

HORITA VS-50
VIDEO STOP WATCH
USER MANUAL

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1 GENERAL

The VS-50 Video Stopwatch provides an economical means of precisely timing the occurrence of an event relative to video. The VS-50 has an “onscreen” stopwatch timer that can count up or down and can output a “trigger” signal to start or stop an event. The stopwatch counter can be operated either locally via front panel switches, or remotely via simple switch closure inputs to the VS-50 remote control inputs. In addition, the VS-50 has a built in clock/calendar and can display both time and date in a wide variety of user-selectable display formats, including ones which calculate and display the day of the week according to the date entered.

The VS-50 also has provision for user entry of up to 9 lines of twenty characters each, for entering video source ID or other captioning and titling information. All of the VS-50 setup information, operating mode selection, and titling information is saved in a battery backed up, non-volatile memory, and restored at power up.

The VS-50 finds application in timing talent, speeches, dialogues, etc. triggering events related to video capture, as well as security situations, documenting laboratory or other types of experiments, as well as simply for displaying time and date within video images.

2 FEATURES

- Displays Stopwatch, Time, Date, Titling, and operates in local or remote modes with all setup information retained in non-volatile memory
- Stopwatch display can include tenths and hundredths of a second. Twelve display formats are provided to allow selection of displays ranging from just seconds to a display of hours, minutes, seconds, tenths and hundredths of a second. User-selectable time and date video display formats include some which automatically calculate and display the day of the week
- Stopwatch has four modes of operation: downcounter, downcounter with auto preload, down-up counter, and up counter.
- Auto preload counter forms an “interval” timer that can output a GPI signal at regular intervals of from one second up to hours.
- Down-up counter can downcount to zero, output a GPI signal, then count up to display the time following the output of the GPI signal.
- Simple switch-closure-to-ground remote control inputs allow selection of various counter functions such as counter mode, preset, reset, start/stop, etc.
- Remote inputs can be selected as either pulse or level signals.
- GPI output can be set to output either a pulse or level signal when the counter reaches zero, on each second, or on each minute
- Special "split screen" display mode for two smallest vertical sizes insures maximum view of video image by allowing the user to “split” the 9 line display into 5 lines at the top and 4 at the bottom. The amount of the split is quickly and easily user adjustable.
- Four separate setup menus for Display, Stopwatch, Time, and Date allow simple and easy user selection of H and V character size and position, black or white characters, background on/off, time/date on/off, stopwatch mode, GPI ON/OFF, etc.
- Internal crystal controlled clock/calendar IC has battery back-up to maintain time and date when unit is powered off.
- 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 (VS-50), Rackmount (RM-50/VS), Rackmount Add-On (AO-50/VS), or Shortrack (SR-50/VS) models

3 CONNECTING THE VS-50

3.1 Connecting Power

Included with your VS-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 VS-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 VS-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 VS-50 may result.

3.2 Operating From Battery Power

You can operate your VS-50 from battery power in order to use it in the field as a portable time and date or source ID inserter.

The VS-50 can be operated from 9-to-14 volts DC, obtained either from a conventional 12 volt video camera battery, or from a 12 volt battery pack of 8 "AA" or other 1.5 volt batteries.

3.3 Connecting Video In and Out

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

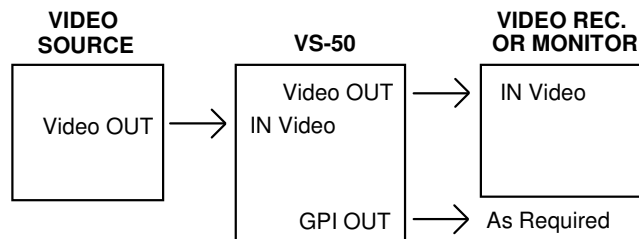


Figure 3-1, Basic VS-50 Hookup

Connect video from the video source to the BNC connector labeled VIDEO IN on the VS-50. Connect VIDEO OUT from the VS-50, to downstream video equipment such as video monitors or video recorders, as desired. When the VS-50 is powered up, the VIDEO IN input is terminated at 75 Ohms. When powered off, video is looped directly from VIDEO IN to VIDEO OUT, bypassing the VS-50.

3.4 Connecting the GPI Output

The VS-50 GPI output signal can be accessed at either the RCA connector labeled GPI OUT, or on Pin-8 of the REMOTE-1 connector. Electrically, the VS-50 GPI output is referred to as an "open collector pulldown to ground" type of signal. This means that the user's equipment must supply the VS-50 GPI output with a positive voltage that first passes through the user's GPI input circuit on his equipment. This circuit will then be activated when the VS-50 GPI output switches to ground. The VS-50 GPI output will "sink" about 100mA of current, and can operate at up to 30 volts.

To connect to the VS-50 GPI output, use an RCA male connector. The center pin is the VS-50 GPI output, the outside of the RCA connector is ground and should be connected to the ground side of your equipment. To use the GPI signal at the REMOTE-1 connector connect to Pin-8 for the GPI signal and to Pin-9 for the ground return.

Using the VS-50 "STOPWATCH SETUP" Menu the GPI signal can be set up to be either a pulse or a logic level change at

the GPI event time. The pulse is of a duration of 100mS (0.1 Sec), starting at the programmed time. The logic level GPI signal simply changes to the opposite level at the programmed GPI time.

3.5 Disconnecting the Internal GPI Pullup Resistor

Although the unit that is receiving the GPI output signal from the VS-50 should supply a positive pullup voltage, the VS-50 GPI output is connected to an internal pullup resistor to +5 volts. This can be disconnected if desired, as follows:

1. To dis-connect the internal pullup first follow the directions in the Section 5, Maintenance, portion of this manual to gain access to the inside of your VS-50.
2. Next locate jumper JP1 on the smaller of the two circuit boards (ASSY 100432).
3. Re-connect the shorting jumper across JP1 to just a single JP1 pin for storage.
4. Reassemble your unit.

4 OPERATING THE VS-50

To operate the VS-50 connect video in and out, the GPI output, apply power, and set the POWER switch to ON. A red LED above the power switch lights when the VS-50 is powered up.

When the VS-50 is initially powered up, it operates in the “Display” mode to display the time, date, and stopwatch values, along with any user source ID information entered. The POSITION and CHAR switches operate to provide quick and convenient control of the display’s horizontal and vertical position, without going through any “menu” operations.

Actuating the MODE switch selects between the setup menus, display, and titling modes

4.1 VS-50 Mode Flow Diagram Explanation

The following figure shows how the VS-50 modes change as the SETUP switch is actuated to DISPLAY and SETUP.

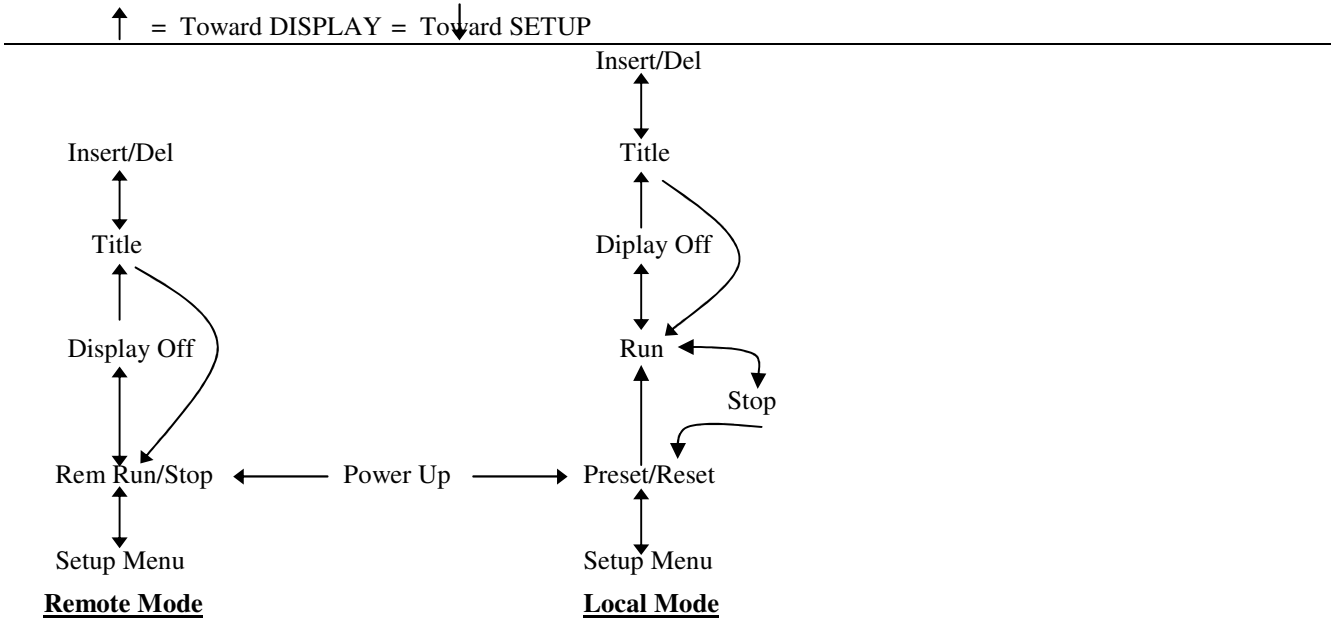


Figure 4.1 VS-50 Mode Flow Diagram

When first powered up, the VS-50 enters the Display mode. If in Local mode of operation, the Stopwatch is stopped. If in Remote mode, the stopwatch operates according to the signals applied to the Remote connectors.

Actuating the MODE switch to SETUP causes the VS-50 to enter the SETUP mode and display the last Setup Menu and Item selected before the VS-50 was powered down. Further actuating of the MODE switch to SETUP causes the VS-50 to

cycle through its four setup menus.

Actuating the MODE switch to DISPLAY when in SETUP mode causes the VS-50 to enter the DISPLAY mode. If operating in the Local mode, the Stopwatch will be set to its Preset or Reset value, depending whether a down or up count stopwatch mode is selected.

4.2 LED Operation

The front panel LED blinks at different rates to provide indication of VS-50 operation.

| <u>LED CONDITION</u> | <u>MEANING</u> |
|--------------------------------|-------------------------------|
| Off | Power off |
| Steady on | Display mode |
| Very slow blink, 1-sec. on/off | No video |
| Slow blink, .5-sec. on/off | Display data entry/Setup mode |
| Fast blink, .25-sec. on/off | Display data edit mode |

4.3 Entering and Exiting the Setup Menus

The setup menus allows selection of various character attributes such as black or white characters, time, date, and stopwatch display formats, stopwatch operating modes, etc.

Some selections, for example black or white characters, affect the setup menu display so you can see their immediate effect. Other selections, for example character size, produce their effect after the setup menu is exited.

To display the setup menus, toggle the MODE switch to SETUP and release. Depending on the actual mode that the VS-50 is operating in, you may have to toggle the switch several times to enter a setup menu. The initial setup menu selected and displayed is the one that was used last.

The selected item on the setup menu is indicated by its “flashing” on and off. In the setup mode, the POSITION and CHAR switches serve to select and change menu items.

To exit the setup mode, actuate the MODE switch to DISPLAY and release.

4.4 Selecting Different Setup Menu Items

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 POSITION switch actuated causes quick scanning through the menu items.

4.5 Changing the 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 scans forward or backward through the choices available. Holding the switch actuated causes automatic scanning through the choices. The setup menu items, functions, and selections available are described for each of the setup menus in the following paragraphs.

:

4.6 “DISPLAY SETUP” Menu

A typical DISPLAY SETUP menu appears on the VS-50 screen as follows:

```
*DISPLAY SETUP*
CHAR COLOR      BLACK
BACKGROUND     ON
CONTRAST        HIGH
SIZE            H-1X V-2S
POSITION        H-18 V-28
LABEL LINES 1-9 OFF
CLR SCR:N      SYS RST:N
```

The following paragraphs provide a detailed explanation of each of the DISPLAY SETUP menu items

| ITEM | FUNCTION | SELECTIONS |
|--|--------------------------------------|---|
| CHAR COLOR | Character color | BLACK = black characters WHITE = white characters |
| This attribute takes effect immediately and also changes the setup screen display. | | |
| BACK- GROUND | Character background | ON = background on OFF = background off |
| This attribute takes effect immediately and also changes the setup screen display. | | |
| CONTRAST | Character contrast | HIGH = high contrast MED = medium contrast LOW = low contrast |
| This attribute takes effect immediately and also changes the setup screen display. | | |
| SIZE | H- (Horizontal) V- (Vertical) | 1X = 1 times (2.1 H pixels) 2X = 2 times (4.2 H pixels) 3X = 3 times (5.6 H pixels) 4X = 4 times (8.4 H pixels) 1S = 1 split (7 H lines) 2S = 2 split (14 H lines) 3X = 3 times (28 H lines) 4X = 4 times (42 H lines) |
| POSITION | H- (Horizontal) V- (Vertical) | 00-63 Numerical reference 00-80 (1S), 00-40 (2S) 00-63 (3X, 4X) Numerical reference |
| CLEAR SCREEN | Clears screen | ON = clear screen OFF = clear screen complete |
| LABEL LINES 1-9 | Labels each line on screen | ON = label screen lines OFF = un-label screen lines |

Labeling of the lines is used to help locate where to put text on the screen or to help in placing the Stopwatch, Time, or Date displays.

| | | |
|-----------------|---------------|--|
| SYSTEM RESET | Resets system | ON = system reset OFF = system reset complete |
|-----------------|---------------|--|

System Reset initializes the VS-50 to a basic display of Stopwatch, Time, and Date

4.7 “STOPWATCH SETUP” Menu

A typical STOPWATCH SETUP menu appears on the VS-50 screen as follows:

```

*STOPWATCH SETUP*
COUNTER          00:05:00
DISPLAY          OFF
START POSITION    100
FORMAT          01
                HH:MM:SS.TH
FLASH AT ZERO   OFF
CONTROL        REM PUL
GPI            PUL ON ZRO
    
```


The following paragraphs provide a detailed explanation of each of the STOPWATCH SETUP menu items

| ITEM | FUNCTION | SELECTIONS |
|-------------|--|--|
| COUNTER | Unformatted counter display and counter preset value | HH:MM:SS HH = 00-99 Hours MM = 00-59 Minutes SS = 00-59 Seconds |
| DISPLAY | Turns display ON and OFF | ON = display ON OFF = display OFF |

NOTE:

The COUNTER HH:MM:SS and the DISPLAY ON/OFF fields can only be accessed by the POSITION switch when in Local (LOC) mode and then only by moving the cursor up the screen to the desired fields.

| | | |
|----------------|--|---|
| START POSITION | Starting character position of formatted stopwatch display | 001-180 001 is upper right 180 is lower left |
|----------------|--|---|

NOTE:

When the starting position of the Stopwatch display is changed via actuating the CHAR switch while the “START POSITION” menu item is selected, the prior display screen is immediately restored. Further actuation of the CHAR switch moves the starting position of the Stopwatch display character by character in a serpentine fashion so that you can observe its actual position within your normal video display. There are 20 character positions available on each of the 9 lines. Character “001” is located at the upper left of the screen; character “180” is located at the lower of the right screen. It is also helpful to use the “LABEL LINES 1-9” function to help see where the Stopwatch is displayed as its starting position on the screen is changed. Even though the Stopwatch display “erases” any text that was on the screen as it is moved, the text can be restored simply by actuating the MODE switch to SETUP, then back to DISPLAY.

| ITEM | FUNCTION | SELECTIONS |
|-------------|--------------------------------------|-------------------|
| FORMAT | Selects format for stopwatch display | 01-12 |

The display formats for the Stopwatch are shown in Table 4.2. Note that the actual text shown in the table (HH, MM, etc.) is displayed on the STOPWATCH SETUP menu so that you can select the type of display desired. When the Stopwatch is displayed on the screen, the actual counter values are displayed.

| FORMAT # | DISPLAY | MEANING |
|-----------------|----------------|---|
| 01 | HH:MM:SS.TH | Hours, Minutes, Seconds, Tenths, and Hundredths of a second |
| 02 | MM:SS.TH | |
| 03 | SS.TH | |
| 04 | HH:MM:SS.T | |
| 05 | MM:SS.T | |
| 06 | SS.T | |
| 07 | HH:MM:SS | |
| 08 | MM:SS | |
| 09 | SS | |
| 10 | HH:MM | |
| 11 | HH | |
| 12 | MM | |

Table 4.1, Stopwatch Display Formats

| ITEM | FUNCTION | SELECTIONS |
|------------------|--|--|
| FLASH AT ZERO | Enables “flashing” of counter display when down counting and zero is reached | ON= flash OFF = don’t flash |
| CONTROL LOC | Selects Local mode and stopwatch counter operation | DWN = down counter, counts down to zero from preset value Stops when zero is reached AUT = down counter, counts down from preset value until zero is reached, then reloads preset value and counts down again. Operates continuously in this manner. DUP = down-up counter, counts down to zero from preset value then counts up when zero is reached. UP = up counter, counts up from zero. |
| REM | | Selects Remote control PUL = selects pulse type control for RUN, REVERSE, OFF, and LAP remote inputs. LEV = selects level type control for RUN, REVERSE, OFF, and LAP remote inputs. |

4.8 “TIME SETUP” Menu

A typical TIME SETUP menu appears on the VS-50 screen as follows:

```

*TIME SETUP*
TIME          HH:MM:SS
DISPLAY      ON
START POSITION 130
FORMAT       01
              09:30 AM

```

The following paragraphs provide a detailed explanation of each of the TIME SETUP menu items

| ITEM | FUNCTION | SELECTIONS |
|-------------|--------------------------|---|
| TIME | Unformatted time display | HH:MM:SS.TH HH = 00-99 Hours MM = 00-59 Minutes SS = 00-59 Seconds |

NOTE:

The TIME value can be accessed for setting by using the POSITION switch to move the cursor up the screen into the desired HH, MM, or SS fields.

| | | |
|---------|--------------------------|--------------------------------------|
| DISPLAY | Turns display ON and OFF | ON = display ON OFF = display OFF |
| START | Starting character | 001-180 001 is upper left hand |

NOTE

The Date value can be accessed for setting by using the POSITION switch to move the cursor up the screen into the DATE MM-DD-YY year fields.

| ITEM | FUNCTION | SELECTIONS |
|----------------|-----------------------------|---|
| DISPLAY | Turns display ON and OFF | ON = display ON OFF = display OFF |
| START POSITION | Starting character position | 001-180 001 is upper left hand of formatted date display corner of screen, 180 is lower right hand corner |

NOTE:

When the starting position of the Date display is changed via actuating the CHAR switch while the “START POSITION” menu item is selected, the prior display screen is immediately restored. Further actuation of the CHAR switch moves the starting position of the Date display character by character in a serpentine fashion so that you can observe its actual position within your normal video display. There are 20 character positions available on each of the 9 lines. Character “001” is located at the upper left of the screen; character “180” is located at the lower right of the screen. It is also helpful to use the “LABEL LINES 1-9” function to help see where the Date is displayed as its starting position on the screen is changed. Even though the Date display “erases” any text that was on the screen as it is moved, the text can be restored simply by actuating the MODE switch to SETUP, then back to DISPLAY.

| ITEM | FUNCTION | SELECTIONS |
|-------------|---------------------------------|--|
| FORMAT | Selects format for date display | 01-60 selects one of 60 formats for displaying the date. After the first twelve formats, the basic pattern repeats, but with different separator characters between the time digits. |

The following nomenclature is used to describe the date format:

| | | |
|----|-----------------------|--------------------------------------|
| 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.) |

Table 4.3 shows the first 12 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-to-24 Hyphen “-” separator.

25-to-36 Period “.” separator.

37-to-48 Blank (transparent) separator.

Table 4.3, Date Display Formats

4.10 Selecting Titling Mode and Entering and Editing Data

To enter source ID information, actuate the MODE switch to DISPLAY and release until the front panel LED flashes at about once per second and the screen displays a flashing cursor which shows the position of where the next character will be entered.

4.11 Character Selection

Use the POSITION and CHAR switches to move the cursor and select the desired characters for entry as shown in Table 4.1. A blank (transparent) character is available between each grouping, and the numeric characters can be quickly accessed by scanning in the reverse (PREV) direction.

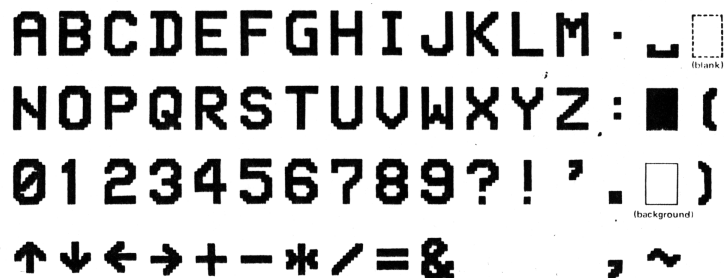


Table 4.4, Character Set

4.12 Inserting Spaces and Deleting Characters

Actuating the MODE switch to DISPLAY when in the Titling mode places the VS-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.

4.13 Centering a Line of Text

The Insert/Delete mode 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 placed where desired.

4.14 Turning the Display Off and On

When the MODE switch is first actuated to DISPLAY after the VS-50 is displaying the normal stopwatch, time, date, and titles, the display is turned off. If actuated to SETUP, the VS-50 display is turned back on. In this manner the VS-50 display can be quickly switched on and off from the front panel switches.

4.15 Split Screen Display

The “split screen” type of display is selected by choosing the “1S” or “2S” mode for the vertical size when in the DISPLAY SETUP menu. The split screen mode splits the nine display lines into 5 lines that move towards the top of the screen, and 4 lines that move towards the bottom.

When split screen is selected, the amount of the vertical split is continuously adjustable, either by changing the value of the vertical position when in the DISPLAY SETUP mode, or by operating the front panel POSITION switch when in the normal display mode. In split screen mode, changing the vertical position value increases or decreases the amount of the vertical split, rather than moving the display vertically, as it does when 3X or 4X vertical size is selected.

With this arrangement, you can place data on line-1 and line-9 and it will just barely be visible (if at all) on most standard monitors when the screen is split to its maximum value

4.16 Operating in Local Mode

1. Select LOC in the STOPWATCH SETUP menu CONTROL item.

NOTE:

When LOC (Local) mode is selected, Remote operation is disabled. None of the Remote input signals will affect operation of the VS-50.

2. Go to the next menu item and select the desired DWN, AUT, DUP, or UP type of stopwatch counter.
3. Set a preset value for the counter if a DWN, AUT, or DUP counter is selected. Access the counter preset by moving the cursor on the STOPWATCH SETUP menu up the menu items until it enters the seconds of the counter display. Then use the NEXT/PREV functions to change the counter seconds value. Do this for the other digits as desired.
4. Set up desired GPI output signal
5. Activate the MODE switch to DISPLAY to exit the Setup menu and display the Stopwatch counter. The counter will be stopped at this time
6. Activate the MODE switch to DISPLAY one more time and the Stopwatch will start counting.
7. To stop counting, activate the MODE switch back to SETUP one time
8. To reset or preset the counter and start over, activate the MODE switch to SETUP one more time.
9. To turn the display off, activate the MODE switch to DISPLAY one more time when the counter is running.
10. To enter titles on the screen, actuate the MODE switch to DISPLAY one more time after the display has switched off. The display will come back on with the flashing cursor, indicating the titling data entry mode.

It is helpful to use the LABEL LINES 1-9 function to assist in locating on which line your text, stopwatch, time, or date displays will be placed.

4.17 Operating in Remote Mode

1. Select REM in the STOPWATCH SETUP menu CONTROL Item.

NOTE:

When REM mode is selected, local operation of the counter via the front panel MODE switch is disabled. Also, local operation to preset the counter and turn the display on and off when in the STOPWATCH SETUP menu, is disabled.

2. Go to the next menu item and select PUL to operate the RUN, REV, OFF, and LAP inputs with a pulse input from a momentary switch closure to ground, such as from a pushbutton switch. Select LEV to operate these inputs with a steady state type of input, such as from a toggle switch.
3. Use the remote PRESET SEC, PRESET MIN, and PRESET HRS inputs to preset the individual digits of the counter as desired. Each actuation at a preset input advances the digit value by +1 count. If the PRESET NEG MINUS input is grounded, each actuation of a preset input advances the digit value by -1 count.

Holding a preset input to ground for greater than 2 seconds causes the counter digit to quickly advance +/- automatically.

Note that this preset value is retained in the VS-50 and is used to preset the Stopwatch counter whenever the PRESET/DOWN input is activated.

4. Use the Remote inputs to select the desired DWN, AUT, DUP, or UP type of Stopwatch counter as follows:

| Counter Type | Remote Input | Use |
|--------------|--------------|------------------------------------|
| Down Counter | PRESET | Use to set counter to preset value |
| | RUN | Use to start and stop counter |

| | | |
|--------------------------|---------------|---|
| Auto Reload Down Counter | AUTO RUN | Connect to Ground Use to start and stop the counter |
| Down/Up Counter | DWN/UP RUN | Connect to Ground Use to start and stop the counter |
| Up Counter | RESET RUN | Use to set counter to zero value Use to start and stop the counter |

5. Set up desired GPI output signal.

4.18 GPI Output Signal Timing Versus Stopwatch Mode

The GPI output signal can be set to be either a pulse or a level at the selected GPI event time. If a GPI Pulse is selected, the GPI output will pull down to ground for 100mS (milliseconds) at the GPI time. If a GPI Level is selected, the GPI output signal will change from its present level to the opposite level at the GPI event time. The GPI output signal is ended whenever the counter is preset or reset. The following table shows the relationship of the GPI timing versus the Stopwatch counter mode

| Stopwatch Mode | GPI Selection | GPI Output Signal Action |
|--------------------|---------------|--------------------------------|
| DWN (down counter) | ON ZRO | When counter reaches zero |
| | ON SEC | On each second and on zero |
| | ON MIN | On each minute and on zero |
| AUT (auto reload) | ON ZRO | Each time counter reaches zero |
| | ON SEC | On each second and on zero |
| | ON MIN | On each minute and on zero |
| DUP (down/up) | ON ZRO | When counter reaches zero |
| | ON SEC | On each second and on zero |
| | ON MIN | On each minute and on zero |
| UP (up counter) | ON ZRO | None |
| | ON SEC | On each second |
| | ON MIN | On each minute |

Table 4.5, GPI Timing Versus Counter Mode

4.19 Remote Control Connector

Remote control of the VS-50 is by way of two DB9 connectors labeled REMOTE-1 and REMOTE-2.

REMOTE-1

| Pin No. | Name | Type | Function |
|---------|-------------|---------|--|
| 1 | RESET/UP | LEVEL | Reset counter to zero, set "up counter" mode |
| 2 | PRESET/DWN | LEVEL | Set counter to preset value set "down counter" mode. |
| 3 | RUN | PUL/LEV | Start/Stop counter |
| 4 | REV | PUL/LEV | Change count direction |
| 5 | OFF | PUL/LEV | Turn display off/on |
| 6 | LAP | PUL/LEV | Lap display on/off |
| 7 | STR-STP-SET | PUL/LVL | Single switch to Start-Stop-Reset/Preset the counter |
| 8 | GPI OUT | PUL/LEV | GPI output signal |
| 9 | GND | | Signal ground |

REMOTE-2

| Pin No. | Name | Type | Function |
|---------|------------|---------|--------------------------------------|
| 1 | AUTO | LEVEL | Sets "auto reload down counter" mode |
| 2 | | | Not Used |
| 3 | Not Used | | |
| 4 | DWN/UP | LEVEL | Sets "down-up counter" mode. |
| 5 | PRESET NEG | LEVEL | Preset in negative (minus) direction |
| 6 | PRESET SEC | PUL/LEV | Preset seconds |
| 7 | PRESET MIN | PUL/LEV | Preset minutes |
| 8 | PRESET HRS | PUL/LEV | Preset hours |
| 9 | GND | | Signal ground |

5. MAINTENANCE

5.1 Cleaning

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

5.2 Service and Troubleshooting

If you suspect your VS-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 VS-50, make sure it supplies the VS-50 with at least 9 volts (maximum of 14 volts) when the VS-50 is switched on.

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

5.3 Adjustments

NOTE:

Remove power from your unit before performing the following adjustments

Adjustments are provided for video level and horizontal size. To access the adjustments, remove the bottom cover from the VS-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 VS-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.

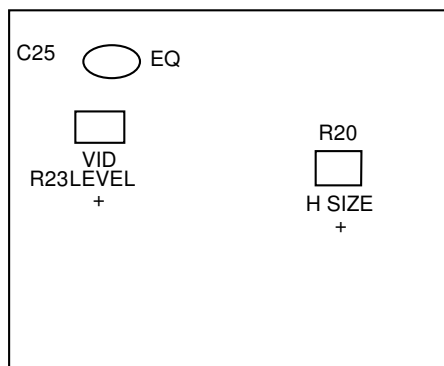


Figure 5-1, Adjustment Locations

5.4 Horizontal Size Adjustment

1. Apply power to your unit and 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-1V P-P composite video |
| GPI Out | RCA-Transistor open collector pulldown to ground. 2N3904, Maximum I = 100mA. Maximum V = +30 volts |
| REMOTE-1 | DB9 |
| 1 RESET/UP | Reset counter , set up counter |
| 2 PRESET/DWN | Preset counter, set down counter |
| 3 RUN | Start/Stop counter |
| 4 REV | Change count direction |
| 5 OFF | Turn display off/on |
| 6 LAP | Lap display on/offp |
| 7 Not Used | |
| 8 GPI OUT | GPI output signal (same as RCA) |
| 9 GND | Signal ground |
| REMOTE-2 | DB9 |
| 1 AUTO | Set down-up counter |
| 2 Not Used | |

| | |
|--------------|-----------------------------------|
| 3 Not Used | |
| 4 DWN/UP | Set auto reload down counter |
| 5 PRESET NEG | Preset negative (minus) direction |
| 6 PRESET SEC | Preset seconds |
| 7 PRESET MIN | Preset minutes |
| 8 PRESET HRS | Preset hours |
| 9 GND | Signal ground |

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

