

HORITA TVC-50

SMPTE Time Code Video Clock

USER MANUAL

For Models TVC-50, RM-50/TVC, SR-50/TVC

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HORITA Co., Inc

P.O. Box 3993, Mission Viejo, CA 92690 (949) 489-0240 www.horita.com

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1 GENERAL

The TVC-50 provides an economical means of inserting a time and date or time code display into a video image. A wide variety of user selectable display formats is available, including ones which calculate and display the day of the week according to the date entered.

The time and date information for the display can be derived from either an internal clock/calendar chip, or from a SMPTE time code input. The TVC-50 can read the SMPTE time code input and provide a time and date display, preset the internal clock/calendar to the time and date from the time code, or simply display the raw time code time and user bit data.

The TVC-50 also has provision for user entry of up to 9 lines of twenty characters each of source ID or other captioning information, which is retained, along with all the setup information, in a battery backed up, non-volatile memory.

The TVC-50 finds application in security situations, documenting laboratory or other types of experiments, video camera use in court rooms or video depositions, as well as simply for displaying time and date within video images, or for providing large video displays of time and date on video monitors for viewing in television studios or other broadcast situations.

In addition, the TVC-50 works with HORITA GPS/SMPTE time code products to provide a precise video display of GPS (UTC) time and date.

2 FEATURES

- * Provides a wide variety of user selectable time and date video display formats, including ones which automatically calculate and display the day of the week.
- * Display area consists of nine (9) lines of twenty (20) characters each for display of time and date as well as source ID or other alpha-numeric information.
- * The nine display lines can be automatically labeled and un-labeled with line numbers from 1-9 to more easily identify where information is going to be placed on the screen.
- * Special "split screen" display mode insures maximum view of the video image by splitting the 9 display lines into two separate display areas of 5 lines and 4 lines. These areas can be adjusted to position text or time displays at the top and bottom of the screen, out of the center of the image.
- * Four "setup" menus including a "help" screen provide easy user setup and control of the TVC-50. Separate menus are provided for System and Display, Time Code and Real Time Clock/Calendar, and Time and Date display setup.
- * Two separate memory pages provide independent sets of display screens and associated setup menus for maximum flexibility in multi format and multi user situations.
- * Internal crystal controlled clock/calendar IC has battery back up to maintain time and date when unit is powered off.
- * SMPTE time code reader reads and displays SMPTE Longitudinal Time Code (LTC/TC) time and user bit values.
- * Time code reader handles time code at frame rates of 24FPS (Frames-Per-Second), 25FPS, and 29.97DF (Drop Frame) or 30FPS (Non-Drop Frame), and automatically detects the frame rate of the time code.
- * The time code can be used to "preset" (jam or jamset) the time and date into the internal clock/calendar chip.
- * Time code displays are "+1 frame" updated with indication of drop or non-drop frame time code format for making "window burns", and can show both time code and user bit data simultaneously.
- * Either the real time clock or the time code can be used as the source of the various formats of the time and date displays, and are separately selectable for each.
- * Supports both HORITA and LEITCH formats for User Bit date data.

- * The time code is amplified and reshaped for looping to other units.
- * Operates from a small AC power adapter, which is included, or can be operated in the field from 9-to-14 volts DC battery power.
- * Available in desktop (TVC-50), Rackmount (RM-50/TVC), Rackmount Add On (AO-50/TVC), or Shortrack (SR-50/TVC) models.

3 CONNECTING THE TVC-50

3.1 Connecting Power

Included with your TVC-50 is an AC power adapter that provides a 9 volt, 500 milliamperes DC output. This adapter is equipped with a miniature phone plug with the "+" (positive) voltage output connected to the front tip of the plug.

Insert the power plug into the TVC-50 "+9V POWER" connector and plug the adapter into 110-120 volt, 60-Hz AC power.

WARNING:

ELECTRICALLY OPERATED PRODUCT

As with all electrical products, precautions should be observed during handling and use to prevent electrical shock.

NOTE:

Make sure the plug is inserted all the way into the power connector or else damage to the power adapter may result. The TVC-50 has internal protection circuitry to prevent it from being damaged should the wrong polarity of power be applied. However, do not use an adapter of more than 9 volts at 500 milliamperes or damage to the TVC-50 may result.

3.2 Operating From Battery Power

You can operate your TVC-50 from battery power in order to use it in the field as a portable time and date or source ID inserter. The TVC-50 can be operated from 9-to-14 volts DC, obtained either from a conventional 12 volt video camera battery, or from a pack of 8 1-1/2 volt batteries. A common battery size to use is AA with the 8 batteries contained in a battery holder having the means to connect the 12 volt output to a cable having a 3.5mm mini phone connector for plugging into the TVC-50 power in connector.

3.3 Connecting Video In and Out

Figure 3-1 shows a basic hookup for the TVC-50 when used with a typical video source and a video recorder or monitor.

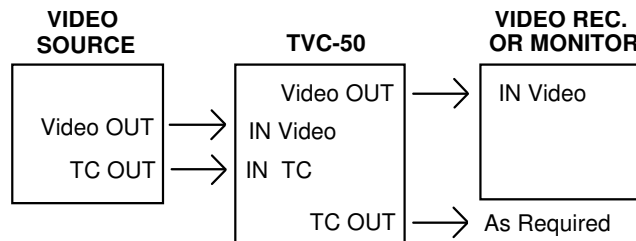


Figure 3-1, Basic TVC-50 Hookup

Connect video from the video source that you want a time and date display keyed into to the BNC connector labeled VIDEO IN. Connect VIDEO OUT from the TVC-50, to downstream video equipment such as video monitors or video recorders, as desired. When the TVC-50 is powered up, the VIDEO IN input is terminated at 75 Ohms. When powered off, video is looped direct from VIDEO IN to VIDEO OUT, bypassing the TVC-50.

3.4 Connecting Time Code In and Out

If using the TVC-50 to display time and date obtained from a SMPTE time code input or to make a time code window burn, connect the time code input signal to the RCA connector labeled TC IN. Connect the TC out signal to other equipment that requires SMPTE time code.

4 OPERATING THE TVC-50

To operate the TVC-50 connect video in and out (and time code if desired), apply power, and set the POWER switch to ON. A red LED above the power switch lights when the TVC-50 is powered up.

When the TVC-50 is initially powered up, it operates in the "display" mode and displays the time and date along with any user source ID information entered. At this time, the POSITION and CHAR switches provide quick and convenient control of the display's horizontal and vertical position, without going through any "menu" operations.

As described in more detail later, after power up, actuating the MODE switch selects between various setup, display on/off, and source ID data entry and edit modes.

4.1 LED Operation

The front panel LED blinks at different rates to indicate TVC-50 operation and input signal conditions.

<u>LED STATUS</u>	<u>MEANING</u>
Off	Power off
Steady on	Display mode
Very slow blink, One-sec. on/off	No video input
Slow blink, 1/2-sec. on/off	Data entry/Setup mode
Fast blink, 1/4-sec. on/off	Data insert/delete mode
Rapid flashing	Reading time code
Rapid flashing one-sec/one-sec off	Reading time code, no video

4.2 Entering and Exiting the Setup Mode and Selecting the Setup Menus

The setup menus allow selection of various character attributes such as black or white characters, time and date display format, time code/internal clock selection, etc.

To display the setup menus, actuate the MODE switch to SETUP and release. There are four menus, titled: "TVC V2.00 HELP", "SYSTEM/CHARACTER", "TIME CODE/CLOCK", and "TIME/DATE DISPLAY". The last menu selected, along with the last item selected on that menu, is the one that is recalled and displayed when the setup mode is first entered from the display mode.

To access the various menus, simply actuate the MODE switch to SETUP and release. Each time this is done the setup menu changes to the next one in sequence. To exit the setup mode, actuate the MODE switch (one time) to DISPLAY and release.

4.3 Selecting a Menu Item

Except for the "help" screen, each setup screen is a menu that has a title and contains various TVC-50 setup selections associated with that title. The currently selected menu item is indicated by flashing of the associated selection for that item. For example, if a menu item has a "yes" or "no" selection for that item, there will be either a flashing "Y" or "N", indicating the current selection.

Individual menu items are selected via the POSITION switch. Flashing of the menu selection moves on to the next item each time the POSITION switch is actuated and released. Actuating the switch down causes the selection to move to the right and down, actuating the switch up causes the reverse action. Holding the switch actuated causes automatic scanning through the various menu items.

4.4 Changing a Selected Menu Item

After a menu item is selected, the choices available for that item are accessed via the CHAR switch. Actuating the CHAR switch down or up progresses forward or backward through the choices available for that menu item. Holding the switch actuated causes automatic scanning through all of the available choices.

4.5 The "TVC V2.00 HELP" Screen

The "HELP" screen provides definitions for various abbreviations used on the TVC-50 setup menus.

<u>HELP SCREEN ITEM</u>	<u>DESCRIPTION</u>
"TVC V2.00 HELP"	This top line provides the software version number.
: IS FOR USER DATA = IS FOR SYSTEM DATA	On the TVC-50 setup screens the display is a combination of fixed text and two kinds of variable data; data that is user changeable and data that is not. User changeable data is preceded by a colon (:) character and flashes when selected by the user. Data that comes from within the TVC-50 "system" itself and cannot be changed by the user, is preceded by an equal sign character (=).
FMT=FORMAT	This refers to the format used to encode the date into the user bits of the time code.
TC	SMPTE (Longitudinal) Time Code
D=DROP N=NON-DROP	"D" is displayed for "Drop-Frame" time code, "N" for Non-drop frame code. Mostly used with time code systems in the US.
UB	UB stands for the "User Bits" of the time code. Used to carry the date information for the TVC-50.
FPS=TC FRMS-PER-SEC	Frames-Per-Second. The 24FPS, 25FPS 29FPS, or 30FPS frame rate of the incoming time code.
JAM=PRESET CLK TO TC	JAM is a term meaning to set/preset the TVC-50 clock/calendar chip time or date to the time or date from the time code.

4.6 The "SYSTEM/CHARACTER" Menu

This menu provides controls for setting up various TVC-50 "system" and display attributes. The items, functions, and selections available for this menu are described as follows:

<u>ITEM</u>	<u>FUNCTION</u>	<u>SELECTIONS</u>
PAGE NO:	Selects memory page	1 = Memory page-1 2 = Memory page-2 This selection applies to and changes all of the setup screens and all of the text entered for each page.
STD:	Selects the video standard	NTSC = US PAL = UK/Europe
CLEAR:	Clears all text from screen	Y = Screen is cleared N = Screen is not cleared
SYS RST:	Performs a system reset	Y = Resets all user settable data to initial values. A "hardware" initiated system reset can be performed by powering up the TVC-50 while holding the MODE switch in the "SETUP" position. System reset does not clear the screen of text.
LABEL LINES 1-9:	Add/remove reference line numbers to/from screen display.	Y = Number lines from 1-9 N = Remove line numbers. Numbers are only on the screen display and not stored in the memory page.

ITEM	FUNCTION	SELECTIONS
SCRN POS	Sets H and V screen number is just for numerical reference.	H:06-64 Moves entire 9 X 20 display position. The display screen left or right horizontally. 06 = most left, 64= most right. V values move entire 9 X 20 display screen up or down vertically or set the amount of vertical "split" in split screen display modes. V:01-64 for vertical sizes 1X, 2X, 3X, and 4X. V:01-80 for NTSC 1S split V:01-40 for NTSC 2S split V:01-99 for PAL 1S split V:01-62 for PAL 2S split.
CHAR:	Selects character "color"	WHT = White character BLK = Black characters
BACK:	Turns "background" around characters on or off	ON = Background is on OFF = Background is off
CONT:	Character contrast	HI = High contrast MED = Medium contrast LOW = Low contrast
FLSH:	Enables character "flash" function.	ON = All characters entered when FLSH is set to ON have their flash attribute set and thereafter flash on and off whenever FLSH is set to ON, and stop flashing when FLSH is set to OFF.
SIZE	Sets H and V character size	H values: 1X = 1 times, smallest H size 2X = 2 times 3X = 3 times 4X = 4 times, largest H size V values: 1X/1S = 1 times/1 split (7H) 1X/1S = 2 times/2 split (14H) 3X = 3 times (21H) 4X = 4 times (28H) (H is vertical size expressed as number of horizontal lines)

4.7 The "TIME CODE/CLOCK" Menu

This menu displays the "raw" time code time and user bit data from the TVC-50 longitudinal time code reader and provides for setting up the battery backed up real-time-clock/calendar chip in the TVC-50.

ITEM	DESCRIPTION
TIME CODE	
FPS=	Displays the auto detected frame rate of the time code. Valid frame rates are 24, 25, and 30 frames-per-second (FPS). "??" is displayed when no time code applied or the frame rate is not yet detected. 29 is displayed when drop-frame is detected, 30 is displayed when drop frame is not detected. Note that the TVC-50 detects the frame rate by using a combination of the frame numbers and the status of a drop/non-drop frame indicator, and not the actual "rate" that the frames are changing with respect to time.
TC =	HH:MM:SS:FF This is the "raw" value of the time code in hours, minutes, second and frames. "D" is displayed for drop frame format time code. "N" is displayed for non-drop frame format time code.
UB =	87:65:43:21 This is the raw user bit data as decoded from the time code and is displayed in "hex" values from 0-9 through A-F. There are thirty two user bits made up of eight groups of four bits each and numbered from ne to

eight as defined in the SMPTE time code specification. The "87:65:43:21" numbers shown here are not the actual user bit values, but instead indicate where the so numbered "groups" of user bits are displayed by the TVC-50.

ITEM	FUNCTION	SELECTIONS
UB DATE FMT:	Selects the format for how the "date" data is decoded (interpreted) from the user bits of the time code.	HORITA LEITCH

For HORITA this is ZZ:YY:MM:DD for the 87:65:43:21 user bits, where ZZ is the time zone, YY is the year, MM the month and DD the day. For LEITCH the encoding does not have the date data in an order that is easily describable here.

CLOCK/CALENDAR

TIME HMS: HH:MM:SS User settable
 hours, minutes, and seconds
 time value of internal clock.
 The time display here is always in the 24 hour "military" time format.

HH = 00-23 hours
 MM = 00-59 minutes
 SS = 00-59 seconds

DATE MDY: MM-DD-YY User settable
 day, month, year value of the internal (clock) calendar
 The date display here is always in this MDY format.

MM = 01-12 months
 DD = 01-31 days
 YY = 00-99 years

internal

JAM TIME: Preset internal clock time to that of the SMPTE time code time value.

Y = Do Jam
 N = NO or Jam performed

Invalid values of time code cannot jam the time. When the time jam is first selected, the selection momentarily changes from "N" to "Y", then back to "N" to indicate that the jam function has been performed. This takes from one to two seconds. If this sequence is not observed, then the jam operation did not occur and should be attempted again.

JAM DATE: Preset internal clock date to that of the SMPTE time code user bit date value.

Y = Do Jam operation
 N = NO or Jam performed

Note that invalid user bit date values cannot jam the date. When the date jam is first selected, the selection momentarily changes from "N" to "Y", then back to "N" to indicate that the jam function has been performed. This takes from one to two seconds. If this sequence is not observed, then the jam operation did not occur and should be attempted again.

4.8 The "TIME/DATE DISPLAY" Menu

This setup menu allows setting up of the TVC-50 time and date displays. The displays can be turned ON or OFF, the position and format changed and the time and date reference selected.

The first menu items are for setting up the time display.

ITEM	FUNCTION	SELECTIONS
TIME:	Turns "formatted" time display ON or OFF.	ON = Time display is on OFF = Time display is off
REF:	Allows selection of time reference for formatted time display	TC = Time code reference CLK = Internal clock ref

ITEM	FUNCTION	SELECTIONS
HMS=	Displays HH:MM:SS value of selected time reference.	Display only
POS:	Starting character position formatted time display	001-180 A value of 001 starts the time display in the upper left corner of the of display screen. A value of 180 starts the display at the lower right of the screen.

NOTE:

When the position of the time display is first changed via actuation of the CHAR switch, the TVC-50 temporarily exits the SETUP menu and returns to display the text screen on which the time will be displayed. Further actuation of the switch causes the starting position of the time display to move character-by-character in a serpentine fashion so that you can observe its actual position within the video and any TVC-50 text overlay.

FORMAT:	Provides selection of the format for displaying the time of day.	01-52 Selects one of 52 time display formats. After the first 13 formats, the basic pattern repeats but with different separator characters between the time digits.
---------	--	--

FORMAT#	DISPLAY	MEANING
01	13:02	24 hour H:M
02	13:02:36	24 hour H:M:S
03	13:02:36.7	24 hour H:M:S.1S
04	1:02 PM	12 hour H:M AM/PM
05	1:02:36 PM	12 hour H:M:S AM/PM
06	1:02:36.7 PM	12 hour H:M:S.1S AM/PM
07	02:36.7	No hours M:S.1S
08	27:24	1/2H:S 1/2 hour downcounter
09	57:24	H:S 1 hour downcounter
10	NTC 13:02:36:21	Non-drop frame time code
	DTC 13:02:36:21	Drop frame time code
11	13:02:36:21	Drop or non drop time code (no display of D or N status)
12	TC 13:01:36:21	Non drop frame time code
	TC 13:01:36,21	Drop frame time code ("comma" for drop frame)
13	13:01:36:21	Non drop frame time code
	13:01:36,21	Drop frame time code ("comma" for drop frame)
14-to-26	Period "." separator.	
27-to-39	Blank (transparent) separator	
40-to-52	No separator except for a period whenever tenth of a second is displayed, and a space between "DTC" or "NTC" and the time code number.	
53-54	Formats 53 and 54 provide a vertically "stacked" type of display for the hours, minutes, seconds, and frames values and appear as shown below:	
53		
HH	Hours	
MM	Minutes	
SS	Seconds	
FF	Frames	
54		
HH	Hours	
MM	Minutes	
SS	Seconds	
FFD/FFN	Frames	Frames has a "D" displayed for Drop Frame time code or an "N" displayed for Non-Drop Frame time code when reading 29.97/30 FPS frame rate time code.

As with the other display formats, the horizontal "position" value is the starting character for where the hours value is positioned. For the display area of nine lines of twenty characters, screen character locations are numbered 001 for the upper left corner, and 180 for the lower right corner.

For example, if set to "001" the HH display is located at the very uppermost left screen position. The other associated values are displayed directly underneath the HH hours display. Increasing the position value moves the entire display across the screen until the HH display drops down to the next line.

The next menu items are for setting up the date display.

ITEM	FUNCTION	SELECTIONS
DATE:	Turns "formatted" date display ON or OFF.	ON = Date display is on OFF = Date display is off
REF:	Allows selection of date reference for formatted date display	TC = Time code reference CLK = Internal clock ref
MDY=	Displays MM:DD:YY value of selected date reference.	Display only
POS:	Starting character position formatted date display	001-180 A value of 001 starts the date display in the upper left corner of the of display screen. A value of 180 starts the display at the lower right of the screen.

NOTE:

When the position of the date display is first changed via actuation of the CHAR switch, the TVC-50 temporarily exits the SETUP menu and returns to display the text screen on which the date will be displayed. Further actuation of the switch causes the starting position of the date display to move character-by-character in a serpentine fashion so that you can observe its actual position within the video and any TVC-50 text overlay.

The following nomenclature is used to describe the date format:

ITEM	FUNCTION	SELECTIONS
mm	numeric month value	(01-12)
dd	numeric day value	(01-31)
yy	numeric year value	(00-99)
cc	numeric century value	(19-20)
MMM	month abbrv.	(JAN,FEB,MAR,etc.)
DAY	day-of-week abbrv.	(SUN,MON,TUE,etc.)

The following table shows the first 13 date display formats which use a slash "/" as the separator character:

FORMAT #	DISPLAY
01	mm/dd
02	mm/yy
03	mm/dd/yy
04	MMM/dd/yy
05	MMM/dd/ccyy
06	DDD/MMM/dd
07	DDD/MMM/dd/yy
08	DDD/MMM/dd/ccyy
09	dd/MMM
10	dd/mm/yy
11	dd/MMM/yy
12	yy/mm/dd
13	UB 87/65/43/21 User Bits of the time code

14-to-26	Hyphen "-" separator.
27-to-39	Period "." separator
40-to-52	Blank (transparent) separator.
53-to-65	No separator

4.9 Selecting Data Entry/Edit Mode and Entering and Editing Data

To enter source ID information when in the display mode, actuate the MODE switch two more times to DISPLAY and release. The first actuation turns the display off, at the second actuation the front panel LED flashes at about twice per second and the screen displays a flashing cursor at the current location of where the next character will be entered or changed

4.10 Character Selection

Use the POSITION and CHAR switches to move the cursor and select the desired characters for entry. The following is a list of the characters and their progression in the forward (NEXT) direction. A blank (transparent) character is available between each grouping, and the numeric characters can be quickly accessed by scanning in the reverse (PREV) direction.

Alphabet

A-Z	upper case only
blank	transparent

Punctuation

.	period
,	comma
'	apostrophe
&	ampersand
:	colon
?	question mark

Punctuation

!	exclamation point
blank	transparent

Graphics

white box	white cursor size box
black box	black cursor size box
up arrow	
down arrow	
left arrow	
right arrow	
center dot	
underscore	(not actually under a character)
blank	transparent

Math Symbols

~	approximately
)	right parentheses
(left parentheses
/	slash (divide)
*	asterisk (multiply)
-	hyphen (minus)
+	plus (add)
=	equal
blank	transparent

Numbers

0-9	
blank	transparent

4.11 Inserting Spaces and Deleting Characters

Actuating the MODE switch to DISPLAY after once already in the data entry mode places the TVC-50 into the insert/delete mode. In this mode both the cursor and LED flash rapidly. The POSITION switch is used to move the cursor to a desired line or character.

Actuating the CHAR switch to PREV deletes the character under the cursor and pulls the remainder of the line to the left. Actuating the CHAR switch to NEXT inserts a space under the cursor and moves the line to the right.

4.12 Centering a Line of Text

The insert and delete function is convenient for centering a line of text once entered. First, enter the text desired on each line, starting at the left of the screen. After the desired text is entered, switch to the insert/delete mode, position the cursor at the start of the line, and insert (or delete) spaces until the line of text is centered or place where desired.

4.13 Turning the Display OFF and ON

When the DISPLAY" mode is first selected directly after exiting SETUP, the TVC-50 display is turned on. If DISPLAY is again selected, the display is turned off. From this point, if DISPLAY is again selected, the TVC-50 enters the text "edit" mode. If, however, SETUP is selected, the display is simply turned back on. In this manner, the MODE switch can be used to quickly turn the TVC-50 display on and off.

4.14 Operating in the Split Screen Mode

The "split screen" mode is selected by choosing "1S" or 2S for the VPOS when in the SYSTEM/DSP setup menu. The split screen mode splits the nine display lines into five (5) lines for the top of the screen, and four (4) lines for the bottom.

When in the split display mode and the vertical position is increased, the first five lines of the display move up from the center of the screen towards the top, and the last four lines move from the center towards the bottom. This keeps TVC-50 text overlays out of the center of the screen.

4.15 Making a Time Code Window Dub

To make a time code window dub or "burn", set the display format to one of the time code formats and position the time code display where desired. Both time code and user bits can be displayed at the same time.

4.16 Time Code "+1 Frame" Updating

After reading the time code frame number, the TVC-50 updates it by +1 frame before it is displayed. This is so the displayed frame number matches the actual time code number that is being read.

NOTE:

To allow the most margin for different time code-to-video phase relationships and to also allow time for updating of the time code frame number by +1 frame before writing it to the video display, it is recommended that the display be positioned within the lower half of the screen.

5. MAINTENANCE

5.1 Cleaning

1. Do not attempt to disassemble your TVC-50 to clean it.
2. Clean your TVC-50 using only a damp cloth.
3. NEVER use water or solvents such as alcohol, window cleaner, etc., to clean your TVC-50.

5.2 Service and Troubleshooting

If you suspect your TVC-50 is not operating properly, check the following:

1. Check all coaxial cables for opens or shorts.
2. If using an AC power adapter different from the one supplied with the TVC-50, make sure it supplies the TVC-50 with at least 9 volts (maximum of 14 volts) when the TVC-50 is switched on.

You may return your TVC-50 to HORITA for service. Please contact HORITA first, either by phone or mail, before returning your unit.

5.3 Adjustments

Adjustments are provided for video level and horizontal size.

To access the adjustments, remove the bottom cover from the TVC-50 by removing the two screws from the front panel and then sliding the bottom cover out towards the front.

If you have a Rackmount or Shortrack packaged TVC-50, remove the four screws from the top cover and remove the cover.

All adjustments are located on the circuit board as shown in Figure 5-1.

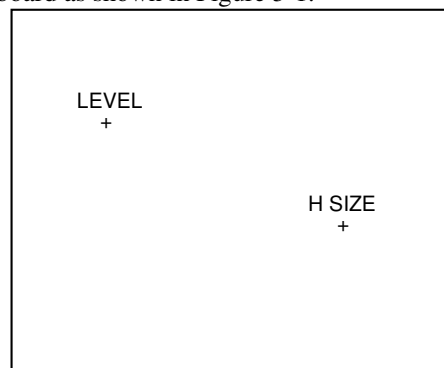


Figure 5-1, Adjustment Locations

5.4 Horizontal Size Adjustment

1. Adjust H-SIZE control for the desired horizontal size.

5.5 Video Level Adjustment

1. Connect a 1-volt P-P video signal to VIDEO IN and a waveform monitor or oscilloscope to VIDEO OUT. Make sure the video output is terminated.
2. Adjust the LEVEL control for a 1-volt P-P output (unity gain).

6 SPECIFICATIONS

Power

Operation	9-to-14V DC, 250 milliamperes
Connector	3.5 MM mini phone jack
AC Adapter	9 volt, 500 milliamperes

Connectors

VIDEO IN	
VIDEO OUT	BNC
TC IN	
TC OUT	RCA
POWER	3.5MM Mini Phone

Switches And Controls

POWER ON/OFF	Toggle switch with red LED above
MODE	
POSITION	
CHAR	Momentary toggle switches

Environment

Operating	5C to 40C (41F to 104F)
Storage	-10C to 60C (14F to 140F)

Dimensions

1.75"H, 3.5"W, 4.5"D

Weight

Approximately 13 Oz. (shipping weight approximately. 29 Oz. including power adapter)

Specifications subject to change without notice