

Courtyard Electronics Ltd

CY250 & CY250D

VT CLOCK

The information in this document is subject to change without notice and should not be construed as a commitment by Courtyard Electronics Limited. Courtyard Electronics Limited shall not be liable for errors contained herein or for incidental consequential damages in connection with the furnishing, performance, or use of this material.

This document contains proprietary information which is protected by copyright. All rights are reserved. No part of this document may be photocopied, reproduced or translated into another language without the written prior consent of Courtyard Electronics Limited.

"WARNING - This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures."

©

October 1996

Courtyard Electronics Limited

Unit 13, Riverside Park, Farnham, Surrey. GU9 7UG, England.
Telephone : +44 (0)1252 712030. Fax : +44 (0)1252 722060

CY250 VT CLOCK INSTALLATION GUIDE

July 1995

Fit the 1 U electronics unit into a 19 inch rack.

Connect to the rear of the electronics unit :

1. Video Input(s) - (these must be CO-TIMED).

A reference of colour black to the looping **BLACK** input.
Any composite video input to the looping **BARS** input.

2. Video Output (dependent on position of LK15 on main pcb).

a) RGB out (LK15 to rear of frame) :
connect **R** to **PR**, **G** to **Y**, and **B** to **PB** on the rear panel.

b) YUV out (LK15 to front of frame) :
connect to **Y**, **PB** (for **U**), **PR** (for **V**) on the rear panel.

c) **Y** out only (includes sync & burst if reference is colour black) :
connect to one or both **Y** outputs on the rear panel.

d) SDI out (CY250D only):
connect to any of the three SDI outputs on the rear panel.

3. Audio Output (Pinout details - see appendix B).

Connect to D9 connector marked **AUDIO** on rear panel.

4. Tally Outputs and GPI Inputs (Pinout details - see appendix A).

Tally 0 Output : connect to D9 connector marked **TALLY0** on rear panel.

Tally 1 Output : connect to D9 connector marked **TALLY1** on rear panel.

5. The Keyboard (Pinout details - see appendix A).

Connect to **REM** for normal use,
Connect to **ENG** when programming the Clock.

6. Timecode Output (Pinout details - see appendix B).

Connect to D9 connector marked **TIMECODE** on rear panel.

7. Switcher (2 x 1 crosspoint) - controlled from System Setup and **TALLY1**.

Incorporates 2 looping inputs (any signal) and dual outputs.

8. Connect a supply of 220 Volt mains to the IEC connector.

NOTE :

The Delay (from reference to **Y** out) = 20 nanoseconds ± 10 nanoseconds.

CONTENTS

SECTION

i.	Installation Guide.....
ii.	Contents.....
iii.	Appendix Index.....
1.	Introduction.....
2.	Specification.....
3.	General Description
3.1	Features.....
3.2	Function Control Keys.....
4.	Operating Instructions
4.1	Power On.....
4.2	The Clock Display.....
4.3	Starting The Clock.....
4.4	Cursor Controls.....
4.5	The Text Editor.....
4.6	Deleting Text.....
4.7	Selecting A Page.....
5.	Programming The Clock
5.1	The Status Line.....
5.2	Selecting A Page.....
5.3	Selecting Clock Or Text Pages.....
5.4	The System Setup Page.....
5.5	Programming A Page Sequence.....
5.6	Programming Scratch Pad Titles.....
5.7	The Page Hold Facility.....
5.8	Programming A Relay Sequence.....
5.9	Programming An Audio Sequence.....
5.10	Pre-roll And Timecode.....
6.	Remote Control
6.1	Remote Starting Of The Clock.....
7.	Circuit Descriptions
7.1	Backplane Module - CY211.....
7.2	Power Supply Unit - CY220/2.....
8.	Maintenance
8.1	Adjustments.....
8.2	Keyboard.....
9.	Adjustments, Test Points And Links
	CY200 Main Module.....
	CY211 Backplane Module.....
	CY220/2 P.S.U. Module.....
10.	Parts Lists.....
11.	Component Layouts
	CY200 Main Module.....
	CY211 Backplane Module.....
	CY220/2 P.S.U. Module.....
12.	Circuit Diagrams
	CY200 Main Module (5 drwgs).....
	CY211 Backplane (5 drwgs).....
	CY220/2 P.S.U. Module (1 drwg).....
13.	Appendices.....

APPENDIX INDEX

APPENDIX A

Details of Relay Tally Pinouts, Remote Start Pinouts and Keyboard Pinouts.

APPENDIX B

Details of the Stereo Audio Output and Longitudinal Timecode Output Connections.

APPENDIX C

Multiple Keyboard Operation.

APPENDIX D

Details of Software Updates - IC45 on CY200 module.

APPENDIX E

Details of Serial Digital Output option.

1. INTRODUCTION

Courtyard Electronics Ltd have produced a VT Clock which provides all of the facilities required of an electronic clapperboard, and also raises the performance, presentation, and operation of all previous VT Clocks.

With the Timecode/Stripe feature, the VT Clock effectively becomes a 'Tape Striper', allowing the user, with one key press, to stripe a tape with, say, Colour bars, the clock counting down, then colour black, all with Timecode.

This handbook gives a detailed description of the VT Clock and a thorough guide to operating the unit. Also included is a comprehensive technical section which provides the "How it Works" information necessary in the unlikely event of a malfunction.

2. SPECIFICATION

MECHANICAL : COURTYARD 1U 19 inch frame, horizontal format.
Access to electronics via removable front panel.
Frame depth ... 470 mm (excl. conn. & front panel).
Weight ... 6 Kg unpacked.

Desktop Keyboard :
Overall Dimensions...330x215x39 mm.
Drop-In hole Size ...310x208 mm.

INPUTS : Power ...200-250 or 100-125 Volts, 50/60 Hz.
"REF"erence ...Colour Black or Composite Sync at standard levels into 75 Ohms.

Video ("BARS") ...Standard levels into 75 Ohms.

OUTPUTS : Video ...2 x Y 1V pk-pk into 75 Ohms
(Current added to reference).
Serial Digital ...RGB or YUV 700mV pk-pk into 75 Ohms.
...3 x CCIR601 Serial Component Digital into 75 Ohms (when fitted).
Delay ...25nS ± 5nS from Reference to Output
Timing Spread ...30nS ± 5nS between G/Y and U & V.

Audio ...Frequencies: 100Hz, 1kHz, 4kHz, 10kHz.
Tolerance : all ±5%.
Levels : +6dBm, 0dBm, -6dBm, OFF.
Tolerance : all ±0.5dBm.
Distortion : < 1% at 1kHz, 0dBm.
...Audio levels can be set for ±8dBm;
Contact Courtyard for more details.

Tallies ...4 x Single Pole Changeover Relay
0 Volts(point of reference only)
+5 Volts(source resistance 470 Ohms)

Timecode ...EBU Longitudinal Timecode

CONTROL : From remote free standing or desk mounting keyboard via RS422 serial interface.

CONNECTORS : Power ...IEC CEE 22
Video ...BNC
Audio ...9 way D socket
Tallies ...9 way D socket x 2
Keyboards ...9 way D socket x 2
Timecode ...9 way D socket

EXTENDERS : COURTYARD service extender type CY200X

3. GENERAL DESCRIPTION

With the exception of one hardware link in the electronics rack, the Courtyard Electronics VT Clock is controlled entirely from the Keyboard unit, or by a remote 'trigger' (from an editor for example).

The Courtyard VT Clock was designed to offer the standard functions of a clock required by all users, and as many other facilities as possible to cater for the special demands of many. Accordingly, it is functional, but at the same time, very flexible. For example, many of the special and unique features available are programmable, allowing users to "customise" the display and operation of the VT Clock to suit their own needs.

Within five seconds of power-on, the VT Clock will be available for display and operation. The VT Clock will have preserved all the screen based information and its operational status from the last point at which power was removed.

At the bottom of the screen is an additional row of text, referred to as the STATUS LINE, which displays information useful to the operator. This line shows which of the five pages is currently being edited, and if the editor is in INSERT or OVERTYPE mode.

Operation of the built-in text editor is simplicity itself. Insert, Delete, Overtype and Cursor control provide the basic text entry requirement.

One press of the SET key (in Engineering Mode) allows selection of Clock or Text for each of the 5 pages. This permits the user to program the display characteristics of the VT Clock as he wishes. A second press of the SET key allows all timed functions to be programmed. A page of information is displayed showing the current settings, making the process simple and clear. At this stage it is also possible to program the Pre-roll and Timecode feature. A third press of SET key allows the user to program his favoured 'Scratch Pad' titles.

3.1 FEATURES

HIGH RESOLUTION CLOCKFACE	...For professional appearance.
LARGE CHARACTERS	...For easy reading, i.e. when spooling.
SCRATCH PAD	...For insertion of user information e.g. Title, Date, Take, etc.
TEXT EDITOR	...Powerful and simple to use.
5 DISPLAY PAGES	...Clock or Text i.e. countdown sequence can include text pages.
CLOCK START FROM	...T-60, T-40, T-30, T-20 & T-10 seconds.
CUT TO BLACK	...Programmable.
WHITE FLASH	...Programmable.
PAGE COUNTDOWN	...Programmable.
PAGE HOLD	...Programmable.
AUDIO TONES	...Programmable (levels & frequencies).
RELAY CLOSURES	...Programmable.
STATUS LINE	...Tells you where you are.
REMOTE START	...Standard.
SYSTEM SET-UP PAGE	...For Programming Page/Audio/Relay sequences, Page Hold, Cut to Black, White Flash, Pre-roll and Timecode.

3.2 FUNCTION CONTROL KEYS

These keys are used to start the clock running at the required start time, select pages, assist text insertion, and program the VT Clock in Engineering Mode.

10	...First press moves clock arm to T-10 seconds. Second press starts the Clock. If the clock arm is already at T-10, the Clock will start with the first press.
20	...As above for T-20 seconds.
30	...As above for T-30 seconds.
40	...As above for T-40 seconds.
60	...As above for T-60 seconds.
Select PAGE	...Selects Page displayed.
Insert	...Selects INSERT or OVERTYPE mode of text editor.
Caps Lock	...Selects capital letters on/off.
Delete	...Deletes characters to the left of the cursor.
<SHIFT> Delete	...Restores Clock pages to base state.
<SHIFT> Delete LINE	...Deletes line of text.
<SHIFT> Delete PAD	...Deletes the scratch pad area.
SET	...Puts the Clock into the two conditions for programming. Active in Engineering Mode only.
SELECT	...Selects option, time, frequency, or level. Active in Engineering Mode only.
HOLD	...Selects Page hold. Active in Engineering Mode only.
SH	...Selects single height teletext characters.
DH	...Selects double height teletext characters.

4. OPERATING INSTRUCTIONS

Please Note:

There are two modes of operation : **Normal Mode** and **Engineering Mode**. The reasoning behind this is simple. In everyday use it is not desirable to be able to accidentally change the previously programmed personality of the VT Clock. The Engineering Mode allows the Clock to be used as normal, but it also allows the user to program the special functions and facilities of the Clock as required. In Normal Mode the Clock is also fully functional but it is not possible to alter any programmable features in this mode.

Most users will program the "personality" of the Clock to suit their own requirements when it is first installed using the Engineering Mode of operation. They will then leave the Clock in Normal Mode, thus ensuring that programmed features and sequences are not corrupted in everyday use.

MEMO :

Normal Mode : Connect keyboard to KBD/REM port on rack unit. In this mode the following function keys are disabled : **SET, SELECT, HOLD, ESC.**

Engineering Mode : Connect keyboard to KBD/ENG port on rack unit. All keys function in this mode.

4.1 POWER ON

The power switch for the unit is located inside the front panel. The Clock is operational within five seconds of switch-on.

MEMO :

The Clock is operational within five seconds of switch-on.

4.2 THE CLOCK DISPLAY

Within five seconds of power on, the Clock will be available for display and operation. The Clock will have preserved all the screen based information and its operational status from the last point at which power was removed.

At the bottom of the screen is an additional row of text, referred to as the STATUS LINE, which displays information useful to the operator. This row shows which of the five pages is currently being edited, and if the editor is in INSERT or OVERTYPE mode.

MEMO :

Use the status display during editing.
The Clock saves all data if power is lost.

4.3 STARTING THE CLOCK

The Clock may be started from the keyboard or remote start units, at T-10, T-20, T-30, T-40 or T-60 seconds. The Clock will start if it is already stopped, or else it will be reset to the selected time, e.g. if the Clock is stopped at T-20 and the operator presses the special function key 40, the Clock will move to T-40 and stop. A second press of special function key 40 will start the Clock.

The status line is forced off whenever the Clock is started. This ensures that there is no contention between operator selection of the page and the sequence being controlled by the countdown.

MEMO :

First press of 10, 20, 30, 40 or 60 stops the clock at selected time (unless clock already at selected time).
Second press starts the Clock.
Both cursor and status display are turned off during countdown.

4.4 CURSOR CONTROLS

The four cursor controls are :

CURSOR	LEFT	(left arrow key)
CURSOR	RIGHT	(right arrow key)
CURSOR	UP	(up arrow key)
CURSOR	DOWN	(down arrow key)

Operation is either by single press of each key, or by holding down the key - in which case the operation will repeat at approximately fifteen operations per second.

Using the cursor controls enables access to all VALID spaces for typing.

VALID spaces are those to which the software limits the cursor controls, and will be explained in more detail in section 4.5.

MEMO :

The cursor can only be moved to special areas of the display.
To move quickly hold the cursor control key down.

4.5 THE TEXT EDITOR

The text editor is the tool which allows text entry into any VALID space.

In a display which includes a clockface, this VALID space is the scratch pad in the top right hand corner of the display. The scratch pad is an area of VALID character positions 22 characters wide and 8 characters deep.

In a display without a clockface, this VALID space is the entire screen. The total VALID character grid is 40 characters wide by 24 characters deep.

The cursor is limited to VALID character positions by the text editor. The editor provides two modes of text entry, which will be familiar to users of word processors.

INSERTING AND OVERTYPING TEXT

The normal mode of text entry is **OVERTYPE MODE**, in which any character typed will replace the character under the cursor.

The second mode of entry is **INSERT MODE**, in which any character typed will be inserted before the character under the cursor, and all characters to the right of the cursor (and the character under the cursor) will be shifted to the right.

MEMO :

The text editor is simple and powerful: learn to use it.
Use INS key to toggle between insert and overtype modes.

4.6 DELETING TEXT

The Delete, Delete LINE & Delete PAD keys have both a normal operation, and a <SHIFT>ed operation.

With the keyboard connected to the KBD/REM port :

- Delete** will delete the character to the left of the cursor on both clock and text pages. In insert mode, this will drag the rest of the line left by 1 character space; in overtype mode, it will leave a space.
- <SHIFT> Delete** restores a clock page to its base state (including preset Scratch Pad Titles). This function completely deletes a text page.
- <SHIFT> Delete LINE** will delete the line upon which the cursor is lying (clock and text pages).
- <SHIFT> Delete PAD** will delete the scratch pad area on a clock page, and completely delete a text page.

With the keyboard connected to the KBD/ENG port :

- Delete** will delete the character to the left of the cursor on both clock and text pages.
- <SHIFT> Delete** restores a clock page to its base state, and completely deletes a text page, except pages 6 & 7 which will be restored to their base state.
- <SHIFT> Delete LINE** has the same effect as described above.
- <SHIFT> Delete PAD** has the same effect as described above.
-

MEMO :

- Delete** Deletes the character left of the cursor.
- <SHIFT> Delete** Restores a clock page to its base state.
Completely deletes a text page.
- <SHIFT> Delete LINE** Deletes a line of text.
- <SHIFT> Delete PAD** Deletes the scratch pad (clock page).
Deletes the whole page (text page).
-

4.7 SELECTING A PAGE

To select one of the seven pages available, use the special function key, PAGE to select the required page. The page number counts up.

Five of the seven pages are for the operator to freely display the required countdown information. The free design pages are page 1,2,3,4 and 5.

Two of the seven pages are reserved for special functions. These are only accessible when the unit is in Engineering mode. See Programming section.

Page 6 is reserved as a page of black. Normally the clock is cut to black a few seconds before zero.

Page 7 is reserved as a page of peak white. Peak white is often used in the countdown sequence as an extra visual cue.

MEMO :

5 pages for free design.
PAGE key selects pages.

5. PROGRAMMING THE CLOCK

N.B. The keyboard must be connected to the KBD/ENG port on the rack in order to program the clock.

5.1 THE STATUS LINE

The **STATUS LINE** is an extra row of text which displays useful information about the current operating conditions. Examples are shown below.

PAGE1

INSERT

This shows that the current display is of PAGE1, and that the current editing mode is INSERT.

PAGE2

OVERTYPE

This shows that the current display is of PAGE2, and that the current editing mode is OVERTYPE.

The "Set Status" mode is entered on the first press of the **SET** key. The "Set Status" mode provides the option to display the clockface.

PAGE1 SELECT OPTION CLOCK

This line shows that the current display is of PAGE1, and that there is also a clockface present. The word **SELECT** is flashing and the cursor sits on the first letter of **CLOCK**. This tells the user to press function key **SELECT** if he wishes to change the page to one without a clockface. The status line would then show :

PAGE1 SELECT OPTION TEXT

Before text can be entered on the page, you must exit from the "Set Status" mode. To exit, two methods are available. The first is to use the **ESC** key, the second is to use the **RET** key.

N.B. Selecting a **TEXT** page will enable insertion of text on that page, e.g. when inserting corporate name and telephone number.

To regain a clockface, simply enter the "Set Status" mode (as above), and use **SELECT** to turn on the clockface (press **ESC** to exit).

MEMO :

"Set Status" mode is entered on the first press of the **SET** key. The set status mode displays useful information to the operator, and allows access to seven display pages. To exit the "Set Status" mode, use **RET** or **ESC**.

5.2 SELECTING A PAGE

To select one of the seven pages available, use the special function key, **PAGE** to select the required page. The page number counts up.

Five of the seven pages are for the operator to freely display the required countdown information. The free design pages are page 1, 2, 3, 4 and 5.

Two of the seven pages are reserved for special functions.

Page 6 Reserved as a page of black. Normally the clock is cut to black a few seconds before zero.

Page 7 Reserved as a page of peak white. Peak white is often used in the countdown sequence as an extra visual cue.

MEMO :

5 pages for free design.
2 pages of special display.

5.3 SELECTING CLOCK OR TEXT PAGES

N.B. Ensure that the "Set Status" mode has been entered. See section 5.1.

Using the **SELECT** key allows any of the pages to be programmed with or without a clockface.

The normal use of this feature is to provide text pages; however an advanced use provides the **COURTYARD** clock with one of its powerful user programmable variables. Temporarily selecting **TEXT** for a **CLOCK** page will allow the cursor to freely move around the complete clock display.

Using this method :

a custom Teletext logo can be entered,
a custom name and telephone number can be entered.

It is popular to enter custom features in the bottom right hand corner.

MEMO :

Temporarily selecting text only will allow the use of advanced features, i.e. custom name and telephone number.

5.4 THE SYSTEM SETUP PAGE

The **System Setup** screen is page 8 within the system, which is reserved to allow access to the powerful programmable sequence generator.

The **System Setup** page is entered by the second press of the **SET** key. A third press of the **SET** key enables programming of scratch-pad titles.

To select a function within the **System Setup** screen, the cursor controls are used to position the cursor over the first character of the term within the System Setup screen. The special function key **SELECT** is then used to toggle the selected term through the available options.

This feature is used to provide the **COURTYARD** clock with one of its powerful user programmable variables. The sequence programmed may include between one and five pages, have a peak white flash and/or cut to black, and have one or more of sixteen audio tones. All entries within the sequence are programmed by the operator from the keyboard unit; there are no links to be made or factory programming.

To exit the **System Setup** screen, use presses of the **ESC** key, which returns the cursor to the active status line in the active page.

N.B. One press of **ESC** returns user to Set Status mode.
A second press returns user to normal status, i.e pressing **PAGE**, only allows access to pages 1 to 5.

MEMO :

Use the System Setup screen to program a sequence.
Use the System Setup screen to program scratchpad titles.
To exit the System Setup screen use ESC.

5.5 PROGRAMMING A PAGE SEQUENCE

Positioning the cursor over the word PAGE and using the SELECT key allows any of the pages to be displayed at a programmed time during the countdown.

Pages always sequence in the order 5, 4, 3, 2, 1, WHITE, 1, BLACK. However, every second the selection is checked for every page. Thus, if a sequence is built up as shown below :

PAGE5	T-50
PAGE4	T-40
PAGE3	T-30
PAGE2	T-20
PAGE1	T-21
WHITE	T-10
PAGE	T-09
BLACK	T-03
PAGE	T+05

For this example, page 2 will never be displayed, because it is overridden by the request for page 1 (Using this method, any or all of the pages can be excluded from a sequence).

There will be a white screen at T-10 for one second.

The clock will then cut to black at T-03, and PAGE1 will return at T+05.

NOTE :

WHITE FLASH OFF :

Place cursor over WHITE and select time to be less than the following time.

WHITE FLASH ONE FRAME :

As above but select WHITE and PAGE to be the same time.

CUT TO BLACK AND REMAIN :

Place cursor over PAGE at the end of the list. Press SELECT to turn PAGE off, e.g. :

BLACK	T-03
PAGE	OFF

MEMO :

Use the programming to include only the features that you need.
To exit the System Setup screen use ESC.
Also see section 5.6 for page 'HOLD' facility
Always start a sequence with PAGE1.

5.6 PROGRAMMING SCRATCH PAD TITLES

Whilst in the System Setup page, press **SET** a third time. This will take the cursor into an area at the bottom right hand corner of the screen called **CLOCK FACE TITLES**. This area is the same size as the scratch pad on a clock page. The user can type in his preferred scratch pad titles or if he wishes, leave the area blank and have no titles at all.

N.B. If two or more spaces are typed, any text following on that line will not appear in the Scratch Pad when <SHIFT> Delete is used.

To return the cursor to the sequence area of the System Setup page, press the **ESC** key.

To call up the titles on a clock page, press **<SHIFT> Delete**. The titles can then still be overwritten, but can be recalled at any time by pressing **<SHIFT> Delete**.

MEMO :

To program scratch pad titles :

- 1). Press **SET** three times (from clock page),
- 2). Type in preferred titles.

N.B. If two or more spaces are typed, any text following on that line will not appear in the Scratch Pad when <SHIFT> Delete is used.

- 3). Press **ESC** three times to return to normal operation.
 - 4). Press **<SHIFT> Delete** to restore titles on a clock page at any time.
-

5.7 THE PAGE HOLD FACILITY

As explained in section 5.5, the System Setup mode can allow any of the pages to be displayed at a programmed time during the countdown in a sequence. However, it may be advantageous to use the pages individually, i.e. without sequencing. This is the page HOLD facility where a page is held throughout the countdown.

To select a page for HOLD, position the cursor over the word PAGE and press the HOLD key. The word 'HOLD' will be displayed next to the page number instead of a time. Thus, if a sequence is built up as shown below :

PAGE5	HOLD
PAGE4	HOLD
PAGE3	T-59
PAGE2	T-40
PAGE1	T-21
WHITE	T-10
PAGE	T-09
BLACK	T-03
PAGE	OFF

Then pages 5 and 4 have been selected as 'HOLD' pages and pages 3, 2 & 1 have been selected as a sequence. To activate a countdown with hold, simply start the clock while the 'hold' page is displayed. The countdown will display the selected page until the cut-to-black becomes valid.

MEMO :

Use the page hold facility to hold any of the 5 pages individually.
To exit the System Setup screen use ESC.
Also see section 5.5 for page 'SEQUENCE' facility

5.8 PROGRAMMING A RELAY SEQUENCE

Positioning the cursor over the word RELAY and using the **SELECT** key allows either of the relays to be turned on or off at a programmed time during the countdown.

Relays are not sequenced in any order. This allows relay 1 to be first, or overlap relay 2, or be second. Similarly, relay 2 may be first, or overlap or be second.

MEMO :

Use the programming to include only the features that you need.
To exit the System Setup screen use ESC.

5.9 PROGRAMMING AN AUDIO SEQUENCE

Positioning the cursor over the frequency and using the **SELECT** key, choose the frequency required. Then positioning the cursor over the amplitude and using the **SELECT** key, choose the amplitude required. Then positioning the cursor over the time and using the **SELECT** key, choose the time required.

Tones always sequence in the order top of list to bottom of list. To exclude a tone from the sequence use the OFF selection in the amplitude selection.

Tones with a duration of one frame can be programmed, e.g. :

01KHz 0dB T-45
01KHz OFF T-45

This will produce a 1KHz tone at 0dBm starting at T-45 and finishing one frame later.

MEMO:

Use the programming to include only the features that you need.
To exit the System Setup screen use ESC.

5.10 PRE-ROLL AND TIMECODE FACILITY

This facility allows for a pre-roll of a video source (usually colour bars) before the clock countdown sequence. In addition, it also provides an output of Timecode. A typical use of this option would be to 'Stripe' a tape with, say, Colour Bars, the Clock countdown, Colour Black and Timecode.

When this facility is activated, a video input in addition to the reference is required.

Whilst in the **System Setup** screen, move the cursor to the RELAY TALLIES area of this page (top RHS).

PRE-ROLL

To set the required pre-roll time, position the cursor over **PREROLL** and press **SELECT** until the desired time is achieved (Up to 3 minutes is possible).

N.B. If no pre-roll is required, set the pre-roll time to **00.00.00**.

BARS

If a pre-roll of the video input is required, move cursor to **BARS** and select PREROLL. If a pre-roll of colour black is required, select OFF.

BURNIN

If the user requires the Timecode to be burnt-in, move the cursor to **BURNIN** and select ON. If not required, select OFF.

HOURS

The number selected here is the Timecode Hours when the Clock has reached T-00. Select a number between 00 and 23.

MEMO :

- | | |
|----------------|---------------------------------------------------|
| PREROLL | - select pre-roll time required. |
| BARS | - select pre-roll of input video or colour black. |
| BURNIN | - select burnin ON/OFF. |
| HOURS | - select Timecode Hours at T-00. |
-

6. REMOTE CONTROL

6.1 REMOTE STARTING OF THE CLOCK

The VT Clock may be started from a remote source such as an editing machine. A simple contact closure to ground or a TTL 'active LOW' signal is all that is required. See Appendix A for connector details.

MEMO :

Set clock to required start position.
Apply GPI trigger to start the clock.
Appendix A gives details of simple remote start.

7. CIRCUIT DESCRIPTIONS

7.1 CY211 BACKPLANE MODULE

The CY211 Backplane module performs a variety of functions : video i/p and o/p, audio generator buffering, Relay, Tally and Keyboard interfacing, TimeCode output driver, and control and power supply routing.

Video Inputs

Colour Black (or 300mV syncs) is fed into U7, a CY2000 Clamp Amplifier, and then into U11, an LM1881 Sync Separator. Because Colour Black will always be present, Clamp Pulses will always appear at T1. These feed the CY2000s which are configured to clamp the black level of all video inputs to OV.

U9 is a GX414A 4 in - 1 out video switcher, configured for just 2 inputs, Colour Black and "Bars". This switcher is used when a PreRoll of the "Bars" signal (from U6) is required prior to the clock countdown. U4 & U5 (CY2000), U8 (GX414A) and U10 (EL2020) form an independent 2 x 1 crosspoint, controllable either manually from the keyboard, or automatically by the VT Clock software (details in Appendix D).

Audio

U3A and U3B gate the audio signal from the CY200 Main Module to provide a stereo signal. This is then balanced in unity gain amplifiers U1 and U2.

Longitudinal TimeCode

U12A (4049), U13A (74HC107) and U14A combine the timecode clock and data lines to provide a single-ended signal for the pulse shaping circuit based around U12B-U12F. This circuit uses digital inverters as linear amplifiers to ensure the correct risetime on the timecode signal. Dual amplifier U15 provides the balanced signal suitable for TimeCode readers, etc.

Relay and Tally Interfacing

T2-T5 are the drivers for Tally Relays RL1-RL4. These provide the following indications :

- RL1 a tally for GPI 0,
- RL2 whether Bars or Colour Black is selected as the input source,
- RL3 a tally for GPI 1,
- RL4 whether input 1 or 2 is selected on the 2x1 crosspoint.

A GPI control can be used to externally trigger the VT Clock. D1 and D2 protect the circuit from unusual voltages for GPI 0, D3 and D4 for GPI 1.

LK2-LK5 provide either electronic (TTL level) or relay (c/o contact) tally indication (relay = default).

Connectors, Power Supply routing

X1 and X2 interface with the CY200 Main Module. P6 and P7 pass the raw low voltage a.c. from the transformers via X3 to the CY220/2 Power Supply Module. P4 and CON5 are the Keyboard interfaces; R29 and R30 are fitted as 200mA resetable fuses to limit current flow to the keyboard.

7.2 CY220/2 POWER SUPPLY UNIT

The CY220/2 Power Supply Unit has a standard configuration. A.C. power is supplied via bridge rectifier BR2 (from a frame mounted transformer) to all four voltage regulators.

REG2, REG3 and REG4 are configured in the standard linear regulator format. Diodes D2, D3 and D7 provide protection under output short-circuit conditions, while D1, D4 and D6 restrict the output-to-input reverse voltage across the regulators under input short-circuit conditions. REG2 provides two feeds, one for the analogue sections of the system, and one for the digital sections - this feed has some extra L/C smoothing to ensure a clean voltage rail.

REG4 is a high efficiency step-down (buck) switching regulator. L4 and C5 provide simple input smoothing. Diode D5 provides output protection, with L1, L2, C6 providing output smoothing. This regulator provides the +5V feed for the micro-processor, Clock Face generation and TeleText sections of the CY200 main module, together with the relay supply on the CY211 backplane module.

Opto-Transistor U1 provides a "power OK" signal, derived directly from the low voltage a.c. input via bridge rectifier BR1. POK therefore, consists of TTL-level 10mS pulses which are fed to the CY200 main module.

8. MAINTENANCE

Routine adjustment is not required and the preset controls should not be casually adjusted.

8.1 ADJUSTMENTS

VIDEO GAIN - Adjust VR1 for 300mV SYNC at Y output.

The VT Clock signal is simply added (at the correct level) to the incoming video reference. This adjustment therefore, is to set unity gain through the unit.

AUDIO LEVEL- Adjust VR2 for correct level.

This adjustment sets the audio output when the selection is 0dBm at 1kHz.

BURST AMP - Adjust VC2 for 300mV at Y output.

Again, this adjustment is to set unity gain through the unit.

8.2 KEYBOARD

The Keyboard provided with the VT Clock is a special version of a standard unit. It can be very awkward to service. If any problems are encountered, or it fails completely, DO NOT ATTEMPT TO REPAIR. Courtyard are able to arrange for the manufacturers to repair any faulty units. Please contact Courtyard regarding any servicing/repair requirements.

9. ADJUSTMENTS, TEST POINTS AND LINKS

CY200 (Main Module)

Adjustments

VR1 Video Output Amplitude.
VR2 Audio Output Amplitude.

VC1 TeleText Phaselock.
VC2 Video Output H.F. Response.

Test Points

There are no user Test Points on this module.

Links

LK1 Factory link (F) : 2-3.
LK2 Not fitted.
LK3 Not fitted.
LK4 Not fitted.
LK5 Not fitted.
LK6 Not fitted.
LK7 Factory link (F) : 1-2.
LK8 Factory link (F) : 1-2.
LK9 Factory link (F) : 2-3.
LK10 Factory link (F) : 1-2 for IC45 up-to V6.2; 2-3 for V7.x onward.
LK11 Factory link (F) : 2-3.
LK12 Fitted.
LK13 Factory link (F) : 2-3.
LK14 Not provided.
LK15 RGB/YUV select.

CONO 13.5MHz Phase-Locked Oscillator : 3-4 and 6-7.

9. ADJUSTMENTS, TEST POINTS AND LINKS

(continued.../)

CY211 (Backplane)

Adjustments

VR1 Longitudinal TimeCode Output Amplitude.
VR2 2 x 1 Video Switcher - Amplitude.

VC1 Not Fitted.
VC2 2 x 1 Video Switcher - H.F Response.

Test Points

TP1 Left Audio.
TP2 Right Audio.
TP3 TimeCode Clock.
TP4 TimeCode Data.
TP5 TimeCode Signal (TTL level).

Links

LK1 Not Provided.
LK2 Tally 0 Relay - Contact changeover or TTL output.
LK3 I/P Video Relay - Contact changeover or TTL output.
LK4 Tally 1 Relay - Contact changeover or TTL output.
LK5 O/P Video Relay - Contact changeover or TTL output.

CY220 (Power Supply Unit)

Adjustments

There are no user adjustments on this module.

Test Points

N12 -12V rail.
P5 + 5V Rail.
P12 +12V Rail.

Links

LK1 Not Fitted.

COURTYARD ELECTRONICS LTD

Bill Of Materials November 30, 1994 13:08:35 Page 1

Item	Quantity	Reference	Part	TOP OF MASTER.REP	DUMMY FOR TOP OF MASTER.REP
1	1	R90	100K,	RES-M-100K	METAL FILM RES. 1% 100K
2	3	C8,C36,C38	100n,	CAP-X7R-104K	100nF X7R CAPACITOR 0.1" 10%
3	2	C15,C22	100p,NPO	CAP-NPO-101J	100pF NPO CAPACITOR 0.1" 5%
4	17	R10B,R10G,R10R,R18B,R18G, R18R,R64,R87,R96,R100, R101,R102,R103,R105,R109, R118,R121	10K,	RES-M-10K0	METAL FILM RES. 1% 10K
5	11	C17,C18,C19,C111,C114, C115,C120,C121,C128,C131, C135	10n,	CAP-X7R-103K	10nF X7R CAPACITOR 0.1" 10%
6	17	C1B,C1G,C1R,C2B,C2G,C2R, C3B,C3G,C3R,C5B,C5G,C5R, C30,C31,C32,C34,C35	10p,	CAP-CER-100K	10pF CERAMIC CAPACITOR 0.1" 2%
7	24	C6B,C7B,C8B,C8G,C8R,C9B, C9G,C9R,C52,C53,C56,C57, C58,C59,C60,C108,C112, C117,C122,C124,C129,C136, C137,C138	10u,	CAP-ER-35106	ELECT RADIAL 35V 10uF
8	1	R15R	11K,	RES-M-11K0	METAL FILM RES. 1% 11K
9	8	R12B,R12G,R12R,R56,R57, R58,R77,R117	12K,	RES-M-12K0	METAL FILM RES. 1% 12K
10	1	R122	150K,	RES-M-150K	METAL FILM RES. 1% 150K
11	1	C10	15p,	CAP-CER-150K	15pF CERAMIC CAPACITOR 0.1" 2%
12	9	L1,L1B,L1G,L1R,L2,L2B, L2G,L2R,L3	15uH,AX	IND-FXD-A-150	INDUCTOR FIXED AXIAL 15uH
13	1	C41	18p,	CAP-CER-180K	18pF CERAMIC CAPACITOR 0.1" 2%
14	42	R5B,R5G,R5R,R6B,R6G,R6R, R9,R11B,R11G,R11R,R16B, R16G,R16R,R17B,R17G,R17R, R18,R20B,R20G,R20R,R21B, R21G,R21R,R23B,R23G,R23R, R24B,R24G,R24R,R25,R29, R61,R62,R65,R68,R74,R75, R76,R85,R86,R91,R94	1K,	RES-M-1K00	METAL FILM RES. 1% 1K
15	2	R39,R98	1K2,	RES-M-1K20	METAL FILM RES. 1% 1K2
16	5	R54,R114,R115,R119,R120	1K5,	RES-M-1K50	METAL FILM RES. 1% 1K5
17	1	VR2	1KMV,	VR-MV-1K	VAR. RES. MULTITURN VERT. 3/8 SQ 1K
18	20	D1,D1B,D1G,D1R,D2B,D2G, D2R,D4,D5,D6,D7,D8,D9, D10,D11,D12,D13,D14,D15, D17	1N4148,	DIO-1N4148	SIGNAL DIODE 1N4148
19	1	RMOD	1R,	RES-M-1R00	METAL FILM RES. 1% 1R
20	1	C11	1n,	CAP-X7R-102K	1nF X7R CAPACITOR 0.1" 10%
21	1	VC2	2-10pF,	VC-2-10	2-10pF TRIMMER CAP MINI (NIL) 0.2"
22	10	R18A,R19B,R19G,R19R,R30, R31,R59,R71,R73,R93	220R,	RES-M-220R	METAL FILM RES. 1% 220R

COURTYARD ELECTRONICS LTD

Bill Of Materials November 30, 1994 13:08:35 Page 2

Item	Quantity	Reference	Part	TOP OF MASTER.REP	DUMMY FOR TOP OF MASTER.REP
23	2	C5,C62	220n,POLY 0.4	CAP-POL-224-4	220nF POLYESTER 0.4" PITCH *NON PREF* USE 0.2" NEXT TIME
24	1	C9	220p,	CAP-CER-221K	220pF CERAMIC CAPACITOR 0.1" 2%
25	18	R1,R2,R3,R4,R5,R6,R7,R8, R12,R13,R14,R23,R24,R28, R34,R36,R37,R66	22K,	RES-M-22K0	METAL FILM RES. 1% 22K
26	1	C13	22n,	CAP-X7R-223K	22nF X7R CAPACITOR 0.1" 10%
27	2	C20,C21	22p,	CAP-CER-220K	22pF CERAMIC CAPACITOR 0.1" 2%
28	1	IC55	26LS32,	IC-26LS32	QUAD LINE RECEIVER (=75173)
29	1	C14	270p,	CAP-CER-271K	270pF CERAMIC CAPACITOR 0.1" 2%
30	9	IC1,IC2,IC3,IC4,IC5,IC6, IC7,IC8,IC45	27C256-150,	IC-27C256-150	27256 CMOS EPROM ACCESS 150ns
31	2	C1,C37	27p,	CAP-CER-270K	27pF CERAMIC CAPACITOR 0.1" 2%
32	7	R50,R51,R52,R53,R78,R84, R99	2K2,	RES-M-2K20	METAL FILM RES. 1% 2K2
33	3	R2B,R2G,R2R	2K7,	RES-M-2K70	METAL FILM RES. 1% 2K7
34	2	C39,C40	2n2,5%	CAP-X7R-222J-2	2n2F X7R CAPACITOR 0.2" 5%
35	1	R15B	30K,	RES-M-30K0	METAL FILM RES. 1% 30K
36	8	R3B,R3G,R3R,R4B,R4G,R4R, R38,R60	330R,	RES-M-330R	METAL FILM RES. 1% 330R
37	3	R27,R80,R81	33R,	RES-M-33R0	METAL FILM RES. 1% 33R
38	1	IC58	3487P,	IC-3487P	QUAD LINE DRIVER (=75174)
39	4	R19,R55,R112,R113	3K,	RES-M-3K00	METAL FILM RES. 1% 3K
40	13	R8B,R8G,R8R,R9B,R9G,R9R, R13B,R13G,R13R,R17,R22, R88,R92	3K3,	RES-M-3K30	METAL FILM RES. 1% 3K3
41	1	R67	3K9,	RES-M-3K90	METAL FILM RES. 1% 3K9
42	5	LK6,LK7,LK8,LK9,LK15	3LK,	PIN-MLX-3	* USE PIN-MLX-36 *
43	2	IC64,IC65	4052,	IC-4052	DUAL 4 CHANNEL MULTIPLEXER
44	2	C16,C23A	470n,POLY 0.6	CAP-POL-474-6	470nF POLYESTER 0.6" PITCH *NON PREF* USE 0.2" NEXT TIME
45	1	C12	470p,X7R	CAP-X7R-471K	470pF X7R CAPACITOR 0.1" 10%
46	1	R116	47K,	RES-M-47K0	METAL FILM RES. 1% 47K
47	1	C4	47n,	CAP-X7R-473K	47nF X7R CAPACITOR 0.1" 10%
48	1	L4	47uH,AX	IND-FXD-A-470	INDUCTOR FIXED AXIAL 47uH
49	15	R1B,R1G,R1R,R7B,R7G,R7R, R14B,R14G,R14R,R26,R32, R33,R63,R72,R89	4K7,	RES-M-4K70	METAL FILM RES. 1% 4K7
50	1	C6	4n7,	CAP-X7R-472K	4n7F X7R CAPACITOR 0.1" 10%
51	1	VC1	5-60pF,	VC-5-60	5-60pF TRIMMER CAP LARGE (YELLOW)
52	1	VR1	500RMV,	VR-MV-500R	VAR. RES. MULTITURN VERT. 3/8 SQ 500R
53	1	R70	560K,	RES-M-560K	METAL FILM RES. 1% 560K
54	3	R15,R106,R110	56K,	RES-M-56K0	METAL FILM RES. 1% 56K
55	1	R15G	5K6,	RES-M-5K60	METAL FILM RES. 1% 5K6
56	1	XTL3	6.0MHz,	XTL-6000KHZ	CRYSTAL HC-18 6.000000 MHz uP SPEC
57	2	R107,R111	620K,	RES-M-620K	METAL FILM RES. 1% 620K
58	1	R69	680K,	RES-M-680K	METAL FILM RES. 1% 680K
59	1	R21	6K8,	RES-M-6K80	METAL FILM RES. 1% 6K8

COURTYARD ELECTRONICS LTD

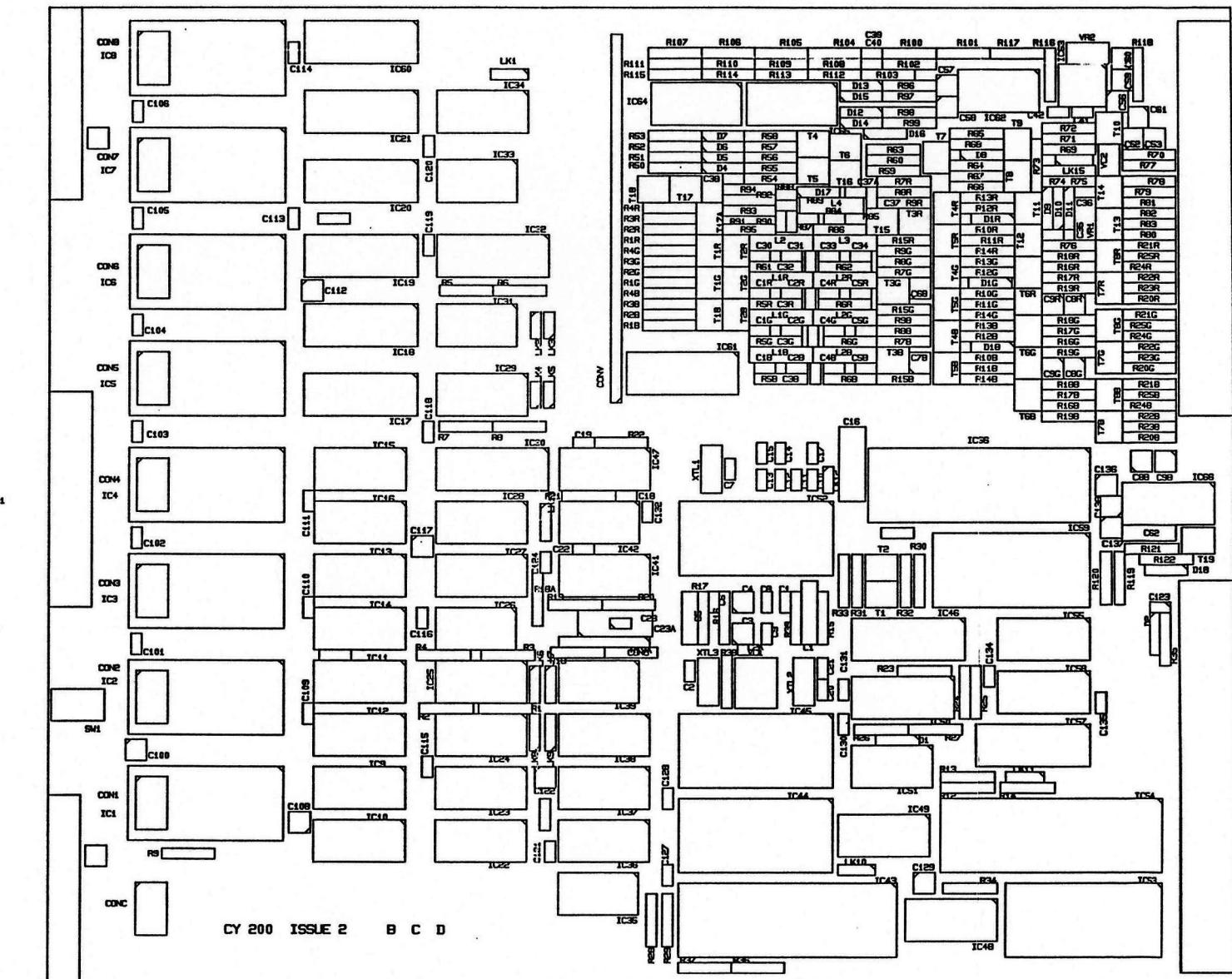
Bill Of Materials November 30, 1994 13:08:35 Page 3

Item	Quantity	Reference	Part	TOP OF MASTER.REP	DUMMY FOR TOP OF MASTER.REP
60	4	C4B,C4G,C4R,C33	6p8,	CAP-CER-6R8K	6p8F CERAMIC CAPACITOR 0.1" 2%
61	1	XTL2	7.424MHz, XTL-7424KHz	XTL-7424KHz	CRYSTAL HC-18 7.424000 MHz UP SPEC
62	4	IC18,IC19,IC20,IC21	74AC374, 74F138,	IC-74AC374 IC-74F138	OCTAL D-TYPE F/F EXPANDABLE 3/8 DECODER
63	1	IC27	74F161,	IC-74F161	SYNC. 4-BIT BINARY COUNTER
64	4	IC13,IC14,IC15,IC16	74HC04,	IC-74HC04	HEX INVERTER
65	2	IC39,IC51	74HC123, 74HC138,	IC-74HC123 IC-74HC138	DUAL ONE-SHOT MULTIVIBRATOR (PHILIPS)
66	1	IC66	74HC139,	IC-74HC139	EXPANDABLE 3/8 DECODER
67	1	IC49	74HC161,	IC-74HC161	DUAL 2 TO 4 DECODER/DEMUX
68	1	IC48	74HC299,	IC-74HC299	SYNC. 4-BIT BINARY COUNTER
69	3	IC36,IC37,IC38	74HC299, 74HC377,	IC-74HC299 IC-74HC377	8-BIT SHIFT/STORAGE REGISTER
70	1	IC57	74HC377,	IC-74HC377	OCTAL D-TYPE F/F + ENABLE
71	4	IC17,IC30,IC46,IC61	74HC74,	IC-74HC74	DUAL D-TYPE EDGE TRIG. F/F
72	2	IC35,IC42	74HCT4046,	IC-74HCT4046	PHASE COMP AND VCO (PHILIPS)
73	1	IC41	74LS00,	IC-74LS00	QUAD 2 I/P NAND
74	1	IC33	74LS02,	IC-74LS02	QUAD 2 I/P NOR
75	1	IC26	74LS161,	IC-74LS161	SYNC. 4-BIT BINARY COUNTER
76	8	IC9,IC10,IC11,IC12,IC22, IC23,IC24,IC25	74LS221, 74LS273, 74LS298, 74LS30, 74LS85, 75R, 75K, 820R, 8K2, 8LK, 9V1, BAT81, TR-BC548B	IC-74LS221 IC-74LS273 IC-74LS298 IC-74LS30 IC-74LS85 RES-M-75R0 RES-M-7K50 RES-M-820R RES-M-8K20 PIN-MLX-8 DIO-Z79-9V1 DIO-BAT81 TRANSISTOR NPN BC548B	DUAL MONOSTABLE MULTIVIBRATOR (MOT.) OCTAL D-TYPE F/F QUAD 2 I/P MUXIPLEXER WITH OUTPUT REG 8 I/P NAND 4-BIT MAGNITUDE COMPARATOR METAL FILM RES. 1% 75R METAL FILM RES. 1% 7K5 METAL FILM RES. 1% 820R METAL FILM RES. 1% 8K2 * USE PIN-MLX-36 * ZENER DIODE BZX79 C9V1 SIGNAL DIODE BAT 81 TRANSISTOR NPN BC548B
77	1	IC47			
78	1	IC32			
79	1	IC34			
80	1	IC31			
81	2	IC28,IC29			
82	5	R25B,R25G,R25R,R82,R83			
83	2	R104,R108			
84	1	R79			
85	4	R22B,R22G,R22R,R97			
86	1	CONO			
87	1	D16			
88	1	D18			
89	18	T1,T2,T3B,T3G,T3R,T4,T4B, T4G,T4R,T7,T7B,T7G,T7R, T8,T11,T13,T15,T19			
90	24	T1B,T1G,T1R,T2B,T2G,T2R, T5,T5B,T5G,T5R,T6,T6B, T6G,T6R,T8B,T8G,T8R,T9, T10,T12,T14,T16,T17,T17A	BC558B,	TR-BC558B	TRANSISTOR PNP BC558B
91	2	Z1A,Z2A	CON-EUR-AC64MR,	CON-EUR-AC64MR	64W DIN 41612 A-C PLUG R/A CLASS 2
92	2	ICS17,ICS50	CON-ICS18-03TP,	CON-ICS18-03TP	DIL IC SKT 18 TURNED PIN 0.3"
93	13	ICS1,ICS2,ICS3,ICS4,ICS5, ICS6,ICS7,ICS8,ICS9, ICS10,ICS11,ICS12,ICS13	CON-ICS28-06TP,	CON-ICS28-06TP	DIL IC SKT 28 TURNED PIN 0.6"
94	3	ICS14,ICS15,ICS16	CON-ICS40-06TP,	CON-ICS40-06TP	DIL IC SKT 40 TURNED PIN 0.6"
95	2	HND1,HND2	ELMA-63-152,	BIM-ELMA-63-152	MODULE EJECTOR HANDLE + RIVETS
96	2	IC44,IC59	GR881,	IC-GR881-15	6264 CMOS NVRAM 150ns GREENWICH
97	2	LK12,C61	LINK,	WIR-TCW-24-LINK	FIT TINNED COPPER WIRE

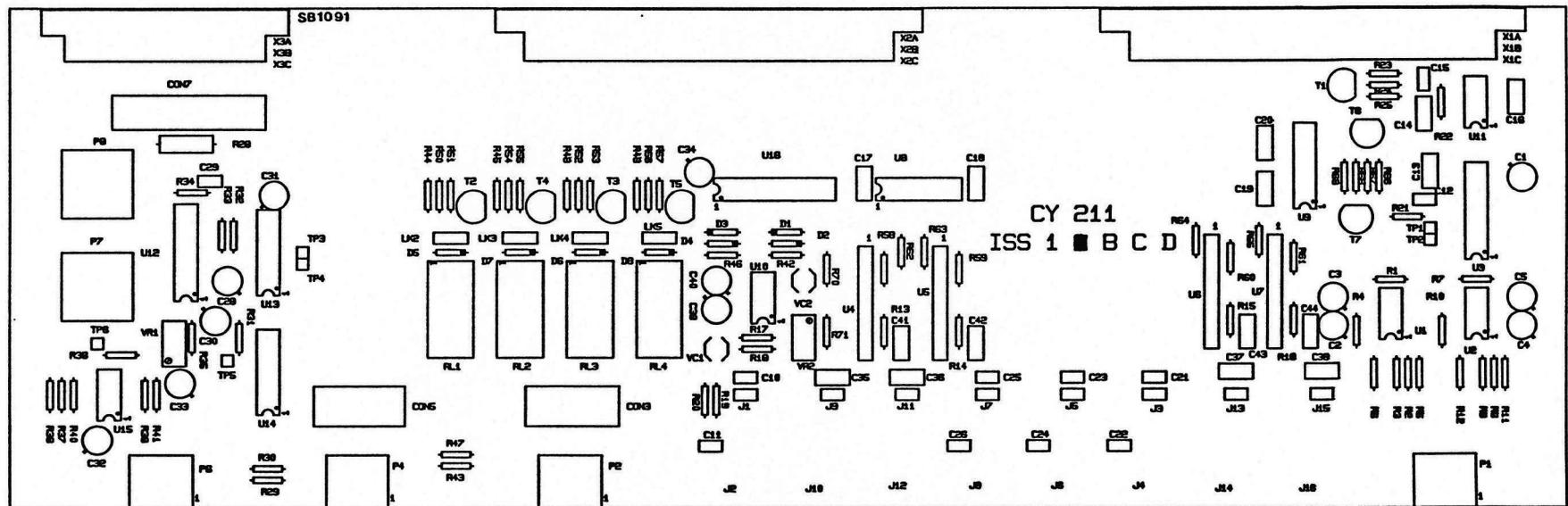
COURTYARD ELECTRONICS LTD

Bill Of Materials November 30, 1994 13:08:35 Page 4

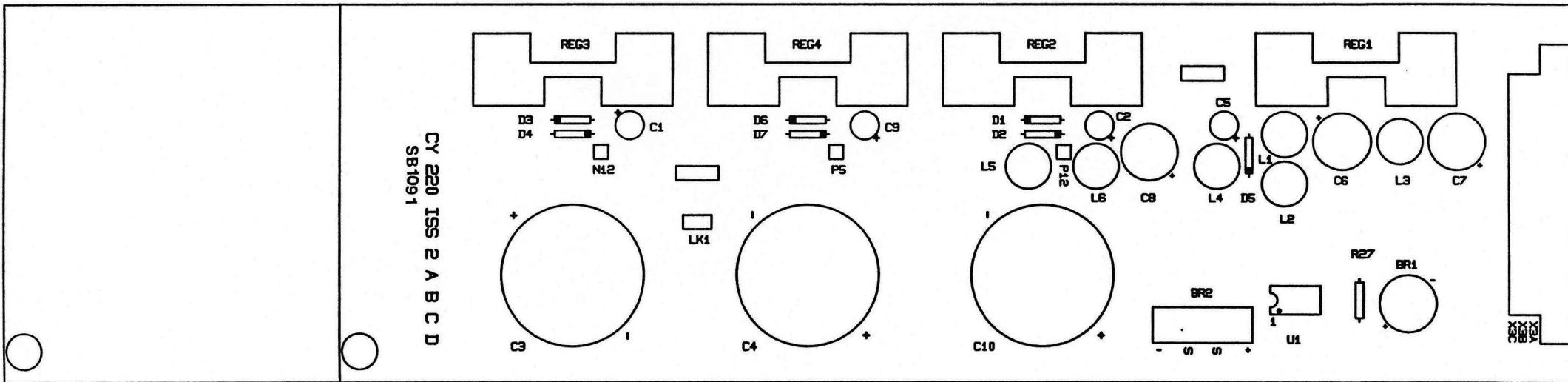
Item	Quantity	Reference	Part	TOP OF MASTER.REP	DUMMY FOR TOP OF MASTER.REP
98	1	LK10	LINK12,	WIR-TCW-24-LINK12	FIT TINNED COPPER WIRE FROM PIN 1 TO PIN 2
99	3	LK1,LK11,LK13	LINK23,	WIR-TCW-24-LINK23	FIT TINNED COPPER WIRE FROM PIN 2 TO PIN 3
100	1	IC62	LM348,	IC-LM348N	QUAD G.P. OP AMP
101	1	IC63	NE5534N,	IC-NE5534N	WIDEBAND LOW NOISE OP AMP
102	54	CON1,SW1,TP1,XTL1,Z1C,C2, NF, C2A,CON2,D2,LK2,TP2,Z2C, C3,CON3,LK3,TP3,CON4,LK4, TP4,CON5,LK5,CON6,C7, CON7,CON8,R16,R19A,R20, C23,R35,C37A,C42,IC60, R95,C100,C101,C102,C103, C104,C105,C106,C109,C110, C113,C116,C118,C119,C123, C127,C130,C132,C134,CONC, CONV	***** NOT FITTED (NF) *****		
103	4	NUT1,NUT2,NUT3,NUT4	NUT-M25-FZ,	NUT-M25-FZ	NUT M2.5 FULL ZINC
104	43	PAD1,PAD2,PAD3,PAD4,PAD5, PAD-TR-MNT, PAD6,PAD7,PAD8,PAD9, PAD10,PAD11,PAD12,PAD13, PAD14,PAD15,PAD16,PAD17, PAD18,PAD19,PAD20,PAD21, PAD22,PAD23,PAD24,PAD25, PAD26,PAD27,PAD28,PAD29, PAD30,PAD31,PAD32,PAD33, PAD34,PAD35,PAD36,PAD37, PAD38,PAD39,PAD40,PAD41, PAD42,PAD43	PAD-TR-MNT	TRANSISTOR MOUNTING PAD	
105	1	PCB1	PCB-CY200-2B,	PCB-CY200-2B	PCB CY200 ISSUE 2B DS PTH SM SS
106	1	IC52	SAA5231,	IC-SAA5231	TELETEXT VIDEO PROCESSOR/DATA SEPERATOR
107	1	IC56	SAA5243P/E,	IC-SAA5243P/E	TELETEXT DISPLAY GENERATOR
108	4	SCW1,SCW2,SCW3,SCW4	SCW-M25-PZP10,	SCW-M25-PZP10	SCREW M2.5 X 10MM PAN ZINC POZI
109	3	PIN7,PIN8,PIN9	SHUNT,	PIN-LINK2	2 PIN SHORTING LINK (SHUNT)
110	6	PIN1,PIN2,PIN3,PIN4,PIN5, PIN6	SPLINE-PIN,	PIN-H2089-01	SPLINED TERMINAL PIN
111	2	TP5,TP6	TP,	PIN-TP-SML	TEST POINT SMALL 20-2137D
112	1	IC43	Z80CCPU,	IC-Z80C-CPU	Z80A CMOS CPU
113	1	IC53	Z80CCTC,	IC-Z80C-CTC	Z80A CMOS CTC
114	1	IC54	Z80CS10/0,	IC-Z80C-SIO/0	Z80A CMOS SIO/0
115	1	IC50	Z8581,	IC-Z8581-6	Z80A NMOS CLOCK GENERATOR 6MHz
116	1	T18	ZTX314,	TR-ZTX314	TRANSISTOR NPN ZTX314



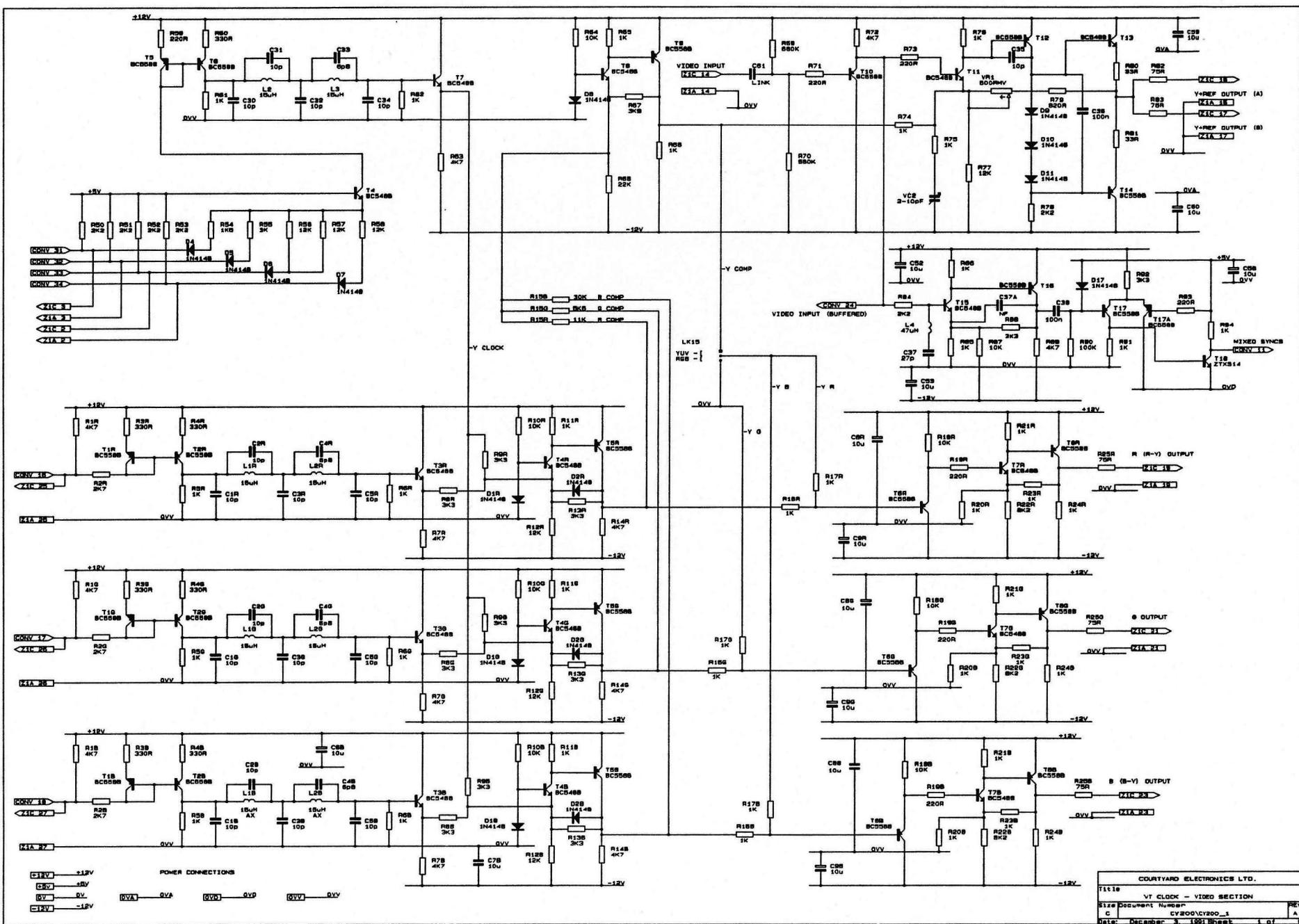
CY 200 ISSUE 2 B C D COMPONENT SILKSCREEN OCT 1986 A.P.D.

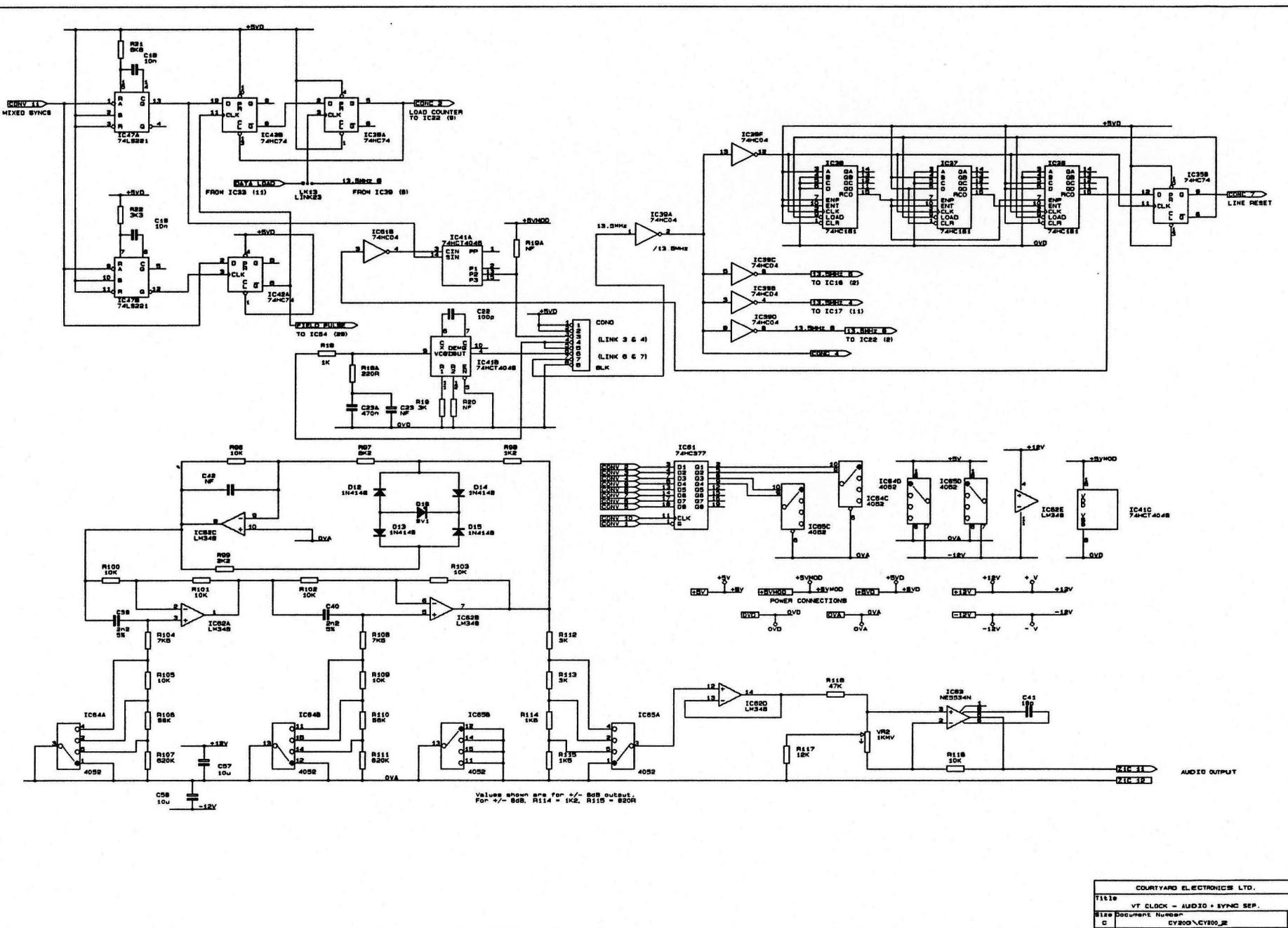


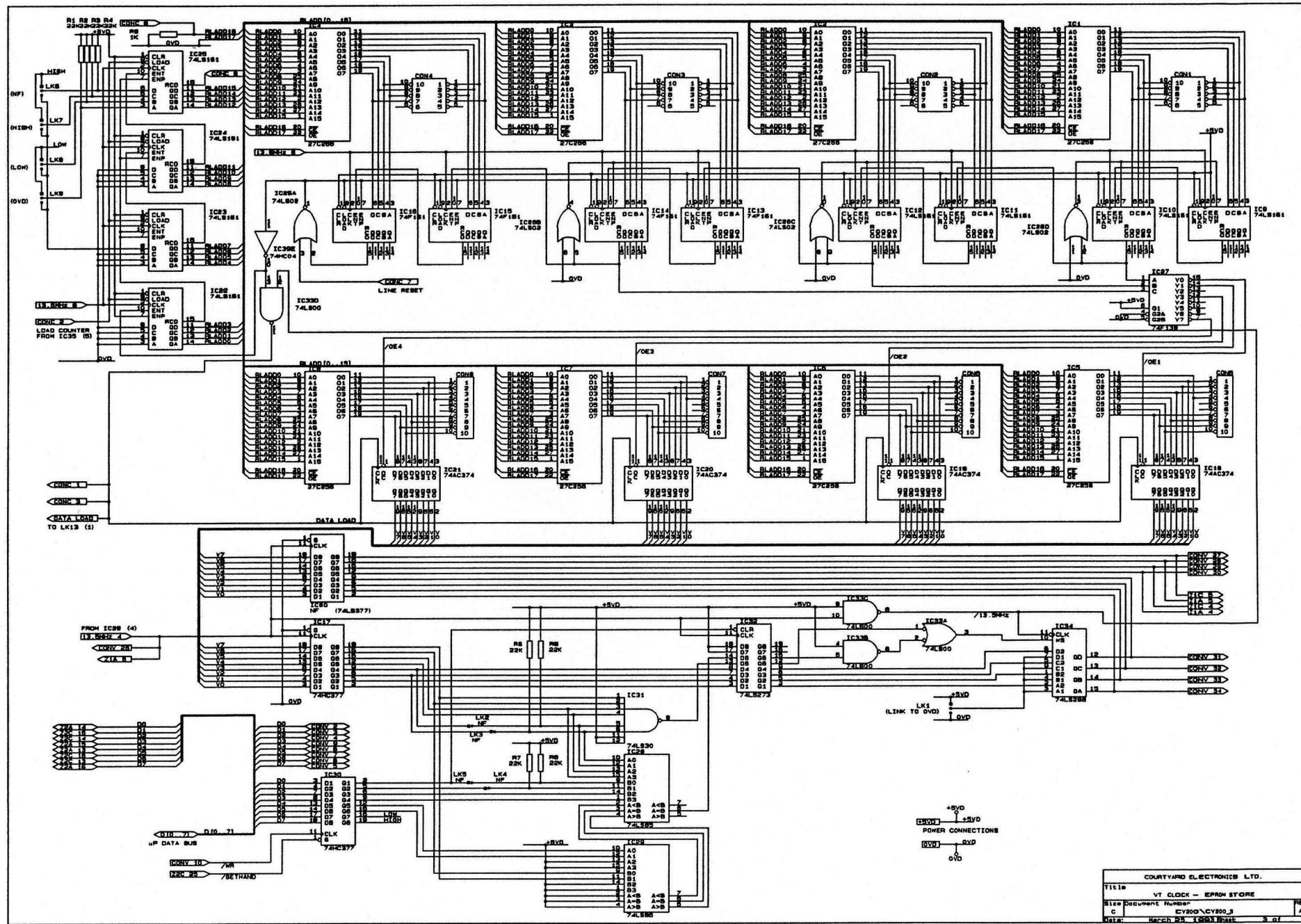
CY 211 ISS 1 B C D COMPONENT SILKSCREEN JAN 1991 I.C.D.



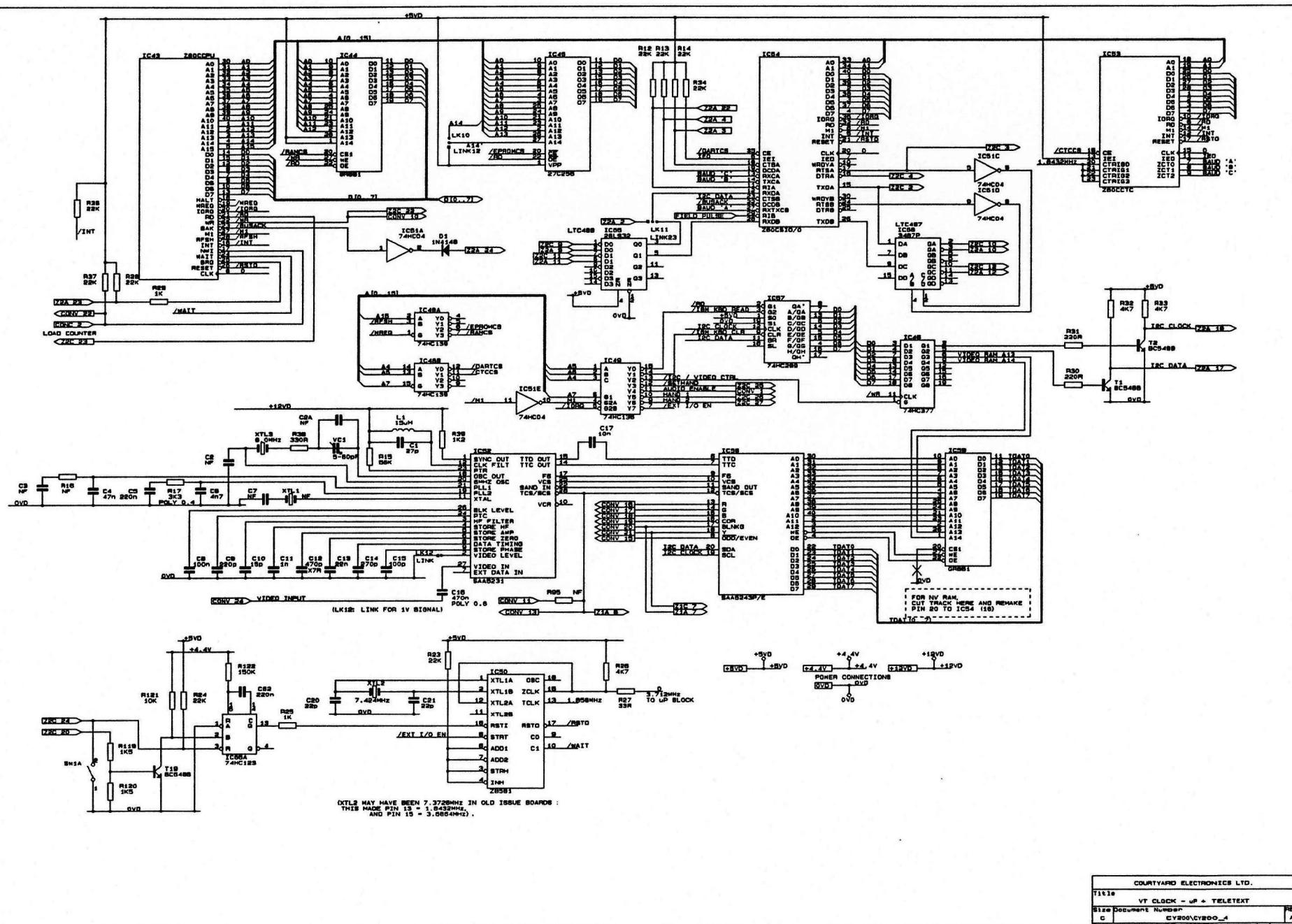
CY 220 ISS 2 ■ B C D COMPONENT SIDE SILKSCREEN JAN 1991 I.C.D.

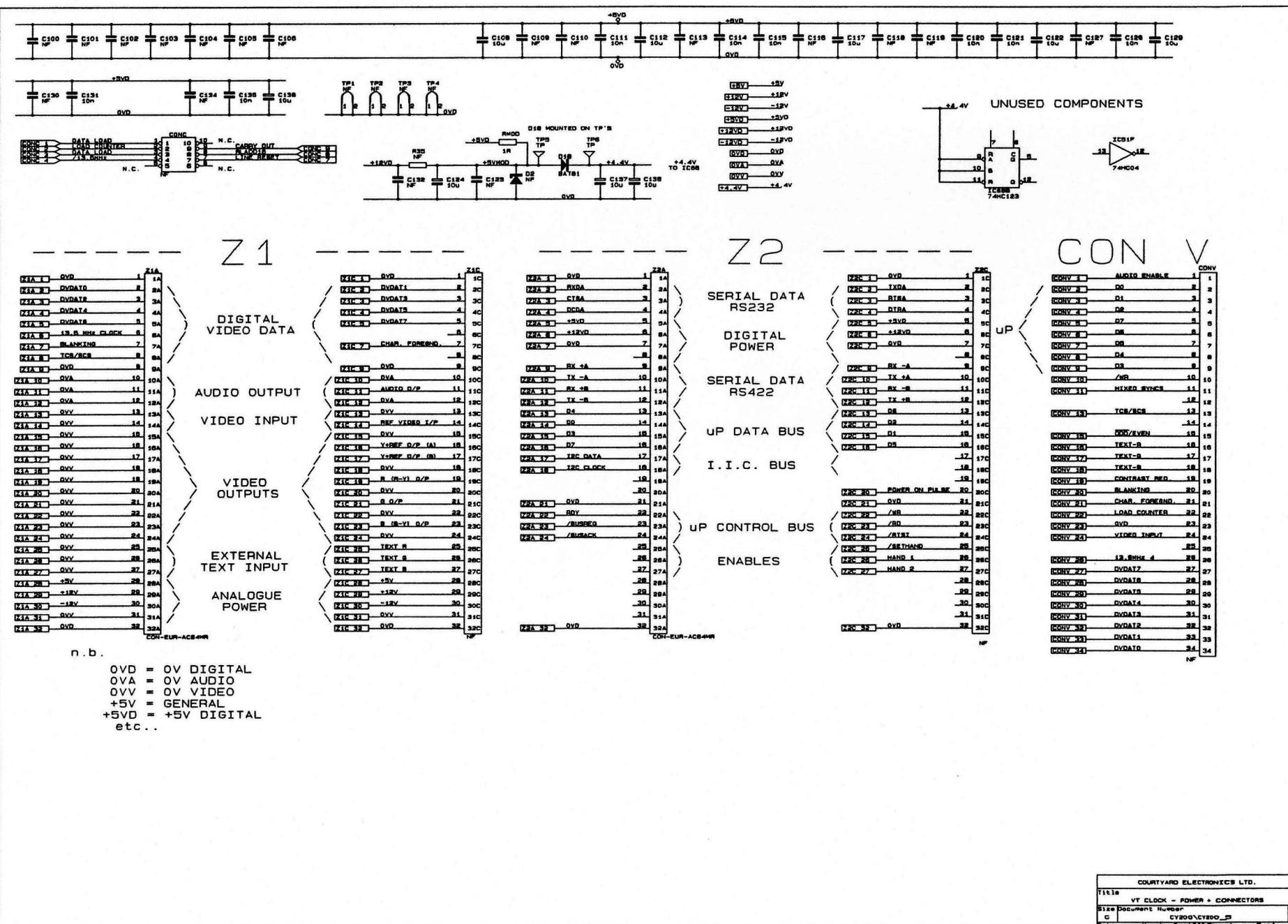


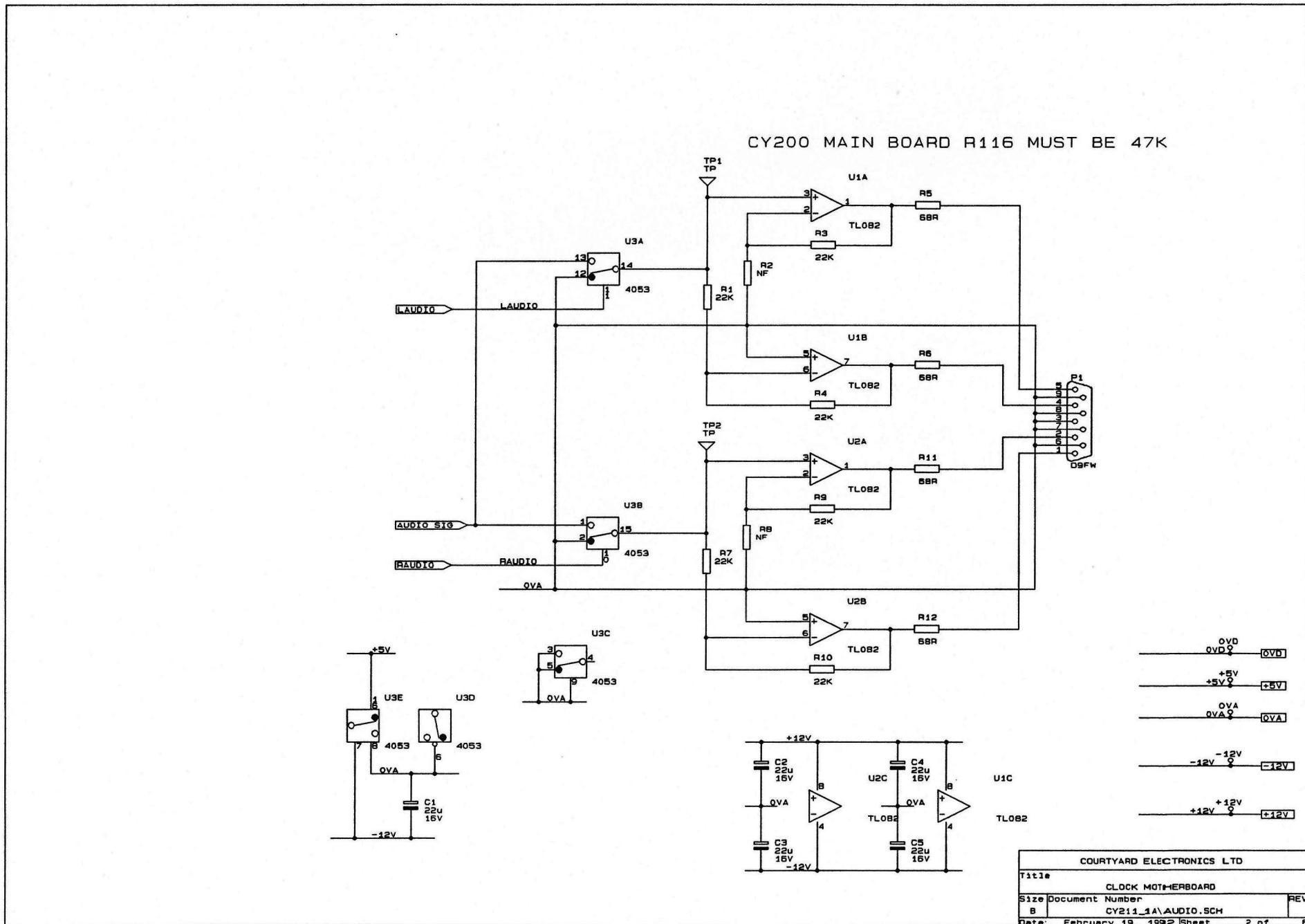


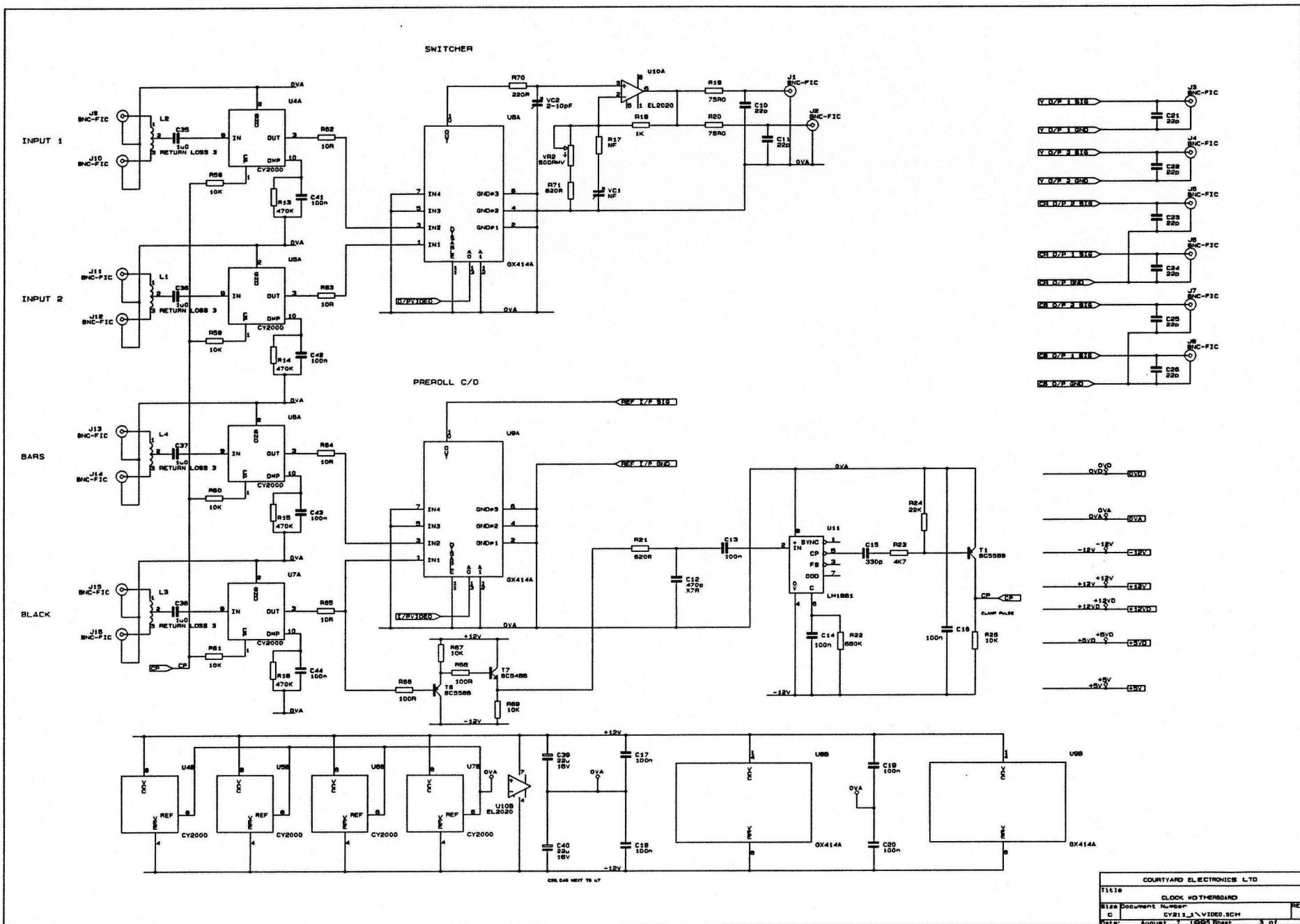


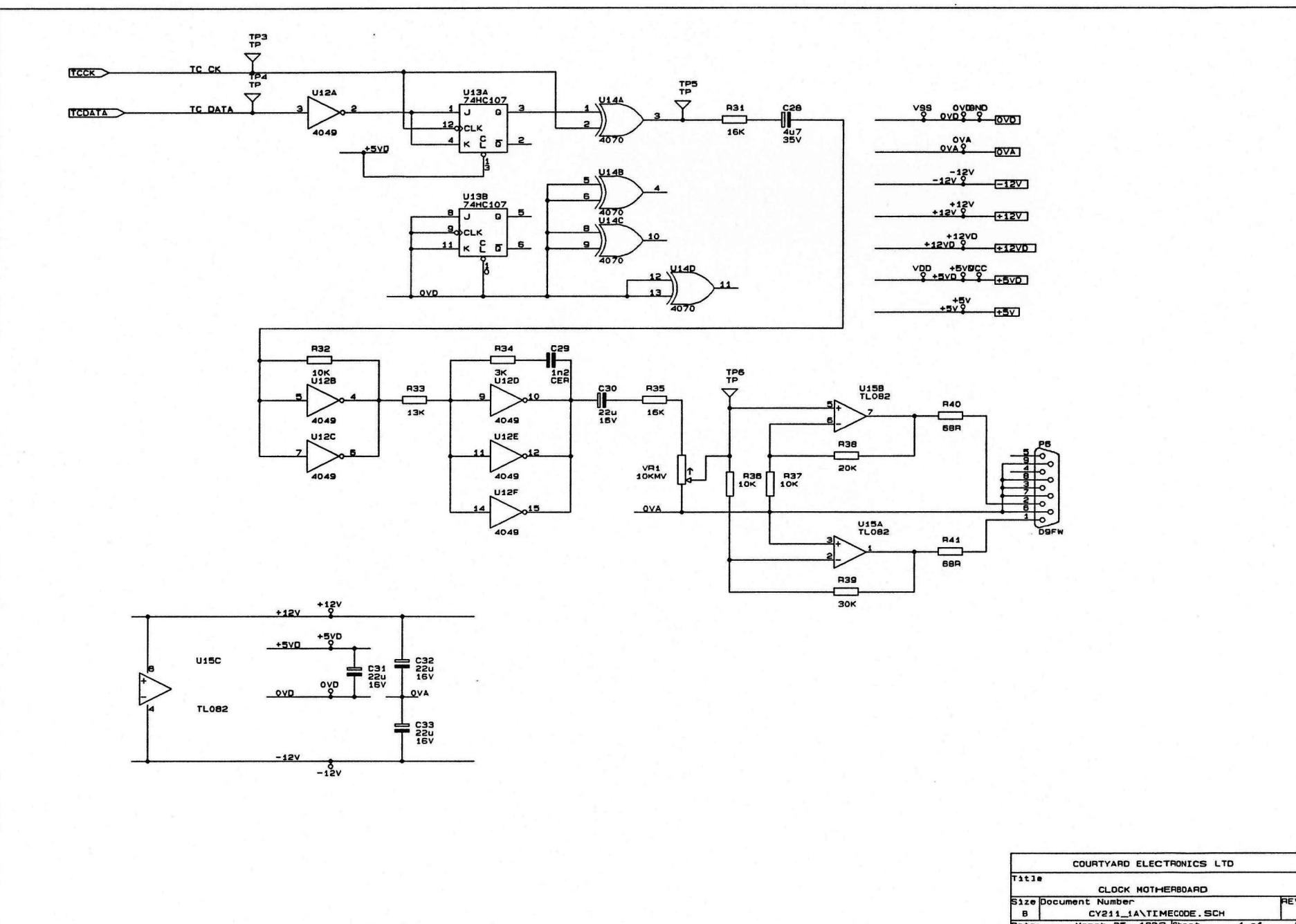
COURTYARD ELECTRONICS LTD.
Title: VT CLOCK - EPROM STORE
Site Document Number: CY200/CY800.5
Rev: A
Date: March 21, 1981
Page: 3 of 3

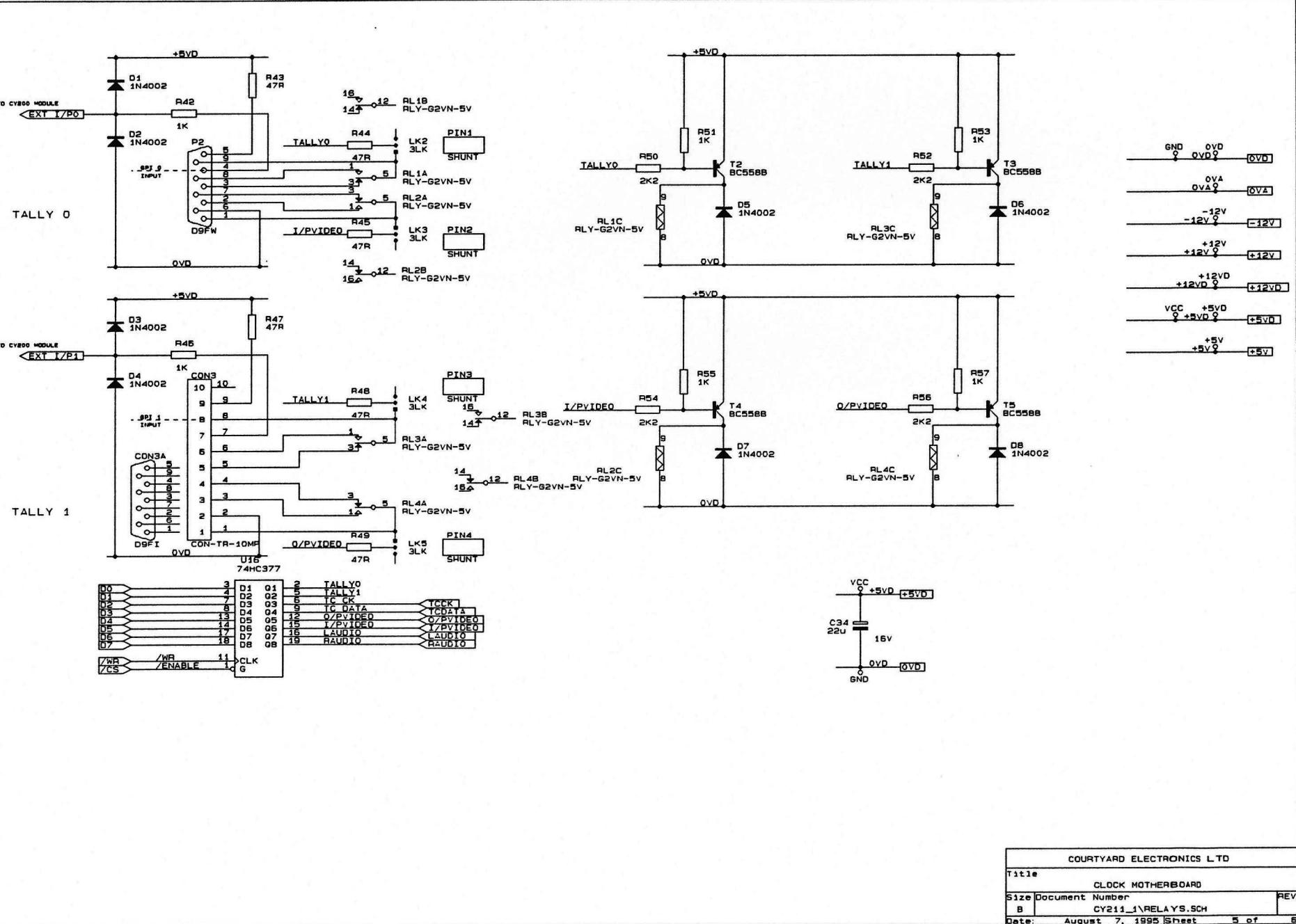


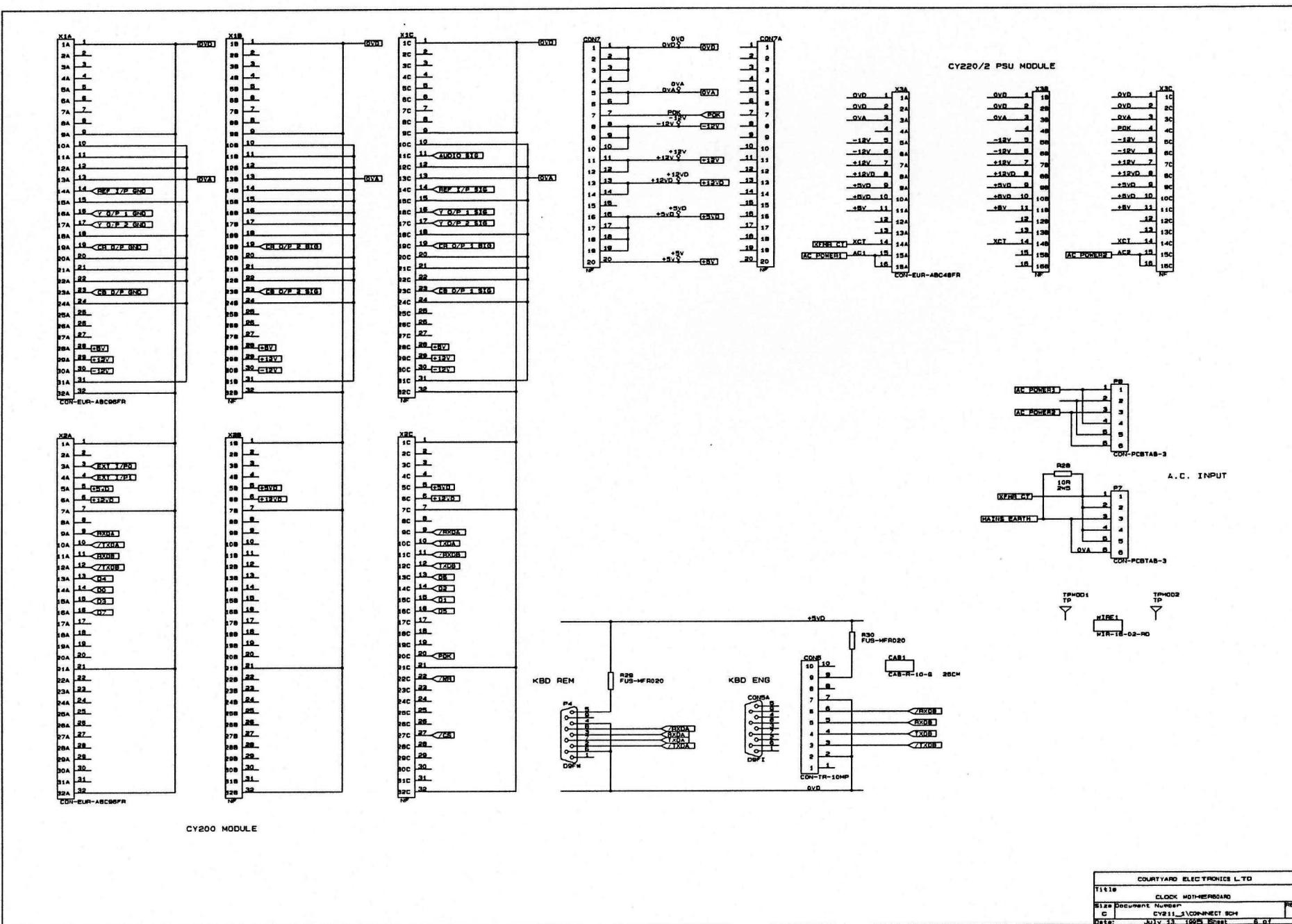


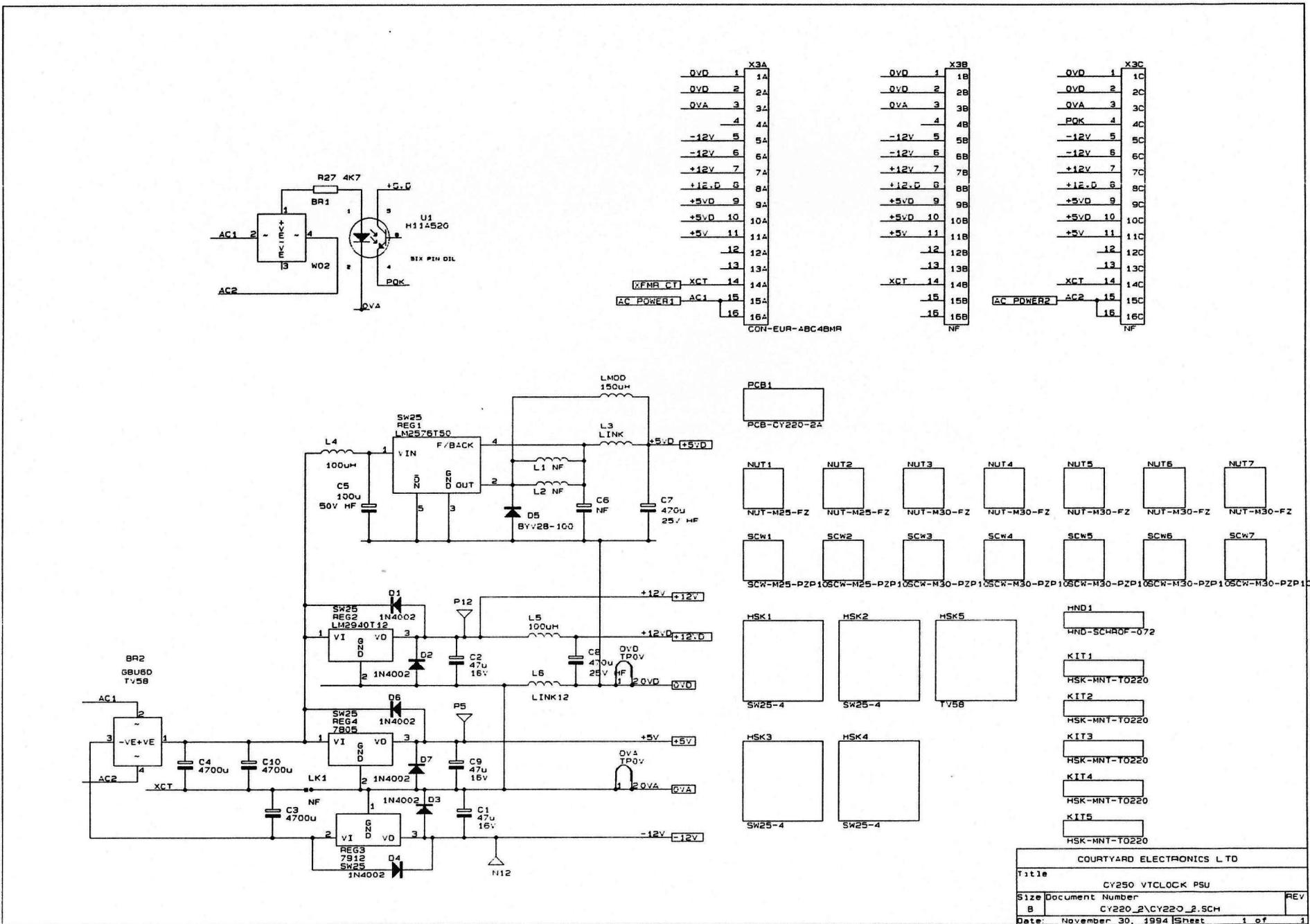












APPENDIX A

Keyboard REM & ENG Port Pinout Details

The Keyboard connections are available on the connectors at the rear of the rack electronics marked **KBD REM** and **KBD ENG**.

Connector Type : D9 Socket.

Pin no. 1	n/c.	Pin no. 6	n/c.
Pin no. 2	n/c.	Pin no. 7	n/c.
Pin no. 3	Data.	Pin no. 8	n/c.
Pin no. 4	OV.	Pin no. 9	n/c.
Pin no. 5	+5V (via 200mA fuse).		

RELAY, TALLY and REMOTE START Pinout Details

TALLY 0 Pre-Roll (Bars/Black c/o) & Relay 1 (GPI 0) Connections.

Connector Type : D9 Socket.

Pin no. 1	Input Video Tally - Common.
Pin no. 2	Input Video Tally - Normally open.
Pin no. 7	Input Video Tally - Normally closed.
Pin no. 9	GPI 0 Tally - Common.
Pin no. 8	GPI 0 Tally - Normally open.
Pin no. 3	GPI 0 Tally - Normally closed.
Pin no. 6	Digital OV.
Pin no. 5	Digital +5V (via 47R resistor).
Pin no. 4	Remote Start closure to Digital OV (or TTL active low).

TALLY 1 Output Switcher & Relay 2 (GPI 1) Connections.

Connector Type : D9 Socket.

Pin no. 1	Output Switcher Tally - Common.
Pin no. 2	Output Switcher Tally - Normally open.
Pin no. 7	Output Switcher Tally - Normally closed.
Pin no. 9	GPI 1 Tally - Common.
Pin no. 8	GPI 1 Tally - Normally open.
Pin no. 3	GPI 1 Tally - Normally closed.
Pin no. 6	Digital OV.
Pin no. 5	Digital +5V (via 47R resistor).
Pin no. 4	Remote Start closure to Digital OV (or TTL active low). (For BBC units, this is the 3-Closure Input).

APPENDIX B

Audio Pinout Details (Stereo)

The audio connections are available on the connector at the rear of the rack electronics marked **AUDIO**.

Connector Type : D9 Socket.

Pin no. 1	'Cold' Right.	Pin no. 6	Ground.
Pin no. 2	'Hot' Right.	Pin no. 7	Ground.
Pin no. 3	Ground.	Pin no. 8	Ground.
Pin no. 4	'Cold' Left.	Pin no. 9	Ground.
Pin no. 5	'Hot' Left.		

TIMECODE Connector Pinout Details

The timecode connections are available on the connector at the rear of the rack electronics marked **TIMECODE**.

Connector Type : D9 Socket.

Pin no. 1	Timecode -ve.
Pin no. 2	Timecode +ve (Positive transition between bits 79 & 0).
Pin no. 3	Timecode OV.
Pin no. 4	n/c.
Pin no. 5	n/c.
Pin no. 6	Timecode OV.
Pin no. 7	Timecode OV.
Pin no. 8	Timecode OV.
Pin no. 9	Timecode OV.

APPENDIX C

Multiple Keyboard Operation

It is possible to use more than 1 keyboard with the Courtyard VT Clock. However, it must be noted that only ONE keyboard may be connected to the unit at any one time.

As can be seen from Appendix A, the keyboard uses 3 wires to communicate with the main unit, OV, +5V and a [bi-directional] data line. It is not possible to permanently power more than one keyboard per port; however the OV line connected to all keyboards may be permanently connected.

The simplest scenario would involve two keyboards connected to a 2-pole changeover (D.ouble P.ole D.ouble T.hrow) switch routing the +5V and Data lines to the requisite extension.

This switch must be of the Break-BEFORE-Make variety to avoid two keyboards being connected to the same data line.

Of course, if three-pole changeover switches are available, then they would provide the ultimate solution for switching all three lines.

If more than two keyboards need to connected, it is suggested that use is made of widely available Data Switch boxes.

APPENDIX D

Software Update Information

CY250 VT CLOCK SOFTWARE RELEASE

L:\Z80\ASM\V60\V60SREL.DOC

This version of software is the first version that can control the additional hardware in the CY250 VT Clock.

INPUT SWITCHER TALLY

A relay tally is now provided for the input switcher; thus a tally of whether black or bars reference is selected is given.

OUTPUT SWITCHER TALLY

The CY250 VT Clock contains a 2 x 1 crosspoint. This has 2 looping inputs and dual outputs. Both inputs are clamped. The crosspoint is controllable in a number of ways. In this software version, only a single method is implemented. This version is used in the BBC Stage 5 installation in conjunction with the second remote start input. The first press of Remote Start 2 will toggle the switcher: the second press will start the Clock: a third press during Clock countdown will reset the Clock and switcher. If the Clock is allowed to count down, then the switcher will be reset when the Clock cuts to black. The output switcher tally reflects the state of the 2 x 1 switcher.

Other modes will be introduced in later versions.

GENERAL PURPOSE TALLY ADDITIONAL MODES

In this software version, the second general purpose relay (Relay2 in System Setup Page) provides a toggle function during clock countdown. This may be used to flash a lamp. In this software version, the normal programmable function of this relay is unavailable.

Other modes will be introduced in later versions.

STEREO AUDIO OUTPUT

In this software version, the stereo audio output does not contain channel identification.

Other modes will be introduced in later versions.

SECOND REMOTE START INPUT

In this software version, the second remote start input only functions in conjunction with the 2 x 1 switcher in the manner described above.

Other modes will be introduced in later versions.

APPENDIX D

Software Update Information

CY250 VT CLOCK SOFTWARE RELEASE

L:\Z80\ASM\V61\V61SREL.DOC

This version of software provides operational improvements and additions.

SECOND REMOTE START INPUT

Improved Control :-

In this software version, the second remote start input function has been improved to include debouncing of this input. The debounce period is a minimum of 85ms and a maximum of 125ms, i.e. the software counts the next 2 FRAME pulses. The exact timing of the remote start functions are not guaranteed; they never have been.

Other modes may be introduced in later versions.

GENERAL PURPOSE TALLY ADDITIONAL MODES

Additional Control :-

In this software version, the second general purpose relay (Relay2 in System Setup Page) provides a toggling function during clock countdown. This may be used to flash a lamp. In this software version, the normal programmable function of this relay has been restored (was not available in v6.0). The toggling function is selected by specifying 'flash' in the 'T-' entry for relay tally 2 on.

Other modes may be introduced in later versions.

APPENDIX D

Software Update Information

CY250 VT CLOCK SOFTWARE RELEASE

L:\Z80\ASM\V62\V62SREL.DOC

This version of software provides operational improvements and additions.

CLOCK FACE AND DOWNSTREAM CROSSPOINT

In this software version, two new keyboard functions have been included, and to support these, additional modes have been added to the setup page. New keycaps to upgrade 79-key keyboards will be available shortly.

1. The clock face can be turned on and off direct from the keyboard and from either engineering or operator port.
2. The downstream crosspoint can be controlled in three modes selected from the setup page.

MANUAL - The crosspoint is controlled from the keyboard (operation of the 2nd GPI is not changed).

AUTO ON CTB - The crosspoint is controlled in conjunction with the 2nd GPI and toggles on the first and third closures of the GPI or the first closure and the clock reaching cut to black. (This is how it worked in the previous issue).

FOLLOW GPI - The crosspoint is controlled in conjunction with the 2nd GPI input. The crosspoint follows the state of the GPI input.

Other modes may be introduced in later versions.

This software revision has used some new keycodes. For VT Clocks used in remote or computer control applications, you should check for correct functionality in all circumstances. New keyboard tables are available to systems integrators and software developers on request.

APPENDIX D

Software Update Information

CY250 VT CLOCK SOFTWARE RELEASE

L:\Z80\ASM\V70\V70SREL.DOC

This version of software provides operational improvements and additions.

CLOCK FACE

1. Provision for 4x3 and 16x9 and Digital clock faces has been added to the setup page. This feature requires a hardware and clock face firmware upgrade.
2. Provision for a moving bar (moving each frame) has been added to the setup page. This feature will be completed in a later release.
3. The TELETEXT numbers have been deleted. They will be replaced by numbers generated in the clock face. This feature requires a clock face firmware upgrade.

CLOCK FACE AND DOWNSTREAM CROSSPOINT

In this software version, two new keyboard functions have been included, and to support these, additional modes have been added to the Setup Page.

1. The remote start on the 2nd GPI can be controlled in three modes selected from the Setup Page.

NORMAL - A normal remote start is performed exactly like on the 1st GPI.

TWO PRESS - The clock is stopped and selected on the first press and started on the second press. When the crosspoint control is in either of the AUTO modes, the first press selects clock on air.

THREE PRESS - The clock is selected on the first press and started on the second press and stopped on the third press. When the crosspoint control is in either of the AUTO modes, the first press selects clock on air.

2. The downstream crosspoint can be controlled in four modes selected from the Setup Page.

MANUAL :-	The crosspoint is controlled from the keyboard (operation of the 2nd GPI is not changed).
AUTO AT CTB :-	The crosspoint is controlled in conjunction with the 2nd GPI and switches to Program when the clock "Cuts To Black".
AUTO AT T-0 :-	The crosspoint is controlled in conjunction with the 2nd GPI and switches to Program at T-0.
FOLLOW GPI :-	The crosspoint is controlled in conjunction with the 2nd GPI input. The crosspoint follows the state of the GPI input.

Other modes may be introduced in later versions.

This software revision has used some new keycodes. For VT Clocks used in remote or computer control applications, you should check for correct functionality in all circumstances. New keyboard tables are available to systems integrators and software developers on request.

Remote start code :	09Dhex
Two press or three press start code :	09Ehex
The crosspoint on code :	0A1hex
The crosspoint off code :	0A3hex

APPENDIX D

Software Update Information

CY250 VT CLOCK SOFTWARE RELEASE

L:\Z80\ASM\V71\V71SREL.DOC

This version of software provides operational improvements and additions.
This version uses a 27C256 EPROM and requires LK10 to be fitted towards the front of the module.

MODES OF OPERATION

Provision for a text-only mode has been added to the Setup page :

In this mode the status line is always blank.
In this mode all programming functions via the SET key continue to operate.
If the clock is started in this mode the operation is unspecified.

Operation in this mode is not logical and has not been tested.

APPENDIX D

Software Update Information

CY250 VT CLOCK SOFTWARE RELEASE

L:\Z80\ASM\V72\V72SREL.DOC

This version of software provides operational improvements and additions. This version uses a 27C256 EPROM and requires LK10 to be fitted towards the front of the module.

MOVING BAR DURING COUNTDOWN

1. The MOVING BAR is now functional.

INTERRUPTED AUDIO

1. Both EBU and GLITZ tones are supported. Interruptions are counted by a frame counter.

The EBU counts 75 frames, 0..6 of which are silent on the selected channels.

The GLITZ counts 150 frames, of which 0..12 are silent on the left channel, and 25..37 and 50..62 are silent on the right channel.

CURSOR ON/OFF

1. A new function key has been defined as Cursor On/Off. This key is the second unmarked key to the right of the DH (Double Height) key.

APPENDIX D

Software Update Information

CY250 VT CLOCK SOFTWARE RELEASE

L:\Z80\ASM\V73\V73SREL.DOC

This version of software provides operational improvements and additions. This version uses a 27C256 EPROM and requires LK10 to be fitted towards the front of the module.

16 x 9 CLOCK FACE

1. This release permits the selection of a 16 x 9 Clock Face as well as the standard 4 x 3 version (provided the appropriate Clock Face EPROMs are installed).
The required Clock Face is selected from the System Setup Page (accessible via the Keyboard Engineering port on the rear of the frame).

There is an associated hardware modification to enable this menu selection :

Wire link from IC61 (19) - LK6 (2).

2. Placement of text associated with the Clock Face (i.e. second numbers) is automatically controlled in software.
When changing Clock Faces, the user must wipe clean any relevant pages before the selecting the new Clock Face and writing the (default) text onto it.

APPENDIX E

CY460 - MonoChrome Digitiser

The CY460 MonoChrome Digitiser provides up to 6 CCIR 601 Serial Digital Component Outputs from an analogue source.

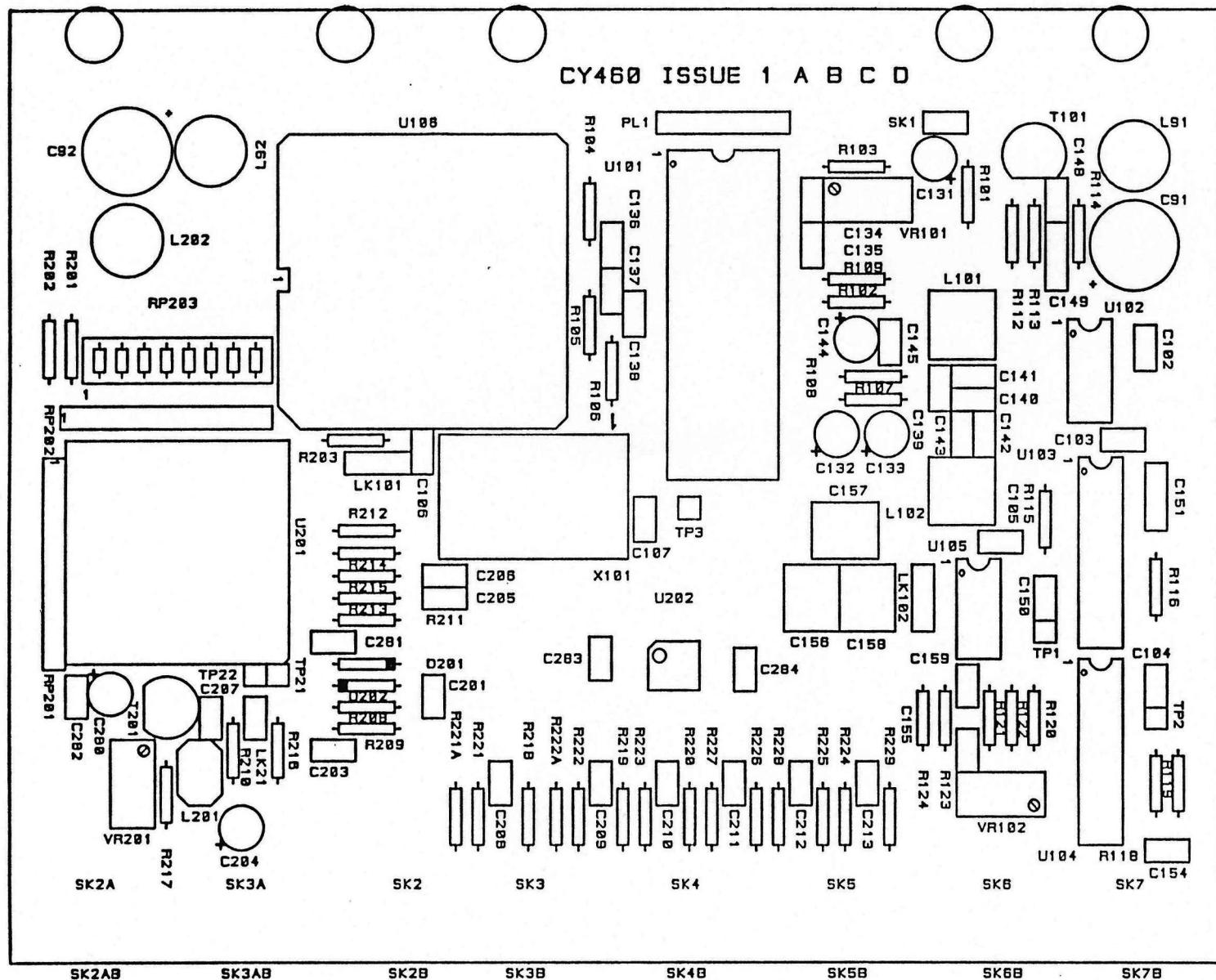
The analogue video is input via SK1 and is fed to U101, an Analogue-To-Digital Converter. Buffered video, adjustable in gain with VR101, becomes available at T101/PL1(6), with U102 providing separated syncs and clamp pulses. U103B produces a clean clamp pulse for the ADC, while U103A provides a $\frac{1}{2}$ line eliminated pulse train to drive the 27MHz phase-locked loop based around U104A (phase comparator), U105 (phaselock voltage buffer/filter), and X101 (27MHz crystal oscillator). Part of U106 is programmed to provide a signal for the second input of the PLL comparator.

U106's primary function is to process the parallel digital data from the ADC prior to feeding onto the Serialiser, U201. This is the industry standard "1601A" Serial Interface Transmission Encoder device, which transforms the 27MHz parallel data to 270MHz serial data. VR201 sets the VCO free-run frequency (only when LK21 is linked) with T201 providing temperature compensation.

U202 is a Serial Digital Cable Driver, providing 6 outputs of the Serial Digital data stream.

Power is supplied via PL1(1) and split into two, filtered rails, via L91, L92, C91 and C92. Typical current consumption is 600mA at +5V d.c.

CY460 ISSUE 1 A B C D



CY460 ISS 1 A B C D COMPONENT SILKSCREEN MARCH 1993 I.C.D.

