

Installation and Operation Manual

SD-STAR™ **Standard Definition Personal Test and Measurement Monitor**

November 2010

Revision: D

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Publication Information

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SD-STAR

Standard Definition Personal Test and Measurement Monitor

Installation and Operation Manual

Revision D

November 2010

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About This Manual

This manual details the features, installation procedures, operational procedures, and specifications of the SD-STAR standard definition personal test and measurement monitor.

About This Manual provides an overview of this installation and operation manual, describes manual conventions, and tells you where to look for specific information. This section also gives you important information on unpacking and shipping your product.

Intended Audience

This manual is written for engineers, technicians, and operators responsible for the installation, setup, and/or operation of the SD-STAR standard definition personal test and measurement monitor.

Finding Specific Information in This Guide

Table P-1 shows the location of specific information in this guide.

Table P-1 Finding Specific Information in this Guide

If you are looking for	Go to
Audio monitor	Page 26
Audio signal generator	Page 28
Battery pack	Page 15
Color monitor	Page 30
Configuration	Page 16
Connections	Page 14
Features	Page 10
Installation	Page 13
Main menu selections	Page 18
Maintenance	Page 42
Oscilloscope	Page 21

Table P-1 Finding Specific Information in this Guide (*Continued*)

If you are looking for	Go to
Pinouts	Page 51
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Serial monitor	Page 24
Service and support	Page 11
Specifications	Page 45
System setup	Page 19
Test signal generator source ID	Page 39
Troubleshooting	Page 41
Vector scope	Page 35
VFlash	Page 42
Waveform monitor	Page 32

Manual Information

This section provides information about the revision history of the manual, writing conventions used for ease of understanding as well as for navigation throughout the document, and information about obtaining other product manuals.

Revision History


Table P-2 Manual Revision History

Edition	Date	Revision History
A	July 2010	Initial release
B	September 2010	Update to power adapter specifications
C	November 2010	Addition of altitude and humidity specifications
D	December 2010	Removal of stylus

Writing Conventions

To enhance your understanding, the authors of this manual have adhered to the following text conventions:

Table P-3 Manual Style and Writing Conventions

Term or Convention	Description
Bold	Indicates dialog boxes, property sheets, fields, buttons, check boxes, list boxes, combo boxes, menus, submenus, windows, lists, and selection names
<i>Italics</i>	Indicates email addresses, the names of books or publications, and the first instances of new terms and specialized words that need emphasis
CAPS	Indicates a specific key on the keyboard, such as ENTER, TAB, CTRL, ALT, or DELETE
Code	Indicates variables or command-line entries, such as a DOS entry or something you type into a field
> or →	Indicates the direction of navigation through a hierarchy of menus and windows
hyperlink	Indicates a jump to another location within the electronic document or elsewhere
Internet address	Indicates a jump to a website or URL
	Indicates important information that helps to avoid and troubleshoot problems
To perform a procedure	Indicates the introduction to a procedure or series of procedural steps

Unpacking/Shipping Information

This product was carefully inspected, tested, and calibrated before shipment to ensure years of stable and trouble free service.

Unpacking a Product

- 1 Check equipment for any visible damage that may have occurred during transit.
- 2 Confirm that you have received all items listed on the packing list.
- 3 Contact your dealer if any item on the packing list is missing.
- 4 Contact the carrier if any item is damaged.
- 5 Remove all packaging material from the product and its associated components before you install the unit.

Product Servicing

SD-STAR modules are not designed for field servicing. All hardware upgrades, modifications, or repairs require you to return the modules to the Customer Service center. For more information see [SD-STAR Service and Support](#) on page 11.

Returning a Product

In the unlikely event that your product fails to operate properly, please contact Customer Service to obtain a Return Authorization (RA) number, and then send the unit back for servicing.

Keep at least one set of original packaging, in the event that you need to return a product for servicing. If the original packaging is not available, you can purchase replacement packaging at a modest cost or supply your own packaging as long as it meets the following criteria:

- Withstands the weight of the product
- Holds the product rigid within the packaging
- Leaves at least two inches of space between the product and the container
- Protects the corners of the product

Ship products back to us for servicing prepaid and, if possible, in the original packaging material. If the product is still within the warranty period, we will return the product prepaid after servicing. For more information see [SD-STAR Service and Support](#) on page 11.

Operator's Safety Summary



WARNING: These instructions are for use by qualified personnel only. To reduce the risk of electric shock, do not perform this installation or any servicing unless you are qualified to do so. Refer all servicing to qualified service personnel.

Ensuring Safety

- If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired. The unit should not be exposed to dripping or splashing, and no objects filled with liquids, such as vases, shall be placed on the unit.
- When the unit is to be permanently cabled, connect the protective ground conductor before making any other connections.
- Operate built in units only when they are properly fitted into the system.
- For permanently cabled units without built in fuses, automatic switches, or similar protective facilities, the AC supply line must be fitted with fuses rated to the units.
- Before switching on the unit, ensure that the operating voltage set at the unit matches the line voltage, if appropriate. If a different operating voltage is to be set, use a fuse with the appropriate rating. Refer to the Installation Instructions.
- Units of Protection Class I with an AC supply cable and plug that can be disconnected must be operated only from a power socket with protective ground contact:
 - Do not use an extension cable-it can render the protective ground connection ineffective.
 - Do not intentionally interrupt the protective ground conductor.
 - Do not break the protective ground conductor inside or outside the unit or loosen the protective ground connection; such actions can cause the unit to become electrically hazardous.
- Before opening the unit, isolate it from the AC supply. Then ensure that

- ❑ Adjustments, part replacements, maintenance, and repairs are carried out by qualified personnel only.
- ❑ Safety regulations and rules are observed to prevent accidents.
- ❑ Only original parts are used to replace parts relevant to safety (for example, the power on/off switches, power transformers, and fuses).
- Replaceable fuses can be hazardous when live. Before replacing a fuse, disconnect the AC power source.
- Use caution when cleaning the equipment; isopropyl alcohol or similar solvents can damage or remove the labels.
- Observe any additional safety instructions specified in this manual.

Explanation of Symbols

These symbols may appear on Harris equipment:

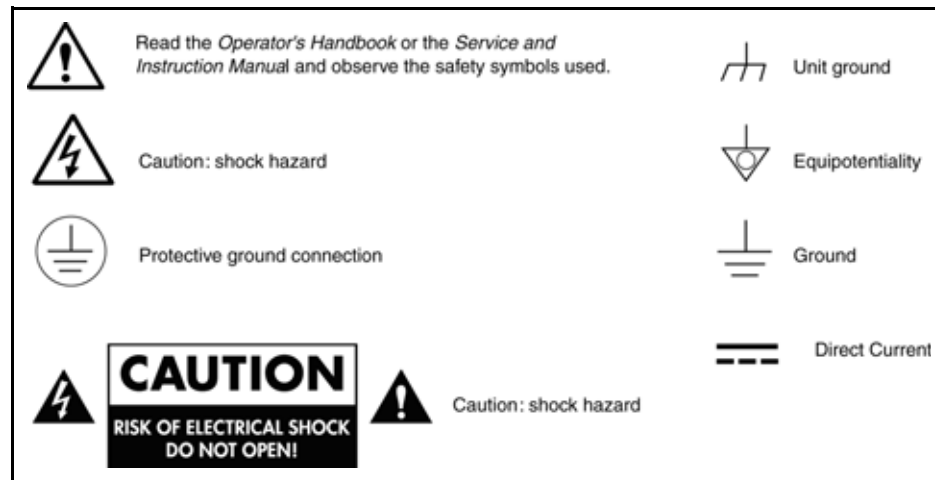


Figure P-1 Safety Symbols Appearing on Harris Equipment

This product manual uses the following safety terms and symbols to identify certain conditions or practices.

Table P-4 Safety Terms and Symbols Appearing in the Product Manual

Symbol	Description
	WARNING: Identifies conditions or practices that can result in personal injury or loss of life — high voltage is present. Uninsulated dangerous voltage within the product's enclosure may be sufficient to constitute a risk of electric shock to persons.
	CAUTION: Identifies conditions or practices that can result in damage to the equipment or other property. Important operating and maintenance (servicing) instructions are included in the literature accompanying the product.

Certification Labels and Symbol Locations

On Harris equipment, certification labels and symbols are located on the back panel, rear chassis sides, or bottom rear of the chassis. On smaller space-restricted units, most labels and symbols can be found on the bottom rear of the chassis.

Directives and Compliances

This section provides information concerning Harris Corporation compliance with EU Directive 2002/95/EC and EU Directive 2002/96/EC.

Restriction on Hazardous Substances (RoHS) Directive

Directive 2002/95/EC — commonly known as the *European Union (EU) Restriction on Hazardous Substances (RoHS)* — sets limits on the use of certain substances found in electrical and electronic equipment. The intent of this legislation is to reduce the amount of hazardous chemicals that may leach out of landfill sites or otherwise contaminate the environment during end-of-life recycling. The Directive, which took effect on July 1, 2006, refers to the following hazardous substances:

- Lead (Pb)
- Mercury (Hg)
- Cadmium (Cd)
- Hexavalent Chromium (Cr-VI)
- Polybrominated Biphenyls (PBB)
- Polybrominated Diphenyl Ethers (PBDE)

In accordance with this EU Directive, products sold in the European Union will be fully RoHS-compliant and “lead-free.” Spare parts supplied for the repair and upgrade of equipment sold before July 1, 2006 are exempt from the legislation. Equipment that complies with the EU directive will be marked with a RoHS-compliant symbol, as shown in [Figure P-2](#).

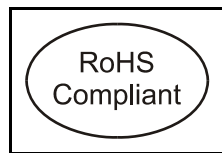


Figure P-2 RoHS Compliance Symbol

Waste from Electrical and Electronic Equipment (WEEE) Directive

The *European Union (EU) Directive 2002/96/EC on Waste from Electrical and Electronic Equipment (WEEE)* deals with the collection, treatment, recovery, and recycling of electrical and electronic waste products. The objective of the WEEE Directive is to assign the responsibility for the disposal of associated hazardous waste to either the producers or users of these products. As of August 13, 2005, producers or users are required to recycle electrical and electronic equipment at end of its useful life, and must not dispose of the equipment in landfills or by using other unapproved methods. (Some EU member states may have different deadlines.)

In accordance with this EU Directive, companies selling electric or electronic devices in the EU will affix labels indicating that such products must be properly recycled. Contact your local Sales representative for information on returning these products for recycling. Equipment that complies with the EU directive will be marked with a WEEE-compliant symbol, as shown in [Figure P-3](#).

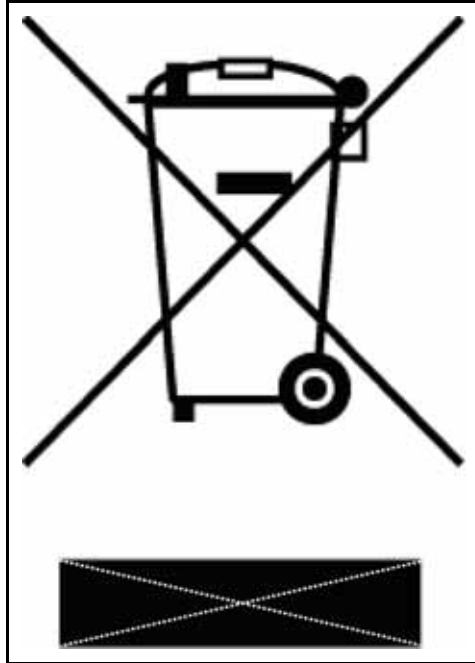


Figure P-3 WEEE Compliance Symbol

1 Introduction

The SD-STAR standard definition and analog composite personal test and measurement monitor is a multi-purpose digital device with Test Signal Generator, Waveform, Vector Scope, Color Monitor, and Audio Analyzer/Monitor functionality. It is ideal for monitoring field production camera setup, equipment installation, or troubleshooting signal path issues related to standard definition digital formats. The SD-STAR also has an oscilloscope function that accepts a variety of input formats for signal testing and monitoring.

The hand-held test and measurement instrument offers the convenience of portability without sacrificing function and performance. The SD-STAR features an integrated 320×240 color LCD display, using touch-screen technology to control and configure each operation. Maintaining power in the field is supported by a lithium ion battery.

The SD-STAR includes two video inputs: one for monitoring SD-SDI signals formatted as SMPTE 259M with embedded AES audio, and one for analog composite video or other formatted signals viewed on the oscilloscope. It contains a Serial Data Analyzer. It also has two video test signal outputs from the test signal generator: one formatted as SMPTE 259M with embedded AES audio, and one formatted as composite analog video. The SD-STAR has a stereo analog audio output of the input embedded source or tone from the audio signal generator (ASG).

Main Features

- Picture Display (Color Monitor)
- Multiple functionality
- Oscilloscope
- Vectorscope
- Waveform Monitor
- Test (video and audio) Signal Generator
- Embedded Audio Monitor
- Serial Data Analyzer (Serial Monitor)
- Multiple format
 - SD SDI: 525/59.94 and 625/50
 - Analog: NTSC and PAL
- Portable, handheld
- Weighs under one pound
- Integrated 320×240 color LCD display
- Touch screen operation

The SD-STAR front, top, and bottom views are illustrated in [Figure 1-1](#).

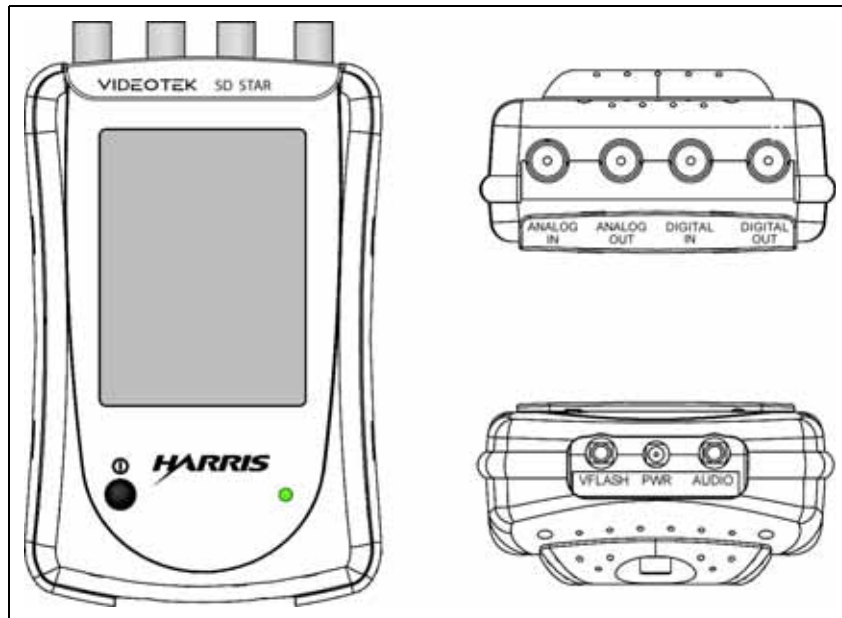


Figure 1-1 SD-STAR Views

SD-STAR Service and Support

For service and support, telephone the Harris Customer Service Department at **1-888-534-8246**. If the problem cannot be resolved over the telephone and the instrument must be shipped to Harris for service or repair:

- Obtain a Return Authorization (RA) number from the Harris Customer Service Department.
- Attach a tag to the unit with the following information:
 - Your company name, address, and telephone number
 - The name of the contact person at your company
 - The RA number
 - The unit serial number
 - An explanation of the problem
- To prevent shipping damage, pack the unit the same way Harris had packed it. If possible, use the original packing materials in the original shipping container.
- Ship the unit to the following location:

Harris Corporation
Videotek Test and Measurement
243 Shoemaker Road
Pottstown, PA 19464-6433
Attn: RA xxxx (where xxxx is the RA number)
Email: BCDSERVICE@harris.com

2 Installation

This section provides information about inspecting, installing, and configuring the SD-STAR.

Inspecting the Shipment

Before installing the SD-STAR, inspect the box and the contents. Report any damage to the shipper, and then telephone the Harris Corporation Customer Service Department (see [SD-STAR Service and Support](#) on page 11).



Refer to the enclosed packing sheet for the latest list of items that are supplied with the unit.

The box contains the following:

- One SD-STAR main unit
- One DVD containing the [SD-STAR Installation and Operation Manual](#)
- One power adapter and cord
- One sunshield
- One belt-style pouch
- One 6-ft, 9-pin D-sub to 3.5 mm connector cable
- One lithium ion battery pack installed

Save the box and packing material for any future shipping requirements.

Connecting the SD-STAR

The SD-STAR connectors and features are illustrated in [Figure 2-1](#), and the function of each is described in [Table 2-1](#).

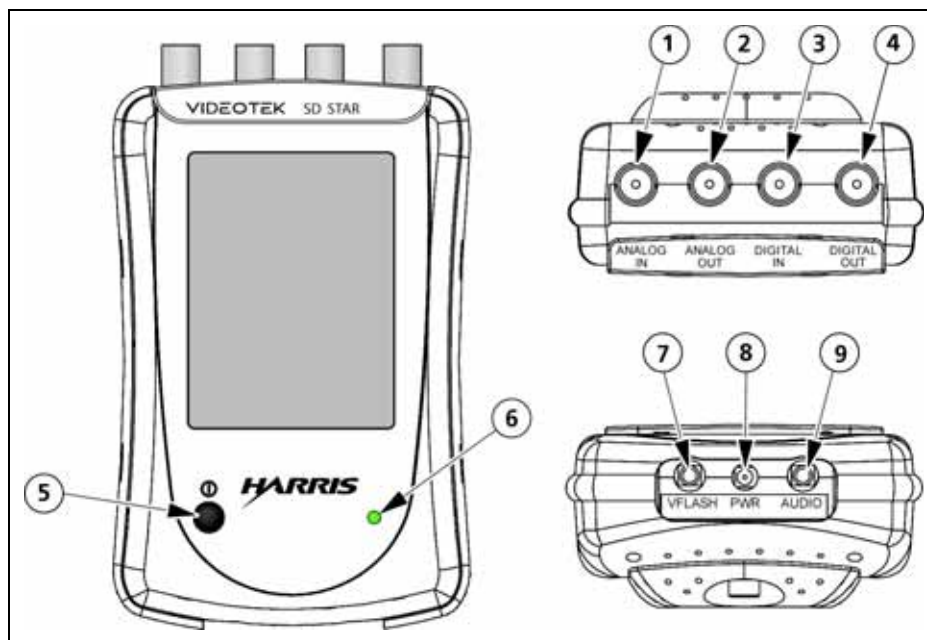



Figure 2-1 SD-STAR Panel

Table 2-1 Description of SD-STAR

Key	Label	Description
1	ANALOG IN	Female composite video input connector; scope input
2	ANALOG OUT	Female composite video output
3	DIGITAL IN	Female BNC connector; SD-SDI input
4	DIGITAL OUT	Female BNC connector; SD-SDI output
5		Power Button; press and hold until the backlight illuminates to turn unit on; press to turn unit off
6	Not labeled	Multi-colored LED to indicate battery charge status: <ul style="list-style-type: none">■ Yellow - low battery charge (when the lithium battery is installed, the LED will only turn yellow when the battery is extremely low)■ Red - battery is charging■ Green - battery is fully charged or battery charge cycle timer is exceeded
7	VFLASH	3.5 mm female phone jack connector for updating the SD-STAR using the supplied cable
8	PWR	Micro-miniature, female, power connector to receive the 5.0V DC to charge the lithium battery and/or power the SD-STAR
9	AUDIO	3.5 mm female phone jack connector with a stereo output to monitor embedded audio or analog audio tone from the audio signal generator

Battery Pack and SD-STAR Power-Up

The SD-STAR is powered by a lithium ion battery pack that is charged with a power adapter. The device can still be in use without affecting charge time. The front panel LED will turn green when the battery is fully charged.



The lithium battery should be charged for 8 hours before using the unit for the first time with the power adapter.

Battery Saver mode in the System Setup menu is used to darken the display in order to save battery power. The LCD screen will flash at regular intervals when Battery Saver mode is activated. This greatly extends the battery life. The Battery Saver mode selections are Off, 1 minute, 5 minutes (default), or 10 minutes. The test signal outputs continue to function when in Battery Saver mode. To exit Battery Saver mode, touch anywhere on the screen.

Recharging the Unit

The battery charging circuit has a built-in timer to protect against damaging the batteries from overcharging. A battery pack that is very low may take longer to charge to full than the timer allows. The charge time can be reset during the charge cycle by removing the external power plug from the unit for a few seconds, and then reconnecting it.

When the EXPECTED TIME TO BATTERY EMPTY displays 3 MINUTES (next to the battery symbol), the unit briefly displays BATTERY EXHAUSTED prior to powering down. Recharge the battery pack installed in the device using the power adapter. (Connect the power adapter to the AC outlet and the PWR connector of the SD-STAR.) The front panel LED will turn green when the battery charging cycle is complete or the battery pack is fully charged.

Replacing the Battery Pack



WARNING: Do not puncture, damage, or discard batteries in fire. The batteries can explode, releasing hazardous chemicals. Dispose of the batteries according to the instructions of the battery manufacturer and in accordance with local laws.

If the lithium ion battery pack needs to be replaced, perform the following:

- 1 Unscrew the thumbscrew on the battery compartment lid on the back of the SD-STAR.
- 2 Remove the old lithium ion battery pack from the CN10 connection inside the battery compartment.
- 3 Plug the new lithium ion battery pack into the CN10 connection inside the battery compartment.
- 4 Insert the new lithium ion battery pack into the battery compartment.
- 5 Place the battery compartment lid back onto the SD-STAR, and then secure the lid using the thumb screw.
- 6 Connect the power adapter to the AC outlet and the PWR connector of the SD-STAR.
- 7 The unit should be charged for eight hours before using the unit for the first time on battery power.

Press and hold the power button until the LCD backlight illuminates to activate the unit. Allow a few seconds for the unit to initialize.

Configuring the SD-STAR

The SD-STAR does not have any specialized configuration procedures. Use of SD-STAR menus and buttons are described in [Chapter 3, *General Operation*](#).

3 General Operation

The SD-STAR main menu is the first screen to appear after the unit is powered on. The **MAIN MENU** button is always active in the lower-left corner of the screen, even though it is not seen on some screens. To return to the main menu, tap on the lower left of any screen.

The Main Menu is shown in [Figure 3-1](#).

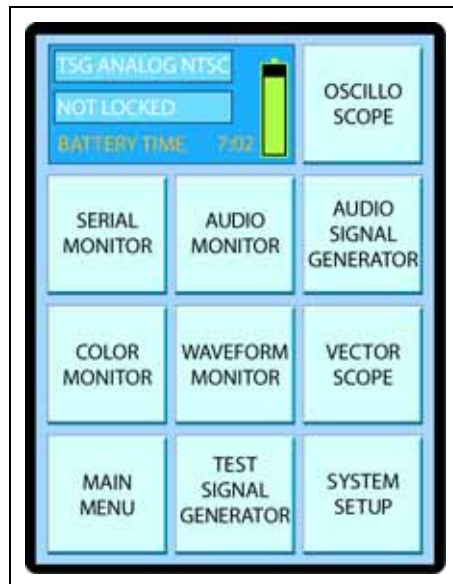


Figure 3-1 Main Menu

Main Menu Selections

The STATUS INDICATION on the upper left of the main menu screen is used to indicate if the input mode and output mode are in analog or digital. The input signal selections are found in the System Setup menu. Also, the battery charge indication is shown in this area. The remaining discharge time is displayed to the bottom left of the battery charge indication. The time remaining will adjust based upon the TSG Power, Input Power, and Screen Saver selections.



The inputs for Monitoring, Scope, and Outputs that are active must be selected in the System Setup Menu. The error message INPUT IS TURNED OFF appears if that function is not activated.

- **OSCILLOSCOPE:** This selection is used to access the Oscilloscope display and its operation submenus. For more information on this selection, see page 21.
- **SERIAL MONITOR:** This selection is used to access the Serial Monitor display. The Serial Monitor screen is used to measure the number and type of errors that occur on the serial input. For more information on this selection, see page 24.
- **AUDIO MONITOR:** This selection is used to access the digital input Embedded Audio Monitor display. This screen is used to control the STEREO output that uses the audio output connector. For more information on this selection, see page 26.
- **AUDIO SIGNAL GENERATOR:** This selection is used to access the analog Audio Tone Generator menu. The tone generator uses the audio output jack as a balanced test tone source. For more information on this selection, see page 28.
- **COLOR MONITOR:** This selection is used to access the Color Monitor display. The Color Monitor display shows the picture of the input signal. For more information on this selection, see page 30.
- **WAVEFORM MONITOR:** This selection is used to access the Waveform Monitor display. For more information on this selection, see page 32.
- **VECTOR SCOPE:** This selection is used to access the Vector Display. For more information on this selection, see page 35.
- **MAIN MENU:** This selection is used to return to the Main Menu.
- **TEST SIGNAL GENERATOR:** This selection is used to access the test signal generator menu. The Test Signal Generator (TSG) screen is used to set up the test signals. For more information on the Test Signal Generator, see page 37.
- **SYSTEM SETUP:** This selection is used to access the System Setup display. The System Setup display is used to change the configurations in the SD-STAR. For more information on this selection, see page 19.

System Setup

The System Setup screen consists of the settings for various functions of the SD-STAR. The input function and output signal modes are selected in this menu.

The System Setup screen is shown in [Figure 3-2](#).

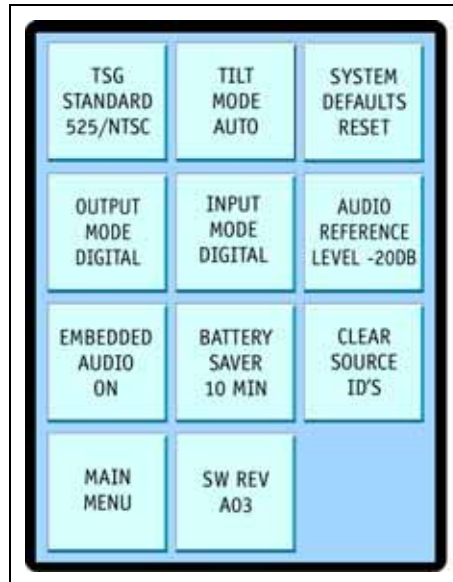


Figure 3-2 System Setup

The buttons include the following selections:

- **TSG STANDARD:** This selection selects the NTSC or PAL standard for analog TSG output and 525/59.94 or 625/50 standard for digital TSG output.
- **TILT MODE:** This selection controls the direction of the display presentation (upright position and left side downward position) of the Oscilloscope, Color Monitor, and Waveform displays tilt mode to automatic (AUTO), horizontal (HOZ), or vertical (VERT).
 - When TILT MODE → AUTO is activated, the Oscilloscope, Color Monitor, and Waveform displays change when the unit is held vertically or held on its side.
 - If the unit is held on its left side, or has been tilted on the left side edge and is currently lying on its back, the enabled displays operate in HOZ presentation.
 - If the unit is held upright, or has been tilted upright and is currently lying on its back, the enabled displays operate in VERT presentation.



To keep these displays in either the horizontal or vertical position, set the TILT MODE to HOZ or VERT.

- When TILT MODE → HOZ is activated, the Oscilloscope, Color Monitor, and Waveform display stay in the horizontal position.

- When TILT MODE → VERT is activated, the Oscilloscope, Color Monitor, and Waveform displays stay in the vertical position.

The sensing of position by the automatic tilt switch is only active in the Oscilloscope, Color Monitor, and Waveform modes. If TILT MODE is set to AUTO but the display does not tilt, rock the SD-STAR to the other orientation and back.

Color Monitor tracks the tilt switch automation and still has the 90° rotation button override. The override button is not remembered when leaving and reentering this function.

- **SYSTEM DEFAULTS RESET:** This selection resets the SD-STAR to the factory default settings.
- **OUTPUT MODE:** This selection sets ANALOG, DIGITAL, or OFF for the TSG output functions.
- **INPUT MODE:** This selection sets AUTO, ANALOG, DIGITAL, SCOPE, or OFF for the input functions.

When this selection is set to AUTO, the selections on the main menu can control the change of which signal type (analog or digital) are being displayed by the color monitor, waveform, and vectorscope functions. The SERIAL MONITOR and AUDIO MONITOR function buttons switch the input selection to DIGITAL, and the OSCILLOSCOPE function selects the analog signal for monitoring functions. The TSG output selection is not affected by these selections.

- **AUDIO REFERENCE LEVEL:** Within the Audio Monitor screen bar graph is a set of reference tick marks that can be set in this menu selection. The reference selections are -18 dB and -20 dB. Once the audio bar goes above the reference marks, the color of the bar changes from green to yellow. When the bar passes the -12 dB mark, then the bar changes from yellow to red. This selection affects one other button:



The **AMPLITUDE FULL SCALE -20(-18)** button in the DIGITAL TSG EMBEDDED AUDIO menu (page 40) changes to either -18 or -20 dB with this selection.

- **EMBEDDED AUDIO:** This selection enables and disables the embedded audio in the digital test signal generator.
- **BATTERY SAVER:** This selection darkens the display and turn off monitor functions in order to save battery power. The settings are OFF, 1 minute, 5 minutes (default), or 10 minutes. The test signal outputs continue to function when in Battery Saver mode. The LCD screen will flash at regular intervals when Battery Saver mode is activated. Touch anywhere on the screen to exit Battery Saver mode. If serial monitor is selected, input circuitry remains on.
- **CLEAR SOURCE ID'S:** This selection is used to erase previously-entered source ID information set up via the TSG SOURCE ID selection.
- **MAIN MENU:** This selection returns to the Main Menu.
- **SW REV:** This button indicates the current SD-STAR software (SW) revision level.

Oscilloscope

The OSCILLOSCOPE monitor screen is shown in [Figure 3-3](#).

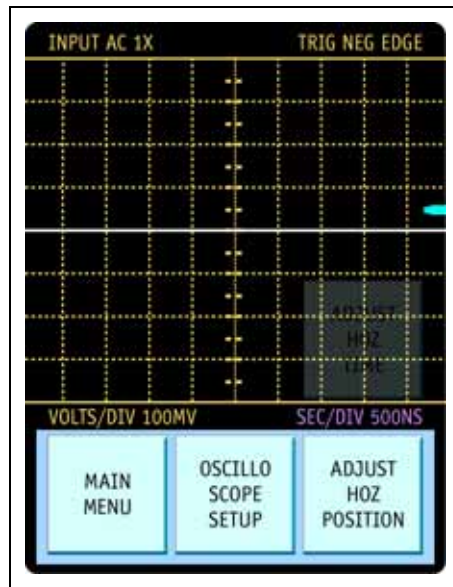


Figure 3-3 OSCILLOSCOPE Monitor Screen



Use the top half of the screen (BNC end) for wipe adjustments. Several of the displays have “ghost” (or hidden) buttons that do not show at all viewing angles. These ghost buttons are always in the lower two rows of buttons. If the display is in horizontal mode, these buttons remain at the same location as the vertical display but more of them become ghost buttons.

When viewing in horizontal mode, the BNCs and wipe area are to the left and the buttons are to the right.

The analog input circuitry limits the signal on the analog input BNC to a maximum of ± 2.2 volts DC. The oscilloscope AC coupling is deeper in the circuit, keeping this 2.2 vDC restriction. With a 10-to-1 scope probe, signals of 40 Vp-p with no DC offset (± 20 vDC) can be viewed.



When viewing repetitive signals (such as video test signals, CW sine waves), because of the sampling rate and the digital sub sampling for the small display of the SD-STAR, on frequencies that are divisible evenly by six the presented waveform may look like a frequency much lower than the signal. Sometimes a pattern is created by the display sampling rate. Selecting a faster horizontal time base should reveal the correct frequency of the signal.

At the top left of the OSCILLOSCOPE monitor screen is a display of the coupling type and the input type as selected in the OSCILLOSCOPE SETUP screen.

At the top right of the screen is a display of the trigger type as selected in the OSCILLOSCOPE SETUP screen or the adjustment button.

At the bottom left of the screen is a display of the volts per graticule division as selected in the OSCILLOSCOPE SETUP screen or the adjustment button.

At the bottom right of the screen is a display of the horizontal time per graticule division as selected in the OSCILLOSCOPE SETUP screen or the adjustment button.

The buttons include the following selections:



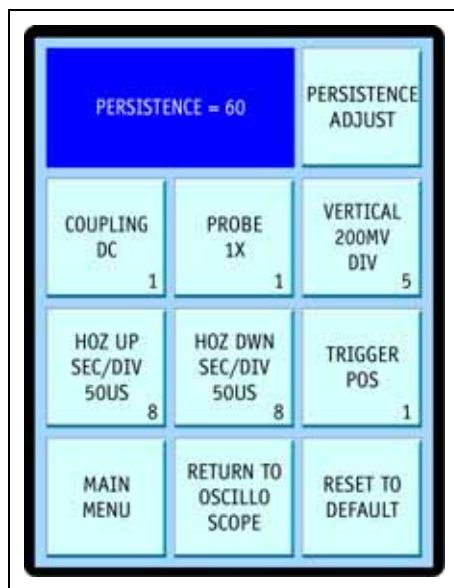
When using the oscilloscope in Horizontal mode all of the buttons will be ghosted. The following description is using the scope in Vertical mode.

- The **ADJUST** button has multiple selections that include **ADJUST HOZ POSITION**, **ADJUST VERT POSITION**, and **ADJUST TRIGGER LEVEL**. This button enables the ghost button above it that is used to change the oscilloscope display.
 - **ADJUST HOZ POSITION** enables the horizontal position screen wipe. This also enables the **ADJUST HOZ TIME** ghost button and is used to change the horizontal time base. The unit will cycle thorough the available time base (**SEC/DIV**) selections on each press of the ghost button.
 - **ADJUST VERT POSITION** enables the vertical position screen wipe. This also enables the **ADJUST VERT TIME** ghost button and is used to change the vertical gain. The unit will cycle thorough the available gain (**VOTLS/DIV**) selections on each press of the ghost button.
 - **ADJUST TRIGGER LEVEL** enables the trigger level screen wipe in POS or NEG trigger. This also enables the **ADJUST TRIGGER MODE** ghost button and is used to change the trigger format. The unit will cycle thorough the available trigger selections on each press of the ghost button. Trigger selections include **TRIG POS EDGE**, **TRIG NEG EDGE**, **TRIG HOZ SYNC**, **TRIG VERT SYNC**, **TRIG ODD FLD**, and **TRIG EVEN FLD**.
- The **OSCILLOSCOPE SETUP** button is used to enter the oscilloscope setup menu, which is used to set up the various functions of the oscilloscope display. See [Oscilloscope Setup](#) on page 22 for more detailed information.

Oscilloscope Setup

The OSCILLOSCOPE SETUP screen consists of the settings for various functions of the SD-STAR oscilloscope display.

The OSCILLOSCOPE SETUP screen is shown in [Figure 3-3](#).



The buttons include the following selections:

- The **PERSISTENCE ADJUST** selection is used to adjust the persistence of the signal. Once it is selected, drag side to side in the blue area to make the appropriate adjustments.
- The **COUPLING** selection is used as follows:
 - In **DC** mode, the vertical position cursor represent the zero volt point of the signal applied to the Analog input BNC.
 - In **AC** mode, the signal displayed will have any DC offset of the signal applied to the Analog input BNC removed.
 - In **GND** mode, a zero reference line is digitally generated for setting the vertical position.
- The **PROBE** selection is used to select the input impedance to 75Ω for direct cabling of the input signal, or $1\text{ M}\Omega$ for scope probe use. The 10X mode alters the vertical sensitivity readout to compensate for the 10:1 probe. The selectable input termination of $1\text{ M}\Omega$ or 75Ω allows the SD-STAR Oscilloscope to accept direct BNC cable connection to AES streams, low level unbalanced audio, and other analog video system signals.
- The **VERTICAL** selection toggles through 6 vertical gain sensitivities: 10, 20, 50, 100, 200, and 500 mVolts per graticule division. The ghost button in the Oscilloscope display copies this button when Adjust Vert Position is selected.
- The **HOZ UP SEC/DIV, HOZ DWN SEC/DIV** selections toggle up and down through 18 horizontal time per graticule division selections: (from fastest) 250, 500 nSec; 1, 2.5, 5, 10, 25, 50, 100, 250, 500 μ Sec; 1, 2.5, 5, 10, 25, 50, and 100 mSec (slowest). The ghost button in the oscilloscope display copies the **HOZ DWN** selection when **ADJUST HOZ POSITION** is selected.
- The **TRIGGER** selection steps through basic and video smart triggering modes. The selections are POS (edge), NEG (edge); HOZ; VERT; ODD FIELD (video), EVEN FIELD (video). The ghost button in the Oscilloscope display copies this button when **ADJUST TRIGGER LEVEL** is selected.
- The **RESET TO DEFAULT** selection sets the scope functions to factory preset values.



A recommended accessory for the oscilloscope operation of the SD-STAR is a 10:1, 100 MHz or better generic scope probe. The Test Products International (TPI) model IP250 that is a 1:1 or 10:1 switchable probe is recommended for use with the SD-STAR.

Serial Monitor

The SERIAL MONITOR screen is used to measure the number and type of errors that occur on the digital input. If everything is acceptable for a particular measurement, GOOD is displayed on the line. During an error, the GOOD indication changes to BAD and the number of times the error occurs is counted.

The SERIAL MONITOR screen is shown in [Figure 3-4](#).

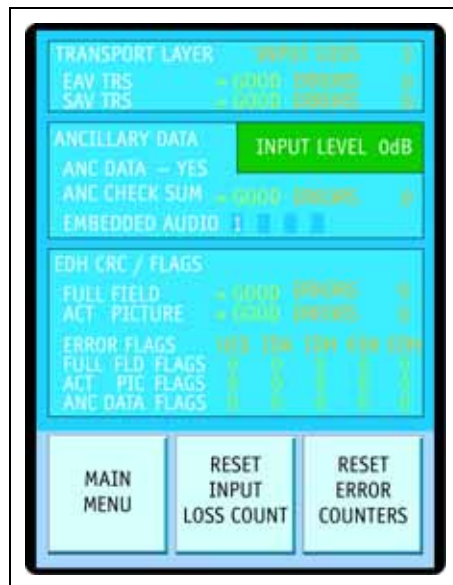


Figure 3-4 Serial Monitor

The errors are measured on the following parameters:

- Transport Layer:
 - EAV TRS: EAV (End of Active Video) looks at the position of that preamble word and verifies that the EAV hamming code is correct.
 - SAV TRS: SAV (Start of Active Video) looks for the position of the preamble word, and verifies that the SAV hamming code is correct.
- Ancillary Data:
 - ANC DATA PRESENT - Verifies that ANC data is detected
 - ANC CHECK SUM: Verifies that the internal calculated ANC CRC value is the same as the received CRC value. The error occurs when the internal calculated CRC value is different from the received CRC value.
 - EMBEDDED AUDIO: Detects how many groups of audio are available.
- EDH CRC/Flags:
 - FULL FIELD: Verifies that no EDH or CRC errors occur within the full field.
 - ACT PICTURE: Verifies that no EDH or CRC errors occur within the active picture.

Beneath the parameters are error flags that represent problems that can happen in Full Field, Active Picture, and Ancillary Data. The flags are Unknown Error Status (UES), Internal Error Detected Already (IDA), Internal Error Detected Here (IDH), Error Detected Already (EDA), and Error Detected Here (EDH). When an error occurs in one of these fields, the flag changes from 0 to 1.

At the bottom of the screen are three buttons:

- **MAIN MENU:** This button is used to return to the main menu.
- **RESET INPUT LOSS COUNT:** This button is used to clear the input loss count.
- **RESET ERROR COUNTERS:** This button is used to zero the error counters. The Serial Monitor error counters are active from the moment the Serial Monitor is selected when the Digital Input is selected. They are not active when the INPUT MODE is off, or if the display and input functions are in BATTERY SAVER mode. They remain active during BATTERY SAVER mode if the Digital input is selected and Audio Monitor menu or Serial Monitor menu is selected.

Audio Monitor

The AUDIO MONITOR screen displays two channels of audio. The channels that appear on the display are determined by the selection made in the AUDIO MONITOR SETUP menu.

The AUDIO MONITOR screen is shown in [Figure 3-5](#).

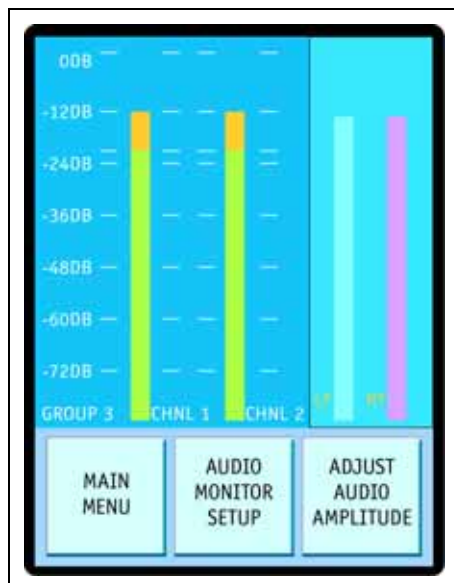


Figure 3-5 Audio Monitor

At the top of the vertical graph is the upper most value 0 dB. From 0 dB the indicators are -12 dB, -24 dB, 36 dB, -48 dB, -60 dB, and -72 dB. Each one of the bar graphs is Peak and Average response. Within the graph is an extra set of reference tick marks that can be set in the SYSTEM SETUP/AUDIO REFERENCE menu. The reference selections are -18 dB and -20 dB. Once the audio bar goes above this reference mark, the color of the bar changes from green to yellow. When the signal level exceeds the 12 dB mark, then the bar changes from yellow to red.

The **ADJUST AUDIO** button is used to select between adjusting the **BALANCE AND AMPLITUDE** of the Left and Right (LF/RT) analog (headphone) audio output. Once **AMPLITUDE** is selected, move up/down to increase and decrease the left and right amplitude for the audio output. If **BALANCE** is selected, move up/down to change the balance between the left and right channels for the audio output.

To achieve preset balance

- 1 Select **ADJUST AUDIO AMPLITUDE**.
- 2 Move up or down until the audio channel indicators reach their maximum or minimum levels.



*If this button reads, **AUDIO OUT IN ASG MODE**, the Audio Signal Generator is ON and it overrides the embedded AUDIO output.*

The **AUDIO MONITOR SETUP** button enters the AUDIO MONITOR SETUP menu, as shown in [Figure 3-6](#) is used to select which two channels from a particular group are displayed. Embedded audio is standardized into sixteen channels (four groups of four channels). The currently selected group and channels are indicated at the bottom of the Audio Monitor screen. The selections are as follows:

- GROUP 1 CHNL 1:2
- GROUP 1 CHNL 3:4
- GROUP 2 CHNL 1:2
- GROUP 2 CHNL 3:4
- GROUP 3 CHNL 1:2
- GROUP 3 CHNL 3:4
- GROUP 4 CHNL 1:2
- GROUP 4 CHNL 3:4

Once configured, press the AUDIO MONITOR MENU to return to the Audio Monitor screen.

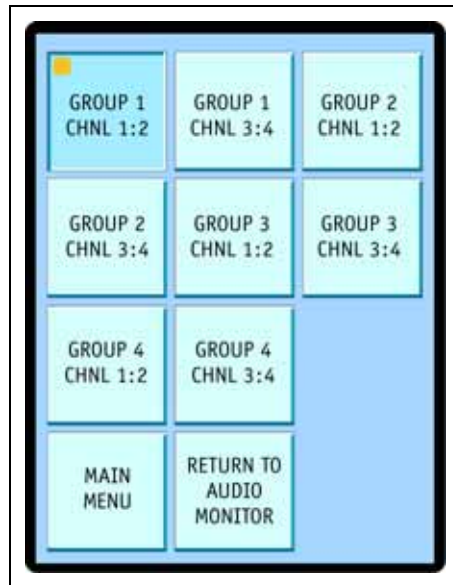


Figure 3-6 Audio Monitor Setup

Audio Signal Generator

The Audio Signal Generator selections are used to set frequency and amplitude for the analog audio output via the audio jack. The Audio Signal Generator screen is shown in [Figure 3-7](#).

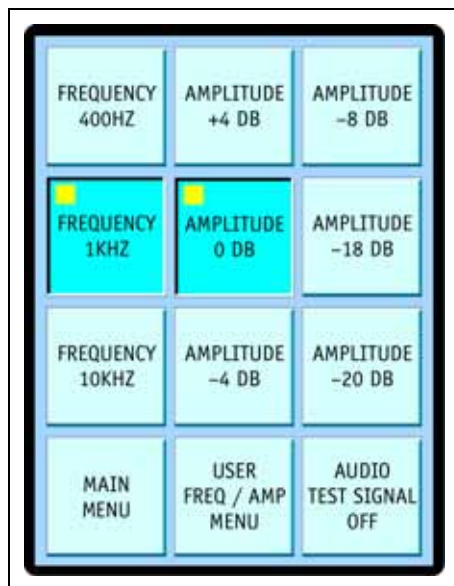


Figure 3-7 Audio Signal Generator Screen



When a selection is enabled, the button face will appear inverted and a small, yellow square will appear in the upper left corner of the button.

- **FREQUENCY:** The **FREQUENCY** buttons are used to set the frequency with preset values. Selections are 400 Hz, 1 kHz, and 10 kHz. To set customized selections, use the USER FREQ/AMP menu.
- **AMPLITUDE:** The **AMPLITUDE** buttons are used to select the level for the selected audio channel. Selections are +4 dB, 0 dB, -4 dB, -8 dB, -18 dB, and -20 dB.
- **USER FREQ/AMP MENU:** The **User FREQ/AMP Menu** button is used to access the USER FREQ/AMP menu. When this menu is selected, amplitude and frequency selections automatically change to user-defined, custom settings, and the FREQUENCY and AMPLITUDE buttons in Audio Channel setup menu display "USER."
- **AUDIO TEST SIGNAL:** This selection is used to enable or disable the audio tone to the audio jack. This will override the embedded audio output selection. Selections are ON and OFF.

User FREQ/AMP Menu

The User FREQ/AMP Menu is used to create custom frequency and amplitude selections for the Audio Signal Generator.

Once the menu is accessed, press the **AMPLITUDE ADJUST** or **FREQUENCY ADJUST** button., and then move up and down in the blue area of the screen to adjust the Amplitude or Frequency values. The **AUDIO TSG MENU** button is used to return the display to the Audio Signal Generator screen, and the **MAIN MENU** button is used to return to the Main Menu screen.

The User FREQ/AMP Menu is shown in [Figure 3-8](#).

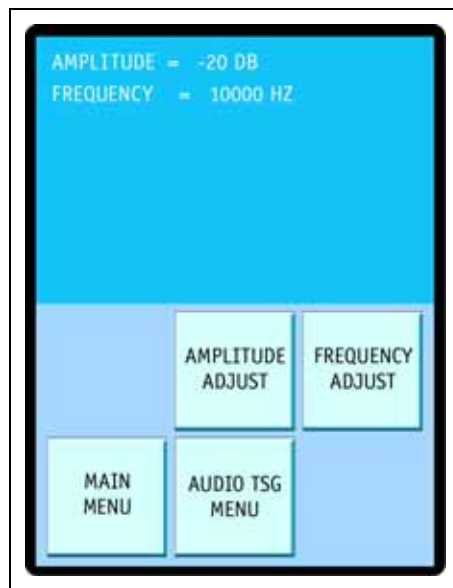


Figure 3-8 USER FREQ/AMP Menu

The **USER FREQ/AMP MENU** button remains highlighted for as long as a custom setting is selected. Pressing another **FREQUENCY** or **AMPLITUDE** button on the Audio Signal Generator menu changes the customized settings.

Color Monitor

The **COLOR MONITOR** selection is used to display a picture on the display. When first displaying the color monitor, the picture display is a vertical display with three buttons at the bottom: Main Menu, Color Monitor 90°, and Pulse Cross, as shown in [Figure 3-9](#). The picture is resized and only uses the odd fields for the display. The active picture is the currently selected input video format.

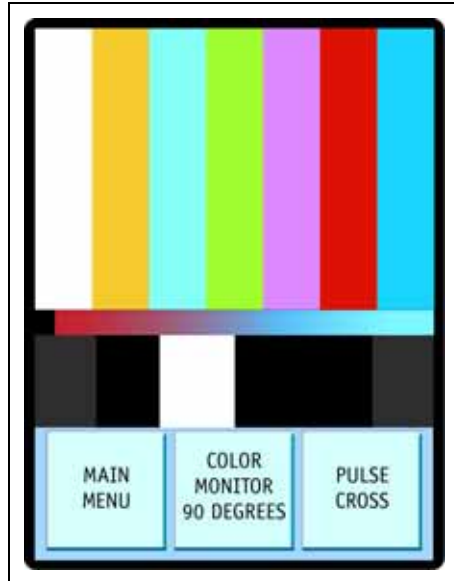


Figure 3-9 Color Monitor Button Locations (Vertically)

Press **Color Monitor 90 Degrees** to display the picture horizontally. When viewing the picture horizontally, no buttons are displayed. However, there are 3 invisible buttons on the right side of the picture, as shown in [Figure 3-10](#).

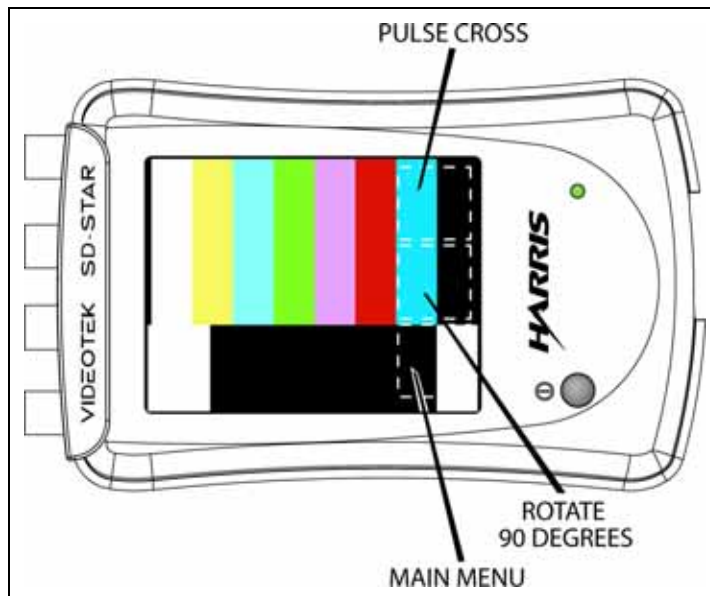


Figure 3-10 Color Monitor Button Locations (Horizontally)

Pulse Cross is used to offset the picture to view the vertical and horizontal blanking area of the picture. Data can be embedded in the blanking areas and viewed using this mode. In analog mode the sync and burst are not displayed. Sample pulse cross screen is shown in [Figure 3-11](#) (a Pulse Cross Horizontal View is also available).

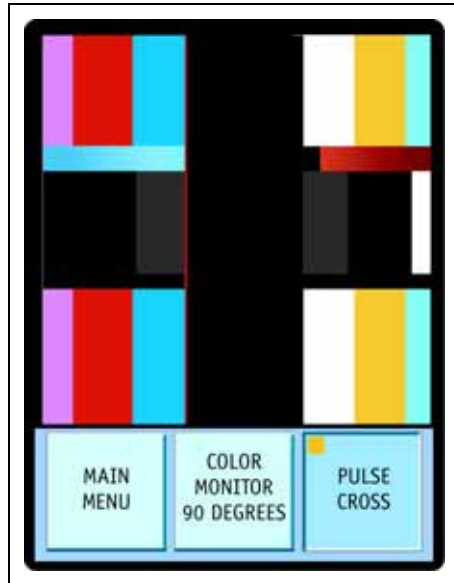


Figure 3-11 Sample Pulse Cross Screen

Waveform Monitor

The Digital Waveform Monitor screen is shown in [Figure 3-12](#).

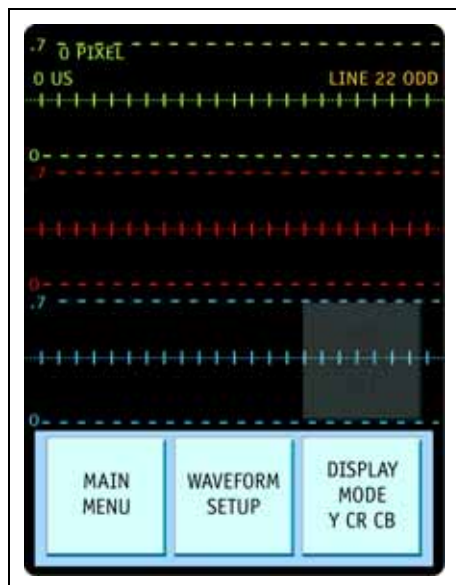


Figure 3-12 Waveform Monitor Screen (Vertical Display Presentation)



Use the top half of the screen (BNC end) for wipe adjustments. Several of the displays have “ghost” (or hidden) buttons that do not show at all viewing angles. These ghost buttons are always in the lower two rows of buttons. If the display is in horizontal mode, these buttons remain at the same location as the vertical display but more of them become ghost buttons.

When viewing in horizontal mode, the BNCs and wipe area are to the left and the buttons are to the right.

The Digital Waveform Monitor screen shows the 1H waveform of the input video. These display modes are available with the **DISPLAY MODE** button in the waveform display:

- **Y CR CB** mode displays the waveform in a luma, component blue, and component red representation. **Y**, **CR**, and **CB** are also single selections when in horizontal display mode.
- **GBR** displays the waveform into a green/red/blue component representation.
- In **ANALOG MODE** the display is composite analog.

The upper-left side of the display shows the pixel number and μ Sec readout representing the delay from SAV for digital. For analog, the display shows the μ Sec readout referencing the falling edge of sync in the upper right hand corner in VERT tilt mode and in the lower left hand corner in HOZ tilt mode. Dragging horizontally across the display changes the active starting pixel number and moves the waveform. The pixel number represents the position of the waveform starting at the left side of the display. To change the waveform position, drag across the screen to change the starting position of the waveform. For example, if the pixel indication says 0, then the active starting pixel is 0.

The upper-right side of the display shows the ODD field, EVEN field or LINE indication. Selection of these indications is made via the **DISPLAY MODE** buttons in the Waveform Setup menu.

In vertical display presentation a ghost button labeled **HOZ ZOOM (ON/OFF)** is displayed above the **DISPLAY MODE** button (see [Figure 3-12](#)). The **HOZ ZOOM** button enables horizontal display magnification. In horizontal display mode the bottom row of buttons remain at the same location, but they become ghosted also.

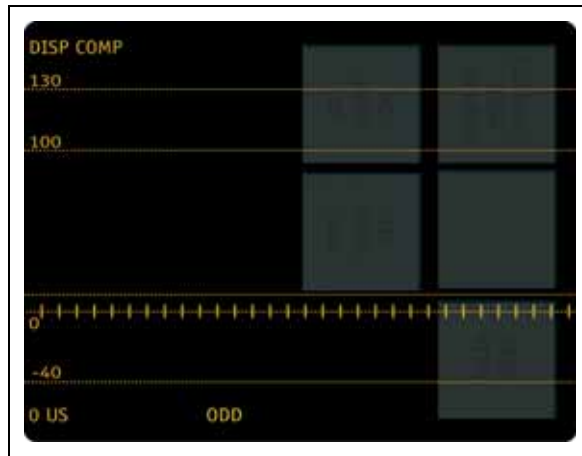


Figure 3-13 Waveform Monitor Screen (Horizontal Display Presentation)

In horizontal display mode, a ghost button labeled **VERT ZOOM (ON/OFF)** is displayed to the left of the **WAVEFORM SETUP** menu button. The **VERT ZOOM** button enables vertical display magnification when only single traces are displayed. The **DISPLAY MODE** button has only Y CR CB or G B R selections added in digital. If line select is active, **VERT ZOOM** → **ON** allows the screen wipe to perform in a vertical position. **VERT ZOOM** → **OFF** allows the screen wipe to change the selected line.

The **MAIN MENU** button is used to return to the Main Menu screen.

Waveform Setup Menu

The Waveform Setup menu screen is shown in [Figure 3-14](#).

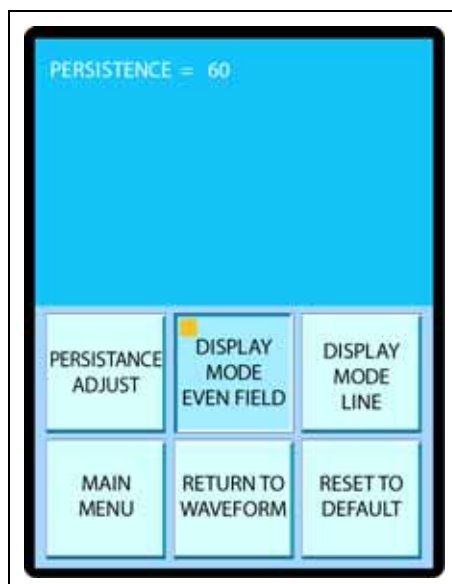


Figure 3-14 Waveform Setup Menu

- The **PERSISTENCE ADJUST** selection is used to adjust the persistence of the waveform. Once it is selected, drag up/down in the blue area to make the appropriate adjustments.
- The **DISPLAY MODE** selections are used to select ODD or EVEN field, or LINE as the display mode on the Waveform Monitor screen.
 - If **ODD FIELD** is selected, the Odd field is displayed on the waveform monitor.
 - If **EVEN FIELD** is selected, the Even field is displayed on the waveform monitor
 - If **LINE** is selected, the line number will be displayed to indicate the waveform is displaying one line only. Vertically dragging on the Waveform display changes the selected line.
- The **RETURN TO WAVEFORM** selection is used to return to the Waveform Monitor screen.
- The **MAIN MENU** selection is used to return to the Main Menu screen.
- The **RESET TO DEFAULT** selection is used to set the Persistence to 60, and the Display Mode to ODD.

Vector Scope

The Vector Scope screen is shown in [Figure 3-15](#).

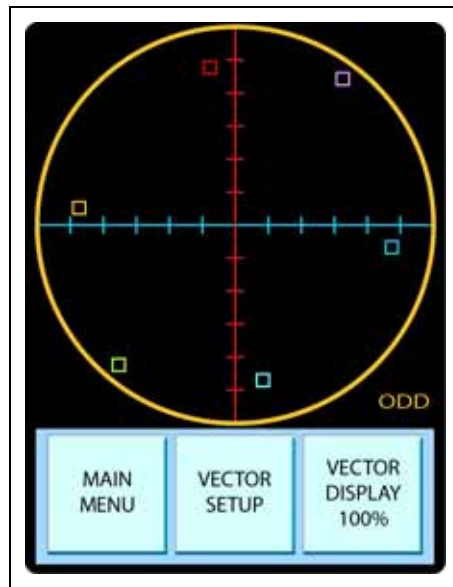


Figure 3-15 Vector Scope

The Vector Scope screen is used to measure the vector of the input. The vector display itself is a yellow circle with a blue horizontal graticule and red vertical graticule. The color boxes in the vector display represent the actual colors being measured: green, yellow, red, magenta, blue, and cyan.

The vector display can be set to 100% or to 75%. These selections are available with the **VECTOR DISPLAY** button:

The lower-right side of the display shows the ODD field, EVEN field or LINE indication. Selection of these indications is made via the **DISPLAY MODE** buttons in the Vector Setup menu.

Vector Setup Menu

The Vector Setup Menu display is shown in [Figure 3-16](#).

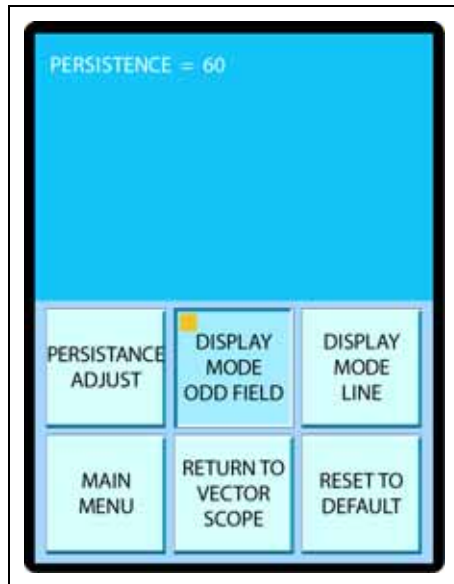


Figure 3-16 Vector Setup Menu

- The **DISPLAY MODE** selections are used to select ODD or EVEN field, or LINE as the display mode on the Vector Scope screen.
 - If **ODD FIELD** is selected, the Odd field is displayed on the vector monitor.
 - If **EVEN FIELD** is selected, the Even field is displayed on the vector monitor.
 - If **LINE** is selected, the display indicates the line number being monitored. Drag up/down on the screen in the Vector Scope display to change the line.
- The **PERSISTENCE ADJUST** selection is used to adjust the persistence of the Vector Scope. Once it is selected, move up/down to make the appropriate adjustments.
- The Vector Setup menu contains the **RESET TO DEFAULT** selection.
- The **RETURN TO VECTOR SCOPE** selection is used to return to the Vector Scope screen.
- The **MAIN MENU** selection is used to return to the Main Menu screen.
- The **RESET TO DEFAULT** selection is used to set the Persistence to 60, and the Display Mode to ODD.

Test Signal Generator

The SD-STAR outputs an SD signal when digital is selected or composite when analog is selected in the SYSTEM SETUP menu. The Test Signal Generator screen is used to select the various test signals available.

The Test Signal Generator screen is shown in [Figure 3-17](#) and [Figure 3-18](#).

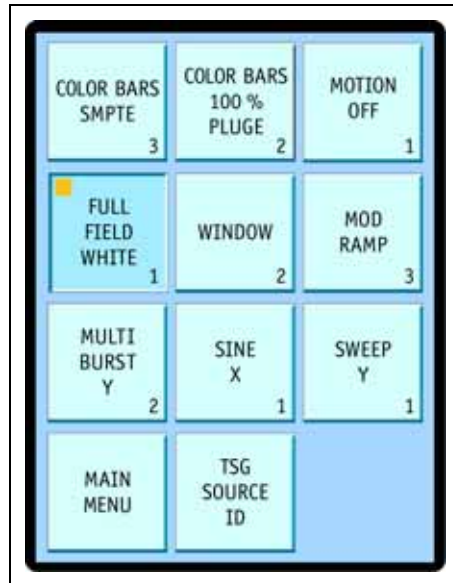


Figure 3-17 Test Signal Generator Analog Selections

Test Signal Generator analog selections are as follows:

- COLOR BARS (75% Full; 75% Pluge; SMPTE)
- COLOR BARS (100% Full; 100% Pluge)
- MOTION (Off, Speed Slow, Speed Medium, Speed Fast)
- FULL FIELD (White; Yellow; Cyan; Green; Magenta; Red; Blue; 75% Grey; Black)
- WINDOW (Window; Window Y)
- Y RAMP (Y Ramp; 10 Step, MOD Ramp)
- MULTI BURST (Multi Burst Y; Multi Pulse Y)
- SINE X
- SWEEP Y
- MAIN MENU (pressing this selection returns to the Main Menu screen)
- TSG SOURCE ID (pressing this selection opens the TSG SOURCE ID screen; see [TSG SOURCE ID](#) on page 39 for more information)

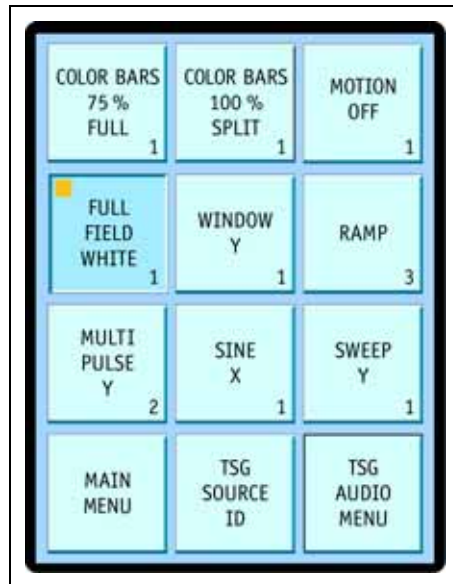


Figure 3-18 Test Signal Generator Digital Selections

Test Signal Generator digital selections are as follows:

- COLOR BARS (75% Full; 75% Split)
- COLOR BARS (100% Full; 100% Split)
- MOTION (Off, Speed Slow, Speed Medium, Speed Fast)
- FULL FIELD (White; Yellow; Cyan; Green; Magenta; Red; Blue; 75% Grey; Black)
- WINDOW (Window; Window Y)
- Y RAMP (Y Ramp; 10 Step, Ramp)
- MULTI BURST (Multi Burst; Multi Pulse; Multi Burst Y; Multi Pulse Y)
- SINE X (Sine X, Check Field)
- SWEEP Y (Sweep; Sweep Y)
- MAIN MENU (pressing this selection returns to the Main Menu screen)
- TSG SOURCE ID (pressing this selection opens the TSG SOURCE ID screen; see [TSG SOURCE ID](#) on page 39 for more information)
- TSG AUDIO MENU (pressing this selection opens the TSG AUDIO MENU screen; see [TSG AUDIO MENU](#) on page 40 for more information)

The Window selection is a pulse and bar signal that has two luminance pixels at the beginning of the line and two luminance pixels at the end of the line. These signals are used for checking video alignment.

TSG SOURCE ID

The TSG SOURCE ID screen is shown in [Figure 3-19](#).

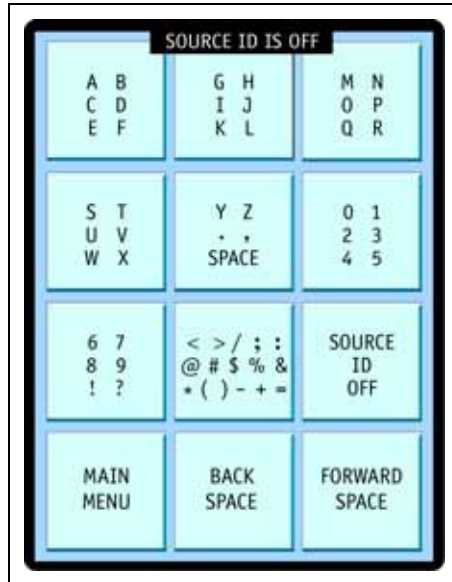


Figure 3-19 Test Signal Generator Source ID

The TSG SOURCE ID menu is used to control the internal character generator. The character generator can insert text into the output of the test signal generator. There are five 18-character identifiers common to both outputs.

The **SOURCE ID** button steps through the Source ID selections OFF, 1, 2, 3, 4, 5, and CYCLE. The user can actually have stored in the unit up to five different source IDs. When enabled, the Source ID selection will be inserted in the center of the TSG signal. When CYCLE is selected, the source IDs appear on the TSG Output one ID at a time in sequential order.

The character buttons step through the group of characters indicated on the button face. For example, the first button steps between A, B, C, D, E, and F. With each tap, the character in the naming field will change letters. Once the desired character is selected, press the **FORWARD SPACE** button to move the character cursor one space to the right. Press the **BACKWARD SPACE** button to move the character cursor to the left one space. The cursor can move anywhere in the line.

Press the **MAIN MENU** button in the lower left corner to return to the Main Menu.



All of the source IDs can be erased in the System Setup menu.

TSG AUDIO MENU

The TSG AUDIO MENU is used to select the embedded audio for the SDI test signal generator output.

The TSG AUDIO MENU screen is shown in [Figure 3-20](#).

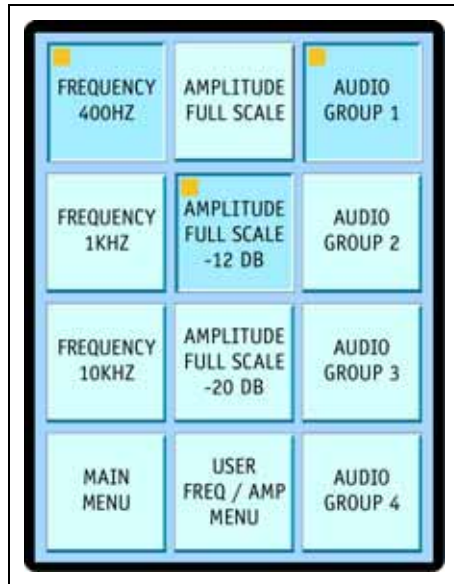


Figure 3-20 TSG Audio Menu

The **FREQUENCY** buttons are used to set the frequency for the embedded audio signal. The frequency selections are 400 Hz, 1 KHz, or 10 KHz.

The **AMPLITUDE** buttons are used to select the amplitude for the embedded audio signal. The amplitude selections are FULL SCALE, -12 dB, and -18/-20 dB (-18 and -20 are dependent upon the selection made in the SYSTEM SETUP menu's **AUDIO REFERENCE LEVEL** button).

Embedded audio is standardized into sixteen channels (four groups of four channels). SDI embedded audio supports one group at a time. Selecting an **AUDIO GROUP** button selects the four channels in an audio group. Group 1 is channels 1, 2, 3, and 4. Group 2 is channels 5, 6, 7, and 8. Group 3 is channels 9, 10, 11, and 12. Group 4 is channels 13, 14, 15, and 16.

The **USER FREQ/AMP MENU** button is used to access the USER FREQ/AMP menu. See [User FREQ/AMP Menu](#) on page 29 for more information.

4 Troubleshooting



CAUTION: These instructions are for use by qualified personnel only. To reduce the risk of electric shock, do not perform this installation or any servicing unless you are qualified to do so. Refer all servicing to qualified service personnel.

If the SD-STAR is not functioning properly, first verify the following:

- The SD-STAR is connected to a power source (batteries functioning, power plugged into the unit).
- All cables are correctly connected (see [Chapter 2, Installation](#)).

Initial difficulties with operation or display can be due to improper setup. Review [Chapter 3, General Operation](#), to ensure that the proper adjustments have been made for the signal requirements.

Problems, Causes, and Solutions

Table 4-1 SD-STAR: Problems, Causes, and Solutions

Problem/Symptom	Possible Cause	Solution or Explanation
Will not display SD waveform	Wrong input mode selected	Go to SYSTEM SETUP, and then select DIGITAL.
No audio output indication in the audio monitor screen	Audio signal generator set to ON	Check the Audio Signal Generator → Test Signal is ON or that the System Setup Menu → Audio Output is OFF.
Display goes dark or flashes between light and dark	Battery Saver Mode is turned on.	Tap the Touch screen to return to activate operation or change BATTERY SAVER to OFF in the SYSTEM SETUP menu.
Black line in is in the middle of the TSG output test signal	TSG SOURCE ID is set to ON with no text	Go to the SOURCE ID and select SOURCE OFF or enter the text for the ID source.

Table 4-1 SD-STAR: Problems, Causes, and Solutions (*Continued*)

Problem/Symptom	Possible Cause	Solution or Explanation
Blank Color Monitor screen with input connected	Incorrect format selected	Select the correct input mode in the SYSTEM SETUP menu to match the source.
Audio not at correct level or frequency	Parameters not set correctly in the USER FREQ/AMP menu	After selecting the AMPLITUDE and Frequency, select BUILD WAVE NOW for changes to occur.
Source ID text does not appear	Text was erased by activating CLEAR SOURCE ID's	Re-enter text while unit is in affected mode.

If the problem still exists after troubleshooting the SD-STAR, see [SD-STAR Service and Support](#) on page 11 for further instructions.

Care and Maintenance

- Do not scratch the screen. Use only your finger or a commercial stylus (user supplied) to operate the SD-STAR. Avoid using sharp objects like pens and pencils to operate the SD-STAR.
- Use a soft and damp cloth to clean the SD-STAR. If the screen needs to be cleaned, use a soft lint-free cloth moistened with a diluted window-cleaning solution. If the SD-STAR is utilizing the power adapter, unplug the adapter before cleaning. Do not use alcohol, aerosol sprays, or abrasives.
- Do not use in rain or areas with heavy moisture.
- Do not charge batteries that are rusty, leaking, or corroded.
- Do not drop the handheld. A strong impact or crushing it in any way may damage it.
- Store the unit in a cool, dry area. Avoid dirty, dusty, damp, or wet areas for storage. Also, avoid areas of extreme hot or cold temperature.

Impairment Clause

Do not use the product in any way beyond its intended use. Using the product beyond the scope of its design may impair the safety of the device and the user.

Star VFlash Installation and Update

Star VFlash is the application software used to update the firmware in the SD-STAR. The latest version of the Star VFlash and the latest firmware file for the SD-STAR can be found on the Harris website.

Once the Star VFlash software and firmware file is downloaded, access the Star VFlash folder at the downloaded location and select Setup.exe. Once Setup.exe is accessed, install the Star VFlash software into the PC by following the on screen instructions. The firmware file will be used after the Star VFlash program is running, so remember where the firmware file was saved (if the file was downloaded).

To perform a Star VFlash update:

- 1 Power off the SD-STAR.
- 2 Plug the RS-232 cable into the SD-STAR.
- 3 Plug the other end of the RS-232 cable into the serial port on the PC.



The supplied USB-to-serial adaptor may be used. The USB adaptor will require installation of certain drivers from the manufacturer-supplied CD. See the manufacturer's instructions for more information.

- 4 Plug the power supply into the SD-STAR, and then power on the power supply.
- 5 Power on the SD-STAR. The backlight will flash for about one second. The device will appear inactive for the remainder of the update.
- 6 Run Star VFlash.
- 7 Make the following selections:
 - COM port number (1 to 256)
 - Device type: SD-STAR



Star VFlash configures the COM port based on the selected device type. The COM port number and device type selection is remembered between Star VFlash sessions.

- 8 On the Star VFlash screen, click the **BROWSE** button.
The Open dialog box opens.
- 9 Select the .FLU file that is compatible with the SD-STAR, and then click the **OPEN** button.
On the Star VFlash screen, the "Current Version" field displays the software revision of the currently connected hardware. The "Updated Version" field displays software revision of the currently loaded .FLU file.
- 10 If the "Updated Version" field version number is greater than the "Current Version" field version number, click the **UPDATE** button.
A Progress bar indicates the Star VFlash is in the process of updating the software. The progress bar will cycle from 0 to 100% six times (going through the Programming Flash, Verifying Flash, Programming SD, and Verifying SD cycles). This will take several minutes.
- 11 When the update is successfully completed:
 - The blue progress bar changes to green.
 - A dialog box appears to indicate that the software has been updated.
 - The SD-STAR reboots.Remove the RS-232 cable.
- 12 Once the software is updated, perform a SD-STAR E2 memory reload:
 - a Enter SYSTEM SETUP and activate the **SYSTEM DEFAULTS RESET** button.
 - b Select **YES**.
 - c Wait for the device to reboot.
- 13 Once the device is rebooted, cycle the **POWER** button.

5 Specifications



Specifications are subject to change without notice.

Inputs

Table 5-1 Analog Input Specifications

Item	Specification
Connector	1 BNC in video modes 75 Ω terminated In Scope mode impedance is selectable
Formats	NTSC or PAL
Return loss	<-25 dB to 6 MHz
Waveform	Displayed in HORZ line format Line select, field selects, H zoom, persistence adjust, and in HORZ tilt display has V zoom
Vector	75% or 100% scale display Line select, field selects, and persistence adjust
Picture	Color monitor with vertical or horizontal orientation display modes; selectable HORZ and VERT delay offsets
Oscilloscope	
Bandwidth	48 MHz
Flatness	$\pm 1\%$ to 6 MHz
Scales (Time) Sec/Div	250 nSec, 500 nSec, 1 μ Sec, 2.5 μ Sec, 5 μ Sec, 10 μ Sec, 25 μ Sec, 50 μ Sec, 100 μ Sec, 250 μ Sec, 500 μ Sec, 1 mSec, 2.5 mSec, 5 mSec, 10 mSec, 25 mSec, 50 mSec, 100 mSec (accuracy < 2% error)
Scales (Amplitude)	Probe 10X mode: Volts/Div 100 mv, 200 mv, 500 mv, 1 V, 2 V and 5 V
1X mode mVolts/Div	10, 20, 50, 100, 200 and 500 (accuracy < 2% error)
Maximum input level	± 2 Volts peak (± 20 with 10X probe)

Table 5-1 Analog Input Specifications (*Continued*)

Item	Specification
Input coupling	DC or AC
Input impedance	75 Ω or 1 M Ω selectable
Position controls	Vertical and horizontal position controls
Trigger	Trigger level adjust positive (POS) and negative (NEG) triggers H, V, and field sync trigger modes

Table 5-2 Digital Input Specifications

Item	Specification
Connector	1 BNC; 75 Ω terminated
Formats	SDI 525/59.94 or 625/50
Return loss	<-15 dB, 5 to 270 MHz
Waveform	Displayed in Y Cb Cr or GBR horizontal line format Line selects, field select, H zoom, persistence adjust, and in HORZ tilt display has V zoom on separate Y Cb Cr components
Vector	75% or 100% scale display Line select, field selects, and persistence adjust
Picture	Color monitor with vertical or horizontal orientation display modes Selectable HORZ and VERT delay offsets
Data	<ul style="list-style-type: none"> ■ Signal loss ■ SAV position ■ SAV XYZ word ■ EAV position ■ EAV XYZ word ■ ANC check sum ■ EDH flags ■ Active picture EDH ■ Full-field EDH ■ SDI signal strength meter
Audio	<p>Displayed as 2 bar graphs for selected channels of embedded audio with meter response as VU + Peak with reference, selection of -20 and 18 dB</p> <p>De-embed 2 channels of AES/EBU 48 kHz audio from any 1 group for display and output analog audio via a headphone jack (16-bit stereo DAC)</p> <p>Bar graph type indicators show output level and balance settings for analog headphone output; control done via touch screen</p>

Outputs

Table 5-3 Analog Output Specifications

Item	Specification
Connector	1 BNC, 75 Ω
Formats	NTSC or PAL 1Vp-p
Return loss	<-25 dB to 6 MHz
Test signals	<ul style="list-style-type: none">■ Pluge bars — 75% 100% and SMPTE■ Full bars — 75% and 100%■ Luminance ramp and Modulated ramp■ Sweep■ 10-Step■ Sin X■ Window■ Multi burst■ Multi pulse■ Full field colors and lumas
Analog tone generator	Output through 3.5 mm TRS jack as one balanced source into HI impedance load Tone frequencies set at 400 Hz, 1000 HZ, and 10 kHz; or adjustable from 20 Hz to 20000Hz in 10 Hz steps Tone level settings for +4, 0, -4, -8, -18, or -20 dBu, or adjustable from -59 to +4 dBu in 1 dB steps

Table 5-4 Digital Output Specifications

Item	Specification
Connector	1 BNC, 75 Ω
Formats	SD SDI 800 mV p-p \pm 10% Rise and fall times < 1.5 ns (20 to 80%)
Output	Test signal SD-SDI output with EDH insertion Generator to have less than 1 EDH error per hour Format selectable for SD as SMPTE 259M-C at 270 Mb/s in 525/59.94 and 625/50 formats
Return loss	<-15 dB at 270 MHz
Test signals	<ul style="list-style-type: none">■ Split bars — 75% and 100%■ Full bars — 75% and 100%■ Luminance ramp & full ramp■ Sweep■ 10-Step■ Sin X■ Window■ Check field■ Multi burst■ Multi pulse■ Full field colors and lumas

Table 5-4 Digital Output Specifications (*Continued*)

Item	Specification
Embedded audio tone	4 channels of audio tone generated in any one of four selectable groups Tone frequencies set at 400 Hz, 1000 Hz, and 10 kHz; or adjustable from 20 Hz to 20000 Hz in 10 Hz steps Tone level settings for full scale, -12, -18, or -20 dBFS; or adjustable from -60 to 0 dBFS in 1 dB steps

Power Requirements

Table 5-5 Power Requirements

Item	Specification
Power adapter	<ul style="list-style-type: none">■ Input: 100 – 240 VAC, 47/63 Hz, 1.0A Mains supply voltage fluctuations not to exceed +/-10% of the nominal voltage.■ Output: 5.0V VDC @ 4A, MAX 20W■ Note: Power Adaptor is for Indoor Use Only in a dry location
Battery	1 lithium battery pack
Power management	Auto shutdown of unused functions, dim display
Installation category ¹	Category I

¹ See page 73 for Installation Category descriptions.

Mechanical

Table 5-6 Mechanical Specifications

Item	Specification
Height	5.8 in. (15.0 cm)
Width	3.6 in. (9.0 cm)
Depth	1.8 in. (4.7 cm)
Weight	12.6 oz (411.0 grams)

Environmental

Table 5-7 Environmental Specifications

Item	Specification
Operating temperature	32° to 104°F (0° to +40°C)
Non-operating temperature	-22° to 185°F (-30° to +85°C)
Humidity (non condensing)	Operating: 20% to 80% Non-operating: 5% to 90%
Altitude	Operating: 6562 ft (2000m)
Transportation	24.00 in. (60.96 cm) impact drop survivable in original factory packaging
Pollution degree ¹	Pollution Degree 2

¹ See page 76 for Pollution Degree descriptions.

A Pinouts

Power Connector Audio and VFlash Pinouts

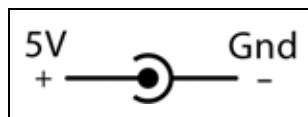


Figure A-1 Power Connector

Table A-1 Phone Jack Connector Audio Pinouts

Pinout	Audio
SLEEVE	GND
TIP	Left
RING	Right

Table A-2 Phone Jack Connector VFlash Pinouts

Pinout	VFLASH
SLEEVE	GND
TIP	Receive
RING	Transmit

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[This is the first released version of the Lesser GPL. It also counts as the successor of the GNU Library Public License, version 2, hence the version number 2.1.]

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C Glossary

601. An international standard (ITU-R BT.601) for component digital television. It defines the sampling systems, matrix values, and filter characteristics for digital television.

8 VSB. Vestigial sideband modulation with 8 discrete amplitude levels.

16 VSB. Vestigial sideband modulation with 16 discrete amplitude levels.

Advanced Television Systems Committee (ATSC). The parent organization that developed, tested and described the form and function of the US digital television formats.

AES/EBU. A digital audio standard established jointly by the Audio Engineering Society (AES) and the European Broadcasting Union (EBU).

Artifacts. Unwanted visible effects in the picture created by disturbances in the transmission or image processing, such as edge crawl or “hanging dots” in analog pictures, or “pixilation” in digital pictures.

ASG. Audio signal generator

Aspect Ratio. The ratio of horizontal to vertical dimensions. A square has an aspect of 1:1 since the horizontal and vertical measurements are always equal. Current television screen aspect ratios are 4:3 and 16:9.

Asynchronous Serial Interface (ASI). A transmission method adopted by the DVB, and called DVB-ASI. The transmission method allows for the transport of varying data payloads in a constant data stream. The DVB-ASI transport stream rate is 270 Mb/s.

Audio Breakaway. Routing video and accompanying audio in separate signal paths.

Audio-Follow. Routing video and accompanying audio together in the same signal path.

Auto Trans. Automatic transition; the execution of a single wipe or fade from current picture to another picture by way of an automatic device.

Bandwidth. The range of frequencies used to transmit information such as picture and sound.

Baseband Video. An unmodulated video signal.

Black. Also color black, blackburst. A composite color video signal that has the composite sync, reference burst, and a black video signal.

Blanking Processor. A circuit which removes sync, burst and blanking from the program video and then replaces it with sync, burst and blanking from the reference input. The process ensures constant sync and burst levels on program video.

Border. An electronically-generated picture member which is used in wipes to separate the two video sources used in the wipe. It is of even thickness and has color produced by the matte generator.

Broadcast Legal. Encoding video signal parameters to conform to prescribed limits for broadcast. Encoding rules vary by NTSC, PAL, country and broadcast facility.

BTSC. Broadcast Television Standards Committee. A US standard for stereo audio encoding in NTSC broadcast television.

CAV. Component Analog Video

CDP. Caption Distribution Packet

CES. Consecutive Errored Samples

Composite Video. A single video signal that includes all color video and timing information. A composite signal includes luminance, chrominance, blanking pulses, sync pulses and color burst information.

Chrominance. The color portion of a video signal that represents the saturation and hue. Black, gray and white have no chrominance; color signals have both chrominance and luminance.

CH. Chroma

Chrominance/Luminance Delay. A measurement that indicates the amount to which chrominance and luminance are aligned with respect to each other. A low C/L delay figure can minimize the effects of ghosts or color offset on the received picture.

C/L Delay. Chrominance/Luminance Delay

Clipping. The electronic process of shearing off the peaks of either the white or black excursions of a video signal for limiting purposes. Clipping is often performed prior to modulation to limit the signal.

CMRR. Common Mode Rejection Ratio

Color Burst. The portion of a color video signal which contains a short sample of the color subcarrier. It is used as a color synchronization signal to establish a reference for the color information following it and is used by a color monitor to decode the color portion of a video signal. The color burst acts as both amplitude and phase reference for color hue and intensity. The color oscillator of a color television receiver is phase locked to the color burst.

Composite Sync. A signal consisting of horizontal sync pulses, vertical sync pulses and equalizing pulses only.

CRC. Cyclical Redundancy Check

Crosspoint. An electronic switch, usually controlled by a button on the panel. Control logic will allow for only one crosspoint, for each bus, to be switched "ON" on at a time.

D/A. Conversion of digital to analog signals.

DA. Distribution Amplifier

Data Element. An item of data as represented before encoding and after decoding.

Decoded Stream. The decoded reconstruction of a compressed bit stream.

Decibel (dB). A logarithmic measure of the ratio between two powers, voltages, currents, sound intensities, etc. Signal-to-noise ratios are expressed in decibels.

Default. A factory preset value or condition.

Demodulator. A receiver, such as for television broadcast, cable, and closed circuit applications. A TV demodulator receives and processes off-air or cable RF signals and provides baseband video and audio outputs.

DHCP. Dynamic Host Configuration Protocol

Differential Gain. A measurement that specifies how much the chrominance gain is affected by the luminance level. Expressed as a percentage showing the largest amplitude change between any two levels, it indicates how much color saturation variance occurs when the luminance level changes.

Differential Phase. A peak-to-peak measurement that specifies the extent to which the chrominance phase is affected by the luminance level. Expressed in degrees of subcarrier phase, it indicates how much hue shift occurs with luminance level changes.

Digital Video Broadcasting (DVB). A specific project office of the European Broadcast Union. This group has produced a set of digital broadcasting standards.

DSK. Down Stream Key, a keyer which is electronically located after (or down stream from) all other functions of a switcher. The key resulting will appear to be on top of all other pictures from the switcher.

DVITC, D-VITC. Digital Vertical Interval Time Code. Timecode information stored on specific lines in the vertical blanking interval of a television signal.

EAV. End of Active Video in component digital systems.

EBU. European Broadcasting Union

Editor. A device or system which controls video tape recorders, video switchers, and other related devices in order to electronically splice segments of recorded video into a finished production.

EDH. Error Detection and Handling. A recommended practice defined in SMPTE RP 165. A system to generate and then detect video data errors in serial digital video systems.

Effects Keyer. A keyer which is electronically located in the mix/wipe generator portion of a switcher. The resulting key would appear under the down stream key.

EIA Rack Space or Unit. A specific size as designated by the Electronics Industry Association. The rack unit is 19 inches wide, and is 1.75 inches tall. A device which requires 3 EIA rack units is 19 inches wide and 5.25 inches ($3 \times 1.75 = 5.25$) tall.

Elementary Stream (ES). A generic term for one of the coded video, audio or other variable length bit streams which are packetized to form MPEG-2 transport streams. Consists of compressed data from a single source (audio, video, data, etc.). One elementary stream is carried in a sequence of PES packets with one and only one stream ID.

Embedded Audio. Digital audio information multiplexed onto a serial digital data stream. Up to sixteen channels can be multiplexed on a single stream of 601 video, minimizing cabling and routing requirement.

ENG. Electronic News Gathering

Encoded Clip Softness. In the encoded legalization process, "softness," as applied to encoded clips, refers to the processing of the video at the point of the clip. The clips are applied in YCbCr color space. The clip point is either an immediate limit (no softness) or will have a range of values leading to the clip point, all reduced to smooth the clip point to a less immediate limit (softness).

Encoded Legalization. Limiting of the luminance and color difference signals such that, once encoded into a composite video signal, the resultant encoded video does not violate the maximum or minimum signal levels as defined by the specific encoding rules. NTSC and PAL video plus various users of these types of video have many varied rules for maximum and minimum encoding limits. Encoded legalization usually calculates first the encoded luminance value and then the corresponding chroma value to make legalization judgements.

Encoded Video. A combined single video signal that is constructed from either separate GRB or luminance and two color difference video signals. NTSC, PAL, and SECAM are all examples of encoded video.

Envelope Detection. An RF signal detection technique that does not respond to phase variations in the carrier signal, enabling measurement of a transmitter's incidental phase. When used together with synchronous detection, envelope detection helps isolate either video and/or RF as the causes of phase distortion.

External Key Input. This is an alternate source for key cut. This is usually a separate external input to a switcher

Fade-thru-Black. A production technique which is a two step process. The first step will fade the program video to black. The second step will fade from black to the video selected on the preview bus. This is usually used in major scene transitions.

Fade-to-Black. A production technique which simply fades the program video to black and program audio to silent. This is used to end programs and to escape from embarrassing pictures or sounds.

Field. A picture or picture portion which is produced within one cycle of vertical synchronization. In interlaced systems, a full picture or frame requires two consecutive fields.

FM Trap. A circuit designed to minimize potential interference from strong FM signals in receiving equipment, such as a TV demodulator. For example, an FM trap can attenuate signals between 88-108 MHz to reduce interference on NTSC television channel 6.

Frame. A single full resolution picture as viewed in either a video or film system. In the case of interlaced video, two consecutive fields provide all of the information of one frame. In non-interlaced systems, one cycle of vertical synchronization produces a frame. A 60 Hz interlaced system, produces 30 frames of video in one second. A 60 Hz progressive (or non-interlaced) system, produces 60 frames of video in one second. Common frame rates are 24 (film) 25, 29.97, 30, 50, 59.94 and 60.

Frame Synchronizer. An electronic device that synchronizes two or more video signals. Using one input as a reference, it locks a second signal to the reference.

Frame Store. An electronic method of capturing and storing a single frame of video.

Gamma. This term applies to the linearity of the change from black to white. Gamma controls adjust the gray or 50% point of the video either up or down, with the effect of changing the gray level of the video.

Gamut. The whole or total of whatever is being addressed. In color space, gamut refers to all colors which are included in a particularly defined color group, such as 601 gamut.

Genlock (Generator Lock). A method of synchronization involving the generation of a video signal that is time and phase locked with another signal.

GPI. General Purpose Interface

Headend. In a cable TV system, the facilities where program sources (satellite, terrestrial, VTR, local) are received and remodulated for distribution through a cable plant.

High Definition Television (HDTV). High definition television has a resolution of approximately twice that of conventional television in both the horizontal (H) and vertical (V) dimensions and a picture aspect ratio (H to V) of 16:9.

High Level. A range of allowed picture parameters defined by the MPEG-2 video coding specification which corresponds to high definition television.

HRC. Harmonically-Related Carrier

Hue. Color tint

ICPM. Incidental Carrier Phase Modulation. A measurement of picture carrier phase distortion (affected by the video signal level) that occurs in the transmitter.

Installation Categories. Categories of measurements that occur on circuits attached or not attached to a live electrical supply outlet. Installation Categories are as follows:

- Category I is for measurements that occur on circuits not attached to a live electrical supply outlet (115/230 VAC). The voltages come from secondary power sources. The secondary power source includes circuits energized by low-voltage sources and electronics such as batteries.
- Category II is for measurements that occur on circuits attached to a live electrical supply outlet (115/230 VAC).
- Category III is for measurements that occur on equipment permanently connected to the building. The distribution level equipment are usually fixed installations and circuit breakers.
- Category IV is for measurements that occur at the main electrical power supply.

IP. Internet Protocol

IRC. Incrementally-Related Carrier

I.R.E. Refers to the Institute of Radio Engineers, and is used as a unit of measurement. In NTSC television, 1 volt of signal equals 140 IRE units.

ISP. Internet Service Provider

Jitter. A deformation of a signal affected by poor synchronization.

Key. An effect in television where a selected portion of background video is removed and replaced with another video.

Key Cut. In a key effect, this is the video which designates the portion of background video which is removed.

Key Fill. In a key effect, this is the video which is used to replace the portion of background video which was removed. This may be the same video as the Key Cut video.

Key Invert. In a key effect, this is an electronic action which reverses the polarity of the key cut signal. It makes black appear as white, and white appear as black.

Key Mask. In a key effect, it uses a wipe pattern from the wipe pattern generator to restrict the key cut from removing video in a portion of the screen. This requires the use of the wipe pattern generator and the Mask/Preset Size controls.

Key Source. Another term which is the same as key cut.

Legalization. The modification of serial digital video to conform to analog color space rules, as required by users.

LCD. Liquid Crystal Display

LED. Light-Emitting Diode

LFE. Low Frequency Effects

Lissajous. A display of the amplitude and phase relationships between two input signals.

LS. Left Surround

LTC. Longitudinal Time Code, A SMPTE timecode standard usually recorded onto the linear audio track of a VTR.

Luminance. The degree of brightness (black and white portion of the video signal) at any given point in the video image. A video signal is comprised of luminance, chrominance and sync. If luminance is high, the picture is bright and if low the picture is dark. Changing the chrominance does not affect the brightness of the picture.

Main Level. A range of allowed picture parameters defined by the MPEG-2 video coding specification with maximum resolution equivalent to standard definition television.

Main Profile. A subset of the syntax of the MPEG-2 video coding specification that is supported over a large range of applications. Applications include, MP@HL (Main profile at high level) and MP@ML (Main profile at main level).

Mask/Preset Size. Uses the wipe pattern generator in the keyer portion of the effects generator. This is used to adjust the size of a preset pattern or for adjusting the size of a mask to block a portion of the key cut (source) from use in the keyer.

Matte Generator. An internal generator which can make any color, is used for border color and may be used for key fill. It is identical to the Color Background Generator, but simply used in other areas of the switcher.

Mbps. Megabits Per Second

mV. Millivolts

M/E. Mix/Effects System

MP@HL. Main profile at high level

MP@ML. Main profile at main level

MPEG. Refers to standards developed by the ISO/IEC JTC1/SC29 WG11, Moving Picture Experts Group.

MPEG-2. Refers to ISO/IEC standards 13818-1 (Systems), 13818-2 (Video), 13818-3 (Audio), and 13818-4 (Compliance).

Multi-Level Effects. Applies to any effects generator which can do more than one effect at a time. Typically, a multi level switcher can produce a Key and a Background transition in the same effects generator at one time.

NTSC. National Television Systems Committee, the color television system used in the United States, Canada, Mexico and Japan.

NVRAM. Nonvolatile RAM

Packet Identifier (PID). A unique integer value used to associate elementary streams of a program in a single or multi-program transport stream.

Packet. A packet consists of a header followed by a number of contiguous bytes from an elementary data stream. It is a layer in the system coding syntax.

Packetized Elementary Stream (PES). The data structure used to carry elementary stream data. The packets consist of a header followed by payload data, and a stream is a series of packets which form an elementary stream and have a single stream identification.

PAL. Phase Alternation Line; the standard color television system in many European and other countries.

Passive Looping. Video and audio signals routed through components, even if power is removed. Signals are not amplified or processed, maintaining transparency.

Pedestal Level. An offset used in a video system to separate the active video from the blanking level by maintaining the black level above the blanking level by a small amount.

Pixel. A Picture cell or Picture element representing one sample of picture information, such as an individual sample of R, G, B, luminance or chrominance.

Pollution Degree. A measurement of the foreign materials such as conductive dust, gas, and moisture between the internal areas of the product and the outside environment. Pollution Degrees are 1, 2, 3, and 4.

- Pollution Degree 1 describes conditions where no pollution occurs or only dry, nonconductive pollution occurs. This is normal for equipment located in clean rooms. The pollution classified under Pollution Degree 1 has no environmental influence.
- Pollution Degree 2 describes conditions where dry, nonconductive pollution occurs. This is normal in an office environment. Temporary conductivity caused by condensation may occur when the unit is not in service.
- Pollution Degree 3 describes conditions where conductive pollution occurs, or dry, nonconductive pollution occurs due to condensation. Rooms that cannot maintain the moisture or temperature fall into this category. The location can only protect from outside weather conditions such as direct sunlight, rain, snow, and wind. Industrial areas can fall under Pollution Degree 3.
- Pollution Degree 4 describes pollution that generates persistent conductivity through conductive dust, rain, or snow. Pollution Degree 4 is for outdoor locations.

Preset. Refers to establishing any condition prior to use on the Program output. This term is used in reference to wipe patterns and is often interchanged with Preview.

Preview. The video output channel used to view the intended Program results prior to the execution of the next transition.

PRO Audio. A transmitted audio channel for talent cueing via Interrupt Foldback (IFB) to ENG vans and remote applications. Some demodulators support PRO audio monitoring.

Program. A transport stream combination of a video stream and one or more audio and data streams associated with that video stream. In analog terms, "Program" refers to the Base Band video and audio produced by the final output of a switcher.

Program Association Table (PAT). A list of all programs that are in the ATSC data stream.

Program Map Table (PMT). A listing of all elementary streams that comprise a complete (television) program.

Program Clock Reference (PCR). This is a time reference signal that is placed in MPEG streams for the purpose of time coordinating various data streams.

Program and System Information Protocol (PSIP). Information sent out as part of an ATSC transport stream which lists all of the video, audio, data and program information contained in the stream. This is the "TV guide" for a given stream.

Progressive Scanning. Also non-interlaced. A system of video scanning where lines of a picture are transmitted consecutively, such as with VGA monitor displays.

Push-push Toggle Switch. An electro-mechanical device which, when pushed, alternates the condition of the switch. Push once, it's off, push again, it's on.

Quadrature Output. An output in a television demodulator used for measuring Incidental Carrier Phase Modulation (ICPM) in a transmitter.

QPSK. Quadrature Phase Shift Keying, typically used by satellite downlinks.

QAM. Quadrature Amplitude Modulation, the technique used by cable TV systems (64-QAM and 256-QAM) to remodulate signals for distribution in a cable plant.

GRB Legalization. Limiting of luminance and color difference video signals such that, once transcoded into GRB component video signals, the resultant video does not violate the maximum or minimum signal levels as defined by component video level rules. Typically, the maximum value for R, G, or B is 700 mV, and the absolute minimum value for any of these signals is 0 mV.

Reclocking. The process of regenerating digital data with a clock recovered from the input data.

Resolution. A measure of the finest detail that can be seen, or resolved, in a reproduced image.

RS. Right Surround

RS-422. Recommended Standard number 422, an E.I.A. standard which describes a type of data interchange. Television products use this standard as its communication format between the electronics frame and editors, control panel and computers. An RS-422 line may be extended up to 1,000 feet (304m).

Sampling. Process by which an analog signal is sampled to convert the analog signal to digital.

SAP. Secondary Audio Program, used in television broadcast for second language broadcasting, simulcasting, and separate audio programming.

Saturation. Color intensity

SAW Filter. Surface Acoustic Wave filter

Segment Error Rate (SER). A calculated average of uncorrected transport stream packets vs. total packets as accumulated over a designated period of time.

Signal to Noise Ratio -Analog (SNR). A measurement of the noise level in a signal expressed in dB (decibels) as a ratio of between the audio or video signal's maximum peak-to-peak signal voltage and the measured voltage of noise present when the signal is removed. Higher SNR figures indicate that any noise introduced by system components will not be perceived in the picture and sound output signals.

Signal to Noise Ratio-8VSB (SNR). As applies to 8VSB transmissions, this is a calculated average power of the ideal signal divided by the actual demodulated signal power.

SMPTE. Society of Motion Picture and Television Engineers

Standard Definition Television (SDTV). This term is used to signify a digital television system in which the quality is approximately equivalent to that of NTSC. This equivalent quality may be achieved from pictures originated at the 4:2:2 level of ITU-R BT.601 and subjected to processing as part of the bit rate compression. The results should be such that when judged across a representative sample of program material, subjective equivalence with NTSC is achieved. The displayed picture may be either the traditional 4:3 or the wide-screen 16:9 aspect ratio.

STL. Studio Transmitter Link

Synchronous Detection. A common detection technique used in television demodulators that removes quadrature distortion, enabling comparison of transmitter output with video input signal.

S-Video. Also Y/C. Transmits luminance and color portions separately via multiple wires, thus avoiding the color encoding process and resulting loss of picture quality.

Tally. A system used to light lamps and indicate usage. Most production switchers have an internal tally system to indicate selected functions, and which selected functions are currently involved with Program.

TCP. Transmission Control Protocol

Telecine. A device used to convert film to video; movie film is digitally sampled and converted to video frame by frame in real-time.

TCXO. Temperature Compensated Crystal Oscillator

THD. Total Harmonic Distortion

Transport Stream-ATSC (TS). Consists of the following: (1) Packets: 188 bytes - fixed length with descriptive data, (2) Carries several programs, (3) has a PID which identifies the type of TS packet (video, audio, other), and (4) carries descriptive information about the program.

TSG. Test signal generator

UHF. Ultra High Frequency

Unity Gain. An electronic term indicating that a signal will be neither amplified or attenuated. One volt of signal level in results in one volt of signal level out.

Vector. A measure that has two individual properties: magnitude and direction.

Vector Clip. A special encoded clip version that limits only the Cb and Cr input video signals and does not affect (nor is it affected by) the luminance component. This color-only clip limits the maximum vector excursions as viewed in an encoded state and is intended for users who wish to prevent encoded vectors from ever exceeding the perimeter circle of an encoded vector display.

VHF. Very High Frequency

VITC. Vertical Interval Time Code, a method for recording on to video tape the timecode address for each video frame inserted in the vertical interval.

Waveform. A visual representation of a signal in the shape of a wave that plots amplitude versus time.

White Level. The brightest part of a video signal, corresponding to approximately 1.0 Volt.

White Balance. An electronic process used to calibrate the picture for accurate color display in different lighting conditions.

Wipe. A special effect in which two pictures from different video sources are displayed on one screen. Production switchers and special effects generators provide numerous wipe patterns varying from simple horizontal and vertical wipes to multi-shaped, multi-colored arrangements.

XGA. High resolution 1024×768 non-interlaced (progressive) display monitor

XVGA. Extended Video Graphics Adapter

YPbPr. CAV format composed of luminance (Y) and two color difference signals (Pb and Pr)

Y/C. Also S-video. Describes the separation of video signal luminance and chrominance components.

Zero Carrier Pulse (chopper). In a TV demodulator, removes the carrier in the vertical interval for a short period, enabling depth of field measurement.

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