Model 9540
and
Model 9542
Video Delay Processor

Instruction Manual

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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.

INFORMATION TO USERS IN THE U.S.A.

NOTE

FCC 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 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 Version	Oct 99
1.1	Chapter 3 Operation has been updated	Nov 99
	1.0-1 Change Sheet inserted	Nov 99
1.2	Added features for Model 9542	May 01

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1. OVERVIEW

The Evertz 9540 series Video Delay Processors are full function video delay units for standard definition digital video. The delay can be set in video units (frames, lines and samples) or time units (seconds). The 9540 delays the complete VBI and all ancillary data including embedded audio, VITS and D-VITC.
There are two models available with different amounts of delay possible.

Model	Delay Range
9540	100 μs up to 0.5 seconds
9542	100 μs up to 2.3 seconds

Possible Applications:

- satellite uplinks
- cable headends
- mobile vehicle outputs
- broadcast transmitter inputs
- anywhere video delay is required
- re-entry feeds into Master Control Switcher for re-timing
- audio compression delay equalization

The Video Delay Processor consists of a 1 RU chassis with integrated control panel.

The video delay processor allows users to store up to 4 commonly used sets of delay parameters as *USER PRESETS,* and recall them with a single keypress.

Features:

- Delay programmable in video units (frames, lines, and samples) or as time units (seconds)
- Auto senses video standard and switches between 525 and 625 video formats
- Delays SMPTE 259M Serial digital video up to ½ second (2.3 seconds for 9542)
- Pass or blank individual lines in the vertical blanking interval
- Bypass relay for program video path – activated on unit failure or from front panel
- Front panel lock-out control
- Easy to operate front panel menu system to program delay settings and VBI line blanking
- Four User-definable presets for commonly used settings
- Optional redundant power supply

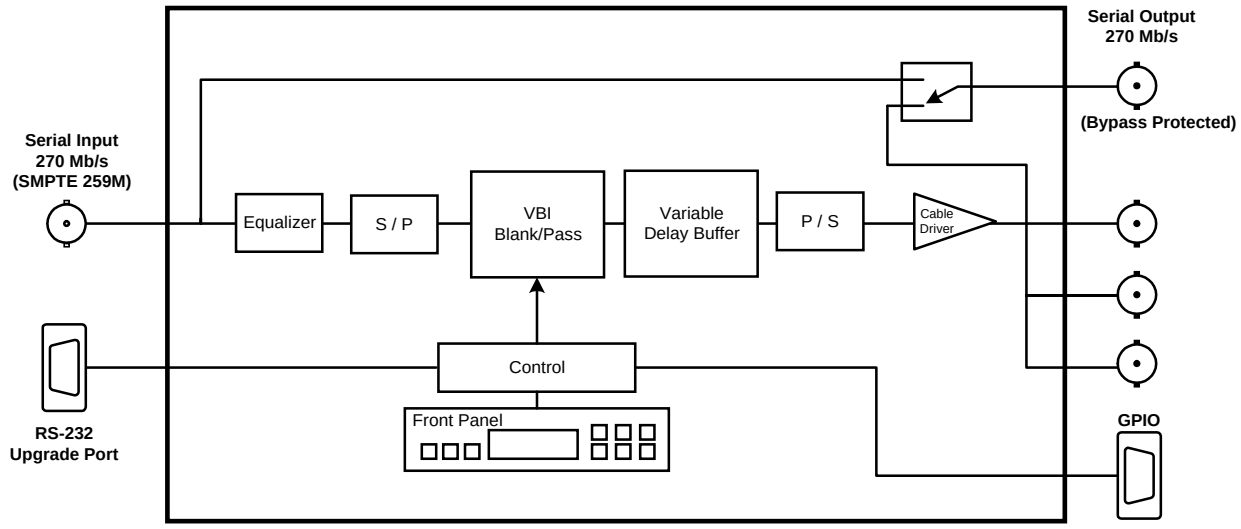

Figure 1-1: 9540 Block Diagram

1.1. HOW TO USE THIS MANUAL

Throughout this manual the term 9540 will refer to both models unless otherwise stated. This manual is organized into 4 chapters: Overview, Installation, Operation and Technical Description. Chapter 1 contains a short overview of the features of the unit. Chapter 2 gives a detailed description of the rear panel connectors and how the Video Delay Processor should be connected into your system. Chapter 3 gives a detailed description of the operation. Chapter 4 gives an overview of how to update the firmware in the unit and other technical issues.

Items of special note are indicated with a double box like this.

2. INSTALLATION

2.1. REAR PANEL

The following sections describe the purpose of the rear panel connectors of the 9540. Sections 2.1.1 to 2.1.3 describe the specific signals that should be connected to the units.

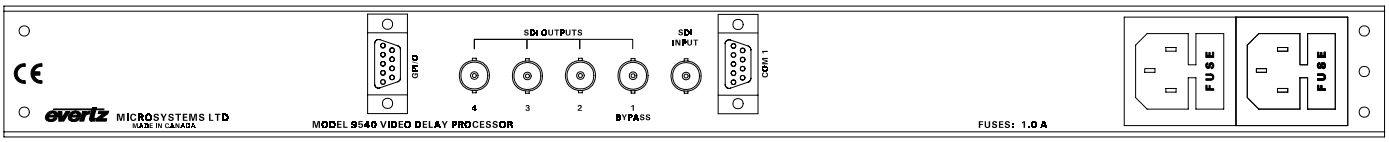

Figure 2-1: Model 9540 Rear Panel Layout

2.1.1. Digital Video Connections

SDI INPUT Input BNC connector for 10-bit serial digital video signals, compatible with the SMPTE 259M (CCIR601) standard.

SDI OUTPUTS Four BNC serial digital video outputs are provided. Output 1 is protected by a bypass relay, which will activate in the event of power loss to the unit, or can be activated from the front panel. The remaining three outputs are not bypass protected.

2.1.2. Remote Control Connections

COM1 A 9 pin female 'D' connector for the RS-232 serial interface used for updating the firmware.

Pin #	Name	Description
1	GND	Chassis ground
2	Tx-/TxD	RS-232 Transmit Output / RS-422 Tx-
3	Rx-/RxD	RS-232 Receive Input / RS-422 Rx-
4		
5	Sig Gnd	RS-232 Signal Ground
6		
7	Rx+/RTS	RS-232 RTS Input / RS-422 Rx+
8	Tx+/CTS	RS-232 CTS Output / RS-422 Tx+
9		

Table 2-1: COM 1 Connector Pin Definitions

GPIO This female 9 pin D is an opto-isolated Parallel port with 3 inputs and 1 output.

Pin #	Name	Description
1	GP+5V	+5V from general purpose interface board
2	Vext	External voltage source for GPI's
3	n/c	No connection
4	n/c	No connection
5	GND	Chassis ground
6	GPO1	Contact closure to ground on loss of SDI input
7	GPI1	Bypass Relay (low = bypass)
8	n/c	No connection
9	n/c	No connection

Table 2-2: GPIO Connector Pin Definitions

2.1.3. Power Connections

LINE: The Video Delay Processor has two universal power supplies that operate on either 115v/60 Hz or 230v/50 Hz AC operation.

2.2. MOUNTING

The Video Delay Processor is equipped with rack mounting angles and fits into a standard 19 inches by 1.75 inches by 17.75 inches (483 mm x 45 mm x 451mm) 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

The Video Delay Processor has two universal power supplies that automatically sense the input voltage. The 9540 operates on either 115 Volt / 60 Hz or 230 Volt / 50 Hz AC. The PSU STATUS LEDs on the front panel indicate if the power supplies are operating normally.

Power should be applied by connecting a 3-wire grounding type power supply cord to the power entry modules 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. The power entry module combines a standard power inlet connector, two 5 x 20 mm fuse holders and an EMI line filter.

CAUTION: To reduce the risk of electric shock, plug each power supply cord into separate branch circuits employing separate service grounds.

2.3.2. Changing the Fuse

The fuse holder is located inside the power entry module. To change the fuses, pull out the fuse holder from the power entry module using a small screwdriver. The fuse holder contains two fuses, one for the line and one for the neutral side of the mains connection. Pull out the blown fuse and place a fuse of the correct value in its place. Use slo blo (time delay) 5 x 20 mm fuses rated for 250 Volts with a current rating of 1 amp. Carefully reinsert the fuseholder into the power entry module.

Never replace with a fuse of greater value.

2.4. CONNECTING THE DIGITAL VIDEO

2.4.1. Video Input and Output

The 9540 requires that a digital video source be connected to the SDI INPUT BNC. The 9540 auto senses whether the input is 525 or 625 line digital video in the component (4:2:2) format.

The four SDI OUTPUT BNCs provide identical delayed versions of the input video. If VBI blanking is selected then these outputs will also have the specified VBI lines blanked.

When the bypass relay is not active, video will be present at outputs 1, 2, 3, and 4. When the bypass relay is active (on power loss to the unit or activated from the front panel or Parallel GPI Input) the input video is connected directly to output 1 and does not pass through the unit. Outputs 2, 3 & 4 will not have any video on them when the bypass relay is active.

2.5. CONNECTING THE GENERAL PURPOSE INPUTS AND OUTPUTS

The 9 pin GPIO connector has 3 general-purpose inputs and 1 general purpose output. The GPI1 input is used to activate the video bypass relay. The GPO1 output will give a contact closure when there is no input signal present.

All GPI1 input is active low. This means that if you leave the input floating (not connected) then it will not be activated. Lowering the GPI input to a voltage below Vext will activate the input.

The user can connect GP+5V supplied from the frame into the Vext pin to provide power to the GPIO opto-isolator circuitry. In this configuration the user can activate the GPI simply by connecting the GPI input pin to Ground (see Figure 2-3). This can be done with a button, switch, relay or an open collector transistor. In this configuration the GPOs will be internally pulled up to 5 volts. (See Figure 2-5) Five volts is available to the user to be used for driving external circuitry. Care must be taken to limit the load to 0.5W so there is no affect on the power supply source in the frame.

Alternately, the user can connect an external power source for the opto-isolator circuitry. Figure 2-4 and Figure 2-6 show how to wire the GPIs and GPOs from an external power supply.

Warning: Do not connect GP+5V from one frame to another frame's GP+5V.

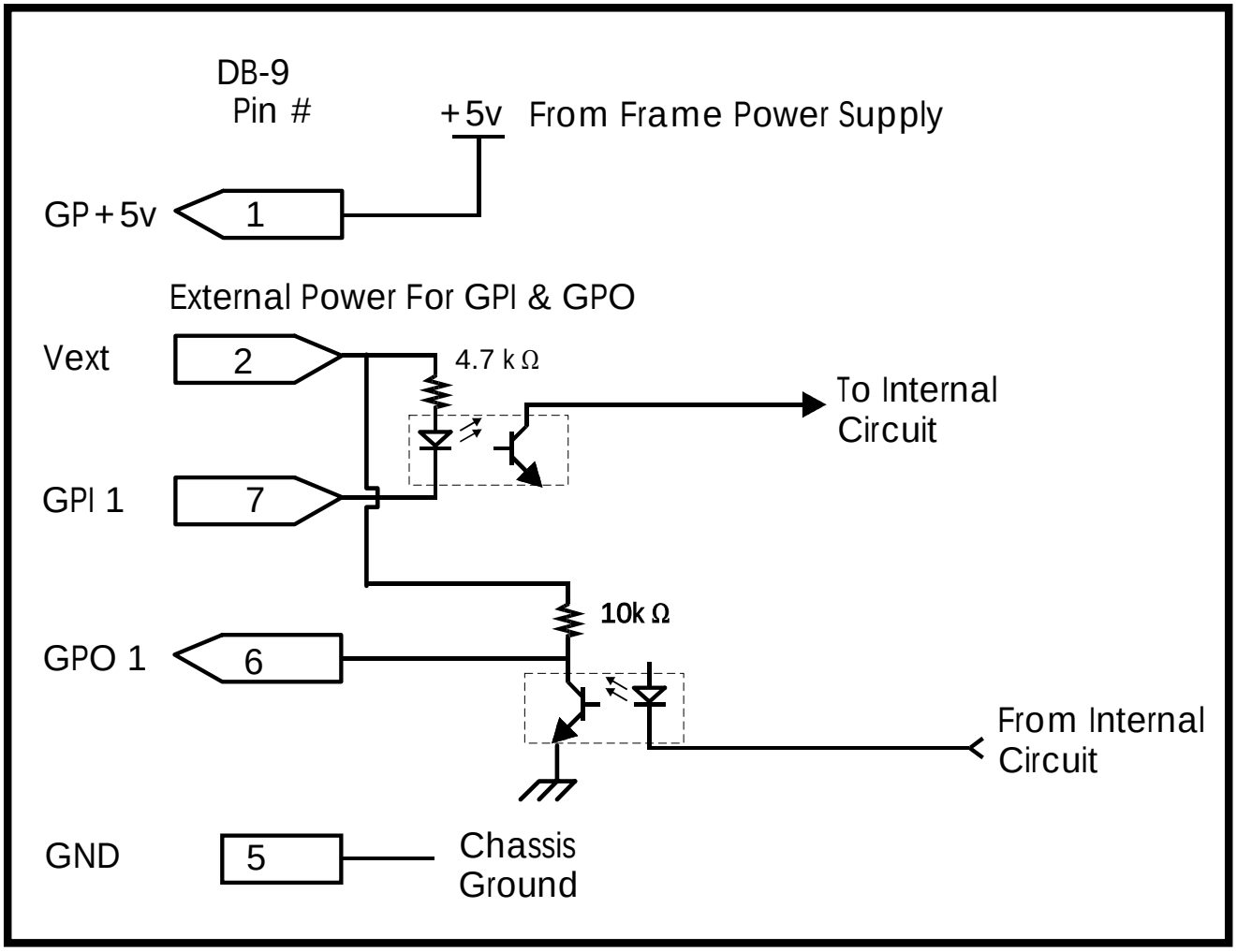

Figure 2-2: General Purpose I/O Schematic

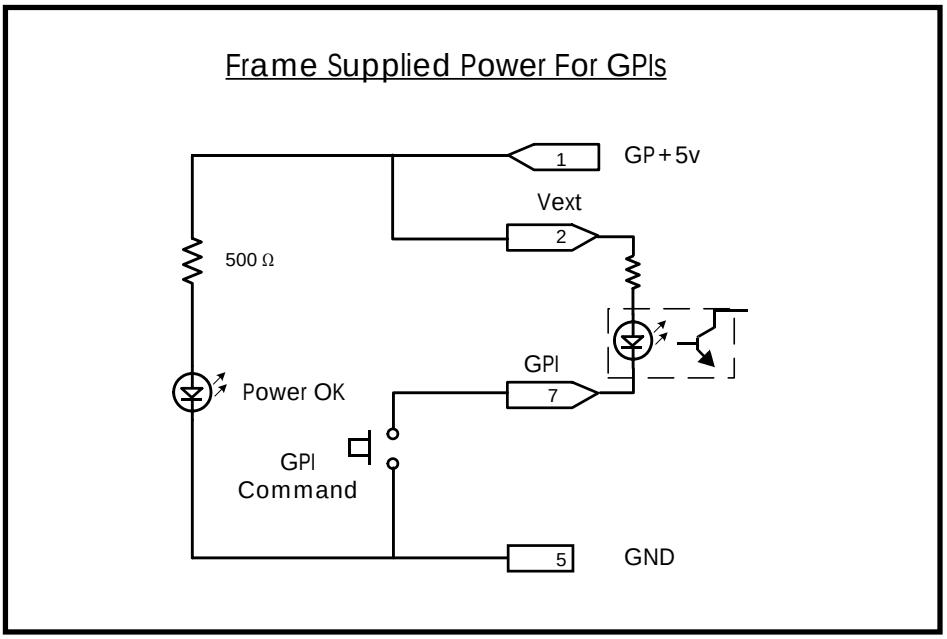

Figure 2-3: Powering the General Purpose Input Opto Isolators from the Unit

Alternately, an external voltage source may be applied (Figure 2-4). The Vext voltage must be greater than the voltage supplied to GPI by at least 5v.

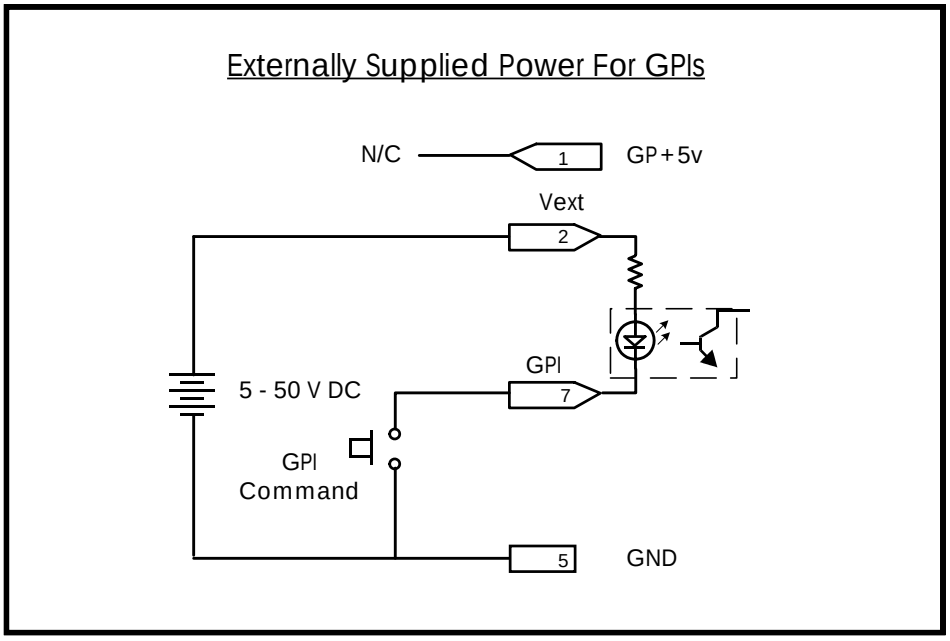

Figure 2-4: Powering the General Purpose Input Opto Isolators from an External Power Supply

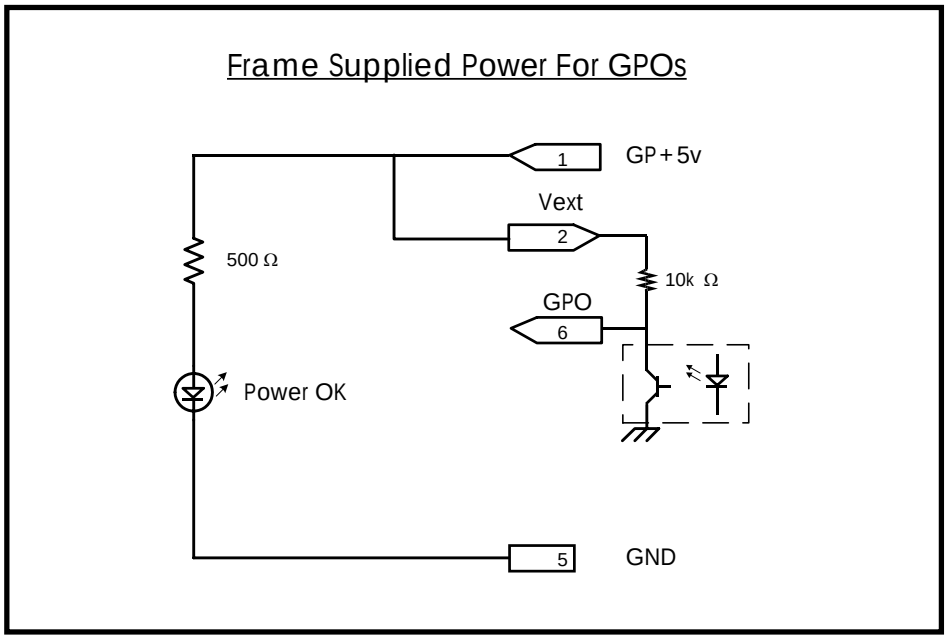

Figure 2-5: Powering the General Purpose Output Opto Isolators from the Unit

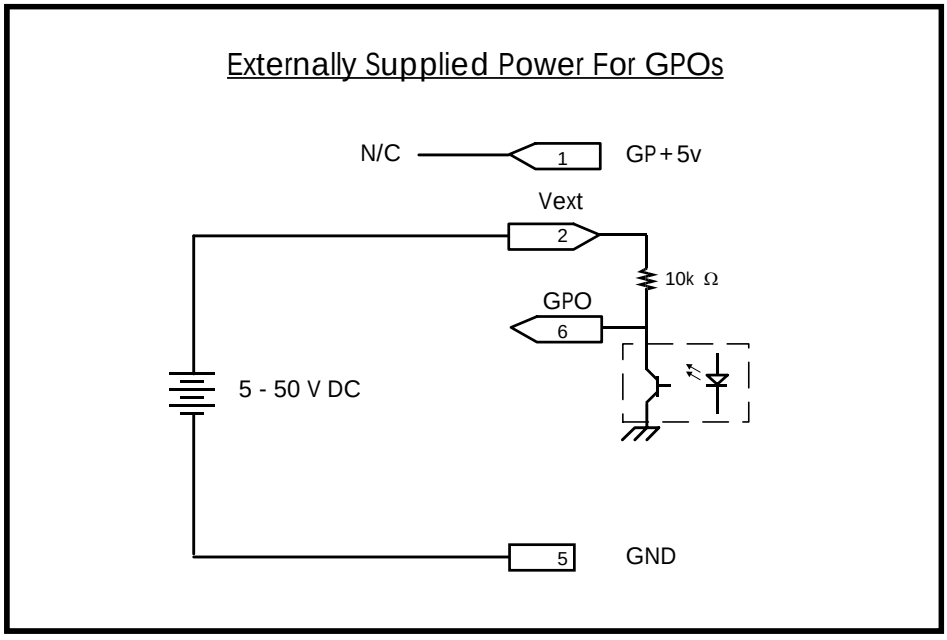

Figure 2-6: Power the General Purpose Output Opto Isolators from an External Power Supply

3. HOW TO OPERATE THE VIDEO DELAY PROCESSOR

3.1. AN OVERVIEW OF THE KEY AND DISPLAY FUNCTIONS

The display area consists of a 16 digit alphanumeric display, 16 LED status indicators and a 16 pushbutton keypad.

The Setup menu provides a means of setting the delay that will be applied to the video, and which lines in the vertical blanking interval will be blanked. Four user preset buttons and one factory preset button allow you to save and recall frequently used collections of settings, to simplify operation of the Video Delay Processor.

When the Video Delay Processor is not in the SETUP menu it will show various messages on the front panel. The current video delay will be shown in video units or in seconds when the unit is active. When the Bypass relay is activated, the front panel will show `Bypassing Video Processor.`

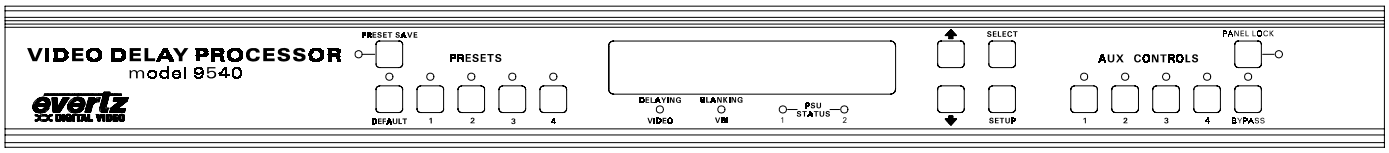

Figure 3-1: Front Panel Layout

The remainder of this section gives an overview of each of the front panel buttons. Sections 3.2 to 3.4 give details on the operation of the 9540.

3.1.1. The Setup Button Group

SETUP This button is used to enter the *setup* menu which is used to control various setup options to configure the operating modes of the video delay processor. (See section 3.2 for a complete description of the *setup* menu.)

SELECT This button is used to save *setup menu* choices and settings.

↑ & ↓ The arrow keys are used to navigate through various menu choices in the *setup* menu.

3.1.2. The Preset Button Group

The Preset key group consists of the **DEFAULT** and **PRESET SAVE** buttons and four **PRESET** buttons. These keys are used to load the factory default delay and VBI blanking settings, or to save and recall one of four different user setups.

DEFAULT This button is used to recall the factory default settings for delay and vertical interval blanking. The factory default is to bypass the delay engine. The video is delayed by the

minimum propagation delay through the device (See section 4.1.4.). None of the VBI lines will be blanked.

PRESET SAVE This button allows the user to save the current delay and VBI blanking settings to one of the four *user preset* memory locations. To save the current settings to one of the *user preset* locations press the **PRESET SAVE** button once, then the desired **PRESET** button. You will be prompted to press the **PRESET SAVE** button a second time to confirm the operation.

PRESETS These four buttons are used to store or recall the non-volatile *USER PRESETS*. To recall a *USER PRESET* press the corresponding button once. (See section 3.3 for a complete description of how to use the *user preset*.)

3.1.3. The Auxiliary Button Group

The Auxiliary key group consists of the **PANEL LOCK** and **BYPASS** buttons and four **AUX CONTROL** buttons.

PANEL LOCK Pressing the *PANEL LOCK* button initiates a **global** panel lock. All front panel controls except the *PANEL LOCK* button are inhibited when *LOCK* is enabled. When the panel is *LOCKED* the *PANEL LOCK* LED illuminates. Pressing the *PANEL LOCK* button will toggle the *LOCK* state *ON* and *OFF*.

BYPASS Pressing the *BYPASS* button activates the video bypass relay. The SDI input video will be fed directly to the Bypass SDI output, bypassing the video delay processor unit. When the Bypass relay is active the *BYPASS* LED illuminates. Pressing the *BYPASS* button will toggle the *BYPASS* state *ON* and *OFF*.

AUX CONTROLS These four buttons will be used for future enhancements to the Video Delay Processor and are not currently used.

3.1.4. Status Indicators

There are 16 status indicators located on the front panel that show operational status of the Video Delay Processor at a glance.

DEFAULT Indicates that the factory default settings are active. If the delay or VBI blanking settings are modified this LED will extinguish.

PRESET Indicates that selected *preset* is active. If the delay or VBI blanking settings are modified this LED will extinguish.

PRESET SAVE Indicates that the *preset save* is currently in progress. Pressing one of the **PRESET** buttons will store the preset.

DELAYING VIDEO Indicates that a delay value greater than the minimum delay through the device is being applied to the video.

BLANKING VBI Indicates that at least one of the lines in the vertical blanking interval is being blanked.

PSU STATUS Indicates that the respective power supply is functioning normally.

AUX CONTROLS These LEDs are not currently used.

PANEL LOCK Indicates that Video Delay Processor front panel controls are locked against accidental changes.

BYPASS Indicates that Video bypass relay is active. Incoming video is not being processed, and no delay or VBI blanking is being applied.

3.1.5. Front Panel Display Messages

When the 9540 is in the normal operating mode (not in one of the setup menus) the front panel display will cycle through a sequence of messages, indicating the current delay settings that are in use. The first message will indicate the video standard that the 9540 has detected. The message will show:

```
525 Video Delay:
        or
625 Video Delay:
```

The next four messages will indicate the delay that the 9540 is adding into the video path. This delay does **not** include the minimum processing delay through the 9540. (See section 4.1.4.) The delay will be shown in video units (3 messages) and time units (1 message), with the time units chosen appropriately for the amount of delay. The delay messages will show:

```
Frames: xx
Lines: yyy
Samples: zzz
Time: t.ddd sec
```

3.2. FRONT PANEL SETUP MENU

The *SETUP* menu system uses the 16 digit alphanumeric display and provides a quick, intuitive method of setting the video delay and the VBI blanking in the Video Delay Processor.

The four keys in the Setup key group (**SETUP**, **SELECT,** ↑**,** ↓) are used to cycle through the various items on the *SETUP* menu. The *SETUP* menu consists of a main menu with two or more choices for each menu item.

To enter the front panel programming menu, press the **SETUP** key. Pressing the ↑ **&** ↓ keys allows you to move vertically within the menu tree. The top-level menu items are shown in UPPERCASE on the front panel display. To view/change the settings for that menu item, press the **SELECT** key. The sub-menu values are shown in lowercase on the front panel display. Navigation of the sub menu items depends on the particular menu item. Some sub menu values will be shown blinking and need to be accepted using the **SELECT** key before they will become active. The sub-menu items that are shown not blinking are the active settings. See sections 3.2.1 and 3.2.2 for a complete description of the individual sub-menu items. Pressing the **SETUP** button one or more times while in one of the sub-menus will return to the main menu tree. Pressing the **SETUP** key while in the top-level menu will return to the normal display mode. Figure 3-2 is an overview of the top level of the *SETUP* menu.

When you make a change to one of the *SETUP* parameters and it starts to blink, you will need to press the *SELECT* button to save the change.

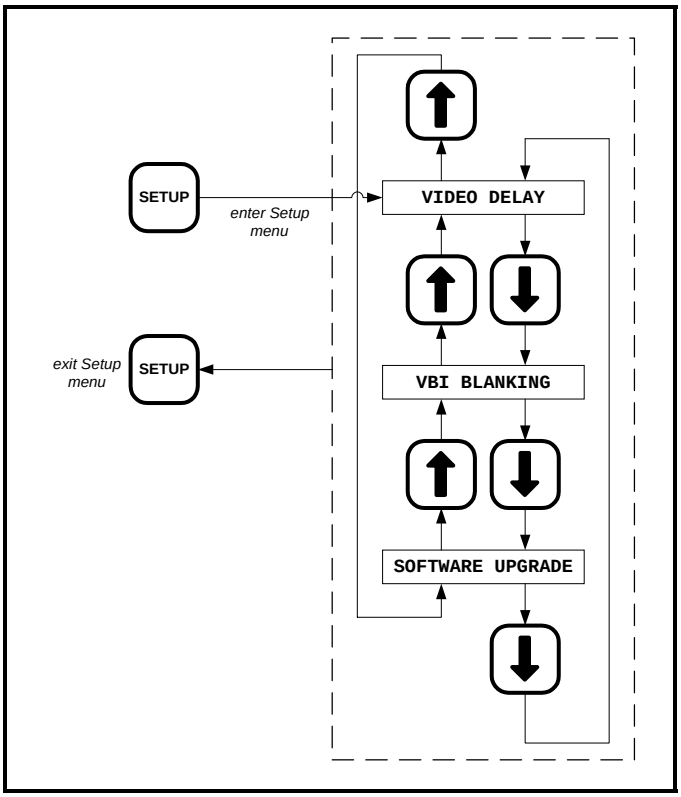

Figure 3-2: Overview of the Setup Menu

3.2.1. Setting the Video Delay

This menu item allows the user to set the video delay. The maximum delay is approximately ½ second (2.3 seconds for 9542) even though it is set using video units (frames, lines and samples). Each time the **SELECT** key is pressed to accept a portion of the total delay, the new video delay will be implemented. The video delay is set using a 3 step process. Figure 3-3 gives an overview of setting the video delay.

Pressing the SETUP button at anytime within this menu item will take you to the previous delay parameter without saving changes to the current delay parameter.

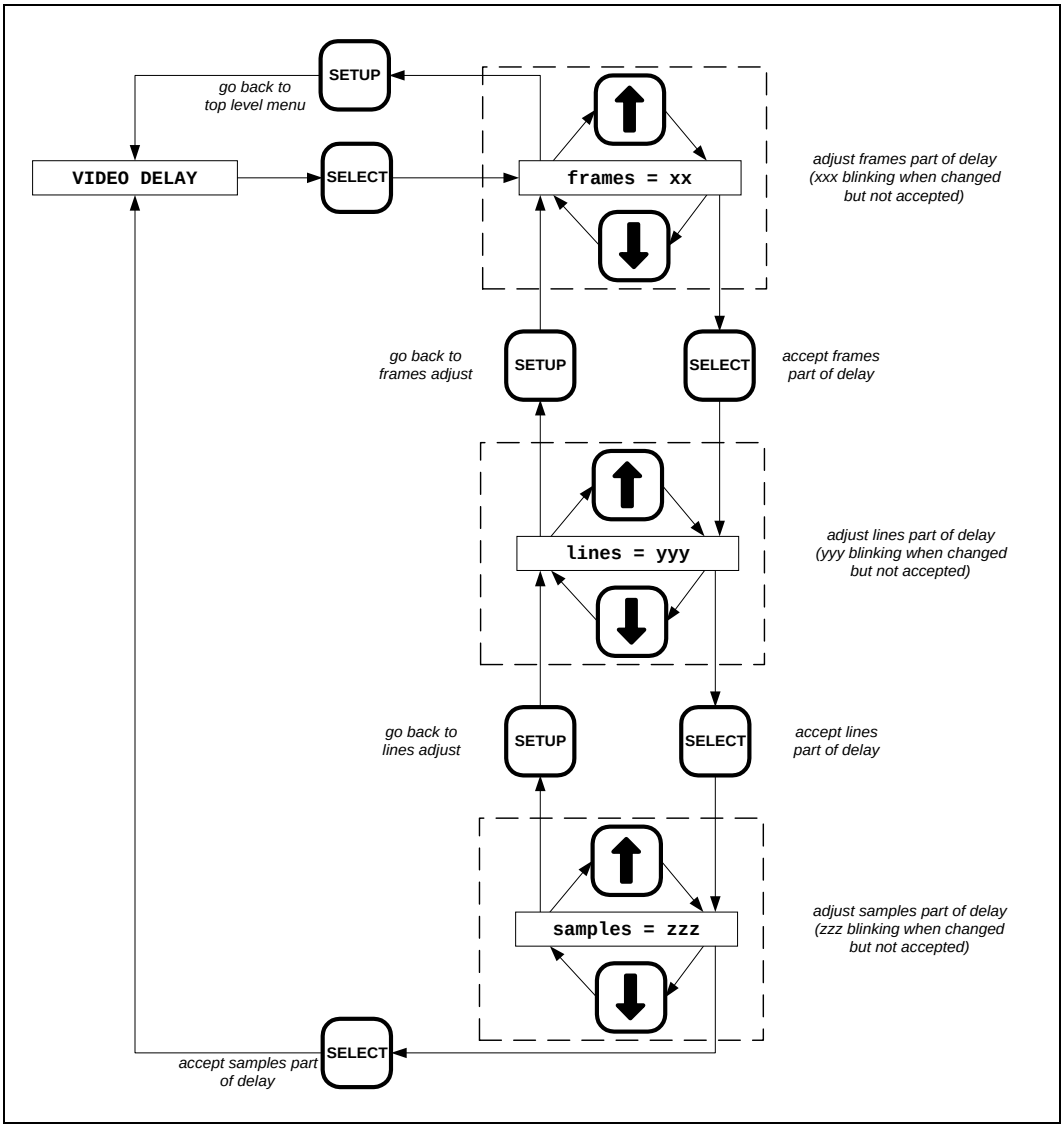

Figure 3-3: Overview of the Video Delay Menu

Step 1: Coarse Adjustment

Press the **SELECT** key to set the delay. The display will show `frames = xx` where xx is the frames part of the delay value. Press the ↑ **&** ↓ keys to adjust the value. Holding the ↑ **&** ↓ keys will change the value at a faster rate. The numeric frames value will be blinking after you have adjusted it indicating that it has not taken effect yet. Press the **SETUP** key to return to the beginning of the video delay setup without setting the frames part of the delay or press the **SELECT** key to accept the video lines part of the delay.

Step 2: Medium Adjustment

The display will show `lines = yyy` where yyy is the partial frame delay in video lines. Press the ↑ **&** ↓ keys to adjust the value up to the maximum number of lines per frame. The numeric lines value will be blinking after you have adjusted it indicating that it has not taken effect yet. Press the **SETUP** key to return to the frames part of the video delay setup without setting the lines part of the delay or press the **SELECT** key to accept the video lines part of the delay.

Step 3: Fine Adjustment

The display will now show `samples = zzzz` where zzzz is the partial line delay in video samples. Press the ↑ **&** ↓ keys to adjust the value. The numeric samples value will be blinking after you have adjusted it indicating that it has not taken effect yet. Press the **SETUP** key to return to the lines part of the video delay setup without setting the samples part of the delay or press the **SELECT** key to accept the video samples part of the delay and complete the delay entry.

Table 3-1 shows the maximum number of video units of delay available in 525 and 625 line video for the model 9540. Table 3-2 shows the maximum number of video units of delay available in 525 and 625 line video for the model 9542. Table 3-3 shows typical conversions between video units and time units for 525 and 625 line video. The calculations are based on the total samples per line shown in Table 3-1, and the time per sample which is 1 / (27 x 10^6) seconds.

Video Type	Lines per frame	Samples per line	Maximum delay			
			Video Units			Time Units
			Frames	Lines	Samples	Milliseconds
525	525	1716	16	525	1716	567.296
625	625	1728	13	625	1728	560.064

Table 3-1: Model 9540 Video Delay Units – 525 and 625 Line Video

Video Type	Lines per frame	Samples per line	Maximum delay			
			Video Units			Time Units
			Frames	Lines	Samples	Seconds
525	525	1716	69	525	1716	2.33573
625	625	1728	58	625	1728	2.36064

Table 3-2: Model 9542 Video Delay Units – 525 and 625 Line Video

Video Type	Desired Delay		Video Units		
	Milliseconds	Total Samples	Frames	Lines	Samples
525	50	1,350,000	1	261	1224
	100	2,700,000	2	523	732
	200	5,400,000	5	521	1464
625	50	1,350,000	1	156	432
	100	2,700,000	2	313	239
	200	5,400,000	5	1	478

Table 3-3: Typical Video Delay Settings – 525 and 625 Line Video

3.2.2. Choosing Which lines in the Vertical Blanking interval will be Blanked

This menu item allows the user to select which lines of the VBI will be blanked and which ones will be passed through.

Press the **SELECT** key to enter the *VBI Blanking* menu item. The display will show `line x: blank` or `line x: pass` where x is the video line number. Press the ↑ **&** ↓ keys to select the VBI line you want to configure. Press the **SELECT** key to set the line blanking for this line. Use the ↑ **&** ↓ keys to select other lines you want to configure. Only valid VBI lines for the current video standard are shown. Press the **SETUP** key from within this menu to exit the *VBI Blanking* menu item. Figure 3-4 gives an overview of the VBI blanking menu.

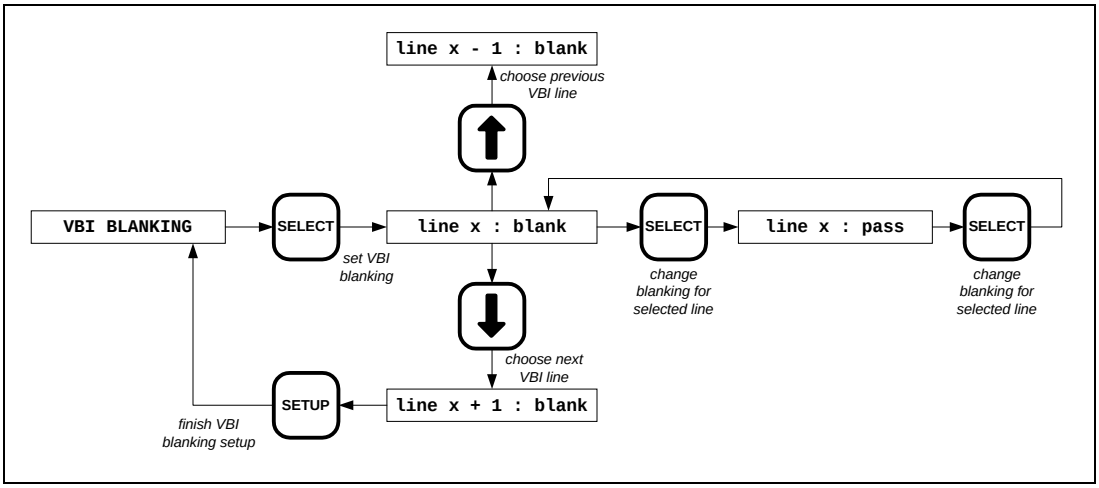

Figure 3-4: Overview of the Vertical Blanking Menu

3.2.3. Upgrading the Firmware in the Video Delay Processor

This menu item allows the user to set up the unit for firmware upgrades. When the front panel message shows `Select = Upgrade`, press the **SETUP** key to return to the main menu or press the **SELECT** key to initiate the firmware upgrade mode. The front panel will show the message `Upgrading` to indicate that it is awaiting a firmware upload. Once this message is displayed, you can only exit the firmware upgrade mode by power cycling the unit. See section 4.2 for a complete description of how to upgrade the firmware in the video delay processor.

3.3. LOADING THE FACTORY DEFAULTS

The **DEFAULT** button is used to recall the factory default settings for video delay (minimum delay as specified in section 4.1.4) and VBI blanking (pass all lines). The *DEFAULT* LED will illuminate when the Factory defaults settings are loaded. The 9540 must be in the normal operating mode (the video delay messages will be cycling on the front panel) in order to recall the factory default settings.

3.4. WORKING WITH THE USER PRESETS

The Video Delay Processor has four memory locations to store user defined presets. Each preset contains the video delay setting and the VBI line blanking settings. The 9540 must be in the normal operating mode (the video delay messages will be cycling on the front panel) in order to save or recall *USER PRESETS.*

3.4.1. Saving User Presets

To save the current settings into one of the four *user preset* memory locations, press the **PRESET SAVE** button. The *PRESET SAVE* LED will come On and the front panel display will show `Store Preset #`. Then press the **PRESET** button corresponding to the location you wish to store the settings to. The Front panel display will show SAVE `to store n` where n is the number of the *user preset*. Press the **PRESET SAVE** button a second time to confirm the operation (The *PRESET SAVE* LED will go Off and the front panel display will show `Preset n stored`) or press any other button to abort the store operation.

User Presets **cannot be deleted directly from memory they can only be overwritten by another configuration saved to the same memory location.**

3.4.2. Recalling User Presets

To load the current object settings from one of the four *user preset* memory locations; press *the* **PRESET** button corresponding to the location you wish to restore the settings from.

Recalling one of the *user presets* will overwrite the current settings and can not be undone. Make sure you want to overwrite your current settings before you recall one of the *user presets*

4. TECHNICAL DESCRIPTION

4.1. SPECIFICATIONS

4.1.1. Serial Video Input

Standards: SMPTE 259M (270 Mb/s)
Connector: 1 BNC input per IEC 169-8
Equalization: Automatic
Max. Cable Length: 210m recommended, tested to 225m @ 270 Mb/s with Belden 8281 or equivalent cable
Return Loss: > 15 dB up to 540 Mb/s

4.1.2. Serial Video Outputs

Number of Outputs: 1 with relay bypass, 3 additional outputs.
Connector: BNC per IEC 169-8
Signal Level: 800mV nominal
DC Offset: 0V ±0.5V
Rise and Fall Time: 470ps nominal
Overshoot: <10% of amplitude
Return Loss: > 15 dB up to 540 Mb/s
Wide Band Jitter: < 0.2 UI

4.1.3. Electrical

Voltage: 110 - 230 Volts AC, 50/60 Hz – unit autosenses the voltage
Fuse Rating: 250 V, 1amp time delay
Power: 30 VA
Safety: ETL Listed, complies with EU safety directives
EMI/RFI: Complies with FCC Part 15 Class A regulations
Complies with EU EMC directive

4.1.4. Functional

Minimum Delay: 815 nsec (22 samples)
Maximum Delay:
Model 9540: 525 line: 17 frames, 625 line: 14 frames (approx. .56 sec)
Model 9542: 525 line: 70 frames, 625 line: 59 frames (approx. 2.3 sec)

4.2. UPDATING THE FIRMWARE IN THE VIDEO DELAY PROCESSOR

The firmware in the Video Delay Processor is contained in a FLASH EPROM device. From time to time firmware updates will be provided to add additional features to the unit. The following procedure will allow you to upload new firmware from your computer.

4.2.1. Requirements

You will need the following equipment in order to update the Video Delay Processor Firmware

- PC with available communications port. The communication speed is 57600 baud, therefore a 486 PC or better with a 16550 UART based communications port is recommended.
- "Straight-thru" serial extension cable (DB9 female to DB9 male) or (DB25 female to DB9 male)
- Terminal program such as Hyper Terminal, Telix, Procomm etc.
- New firmware supplied by Evertz.

4.2.2. Update Procedure

4.2.2.1. Part I – Terminal program Setup

1. Power down the 9540 Video Delay Processor.

2. Connect the "straight-thru" serial cable from the PCs' RS-232 communications port to the **COM1** RS-232 communications port on the back of the Video Delay Processor.

3. Start the terminal program.

4. Configure the port settings of the terminal program as follows:

Baud	**57600**
Parity	**No**
Data bits	**8**
Stop bits	**2**
Flow Control	**None**

5. Power up the 9540 Video Delay Processor.

4.2.2.2. Part II – Invoke upload mode via the front panel

If you cannot invoke the upload mode via the front panel outlined in Part II then follow the steps in Part III.

6. You can invoke the Software upgrade mode using the front panel Setup Menu. (See section 3.2 for information on how to operate the front panel menus.)

   - Press the **SETUP** button once to enter the front panel menu.
   - Press the ↑ **&** ↓ keys until the front panel display reads `SOFTWARE UPGRADE.`
   - Press the **SELECT** button to select the software upgrade mode.
   - The front panel display should now show the message `Select = Upgrade`.

- Press the **SELECT** button to confirm the *Upgrade* operation, or press the **SETUP** button two times to return to normal operating mode.
- Proceed to Part IV for instructions on uploading the firmware.

4.2.2.3. Part III – Invoke upload mode from the Terminal Program

In the event that you can not initiate upload mode from the front panel menu, you may send commands to the Video Delay Processor to initiate upload mode using the terminal program.

7. Power-up the Video Delay Processor.

8. After you power up the Video Delay Processor, a banner with the boot code version information should appear in the terminal window.

For example:

```
EVERTZ 7700PB MONITOR 1.3
COPYRIGHT 1997, 1998, 1999 EVERTZ MICROSYSTEMS LTD.
COLD BOOT |
```

The cursor to the right of the word "**BOOT>**" should be spinning.

9. The following is a list of possible reasons for failed communications:

   - Defective RS-232 "straight-thru" serial extension cable.
   - Wrong communications port selected in the terminal program.
   - Improper port settings in the terminal program. (Refer to step 4 for settings). Note that Hyperterminal will not change port settings while connected. Click on Hyperterminal's "Disconnect" Button then click the "Reconnect" button to activate changes to the port settings.
   - Video Delay Processor is off.

10. While the cursor is spinning press the <CTRL> and <X> keys on your computer keyboard at the same time, this should stop the cursor from spinning. The spinning prompt will only remain for about 5 seconds. You must press <CTRL-X> during this 5 second delay. If the unit continues to boot-up, simply cycle the power and repeat this step.

11. Hit the <**ENTER**> key on your computer once.

12. Type the word "**upgrade**", without quotes, and hit the <**ENTER**> key once.

13. The boot code will ask for confirmation. Type "**y**", without quotes.

14. You should now see a prompt asking you to upload the file.

For example:

```
BOOT> upgrade
UPLOAD FLASH MAIN
ARE YOU SURE YOU WANT TO UPLOAD FLASH? [Y/N] Y

UPLOAD FILE FOR $08000 NOW, CONTROL-X TO CANCEL
```

4.2.2.4. Part IV – Uploading the new firmware

15. Upload the "*.bin" file supplied using the X-Modem transfer protocol of your terminal program. If you do not start the upload within 10 minutes the Video Delay Processor's boot code will time out. You can restart the upgrade process by power cycling the unit.

16. The boot code will indicate whether the operation was successful upon completion of the upload.

    For Example:

```
UPLOAD OKAY
BOOT>
```

17. The following is a list of possible reasons for a failed upload:

- If you get the message "transfer cancelled by remote" you must restart the terminal program and load the bin file again.
- The supplied "***.bin**" file is corrupt.
- Wrong file specified to be uploaded.
- The PCs' RS-232 communications port can't handle a port speed of **57600**.
- Noise induced into the RS-232 "straight-thru" serial extension cable.

4.2.2.5. Part V – Completing the Upgrade

18. Type the word "**boot**", without quotes, and hit the <**ENTER**> key once. The Video Delay Processor should now reboot.

19. If the Video Delay Processor fails to reboot after the upgrade, then cycle the power on Video Delay Processor.

20. You can now close the terminal program and disconnect the RS-232 serial cable.

The update procedure is now completed