode a second composite input can be input to the card and can be selected by using the remote control panel. In the Dolby/AES mode the digital audio can be input and embedded within the FS-516 card.

SDI in accepts standard definition digital video in with or without audio embedding. Once input the video and audio can be routed, adjusted, synchronized and managed using the remote control panel.

VID IN is a composite video input. Analog video will be processed with the QuadraComb filter and digit and converted to a SDI output.

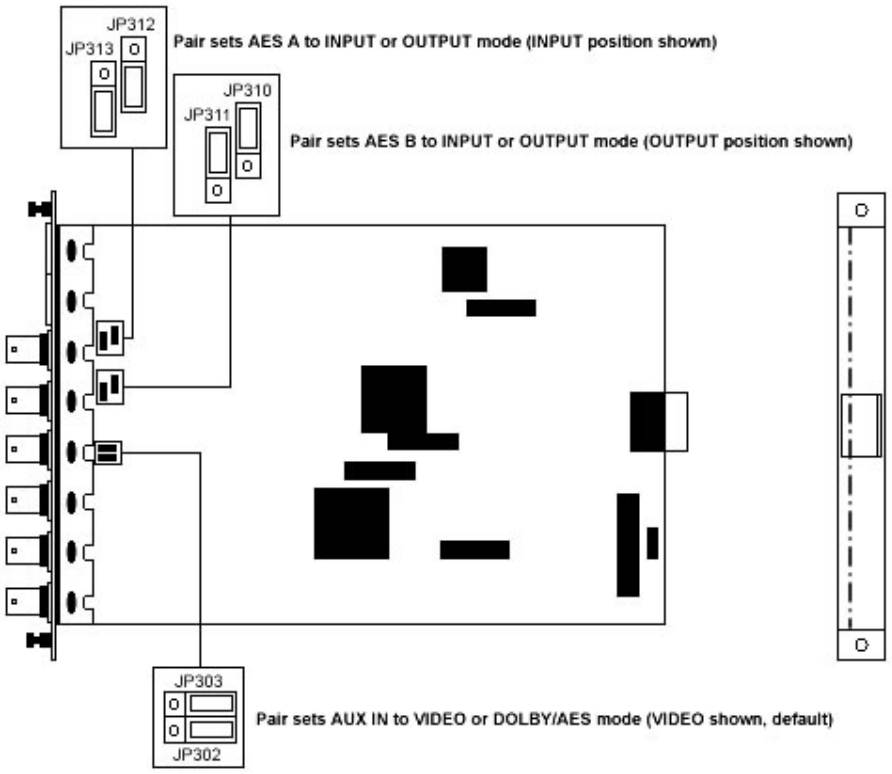
OUT A and B are SDI video outputs that can have up to 16 channels of audio embedded into the stream.



Jumper Settings

Due to the limited real estate on the FS-516 card three BNC connectors have dual functions that are selected by the use of jumpers. There are six jumpers on the FS-516 card that are used to set the input and output connections of the card. The factory defaults are set at the factory and are indicated in the diagram below.

Jumpers JP302 and JP303 configure AUX IN to be either composite VIDEO B or Dolby/AES input mode.
Jumpers JP310 and JP311 configure the AES B connector to be either input or output.
Jumpers JP312 and JP313 configure the AES A connector to be either input or output.

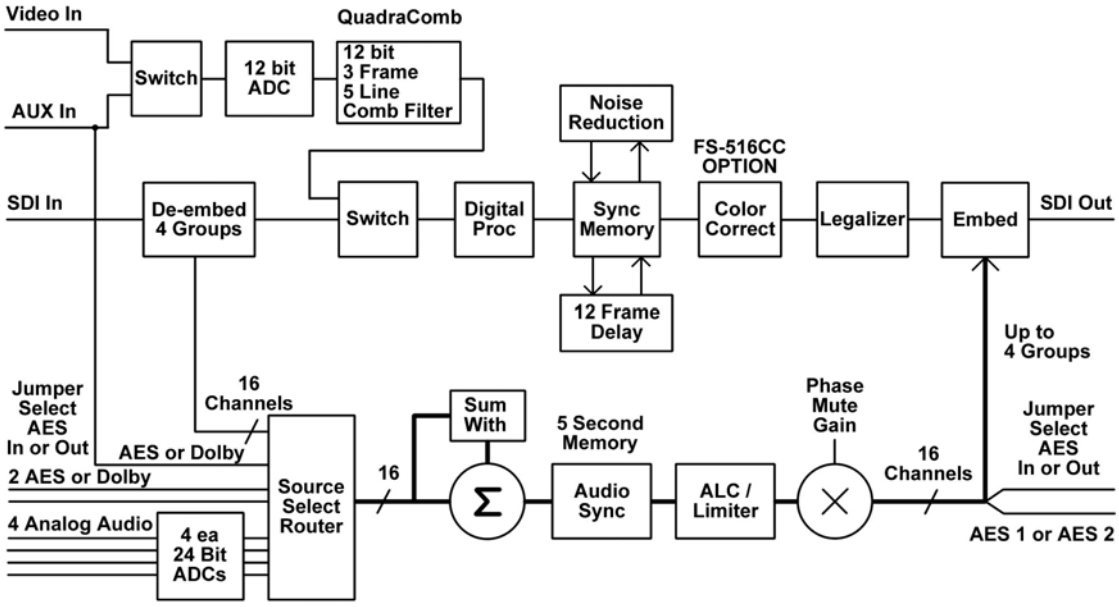


Video Reference Inputs

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”. See GL Timing for setting instructions.

4. Card Operation

FS-516 Block Diagram



The FS-512 can select one of 2 analog video inputs. Video In is a composite video input designated by the controller as Video A, and the AUX In can be jumper selected to be a second composite video in designated by the controller as Video B. The AUX input can also be used as 3rd AES or Dolby digital audio input. The Video In A can also be used as a board reference in place of the chassis reference from the mid-plane. The source is selected by using the switch control from the remote. From there the composite video is converted from analog to a 12 bit composite digital signal that drives the comb filter.

The 12 bit digital composite video signal goes to the QuadraComb comb filter where the chrominance and luminance are separated from the composite signal. Frame comb mode always works better than line comb mode for stationary parts of the video signal. QuadraComb uses 3 frames to enhance the frame comb so it is not fooled by sharp luma and chroma transitions that usually cause other comb filters to fail and adapt to line comb mode when the signal is stationary and suitable for frame combing. The 3rd frame not only gives QuadraComb the ability to frame comb where other comb filters fail but it also gives more sensitive motion detection to minimize motion artifacts so it can adapt to line comb mode or trap mode where required. The line comb portion uses 5 lines for NTSC as well as PAL to give the best possible line comb results in the pixels where the video is moving. The comb control logic determines the best method of separating the luma and chroma on a pixel-by-pixel basis and generates multiplier coefficients to smoothly transition between the different modes or combination of modes of combing.

The luminance is shifted in DC level to meet CCIR-601 specifications. The US standard NTSC signal normally requires removal of setup and adding a gain of 7.5%. The Japan standard of NTSC does not have setup and is treated as PAL without setup removed therefore no gain offset is needed. The chrominance signal is demodulated, by a synthesized subcarrier, to its R-Y and B-Y components. The RY and BY signals are filtered to the proper shape and scaled to CCIR-601 specifications.

SDI input can be selected in place of the composite video inputs using the remote control settings. The SDI signal is sent through a Serial to Parallel converter and then sent to the De-Embedder to remove the audio streams. The audio is sent to the audio select router, this is explained in the audio section. The digital video, stripped of the audio, is sent through the Input Selection Switch and on to the video processing. In

the Digital Processing block the user can control Black, Brightness, Hue, and Saturation.

In the Synchro Memory block the video signal is synchronized with house sync. An additional 12 Frames of delay can be added to the video to lip-sync the audio in extreme cases. Genlock sources are provided by either frame input or by individual card inputs. Genlock source is selected by the remote control.

A TBC is placed at the input to the synchronizer memory. Unlike other TBCs that are called Digital TBCs but use analog control of a wide range voltage controlled oscillator, this is a truly digital TBC in every sense of the definition. The input clock of the FS-516 is locked to the burst of the video signal even though it may come from a local or remote VCR. This gives the QuadraComb the best chance of combing properly since the subcarrier is in the proper phase in the lines above and below the current scan line. This technique is the most effective way of separating the luminance and chrominance without trap filters that destroy the luma bandwidth and limit the chroma resolution. The problem is the decoded signal still has all of the time base error of the tape. This error is removed by using a resampling technique similar to a DVE that stretches or compresses every pixel in a line to reestablish the correct line length and position. The TBC uses the over sampled video and a 4 point interpolation to stretch and compress as necessary while maintaining flat frequency response and group delay.

Color Correction is an optional feature for the FS-516 card and is designated by the CC suffix in the model number, FS-516CC. The color correction option precedes the video legalizer to ensure the adjusted colors are legal. There are several controls available on the remote control panel to manipulate the color temperature of the video image.

Legalize is a standard feature of the FS-516 card. The Legalizer up samples the RY and BY signal and converts the Y/RY/BY signals to RGB to detect any illegal pixels and generate a correction signal. When Legalize is enabled the correction signal is used to multiply the 601 signal by the correct coefficients to correct its gain pixel-by-pixel. A DC offset is added as necessary when dark colors are over saturated for the luma level. Once again only the out of range pixels are corrected. There are several adjustments available via the remote control for this feature.

The audio inputs to the FS-516 are, analog, AES, Dolby, and embedded SDI. The Dolby / AES 3 selection are selected using the jumpers and the control panel menu. The board has both AES inputs and outputs but the BNCs are restricted so the AES A and AES B BNCs can be hardware selected to be either inputs or outputs to the card. After selection with the jumpers, the selection of the sources is provided with the control panel. The analog inputs are digitized 24bit 96KHz and are fed to the router selection. The router takes all incoming audio and routes them to the available 16 channels of output.

Once out of the router the individual audio channels can be summed with a single channel of audio, perhaps for a mono mix of stereo. The audio is fed to the audio synchronizer that not only synchronizes with the house sync but provides up to 5 seconds of delay to adjust for lip-sync errors.

The ALC (Automatic Level Control) / Limiter is a two part process that can automatically adjust for average audio level changes and can prevent audio clipping from occurring. The ALC / Limiter can be applied by audio Groups or by audio Banks. Groups are designated by the SDI standard of 4 groups of 4 channels each and Banks are a customize selection of channels that can be adjusted as a unit. In the case of Dolby, 6 channels must be controlled as a group to preserve the integrity of the encoding and using the group mode would be inadequate.

In the Phase Mute Gain section the audio signals can be individual controlled using the remote control. Phase can be inverted, the audio can be muted, and the gain of the individual signals or groups can be adjusted.

The audio output of the 16 channels can be routed and embedded into the SDI stream or some channels can be routed to the AES outputs, providing 2 channels of digital audio on each AES output. The AES outputs must be jumper selected as outputs for this mode.

FS-516 or FS-516CC Video Synchronizer Controls

Video Input

The video synchronizer card accepts both composite analog and SDI inputs. The SDI input can have embedded audio that can be broken out, rerouted, or re-embedded. There are two composite inputs, one marked VID IN and the second marked AUX. The VIDEO INPUT control on the remote should be used to select the proper input configuration from the choices below.

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

RCP-503
Select the card to be controlled
Select the uppermost left menu button – Video In
Select the desired input
Select the Back button to return the main menu

RCP-502
Rotate the Selector Knob to highlight the VIDEO INPUT submenu.
Press the MENU pushbutton to select.
Rotate the Selector Knob to select ANALOG-A, ANALOG-B, or DIGITAL as the input.
Press BACK to exit the submenu.

TBC Mode Setting

The Time Base Corrector can be disabled by setting this control to OFF, Lock up in very noisy environments, such as very noisy satellite feeds, can be affected if the TBC is turned on or is in Auto Mode. Turn the TBC mode ON if you are using helical scan VCRs without time base correction or VHS type inputs as the analog video source. The Auto Mode is very effective at selecting TBC mode when required. The only time it is not effective is when a tape input has so little jitter or skew error it cannot be detected by the AUTO Mode detectors. The TBC Mode has 2 small negative effects on video quality when used. The TBC mode has much better combing and frequency response than other TBCs but it bypasses the frame comb due to jitter between frames and reduces the bandwidth slightly. It also produces slightly more jitter than burst lock mode. TBC is disabled whenever the SDI input is selected.

RCP-503
Select the card to be controlled
Select the second button down from the top on the left – TBC
Select from OFF, ON, AUTO
Select the back button to return to the menu

RCP-502
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.

RCP-503
Select the card to be controlled
Select the third button down from the top on the left – VIDEO AGC
Select AGC ON or AGC OFF
Select the Back button to return to the main menu

RCP-502
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.

RCP-503
Select the card to be controlled
While on this main menu the Proc-Amp controls are active and can be adjusted by turning the knobs located under the display screen. The controls are GAIN, BLACK, CHROMA, and HUE.
A button located on the bottom on the left side of the screen is PROC PRESETS – Selecting this button will return the settings of the knobs (gain, black, chroma, and hue) to unity.

Legalize
The FS-516 and FS-516CC boards include 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 that 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.

RCP-503
Select the card to be controlled
Select the bottom right button – MORE
Select the upper right button – LEGALIZE
The four knobs located under the display allow for adjustments
- Luma Limit – Off, Loose, Nominal, Tight
- Encoded Limit – Off, Loose, Nominal, Tight
- RGB Limit – Off, Loose, Nominal, Tight
- VBI Legalize – Is Off or Follows Main

Select the Back button twice to return to the main menu

RCP-502
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-516CC option

The FS-516 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 is included.

RCP-503

Select the card to be controlled
Select the bottom right button – MORE
Select the second button down on the right – COLOR CORRECTOR
From this menu you may select from six selections; White Bal, Black Bal, Gamma, Blk LvlStr, Set CC to Unity, and CC Memories.
The four selections on the left side of the display operate similarly, Select the button you would like to adjust and use the knobs to adjust the desired color channel. Select the Back button to return to the menu.

- White Bal – Adjusts the color temperature by giving individual control of the individual gains of RG & B channels.
- Black Bal – Adjusts the color temperature of dark areas by adjusting the black (DC) offset of the R.G & B channels
- Gamma – Adjusts color temperature of the mid range video levels by adjusting the linearity (Gamma shape) of the individual R, G & B channels
- Black Stretch – Adjust the grey (20IRE area) of the color channels by changing the linearity of the luminance curve.

Selecting Set CC to Unity will reset all settings for active Color Correction (visible menu and other menus) to a unity setting.

It is possible to store 8 color corrector setup settings into memory by using the CC Memory menu.
After you have created a color correction settings scene that you would save.
Select CC Memories from the right side second down button choice
All of your previous settings will be displayed on this screen
The Right most knob will select the storage bin. The number above the knob reflects the storage bin.
There are eight bins available.
After you have selected a bin, select Save to Mem, second button down on the right. This has stored your settings to that bin.
To recall a color setting, select the bin number by using the right most knob and select the Recall from Mem button.
Selecting Set CC to Unity will reset the active settings to Unity but will not change the stored settings.
Select the back button to return to the previous menu.

RCP-502

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.

RCP-503
To output test signals – select the Test Out button located on the upper left side of the control panel.
To select the test signal to output, do the following,
Select the card to be controlled
Select the bottom right button – MORE
Select the upper left button – SELECT TEST SIG
There are several selections on this menu screen:

- ON – Activates the test signal generator
- OFF – Deactivates the test signal generator. When selecting the Test Out button the card will not output test signals.
- Text Overlay – Allows for two lines of 10 characters to be displayed over the test signal.
- FRZ Type – There are three selections Field 1, Field 2, and Frame. This is for freezing incoming video.
- FREEZE – Select Freeze mode ON or OFF
- Save Frame – After a video frame has been frozen, that frozen frame can be saved into memory and then can be selected as a test pattern.
- The Left most knob selects the test pattern. The selections are; EIA Bars, SMPTE Bars, 75% Full Field Bars, 75% Rev Bars, 75% YRef Bars, 75% Red Bars, 75% Red Field, Multi-burst, Multi-pulse, 50IRE Pedestal, Pulse and Bar, NTC7 Composite, Matrix, 3-Level Chroma, Ramp 40IRE Modulated, Blanking, and Saved Frame.

To change the Text Overlay, Select the TEXT OVERLAY button
The upper left button – Toggle Line Sel – selects the line to edit
The upper right button selects whether text is displayed or not – On or Off.
Select Position knob selects the character position to edit.
Change Letter cycles through the available characters. There is no save button, stopping on the character, selects it.

RCP-502
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.

Noise Reduction
The noise reduction settings should only be adjusted after speaking with Fortel DTV technical support.

RCP-503
Select the card to be controlled
Select MORE button, lower right button.
Select NOISE REDUCTION, second button down on the left.
Select Enable or Disable, second button down on the left.
To make further adjustments, enter the engineering code 999enter from the keypad. Note the current settings before making adjustments.
Default settings

CORING – 4	Adjusts between 0 and 63 noise coring.
LUMA FILTER – Wide	Wide, Dynamic, Shaped, and Soft
CHROMA FILTER – Flat	Flat, Flat Dynamic, Shaped Dynamic
AVERAGING – Off	Off, Low, Medium, High, Forced

The PRESET button returns to the factory settings.
Use the Back button to return to the previous menus.

Noise Filters
There are four filter options that can be selected; Off, Low, High, and Auto. The default setting is Off.

RCP-503
Select the card to be controlled
Select MORE button, lower right button.
Select NOISE FILTERS, third button down on the left.
Change the noise filter by toggling the Recursive button, second button down on the left.

Configuration Settings
These settings are not operator adjustments they are for experienced users that have a good understanding of the video network and video settings.

RCP-503

Select the card to be controlled
Select the bottom right button – MORE
Select the third button down on the right – CONFIGURE
Enter the password 999enter from the keypad.
There are seven selections on this menu; COMB FILTER, NOISE REDUCTION, ANALOG BLACK, HOT SWITCH, CONFIGURE VBI, GL TIMING, and MORE.
The MORE menu contains; VIDEO POS, MIN DELAY, NAME CARD, CARD INFO, AND USER RESET…
Each menu choice is described below.

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. Engineers who fully understand the nature of comb filters and the special conditions under which they behave should change this setting. 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.

Noise Reduction
The noise reduction settings should only be adjusted after speaking with Fortel DTV technical support.

RCP-503
Select the card to be controlled
Select MORE button, lower right button.
Select NOISE REDUCTION, second button down on the left.
Select Enable or Disable, second button down on the left.
To make further adjustments, enter the engineering code 999enter from the keypad. Note the current settings before making adjustments.
Default settings

CORING – 4	Adjusts between 0 and 63 noise coring.
LUMA FILTER – Wide	Wide, Dynamic, Shaped, and Soft
CHROMA FILTER – Flat	Flat, Flat Dynamic, Shaped Dynamic
AVERAGING – Off	Off, Low, Medium, High, Forced

The PRESET button returns to the factory settings.
Use the Back button to return to the previous menus.

Analog Black
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.

RCP-503
Select the card to be controlled
Select MORE button, lower right button.

Select CONFIGURE, third button down on the left.
To make further adjustments, enter the engineering code 999enter from the keypad.
Select ANALOG BLACK, third button down on the left.
Using the left upper two buttons select either 7.5IRE or 0IRE.
Select the Back button to return to previous menus.

RCP-502
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.

Hot Switch
The HOT SWITCH option 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. The options are:

OFF – Passes video, no matter the quality of the video.
CUT TO TEST SIGNAL – When the video drops below standards, the video test signal will be output.
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.
BLACK – will switch the output 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. This option is desired if used in conjunction with out-board video sense switches.

RCP-503
Select the card to be controlled
Select MORE button, lower right button.
Select CONFIGURE, third button down on the left.
To make further adjustments, enter the engineering code 999enter from the keypad.
Select HOT SWITCH, bottom button on the left.
Select the desired option from the choices displayed. Note the current selection is displayed on the bottom center of the menu.
Press the BACK button to exit to the previous menu.

Configure VBI
The configure VBI 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 remove information) 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.

RCP-503
Select the card to be controlled
Select MORE button, lower right button.
Select CONFIGURE, third button down on the left.
To make further adjustments, enter the engineering code 999enter from the keypad.
Select CONFIGURE VBI, top button on the right.

The knobs on the bottom provide selections for LINE/FIELD, SIGNAL, COMB MODE, and BLACK SETUP.

LINE/FIELD – Selects Line 10 Field 1 through Line 22 field 2 – the selected line's adjustment setting is reflected on the menu screen.

SIGNAL – Selects the signal to be presented on the given line and field. Options are; Pass Input, Luma Only, Blank, 100% Multiburst, Multipulse, 2T Pulse and Bar, NTC7 Composite, 3-Level Chroma, WB Sweep, 75% Bars/100IRE White, and Modulated Ramp.

COMB MODE – Selects whether the comb filter is applied to the signal or not. Normally Off.

BLACK SETUP – Selects 7.5IRE or 0IRE setup levels.

Press the BACK button to exit to the previous menu.

RCP-502

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 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 button to exit to the previous menu.

GL (Genlock) Timing

Genlock timing consists of input reference, horizontal timing and vertical timing. The genlock signal input can be selected by the card input or the frame input.

RCP-503

Select the card to be controlled
Select MORE button, lower right button.
Select CONFIGURE, third button down on the left.
To make further adjustments, enter the engineering code 999enter from the keypad.
Select GL TIMING, second button from the top on the right.
Select GL TO FRAME or GL TO CARD by using the buttons on the left side of the menu. The current setting is indicated on the menu screen.
Use the H PHASE and V PHASE knobs to align the horizontal and vertical sync position to match that of the facility timing.
Press the BACK button to exit to the previous menu.

More Configuration

Continuing with the configuration menu, there is a MORE option that provides for the following settings; VIDEO POS, MIN DELAY, NAME CARD< CARD INFO, and USER RESET.

Video Position

The VIDEO POS centers the video image in relation to horizontal and vertical blanking. In most instances this should remain at the default setting of 0 and 0.

RCP-503

Select the card to be controlled
Select MORE button, lower right button.
Select CONFIGURE, third button down on the left.
To make further adjustments, enter the engineering code 999enter from the keypad.
Select MORE bottom button on the right.
Select VIDEO POS top button on the left

You may adjust the position of the video within the blanking area. This adjustment should be made with the aid of a waveform monitor.
Press the BACK pushbutton to exit to the previous menu.

Minimum Delay
The minimum delay of the synchronizer can be selected from 0 to 6 frames. This is generally set at 0 frames.

RCP-503
Select the card to be controlled
Select MORE button, lower right button.
Select CONFIGURE, third button down on the left.
To make further adjustments, enter the engineering code 999enter from the keypad.
Select MORE bottom button on the right.
Select MIN DELAY second button down on the left
You may adjust the minimum delay from 0 to 6 frames.
Press the BACK pushbutton to exit to the previous menu.

Name Card
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-516 card is assigned the default name FS-516-#, where # is the slot number in which the card is presently installed. Example: FS-516-01 is the default name of an FS-516 card installed in slot 01 in an FRM-504 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 supersede 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.

RCP-503
Select the card to be controlled
Select MORE button, lower right button.
Select CONFIGURE, third button down on the left.
To make further adjustments, enter the engineering code 999enter from the keypad.
Select MORE bottom button on the right.
Select NAME CARD top button down on the right
CHANGE POSITION is the character position of the name. There are 8 characters allowed.
CHANGE LETTER is selects the character to be placed in the given position.
There is no save; the name will be automatically saved into memory.
Press the BACK pushbutton to exit to the previous menu.

Card Information
This is a status menu that displays the following information; Card Model, Software Revision, and the Card Temperature.

RCP-503
Select the card to be controlled
Select MORE button, lower right button.
Select CONFIGURE, third button down on the left.
To make further adjustments, enter the engineering code 999enter from the keypad.
Select MORE, bottom button on the right.
Select CARD INFO by using the second button down on the right side of the menu.
The information will be displayed.
Press the BACK pushbutton to exit to the previous menu.

User Reset
The User Reset function resets the card to the factory default settings. This includes the Card Name, Color Correction User Memories, and Timing Settings. Be very careful before using this feature.

RCP-503
Select the card to be controlled
Select MORE button, lower right button.
Select CONFIGURE, third button down on the left.
To make further adjustments, enter the engineering code 999enter from the keypad.
Select MORE, bottom button on the right.
Select USER RESET by using the bottom button on the right side of the menu.
Select RESET! – Without extra prompts, the data has been reset to default.
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 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.

Embedded Audio
The FS-516 card has four analog inputs, three AES digital audio inputs, and can accept 16 channels of audio embedded in the SDI stream. The card is capable of de-embedding and re-embedding the audio channels to a number of different configurations. In addition, Automatic Level Control and Audio Limiting can be applied to the streams or groups of streams.

To access the audio menus on the controller, remember to press the audio selector button on the left side of the control panel.

Audio Output Levels
The embedded audio is assembled into four groups. The audio main menu of the FS-516 allows for the adjustment of the audio channels within the group. The menu selection for groups are located on the left side of the menu screen the groups are; Grp-1, Grp-2, Grp-3, and Grp-4. The knobs at the bottom of the menu are for the individual channels within the audio group. To change the level of a channel, the group must first be selected then the channel can be adjusted. The adjustments are relative to the audio level that currently resides on that channel, for example 0dB is not a zero level but no change to the current level. A +3dB adjustment adds 3dB of gain to the current signal.

RCP-503
Select the card to be controlled
Select the Audio controller button, left side of the controller.
Select the group that contains the desired audio channel. The group being adjusted is indicated with an arrow to the menu selection and on the main menu in text format.
Use the knobs to adjust the audio channel levels within the group.
Select the Back button to return to previous menus.

Phase Adjustment
Each audio channel can have its phase inverted (a phase adjustment of 180°) or can be set to the Normal mode.

RCP-503
Select the card to be controlled
Select the Audio controller button, left side of the controller.
Select PHASE – top button on the right
Select the group that contains the desired audio channel. The group being adjusted is indicated with an arrow to the menu selection and on the main menu in text format.
Use the knobs to select the audio phase, Normal or Invert.
Select the Back button to return to previous menus.

Mute Adjustment
Each audio channel can have a mute function turned on or off.

RCP-503
Select the card to be controlled
Select the Audio controller button, left side of the controller.
Select MUTE – second button from the top on the right side of the menu.
Select the group that contains the desired audio channel. The group being adjusted is indicated with an arrow to the menu selection and on the main menu in text format.
Use the knobs to select audio mute; On or Off.

Select the Back button to return to previous menus.

Bank Gain Adjustment
Individual audio channels are grouped into banks of one to twelve channels each. These banks can be adjusted as a single unit. The adjustments are relative to the audio level that currently resides on that channel, for example 0dB is not a zero level but no change to the current level. A +3dB adjustment adds 3dB of gain to the current signal. *Note: Banks are different than groups because groups are considered to be four channels per group, while banks can be any number of channels from a single channel to twelve channels.*

RCP-503
Select the card to be controlled
Select the Audio controller button, left side of the controller.
Select BANK GAIN, third button down on right side.
Use the knobs to adjust the Banks or Groups audio levels.
Select the Back button to return to previous menus.

Reset All Audio Gains
It is possible to reset all user audio gain adjustments back to a unity setting. This includes the group settings as well as the individual settings.

RCP-503
Select the card to be controlled
Select the Audio controller button, left side of the controller.
Select BANK GAIN, third button down on right side.
Select Reset All Audio Gains – There will be no additional warnings, the audio will be reset immediately.
Select the Back button to return to previous menus.

Bank Configuration
Banks are selected using consecutive (adjacent) audio channels. There are four banks by default. The first bank includes channel one and the last bank includes channel sixteen. It is important to have a bank setting to accommodate multi-channel surround sound paths. *Note: Banks are different than groups because groups are considered to be four channels per group, while banks can be any number of channels from a single channel to twelve channels.*

RCP-503
Select the card to be controlled
Select the Audio controller button, left side of the controller.
Select BANK GAIN, third button down on right side.
Select BANK CONFIG, top button on the right side of the menu.
The knobs across the bottom select the channels for the four banks.
The first knob begins with group one, channel one, displayed by Grp1.1
Adjusting the knob selects the last channel within that bank. Concurrently, the adjacent knob display changes to reflect the first available channel for the next bank.
Select the Back button to return to previous menus.

Analog Audio Input Gain
There is a trim adjustment for the analog audio inputs. This adjustment is used to bring the analog audio levels into par with the digital channels.

RCP-503
Select the card to be controlled

Select the Audio controller button, left side of the controller.
Select CFG bottom button on right side.
Select Analog In Gain, top button on the left side of the menu.
The knobs across the bottom adjust the trim level for the four analog audio inputs.
Select the Back button to return to previous menus.

Tone Generator Configuration
Built into the FS-516 are test tone generators for audio. There are settings for four tone frequencies and tone levels. The tone frequency aids in identifying the different channels within a group or bank.

RCP-503
Select the card to be controlled
Select the Audio controller button, left side of the controller.
Select CFG bottom button on right side.
Select Tone Gen Config, second button down on the left side of the menu.
Select Freq, top button on the left side of the menu.
The knobs across the bottom adjust the frequency of the test tones from 20Hz to 20,000Hz
Select Level, second button down on the left side of the menu.
The knobs across the bottom adjust the absolute level for the four test tone generators from –96.0dBFS to 0.0dBFS.
Select the Back button to return to previous menus.

Lip-Sync Phase Adjust
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 that provides the tracking information. 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.

RCP-503
Select the card to be controlled
Select the Audio controller button, left side of the controller.
Select CFG bottom button on right side.
Select Lip-Sync Adjust, third button from the top on the left side of the menu.
The left most knob, Tracking, can be set to Slow, Medium, or Fast.
The second knob from the left, Add Offset, can add additional audio delay to properly correct lip-sync errors.
Select the Back button to return to previous menus.

Embed Enable Setting
Audio streams can be embedded into the SDI stream if desired. This setting is normally set to Off

RCP-503
Select the card to be controlled
Select the Audio controller button, left side of the controller.
Select CFG bottom button on right side.
Select Embed Enab, bottom button on the left side of the menu.
This selection is either On or Off
Select the Back button to return to previous menus.

Select, Route and Embed Audio Sources
By using this menu any of the audio channels can be embedded into the SDI stream. Audio inputs can be routed into groups and summed with other channels.

RCP-503
Select the card to be controlled
Select the Audio controller button, left side of the controller.
Select CFG bottom button on right side.
Opt Select Sources, top button on the right side of the menu.
Using the left most knob select the output channel desired. The indication is Group.Channel or Grp4.3 is Group 4 Channel 3.
Using the second knob to select the input channel desired.
The third knob allows a second channel to be summed with the channel selected with the second knob.
The fourth knob adjusts the amount of summing to be used for the two channels.
Select the Back button to return to previous menus.

AES Output Selection
The four AES outputs can be selected from the available group settings.

RCP-503
Select the card to be controlled
Select the Audio controller button, left side of the controller.
Select CFG bottom button on right side.
Select AES Out Sources, second button from the top on the right side of the menu.
Using the knobs across the bottom select the input group and channel for the output channel desired. The indication is Group.Channel or Grp4.3 is Group 4 Channel 3.
Select the Back button to return to previous menus.

Automatic Level Control Configuration
There are four Automatic Level Control (ALC) circuits, one for each of four banks. Each bank can have ALC active or not, Audio Limiter active or not, ALC Level and Rate, and Peak Limiter Level and Rate.

RCP-503
Select the card to be controlled
Select the Audio controller button, left side of the controller.
Select CFG bottom button on right side.
Select ALC Config, third button from the top on the right side of the menu.
Select a Bank to Adjust
Select to activate/deactivate the ALC by using the ALC select button
Select to activate/deactivate the Limiter by using the LIM select button
The left most knob – LEVEL– adjusts the floor level at which the ALC becomes active.
The next knob controls the rate or speed at which the ALC attacks or adjusts the level.
The third knob sets the ceiling that the limiter starts to reduce the audio level.
The right most knob adjusts the rate at which the limiter adjusts for over volume.
Select the Back button to return to previous menus.

5. 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 that are identified here with ways to isolate them and render a solution.

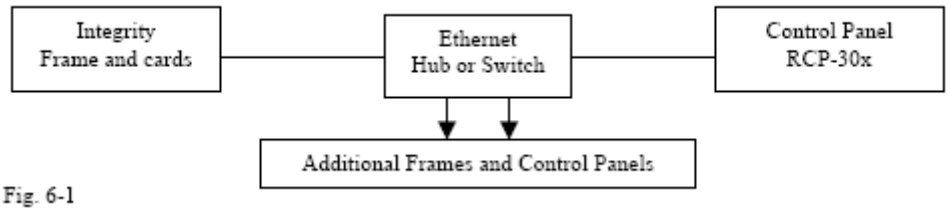


Fig. 6-1

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 that 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

No frames or cards found.

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

1. The controller card (ZFCB) 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, and then remove the inner center cover to access the ZFCB 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, and 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.
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. Make sure the selected IP addresses are each unique on the network. The MAC addresses are factory programmed, and cannot be changed.

Selecting Ethernet cables

There are varieties of cables with RJ-45 connectors on the ends in the marketplace. 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 802.3specifications.

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