Model 8150

Digital Afterburner

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 issue	July 98

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1. OVERVIEW

The 8150 Digital Afterburner is a multi-purpose Digital VITC Reader and character inserter that extracts the vertical interval timecode directly from the digital bitstream. A 16 digit alphanumeric display can be quickly delegated to show the required data. The Digital Afterburner contains three separate VITC readers that can be operated independently of each other. The Digital Afterburner can be configured in one of two basic operating modes:

- Triple VITC reader - reads VITC from three sets of lines on the same video simultaneously - each reader controlled separately
- Three Line VITC reader - reads 3 line VITC standard generated by 4025 Film Footage Encoder - the 3 readers have common controls. Most reader settings are automatically detected from the 3 line VITC

The Digital Afterburner is designed to work as a companion to the Evertz 4015 and 4025 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. The Digital Afterburner reads edge numbers encoded using the proprietary 2 line Evertz and the industry standard 3 line VITC encoding schemes 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.

The model 8150 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.

Features:

- Standard unit is equipped for component digital video.
- Serial digital video input provides automatic cable equalization on cable lengths up to 200 meters of low loss coax such as Belden 8281
- Serial digital video output provides two separate outputs
- Passes embedded audio and other ancillary data signals
- Rack mountable
- 8 or 10 bit resolution
- 16 digit Alpha-numeric display, with 16 pushbuttons
- High resolution character inserter provides up to six independently positionable windows to show time and 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.

1.1. HOW TO USE THIS MANUAL

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

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

1.2. DEFINITIONS

AES: (Audio Engineering Society): A professional organization that recommends standards for the audio industries.

AES/EBU: Informal name for a digital audio standard established jointly by the Audio Engineering Society and the European Broadcasting Union organizations.

ANALOG: An adjective describing any signal that varies continuously as opposed to a digital signal that contains discrete levels representing digits 0 and 1.

A-TO D CONVERTER (ANALOG-TO-DIGITAL): A circuit that uses digital sampling to convert an analog signal into a digital representation of that signal.

BIT: A binary representation of 0 or 1. One of the quantized levels of a pixel.

BIT PARALLEL: Byte-wise transmission of digital video down a multi-conductor cable where each pair of wires carries a single bit. This standard is covered under SMPTE 125M, EBU 3267-E and CCIR 656.

BIT SERIAL: Bit-wise transmission of digital video down a single conductor such as coaxial cable. May also be sent through fiber optics. This standard is covered under SMPTE 259M and CCIR 656.

BIT STREAM: A continuous series of bits transmitted on a line.

BNC: Abbreviation of "baby N connector". A cable connector used extensively in television systems.

BYTE: A complete set of quantized levels containing all the bits. Bytes consisting of 8 to 10 bits per sample are typical in digital video systems.

CABLE EQUALIZATION: The process of altering the frequency response of a video amplifier to compensate for high frequency losses in coaxial cable.

CCIR (International Radio Consultative Committee) An international standards committee. (This organization is now known as ITU.)

CCIR-601: (This document now known as ITU-R601). An international standard for component digital television from which was derived SMPTE 125M and EBU 3246-E standards. CCIR-601 defines the sampling systems, matrix values and filter characteristics for both Y, B-Y, R-Y and RGB component digital television signals.

CCIR-656 (This document now known as ITU-R656). The physical parallel and serial interconnect scheme for CCIR-601. CCIR-656 defines the parallel connector pinouts as well as the blanking, sync and multiplexing schemes used in both parallel and serial interfaces. It reflects definitions found in EBU Tech 3267 (for 625 line systems) and SMPTE 125M (parallel 525 line systems) and SMPTE 259M (serial 525 line systems).

CLIFF EFFECT (also referred to as the 'digital cliff') This is a phenomenon found in digital video systems that describes the sudden deterioration of picture quality when due to excessive bit errors, often caused by excessive cable lengths. The digital signal will be perfect even though one of its signal parameters is approaching or passing the specified limits. At a given moment however, the parameter will reach a point where the data can no longer be interpreted correctly, and the picture will be totally unrecognizable.

COMPONENT ANALOG: The non-encoded output of a camera, video tape recorder, etc., consisting of the three primary colour signals: red, green, and blue (RGB) that together convey all necessary picture information. In some component video formats these three components have been translated into a luminance signal and two colour difference signals, for example Y, B-Y, R-Y.

COMPONENT DIGITAL: A digital representation of a component analog signal set, most often Y, B-Y, R-Y. The encoding parameters are specified by CCIR-601. CCIR-656 and SMPTE 125M specify the parallel interface.

COMPOSITE ANALOG: An encoded video signal such as NTSC or PAL video, that includes horizontal and vertical synchronizing information.

COMPOSITE DIGITAL: A digitally encoded video signal, such as NTSC or PAL video that includes horizontal and vertical synchronizing information.

D1: A component digital video recording format that uses data conforming to the CCIR-601 standard. Records on 19 mm magnetic tape. (Often used incorrectly to refer to component digital video.)

D2: A composite digital video recording format that uses data conforming to SMPTE 244M. Records on 19 mm magnetic tape. (Often used incorrectly to refer to composite digital video.)

D3: A composite digital video recording format that uses data conforming to SMPTE 244M. Records on 1/2" magnetic tape.

EBU (European Broadcasting Union): An organization of European broadcasters that among other activities provides technical recommendations for the 625/50 line television systems.

EBU TECH 3267-E: The EBU recommendation for the parallel interface of 625 line digital video signal. This is a revision of the earlier EBU Tech 3246-E standard that was in turn derived from CCIR-601.

EDH Error Detection and Handling (EDH) is defined in SMPTE RP-165 as a method of determining when bit errors have occurred along the digital video path. According to RP-165, two error detection checkwords are used, one for active picture samples, and the other on a full field of samples. Three sets of flags are used to convey information regarding detected errors, to facilitate identification of faulty equipment or cabling. One set of flags is associated with each checkword, and the third is used to evaluate ancillary data integrity. The checkwords and flags are combined into a special error-detection data packet that is included as ancillary data in the serial digital signal.

EMBEDDED AUDIO: Digital audio is multiplexed onto a serial digital video data stream.

ITU: The United Nations regulatory body governing all forms of communications. ITU-R (previously CCIR) regulates the radio frequency spectrum, while ITU-T (previously CCITT) deals with the telecommunications standards.

ITU-R601: See CCIR601

PIXEL: The smallest distinguishable and resolvable area in a video image. A single point on the screen. In digital video, a single sample of the picture. Derived from the words *picture element*.

RESOLUTION: The number of bits (four, eight, ten, etc.) determines the resolution of the signal. Eight bits is the minimum resolution for broadcast television signals.

4 bits = a resolution of 1 in 16.
8 bits = a resolution of 1 in 256.
10 bits = a resolution of 1 in 1024.

SERIAL DIGITAL: Digital information that is transmitted in serial form. Often used informally to refer to serial digital television signals.

SMPTE (Society of Motion Picture and Television Engineers): A professional organization that recommends standards for the film and television industries.

SMPTE 125M: The SMPTE standard for bit parallel digital interface for component video signals. SMPTE 125M defines the parameters required to generate and distribute component video signals on a parallel interface.

SMPTE 244M: The SMPTE standard for bit parallel digital interface for composite video signals. SMPTE 244M defines the parameters required to generate and distribute composite video signals on a parallel interface.

SMPTE 259M: The SMPTE standard for 525 line serial digital component and composite interfaces.

TRS: Timing reference signals used in composite digital systems. (It is four words long).

TRS-ID: Abbreviation for "Timing Reference Signal Identification". A reference signal used to maintain timing in composite digital systems. (It is four words long.)

4:2:2 A commonly used term for a component digital video format. The details of the format are specified in the CCIR-601 standard. The numerals 4:2:2 denote the ratio of the sampling frequencies of the luminance channel to the two colour difference channels. For every four luminance samples, there are two samples of each colour difference channel.

4Fsc Four times subcarrier sampling rate uses in composite digital systems. In NTSC this is 14.3 MHz. In PAL this is 17.7 MHz.

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2. INSTALLATION

2.1. REAR PANEL

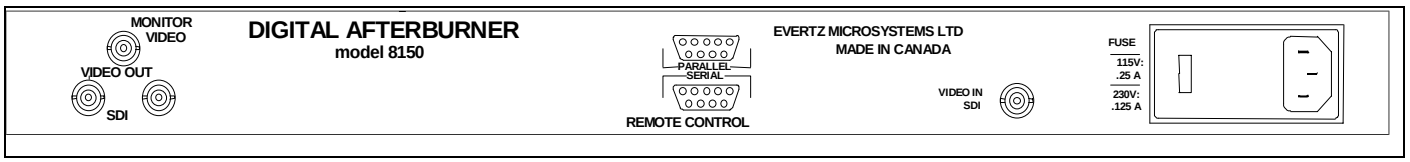


Figure 2-1: 8150 Rear Panel

The following sections describe the purpose of the rear panel connectors of the 8150. Sections 2.1.1 to 2.1.2 describe the specific signals that should be connected to the 8150.

2.1.1. Digital Video Connections

VIDEO IN SDI: A BNC connector for input of 10 bit serial digital video signals compatible with the SMPTE 259M standard.

VIDEO OUT SDI: Two BNC connectors for output of 10 bit serial digital video signals compatible with the SMPTE 259M standard. This video will be the video input with characters inserted onto it.

2.1.2. Analog Monitor Connections (8150-MON option)

The analog composite monitor output is optional and may not be fitted on your unit.

MONITOR VIDEO: A BNC output of the optional composite analog encoder.

2.1.3. Power Connections

LINE: The 8150 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).

2.1.4. Remote Control Connections

SERIAL: A 9-pin female 'D' connector for RS232/422 communications to a computer (Future Use)

Pin	Description
1	Ground
2	RS-422 Transmit A(-)
3	RS-422 Receive B(+)
4	Receive Common
5	RS-232 Transmit
6	Transmit Common
7	RS-422 Transmit B(+)
8	RS-232 Receive and RS-422 Receive A(-)
9	Ground

PARALLEL: A 9 pin female 'D' connector for connection to 'closure to ground' remote control signals. Each input has an internal 47 K ohm pull-up to +5 volts. (Future Use)

2.2. MOUNTING

The 8150 Digital VITC Reader 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 SST 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

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.

Never replace with a fuse of greater value.

2.4. CONNECTING THE DIGITAL VIDEO

2.4.1. Video Input

The 8150 requires that a digital video source be connected to the VIDEO IN SDI video input. The 8150 may be configured to accept either 525 or 625 line digital video in the component (4:2:2) format. The VIDEO TYPE parameter on the front panel menu must be set correctly to match the video input. (See section 3.7.1 for information on changing the video type setting).

The 4:2:2 and 4 Fsc LED's indicate which input is active. The VIDEO LED indicates that there is video present. When it is blinking it indicates that there is no video present.

2.4.2. Video Output

The VIDEO OUT SDI outputs contain the input video with character data keyed in by the keyer. Connect one of these outputs to any input on your system that accepts 8 or 10 bit SERIAL digital video. Two identical VIDEO OUT SDI digital video outputs are provided.

2.5. TYPICAL APPLICATION

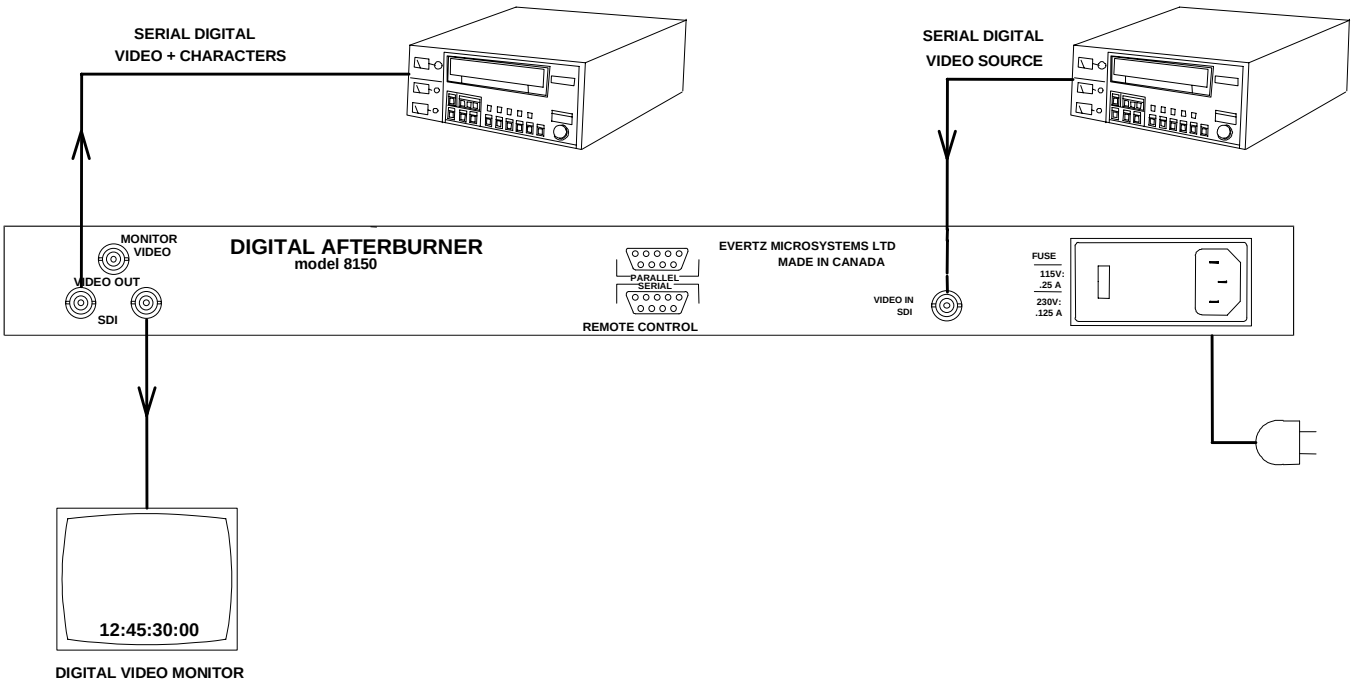


Figure 2-2: Typical Application of 8150 for Character Generation

3. HOW TO OPERATE THE DIGITAL AFTERBURNER

3.1. AN OVERVIEW OF KEY AND DISPLAY FUNCTIONS

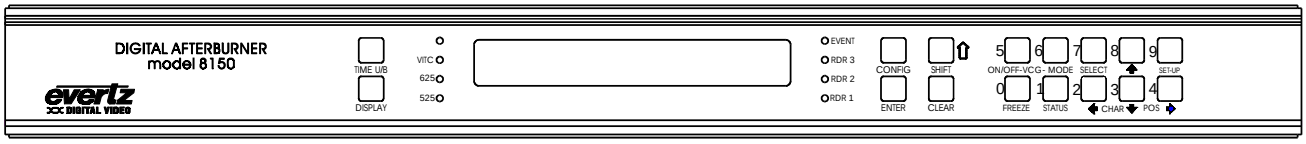


Figure 3-1: Front Panel Layout

The 8150 Digital Afterburner provides a display of time or user bit information from its readers using a 16 digit alphanumeric display on the front panel, or using characters keyed into the input video. Operational control is handled by 16 front panel keys. Eight LED's provide operational status at a glance.

The keypad is used to control the front panel menu system, to position the character display windows, and to provide control of the front panel display. When the **SHIFT** key is held down, the meanings of some of the keys are modified, gaining quick access to a wider variety of functions. (Throughout this manual **SHIFT +** indicates that you should hold down the **SHIFT** key while pressing the second key.)

A front panel programming menu provides a quick and simple method of configuring the 8150 Digital Afterburner for your application.

Sections 3.4 to 3.8 give detailed information on the specific operations required to control the 8150.

3.1.1. Overview of the Pushbuttons

Sixteen front panel pushbuttons are used to control the operation of the Afterburner.

TIME/UB Is used to select whether time or user bit data is being displayed on the front panel alphanumeric display. The leftmost 4 characters of the front panel display whether time or user bits is being displayed, and which reader the data is coming from. (E.g.: `TIM1 12:34:56:10` indicates that time from reader 1 is being displayed.

DISPLAY Is used to select which reader is being displayed on the front panel alphanumeric display. The leftmost 4 characters of the front panel display whether time or user bits is being displayed, and which reader the data is coming from. (E.g.: `TIM1 12:34:56:10` indicates that time from reader 1 is being displayed.

CONFIG A user screen appears which is used to load user definable configurations. Press the **ENTER** key to load the configuration.

Press the CONFIG key again to select another configuration. (See also section 3.9.2)

FREEZE Stops the updating of the reader display data on the front panel and in the VCG. A special character (**F)** appears to the left of the numeric display on the front panel, indicating that the display is in Freeze mode. Press the **FREEZE** key again to return to normal update mode.

STATUS Displays a status screen on the VCG that summarizes the current operational modes of the Digital Afterburner.

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

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

SETUP Initiates SETUP mode and displays the front panel 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 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 3.8.1)
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 3.8.2)

3.1.2. Overview of the Shifted Key Functions

When the **SHIFT** key is held down the standard meanings of many of the keys are modified. Throughout this manual shifted keys are referred to as **SHIFT + STATUS** for example. When you see this it means to hold the **SHIFT** key while pressing the other key. Following is an overview of the main shifted functions.

SHIFT + num{1-5} Stores user configurations. (See also section 3.9.1)

3.1.3. Status Indicators

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

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

625 Indicates that the reader time is properly genlocked to a 625 line component video reference. If it is blinking, it indicates that the 625 line video standard is selected, but a valid 625 line video reference is not present.

525 Indicates that the reader time is properly genlocked to a 525 line video reference. If it is blinking, it indicates that the 525 line video standard is selected, but a valid 525 line video reference is not present.

EVENT Future Use

RDR 3 Indicates that Reader 3 is reading valid code.

RDR 2 Indicates that Reader 2 is reading valid code.

RDR 1 Indicates that Reader 1 is reading valid code.

3.2. FRONT PANEL DISPLAY FUNCTIONS

The **DISPLAY** and **TIME/UB** keys are used to select which data is being displayed in the alphanumeric display. Press the **DISPLAY** key one or more times to select the reader you wish to display. Press the **TIME/UB** to change from displaying time or user bits from the selected reader. The four left characters of the front panel display indicate what is currently displayed.

TIM1	Reader 1 Time
UB1	Reader 1 User Bits
TIM2	Reader 2 Time
UB2	Reader 2 User Bits
TIM3	Reader 3 Time
UB3	Reader 3 User Bits

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, an **F** is displayed to the left of the numeric characters on the front panel display. Press the **FREEZE** key again to release the FREEZE mode and begin updating of the data.

3.2.1. Front Panel Drop Frame Indicators (NTSC Only)

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	Period (.)

3.3. AN OVERVIEW OF THE FRONT PANEL PROGRAMMING MENU

The key to the operational flexibility of the 8150 Digital Afterburner lies in the front panel programming menu system. The programming menu system uses the 12 digit alphanumeric display and provides a quick, intuitive method of configuring 8150 Digital Afterburner, guiding you to the correct setup for your application. The six keys in the Setup key group (**SELECT**, **SETUP,** ←, →, ↑, ↓) are used to cycle through the various items on the programming menu.

The 8150 menu system consists of a main menu with two or more choices for each menu item. The sub menu items are shown in lower case to allow them to be easily distinguished from the main level items. Figure 3-2 is an overview of the front panel menu system, and shows all the menu items and where you will find the menu choices.

- **RDR ASSIGNMENT**
  - Rass indp rdrs
  - Rass 3 line mod
- **RDR1 MODE**
  - R1 mod time data
  - R1 mod time time
  - R1 mod time edge
  - R1 mod kinfo+edge
  - R1 mod data data
  - R1 mod time date
- **RDR1 START LINE**
  - R1 start line = 14
- **RDR1 END LINE**
  - R1 end line = 16
- **RDR1 VITC CRC**
  - R1 crc normal
  - R1 crc keykode
- **RDR1 DISPLAY**
  - R1 disply direct
  - R1 disply process
- **RDR1 FILM TYPE**
  - R1 16 mm 20 frm
  - R1 16 mm 40 frm
  - R1 35 mm 3 perf
  - R1 35 mm 4 perf
  - R1 35 mm 8 perf
  - R1 65 mm 5 perf
  - R1 65 mm 8 perf
  - R1 65 mm 10 perf
  - R1 65 mm 15 perf
  - R1 65 80 5 perf
  - R1 65 80 8 perf
  - R1 65 80 10 perf
  - R1 showscan
- **RDR1 FILM RATE**
  - R1 rate 24 fps
  - R1 rate 30 fps
- **RDR1 EDGE STYLE**
  - R1 style generic
  - R1 style evertz
- **RDR1 EDGE FORMAT**
  - R1 format 4 dig
  - R1 format 5 dig
  - R1 format 6 dig
  - R1 format 7 dig

- **RDR2 MODE**
  - R2 mod time data
  - R2 mod time time
  - R2 mod time edge
  - R2 mod kinfo+edge
  - R2 mod data data
  - R2 mod time date
- **RDR2 START LINE**
  - R2 start line = 24
- **RDR2 END LINE**
  - R2 end line = 26
- **RDR2 VITC CRC**
  - R2 crc normal
  - R2 crc keykode
- **RDR2 DISPLAY**
  - R2 disply direct
  - R2 disply process
- **RDR2 FILM TYPE**
  - R2 16 mm 20 frm
  - R2 16 mm 40 frm
  - R2 35 mm 3 perf
  - R2 35 mm 4 perf
  - R2 35 mm 8 perf
  - R2 65 mm 5 perf
  - R2 65 mm 8 perf
  - R2 65 mm 20 perf
  - R2 65 mm 25 perf
  - R2 65 80 5 perf
  - R2 65 80 8 perf
  - R2 65 80 20 perf
  - R2 showscan
- **RDR2 FILM RATE**
  - R2 rate 24 fps
  - R2 rate 30 fps
- **RDR2 EDGE STYLE**
  - R2 style generic
  - R2 style evertz
- **RDR2 EDGE FORMAT**
  - R2 format 4 dig
  - R2 format 5 dig
  - R2 format 6 dig
  - R2 format 7 dig

- **RDR3 MODE**
  - R1 mod time data
  - R1 mod time time
  - R1 mod time edge
  - R1 mod kinfo+edge
  - R1 mod data data
  - R1 mod time date
- **RDR3 START LINE**
  - R3 start line = 34
- **RDR3 END LINE**
  - R3 end line = 36
- **RDR3 VITC CRC**
  - R3 crc normal
  - R3 crc produc'n
- **RDR3 DISPLAY**
  - R3 disply direct
  - R3 disply process
- **RDR3 FILM TYPE**
  - R3 16 mm 30 frm
  - R3 16 mm 40 frm
  - R3 35 mm 3 perf
  - R3 35 mm 4 perf
  - R3 35 mm 8 perf
  - R3 65 mm 5 perf
  - R3 65 mm 8 perf
  - R3 65 mm 30 perf
  - R3 65 mm 35 perf
  - R3 65 80 5 perf
  - R3 65 80 8 perf
  - R3 65 80 30 perf
  - R3 showscan
- **RDR3 FILM RATE**
  - R3 rate 34 fps
  - R3 rate 30 fps
- **RDR3 EDGE STYLE**
  - R3 style generic
  - R3 style evertz
- **RDR3 EDGE FORMAT**
  - R3 format 4 dig
  - R3 format 5 dig
  - R3 format 6 dig
  - R3 format 7 dig

Figure 3-2: Overview of the 8150 Programming Menu System

To enter the front panel programming menu, press the **SETUP** key. The two vertical arrow keys (↑, ↓) allow you to move vertically within the menu

tree. When you have selected the desired menu item, press the ➔ key to reveal the choices for that item. The choice that is currently selected will be blinking. When you have selected the desired sub menu choice press the **SELECT** key to save your choice.

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

To aid in finding the descriptions of the various menu items in sections 3.4 to 3.6.2, the drop down menu items and its sub menu items are shown in the margin of the manual, next to the description as shown.

Each of the menu items is described in section 3.4 with an explanation of what each choice does.

3.3.1. Engineering Setup Menu

The Engineering Setup menu allows the advanced user to change various internal parameters of the 8150, or to invoke several advanced modes.

This menu should be used by advanced users only, as improper use can overwrite user setups.

The 8150 Engineering Setup menu consists of a main menu with two or more choices for each menu item. The sub menu items are shown in lower case to allow them to be easily distinguished from the main level items. Figure 3-3 is an overview of the Engineering Setup menu, and shows all the menu items and where you will find the menu choices. To enter the Engineering Setup menu, press the **SHIFT+SETUP** keys. Each of the menu items is described in section 3.4, with an explanation of what each choice does.

- **VIDEO TYPE**
  - Type 422 525
  - Type 422 625
  - Type 422 auto
- **DISPLAY LEVEL**
  - Display level 6
- **SOFTWARE VERSION**
  - DB80D1.M R980609
- **CHAR SIZE**
  - Char tiny
  - Char small
  - Char large
- **CHAR STYLE**
  - Char white+black
  - Char white+bkgnd
  - Char white
  - Char black+white
  - Char black+bkgnd
  - Char black
- **VCG FRAMES**
  - Vcg frames off
  - Vcg frames on
- **VCG FIELDS**
  - Vcg fields off
  - Vcg fields on
- **VCG SYMBOLS**
  - Vcg symbols off
  - Vcg symbols on
- **XRAM TEST**
  - Xram test on?
- **FACTORY RESET**
  - Shift+sel=reset

Figure 3-3 Overview of the 8150 Engineering Menu

3.4. ASSIGNING THE OVERALL FUNCTIONS OF THE READERS

- **RDR ASSIGNMENT**
  - Rass indp rdrs
  - Rass 3 line mod

The **RDR ASSIGNMENT** menu item is used to select whether the three VITC readers will be controlled separately or if it will be controlled as a single 3 line VITC reader.

Select **Rass indp rdrs** to configure reader 1, reader 2 and reader 3 as 3 separate VITC readers. Each reader has its down menu items which allows you to set up its operation independent of the other two readers. (See section 3.5).

Select **Rass 3 line mod** to configure the Digital Afterburner for reading the 3 Line VITC format. In this mode, the 8150 is configured as a single 3 line

reader. The RDR MODE, VITC CRC, EDGE STYLE and EDGE FORMAT are pre-determined by selecting the 3 line mod assignment. The FILM TYPE and FILM RATE are encoded into the VITC data and are automatically configured when 3 LINE VITC is being read. The Start and End line settings for reader 1 are used to control what lines the 8150 will read in 3 line mod.

3.5. SETTING UP THE INDIVIDUAL READERS

The front panel menu has separate menu items to program various reader modes for each reader. These menu items control various reader modes such as VITC line numbers, whether user bits contain static numbers or time information, etc. Figure 3-2 shows the items on the front panel menu that contain the possible reader setups. Each reader has a corresponding set of menu items. For simplicity, throughout section 3.5 all references to reader 1 apply equally to reader 2 and reader 3 unless otherwise specified.

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

RDR1 MODE
- **R1 mod time data**
- **R1 mod time time**
- **R1 mod time edge**
- **R1 mod kinfo+edge**
- **R1 mod data data**
- **R1 mod time date**

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 bits 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 bits contain normal time information and the user bits contain encoded film edge numbers. The FILM TYPE, FILM RATE, EDGE STYLE & EDGE FORMAT menu items must be used to select the specific format of the edge number information.

Select **kinfo + edge** when the time bits contain encoded film manufacture & prefix information and the user bits contain encoded film edge numbers. The FILM TYPE, FILM RATE, EDGE STYLE & EDGE FORMAT menu items 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 4025 Film Footage Encoder operating in one of its "+Keykode" modes and usually requires that the VITC CRC be set to KEYKODE.

Select **data data** when both the time and the user bits contain numeric data.

Select **time date** when the time contains normal time information and the user bits contain date information (recorded in the TIME DATE format of the generator).

3.5.2. Setting The VITC Reader Line Range

RDR1 START LINE
R1 start line = 14
RDR1 END LINE
R1 end line = 16

The **START LINE** and **END LINE** menu items are used to select the lines that are enabled for VITC reading.

The **Start line** menu items used to set the first line that VITC will be read from. To view the current setting press the ➔ key. The current line number will be blinking. To set a different line use the ← or ➔ keys. To accept the new value press the **SELECT** key.

The **End Line** menu item is used to set the second line that VITC will be read from. To view the current setting press the ➔ key. The current line number will be blinking. To set a different line use the ← or ➔ keys. To accept the new value press the **SELECT** key.

RDR START LINE and RDR END LINE determine a range of lines that the 8150 will look for VITC on. It will attempt to read VITC from the lower number to the higher number.

3.5.3. Selecting the VITC CRC

RDR1 VITC CRC
R1 crc normal
R1 crc keykode

The **VITC CRC** menu item is used to select whether the VITC data being read has a normal CRC or the special CRCs used by the ***Evertz*** 4025 Film Footage Encoder. Reader 1 and reader 2 can be set to recover VITC with NORMAL or KEYKODE type CRCs. Reader 3 can set to recover VITC with NORMAL or PRODUCTION timecode type CRCs.

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

Select **KEYKODE** to read VITC data that was encoded with special KEYKODE CRC encoding by a 4025 set to one of its '+KeyKode' modes. Normally this mode is only used when the reader mode is set to KEY INFO + EDGE.

RDR3 VITC CRC
R3 crc normal
R3 crc produc'n

Select **PRODUCT'N** to read VITC data which was encoded with special PRODUCTION TIMECODE CRC encoding by a 4025 set to one of its 'three - line VITC' modes. Normally this mode is only used when the reader mode is set to TIME DATA.

3.5.4. Controlling the 'Look ahead' Compensation

RDR1 DISPLAY
R1 disply direct
R1 disply process

The **DISPLAY** menu item is used to select whether the normal 'look ahead' 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 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 'look ahead' compensation. Displays from the VITC reader 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 'look ahead' compensation. Displays from the VITC reader will be 'on time' but cannot be positioned at the very top of the raster.

3.5.5. Selecting the Film Related Modes

The **FILM TYPE**, **FILM RATE**, **EDGE STYLE** and **EDGE FORMAT** items are used to set up reader 1 or reader 2 to recover Film edge numbers that have been encoded by the Evertz Film Footage Encoders model 4015 or 4025. These modes need to be set if the reader 1 or reader 2 mode is set to **TIME EDGE** or **KEYINFO + EDGE**. In other modes they are not used.

RDR1 FILM TYPE
R1 16 mm 20 frm
R1 16 mm 40 frm
R1 35 mm 3 perf
R1 35 mm 4 perf
R1 35 mm 8 perf
R1 65 mm 5 perf
R1 65 mm 8 perf
R1 65 mm 10 perf
R1 65 mm 15 perf
R1 65 80 5 perf
R1 65 80 8 perf
R1 65 80 10 perf
R1 showscan

The **FILM TYPE** menu item is used to select the number of film frames per key number used on encoded user bits.

Select **16 mm 20 frm** if you are using 16 mm film stock with key numbers every 20 perforations. This is the mode required for film stock with KeyKode numbers.

Select **16 mm 40 frm** if you are using 16 mm film stock with key numbers every 40 perforations. This is the mode required for non-KeyKoded film stock.

Select **35 mm 3 perf** if you are using 35 mm film stock shot in a 3 Perf per frame format.

Select **35 mm 4 perf** if you are using 35 mm film stock shot in a 4 Perf per frame format.

Select **35 mm 8 perf** if you are using 35 mm film stock shot in an 8 Perf per frame format (also known as VistaVision).

Select **65 mm 5 perf** if you are using 65 mm film stock with 120 perf Key number repetition shot in a 5 Perf per frame format.

Select **65 mm 8 perf** if you are using 65 mm film stock with 120 perf Key number repetition shot in an 8 Perf per frame format

Select **65 mm 10 perf** if you are using 65 mm film stock with 120 perf Key number repetition shot in a 10 Perf per frame format

Select **65 mm 15 perf** if you are using 65 mm film stock with 120 perf Key number repetition shot in a 15 Perf per frame format

Select **65 80 5 perf** if you are using 65 mm film stock with 80 perf Key number repetition shot in a 5 Perf per frame format

Select **65 80 8 perf** if you are using 65 mm film stock with 80 perf Key number repetition shot in a 8 Perf per frame format

Select **65 80 10 perf** if you are using 65 mm film stock with 80 perf Key number repetition shot in a 10 Perf per frame format

Select **showscan** if you are using 65 mm film stock with 120 perf Key number repetition shot in a Showscan (5 Perf per frame, 60 FPS) format. In **showscan** format the FILM rate setting must be set to 30 FPS for NTSC and 25 FPS for PAL.

RDR1 FILM RATE
R1 rate 24 fps
R1 rate 30 fps

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 fps** to select a transfer rate of 24 (23.97) frames per second.

Select **30 fps** to select a transfer rate of 30 (29.97) frames per second

When the VIDEO TYPE is PAL:

RDR1 FILM RATE
R1 rate 25 fps

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

RDR1 EDGE STYLE
R1 style generic
R1 style evertz

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, 4, 5 or 6 digits of footage may be selected using the EDGE 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, 4, 5, 6 or 7 digits of footage may be selected using the EDGE 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 that contain the pulldown of the given frame.

RDR1 EDGE FORMAT
R1 format 4 dig
R1 format 5 dig
R1 format 6 dig
R1 format 7 dig

The **EDGE 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, 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. Select 4 digit format when using film stock with Keykode numbers.

When EVERTZ style is used, 4, 5, 6 or 7 digits of footage may be selected using the EDGE 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 that contain the pulldown of the given film frame. Select 4 digit format when using film stock with Keykode numbers.

3.6. OPERATING THE 8150 IN 3 LINE VITC MODE

When the RDR ASSIGNMENT menu item is set to **3 line mod**, the 3 readers in the 8150 are configured to operate as a single 3 line VITC reader to decode film transfer data encoded by the 4025 and 4025TR Film Footage Encoders. Three line VITC is encoded on three consecutive lines, with an optional second set of three lines. The first line contains Video timecode and user bits from the film transfer. The second line contains either KeyKode or Ink number information. The third line contains audio time code and user bit information.

The RDR MODE, VITC CRC, EDGE STYLE and EDGE FORMAT are pre-determined by selecting the **3 line mod** assignment. The FILM TYPE and FILM RATE are encoded into the VITC data and are automatically configured when 3 LINE VITC is being read. When you select any of these menu items while the 8150 is in **3 line mod** you will get a message saying `Fixed in 3L mode.`

3.6.1. Setting The VITC Reader Line Range - 3 Line VITC Mode

RDR1 START LINE
R1 start line = 14
RDR1 END LINE
R1 end line = 16

The **RDR1 START LINE** and **RDR1 END LINE** menu items are used to select the lines that are enabled for VITC reading for all three readers in 3 line mode

The **Start line** menu items used to set the first line that VITC will be read from. To view the current setting press the ➔ key. The current line number will be blinking. To set a different line use the ← or ➔ keys. To accept the new value press the **SELECT** key.

The **End Line** menu item is used to set the second line that VITC will be read from. To view the current setting press the ➔ key. The current line

number will be blinking. To set a different line use the ← or → keys. To accept the new value press the **SELECT** key.

RDR START LINE and RDR END LINE determine a range of lines that the 8150 will look for VITC on. It will attempt to read VITC from the lower number to the higher number.

3.6.2. Controlling the 'Look ahead' Compensation - 3 Line VITC Mode

RDR1 DISPLAY
R1 disply direct
R1 disply process

The **RDR1 DISPLAY** menu item is used to select whether the normal 'look ahead' compensation for all three readers is active or not. Normally, the data is read in one frame and displayed with an 'add 1 frame' compensation. This method 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 'look ahead' compensation. Displays from the VITC reader 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 'look ahead' compensation. Displays from the VITC reader will be 'on time' but cannot be positioned at the very top of the raster.

3.7. PROGRAMMING THE ENGINEERING SETUP FUNCTIONS

The Engineering Setup Menu is used to set the serial port baud parameters, front panel display brightness, reset the 8150 to factory defaults, etc. The Engineering Setup menu items are normally required only during installation. (See section 3.3.1 for information on using the Engineering Setup menu system).

3.7.1. Selecting the Video Type

VIDEO TYPE
Type 422 525
Type 422 625
Type 422 auto

The **VIDEO TYPE** menu item is used to program the 8025 for the digital video format.

Select **422 525** for operation with component video with a line rate of 525 lines per field. Conforming to SMPTE 125M.

Select **422 625** for operation with component video with a line rate of 625 lines per field. Conforming to EBU Tech 3267-E (1992) or the 4:2:2 level of CCIR recommendation 601.

Select **422 auto** for operation with component video with a line rate of either 525 or 625 lines per field. The 8150 will auto detect the line rate and automatically reconfigure itself. Press SHIFT+WINDOW when you are not in the SETUP menus to display the standard that is currently active.

3.7.2. Adjusting the Front Panel Display Brightness

DISPLAY LEVEL
Display Level = 2

The **DISPLAY LEVEL** menu item is used to adjust brightness of the front panel display. Use the ← and →keys to adjust.

3.7.3. Displaying the 8150 Software version

SOFTWARE VERSION
DB80D1.M R980609

The **SOFTWARE VERSION** menu item is used to display the 8150's software version. When you press the ← or → keys, the display shows the software version which will be something like:

```
DB80D1.M R980609
```

3.7.4. Selecting the Character Size

CHAR SIZE
Char tiny
Char small
Char 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.

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

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

3.7.5. Selecting the Character Style

CHAR STYLE
Char white
Char white+black
Char white+bkgnd
Char black
Char black+white
Char black+bkgnd

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 white characters keyed into a black background mask.

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

Select **Char white + black** to key white characters on a black background mask into the picture.

Select **Char white + bkgnd** to key white characters on a transparent gray background mask into the picture.

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

Select **Char black + white** to key black characters on a white background mask into the picture.

Select **Char black + bkgnd** to key black characters on a transparent white background mask into the picture.

3.7.6. Selecting whether the Frames, Fields and Symbols will be displayed on the VCG

VCG FRAMES
- **Vcg frames off**
- **Vcg frames on**

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

Select **Vcg frames off** to hide the timecode frames.

Select **Vcg frames on** to show the timecode frames.

VCG FIELDS
- **Vcg fields off**
- **Vcg field on**

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

Select **Vcg fields off** to hide the timecode fields.

Select **Vcg fields on** to show the timecode fields.

VCG SYMBOLS
- **Vcg symbols off**
- **Vcg symbols on**

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

Select **Vcg symbols off** to hide the symbols.

Select **Vcg symbols on** to show the symbols.

3.7.7. Testing the Data Memory

XRAM TEST
- **Xram test on?**

The **XRAM TEST** menu item is used to test the 8150 data memory. This diagnostic is normally used at factory build time, but may be run at any time if there is suspected memory problems. To start the XRAM test press the **SELECT** key. To terminate the XRAM test at any time press the CLEAR key. When the XRAM test is running, the 8150 shows the front panel message: (xxxx is the memory address being tested)

```
Running xxxx
```

When the XRAM test has successfully completed, the 8150 shows the front panel message:

```
Xram test passed
```

If there is a memory fault detected, the 8150 shows the front panel message:

```
Failed at: xxxx
```

If this occurs, contact the factory for further instructions on how to resolve the problem.

3.7.8. Resetting the 8150 to Factory Defaults

FACTORY RESET
Sh+sel = reset

The **FACTORY RESET** menu item is used to return the 8150 to its factory defaults. When you press the ← or → keys, the display shows **Sh+sel = reset**. When you press **SHIFT + SELECT** the 8150 will reload its factory defaults and show the message

```
Reset done
```

3.8. CHARACTER GENERATOR FUNCTIONS

Up to six separately positionable character windows displaying time or user bits from each reader are available. The four arrow keys (↑, ↓, ←, →) control the position of all the windows. The **VCG ON/OFF** key selects whether the video character generator (VCG) keyer is on or off. The use of these keys in combination with the **VCG MODE** key selects which windows are displayed and their position on the screen. The CHAR SIZE item of the Engineering Setup menu is used to select character size.

3.8.1. Selecting and Positioning the Individual Character Inserter Windows

Press **VCG MODE** to enable the window select mode. All windows will appear on the character screen with the window for the reader 1 Time highlighted. Use the arrow keys (↑, ↓, ←, →) to position the reader 1 Time window on the screen. Press the **VCG ON/OFF** key to turn the window on or off. Press the **VCG MODE** key to highlight the reader 1 User Bits window. Use the **VCG ON/OFF** key to turn it on or off and the arrow keys to move it to the desired location. Press the **VCG MODE** key to advance to the next window, etc. Press **CLEAR** to return to normal display mode.

For example: to move only the reader 2 Time window down 1 line, leaving the other windows in the same place, press **VCG MODE** three times and press the ↓ key. Press the **CLEAR** key to return to the normal display mode.

3.8.2. Positioning the Overall Character Display

In the normal VCG display mode, when none of the windows are highlighted, the arrow keys (↑, ↓, ←, →) move all the displayed windows

by the same relative amount. For example, to move all the windows down by one line press the 🡻 key.

3.8.3. Making Fine Adjustments To The Character Generator Raster Position

In the normal VCG display mode, when none of the windows are highlighted, holding down the shift key while pressing the arrow keys (🡹, 🡻, 🡸, 🡺) move the complete character raster in fine increments on the picture. The range of fine adjustment is limited when the character windows are positioned near the edges of the screen.

3.8.4. VCG Drop Frame Indicators (NTSC Only)

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	Period (.)

3.8.5. VCG 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) The field number display may be disabled using the VCG FIELDS item in the VCG menu.

3.9. STORING & RECALLING USER CONFIGURATIONS

The 8150 has the ability to store 5 user configurations. All five user configurations store the current settings of all items on the setup menu and most items of the Engineering menu.

3.9.1. Storing User Configurations

Press **CONFIG** to enter the configuration mode of the 8150. The front panel shows that you are ready to choose a configuration. Hold the **SHIFT** key and press one of numeric keys from 1 to 5 to select which configuration will be saved. Press **ENTER** to store the selected user config. Press **CLEAR** to return to the normal operating mode.

3.9.2. Recalling User Configurations

Press **CONFIG** to enter the configuration mode of the 8150. The front panel shows that you are ready to choose a configuration. Press one of numeric keys from 1 to 5 to select which configuration will be loaded. Press **ENTER** to load the selected user config. Press **CLEAR** to return to the normal operating mode. If you attempt to load a user config that is empty you will receive a warning message.

4. TECHNICAL DESCRIPTION

4.1. OVERVIEW

The model 8150 Digital Afterburner combines the latest LSI technology with sophisticated microcontroller firmware to provide a powerful, flexible reader system. The 8150 reads Vertical Interval Time Code directly from the digital video bitstream. It displays the data on the front panel and in the high-resolution character generator.

The front panel alphanumeric display is used to configure various items. The 8150's menu system consists of a main menu with two or more choices on each menu item.

4.2. JUMPERS AND SWITCHES

Component layout drawing 8025-81 shows the location and function of the switches and jumpers inside the model 8150. The jumper positions marked in **bold** face type are the default settings.

4.2.1. DIP Switch Functions

The main circuit board of the model 8150 contains an 8 position DIP switch that is used to invoke various diagnostic and calibration functions. The functions of each switch are described below.

Switch	Name	Normal	Function when Open	Function when Closed
1	Ser In	Closed		Serial Input Hardware Installed
2	Ser Out	Closed		Serial Output Hardware Installed
3	Mon	Open		Monitor Hardware Installed
4	Factory Reset	Open		Resets 8150 to factory defaults on power up
5	Not Used	Open		
6	Quick Boot	Open		Faster Boot up
7	Not used	Open		
8	Not used	Open		

Figure 4-1: DIP Switch Functions

4.2.2. Jumper Functions - Main Board

All jumpers 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	LCA Size	A	3042
		B	3064/3090
JP3	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.
JP4	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 LCA loads.
JP5			Not installed for 8150
JP8	RS422	Pins 1,2	
	RS232	Pins 2,3	Default
JP10,11,12,13			Not installed for 8150

4.3. CIRCUIT DESCRIPTION

The model 8150 is a microcontroller-based device functionally divided into the following hardware subsystems:

1 Microcontroller & I/O
2 Display and Pushbuttons
3 Serial Digital Video Input
4 Serial Digital Video Output
5 VITC Reader/Character Generator Logic
6 VITC Reader/Character Generator Keyer
7 Analog Composite Monitor

The microcontroller, serial video inputs and outputs, and keyer LCA circuits are all contained on the main circuit card (8025). 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 analog composite monitor circuitry is contained on a separate circuit board (8026 or 8029) which plugs into the main board via two forty-four pin headers. The VITC Reader/Character generator logic circuitry is contained on a separate circuit board (8037) which plugs into the main board via a forty-pin header. The relevant schematic drawings are shown in brackets for each section of the circuit. The heart of the model 8150 circuitry is a programmable logic array (LCA) device (U17) that contains the keyer circuitry and the support circuitry for addressing various devices on the board.

4.3.1. Microcontroller (8025-36)

At the heart of the model 8150 reader is an 8032 microcontroller, (MCU) U19. 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 U21. Scratch pad and data RAM are provided internally by the MCU. An onboard oscillator, also part of the MCU, is crystal controlled. Its' 14.7456 MHz frequency is internally divided by 12, resulting in a processor operating frequency of 1.2288 MHz. Address decoder U23 provides decoded chip enables to each of the peripheral devices on the board. Addressable latches U24 and U34 provide mode select control lines used throughout the board.

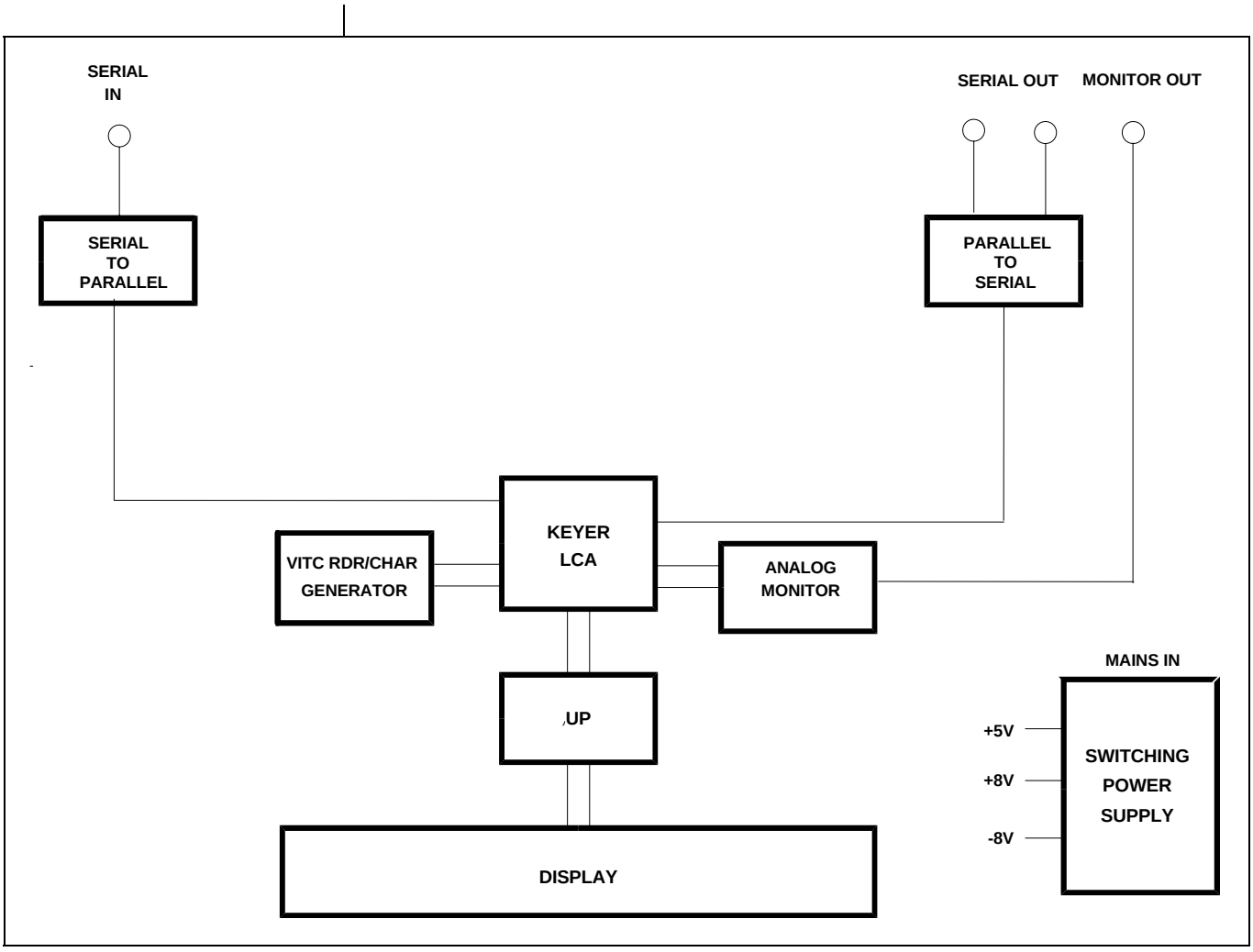


Figure 4-2: Block Diagram

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

A 16 digit alphanumeric display and a 16-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 16-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.

Interface driver U3 controls the 8 status LED's. 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).
The 16 pushbuttons are arranged in an 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.

To perform a Keyboard test and lamp test of the front panel LED's hold down the SETUP key on power up. The front panel display will show:

```
00    KEY
```

As you press various key combinations various LEDs will illuminate. The front panel display will show the Keyboard scan codes for each key combination pressed. Table 4-1 below shows the SCAN code for each key. To exit LED test mode, remove and re-apply power to the unit.

Key	Scan Code	Key	Scan Code
TIME/UB	41	DISPLAY	01
ENTER	02	CLEAR	03
VCG MODE	45	VCG ON/OFF	44
FREEZE	04	STATUS	05
CONFIG	42	SHIFT	43
SELECT	46	SETUP	48
↑	47	←	06
↓	07	→	08

Table 4-1: Keyboard Scan Codes

4.3.3. Serial Digital Video Input (8025-33)

The serial digital input circuitry is based on the Gennum Genlinx Serial Digital Video chip set. The 9005 receiver/equalizer provides automatic cable equalization and clock extraction from the serial digital signal. It provides a balanced ECL level recovered clock and data signals to the 9000 decoder. The 9000 decoder de-serializes the signal and provides a parallel clock and 10 bits of parallel data input B of the input multiplexer U7, U8, and U9.

The 9005 receiver is set to work with 270 MHz 4:2:2 component video data rates. The capture frequency of the 9005 is set by trim pots VR2 and can be adjusted with the following procedure.

1. Connect a digital voltmeter set on a 10 volt range to the Loop filter test point LF (located at the rear left corner of the 8025 board).

2. Connect a serial digital video signal to the serial input of the 8150. Connect the serial output of the 8150 to a digital monitor, or connect the analog monitor output of the 8150 to an analog monitor.

4. Rotate trimpot VR2 for component video fully clockwise. Slowly rotate the trimpot counter clockwise monitoring the loop filter voltage on the digital voltmeter. Continue turning the trimpot until the picture appears. Note the voltage on the LF test point.

5. Continue rotating the trimpot until the loop filter voltage is 200 mVolts above the voltage measures in step 4.

4.3.4. Serial Digital Video Output (8025-34)

The serial digital output circuitry is based on the Gennum Genlinx chip set, and consists of the 9002 encoder and 9008 cable driver. The 9002 receives TTL level parallel data and clock signals from the keyer LCA and encodes the data into the SMPTE 259 specified bitstream. Cable driver 9008 receives the serial data from the 9002. The output of the 9008 is adjustable using trim pot VR7, and is nominally set to 800 mVolt p-p. Two identical serial outputs are provided.

4.3.5. VITC Reader/Character Generator Logic (8037-31, 8037-32, 8037-33)

The 8150 is be fitted with an 8037 submodule which contains the VITC reader and character generator logic circuitry. The actual extraction of the VITC and insertion of the character data into the digital bitstream is done by the Keyer LCA circuitry on the main board. (See section 4.3.6) The Keyer LCA extracts video sync and pixel clock data from the digital video and passes it to the 8037 on the 40 pin header. Vertical sync (V) is on pin 15, Horizontal sync (H) is on pin 16, Field information (F) is on pin 1 and the digital sample clock (KCK) is on pin 2 of the header. The MCU address and data bus are also fed up the header from the main board.

The majority of the logic for the VITC Reader/Character generator functions is contained in a programmable logic device (LCA) U18. Its program is loaded from FLASH EPROM U2 on power up. Configuration latch U3 controls what part of the FLASH EPROM is used during loading of the LCA on power up.

The VITC data is clocked out of the keyer LCA on the main board and passed up the header on pin KC0 to the LCA on the submodule. The VITC bit rate is derived from the sample clock KCK in the LCA. For digital composite NTSC signals, each VITC bit is 8 sample clocks long. For digital component signals the VITC bit rate is 15 sample clocks per 2 VITC bits.

The decoded VITC bit rate clock 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 received data and writes the decoded data to RAM U1 one byte (8 bits) at a time. Once per field, the MCU unloads the recovered VITC data from the RAM on lines where VITC reading is enabled.

The majority of the logic for the character generator functions is also contained in a programmable logic device (LCA) U18. The character display is formatted to display 28 rows of 32 characters each in the tiny size, 14 rows the small size, and 7 rows in the large size. Each of the character positions corresponds to one location in static RAM U1. 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 FLASH EPROM U2 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 pixel clock is derived from and is the same rate as the digital sample clock KCK. A 4 bit value representing the white level of each pixel is clocked out of the LCA on the KC0, KC1, KC2, and KC3 lines and fed down the header to the keyer LCA. The special value with all bits set to 1 disables the keyer where no characters are displayed. The character white level is encoded by the other 15 values to provide anti-aliasing of the character data. Maximum white level is set at 80 IRE, while character black level is fixed at setup level.

4.3.6. Keyer LCA (8025-32, 8025-35, 8025-37)

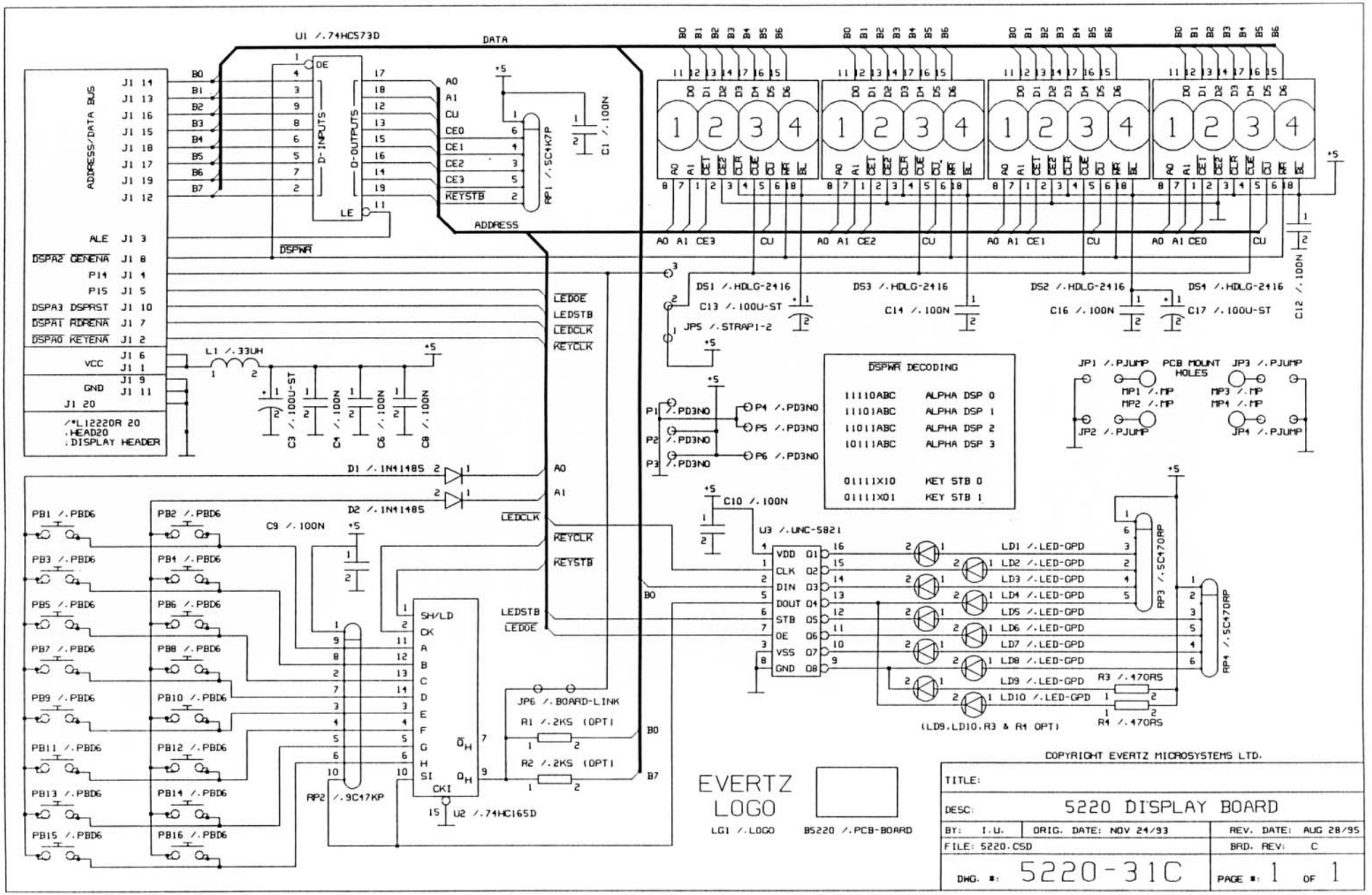
The heart of the 8150 is the Keyer LCA U17 on the main board. Input video from the serial input circuitry is fed to the inputs of the keyer LCA by U7, U8, and U9.

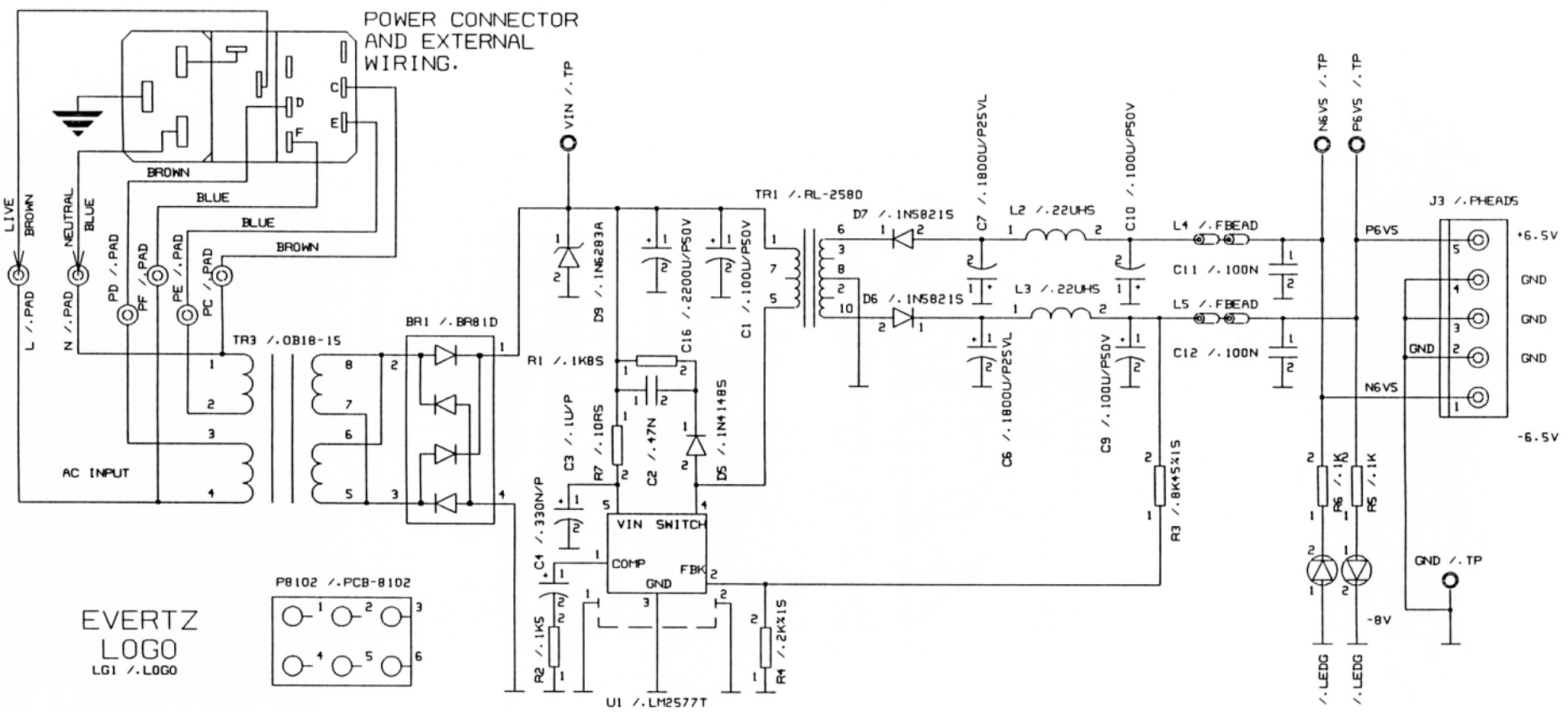
The keyer control signals from the VITC Reader / Character generator submodule and are fed down the 40 pin header from the 8037/8034 on the KC0, KC1, KC2, and KC3 lines and are used to control what data is being inserted into the bitstream and when it will be inserted. During the vertical interval, when VITC is being read, the VITC data is passed up the header on KC0. During the remainder of the field when characters are being generated, character data is passed down from the submodule on all four lines.

The keyer LCA provides parallel data out which is fed to the serial output circuitry. The LCA also generates the necessary signals required to control the analog output circuitry that is contained on the 8029 submodule.

4.3.7. Analog Monitor Output - optional (8029-31, 8029-32)

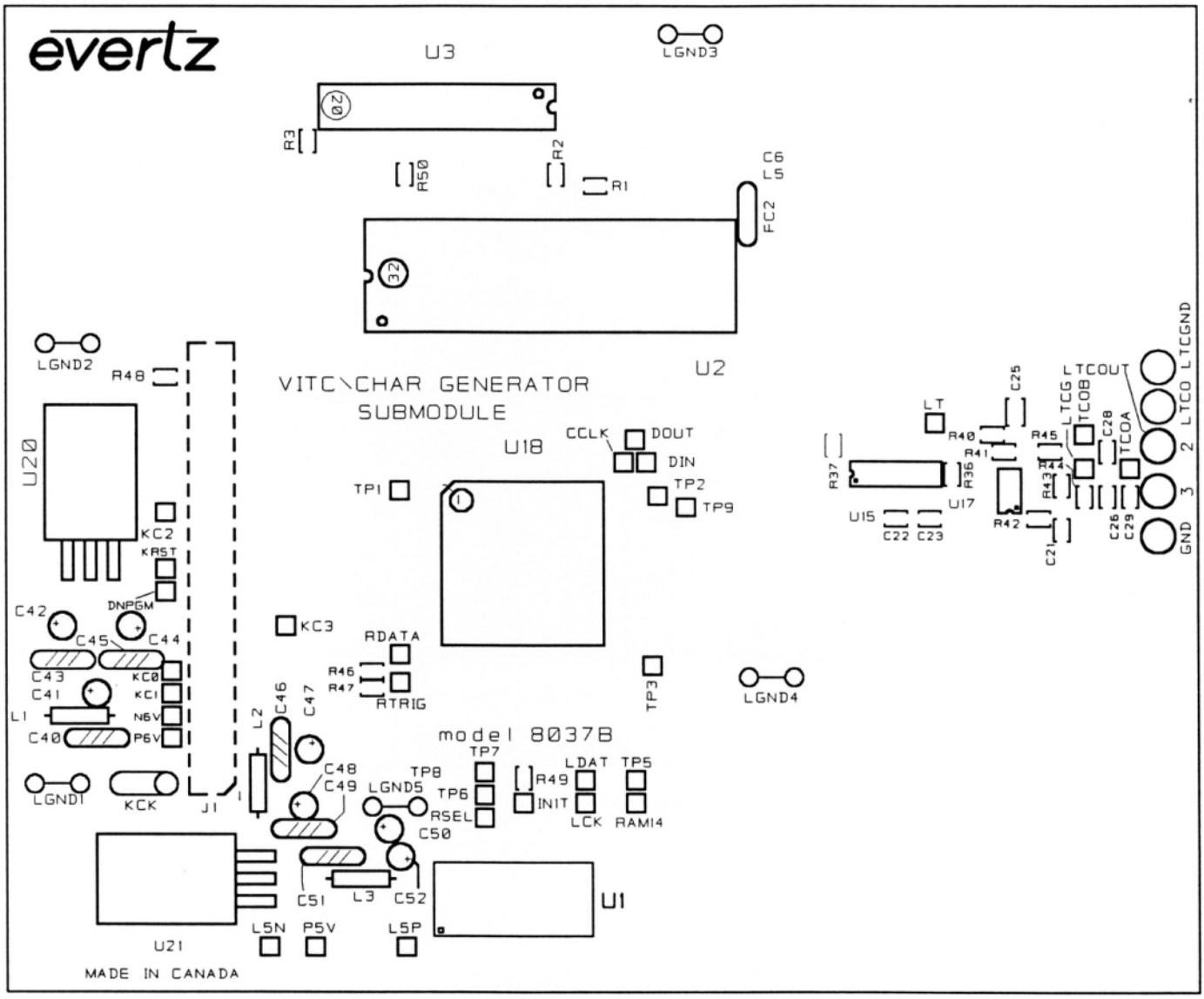
The 8150 may be fitted with either an 8029 submodule that contains the optional analog monitor output circuitry. The heart of the analog monitor is the 22191 Digital Video Encoder chip. When used in component (4:2:2) applications, Y/C data is demultiplexed by latches U4 and U5 and fed to the parallel data port of the 22191. The chrominance signals are modulated onto a digitally synthesized subcarrier by the 22191. Luminance and chrominance signals are separately interpolated at twice the pixel rate and digitally combined. The resulting composite signal is converted to analog levels by a 10 bit D/A converter and output to the analog filter circuitry. The encoder operates from a single clock that is running at 27 MHz (PXCK).


U1 /.74HC573D
DATA
ADDRESS/DATA BUS
ALE
DSPA2 GENENA
P14
P15
DSPA3 DSPRST
DSPA1 ADRENA
DSPA0 KEYENA
VCC
GND
/*L12220R 20
.HEAD20
;DISPLAY HEADER
L1 /.33UH
C3 /.100U-ST
C4 /.100N
C6 /.100N
C8 /.100N
DSPWR
LEDOE
LEDSTB
LEDCLK
KEYCLK
ADDRESS
RP1 /.SC47K7P
C1 /.100N
A0 A1 CE3 CU
A0 A1 CE2 CU
A0 A1 CE1 CU
A0 A1 CE0 CU
DS1 /.HDLG-2416
DS3 /.HDLG-2416
DS2 /.HDLG-2416
DS4 /.HDLG-2416
C13 /.100U-ST
C14 /.100N
C16 /.100N
C17 /.100U-ST
C12 /.100N
JPS /.STRAP1-2
DSPWR DECODING
11110ABC ALPHA DSP 0
11101ABC ALPHA DSP 1
11011ABC ALPHA DSP 2
10111ABC ALPHA DSP 3
01111X10 KEY STB 0
01111X01 KEY STB 1
JP1 /.PJUMP
PCB MOUNT HOLES
JP3 /.PJUMP
MP1 /.MP
MP2 /.MP
MP3 /.MP
MP4 /.MP
JP2 /.PJUMP
JP4 /.PJUMP
P1 /.PD3NO
P2 /.PD3NO
P3 /.PD3NO
P4 /.PD3NO
P5 /.PD3NO
P6 /.PD3NO
D1 /.1N4148S
D2 /.1N4148S
C9 /.100N
C10 /.100N
U3 /.UNC-5821
LD1 /.LED-GPD
LD2 /.LED-GPD
LD3 /.LED-GPD
LD4 /.LED-GPD
LD5 /.LED-GPD
LD6 /.LED-GPD
LD7 /.LED-GPD
LD8 /.LED-GPD
LD9 /.LED-GPD
LD10 /.LED-GPD
RP3 /.SC470RP
RP4 /.SC470RP
R3 /.470RS
R4 /.470RS
(LD9,LD10,R3 & R4 OPT)
PB1 /.PBD6
PB2 /.PBD6
PB3 /.PBD6
PB4 /.PBD6
PB5 /.PBD6
PB6 /.PBD6
PB7 /.PBD6
PB8 /.PBD6
PB9 /.PBD6
PB10 /.PBD6
PB11 /.PBD6
PB12 /.PBD6
PB13 /.PBD6
PB14 /.PBD6
PB15 /.PBD6
PB16 /.PBD6
RP2 /.9C47KP
U2 /.74HC165D
JP6 /.BOARD-LINK
R1 /.2KS (OPT)
R2 /.2KS (OPT)
EVERTZ LOGO
LG1 /.LOGO
B5220 /.PCB-BOARD
COPYRIGHT EVERTZ MICROSYSTEMS LTD.
TITLE:
DESC: 5220 DISPLAY BOARD
BY: I.U.
ORIG. DATE: NOV 24/93
REV. DATE: AUG 28/95
FILE: 5220.CSD
BRD. REV: C
DWG. #: 5220-31C
PAGE # 1 OF 1

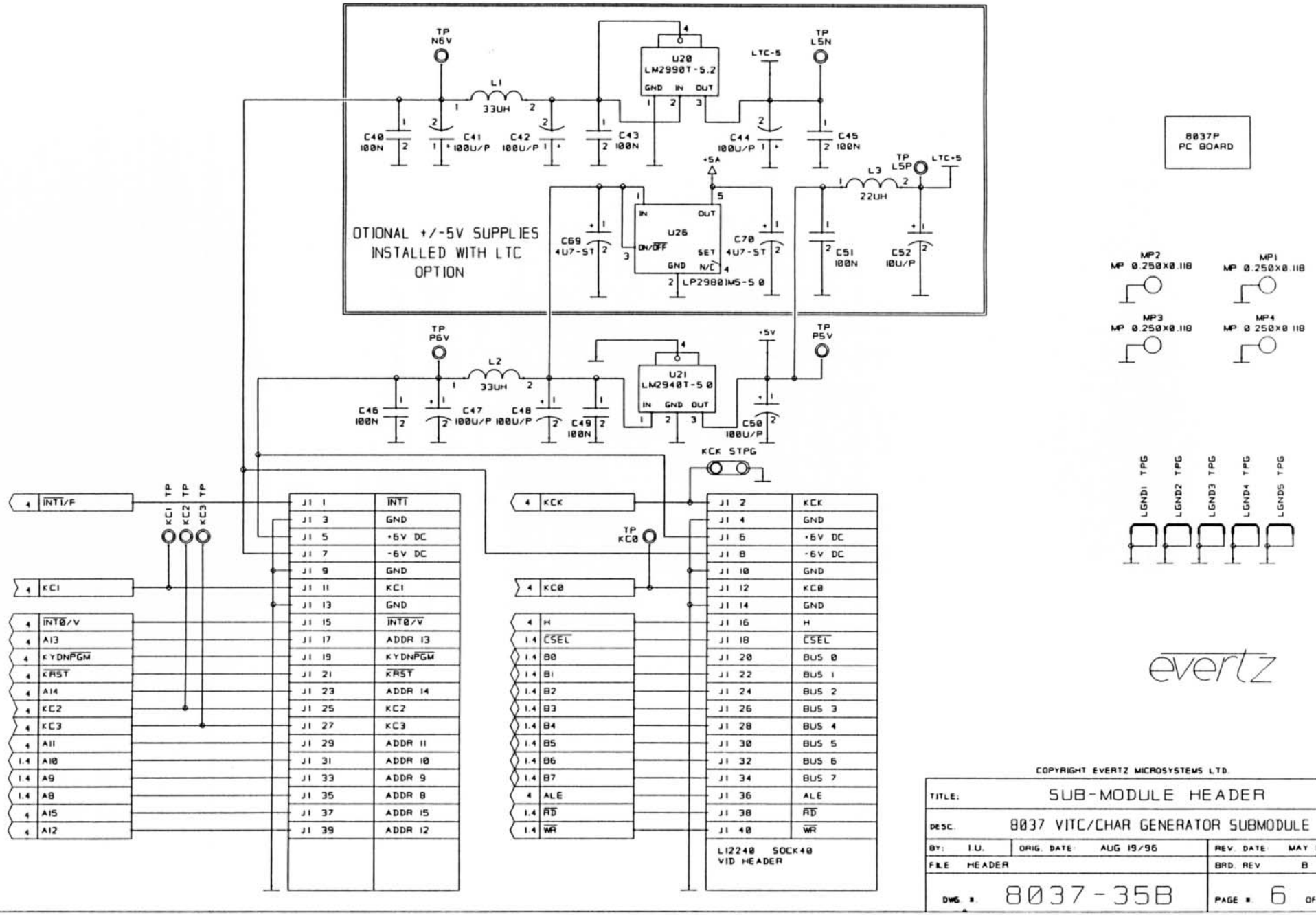


6.5V REGULATOR CIRCUIT

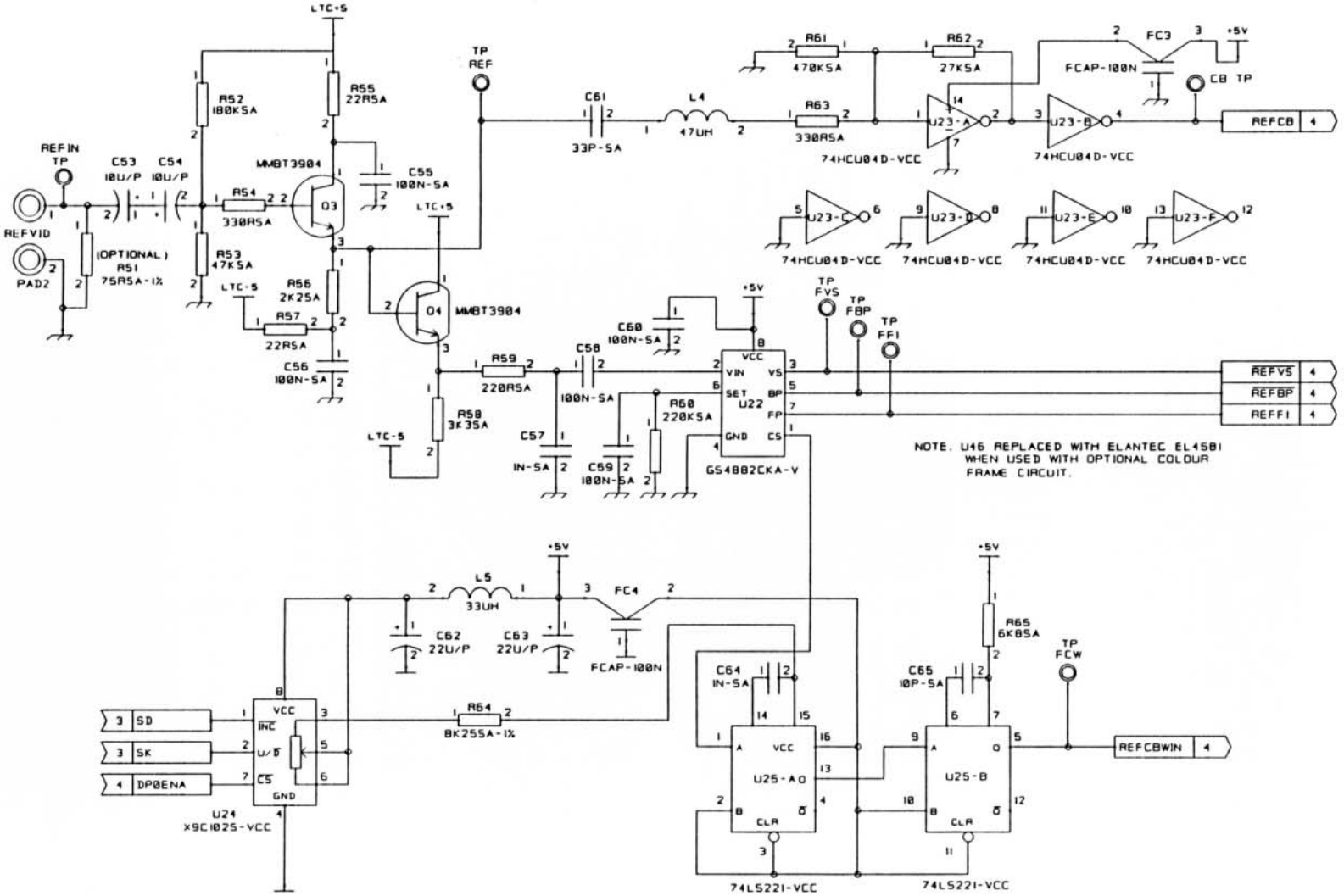
TITLE:			
DESC:	POWER SUPPLY CIRCUIT		
BY: I.U.	ORIG. DATE: FEB 26/93		REV. DATE: MAY 6/94
FILE: PWR.CSD			BRD. REV: A
DWG. #: 8102-31A			PAGE #: 1 OF 1



EVERTZ	BOARD NO. : MODEL 8037 VITC/CHAR GEN SUBMODULE	TITLE: MODEL 8037 COMPONENT LAYOUT FOR INSTALLATION IN 8950	REV: B	DWN I.U.
		DATE: MAY 21/97	DWG NO. : 8037B-82	

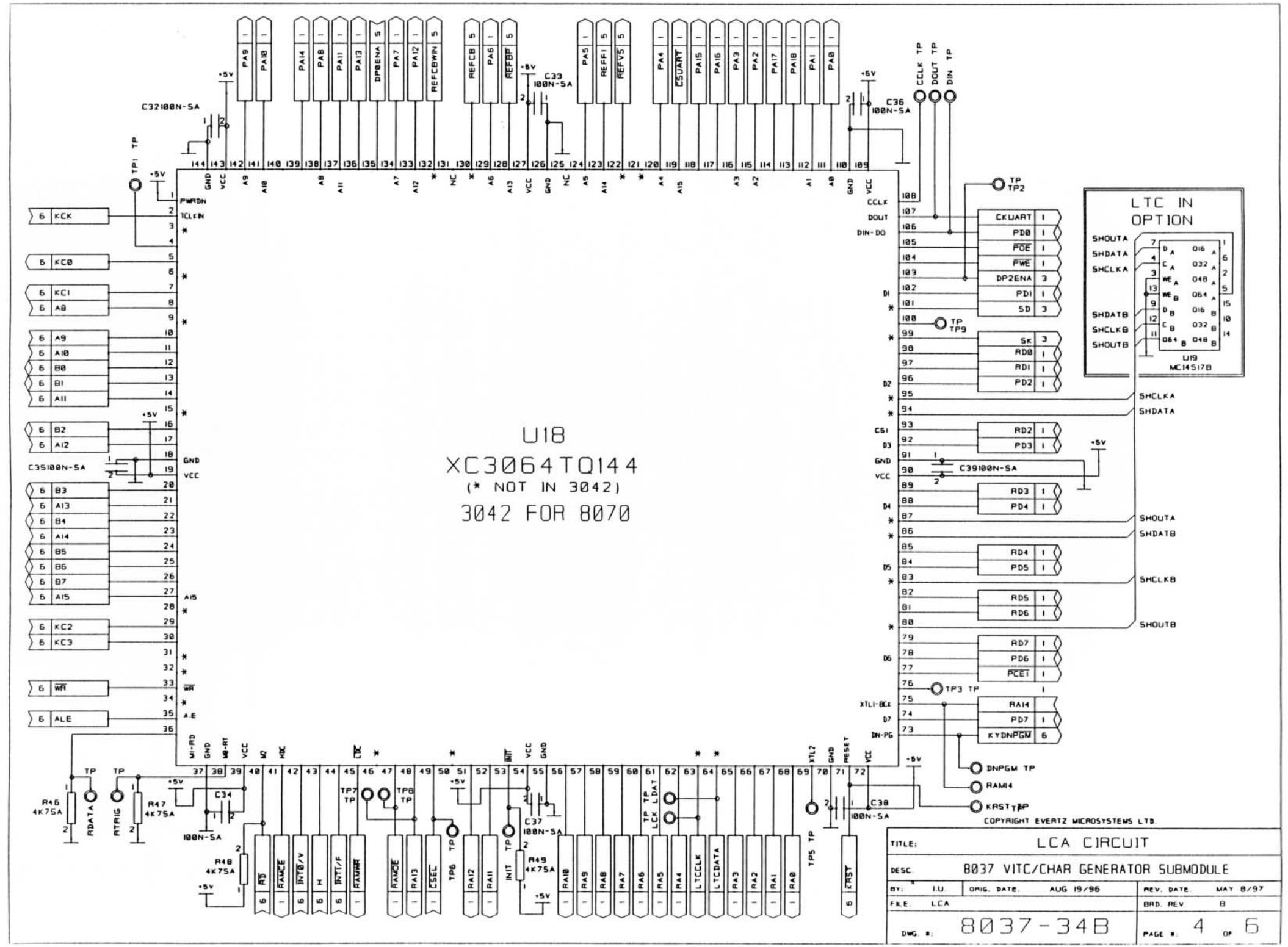


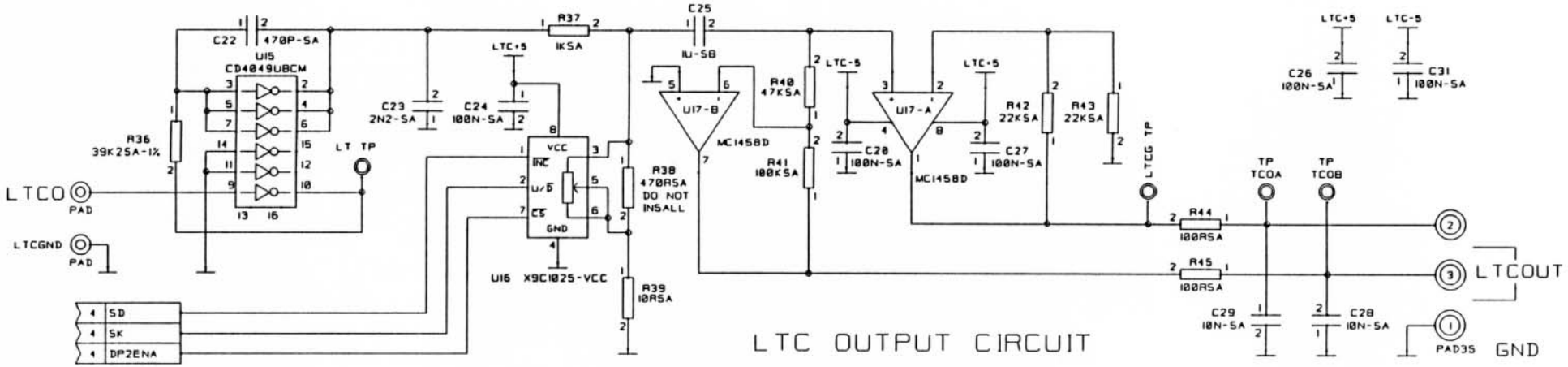
TITLE:	SUB-MODULE HEADER		
DESC.	8037 VITC/CHAR GENERATOR SUBMODULE		
BY: I.U.	ORIG. DATE: AUG 19/96		REV. DATE: MAY 8/97
FILE HEADER			BRD. REV B
DWG. # 8037-35B			PAGE # 6 OF 6



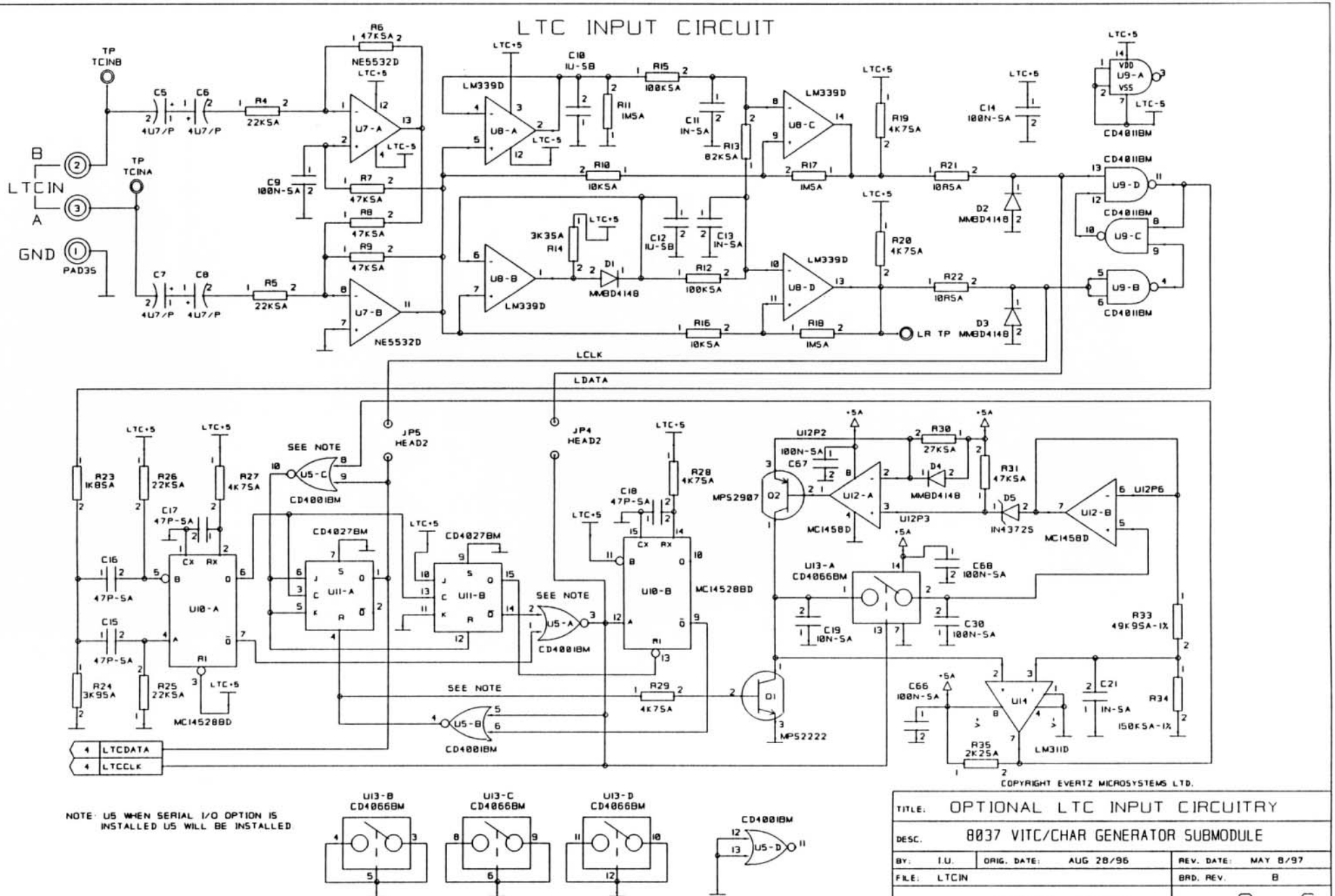
COPPER BRIDGE

TITLE:	OPTIONAL COLOUR FRAME & REF VIDEO CIRCUIT		
DESC.	8037 VITC/CHAR GENERATOR SUBMODULE		
BY: I.U.	ORIG. DATE: AUG 19/96	REV. DATE:	MAY 8/97
FILE REF		BRD REV	B
DWG. #. 8037-35B		PAGE #.	5 OF 6


U18
XC3064TQ144
(* NOT IN 3042)
3042 FOR 8070
LTC IN OPTION
U19
MC145178
C32 100N-SA
C33 100N-SA
C34 100N-SA
C35 100N-SA
C36 100N-SA
C37 100N-SA
C38 100N-SA
C39 100N-SA
R46 4K7SA
R47 4K7SA
R48 4K7SA
R49 4K7SA
TP1 TP
TP2
TP3 TP
TP6
TP7 TP
TP8 TP
TP9
TP5 TP
CCLK TP
DOUT TP
DIN TP
DNPGM TP
RAM4
KRST TP
COPYRIGHT EVERTZ MICROSYSTEMS LTD.
TITLE: LCA CIRCUIT
DESC. 8037 VITC/CHAR GENERATOR SUBMODULE
BY: I.U. ORIG. DATE. AUG 19/96 REV. DATE. MAY 8/97
FILE. LCA BRD. REV B
DWG. #: 8037-34B PAGE # 4 OF 6

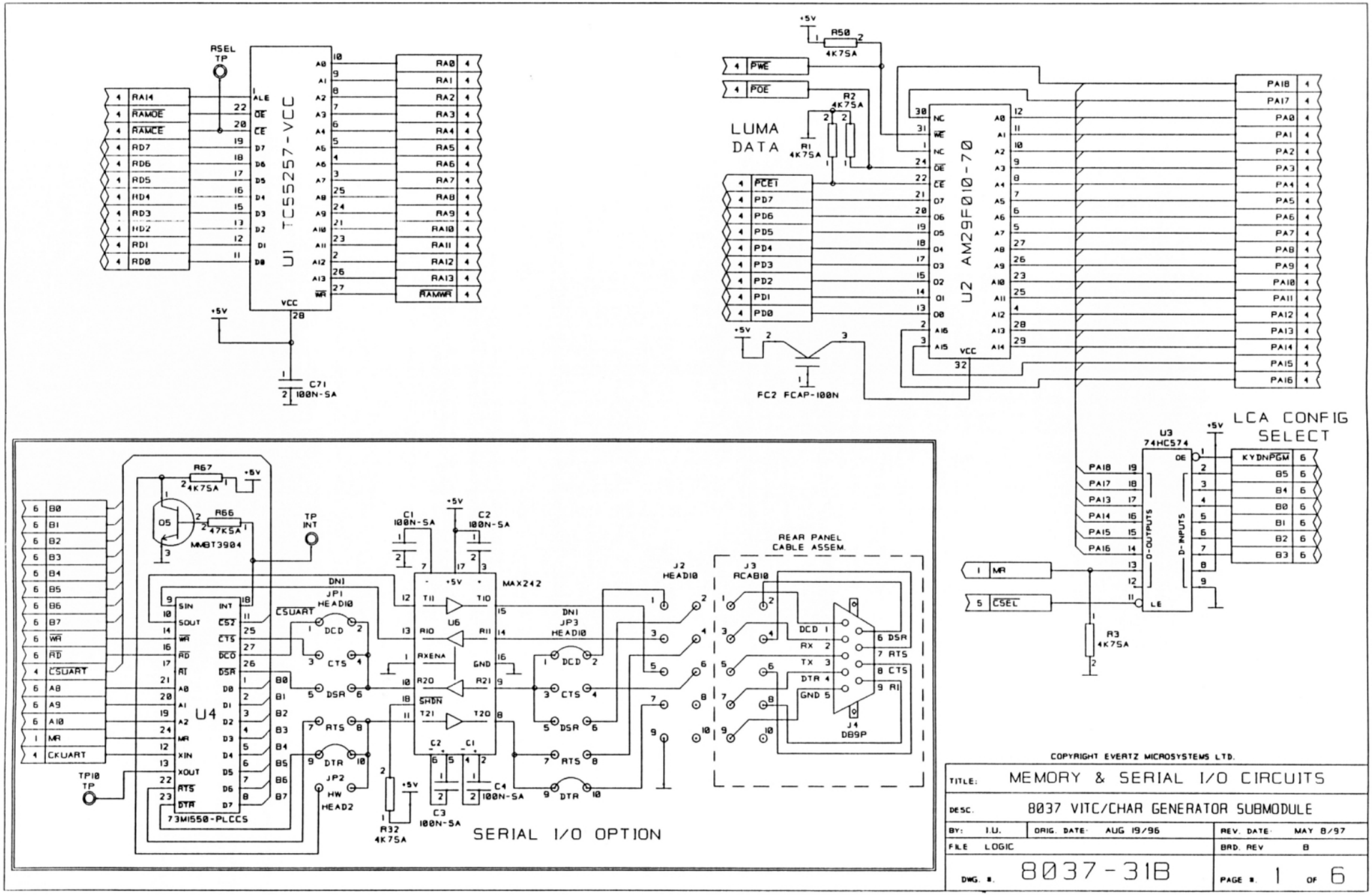


TITLE:	OPTIONAL LTC OUTPUT CIRCUITRY		
DESC.	8037 VITC/CHAR GENERATOR SUBMODULE		
BY: I.U.	ORIG DATE: AUG 19/96	REV. DATE:	MAY 8/97
FILE LTCOUT		BRD. REV	B
DWG. #	8037-33B	PAGE #	3 OF 6

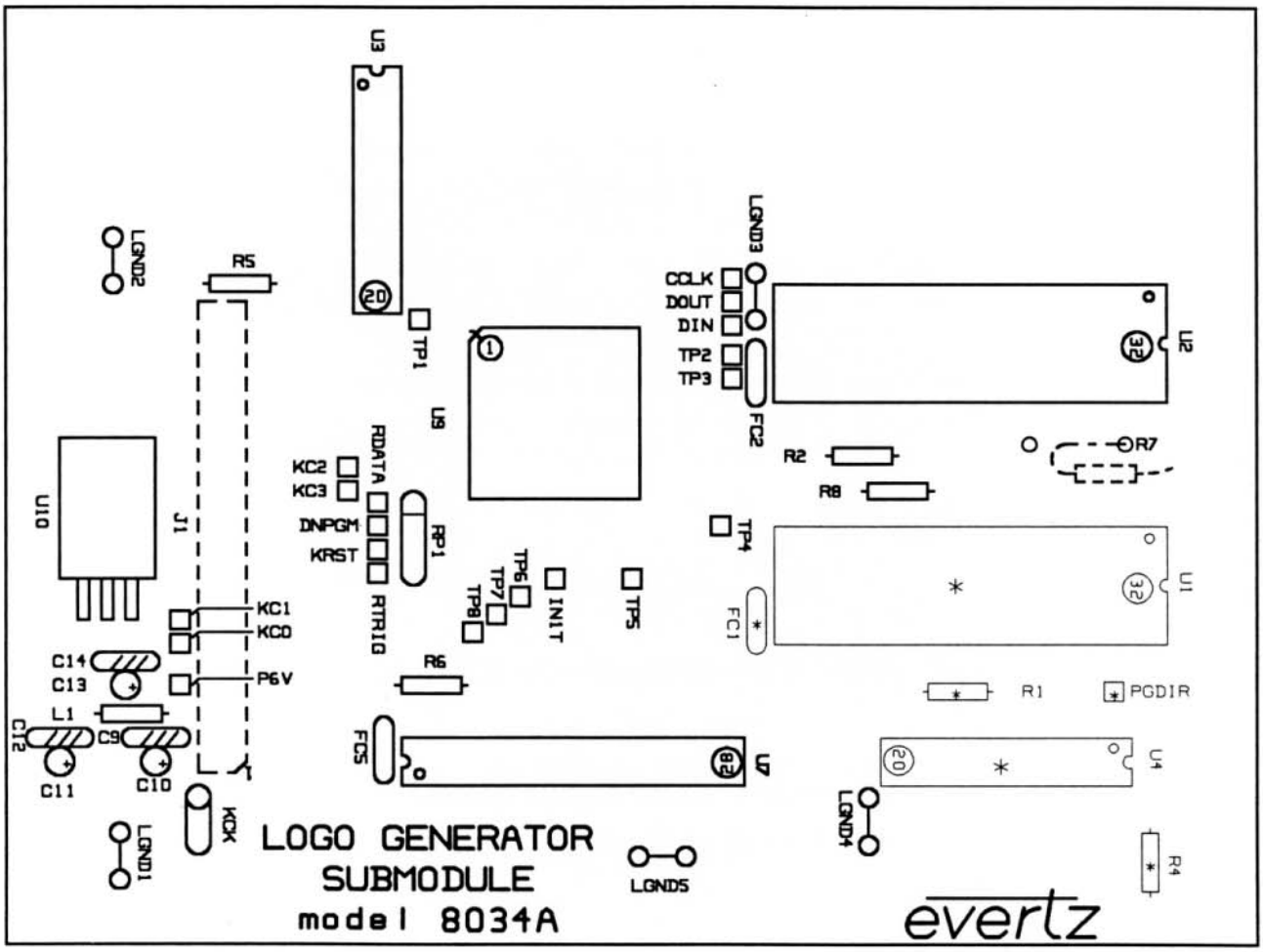


NOTE: U5 WHEN SERIAL I/O OPTION IS INSTALLED U5 WILL BE INSTALLED

TITLE:	OPTIONAL LTC INPUT CIRCUITRY		
DESC.	8037 VITC/CHAR GENERATOR SUBMODULE		
BY: I.U.	ORIG. DATE: AUG 28/96	REV. DATE: MAY 8/97	
FILE: LTCIN		BRD. REV. B	
DWG # 8037-32B		PAGE # 2 OF 6	

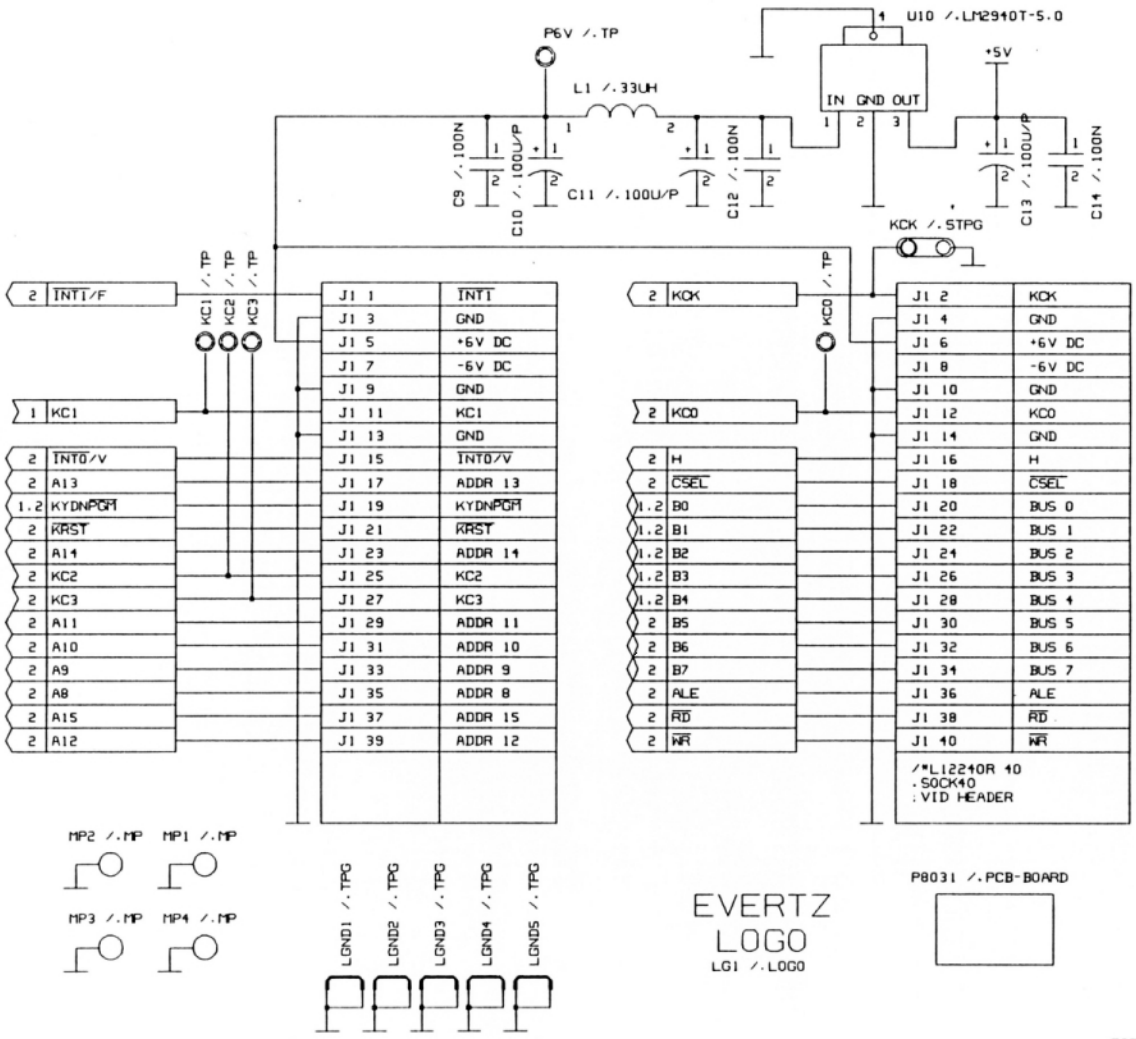


TITLE:	MEMORY & SERIAL I/O CIRCUITS		
DESC.	8037 VITC/CHAR GENERATOR SUBMODULE		
BY: I.U.	ORIG. DATE: AUG 19/96		REV. DATE: MAY 8/97
FILE LOGIC			BRD. REV B
DWG. #.	8037-31B		PAGE #. 1 OF 6

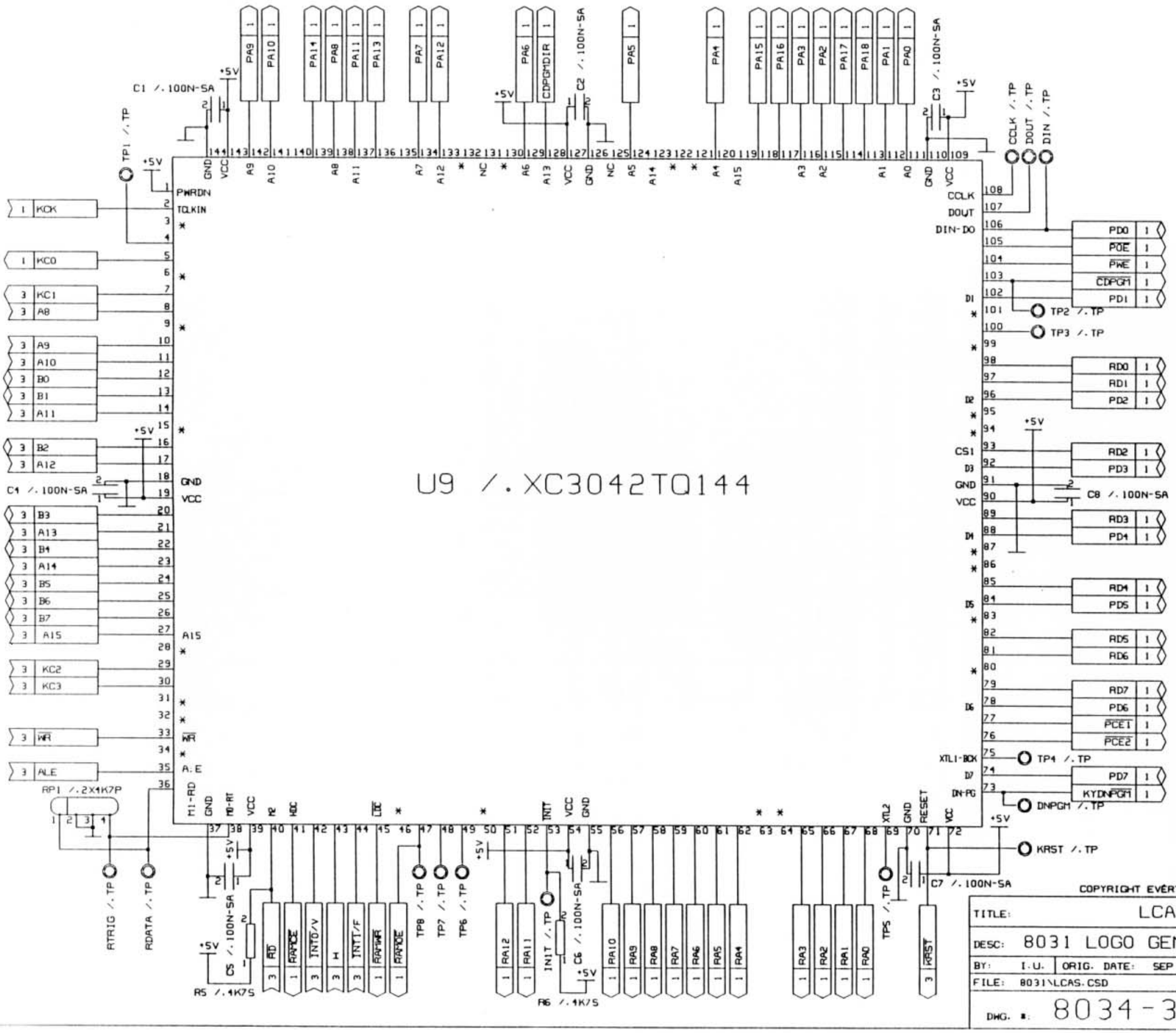


* = NOT INSTALLED

EVERTZ	BOARD NO. : 8034 LOGO GENERATOR SUB-MODULE	TITLE: MODEL 8034 COMPONENT LAYOUT	REV: A	DWN I.U.
		DATE: MAR 1/96	DWG NO. : 8034-80A	

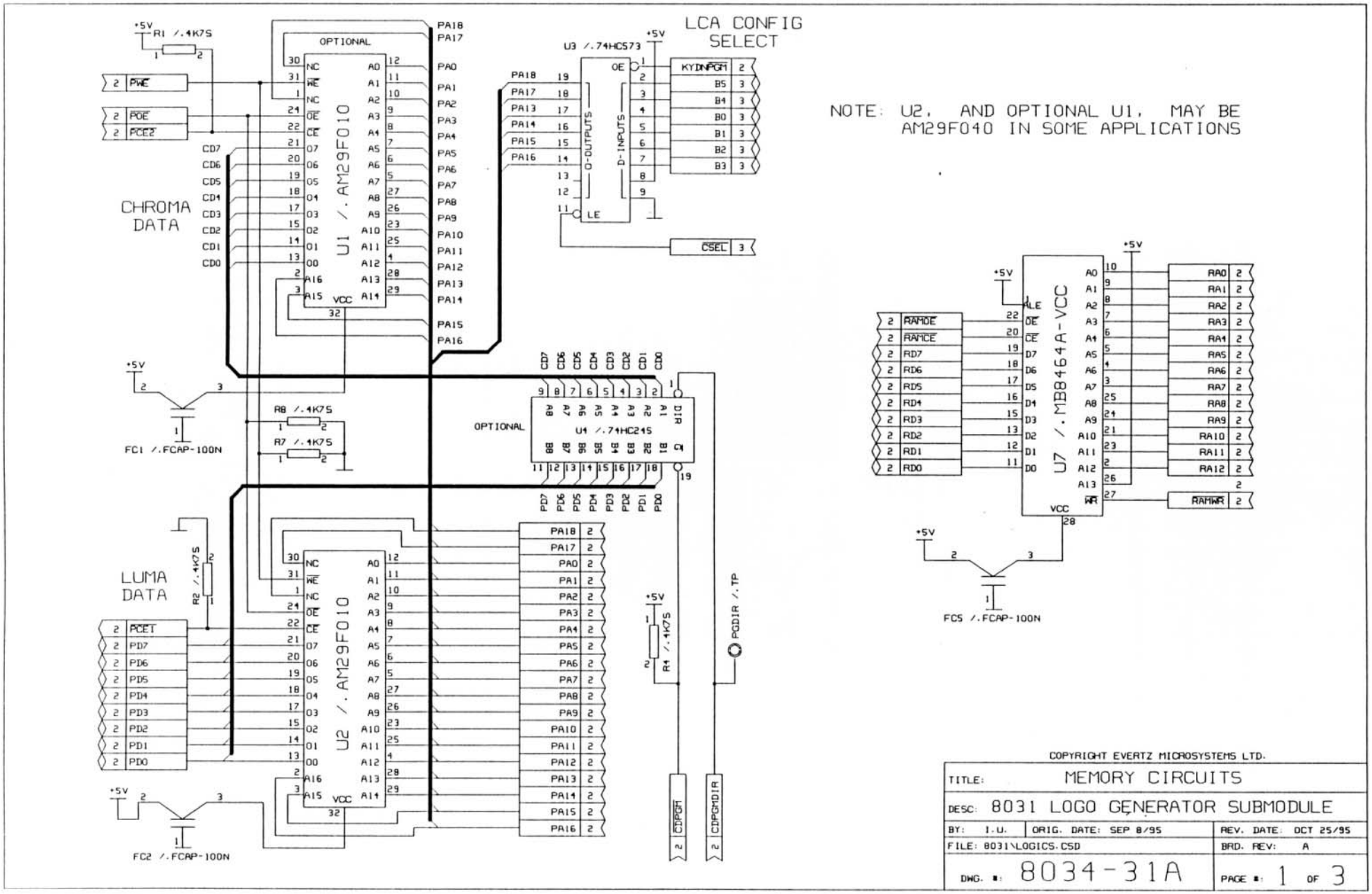


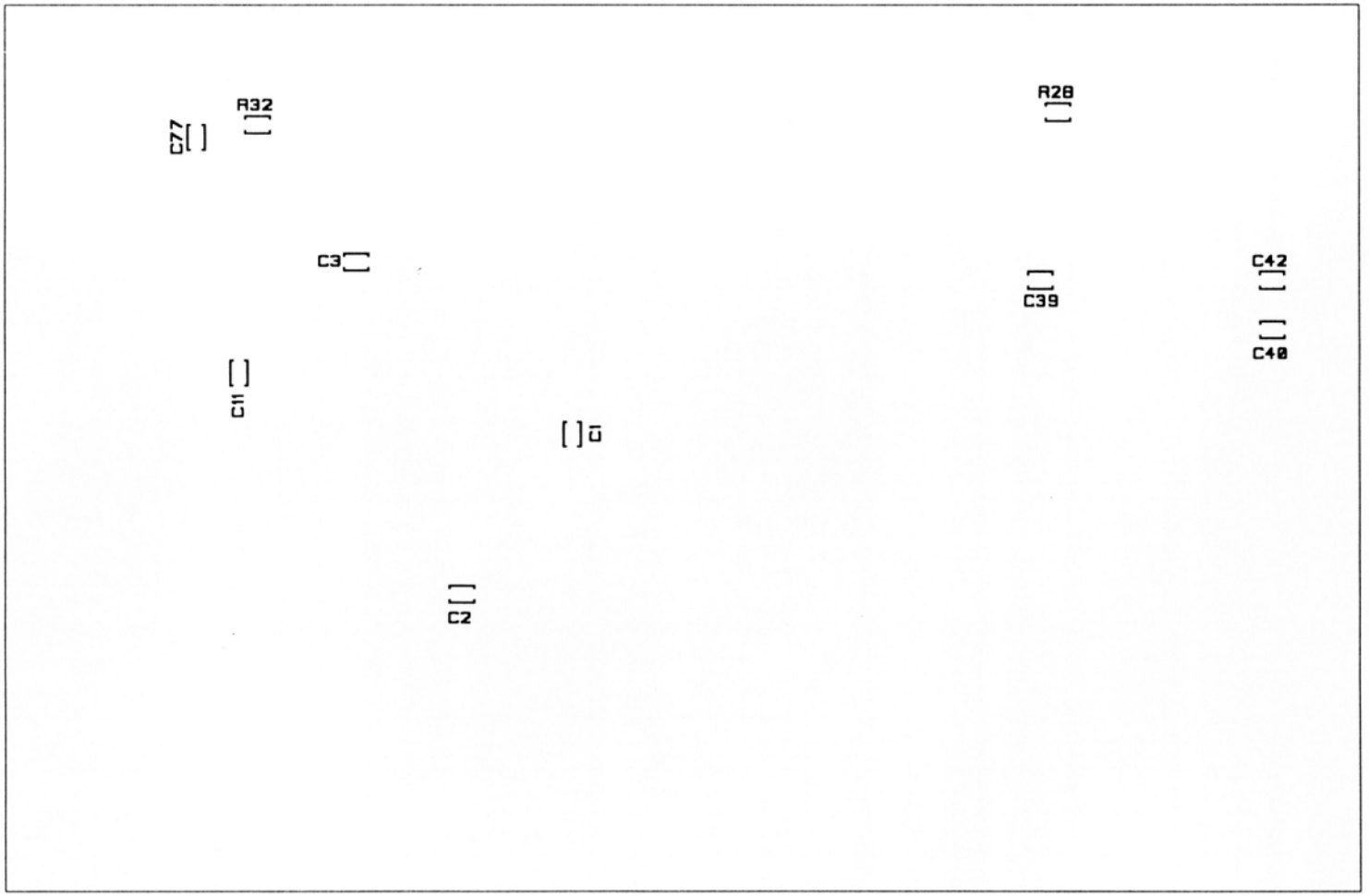
TITLE: SUB-MODULE HEADER		
DESC: 8031 LOGO GENERATOR SUBMODULE		
BY: I.U.	ORIG. DATE: SEP 8/95	REV. DATE: OCT 25/95
FILE: 8031\HEADERS.CSD		BRD. REV: A
DWG. #: 8034-33A		PAGE #: 3 OF 3



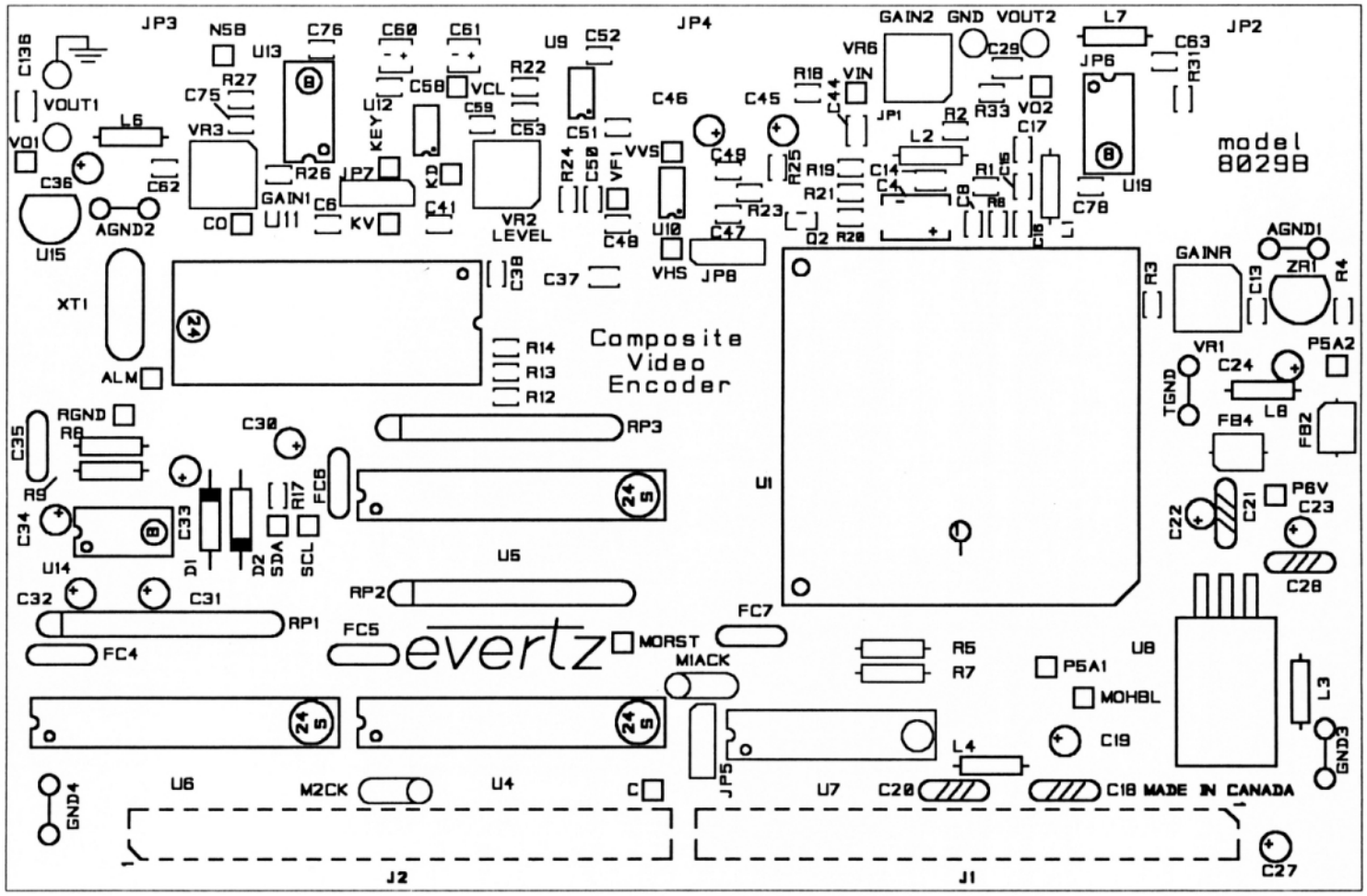
COPYRIGHT EVERTZ MICROSYSTEMS LTD.

TITLE: LCA CIRCUIT			
DESC: 8031 LOGO GENERATOR SUBMODULE			
BY: I.U.	ORIG. DATE: SEP 8/95		REV. DATE: OCT 25/95
FILE: 8031\LCAS.CSD			BRD. REV: A
DWG. #: 8034-32A			PAGE #: 2 OF 3


LCA CONFIG SELECT
NOTE: U2, AND OPTIONAL U1, MAY BE AM29F040 IN SOME APPLICATIONS
CHROMA DATA
LUMA DATA
OPTIONAL
U1 /.AM29F010
U2 /.AM29F010
U3 /.74HCS73
U4 /.74HC245
U7 /.MB8464A-VCC
R1 /.4K7S
R2 /.4K7S
R4 /.4K7S
R7 /.4K7S
R8 /.4K7S
FC1 /.FCAP-100N
FC2 /.FCAP-100N
FC5 /.FCAP-100N
PGDIR /.TP
KYDNPGM
CSEL
PWE
POE
PCE2
PCET
RAMDE
RAMCE
RAMWR
COPYRIGHT EVERTZ MICROSYSTEMS LTD.
TITLE: MEMORY CIRCUITS
DESC: 8031 LOGO GENERATOR SUBMODULE
BY: I.U.
ORIG. DATE: SEP 8/95
REV. DATE: OCT 25/95
FILE: 8031\LOGICS.CSD
BRD. REV: A
DWG. #: 8034-31A
PAGE #: 1 OF 3

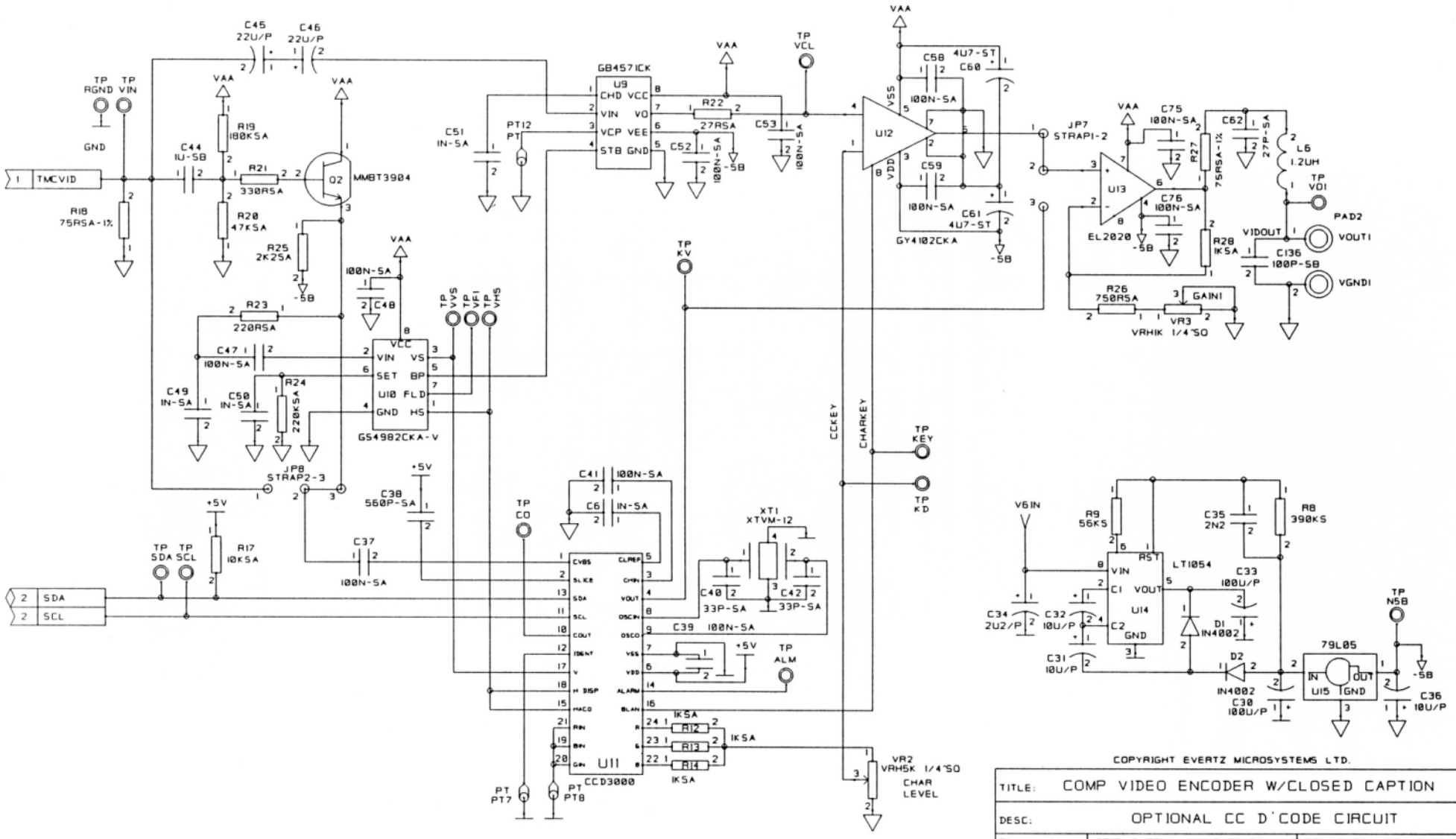


EVERTZ	TITLE: MODEL 8029 COMPOSITE VIDEO ENCODER	
TITLE : BOTTOM COMPONENT LAYOUT	DWN BY: I.U.	REV. B
DATE: JUN 28/96	REV DATE: FEB 19/97	DWG No.: 8029-81B

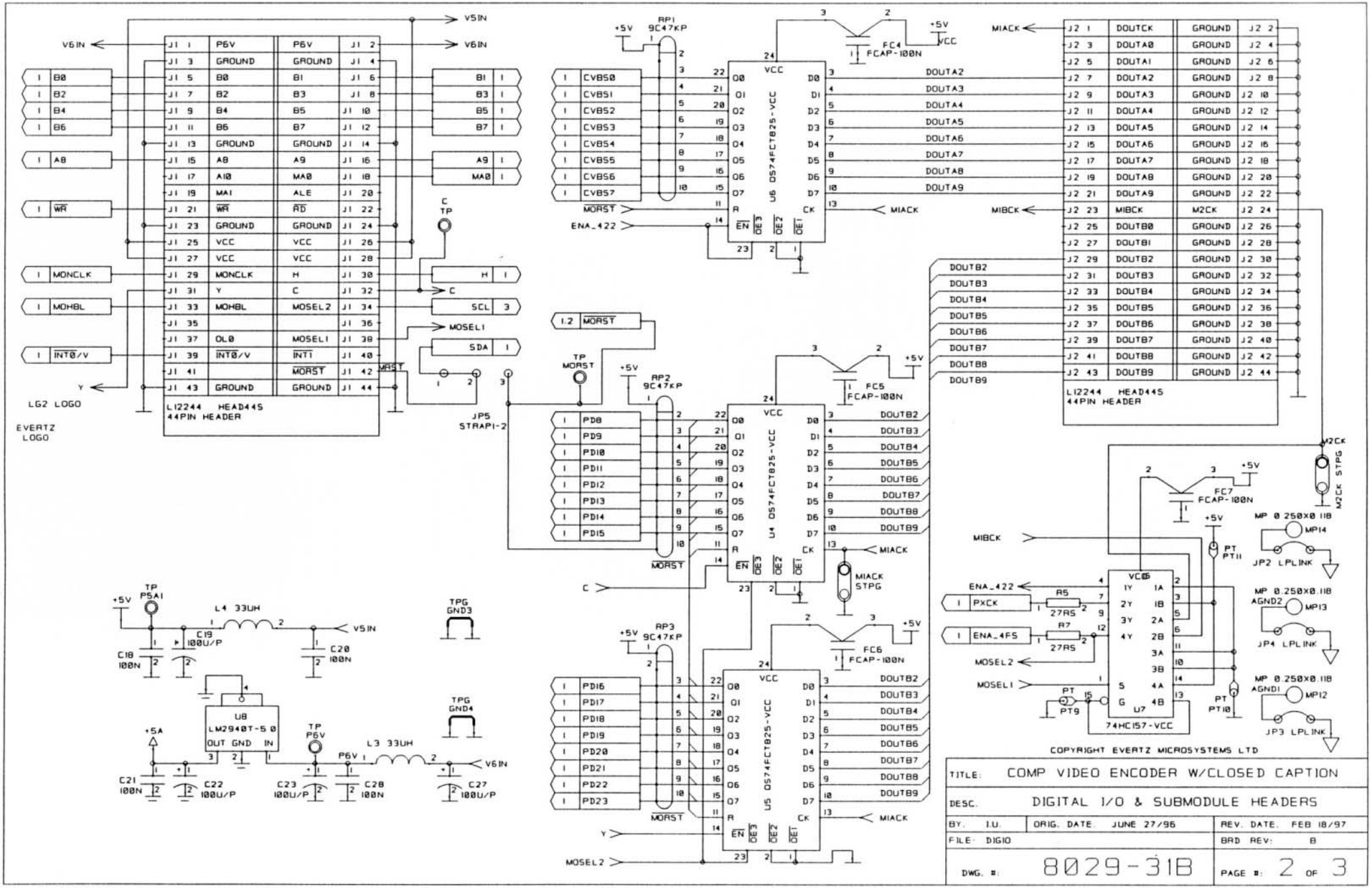


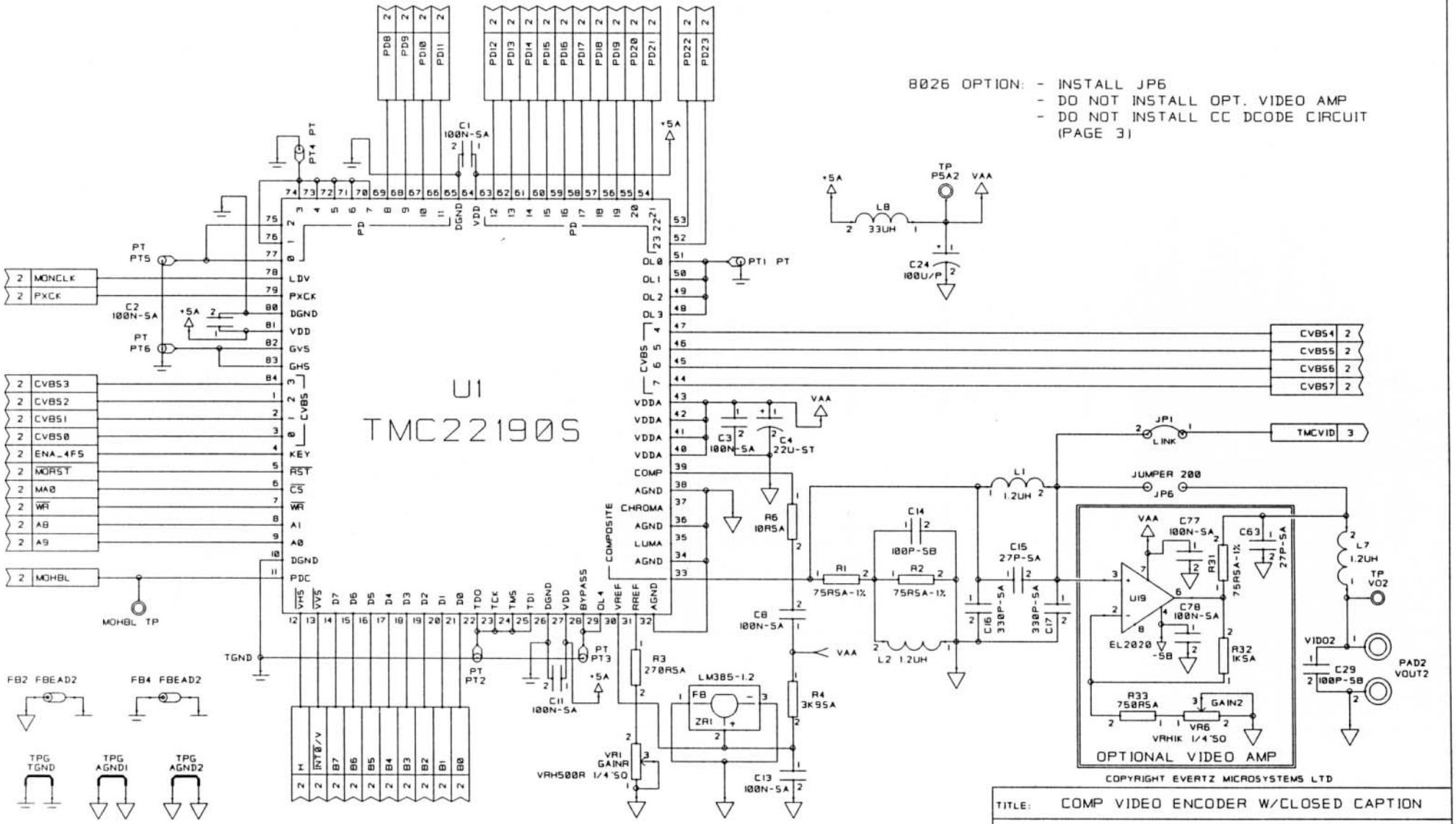
C1, C2, C3 , C11, C39, C40,C42,C77
R28 & R32 ARE MOUNTED ON BACK
OF BOARD.

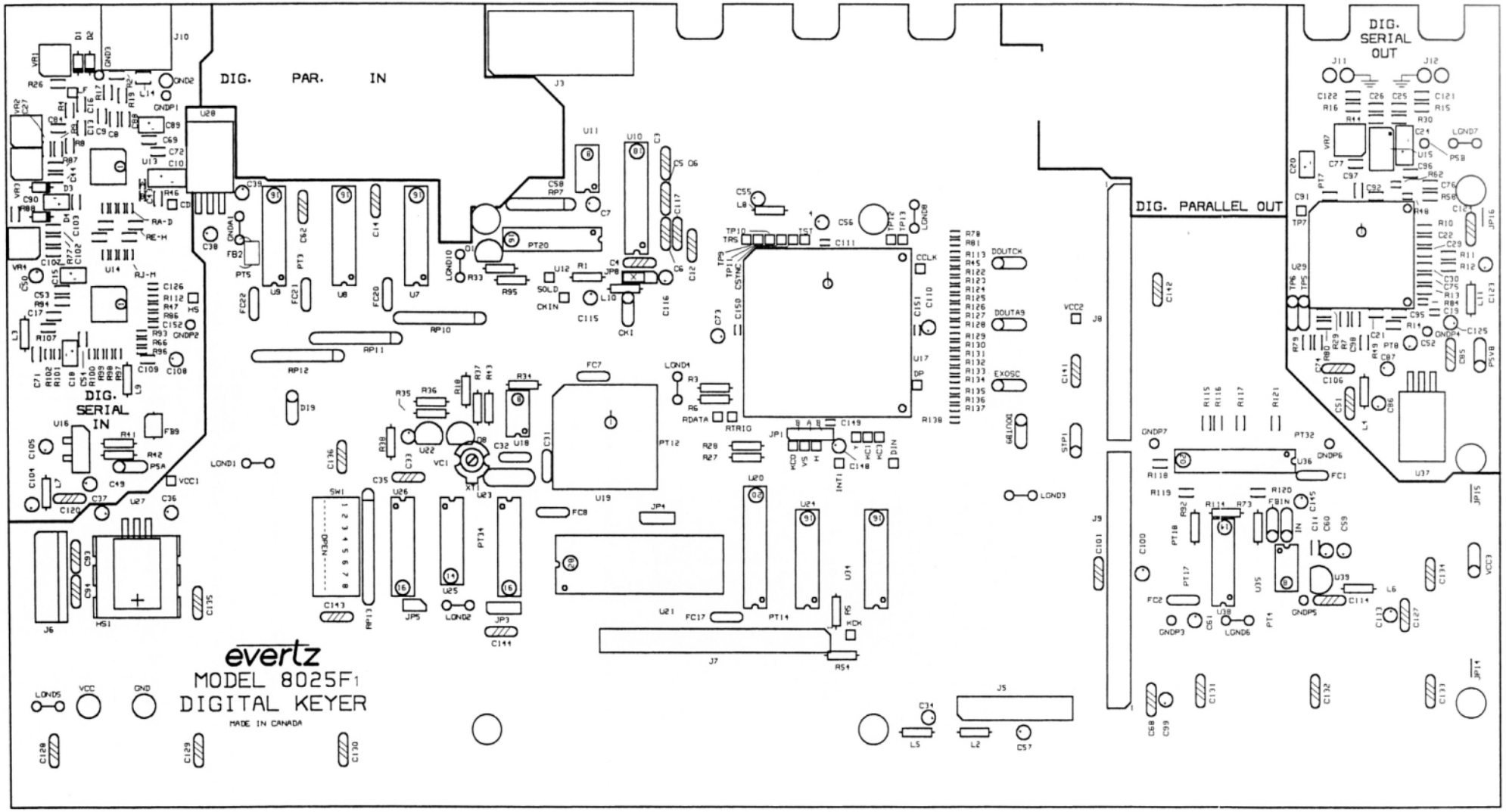
EVERTZ		TITLE: MODEL 8029 COMPOSITE VIDEO ENCODER
TITLE : TOP COMPONENT LAYOUT		DWN BY: I.U. / REV: B
DATE: JUN 28/96	REV DATE: FEB 19/97	DWG No.: 8029-80B



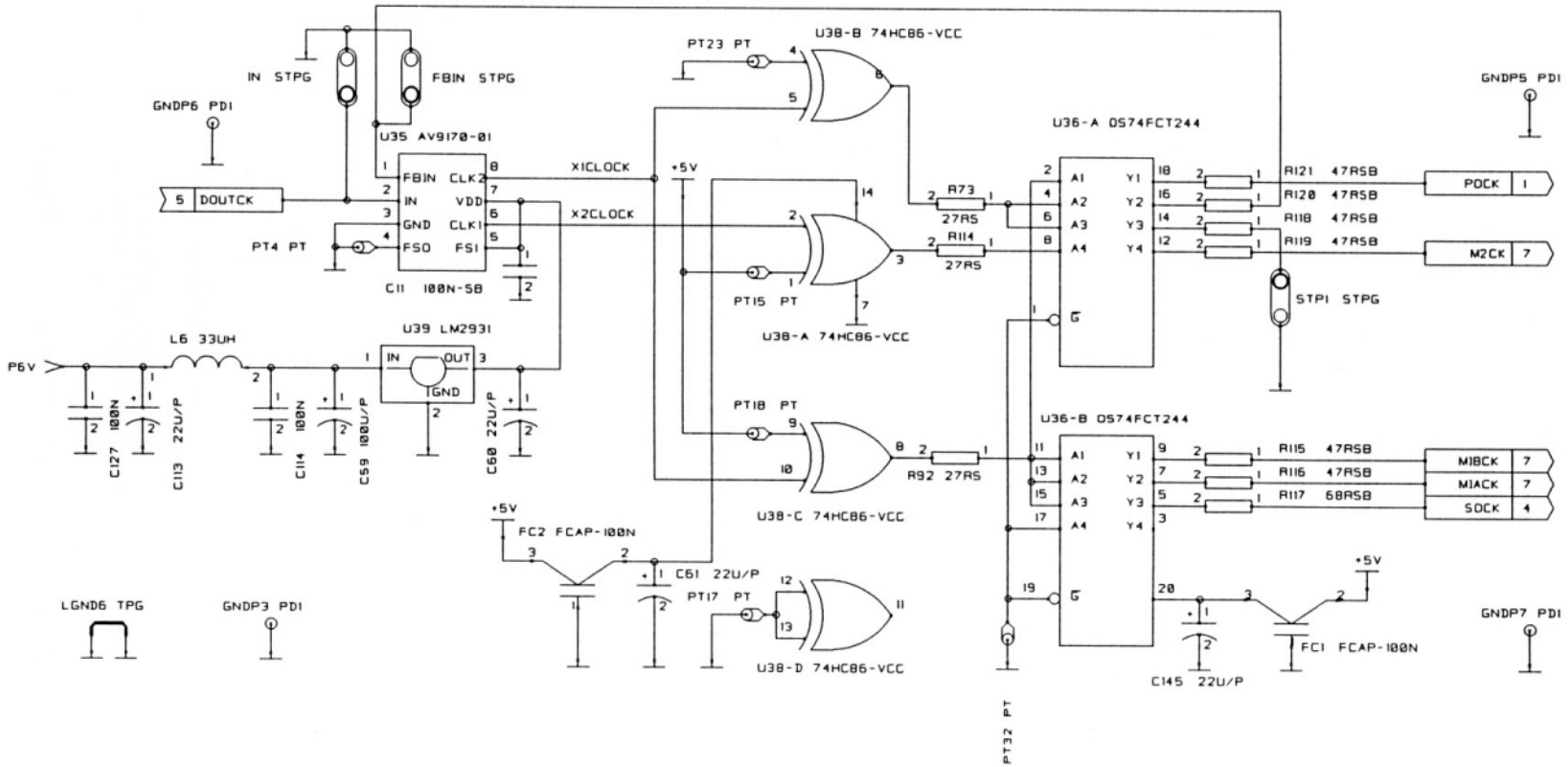
TITLE:	COMP VIDEO ENCODER W/CLOSED CAPTION		
DESC:	OPTIONAL CC D'CODE CIRCUIT		
BY: I.U.	ORIG. DATE: JUNE 27/96		REV. DATE: FEB 18/97
FILE: VIDEO_10			BRD. REV: B
DWG. #: 8029-32B			PAGE #: 3 OF 3


J1 1 P6V P6V J1 2
J1 3 GROUND GROUND J1 4
J1 5 B0 B1 J1 6
J1 7 B2 B3 J1 8
J1 9 B4 B5 J1 10
J1 11 B6 B7 J1 12
J1 13 GROUND GROUND J1 14
J1 15 A8 A9 J1 16
J1 17 A10 MA0 J1 18
J1 19 MA1 ALE J1 20
J1 21 WR RD J1 22
J1 23 GROUND GROUND J1 24
J1 25 VCC VCC J1 26
J1 27 VCC VCC J1 28
J1 29 MONCLK H J1 30
J1 31 Y C J1 32
J1 33 MOHBL MOSEL2 J1 34
J1 35 J1 36
J1 37 OL0 MOSEL1 J1 38
J1 39 INT0/V INT1 J1 40
J1 41 MORST J1 42
J1 43 GROUND GROUND J1 44
L12244 HEAD44S
44PIN HEADER
V5IN
V6IN
LG2 LOGO
EVERTZ LOGO
C TP
MOSEL1
SDA
JP5 STRAPI-2
RP1 9C47KP
U6 OS74FCT825-VCC
FC4 FCAP-100N
CVBS0
CVBS1
CVBS2
CVBS3
CVBS4
CVBS5
CVBS6
CVBS7
ENA_422
DOUTA2
DOUTA3
DOUTA4
DOUTA5
DOUTA6
DOUTA7
DOUTA8
DOUTA9
MIACK
MIBCK
J2 1 DOUTCK GROUND J2 2
J2 3 DOUTA0 GROUND J2 4
J2 5 DOUTA1 GROUND J2 6
J2 7 DOUTA2 GROUND J2 8
J2 9 DOUTA3 GROUND J2 10
J2 11 DOUTA4 GROUND J2 12
J2 13 DOUTA5 GROUND J2 14
J2 15 DOUTA6 GROUND J2 16
J2 17 DOUTA7 GROUND J2 18
J2 19 DOUTA8 GROUND J2 20
J2 21 DOUTA9 GROUND J2 22
J2 23 MIBCK M2CK J2 24
J2 25 DOUTB0 GROUND J2 26
J2 27 DOUTB1 GROUND J2 28
J2 29 DOUTB2 GROUND J2 30
J2 31 DOUTB3 GROUND J2 32
J2 33 DOUTB4 GROUND J2 34
J2 35 DOUTB5 GROUND J2 36
J2 37 DOUTB6 GROUND J2 38
J2 39 DOUTB7 GROUND J2 40
J2 41 DOUTB8 GROUND J2 42
J2 43 DOUTB9 GROUND J2 44
L12244 HEAD44S
44PIN HEADER
TP MORST
JP5 STRAPI-2
RP2 9C47KP
U4 OS74FCT825-VCC
FC5 FCAP-100N
PD8
PD9
PD10
PD11
PD12
PD13
PD14
PD15
MIACK STPG
RP3 9C47KP
U5 OS74FCT825-VCC
FC6 FCAP-100N
PD16
PD17
PD18
PD19
PD20
PD21
PD22
PD23
M2CK STPG
FC7 FCAP-100N
MP 0.250X0.118
MP14
JP2 LPLINK
MP13
JP4 LPLINK
MP12
JP3 LPLINK
AGND2
AGND1
PT PT11
PT PT10
PT PT9
PXCK
ENA_4FS
R5 27R5
R7 27R5
U7 74HC157-VCC
TP P5AI
L4 33UH
C19 100U/P
C18 100N
C20 100N
TPG GND3
U8 LM2940T-5.0
OUT GND IN
+5A
TP P6V
L3 33UH
C21 100N
C22 100U/P
C23 100U/P
C28 100N
C27 100U/P
TPG GND4
COPYRIGHT EVERTZ MICROSYSTEMS LTD
TITLE: COMP VIDEO ENCODER W/CLOSED CAPTION
DESC. DIGITAL I/O & SUBMODULE HEADERS
BY. I.U. ORIG. DATE. JUNE 27/96 REV. DATE. FEB 18/97
FILE: DIGIO BRD REV: B
DWG. #: 8029-31B PAGE #: 2 OF 3

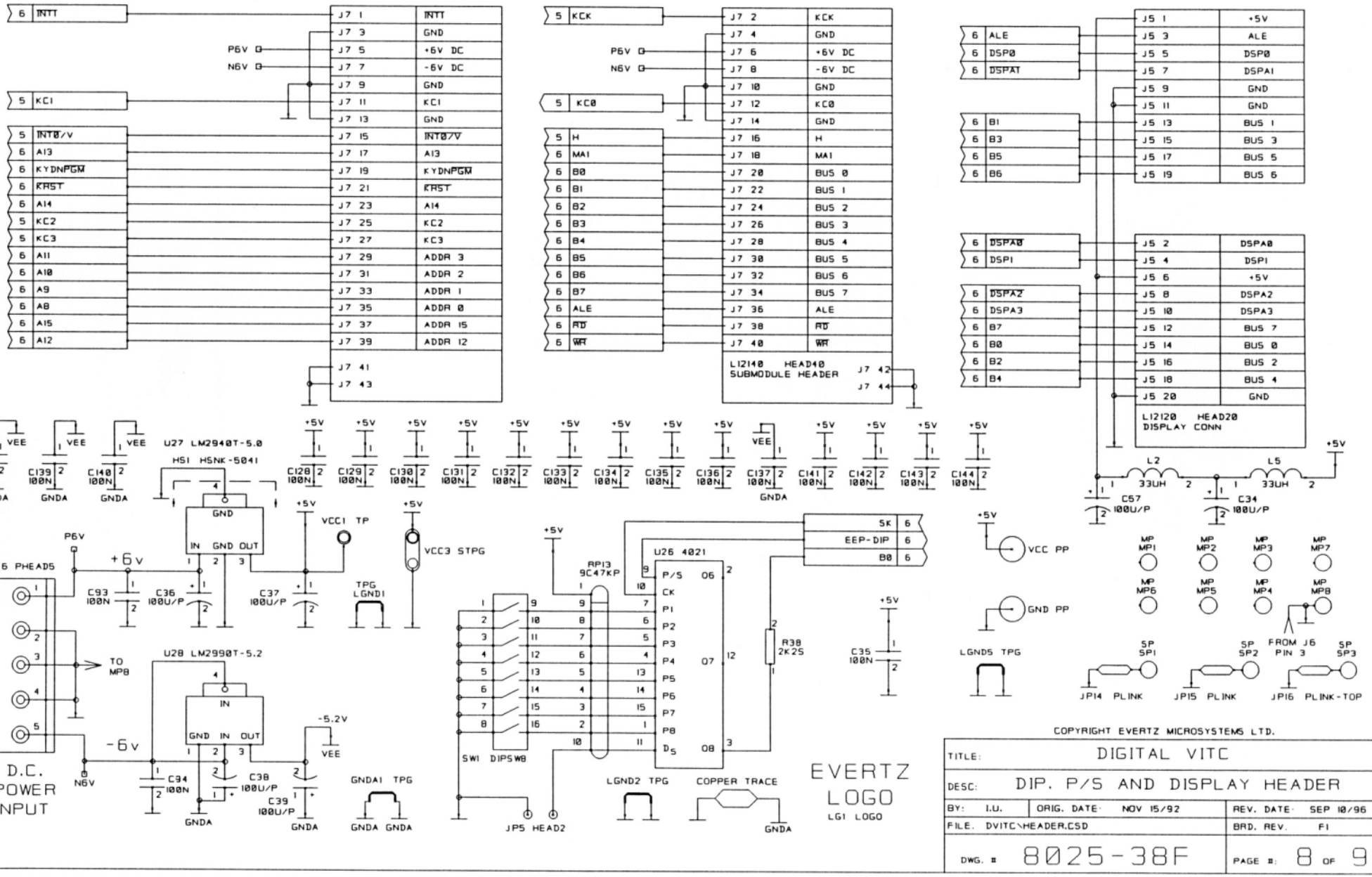

8026 OPTION: - INSTALL JP6
- DO NOT INSTALL OPT. VIDEO AMP
- DO NOT INSTALL CC DCODE CIRCUIT (PAGE 3)
U1
TMC22190S
OPTIONAL VIDEO AMP
COPYRIGHT EVERTZ MICROSYSTEMS LTD
TITLE: COMP VIDEO ENCODER W/CLOSED CAPTION
DESC. VIDEO ENCODER
BY. I.U. ORIG. DATE. JUNE 27/96 REV. DATE. FEB 18/97
FILE: VIDENC BRD REV: B
DWG. #: 8029-30B PAGE #: 1 OF 3



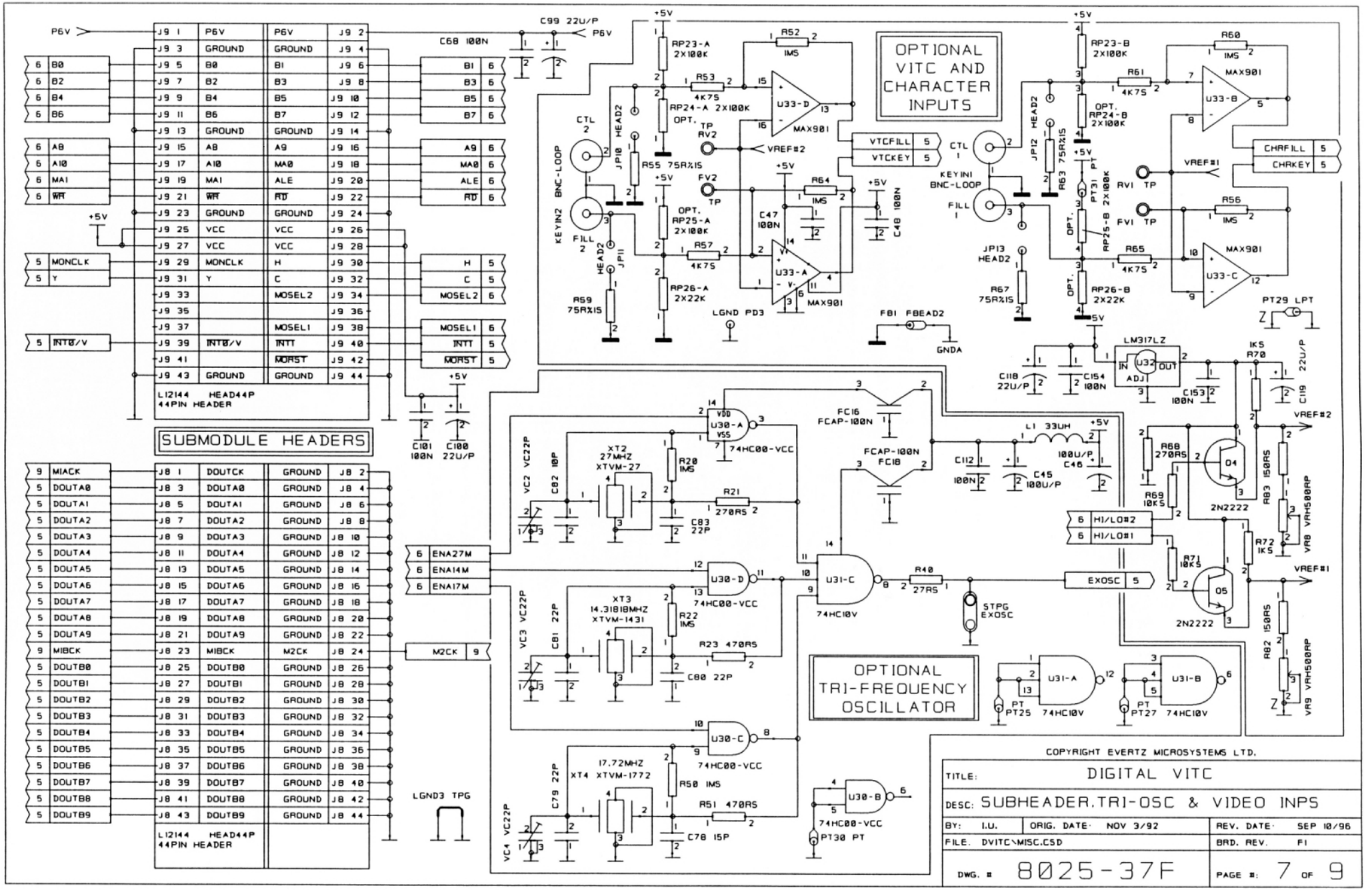
EVERTZ	BOARD: MODEL 8025 DIGITAL KEYER	TITLE: 8010 AND 8950 COMPONENT LAYOUT	DWN BY: I.U.	REV: F1
		DATE: OCT 16/96	DWG NO.: 8025-83F1	

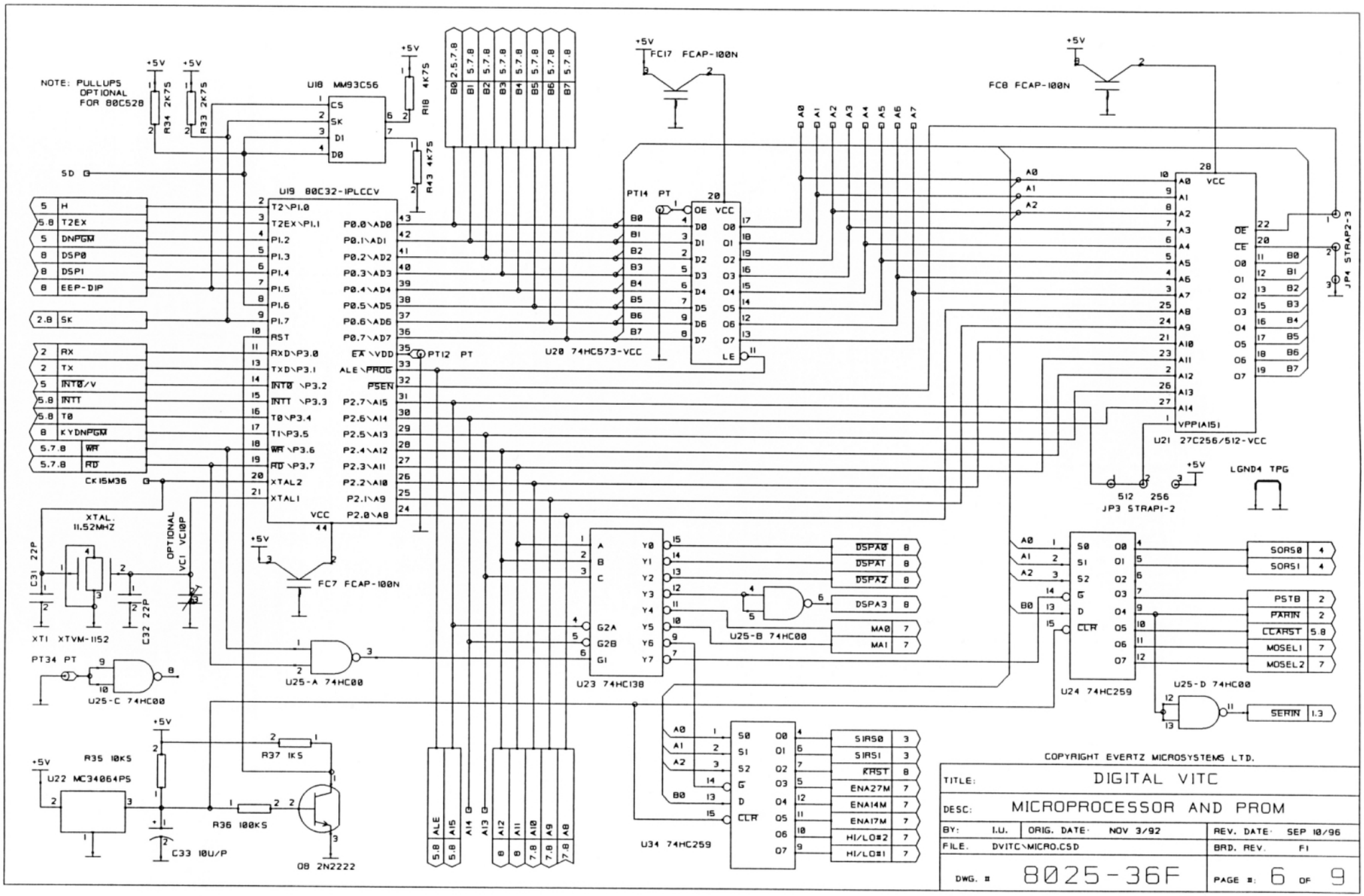


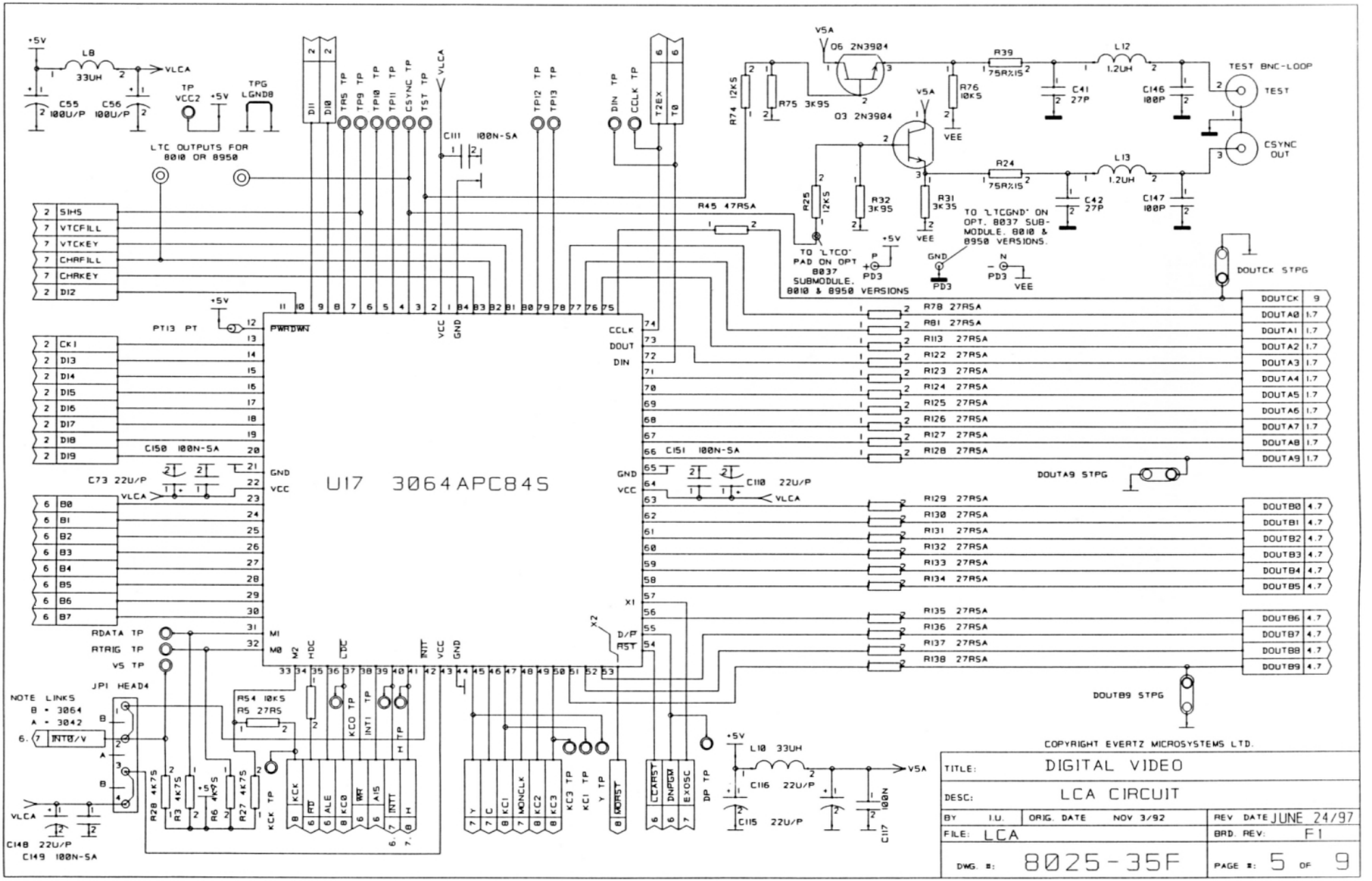
TITLE: DIGITAL VITC			
DESC: CLOCK BUFFER/MULIPLIER CIRCUIT			
BY: I.U.	ORIG. DATE: NOV 15/92		REV. DATE: SEP 10/96
FILE: DVITC\CLOCK.CSD			BRD. REV. F1
DWG. #: 8025-39F			PAGE #: 9 OF 9

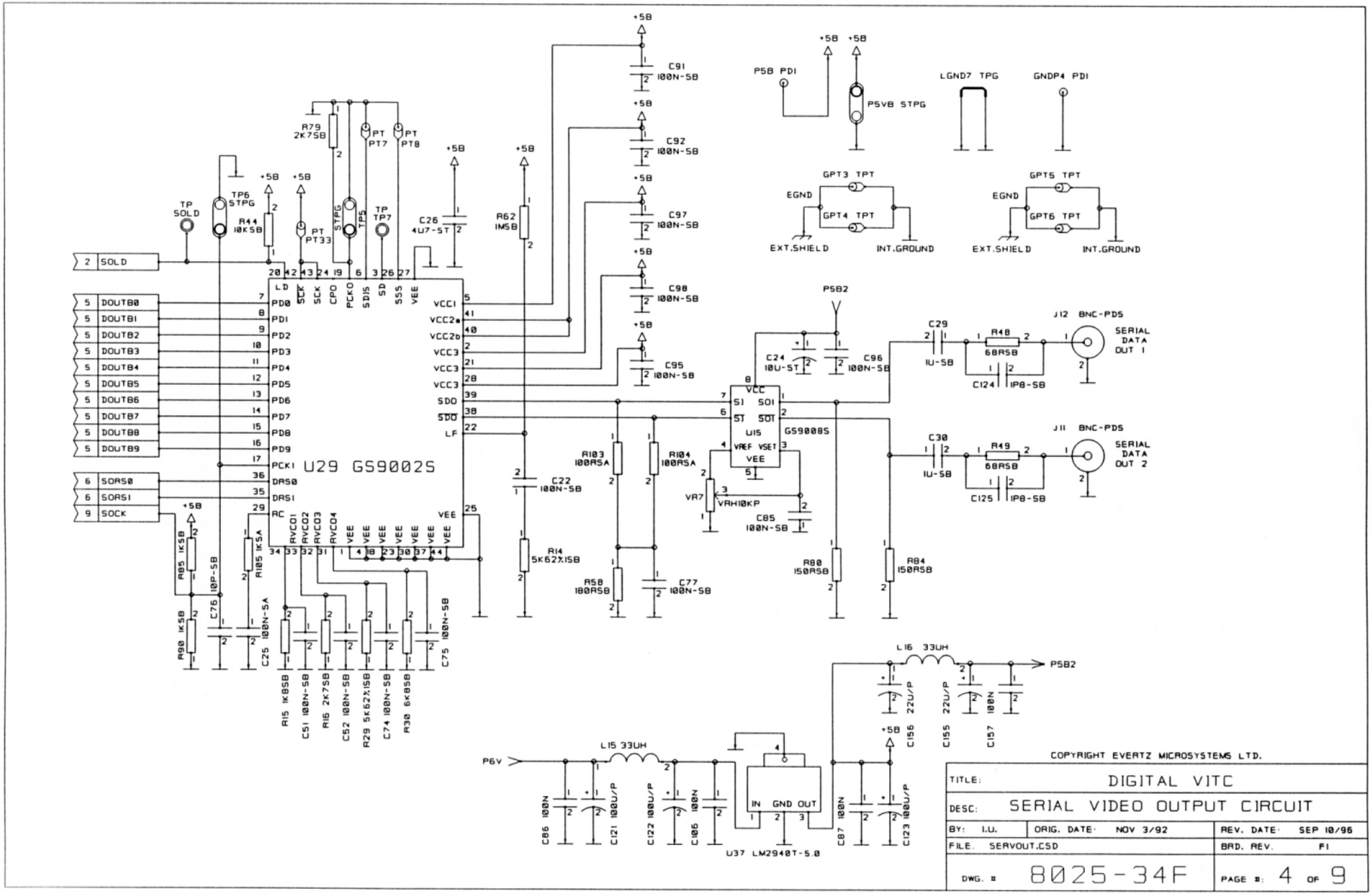


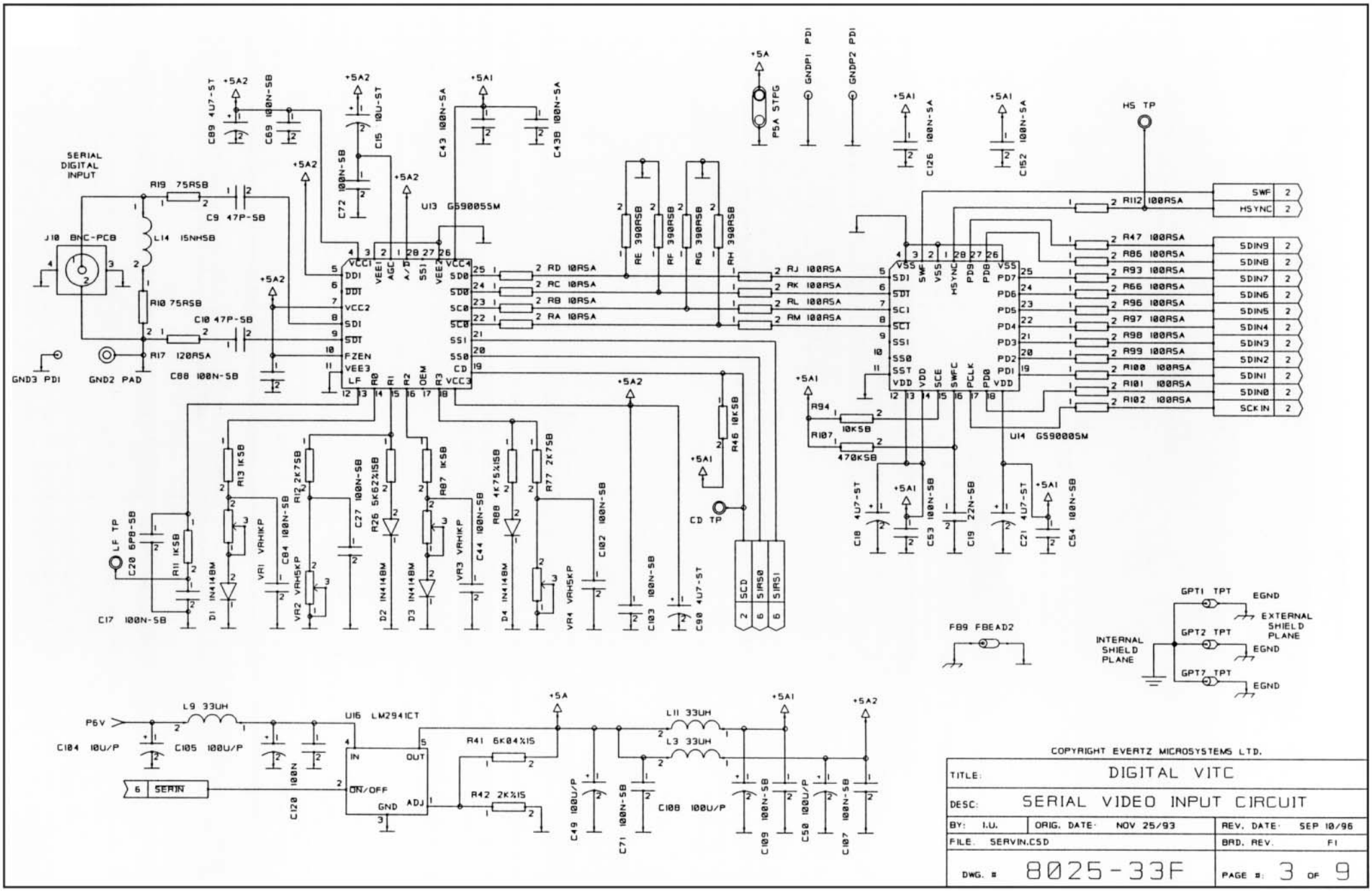
TITLE:	DIGITAL VITC		
DESC:	DIP, P/S AND DISPLAY HEADER		
BY: I.U.	ORIG. DATE: NOV 15/92		REV. DATE: SEP 10/96
FILE: DVITC\HEADER.CSD			BRD. REV. F1
DWG. #: 8025-38F			PAGE #: 8 OF 9


SUBMODULE HEADERS
L12144 HEAD44P
44PIN HEADER
OPTIONAL VITC AND CHARACTER INPUTS
OPTIONAL TRI-FREQUENCY OSCILLATOR
COPYRIGHT EVERTZ MICROSYSTEMS LTD.
TITLE: DIGITAL VITC
DESC: SUBHEADER,TRI-OSC & VIDEO INPS
BY: I.U.
ORIG. DATE: NOV 3/92
REV. DATE: SEP 10/96
FILE: DVITC\MISC.CSD
BRD. REV. F1
DWG. # 8025-37F
PAGE #: 7 OF 9

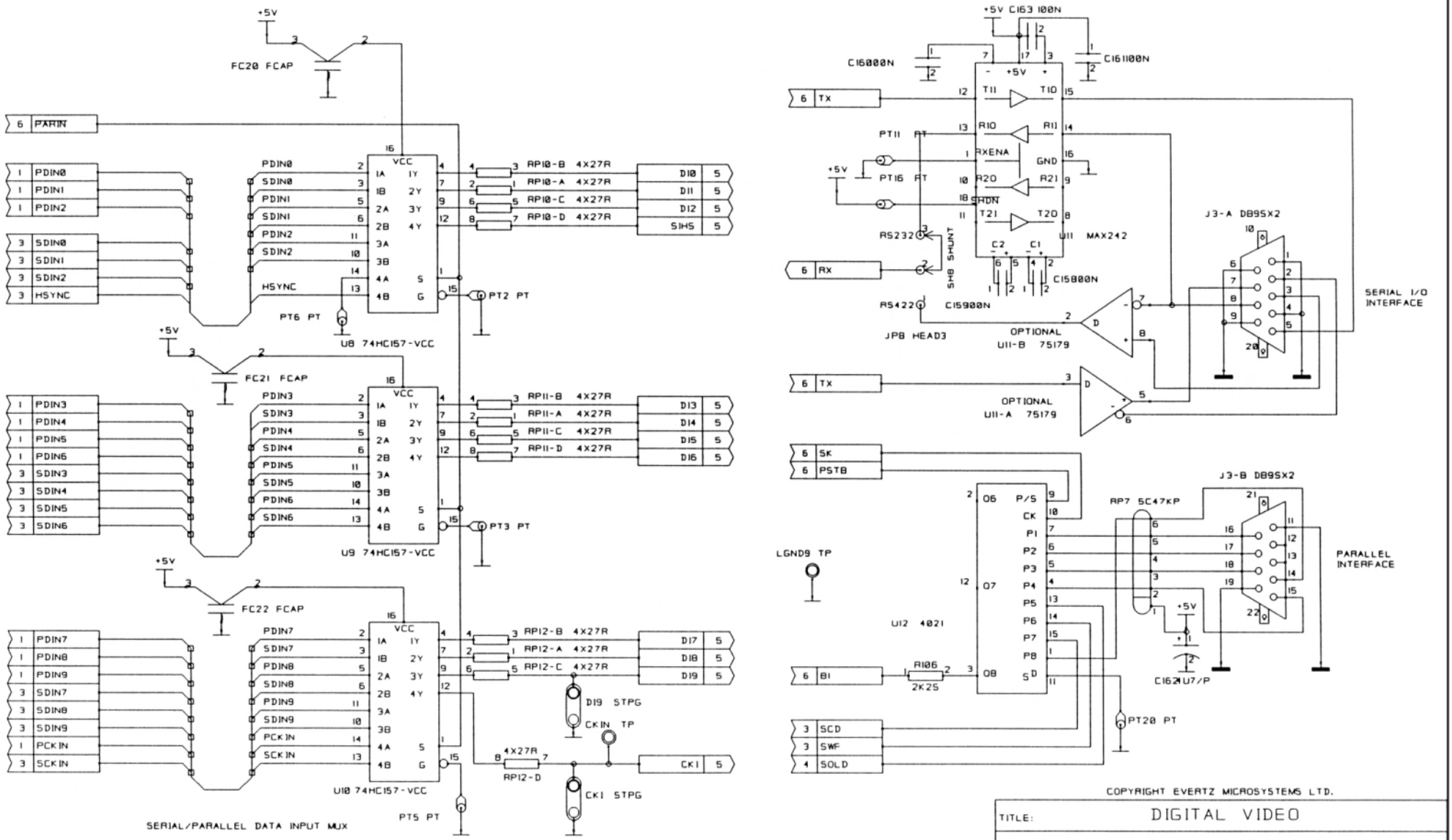

NOTE: PULLUPS OPTIONAL FOR 80C528
U18 MM93C56
U19 80C32-1PLCC
U20 74HC573-VCC
U21 27C256/512-VCC
U23 74HC138
U24 74HC259
U34 74HC259
U25-A 74HC00
U25-B 74HC00
U25-C 74HC00
U25-D 74HC00
FC7 FCAP-100N
FC8 FCAP-100N
FC17 FCAP-100N
XTAL. 11.52MHZ
XT1 XTVM-1152
Q8 2N2222
U22 MC34064P5
JP3 STRAP1-2
JP4 STRAP2-3
COPYRIGHT EVERTZ MICROSYSTEMS LTD.
TITLE: DIGITAL VITC
DESC: MICROPROCESSOR AND PROM
BY: I.U. ORIG. DATE: NOV 3/92 REV. DATE: SEP 10/96
FILE: DVITC\MICRO.CSD BRD. REV. F1
DWG. # 8025-36F PAGE #: 6 OF 9


U17 3064APC84S
LTC OUTPUTS FOR 8010 OR 8950
TO 'LTCO' PAD ON OPT 8037 SUBMODULE. 8010 & 8950 VERSIONS
TO 'LTCGND' ON OPT. 8037 SUB-MODULE. 8010 & 8950 VERSIONS.
TEST BNC-LOOP
TEST
CSYNC OUT
DOUTCK STPG
DOUTA9 STPG
DOUTB9 STPG
JP1 HEAD4
NOTE LINKS
B = 3064
A = 3042
COPYRIGHT EVERTZ MICROSYSTEMS LTD.
TITLE: DIGITAL VIDEO
DESC: LCA CIRCUIT
BY I.U. ORIG. DATE NOV 3/92
REV DATE JUNE 24/97
FILE: LCA
BRD. REV: F1
DWG. #: 8025-35F
PAGE #: 5 OF 9

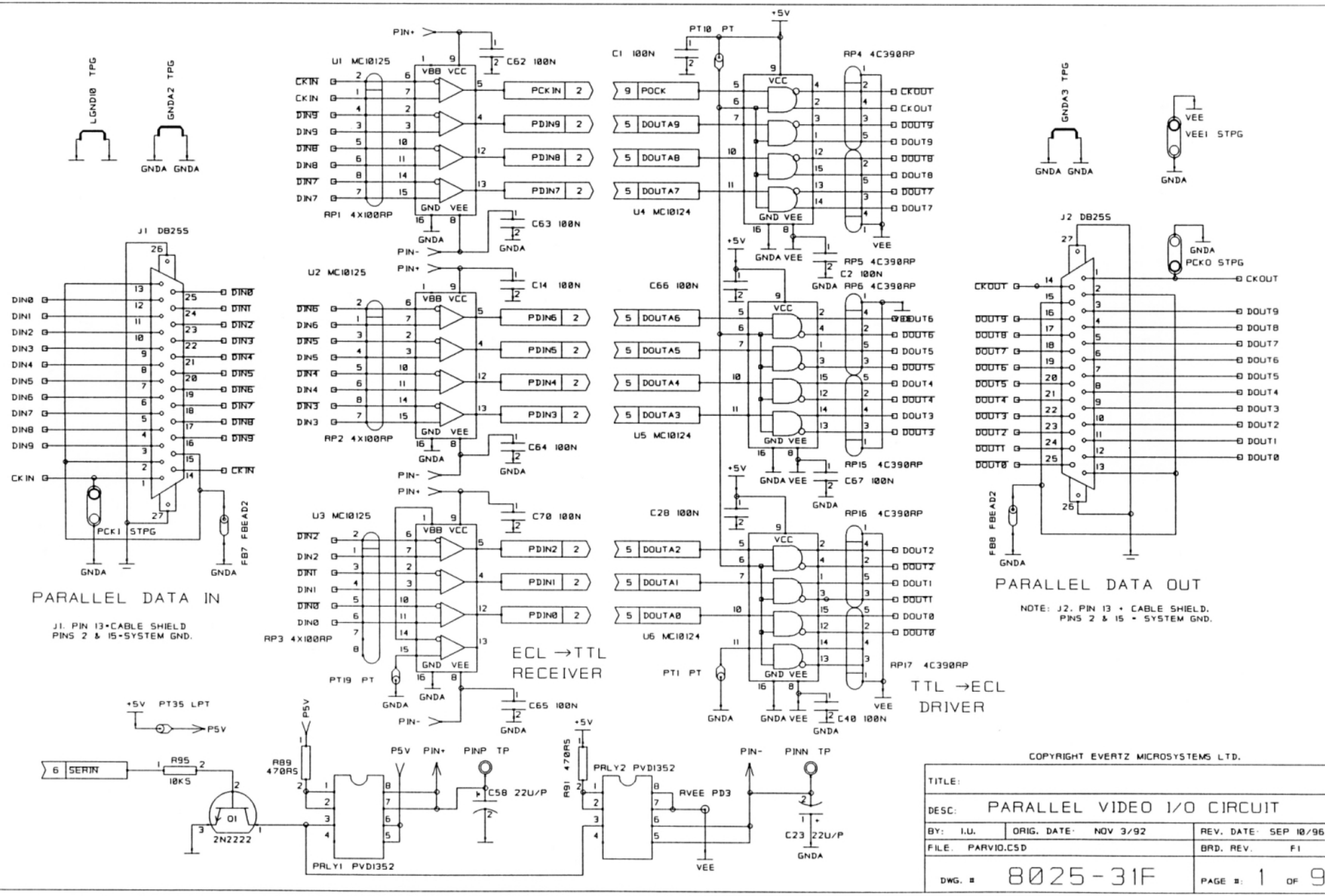

U29 GS9002S
U15 GS9088S
U37 LM2940T-5.0
SOLD
SOCK
SORS0
SORS1
DOUTB0
DOUTB1
DOUTB2
DOUTB3
DOUTB4
DOUTB5
DOUTB6
DOUTB7
DOUTB8
DOUTB9
+5B
P5B PDI
PSVB STPG
LGND7 TPG
GNDP4 PDI
GPT3 TPT
GPT4 TPT
GPT5 TPT
GPT6 TPT
EGND
EXT.SHIELD
INT.GROUND
P5B2
P6V
SERIAL DATA OUT 1
SERIAL DATA OUT 2
BNC-PDS
L15 33UH
L16 33UH
IN GND OUT
COPYRIGHT EVERTZ MICROSYSTEMS LTD.
TITLE: DIGITAL VITC
DESC: SERIAL VIDEO OUTPUT CIRCUIT
BY: I.U.
ORIG. DATE: NOV 3/92
REV. DATE: SEP 10/96
FILE: SERVOUT.CSD
BRD. REV. F1
DWG. #: 8025-34F
PAGE #: 4 OF 9



TITLE:	DIGITAL VITC		
DESC:	SERIAL VIDEO INPUT CIRCUIT		
BY: I.U.	ORIG. DATE: NOV 25/93		REV. DATE: SEP 10/96
FILE: SERVIN.C5D			BRD. REV. F1
DWG. #: 8025-33F			PAGE #: 3 OF 9



TITLE:	DIGITAL VIDEO		
DESC:	SER/PAR MUX & I/O INTERFACE		
BY: I.U.	ORIG. DATE: NOV 3/92		REV. DATE: SEP 10/96
FILE: SPIN1.CSD			BRD. REV. F1
DWG. # 8025-32F			PAGE #: 2 OF 9



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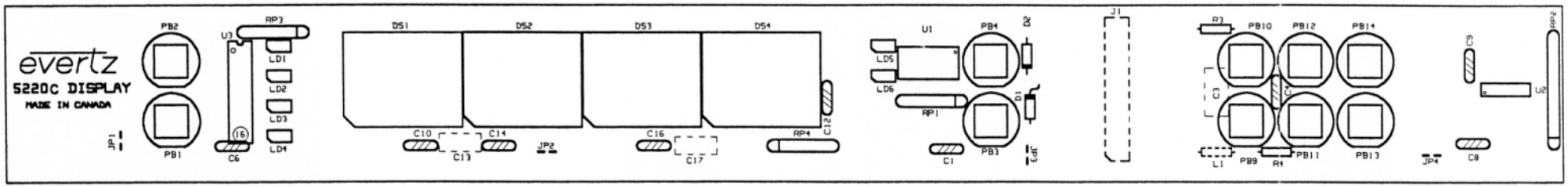
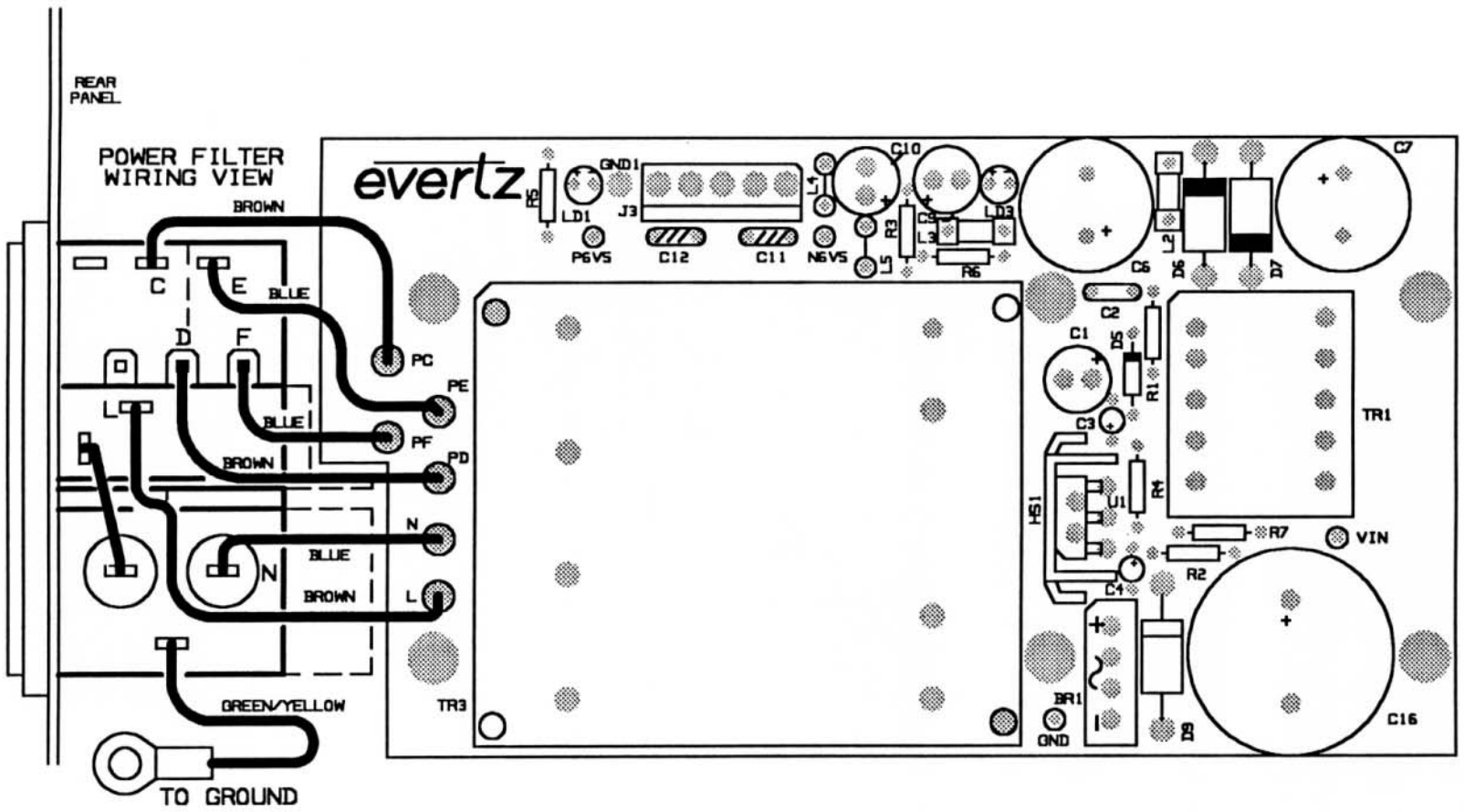
TITLE:		
DESC:	PARALLEL VIDEO I/O CIRCUIT	
BY: I.U.	ORIG. DATE: NOV 3/92	REV. DATE: SEP 10/96
FILE: PARV10.CSD		BRD. REV. F1
DWG. #: 8025-31F		PAGE #: 1 OF 9



EVERTZ MICROSYSTEMS LTD	ORIG DATE : NOV 24/93	REV. DATE : FEB 28/96
TITLE: 8950 DISPLAY COMPONENT LAYOUT	BRD REV. C	DWG NO. : 5220-89C



EVERTZ MOCROSYSTEMS LTD	ORIG DATE : FEB 26/93	REV. DATE : MAY 6/94	
TITLE: 8102 COMPONENT LAYOUT	BRD REV : A	DWG NO. : 8102-80A	