Model 5100D Afterburner

Dual LTC/VITC Time Code Reader

INSTRUCTION MANUAL

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Preliminary Version 1.0, August, 1992

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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	Preliminary version	08/92

Chapter 1: INTRODUCTION

Afterburner combines the latest LSI technology with sophisticated microcontroller firmware to provide a powerful, flexible time code reader systems. ***Afterburner*** is a dual LTC/VITC reader and multi-function character inserter. Its power and flexibility are unsurpassed in time code reader applications. A 12 digit alphanumeric display can be quickly delegated to show the required data. ***Afterburner*** contains two separate readers that can be operated independent of each other, or can be linked to form a auto LTC/VITC reader. ***Afterburner*** can be configured in one of three basic operating modes:

- Reader 1; full speed (1/30 to 70 times play) LTC reader Reader 2: 0 to 15X speed VITC reader.
- Dual 0 to 15X speed VITC reader - reads VITC from two sets of lines on the same video simultaneously.
- Auto LTC/VITC reader automatically switches between LTC and VITC inputs reading whichever is valid.

Afterburner is designed to work as a companion to the ***Evertz*** 4015 Film Footage Encoders. Film edge numbers (Keykode) which have been encoded into the user bits can be recovered and displayed in standard film format notations as are used by the Film Footage Encoder. In NTSC 24 frame per second transfers, the 3/2 pulldown information is recovered from the encoded user bits and displayed in standard A, B, C, D film frame type convention, when the incoming code is at play speed. ***Afterburner*** reads edge numbers encoded using the proprietary ***Evertz*** encoding scheme and can display pulldown information from the VITC in all speeds. This permits unambiguous identification of the film frame pulldown when the VTR is parked on any frame.

Afterburner provides a fully decoded and regenerated play speed LTC output, containing information related to reader 1. In many VTR's, the position of the LTC time code head relative to the video signal can vary quite considerably from machine to machine, causing a code phase shift relative to the video frame. When reader 1 is configured to read LTC the translator output can be operated in the regenerate or reshape mode. In reshape mode, incoming LTC is restored to the proper waveform, and output in phase with the incoming LTC. In regenerate mode, the incoming LTC is fully decoded and regenerated. When incoming LTC is at normal play speed, the output code is re-phased to the video, thus compensating for any LTC code misalignments from the video. When reader 1 is configured to read VITC, the LTC output provides an LTC translation of the incoming VITC.

The recovery of recorded LTC time code at other than play speed has always presented some degree of difficulty, particularly with low end 3/4" and 1/2" recorders lacking a separate address track. The high speed reader in ***Afterburner*** employs sophisticated input conditioning and clock and data separator circuits to reliably recover LTC over the full shuttle and wind speed range of most VTR's.

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. ***Afterburner*** 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. When ***Afterburner*** is operated in the dual VITC reader mode, two sets of VITC data can be independently recovered for the same video and displayed on the front panel or character inserter.

The high resolution character inserter provides up to 4 independently positionable windows to show time and user bits from both readers 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 ***Afterburner*** to be conveniently configured for particular customer requirements. Four function keys are used to save and recall various configurations, so that the operator can quickly recall to frequently used setups.

Chapter 2: INSTALLATION

2.1 MOUNTING

Afterburner is designed to be used as a table top unit. Its compact size and light weight construction make it ideal for mobile applications of console mounting. Two units may be fitted into the optional rack mounting bracket which fits into a standard 19 inch by 1 3/4 inch (483mm x 45mm) rack space. A blank panel may be ordered for the rack mount bracket if only one unit is to be used.

2.2 REAR PANEL CONNECTIONS

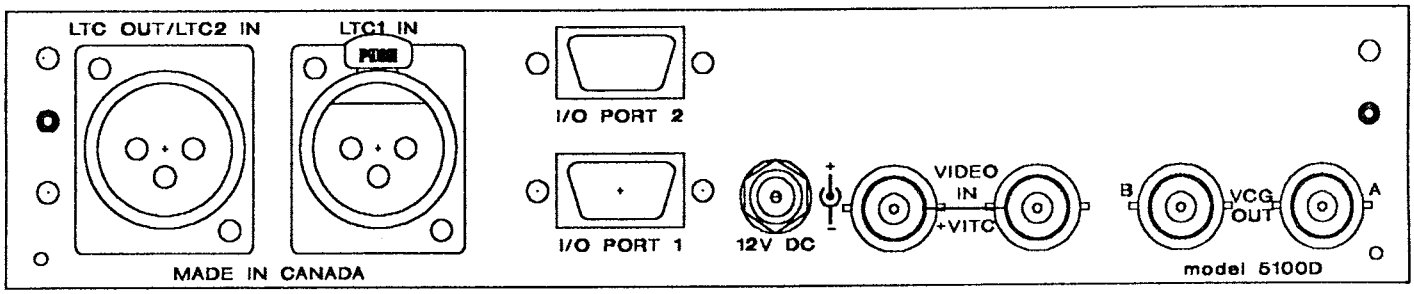


Figure 2.1 *Afterburner* Rear Panel

Figure 2.1 above shows the rear panel connectors provided on ***Afterburner***. The following summarizes the use of each connector. Consult sections 2.3 to 2.6 for specific information on connections to ***Afterburner***

2.3 POWER

Afterburner is designed to operate from an external 12 Volt DC power source. An external 115 or 230 volts AC to 12 volt DC (1.0 amp) power adapter is provided with ***Afterburner*** depending on the power supply voltage of your country. ***Afterburner*** may also be powered from a 12 Volt battery source for mobile applications. The 2.5 mm centre post is +12 VDC and the outer sleeve is ground. ***Afterburner*** is internally fused with a .75 Amp slow blo fuse. Never replace with a fuse of greater value.

Before connecting the power, make sure that the + voltage is connected to the centre post of the input DC connector, and that you are using a power adapter suited for the proper line voltage

2.4 READER VIDEO INPUT

Video associated with the LTC code or 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. The input video signal is also used as a reference for the LTC translator output when it is operated in regenerate mode, and the incoming code is at play speed.

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, labeled 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 and 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 LONGITUDINAL TIME CODE IN/OUT

The LTC reader input connects to your head pre-amplifier output. When using an unbalanced input to the reader, the signal should be applied to pin 3 of the reader input connector. Normally, the unused input, (pin 2) should be connected to ground (pin 1).

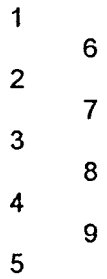
A fully decoded and regenerated play speed LTC output is provided containing information related to reader 1. In many VTR's, the LTC time code head position with respect to the video signal can vary quite considerably from machine to machine causing a code phase shift relative to the video frame. When reader 1 is configured to read LTC the translator output can be operated in the regenerate or reshape mode. In reshape mode, incoming LTC is restored to the proper waveform, and output in phase with the incoming LTC. In regenerate mode, the incoming LTC is fully decoded and regenerated. When incoming LTC is at normal play speed, the output code is re-phased to the video, thus compensating for any LTC code misalignments from the video. When reader 1 is configured to read VITC, the LTC output provides an LTC translation of the incoming VITC.

When using the regenerated LTC output, the video from the tape being read must be looped through the video input (See Section 2.4) to ensure correct phasing of the LTC output to the video. In audio tape applications or other situations where video cannot be looped through the video input, it is advisable to use the reshaped output instead of the regenerated output. To accomplish this use the TRANSLATOR OUTPUT menu selections.

2.7 I/O CONNECTOR PIN ASSIGNMENTS

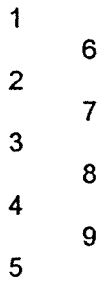
2.7.1 I/O Port 1

A 9 pin D connector located on the rear panel labeled I/O Port 1 provides serial remote control of ***Afterburner*** functions. In addition, reader data is available on the serial port. The pinout of the D connector is as follows:



2.7.2 I/O Port 2

A 9 pin D connector located on the rear panel labeled I/O Port 2 provides parallel remote control of some of the Afterburner functions. The pinout of the D connector is as follows:



2.8 SAMPLE CONFIGURATIONS

Several sample installation setups are diagrammed below to aid the user in properly connecting ***Afterburner*** into his system. Contact the factory for other applications.

Figure 2.2 illustrates the basic set-up for reading LTC and VITC, making off-line cassette copies with character burn-ins, or for dubbing tapes with regenerated time code. Longitudinal code misalignments from the video frame are compensated for, and the regenerated LTC is properly timed to the video. The source video must be looped through the video input of ***Afterburner*** to ensure correct timing of the output LTC to the video. (See the TRANSLATOR menu selections in section 3.)

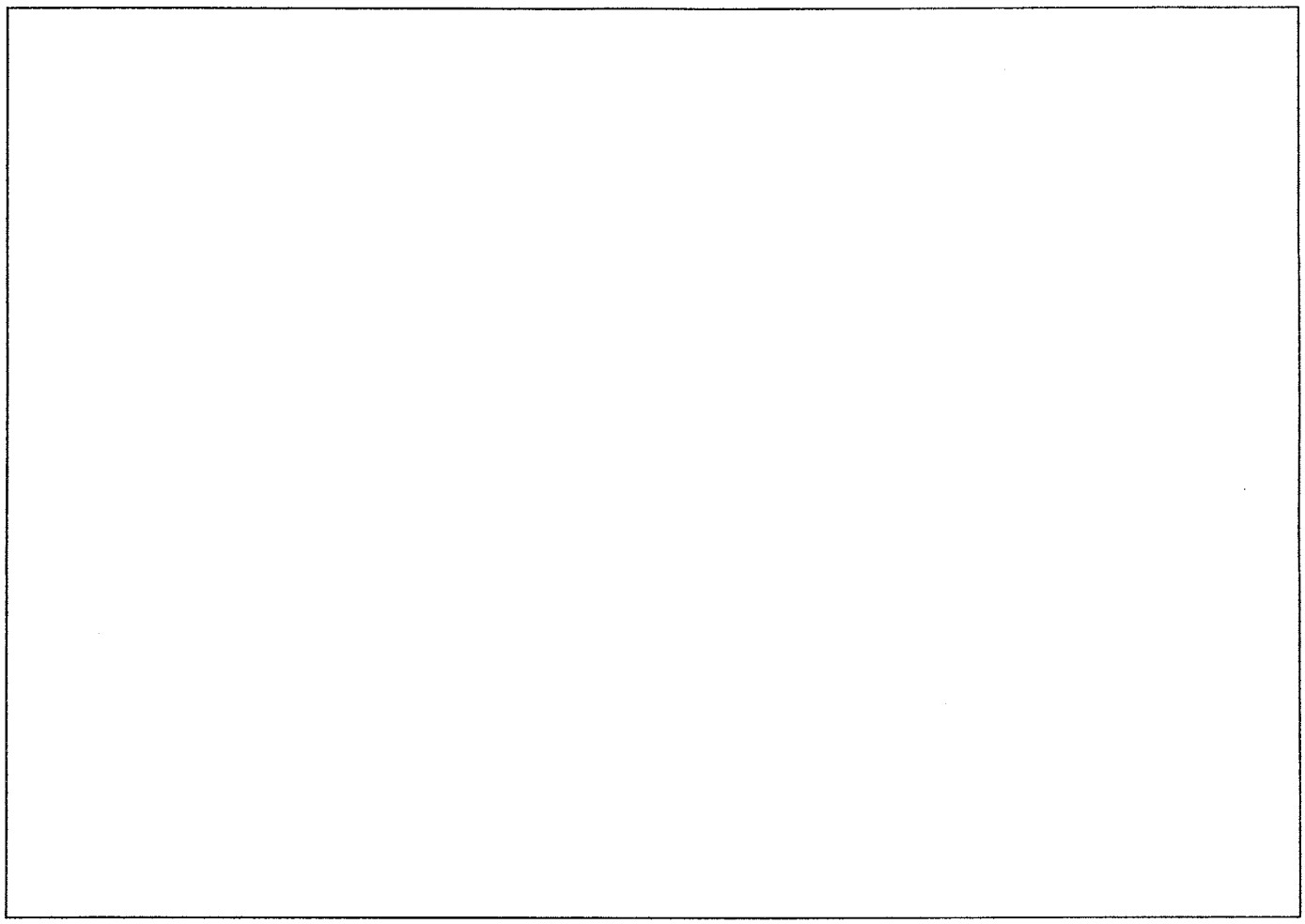


Figure 2.2: Dubbing and Off-line Character Burn In

Figure 2-3 illustrates the setup for a VITC/LTC editing system. Using ***Afterburner*** your existing editing system can use LTC only, VITC only or both LTC and VITC together for both edit decision making and editing. The video from each source VTR is looped though the respective Afterburner, which will read VITC whenever it is present on the video. It is important that the VITC is recorded on vertical interval lines that will be reproduced by your VTR in playback. See your VTR manual for further information. If a time base corrector is used, the video output should be fed to the Afterburner prior to TBC processing, because many TBC's blank the vertical interval, and eliminate the VITC. If it is desired to time base correct the video before ***Afterburner***, make sure that the lines containing the VITC are passed through the TBC.

The recovered VITC is translated to LTC by ***Afterburner***, which can be read by the LTC reader in the edit controller. The new LTC is generated at approximately play speed so that the edit controller can read it during slow motion decision making and also for cueing and parking the VTR during editing. When the incoming code is at play speed, the LTC is synchronized to the video, so that the edit controller can use it to synchronize the playback and record VTRs during the edit pre-roll interval, just as it would have used the original LTC from the VTR.

If it is desired to record VITC on the record VTR, a VITC/LTC jam-sync generator such as our ECM 4010 must be used in the place of ***Afterburner*** on the record VTR. During the edit pre-roll, when the record VTR is in playback, the jam-sync generator will follow the numbers read from the record machine. When the record VTR switches from playback to record, the jam-synced VITC will be recorded in the video without interruption. See model ECM 4010 Instruction Manual for more detailed information.

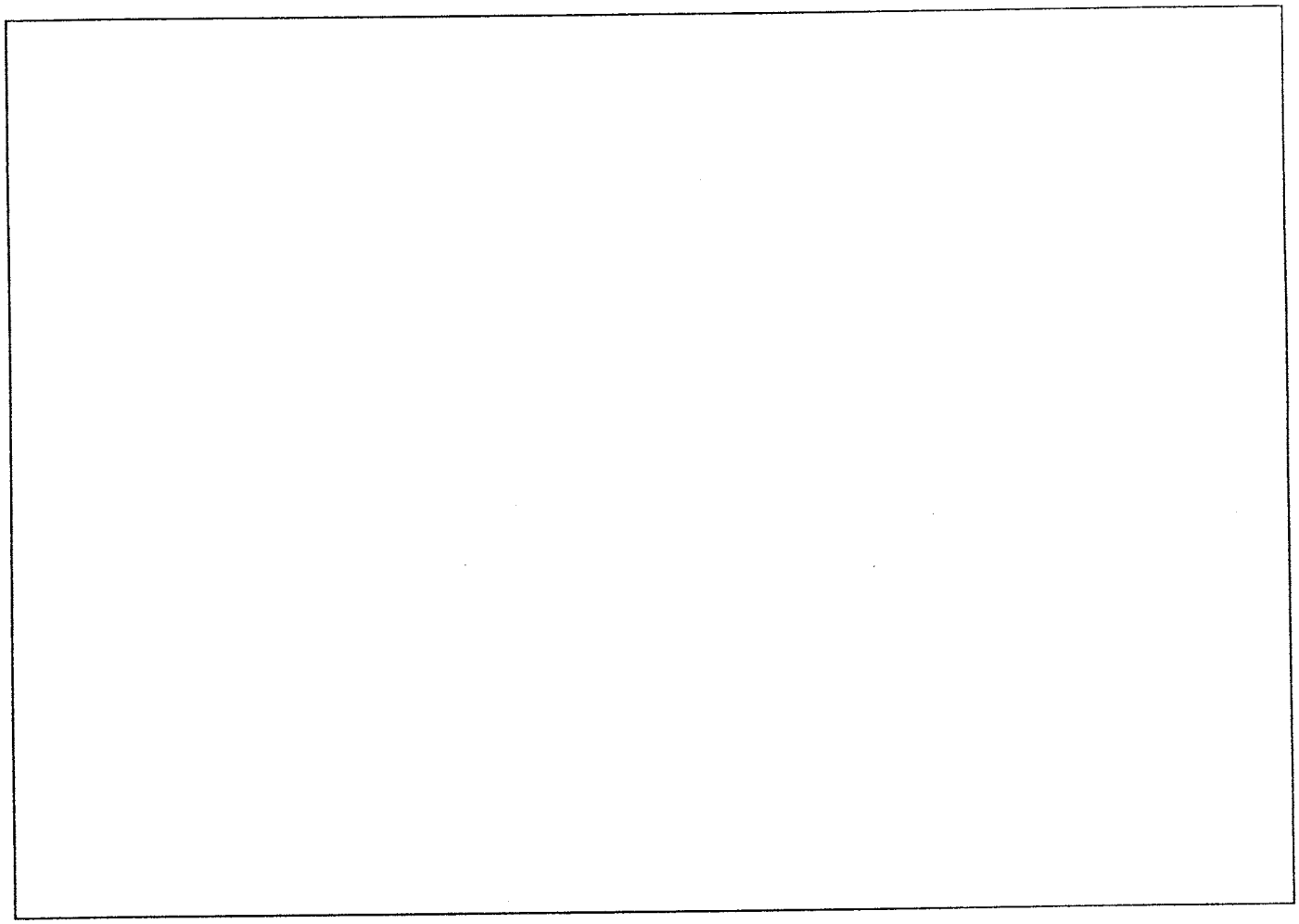


Figure 2.3 VITC translation to LTC for Editing

Chapter 3: OPERATING INSTRUCTIONS

Afterburner is a a dual LTC/VITC reader and multi-function character inserter. Its power and flexibility are unsurpassed time code reader applications. A 12 digit alphanumeric display is quickly delegated to show the required data and ***Afterburner*** contains two separate readers which can be operated independent of each other, or can be linked to form an auto LTC/VITC reader. ***Afterburner*** can be configured in one of three basic operating modes:

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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 ***Afterburner*** to be conveniently configured for particular customer requirements. Four function keys are used to save and recall various configurations so that ***Afterburner*** can be quickly changed to frequently used setups.

3.1 FRONT PANEL OVERVIEW

The ***Afterburner*** Time Code Reader provides a display of time or user bit information from either of its two readers using a 12 digit alphanumeric display on the front panel, or using characters keyed into the input video. Operational control is handled by 14 front panel keys. Six LED's provide operational status at a glance.

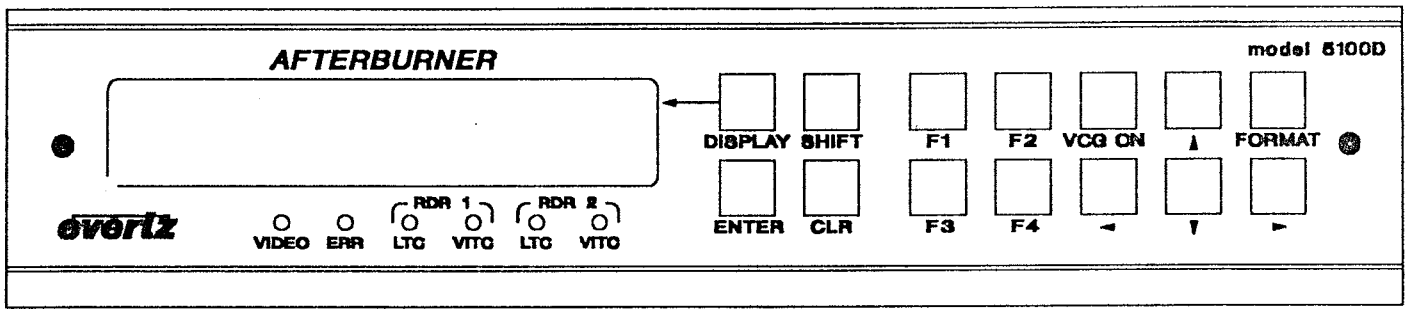


Figure 3.1 Afterburner Front Panel

3.2 STATUS INDICATORS

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

VIDEO Indicated that video is present on the VIDEO IN loop, and that the correct video standard has been selected.

ERR Indicates that there was a reading error in either Reader 1 or Reader 2.

Two status LED's show the reading mode of each reader. Selection of the source of reader data is controlled by the READER ASSIGNMENT menu (See section 3.5)

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

LTC Indicates that the reader data being displayed is coming from the LTC reader.

3.3 ON SCREEN PROGRAMMING MENU - OVERVIEW

The key to the operational flexibility of ***Afterburner*** lies in the powerful on screen programming menu system which uses the built in character generator. This method of configuring ***Afterburner*** is quick, and simple, guiding you to the correct setup for your application. Five front panel push buttons (←, →, ↑, ↓, and FORMAT) are used to cycle through the various items on the programming menu.

The ***Afterburner*** menu system consists of four drop down menus. The titles of each of the drop down menus is shown on the top line of the character display. An abbreviated description is also shown on the front panel display, allowing the menu system top be used without a video monitor. Selecting an item on of the drop down menus reveals a sub-menu showing the choices for that item. Figure 3.3 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.

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

READER
- **ASSIGNMENT**

RDR 1	RDR 2
LTC	VITC
VITC	VITC
LTC/VITC	OFF

- **RDR1 MODE**

TIME	USERBITS
TIME	DATA
TIME	TIME
TIME	EDGE
KEY INFO	+ EDGE
DATA	DATA

- **RDR1 VITC LINE**
  - LINE RANGE:

START	END
10	20

- **RDR1 CRC**
  - NORMAL
  - SPECIAL
- **RDR 1 DIRECT**
  - OFF
  - ON
- **RDR2 MODE**

TIME	USERBITS
TIME	DATA
TIME	TIME
TIME	EDGE
KEY INFO	+ EDGE
DATA	DATA

- **RDR2 VITC LINE**
  - LINE RANGE:

START	END
10	20

- **RDR2 CRC**
  - NORMAL
  - SPECIAL
- **RDR 2 DIRECT**
  - OFF
  - ON

EDGE
- **RDR1 FILM TYPE**
  - 35 MM 16 FRM/FT
  - 16 MM 20 FRM/KEY
  - 16 MM 40 FRM/FT
- **RDR1 FILM RATE**
  - 25 FRMS/SEC
  - 24 FRMS/SEC
  - 30 FRMS/SEC
- **RDR1 EDG STYLE**
  - GENERIC
  - EVERTZ
- **RDR1 EDG FORMAT**
  - 4 DIG FT + FRM
  - 5 DIG FT + FRM
  - 6 DIG FT + FRM
  - 7 DIG FT + FRM
- **RDR2 FILM TYPE**
  - 35 MM 16 FRM/FT
  - 16 MM 20 FRM/KEY
  - 16 MM 40 FRM/FT
- **RDR2 FILM RATE**
  - 25 FRMS/SEC
  - 24 FRMS/SEC
  - 30 FRMS/SEC
- **RDR2 EDG STYLE**
  - GENERIC
  - EVERTZ
- **RDR2 EDG FORMAT**
  - 4 DIG FT + FRM
  - 5 DIG FT + FRM
  - 6 DIG FT + FRM
  - 7 DIG FT + FRM

CONFIGURATION
- **VIDEO TYPE**
  - PAL
  - NTSC
- **TRANSLATOR**
  - REGENERATE
  - RESHAPE
- **LTC OUT LEVEL**
  - 0.5 VOLTS
  - 1 VOLTS
  - 4 VOLTS
- **RDR DIAGS**
  - OFF
  - ON
- **BAUD RATE**
  - 38400
  - 19200
  - 9600
  - 2400
- **WORD SIZE**
  - 7 BITS
  - 8 BITS
- **PARITY**
  - NONE
  - EVEN
  - ODD

Figure 3.3 *Afterburner* On Screen Programming Menu Overview

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 3.4). 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. The EDGE drop down menu is used to set up specific film number modes for each reader when the reader mode is set to either Time + Edge, or Key Info + Edge. The CONFIGURATION drop down menu is used to select the video standard, set the mode and output level of the translator output, and to configure the serial port interface. The CONFIGURATION menu items are normally only required during installation.

To enter the on screen programming menus, press the FORMAT 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 FORMAT 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 FORMAT key to save your choice and you will return to the drop down menu.

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

Each of the menu items are described in the following sections, with an explanation of what each choice does. Section 3.4 describes the items on the VCG drop down menu. Section 3.5 describes the items on the Reader drop down menu. Section 3.5.1 describes the items on the EDGE drop down menu. Section 3.6 describes the items on the CONFIGURATION drop down menu.

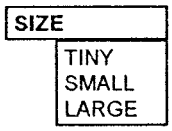
3.4 PROGRAMMING THE CHARACTER GENERATOR FUNCTIONS

The Display setup screen is used to select various characteristics of the VCG display. The following descriptions of each mode appear in the order of selection on the format display.

VCG **READER** **EDGE** **CONFIGURATION**

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

Figure 3-4: VCG Drop Down Menu



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.

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.

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

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. The following descriptions appear in the order of selection on the format display.

VCG **READER** **EDGE** **CONFIGURATION**

ASSIGNMENT

RDR 1	RDR 2
LTC	VITC
VITC	VITC
LTC/VITC	OFF

RDR1 MODE

TIME	USERBITS
TIME	DATA
TIME	TIME
TIME	EDGE
KEY INFO	+ EDGE
DATA	DATA

RDR1 VITC LINE

LINE RANGE:

START	END
10	20

RDR1 CRC
NORMAL
SPECIAL

RDR 1 DIRECT
OFF
ON

RDR2 MODE

TIME	USERBITS
TIME	DATA
TIME	TIME
TIME	EDGE
KEY INFO	+ EDGE
DATA	DATA

RDR2 VITC LINE

LINE RANGE:

START	END
10	20

RDR2 CRC
NORMAL
SPECIAL

RDR 2 DIRECT
OFF
ON

Figure 3-5: READER Menu

ASSIGNMENT	
RDR 1	RDR 2
LTC	VITC
VITC	VITC
LTC/VITC	OFF

Afterburner has two separate sets of reader hardware (called reader 1 and reader 2) that can be configured in three different ways. The **ASSIGNMENT** menu is used to select how the reader hardware is configured.

Select **LTC VITC** to configure reader 1 for longitudinal time code (LTC) reading, and reader 2 for Vertical interval time code (VITC) reading. Reader 2 can be set to recover VITC from a specific range of video lines, and can be set for either normal or special CRC encoding.

Select **VITC VITC** to configure both readers for Vertical interval time code (VITC) reading. The readers can be set to recover VITC from different ranges of video lines, and can be set for either normal or special CRC encoding.

Select **LTC/VITC OFF** to configure reader 1 to automatically switch between longitudinal time code (LTC) and Vertical interval time code (VITC) reading. The reader can be set to recover VITC from a specific range of video lines, and can be set for either normal or special CRC encoding. In this mode reader 2 is turned off as both sets of reader hardware are used.

The remaining menu items are the same for both reader 1 and reader 2.

MODE	
TIME	USER BITS
TIME	DATA
TIME	TIME
TIME	EDGE
KEY INFO	EDGE
DATA	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 DATA** when the time contains normal time information and the user bits contain numeric data.

Select **TIME TIME** when both the time and the user bits contain time information.

Select **TIME EDGE** when the time contains normal time information and the user bits contain encoded film edge numbers. The EDGE menu must be used to select the specific format of the edge number information.

Select **KEY INFO EDGE** when the time contains the film edge number manufacturer and prefix information and the user bits contain encoded film edge numbers. The EDGE menu must be used to select the specific format of the edge number information. This mode is normally used in conjunction with material encoded with ***Evertz*** 4015 or 4025 Film footage encoders, and usually requires that the CRC be set to special. (see below)

Select **DATA DATA** when both the time and user bits contain numeric data, or you wish to see the raw data contained in the time and user bits, without formatting.

VITC LINE	
LINE RANGE:	
START	END
10	20

The **VITC LINE** 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 **VITC LINE** 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.

CRC
NORMAL
SPECIAL

The **CRC** menu item is used to select whether the VITC data being read has a normal CRC or a special inverted CRC used by the ***Evertz*** 4015 and 4025 Film Footage Encoders.

Select **NORMAL** to read VITC data with standard SMPTE/EBU CRC encoding.

Select **SPECIAL** to read VITC data with special ***Evertz*** CRC encoding.

DIRECT
OFF
ON

The **DIRECT** 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. There is a slight limitation on the use of the topmost positions of the character generator when in the direct mode.

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

3.5.1 Programming the Film Edge Number Setup Functions

The EDGE drop down menu is used to set up specific film number modes for the user bits of each reader, when the reader mode is set to either Time Edge, or Key Info + Edge. The following descriptions of each mode appear in the order of selection on the format display.

VCG	READER	EDGE	CONFIGURATION
		RDR1 FILM TYPE	
		35 MM 16 FRM/FT	
		16 MM 20 FRM/KEY	
		16 MM 40 FRM/FT	
		RDR1 FILM RATE	
		24 FRMS/SEC	
		30 FRMS/SEC	
		25 FRMS/SEC	
		RDR1 EDG STYLE	
		GENERIC	
		EVERTZ	
		RDR1 EDG FORMAT	
		4 DIG FT + FRM	
		5 DIG FT + FRM	
		6 DIG FT + FRM	
		7 DIG FT + FRM	
		RDR2 FILM TYPE	
		35 MM 16 FRM/FT	
		16 MM 20 FRM/KEY	
		16 MM 40 FRM/FT	
		RDR2 FILM RATE	
		24 FRMS/SEC	
		30 FRMS/SEC	
		25 FRMS/SEC	
		RDR2 EDG STYLE	
		GENERIC	
		EVERTZ	
		RDR2 EDG FORMAT	
		4 DIG FT + FRM	
		5 DIG FT + FRM	
		6 DIG FT + FRM	
		7 DIG FT + FRM	

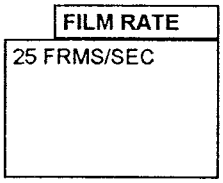
Figure 3-5: Edge Code Drop Down Menu

FILM TYPE
35 MM 16 FRM/FT
16 MM 20 FRM/KEY
16 MM 40 FRM/FT

The **FILM TYPE** menu item is used to select the number of film frames per key number used on encoded user bits.
Select **35 MM 16 FRMS/FT** if you are using normal 4 perf 35 mm film stock.
Select **16 MM 20 FRMS/KEY** if you are using 16 mm film stock with key numbers every 20 perforations.
Select **16 MM 40 FRMS/FT** if you are using 16 mm film stock with key numbers every 40 perforations.

The **FILM RATE** menu item is used to select the transfer rate that the telecine was using during the film to tape transfer.

When the VIDEO TYPE is NTSC
Select **24** to select a transfer rate of 24 (23.97) frames per second.



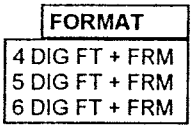
Select **30** to select a transfer rate of 30 (29.97) frames per second. The front panel 1/1 indicator should be On.

When the VIDEO TYPE is PAL
In PAL systems the film rate is fixed at **25,** indicating a transfer of 25 frames per second.

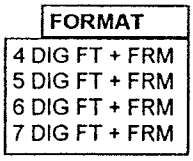
The **EDGE STYLE** menu item is used to select whether the edge numbers have been encoded as normal packed BCD digits, or in a compressed binary format, which allows more digits to be encoded.

Select **GENERIC** if standard BCD encoding has been used. When Generic style is used, either 4, 5 or 6 digits of footage may be selected using the EDG FORMAT menu item. Digits that are not used for footage numbers are utilized for a static prefix number.

Select **EVERTZ** if binary encoding of edge numbers has been used to compress more data into the available space. When EVERTZ style is used, either 4, 5, 6 or 7 digits of footage may be selected using the EDG FORMAT menu item. Digits that are not used for footage numbers are utilized for a static prefix number. In addition, three flag bits are encoded into the user bits which contain the pulldown of the given frame.



The **FORMAT** menu item is used to select the format of the edge numbering scheme. Specifically this affects the number of digits of feet that have been encoded. In GENERIC STYLE there is a total of 8 digits. In EVERTZ STYLE there is a total of nine digits. The right most two are always used for frames. The sub menu choices determine the split between the footage and prefix on the remaining digits.



When GENERIC style is used, either 4, 5 or 6 digits of footage may be selected . Digits that are not used for footage numbers are utilized for a static prefix number.

When EVERTZ style is used, either 4, 5, 6 or 7 digits of footage may be selected using the EDG FORMAT menu item. Digits that are not used for footage numbers are utilized for a static prefix number. In addition, three flag bits are encoded into the user bits which contain the pulldown of the given film frame.

3.6 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, and to configure the serial port interface. The CONFIGURATION menu items are normally only required during installation. The following descriptions of each mode appear in the order of selection on the format display.

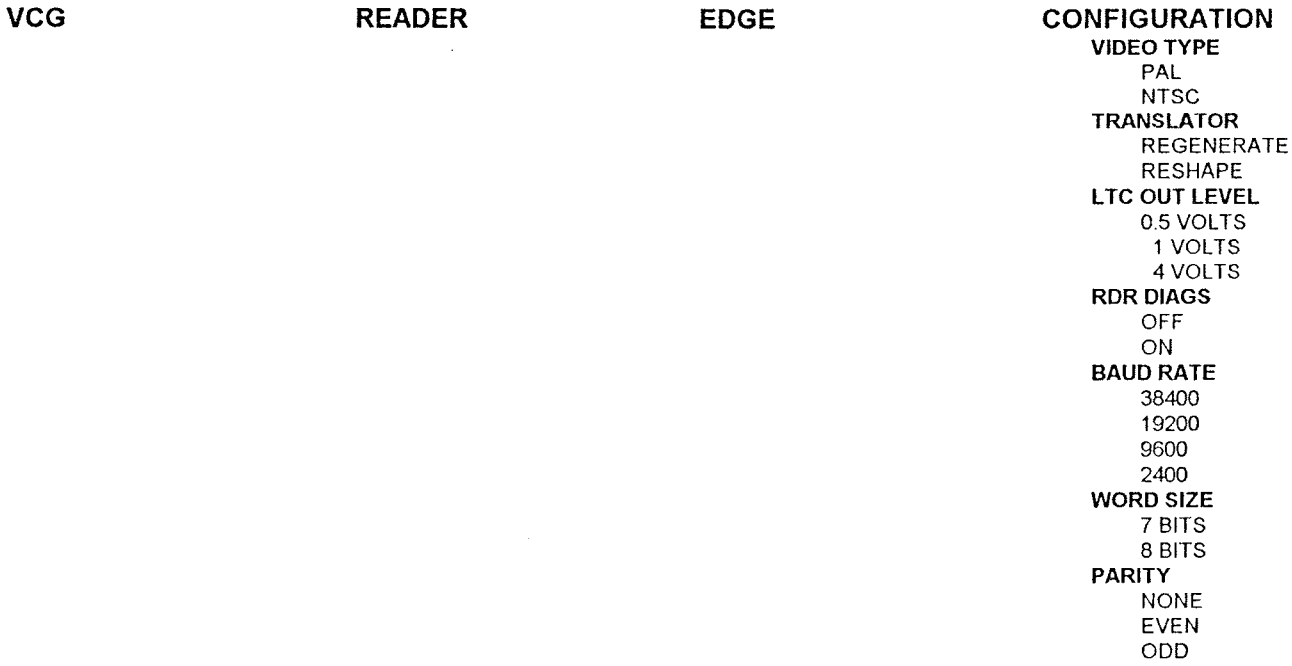
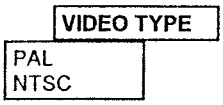


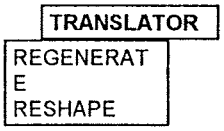
Figure 3-6: CONFIGURATION Drop Down Menu



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

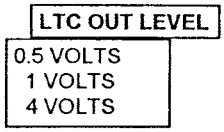
Select **NTSC** if you are using NTSC video.



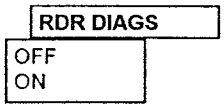
The **TRANSLATOR** menu item is used to select the function of the LTC translator output. When reader 1 is configured to read LTC the translator output can be operated in the regenerate or reshape mode.

In **REGENERATE** mode, the incoming LTC is fully decoded and regenerated. When incoming LTC is at normal play speed, the output code is re-phased to the video, thus compensating for any LTC code misalignments from the video. When reader 1 is configured to read VITC, the LTC output provides an LTC translation of the incoming VITC. When using the regenerated LTC output, the video from the tape being read must be looped through the video input (See Section 2.3) to ensure correct phasing of the LTC output to the video.

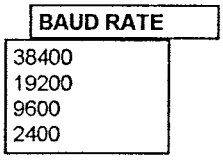
In **RESHAPE** mode, incoming LTC is restored to the proper waveform, and output in phase with the incoming LTC. In audio tape applications or other situations where video cannot be looped through the video input, it is advisable to use the reshaped output instead of the regenerated output.



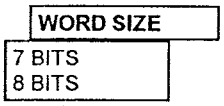
The **LTC OUT LEVEL** menu item is used to select one of three LTC translator output levels. The recommended output level setting is 1 VOLT



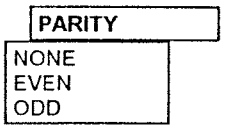
The **RDR DIAGS** menu item is reserved for future options.



The **BAUD RATE** menu item is used to select the baud rate used by the serial port. Select **38400, 19200, 9600,** or **2400,** as appropriate for your computer system



The **WORD SIZE** menu item is used to select the number of bits in each character on the serial port. Select **7** or **8** bits as appropriate for your computer system.



The **PARITY** menu item is used to select the parity used by the serial port. Select **NONE, EVEN** or **ODD,** as appropriate for your computer system.

3.7 FRONT PANEL DISPLAY FUNCTIONS

The DISPLAY key is used to select which data is being displayed in the alphanumeric display. Press the DISPLAY key once to show what data is currently being displayed. While the message is present, press it successively to cycle through the four possible displays (time and user bits for each reader) until the message corresponding to the desired display is shown. After about 5 seconds with no key pressed, the desired data is shown.

3.8 CHARACTER GENERATOR CONTROLS

Up to four separately positionable character windows displaying time or user bits from both readers are available. The four arrow keys (↑, ↓, ←, →) control the position of all the windows . THE **VCG ON** key selects whether the VCG keyer is on or off. The use of these keys in combination with the **SHIFT** key selects which windows are displayed and their position on the screen. The use of the **SHIFT** key in combination with another key is shown as **SHIFT+KEY** (eg. **SHIFT + VCG ON).** In addition the VCG drop down menu of the on screen programming menu is used to select character size and style.

3.8.1 Selecting and Positioning the Individual Character Inserter Windows

Press **SHIFT + VCG ON** to enable the window select mode. All four windows will appear on the character screen, with the window for Reader 1 Time highlighted. Use the four arrow keys (↑, ↓, ←, →) to position the window Reader 1 Time window on the screen. Press the **VCG ON** key to turn the window on or off. Press the **ENTER** key to highlight the Reader 1 User Bits window. Use the arrow keys and the **VCG ON** key to move the window to the desired location. Select the remaining windows using the **ENTER** key until all four windows are where you want them on the screen. Press the **CLR** key to exit the window select mode.

3.8.2 Positioning the Overall Character Display

In the normal display mode, when none of the windows are highlighted, the four arrow keys (↑, ↓, ←, →) move all the displayed windows by the same relative amount. For example, to move the time and user bits windows both down by one line press the ↓ key. To move only the Time window down, leaving the user bit window in the same place, press **SHIFT + VCG ON** and the press the ↓ key. Press the **CLR** key to return to the normal display mode.

3.8.3 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 (.)

3.8.4 Field Identification

When reading VITC, the field number sequence will 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)