Model 5950-SID
VITC Reader / Source ID Decoder

Instruction Manual

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EVERTZ MICROSYSTEMS LTD.
5288 John Lucas Drive, Burlington, Ontario, Canada, L7L 5Z9
Phone: 905-335-3700
Fax: 905-335-3573
Internet: Sales: sales@evertz.com
Tech Support: eng@evertz.com
Web Page: http://www.evertz.com

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INFORMATION TO USERS IN EUROPE

NOTE

CISPR 22 CLASS A DIGITAL DEVICE OR PERIPHERAL

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to the European Union EMC directive. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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NOTE

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This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

WARNING

Changes or Modifications not expressly approved by Evertz Microsystems Ltd. could void the user's authority to operate the equipment.

Use of unshielded plugs or cables may cause radiation interference. Properly shielded interface cables with the shield connected to the chassis ground of the device must be used.

REVISION HISTORY

REVISION	DESCRIPTION	DATE
1.0	Original issue	October 95
	Manual Change Sheet 1.0-1 inserted	March 96

The following document describes the operational changes to the 5950-SID Source ID decoder related to firmware version 960321. References to the 5950-SID manual are to version 1.0 printed October 1995.

1. New Features

- Decoding of new 9 character VITC SID format
- Decoding of source ID from PESA Source ID Encoders - only displayed when no VITC SID is present.
- LTC Reader input added - only displayed when VITC SID, PESA SID and normal VTR VITC are not present

2. Support for 5 and 9 character VITC Source ID formats.

The 5950-SID automatically detects whether incoming VITC with source ID is encoded in one of two formats, and appropriately displays each one. The first format consists of 5 alpha-numeric characters followed by a number from 000 to 999. The source message and number are separated by a dash (-) in the source Id display. The second format consists of 9 alphanumeric characters. VITC with source ID encoded in either format receives the highest priority in the 5950-SID and is always displayed if present.

3. PESA Source ID Decoding Implemented

When VITC with source ID is not present, the 5950-SID will decode any incoming PESA format source ID. The VITC Code In LED will be on when PESA source ID is detected on the incoming video. The Time and Status VCG windows will be automatically turned off if they are visible, and the PESA source ID message will be shown in the Source ID window. The front panel display will switch to the PESA source ID message. The front panel display will show `PID: source msg.`

When a video input that contains VITC with encoded source ID returns, the character windows will be restored to the last state they were in, and the front panel display will revert to the last display it was showing.

4. LTC Reader Added

An LTC reader has been added to the 5950-SID. The LTC CODE IN LED will be on when LTC is present. This reader is only displayed when there is no VITC or PESA data available on the incoming video. The Source ID and Status VCG windows will be automatically turned off if they are visible, and the LTC reader time will be shown in the Time window. The front panel display will switch to the LTC reader time and the LTC DISPLAY LED will be turned on.

When a source that contains either VITC or PESA source ID returns, the character windows will be restored to the last state they were in, and the front panel display will revert to the last display it was showing.

The LTC reader input connects to any LTC source such as the head preamplifier of a VTR or a house timecode. The LTC Reader In XLR provides a balanced input, with the signals connected to pins 2 and 3. When using an unbalanced input to the reader, the signal should be applied to pin 3 of the XLR, and the unused input (pin 2) should be connected to ground (pin 1).

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1. INTRODUCTION

The model 5950-SID VITC Reader / Source ID Decoder combines the latest LSI technology with sophisticated microcontroller firmware to provide a powerful, flexible reader system. The model 5950-SID is a VITC reader and multi-function character inserter to display the decoded source ID information. A 12 digit alphanumeric display can be quickly delegated to show the required data.

The 5950-SID has been designed to decode Source ID/status information which has been encoded by source ID Encoders such as the model 8025-SIE. The VTR time is encoded in the usual way for sources that have timecode associated with them. For non-timecoded sources such as cameras, the 5950-SID senses codes in the user bits to automatically blank the time display on the character inserter. A 5 character source ID message and a 3 digit source number are encoded into the user bits. For VTR sources, VTR status is also encoded into the user bits. For sources that do not have encoded status information, the 5950-SID automatically blanks the status display.

The model 5950-SID contains all the necessary video processing circuits and therefore, requires no external signals other than the video signal itself. The VITC reader's line range can be easily programmed from the front panel, thus permitting recovery of specific VITC data where multiple sets have been recorded.

The high resolution character inserter provides two independently positionable windows to show time and source ID/status (decoded from the user bits) simultaneously. Three character sizes and the choice of white or black characters with or without contrasting background mask are selected from the front panel.

When displaying data recovered from a VITC source, the 'lookahead' compensation can be turned off, allowing field accurate burn-ins of edited material. The field number sequence will be displayed to the right of the frames display. When the data being read was recorded in the non colour frame mode, the field number sequence will be 1,2,1, etc. (1,2,3,4,1, etc. for PAL). When the reader data was recorded in the colour frame mode, the field number sequence will be 1,2,3,4,1, etc. (1,2,3,4,5,6,7,8,1, etc. for PAL).

The Character inserter provides an on screen programming menu system, which is used to configure the various operating modes. The use of drop down menus, and dedicated programming keys, allows the model 5950-SID to be conveniently configured for particular customer requirements.

1.1. HOW TO USE THIS MANUAL

This manual is organized into 4 chapters : Introduction, Installation, Operation, and Technical Description.

Items of special note for all users are marked with a double box like this.

2. INSTALLATION

2.1. REAR PANEL CONNECTIONS

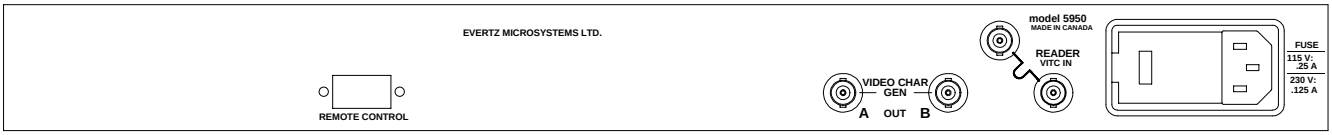

Figure 2-1: Rear Panel Layout

The following sections describe the purpose of the rear panel connectors of the 5950-SID. Figure 2.1 above shows the rear panel connectors provided on the model 5950-SID. Sections 2.1.1 to 2.1.3 describe the specific signals that should be connected to the 5950-SID.

2.1.1. Video Connections

VIDEO IN + VITC A BNC loop for input of program video onto which characters are to be inserted. If the video contains vertical interval time code, it will be read by the reader when it is configured in the VITC or AUTO modes This signal is also used to provide a gen-lock reference for the LTC translator output.

VCG OUT A & B Two isolated BNC connectors with identical outputs of program video with characters inserted. This output is also used to display the on screen programming menu and is normally connected to a video monitor.

2.1.2. Parallel Remote Control Connections

REMOTE CTL A 9 pin female 'D' connector used for parallel remote control inputs.

2.1.3. Power Connections

LINE: The 5950-SID may be set for either 115v/60 Hz or 230v/50 Hz AC operation. The voltage selector switch is accessible on the rear panel. The line voltage connector contains an integral slow blow fuse (and a spare one).

2.2. MOUNTING

The 5950-SID VITC Reader/ Source ID Decoder is equipped with rack mounting angles and fits into a standard 19 inch by 1 3/4 inch (483 mm x 45 mm) rack space. The mounting angles may be removed if rack mounting is not desired.

2.3. POWER REQUIREMENTS

2.3.1. Selecting the Correct Mains Voltage

Power requirements are 115 or 230 volts AC at 50 or 60 Hz, switch selectable on the rear panel. Power should be applied by connecting a 3 wire grounding type power supply cord to the power entry module on the rear panel. The power cord should be minimum 18 AWG wire size, type SVT marked VW-1, maximum 2.5 m in length.

Before connecting the line power, be sure to select the proper line voltage. Also, check that the line fuse is rated for the correct value marked on the rear panel.

The power entry module combines a standard IEC 320 power inlet connector, voltage selector switch, two 5 x 20 mm fuse holders (one active, one spare) and an EMI line filter.

To change the mains voltage setting, open the cover of the power entry module using a small screwdriver. Remove the drum selector switch, and re-insert it so that the desired voltage is visible through the opening on the mains connector cover. Check that the correct fuse is in use as shown in section below.

2.3.2. Changing the Fuse

The fuse holder is located inside the power entry module. To change the fuse, open the cover of the power entry module using a small screwdriver. The fuse holder on the bottom contains the active fuse. The one at the top contains a spare fuse. Pull the bottom fuse holder out and place a fuse of the correct value in it. Use slo blo (time delay) 5 x 20 mm fuses rated for 250 Volts with the following current ratings:

For 115 Volt operation	250 mA
For 230 Volt operation	125 mA

Never replace with a fuse of greater value.

Make sure that the arrow is pointing down when you replace the fuse holder. Close the door on the power entry module and connect the mains voltage.

2.4. READER VIDEO INPUT

Video with VITC recorded on it is connected to the VIDEO IN loop. The video input has a high impedance input tapped off the loop through, therefore the input must be terminated with 75 ohms at the end of the line.

2.5. CHARACTER INSERTER VIDEO

The input video on which the characters are to be displayed is the same video as the reader uses and is connected to the VIDEO IN loop. The video input has a high impedance input tapped off the loop through, therefore the input must be terminated with 75 ohms at the end of the line.

Two isolated character generator outputs labelled VCG OUT A and B, are provided to drive a preview monitor and a video recorder. Characters are keyed into the video connected to the VIDEO IN loop. Size, position, and style of the character displays are controlled from the on screen programming menu.

In order to use the on screen programming menu system, video must be applied to the VIDEO IN loop and one of the VCG outputs must be connected to a video monitor.

2.6. REMOTE CONTROL CONNECTOR PIN ASSIGNMENTS

A 9 pin D connector located on the rear panel labelled REMOTE CTL provides 6 parallel control inputs for remote control of some of the model 5950-SID functions. The pinout of the D connector is as follows:

1		Frame Ground
	6	Unassigned
2		VCG On/Off
	7	VITC reader
3		Freeze
	8	Unassigned
4		Time/UB
	9	Frame Ground
5		

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3. OPERATING INSTRUCTIONS

The model 5950-SID is a VITC reader and multi-function character inserter designed specifically for decoding and displaying source ID /VTR status information encoded into the user bits. A 12 digit alphanumeric display is quickly delegated to show the time, source ID or VTR status information.

The character inserter has two independently postionable windows to display the time and source ID/status information. The character inserter also provides an on screen programming menu system, which is used to configure the various operating modes. The use of drop down menus and dedicated programming keys, allows the model 5950-SID to be conveniently configured for particular customer requirements.

3.1. FRONT PANEL OVERVIEW

The model 5950-SID VITC Reader/Source ID Decoder provides a display of time or user bit information from its reader using a 12 digit alphanumeric display on the front panel, or using characters keyed into the input video. Operational control is handled by 10 front panel keys. Six LED's provide operational status at a glance.

Figure 3-1: Front Panel Layout

3.1.1. Overview of the Pushbuttons

Ten front panel pushbuttons are used to control the operation of the 5950-SID.

TIME/UB Is used to select whether time, source ID or status is being displayed on the front panel alphanumeric display.

CHAR GEN MODE Initiates VCG window select mode and highlights the selected window. Use the arrow keys to move the window, use the **CHAR GEN ON/OFF** key to turn the window on or off. Press the **MODE** key again to select the next VCG window. Press the **MODE** key a third time to return to the normal VCG display mode.

CHAR GEN ON/OFF Turns the character generator ON and OFF. When in the VCG window select mode the **CHAR GEN ON/OFF** key is used to turn individual windows ON and OFF.

SETUP Initiates SETUP mode and displays the on screen programming menu. Pressing the **SETUP** key again exits the SETUP mode.

SELECT When in the SETUP mode the **SELECT** key is used to choose items from within a drop down menu or sub menu.

← → ↑ ↓ When in the SETUP mode, the arrow keys are used to move between various items in the menu system.

When in the VCG window select mode, the arrow keys are used to position individual windows on the screen. (See also section 3.3.1.)

When not in either the SETUP or VCG window select modes, the arrow keys are used to position all the windows on the screen. (See also section 3.3.2.)

3.1.2. Overview of the Status Indicators

There are six status indicators that show operational status at a glance.

DISPLAY LTC Not used on the 5950-SID

DISPLAY VITC Indicates that the data being displayed is from the VITC reader.

GEN LCK PAL Indicates that the 5950-SID is properly genlocked to a PAL video reference. If it is blinking, it indicates that the PAL video standard is selected, but a valid PAL video reference is not present.

GEN LCK NTSC Indicates that the 5950-SID is properly genlocked to a NTSC video reference. If it is blinking, it indicates that the NTSC video standard is selected, but a valid PAL video reference is not present.

PRESENT LTC Not used on the 5950-SID

PRESENT VITC Indicates that the VITC reader is reading valid code.

3.2. FRONT PANEL DISPLAY FUNCTIONS

The **TIME/UB** key is used to select which data is being displayed in the alphanumeric display. Each time it is pressed it cycles to the next display data. Currently there are three types of display data:

ID: VTR-10	Source ID Message
STATUS: STOP	VTR Status
12:34:56:00	VTR Timecode

The **FREEZE** key is used to stop updating of the VCG and front panel displays at a particular point in time. When in the FREEZE mode, a **f** is displayed in the leftmost character of the front panel display. Press the **FREEZE** key again to release the FREEZE mode and begin updating of the data.

3.2.1. Special Front Panel Indicators

The following special indicators are used between the seconds and frames digits of the front panel time display to identify non drop frame and drop frame code (NTSC only)

Non Drop Frame Colon (:)
Drop Frame (NTSC) Period (.)

3.3. CHARACTER GENERATOR FUNCTIONS

Two separately positionable character windows displaying time or Source ID/Status (user bits) are available. Although the Source ID and Status windows move together, they can be independently turned on and off. The four arrow keys (↑, ↓, ←, →) control the position of all the windows . THE **CHAR GEN ON/OFF** key selects whether the video character generator (VCG) keyer is on or off. The use of these keys in combination with the **CHAR GEN MODE** key selects which windows are displayed and their position on the screen. The VCG drop down menu of the on screen programming menu is used to select character size and style.

3.3.1. Selecting and Positioning the Individual Character Inserter Windows

Press **CHAR GEN MODE** to enable the window select mode. Both windows will appear on the character screen with the window for the time highlighted. Use the arrow keys (↑, ↓, ←, →) to position the time window on the screen. Use the **CHAR GEN ON/OFF** key to turn the window on or off. Press the **CHAR GEN MODE** key to highlight the source ID window. Use the **CHAR GEN ON/OFF** key to turn the source ID window on or off and the arrow keys to move it to the desired location. Press the **CHAR GEN MODE** key to highlight the status window. Use the **CHAR GEN ON/OFF** key to turn the status window on or off and the arrow keys to move it to the desired location. Press the **CHAR GEN MODE** key to return to normal display mode. For example, to move only the Time window down, leaving the source ID/status window in the same place, press **CHAR GEN MODE** and press the ↓ key. Press the **CHAR GEN MODE** key three times to return to the normal display mode.

3.3.2. Positioning the Overall Character Display

In the normal VCG display mode, when neither of the windows is highlighted, the arrow keys (↑, ↓, ←, →) move all the displayed windows

by the same relative amount. For example, to move the time and source ID/status windows both down by one line press the 🡻 key.

3.3.3. Character Generator On/ Off Controls

There are several factors that control whether the character generator windows will be turned on or off. In order of priority these are:

1. The **CHAR GEN ON/OFF** key on the front panel alternately turns the characters on and off.

2 The VCG Keyer On/Off remote control input on the rear panel alternately turns the characters on and off. This input has equal priority with the front panel On/Off key.

3. The individual windows can be turned off using the **CHAR GEN ON/OFF** key in window select mode.

4. If the source does not have timecode associated with it, (SRC TIME flag in user bits is off) the time window will be turned off.

   If the source does not have status associated with it, (SRC STATUS flag in user bits is off) the status window will be turned off.

3.3.4. Special VCG Indicators

The following special indicators are used between the seconds and frames digits of the time windows in the character inserter to identify non drop frame and drop frame code (NTSC only)

Non Drop Frame Colon (:)
Drop Frame (NTSC) Period (.)

3.3.5. Field Identification

When reading VITC, the field number sequence may be displayed to the right of the reader time frames display. When the data being read was recorded in the non colour frame mode the field number sequence will be 1, 2, 1, etc. (1, 2, 3, 4, 1, etc. for PAL). When the reader data was recorded in the colour frame mode, the field number sequence will be 1, 2, 3, 4, 1, etc. (1, 2, 3, 4, 5, 6, 7, 8, 1, etc. for PAL) The field number display may be disabled using the VCG FIELDS item in the VCG menu.

3.4. ON SCREEN PROGRAMMING MENU - OVERVIEW

The key to the operational flexibility of the model 5950-SID lies in the powerful on screen programming menu system which uses the built in character generator. This method of configuring the model 5950-SID is

quick, and simple, guiding you to the correct setup for your application. Six front panel push buttons (🡐, 🡒, 🡑, 🡓, and **SELECT** and **SETUP**) are used to cycle through the various items on the programming menu.

The model 5950-SID menu system consists of three drop down menus. The titles of each of the drop down menus are shown on the top line of the character display. Selecting an item on one of the drop down menus reveals a sub-menu showing the choices for that item. Figure 3.2 is an overview of the on screen menu system and shows all the menu choices and where you will find the menu items. Note that some menu choices will be hidden depending on the programmed mode of operation.

READER
- **ASSIGNMENT**
  - FIXED TO VITC
- **MODE**
  - TIME DATA / USERBITS
  - TIME DATA / SOURCE ID DATA
- **VITC LINES**
  - LINE RANGE:
  - START 10 / END 20
- **DISPLAY**
  - PROCESSED
  - DIRECT

VCG
- **CHAR SIZE**
  - TINY
  - SMALL
  - LARGE
- **CHAR STYLE**
  - WHITE
  - WHITE ON BLACK
  - BLACK
  - BLACK ON WHITE
- **VCG FRAMES**
  - DISPLAY
  - BLANK
- **VCG FIELDS**
  - DISPLAY
  - BLANK
- **VCG SYMBOLS**
  - DISPLAY
  - BLANK

CONFIGURATION
- **VIDEO TYPE**
  - AUTO
  - NTSC
  - PAL
- **HORZ CHAR SIZE**
  - HORIZONTAL
  - CHAR SIZE = 10
  - ← OR → TO ADJUST
- **DISPLAY LEVEL**
  - FRONT PANEL
  - BRIGHTNESS = 2
  - ↑ OR ↓ TO ADJUST
- **FACTORY RESET**
  - ** WARNING **
  - THIS COMPLETELY
    - RESETS UNIT
  - USE TIME/UB + SELECT
  - TO PROCEED

Figure 3-2: On Screen Programming Menu Overview

Abbreviated menu descriptions are also shown on the front panel display, allowing the menu system to be used without a video monitor. Figure 3-3 shows an overview of the front panel menu descriptions. When the drop down menu items are selected, menu items are shown in UPPERCASE. When the sub menus are selected, the menu items are shown in lower case.

RDR ASSIGN
- fixed vitc

RDR MODE
- mode tim sid
- mode dat dat

RDR LINES
- line strt
- line end

RDR DISPLAY
- disp process
- dsp direct

VCG SIZE
- size tiny
- size small
- size large

VCG STYLE
- style white
- style wht/bl
- style black
- style bl/wht

VCG FRAMES
- frms display
- frms blank

VCG FIELDS
- flds display
- flds blank

VCG SYMBOLS
- sym display
- sym blank

CFG VIDEO
- vid typ AUTO
- vid typ NTSC
- vid typ PAL

CFG HOR SIZE
- hor size 02

CFG DSPL LVL
- dsply lvl 1

FACTORY RESET
- tm/ub + select

Figure 3-3: Overview of Front Panel Menu

To enter the on screen programming menus, press the **SETUP** key. The character generator will show the last format screen that was used with the currently selected item highlighted. The two horizontal arrow keys (←, →)

allow you to move horizontally to another drop down menu when the sub menu is hidden. Using these two keys you can quickly scan the entire menu system for the item you wish to change.

The two vertical arrow keys (↑, ↓) allow you to move vertically within the drop down menus. When you have selected the desired menu item, press the **SELECT** key to reveal the sub menu choices for that item. Use the two vertical arrow keys (↑, ↓) to move vertically within the sub menu. When you have selected the desired sub menu choice press the **SELECT** key to save your choice and return to the drop down menu.

When you have made all the desired changes, press the **SETUP** key to return to the normal display mode.

The READER drop down menu is used to program various reader modes such as selecting VITC Line numbers, whether user bits contain static numbers or source ID information, etc. (See section 3.6). The VCG drop down menu is used to program the size and style of the character generator, and whether the time code frames will be displayed or not (See section 3.5). The CONFIGURATION drop down menu is used to select the video standard, set the horizontal character width, display brightness, etc. (See section 3.7). The CONFIGURATION menu items are normally only required during installation. Each of the menu items are described in the following sections with an explanation of what each choice does.

To aid in finding the descriptions of the various menu items in sections 3.5 to 3.7, the drop down menu items and its sub menu items are shown in the margin of the manual, next to the description as shown.

3.5. PROGRAMMING THE READER SETUP FUNCTIONS

The READER drop down menu is used to program various reader modes such as selecting LTC or VITC operation for each reader, VITC Line numbers, whether user bits contain static numbers of encoded film edge number information, etc. Figure 3-4 shows the items on the READER drop down menu. The following descriptions appear in the order they appear on the menu.

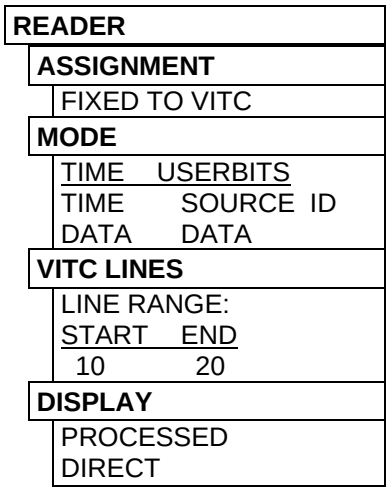
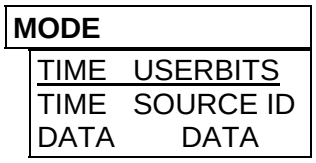


Figure 3-4: READER Drop Down Menu

3.5.1. Selecting the Reader hardware Configuration

The **ASSIGNMENT** menu is used to select how the reader hardware is configured. The model 5950-SID is configured for Vertical Interval Time Code (VITC) reading only. The reader can be set to recover VITC from different ranges of video lines.

3.5.2. Selecting the Format of the Time and User Bit Data

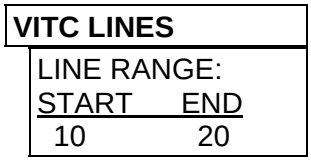


The **MODE** menu item is used to select the type of information that is contained in the time and user bits of the reader.

Select **TIME SOURCE ID** when the time contains normal time information and the user bits contain encoded source ID/status information. This is the normal mode of operation.

Select **DATA DATA** to display the undecoded user bit data. This mode is used for debugging purposes only.

3.5.3. Setting the VITC Reader Line Range



The **VITC LINES** menu item is used to select the lines which are enabled for VITC reading. VITC reading is enabled between the lower and higher line numbers shown (inclusive). If the reader is not assigned as a VITC reader then this menu item is not available.

When the **VITC LINES** sub menu is first selected, the START line number will be in reverse video indicating it can be changed. Press the up and down (↑, ↓) keys to change the starting line. Press the right (→) key to highlight the END line, indicating that it can be changed. Press the up and down (↑, ↓) keys to change the starting line.

3.5.4. Controlling the Reader 'Look Ahead' Compensation

DISPLAY
PROCESSED
DIRECT

The **DISPLAY** menu item is used to select whether the normal 'lookahead' compensation for reader dropouts is active or not. Normally, the data is read in one frame and displayed with an 'add 1 frame' compensation. This method guarantees an 'on time' character display for LTC and also helps to cover any minor reader disturbances. In some operational modes it is desirable to disable this feature and to display exactly what is being read. When reading VITC, it is possible to read and display the information in the same video field, thus maintaining field accuracy even in DIRECT mode. The topmost positions of the character generator are not available when in the direct mode.

Select **PROCESSED** to enable normal 'lookahead' compensation. Displays from either the LTC or VITC readers will be 'on time' but will not follow code discontinuities immediately.

Select **DIRECT** to enable DIRECT display mode. Data is displayed exactly as it is read without 'lookahead' compensation. Displays from the VITC reader will be 'on time' but cannot be positioned at the very top of the raster. Displays from the LTC reader will be behind by two frames.

3.6. PROGRAMMING THE CHARACTER GENERATOR FUNCTIONS

The VCG drop down menu is used to select various characteristics of the VCG display. Figure 3-5 shows the items on the VCG drop down menu.

The following descriptions appear in the order they appear on the menu.

- **VCG**
  - **CHAR SIZE**
    - TINY
    - SMALL
    - LARGE
  - **CHAR STYLE**
    - WHITE
    - WHITE ON BLACK
    - BLACK
    - BLACK ON WHITE
  - **VCG FRAMES**
    - DISPLAY
    - BLANK
  - **VCG FIELDS**
    - DISPLAY
    - BLANK
  - **VCG SYMBOLS**
    - DISPLAY
    - BLANK

Figure 3-5: VCG Drop Down Menu

3.6.1. Selecting the Character Size

- **CHAR SIZE**
  - TINY
  - SMALL
  - LARGE

The **CHAR SIZE** menu item is used to select one of three sizes for the character generator's display. The on screen format menus always use the small character size.

The **TINY** character size occupies 8 lines per field for each character row. This permits 28 vertical positions on the raster in NTSC or 32 in PAL.

The **SMALL** character size occupies 16 lines per field for each character row. This permits 14 vertical positions on the raster in NTSC or 16 in PAL.

The **LARGE** character size occupies 32 lines per field for each character row. This permits 7 vertical positions on the raster in NTSC or 8 in PAL.

3.6.2. Selecting the Character Style

CHAR STYLE
- WHITE
- WHITE ON BLACK
- BLACK
- BLACK ON WHITE

The **CHAR STYLE** menu item is used to select whether the background mask will be used and whether the characters will be white or black. The on screen format menus are always keyed into a black background mask.

Select **WHITE** to disable the background and key white characters directly into the picture.

Select **WHITE ON BLACK** to key white characters on a black background mask into the picture.

Select **BLACK** to disable the background and key black characters directly into the picture.

Select **BLACK ON WHITE** to key black characters on a white background mask into the picture.

3.6.3. Controlling what the VCG displays

VCG FRAMES
- DISPLAY
- BLANK

The **FRAMES** menu item is used to select whether the frames will be shown when the time is displayed.

Select **DISPLAY** to display the frames of the time displays
Select **BLANK** to blank the frames of the time displays

VCG FIELDS
- DISPLAY
- BLANK

The **FIELDS** menu item is used to select whether the fields will be shown when the time is displayed.

Select **DISPLAY** to display the fields of the time displays
Select **BLANK** to blank the fields of the time displays

VCG SYMBOLS
- DISPLAY
- BLANK

The **SYMBOLS** menu item is used to select whether the **^** symbol will be shown in front of the time and user bit displays of the VCG.

Select **DISPLAY** to display the VCG symbols.
Select **BLANK** to blank the VCG symbols.

3.7. PROGRAMMING THE OVERALL CONFIGURATION FUNCTIONS

The CONFIGURATION drop down menu is used to select the video standard, set the mode and output level of the translator output. The CONFIGURATION menu items are normally required only during installation.

Figure 3-6 shows the items on the CONFIGURATION drop down menu.

The following descriptions appear in the order they appear the menu.

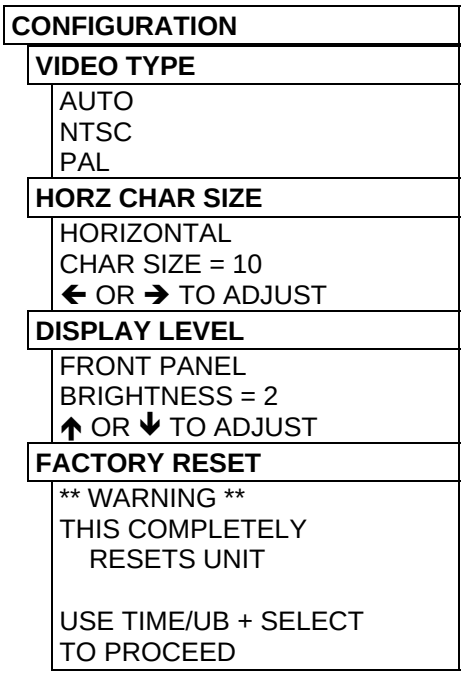
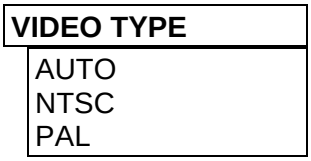


Figure 3-6: CONFIGURATION Drop Down Menu

3.7.1. Selecting the Video Standard

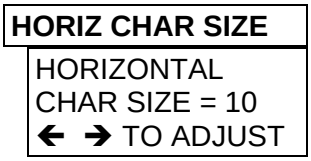


The **VIDEO TYPE** menu item is used to select the video standard of the program video. Changing the video standard will affect the settings of the VITC LINE RANGE menu setting. Make sure that you re-check this setting when you change the video standard.

Select **AUTO** if you want to have the 5950-SID auto detect PAL and NTSC video.

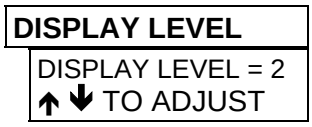
Select **NTSC** if you are using NTSC video.
Select **PAL** if you are using PAL video.

3.7.2. Adjusting the Horizontal Character Size



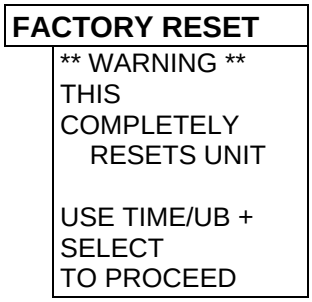
The **HORIZ CHAR SIZE** menu item is used to adjust the character width. Use the ← & → keys to adjust the right side of the raster.

3.7.3. Adjusting the Front Panel Display Brightness



The **DISPLAY LEVEL** menu item is used to adjust brightness of the front panel display. Use the ↑ & ↓ keys to adjust.

3.7.4. Resetting the 5950-SID to its Factory Defaults



The **FACTORY RESET** menu item is used to reset the 5950-SID to the factory default parameters. Press the **TIME/UB + SELECT** keys when the sub menu screen is displayed to reset the 5950-SID to factory defaults. The 5950-SID will perform a power-on configuration before returning to the normal operating mode.

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4. TECHNICAL DESCRIPTION

4.1. OVERVIEW

The model 5950-SID VITC reader / source ID decoder contains VITC reader which can read at speeds from still frame to in excess of 40 times play speed. The VITC reader is designed for use with non time base corrected video signals. Although the use of time base correctors will enhance the recovery range of the VITC reader, the amount of improvement is dependent on the type of TBC and transport being used. The model 5950-SID contains all the necessary video processing circuits and therefore, requires no external signals other than the video signal itself.

The video character inserter contains a high resolution character inserter which provides white or black characters keyed into the video with or without a contrasting background. Character size and raster position are software selectable. The character display may be used to show time or user bits. Each of the windows can be turned on and off and positioned independent of each other.

The character inserter is also used for the on Screen Programming menus which are used to set up the various operational modes of the model 5950-SID.

4.2. JUMPERS AND SWITCHES

Figure 4-2 shows the location and function of the switches and jumpers inside the model 5950-SID. The jumper positions marked in **bold** face type are the default settings.

4.2.1. DIP Switch Functions

The main circuit board of the 5950-SID contains an 8 position DIP switch which is used to invoke various diagnostic and calibrations functions. The functions of each switch are described below.

Switch	Name	Normal	Function when Open	Function when Closed
1	Not used	Open		
2	Not used	Open		
3	Not used	Open		
4	Not used	Open		
5	Not Used	Open		
6	Factory Reset	Open	none	Resets 5950 to factory defaults on power up
7	Diagnostics	Open	none	Enters diagnostics mode on power up
8	Not used	Open		

Figure 4-1: DIP Switch Functions

When in Diagnostics mode the following key presses initiate various diagnostics modes.

CHAR GEN MODE Displays the complete character font on the VCG screen. Each time it is pressed it cycles to the next font set.

FREEZE Displays the status of the remote control input pins. The front panel shows **Par In 111111**. The six 1's correspond to the state of each input on the 9 pin remote control connector. The rightmost digit is for input 1, and the leftmost digit is for input 6. When the input is open or connected to +5 Volts a **1** will be displayed. When the input is grounded, a **0** will be displayed.

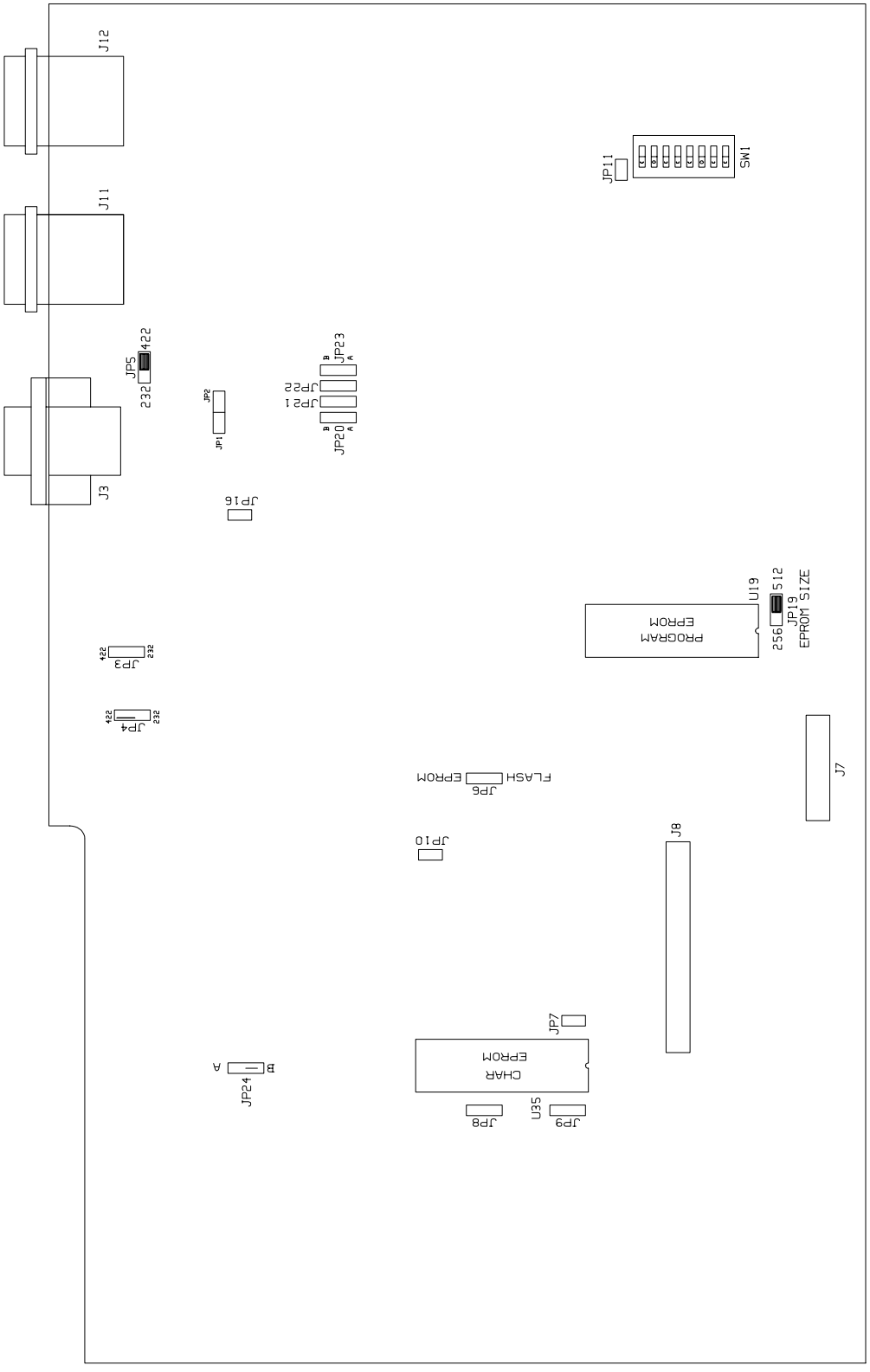

Figure 4-2: Main Board Jumper Locations

4.2.2. Jumper Functions

All jumpers except JP9 are printed circuit board links and are installed in the default position. To change the position, the board link must be cut and a wire link must be installed in the desired location.

JP1	Parallel I/O 1 (pin 9)	**Installed**	When link is installed, Output 1 has 4.7K pullup to +5 Volts
		Open	When link is cut open, Output 1 is Open collector
JP2	Parallel I/O 2 (pin 5)	**Installed**	When link is installed, Output 2 has 4.7K pullup to +5 Volts
		Open	When link is cut open, Output 2 is Open collector
JP3	Editor Serial I/O		Not installed for 5950
JP4	VTR Serial I/O		Not installed for 5950
JP5	Remote Serial I/O		Not installed for 5950
JP6	FLASH / EPROM		Not installed for 5950
JP7	Char EPROM 512K	**Open**	Used when Char EPROM is 128K or 256K.
		Installed	Connects Char EPROM U35 address A15 to LCA U36 when Char EPROM is 512K. Jumper JP9 must also be in the '256' position.
JP8	Char EPROM CE	**Pin 2,3**	Board link installed connects Char EPROM CE to ground.
		Pins 1,2	Board link installed connects Char EPROM CE to +5 Volts after LCS loads.
JP9	Char EPROM Size	**128**	Board link installed connects Char EPROM U35 Address A14 to +5 volts for use with 128K size EPROM.
		256	Board link installed connects Char EPROM U35 Address A14 to LCA U36 for use with 256K size EPROM.
JP10			Not installed for 5950
JP11	Diagnostics 1		Not installed for 5950
JP16	Diagnostics 2		Not installed for 5950
JP19	MCU EPROM Size	**512**	Board link installed connects MCU EPROM U19 Address A15 to microprocessor A15 for use with 512K size EPROM.
		256	Board link installed connects MCU EPROM U19 Address A15 to +5 volts for use with 256K size EPROM.
JP20	UART RX		Not installed for 5950
JP21	UART TX		Not installed for 5950
JP22	MCU RX		Not installed for 5950

JP23	MCU TX		Not installed for 5950
JP24	VCG Video In	A	VITC Reader Video connected to RDR IN Loop. VCG video connected to Gen Video In loop.
		B	VITC Reader and VCG Video connected to either RDR IN Loop or Gen Video In loop as selected by U38.
		A & B	VITC Reader Video and VCG video connected to RDR IN Loop. U38 not installed.

4.3. CIRCUIT DESCRIPTION

The model 5950-SID reader is a microcontroller based device functionally divided into the following hardware subsystems:

1 Microcontroller & I/O
2 Display and Pushbuttons
3 High speed VITC Reader
4 Character generator video keyer
5 Character generator logic

The microcontroller, LTC and VITC readers, LTC translator, character generator logic and video processing circuits are all contained on the main circuit card (5200). The display and keypad circuitry is contained on a separate circuit board (5220) which plugs into the main board via a twenty conductor ribbon cable. The relevant schematic drawings are shown in brackets for each section of the circuit. The heart of the model 5950-SID circuitry are two programmable logic array (LCA) devices. One LCA (U25) contains most of the VITC reader logic and the support circuitry for addressing various devices on the board. The other LCA (U36) contains the character generator raster scanning logic.

4.3.1. Microcontroller (5200-33)

At the heart of the model 5950-SID reader is an 8032 microcontroller, (MCU) U17. Its three 8 bit bi-directional ports and 8 bit bus provide peripheral interfacing to the rest of the circuits. Program memory is contained on EPROM U19. Scratch pad and data RAM are provided internally by the MCU. An onboard oscillator, also part of the MCU, is crystal controlled. Its' 15.36 MHz frequency is internally divided by 12, resulting in a processor operating frequency of 1.28 MHz.

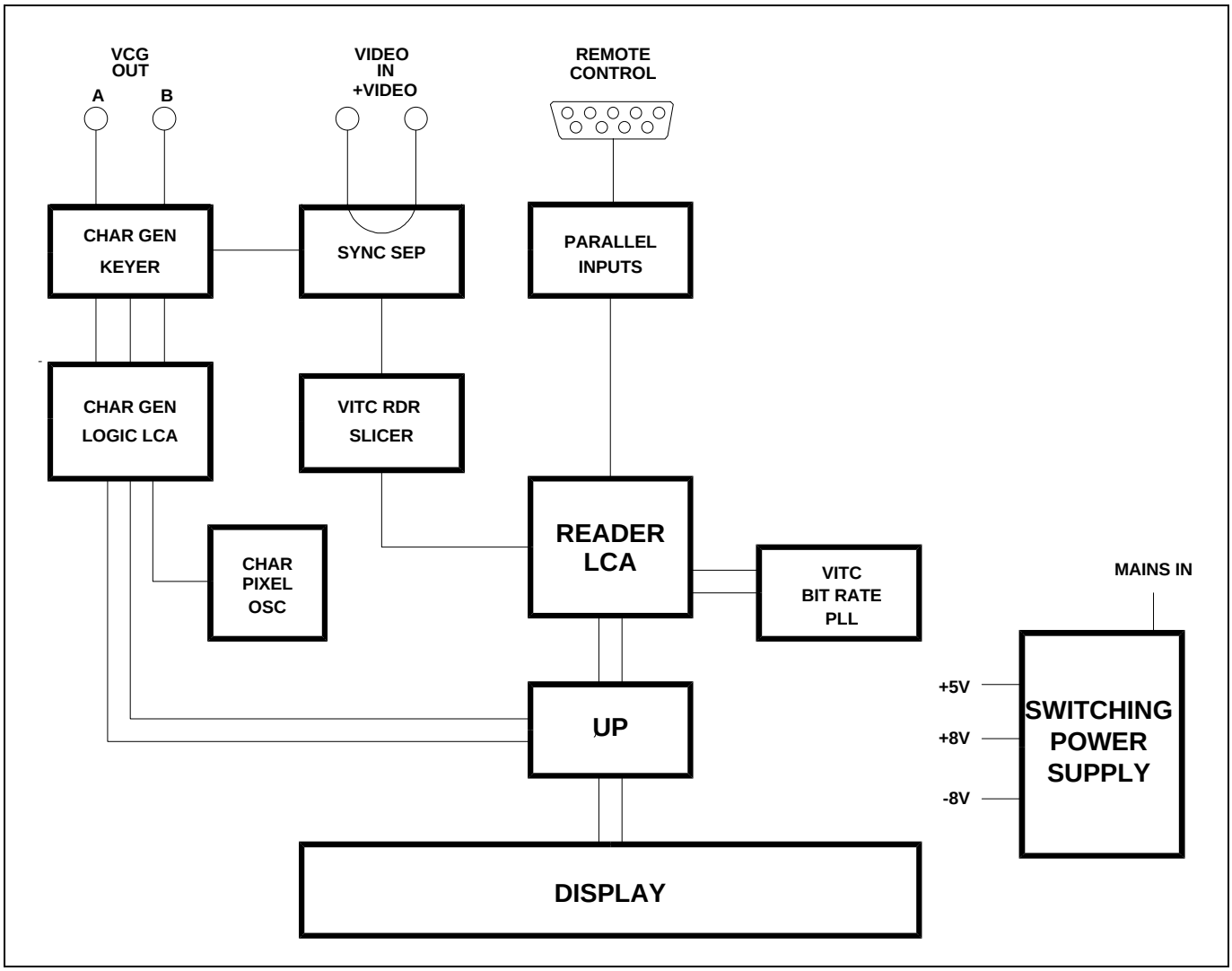

Figure 4-3: Block Diagram

4.3.2. Front Panel Display and Pushbuttons (5220-31)

A 12 digit alphanumeric display, and a 10 button keypad are contained on a separate circuit card (5220) which is connected to the main circuit board via a 20 conductor ribbon cable.

The 12 digit display is self scanning and contains its own character display memory. Data is written to the displays once per frame. Address Latch U1 generates chip enable and address information to the display devices to allow the MCU to write data to the display and control registers.

The status LED's are controlled by interface driver U3. This driver is accessed with a serial clock and data stream once per frame. When all the LED information has been shifted into the driver, it is latched there by the LEDSTB signal from the MCU (display header pin 10).

LED diagnostics can be invoked by holding down any key on power up. When any key is pressed, all the front panel LED's should come on. To exit LED test mode, remove and re-apply power to the unit.

The 10 push buttons are arranged in a 8 x 2 matrix. Data from 8 keys at a time is latched into U2 by signal SH/LD on U2 pin 1. Address decoder U1 selects which set of 8 switches is latched into U2 using enable lines A0 and A1. Each time a key is pressed, the MCU firmware generates a key scan code corresponding to the position of the key in the key matrix.

Keyboard diagnostics can be invoked by pressing any key during power up. The front panel display will show the message SCAN CODE and the keyboard scan code. When no keys are depressed, the key scan code is ??. Pressing a key will show the corresponding key scan codes, as shown in the table below. To exit the keyboard test, remove and re-apply power to the unit.

Key	Scan Code	Key	Scan Code
TIME/UB	41	SETUP	47
FREEZE	01	←	05
CHAR MODE	42	↓	06
CHAR ON/OFF	02	→	07
SELECT	45	↑	46

Figure 4-4: Keyboard Scan Codes

4.3.3. High Speed VITC Reader (5200-36) & (5200-34)

Reader composite video is buffered by Q2 and distributed to the VITC sync separator and data extractor. The sync separator U44 provides H Sync, V Sync, a Frame pulse (active high for field 1) and a back porch clamp pulse to drive the DC restorer circuitry U43 and associated components. Composite video is buffered and DC restored by U43 to provide clamped VITC video to comparator U45b (test point CRV). Peak detector U45a and associated components provide a reference level to U45a of approximately one half the peak VITC level to ensure proper extraction of the VITC data regardless of the video level. Comparator U45b extracts the VITC data bits from the video (test point VTCO) and sends it to the LCA U25 for further processing.

A phase locked loop consisting of U28, 29, and 30 and associated components extracts the VITC bitrate clock from the data and is used to decode 0 and 1 bits inside the LCA. The LCA validates the cyclic redundancy check (CRC) word and sync bit patterns for the recovered data and generates a VITC ready signal to the MCU. Data is shifted into U24 or U26, depending on the reader assignments where it is unloaded by the MCU. The MCU unloads the VITC data through the LCA.

4.3.4. Character Generator Sync Separator and Keyer (5200-36)

The Character inserter composite video is taken from the Reader Video input loop and is buffered by Q2 and distributed to the character generator sync separator and keyer/ amplifier. The sync separator U54 provides H Sync, V Sync, a Frame pulse (active high for field 1) and a back porch clamp pulse to drive the DC restorer circuitry U55 and associated components.

The Video keyer U40 is controlled by the VCGKEY signal generated in the LCA U36. VCGKEY switches U40 between the program video path and the VCGWHITE data. When the VCGKEY signal is LOW the active video is passed through the keyer. When the VCGKEY signal is HIGH the VCGWHITE data is added to the black level of the video.

To calibrate the video keyer, connect colour bars from your sync generator to the Reader Video input loop of the model 5950-SID and to channel A of your oscilloscope and terminate it. Connect one of the video outputs of the model 5950-SID to channel B of your scope and terminate it. Adjust the **GAIN** trimpot (VR3) so that the output amplitude matches the input. Adjust the **CHAR LEVEL** trimpot (VR2) so that the inserted characters are approximately at the peak white video level.

4.3.5. Character Generator Logic (5200-37)

The majority of the logic for the character generator functions is contained in a programmable logic device (LCA) U36. Its program is loaded from EPROM U35 on power up. The character display is formatted to display 28 (32 for PAL) rows of 32 characters each in the tiny size, 14 (16 for PAL) rows the small size, and 7 (8 for PAL) rows in the large size. Each of the character positions corresponds to one location in static RAM 37. The MCU writes characters into specified locations in the RAM corresponding to the position of the characters on the screen. RAM locations are scanned during each television field. Valid characters address corresponding sections of the character EPROM U35 and are loaded into the LCA one byte (8 bits) at a time. Each byte corresponds to either the left or right half of a character pixel line. The internal logic in the LCA controls how many lines per character and how many character lines there are on the raster according to registers set by the firmware.

The character data is clocked out of the LCA on the VCGWHITE output (U36 pin 73). A special character with all bits set to 1 is written into all positions of the RAM where no characters are to be displayed. These characters disable the keyer by the VCGKEY signal generated in the LCA (U36 pin 79). When other characters are present the VCGKEY signal becomes active, allowing the characters to be keyed into the video signal. The character data is clocked out of the LCA with the dot clock, so that the pixel width is not dependent on propagation delays in the LCA. The pixels are presented to the video keyer U40 through CHAR LEVEL trimpot VR2. A control register in the LCA selects whether the characters will be white or black and whether they will be keyed into a contrasting background.

Character style selection is accomplished by the on screen programming menu.

The pixel oscillator consists of monostable U32b and associated components. The oscillator frequency which determines horizontal size of the characters is adjusted by the digital trimpot (NVPOT) U34 and associated components. The MCU writes different values to the NVPOT which control the adjustment input to voltage regulator U33, which in turn sets the voltage present for the RC timing network of the monostable. The starting position of the characters at the left of the screen is determined by monostable U32A. The left position of the characters is adjusted by trimpot VR1.

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Evertz Microsystems Ltd.
3465 Mainway Drive, Burlington, Ontario, Canada, L7M 1A9
Phone: 905-335-3700 Fax: 905-335-3573 BBS: 905-335-9131
Internet: Tech support: eng@evertz.com Sales info: sales@evertz.com

INSTRUCTIONS FOR UPGRADING 5950-SID FIRMWARE

These devices are subject to damage by electrostatic charge buildup which can occur with improper handling. The devices should always be carried and stored in the anti-static carrier tube provided.

- Unplug from mains. Remove the top cover.
- Using a small screwdriver lift out the EPROM U19, being careful not to bend the pins. Also take note of the orientation of the device (where the end with the notch is located).
- Install the new EPROM in the same socket and in the same orientation as the old one (i.e.: with the notched end pointing in the same direction)
-

Severe damage may result from an improperly installed PROM. Double check the installation before restoring power.

- Replace chassis top cover.
- Restore power.
- Place old EPROM and VITC Generator Board in the anti-static packaging provided and return to us (BY AIRMAIL)