



Notes for use

No. 94



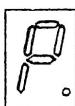
3 CHIP PLUS

- INSTRUCTIONS for PROGRAM LOADER (540.301)
PROGRAM MEMORY (540.302)
BURNER (540.305)

Many of the instructions below refer to the type of display which should be seen on the Program Loader board (540.301) at various times. The 6 seven-segment displays are arranged into three areas: 3 of the displays form the ADDRESS area, 2 form the DATA area, and the last shows the PROMPT to which the user should respond by an appropriate key-press. The ADDRESS and DATA areas would normally contain hexadecimal numbers, between 000 and 7FF for the ADDRESS, and between 00 and FF for the DATA. In these instruction notes, the use of the symbol 'y' or '(y+1)' etc in an ADDRESS position indicates that any hexadecimal digit (from 0 to F) is being displayed. The symbol 'xx' indicates that the DATA display can contain any value. Occasionally, the ADDRESS and DATA areas are used together to contain a message such as 'error' or a query such as 'HOLE?'. The PROMPT area is used to display a single alphabetic character which gives a clue to the current mode of operation, or the next key to be pressed to continue the operation. In these notes, the total display area is shown in the following form:



where AAA = ADDRESS DD = DATA P = PROMPT



1. THE PROGRAM LOADER (540.301) & PROGRAM MEMORY (540.302)

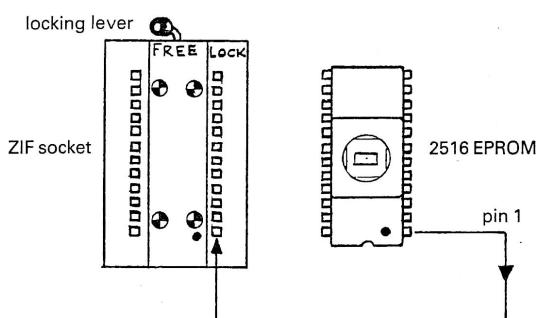
Immediately after switch-on, the board should display



If not, press the RESET button.

A memory device should now be inserted into the ZIF (Zero-Insertion Force) socket on the board. If you wish only to READ the contents of memory, this device can be an EPROM (Erasable Programmable Read-Only Memory integrated circuit) of the 2516/2716 type.

NOTE: THE I.C. MUST BE INSERTED INTO THE SOCKET WITH PIN 1 AT THE BOTTOM RIGHT-HAND CORNER.



If you wish to WRITE and/or EDIT programs, you will need an alterable memory such as the battery-backed RAM (Random Access Memory) of the 3 Chip Plus Program Memory board (540.302). Again, this must be inserted the correct way up, but the design of the Program Memory board prevents incorrect insertion.

Each of the memory devices described above contains 2K of memory cells (i.e. 2048 locations) into which numbers from 0 to 255 can be inserted. In hexadecimal, we would say that the memory extended from 000 to 7FF. Another way of thinking of the memory is to say that it consists of 8 'pages' where each page contains 256 (100 hex) memory locations. The pages would be known as 'page 0', 'page 1' etc, up to 'page 7', i.e. the page number is given by the most significant digit of the address.

The key-pad contains 16 keys in the central block which give the hexadecimal digits 0 to F. There are also two lines of 'command keys', the function of which is explained below:

m	cp	cq	e
a	d	-1	+1

Command Key-Press	Prompt becomes	Subsequent Function
a	a	An ADDRESS in memory can be selected by three presses of the keys 0 to F. The DATA in that memory address will be displayed.
d	d	DATA can be entered into the currently displayed memory ADDRESS by two presses of the keys 0 to F, overwriting any existing data. This applies only to alterable memory.
+1	d	The ADDRESS is incremented by one. The new ADDRESS, and the DATA in memory at that address are displayed. DATA can be entered into the selected address (overwriting existing data), assuming alterable memory is being used.
-1	d	The ADDRESS is decremented by one. The new ADDRESS, and the DATA in memory at that address are displayed. DATA can be entered into the selected address (overwriting existing data), assuming alterable memory is being used.
cq	top FF ?	<p>This enables all or part of alterable memory to be filled with FF. Unused memory locations should contain FF as this identifies unused areas of memory and saves time during burning of EPROMS as addresses containing FF are skipped over during burning.</p> <p>BEFORE selecting this facility, the display should show the first unused address, thus all of the desired program is located below this address. Then press F to confirm that you wish to proceed with the overwriting of this top portion of memory. Each memory cell from the displayed address to the top of memory at address 7FF will then be filled with FF. The ADDRESS remains at the start of the filled block. The DATA shows FF, as the new contents of that address. The PROMPT shows F to confirm that the process is finished.</p> <p>After the prompt</p>  <p>where normally you would confirm with the key-press F, pressing any other key will cause the operation to be aborted. The display will then revert to</p>  <p>If, during the clearing process, the display shows</p>  <p>then a memory location has refused to clear to FF. Press any key. The display will then show the address of the error, and for 1 second, the contents of the memory, e.g.</p>  <p>Options then available are</p> <ul style="list-style-type: none"> • to press key d to see the contents of that address again • to press key A to abort the operation, when the display reverts to  <ul style="list-style-type: none"> • to press any other key to continue the clearing operation: any further errors will be displayed in the same way.

Command Key-Press	Prompt becomes	Subsequent Function
m	HOL E?	<p>This facility allows blocks of program to be moved to make space for extra instructions. The ADDRESS of the first cell where the space is to start, must first be selected. Pressing the +1 key moves a whole block of machine code in memory up by one cell. The block which is moved starts at the selected address and ends at the next 'page' boundary. The contents of the last cell in that page are lost, while the 'hole' which has been created at the selected address is filled with FF. The display then shows the next ADDRESS to that first selected. Of course, it contains the same DATA as the previous address because the data has been shifted up. The PROMPT is H to indicate that you may extend the HOLE by pressing the +1 key several more times. Any key other than +1 will cause the Program Loader to go into 'data entry' mode (as with command key 'd') at the address currently displayed.</p> <p>As an example, if the start address is 34A, then the contents of all cells 34A to 3FE will be moved up by one cell. The contents of 3FF will be lost, and 34A will contain FF. The display will show</p>  <p>where xx represents the original contents of 34A.</p> <p>If you attempt to create a hole at the top of a page (e.g. 4FF), when key +1 is pressed, that cell is cleared to FF, but the address remains at that location; it does not increment.</p>

2. USING THE BURNER (540.305)

The Burner can be used to create permanent copies of programs in EPROM integrated circuits. The ZIF socket on the Burner will take an EPROM of the 2516 or 2716 type.

NOTE: IT MUST ONLY BE CONNECTED TO THE PROGRAM LOADER BOARD, FROM WHICH IT RECEIVES ITS POWER, AS WELL AS THE CONTROLLING INSTRUCTIONS AND DATA TO BE BURNED INTO ROM. TAKE CARE TO INSERT THE I.C. INTO THE ZIF SOCKET THE CORRECT WAY ROUND: i.e. PIN 1 MUST BE TOWARDS THE BOTTOM RIGHT-HAND CORNER OF THE SOCKET.

Command Key-Press	Prompt becomes	Subsequent Function
cp	COP Y?	<p>This facility allows the contents of a ROM in the Burner board to be copied into alterable memory (the Program Memory board). Press key C to start the process. On completion, the display shows</p>  <p>Pressing any key other than C, sets the display to</p>  <p>This facility can be used to compare two EPROM's – see below.</p>
e	burn? U	<p>To program a UV-erasable EPROM, press key B. During the process, the address and data of the current memory cell are displayed. Cells containing FF are skipped over. Verification takes place as burning proceeds. When the process is complete, the display shows</p>  <p>Pressing keys other than B or E sets the display to</p> 

Error Messages during Copy/Burn Processes

display	meaning
	The external ROM has not been correctly copied into the Program Memory
	The EEPROM has not programmed correctly

The Program Loader can be used to view the errors. Press a key and the address of the first error will be displayed, together with the contents of the Program Memory for 1 second, while the PROMPT shows A. After that, the DATA area shows the contents of the same memory location in the PROM in the Burner board while the PROMPT shows 0.

The options then available are

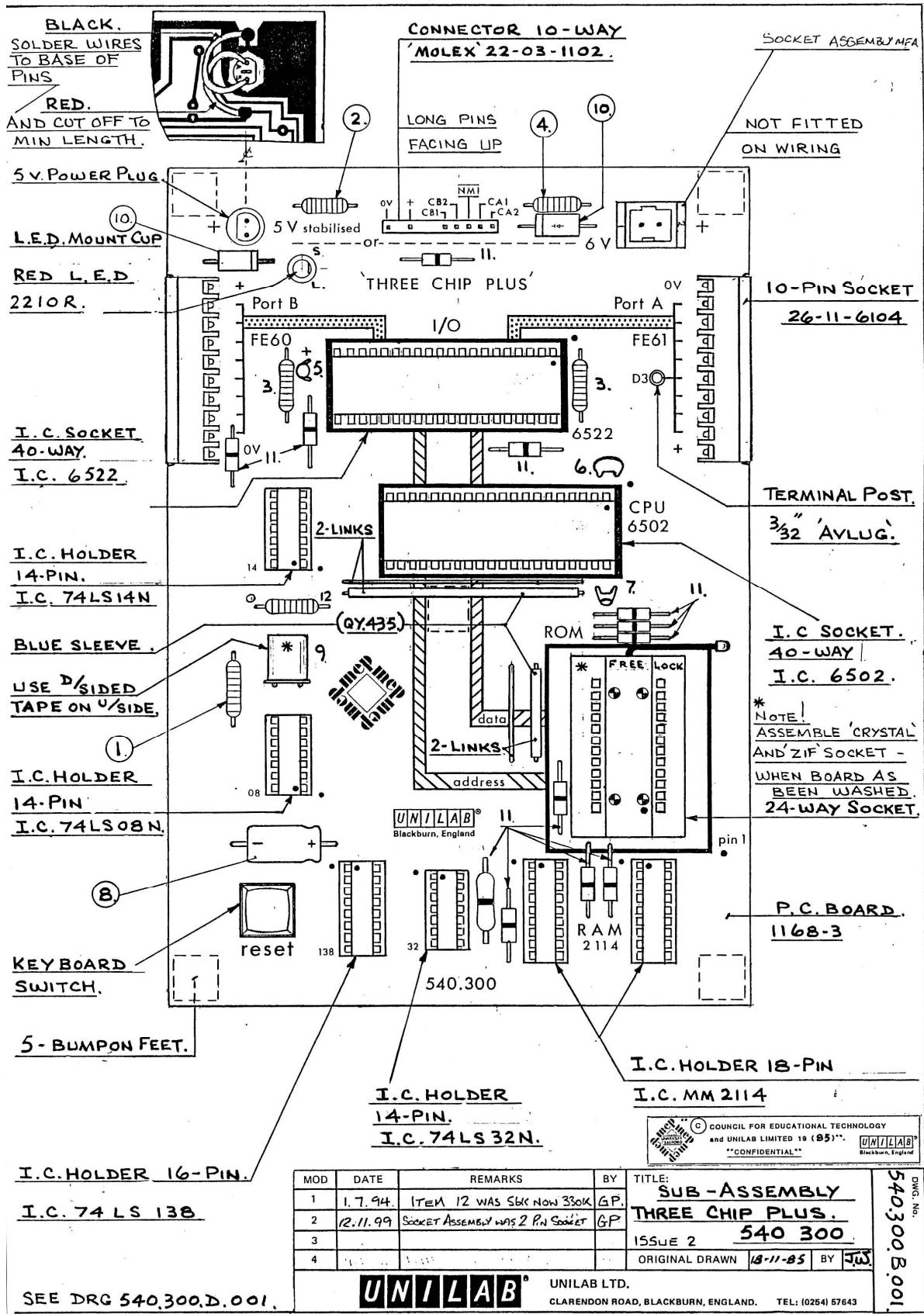
- to press key d to see the contents of the Program Memory address again
- to press key A to abort the operation, when the display reverts to

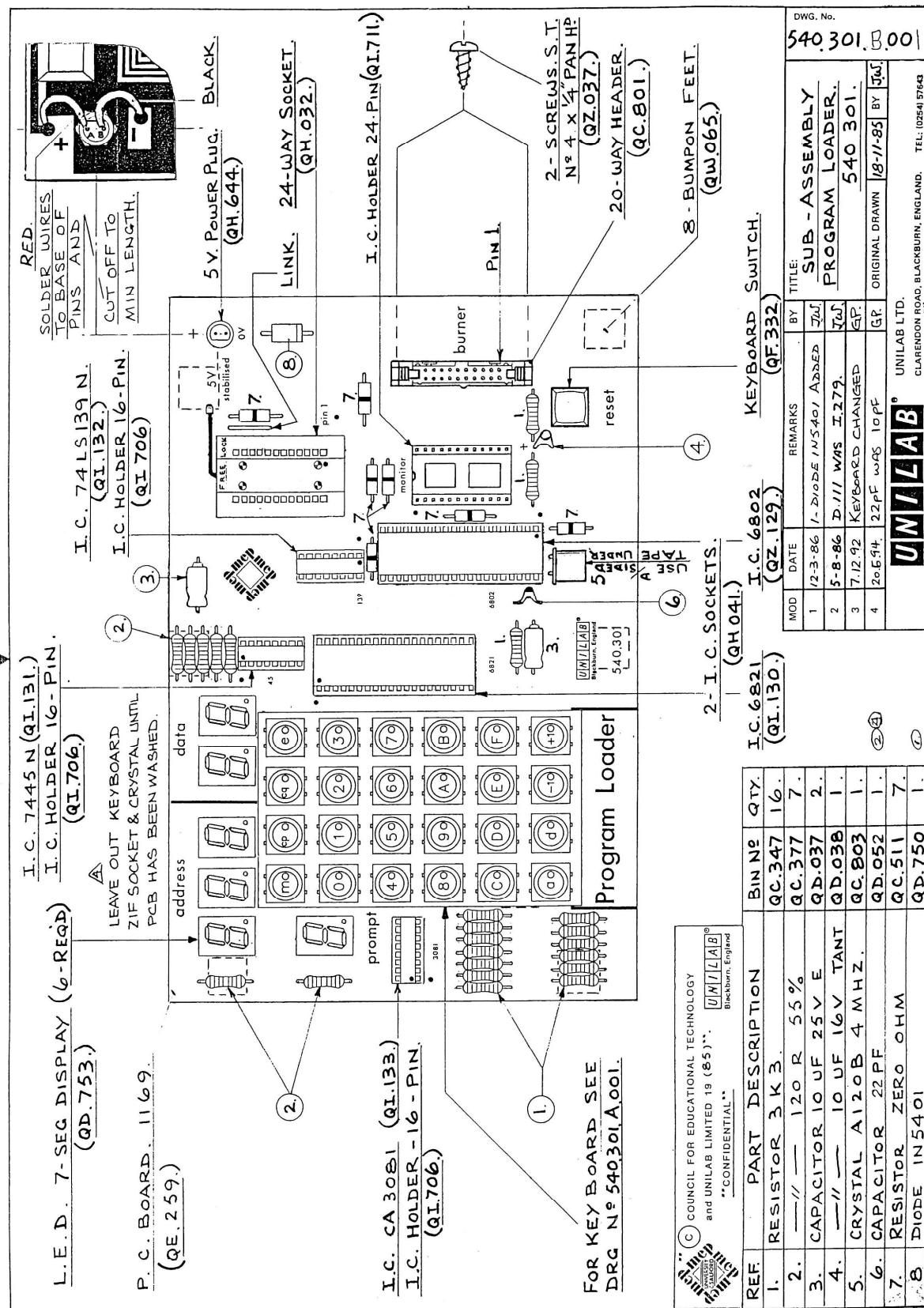


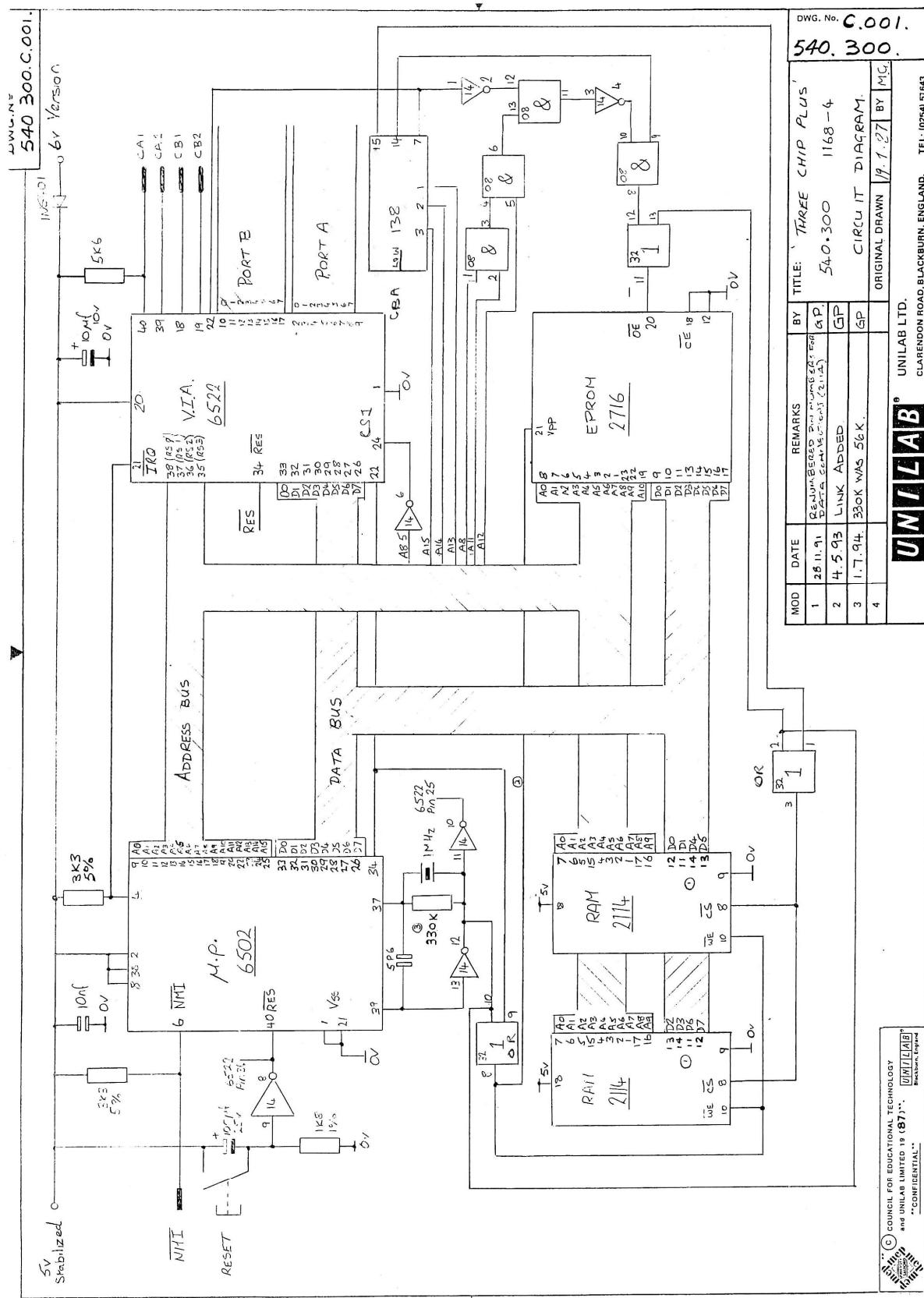
- to press any other key to continue the burn or copy operation: any further errors will be displayed in the same way.

Comparing Two EPROM's

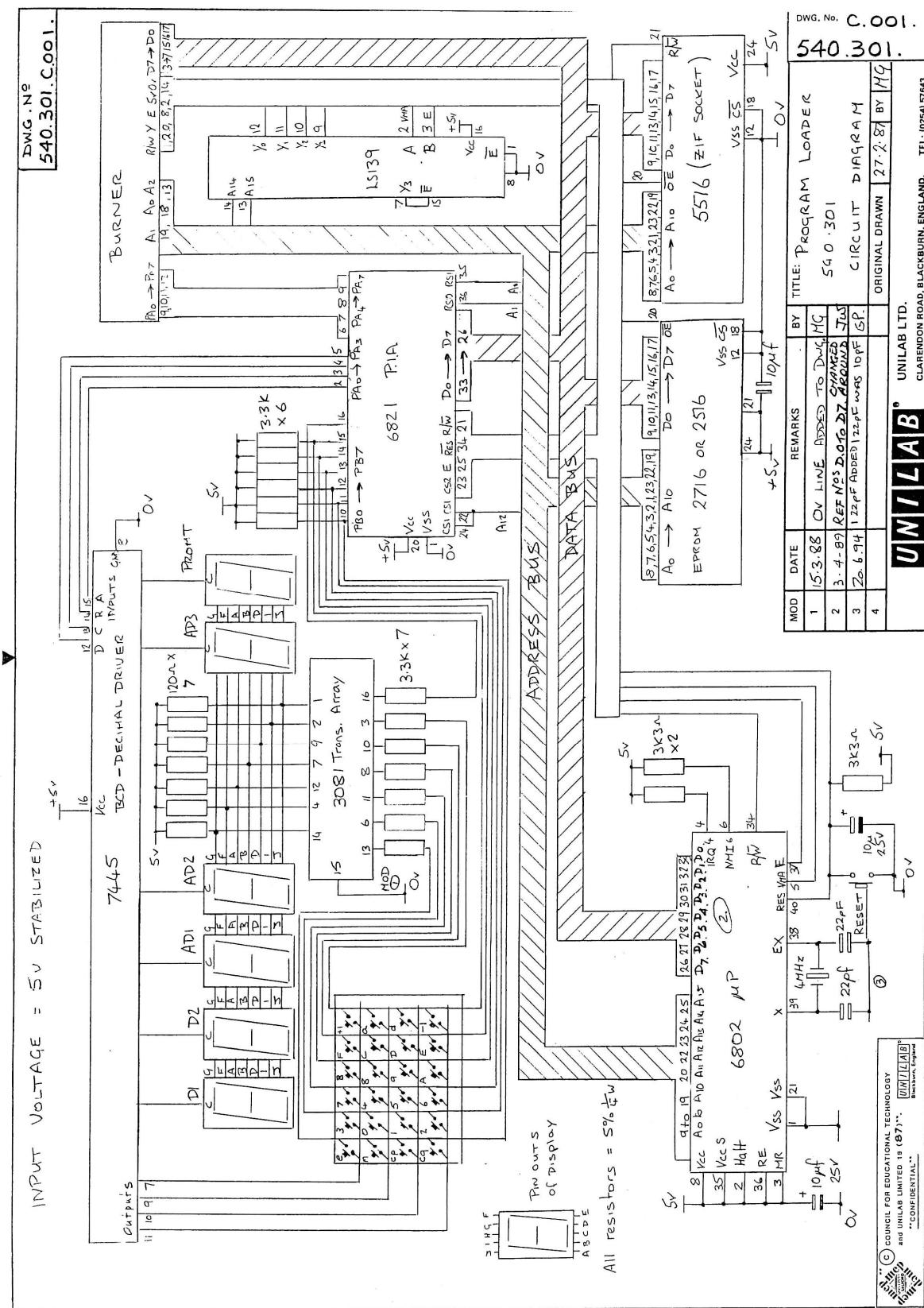
Insert the EPROM's into the ZIF sockets on the Program Loader and the Burner boards. Now press cp followed by C. If no error message is given then the two; are identical. Individual differences will be reported by the 'Error C' facility described above.

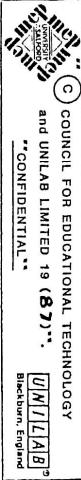






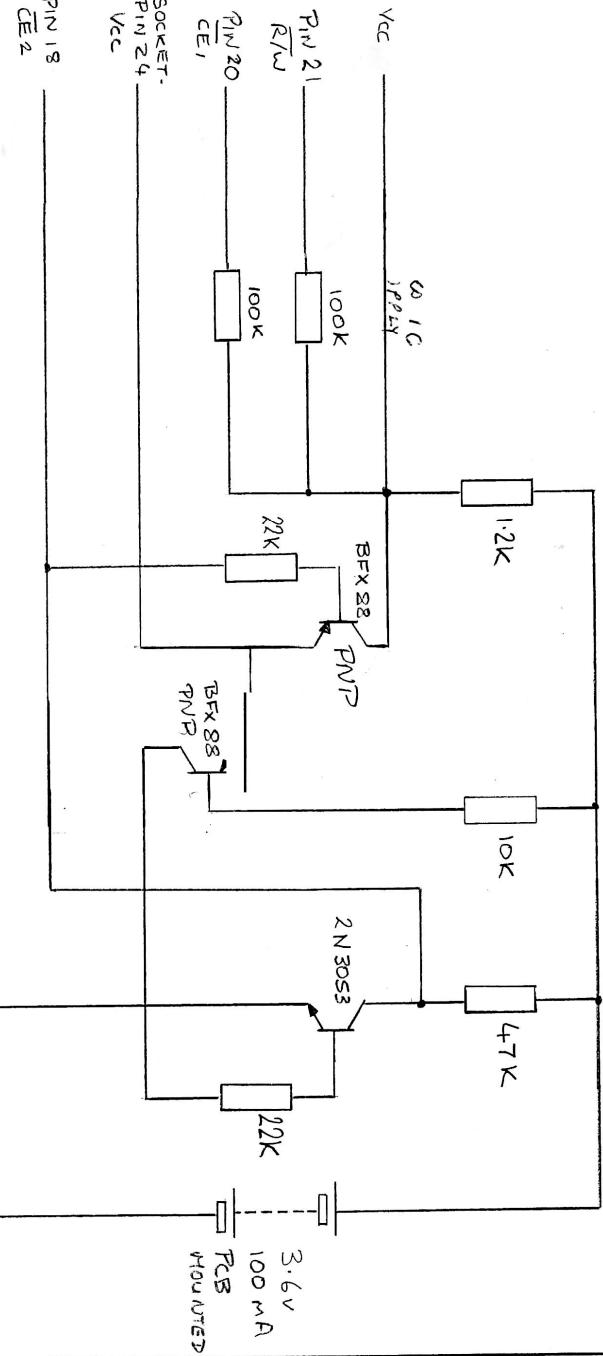
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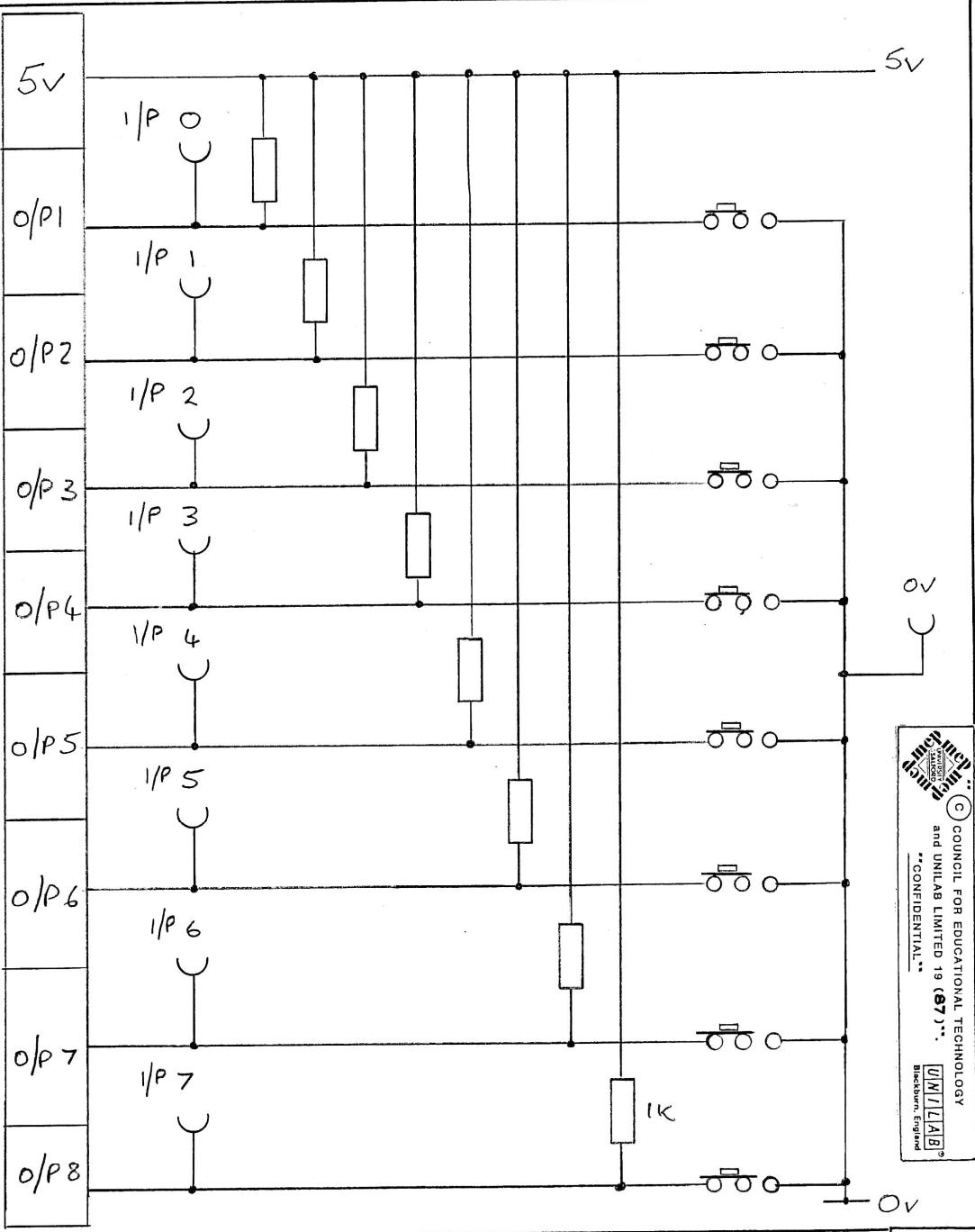
OLOGY



MOD	DATE	REMARKS	BY	TITLE: PROGRAM MEMORY 540.302 CIRCUIT DIAGRAM
1				
2				
3				
4				ORIGINAL DRAWN 20.2.87 BY MC

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CLARENDON ROAD, BLACKBURN, ENGLAND. TEL: (0254) 57643

DWG. NO. C.001.
540.302.

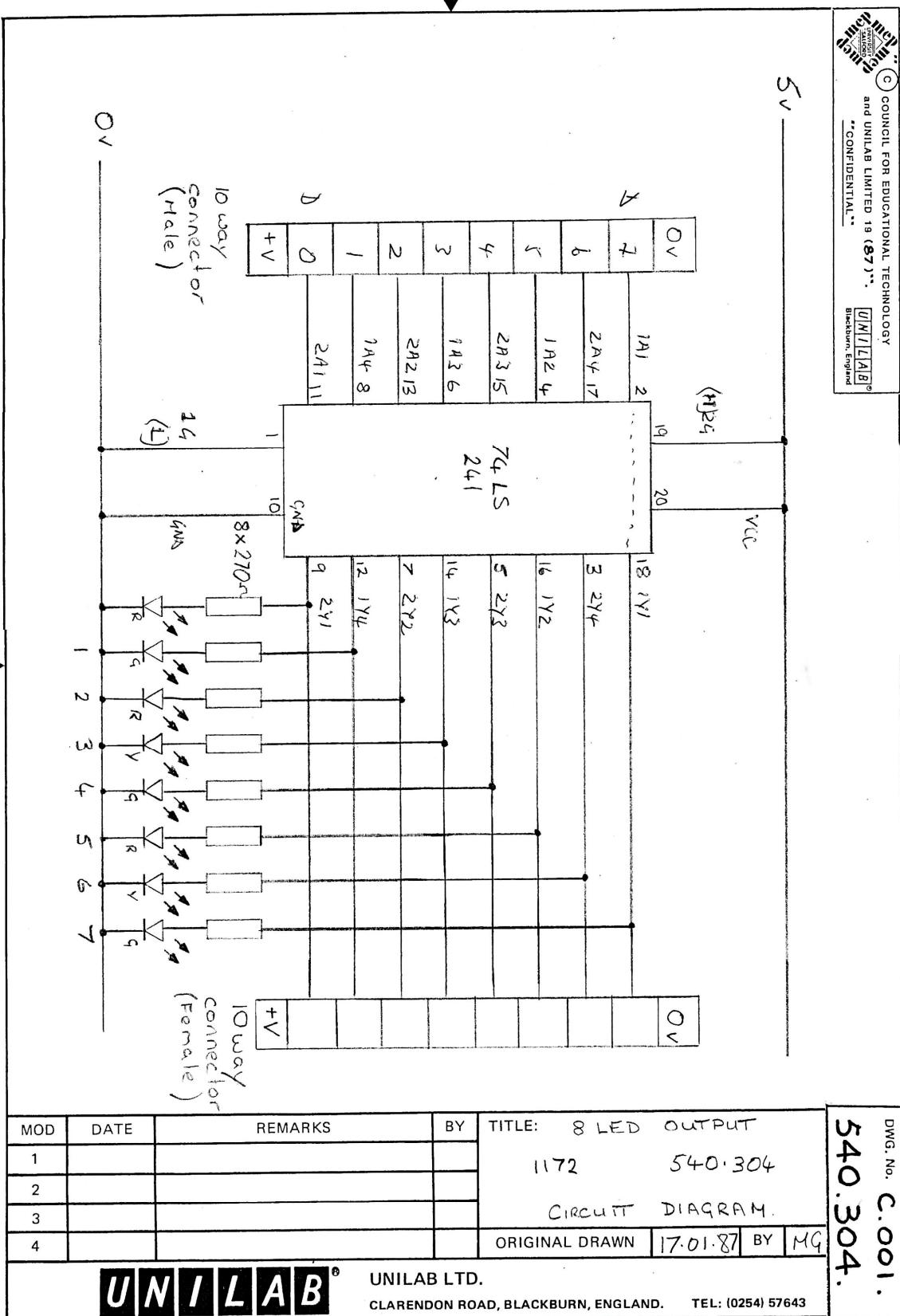


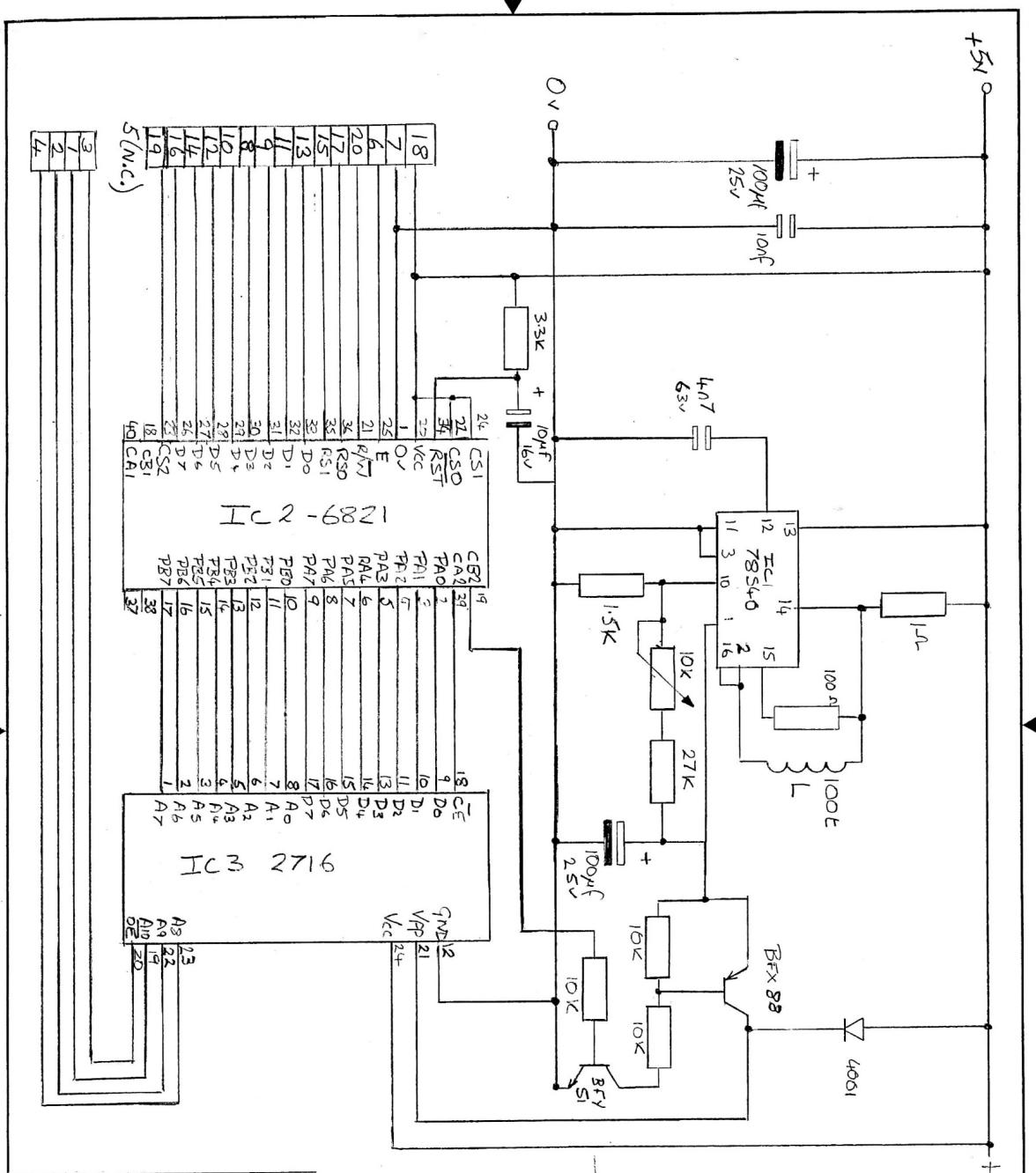
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UNILAB LTD.
Blackburn, England

REF.
DWG. No. C. 001.
540.303.

MOD	DATE	REMARKS	BY	TITLE: 8 SWITCH INPUT	
1				540.303	
2				CIRCUIT DIAGRAM	
3				ORIGINAL DRAWN 24.2.87 BY MG	
4					
UNILAB LTD. CLARENDON ROAD, BLACKBURN, ENGLAND. TEL: (0254) 57643					

REF.
DWG. No. C.001.
540.304.

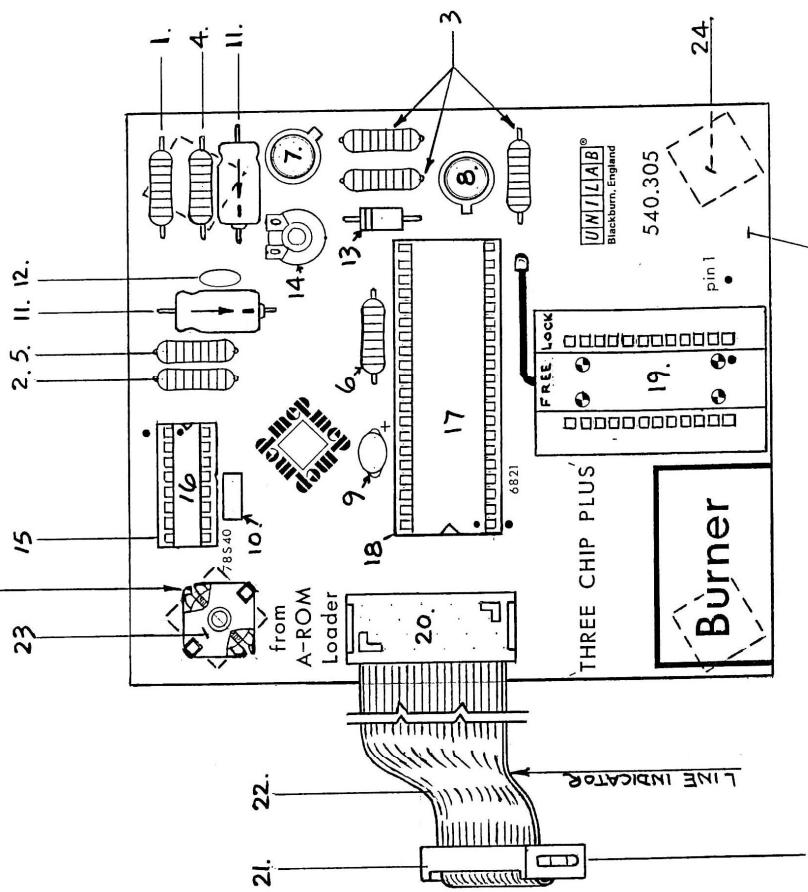




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MOD	DATE	REMARKS	BY	TITLE: BURNER THREE CHIP PLUS 540.305 1173 CIRCUIT DIAGRAM	DWG. NO. C.001. 540.305.
1	14.5.90	10K RESISTOR REMOVED (BOTH CONNECTOR RENUMBERD INCORRECT)	PCB	ORIGINAL DRAWN 17.01.87 BY MG	
2					
3					
4					
UNILAB® UNILAB LTD. CLARENDON ROAD, BLACKBURN, ENGLAND. TEL: (0254) 57643					

WIRE CONNECTIONS FROM CHOKE



P.C.B. 1173 (QE208.)

SEE DWG N°
540.305 A 002.

Dwg N°
540.305 B.001.

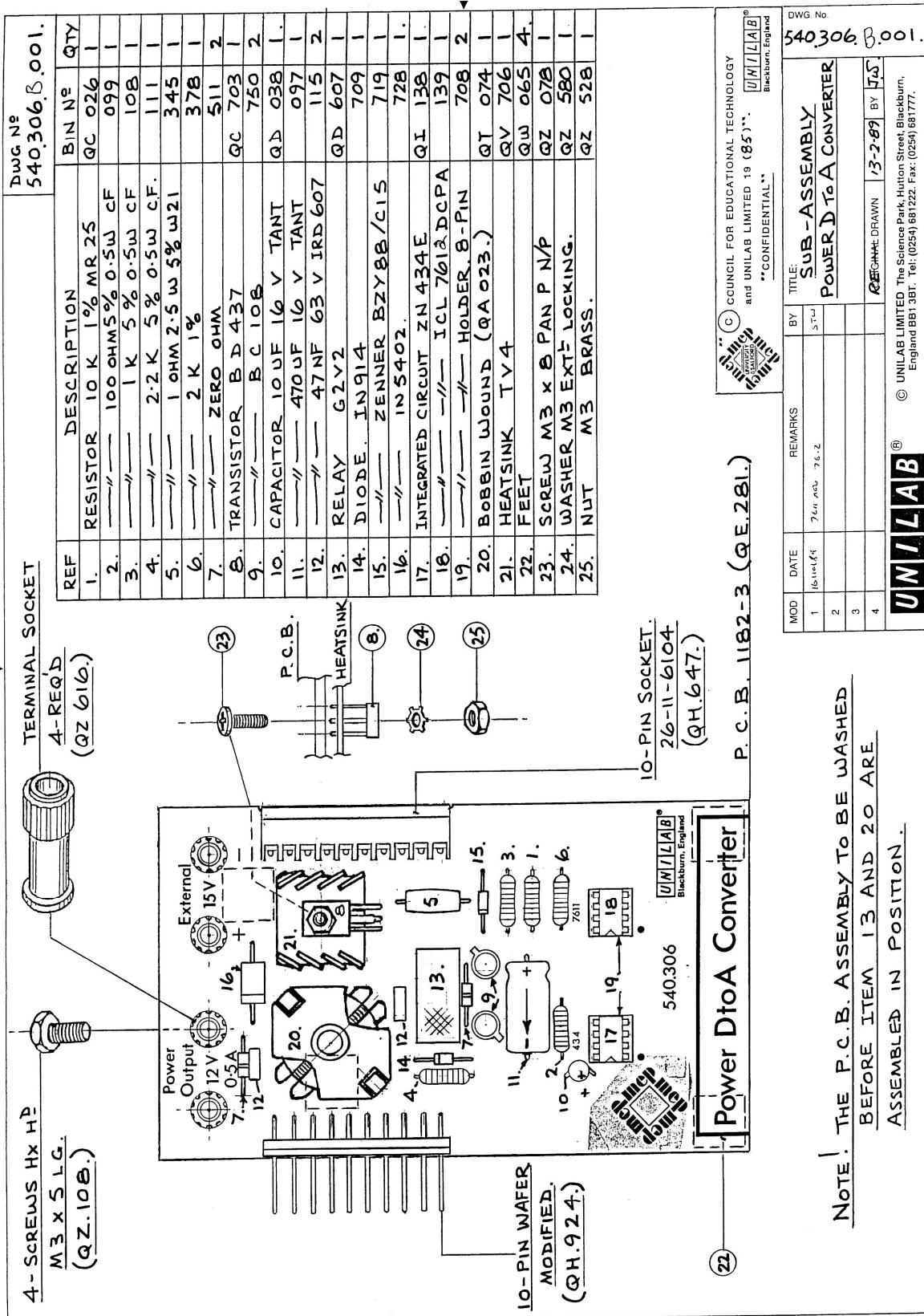
REF.	DESCRIPTION.	BIN N°	QTY
1.	RESISTOR 1.5K 5% 0.25W CF.	QC 082	1.
2.	// 100 OHM --- 0.5 W	099	1.
3.	// 10 K	119	3.
4.	// 27 K	123	1.
5.	// 1 OHM 1%	212	1.
6.	// 3 K3	347	1.
7.	TRANSISTOR BF X 88	729	1.
8.	// BF Y 51	743	1.
9.	CAPACITOR 10UF 16V TANT	QD 038	1.
10.	// 47NF 63V 1RD 607	114	1.
11.	// 100 μF 25V AXIAL	206	2.
12.	// 0.01 MFD 18V DISC CER	QDUN 020	1.
13.	DIODE IN 4001	QD 733	1.
14.	POTENTIOMETER 10K PRESET 20%	QF 005	1.
15.	I.C. HOLDER 16-PIN	QI 706	1.
16.	INTEGRATED CIRCUIT 78S40	137	1.
17.	// MC 6821 P	130	1.
18.	I.C. SOCKET 40-WAY LOW PROFILE	QH 041	1.
19.	Z.I.F. SOCKET 24-WAY	Q32	1.
20.	TRANS CONNECTOR 20-WAY 609-2003	119	1.
21.	// 20-WAY 609-2041	919	1.
22.	20-WAY RIBBON CABLE	QY 163	1.
23.	CHOKE ASSEMBLY L1 RM6	QA 024	1.
24.	FEET GREY BLUE CHIP/SCOPE.	QW 065	4.

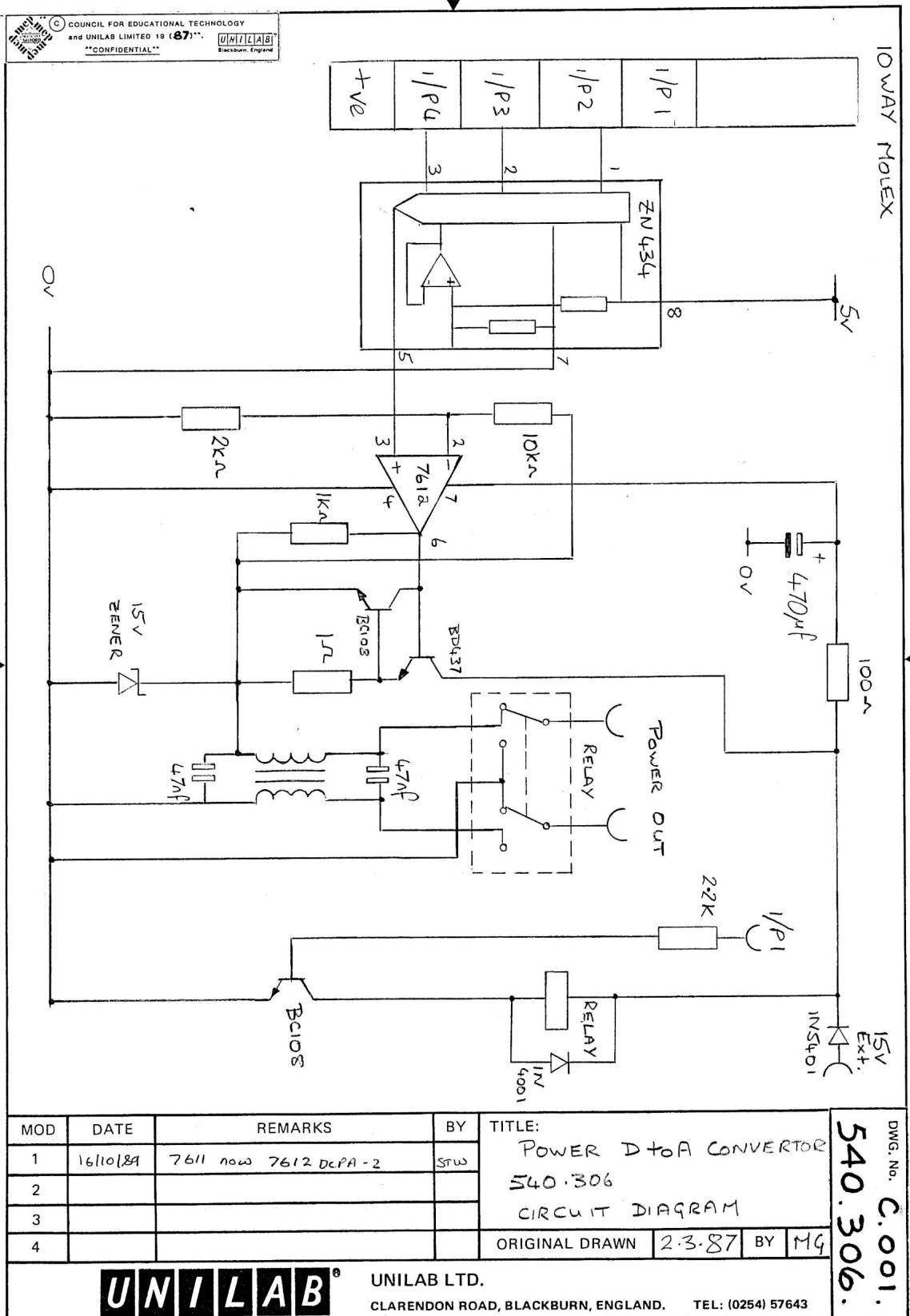
Dwg N°
540.305 B.001.

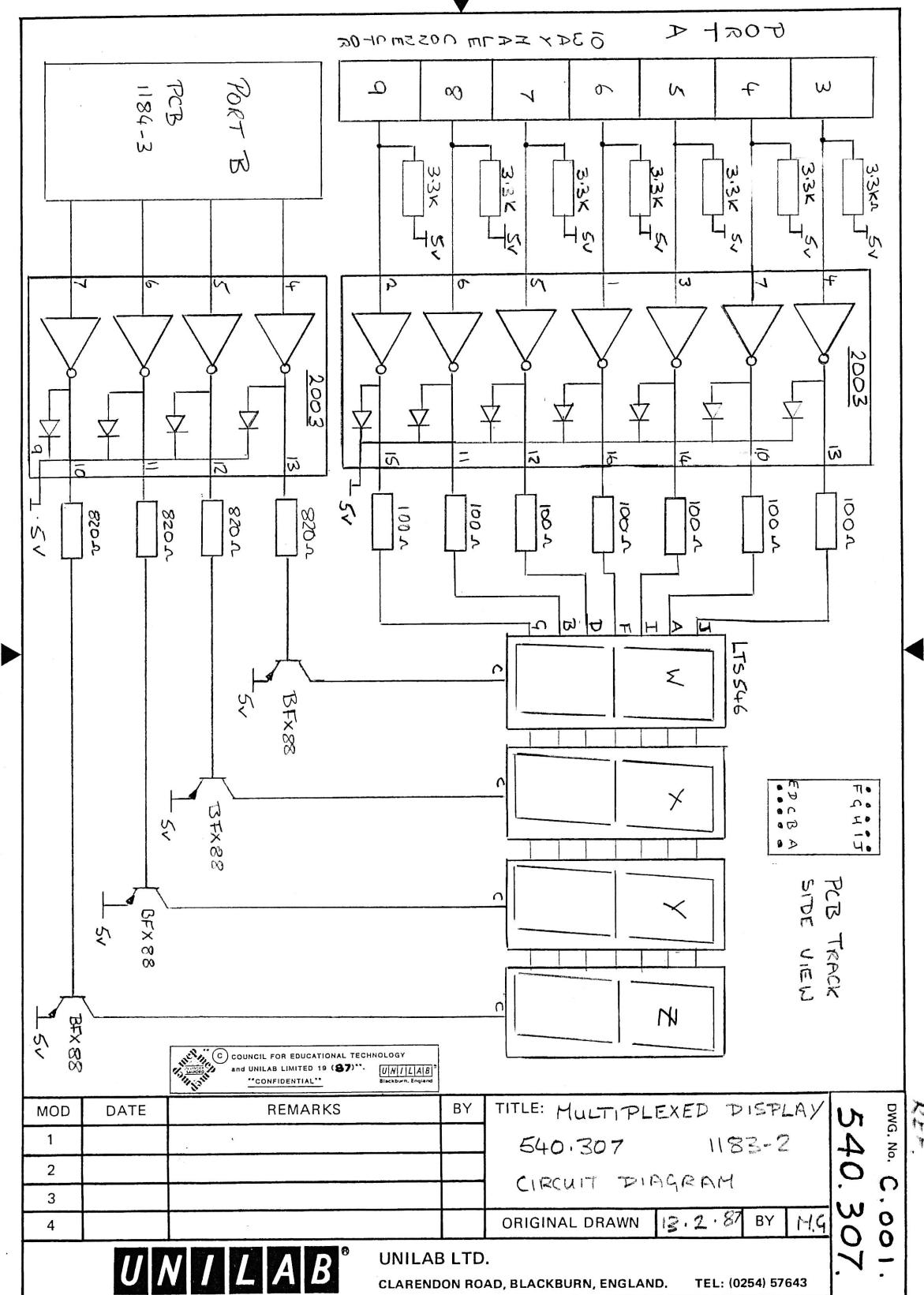
MOD	DATE	REMARKS	BY	TITLE:
1	8.6.93	QH19 WAS QH1920	GP	SUB - ASSEMBLY
2			-	BURNER -
3				
4				RELEASER DRAWN 1-3-89 BY JWS

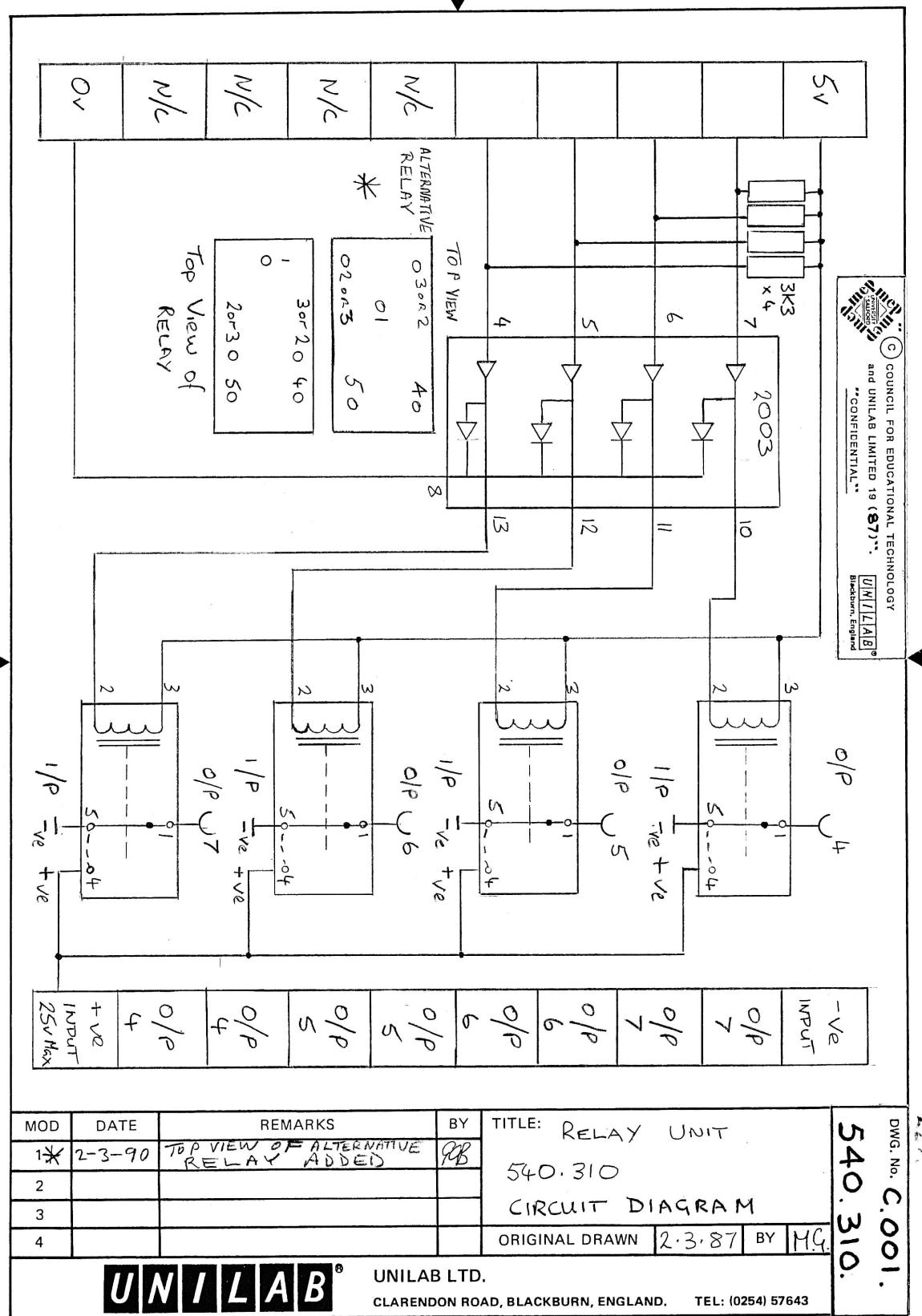
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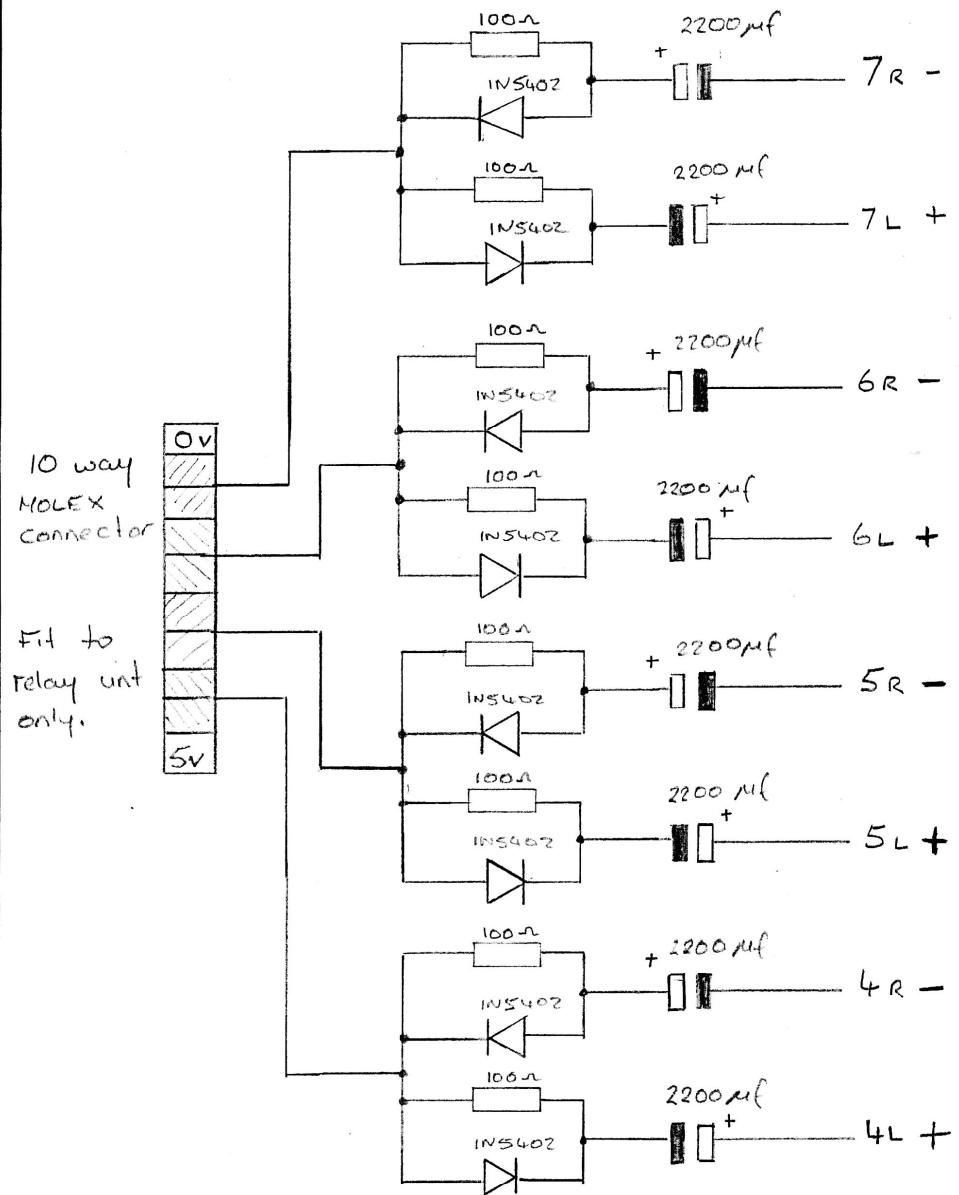




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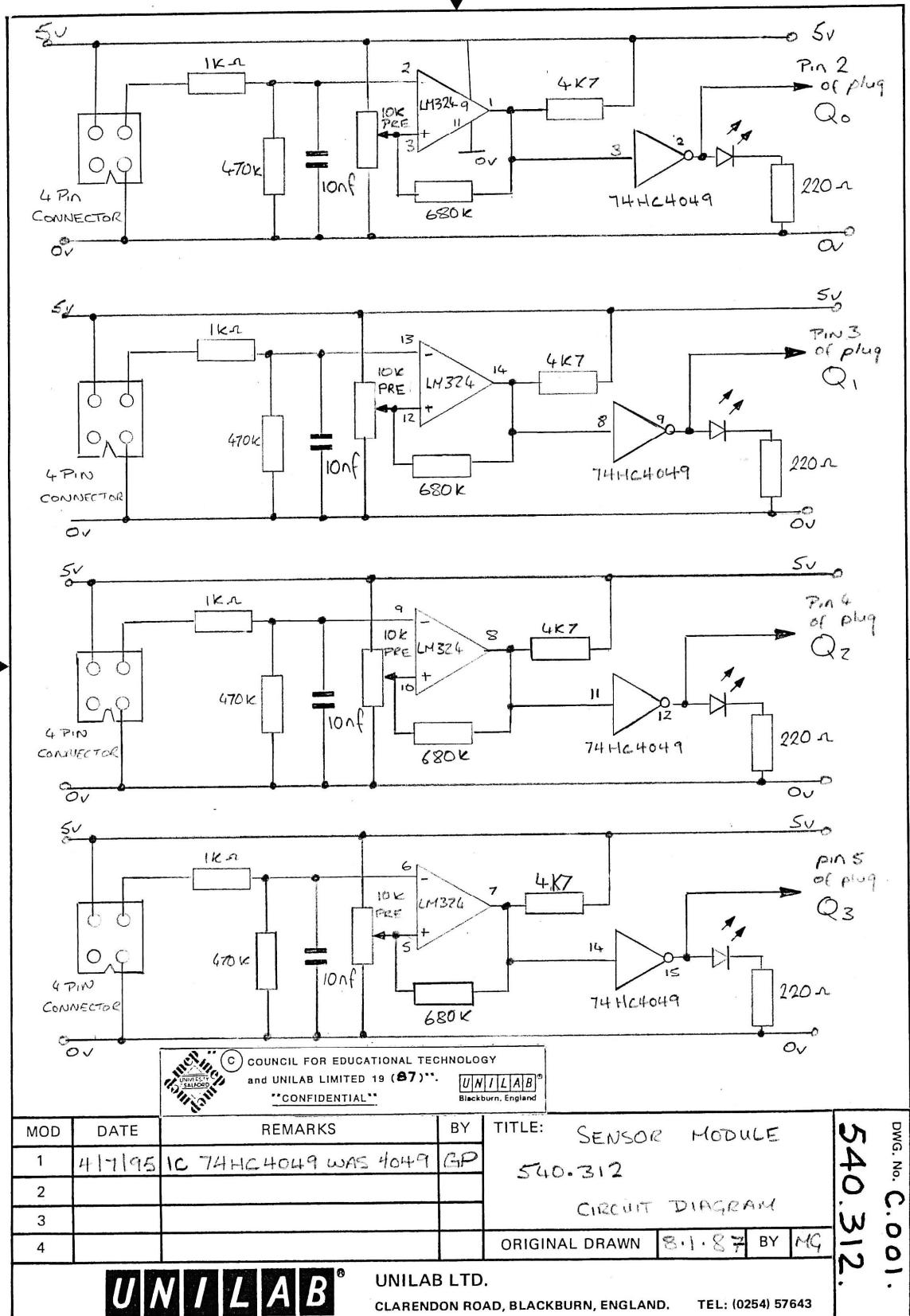


MOD	DATE	REMARKS	BY	TITLE: POINT MOTOR ADAPTER 540.311	CIRCUIT DIAGRAM	ORIGINAL DRAWN 8.1.87 BY MG	DWG. NO. C.001.	REF. 540.311.
1								
2								
3								
4								

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REF. NO. C.001.
540.314.

