

# Programmable Timer – Counters

## PM 6652, -54

### Service Manual

9499 465 00511

850415 First edition



# S&I

Scientific & Industrial Equipment Division



**Scientific &  
Industrial Equipment**

# PHILIPS

## HOW TO READ THE DIAGRAMS

This chapter contains circuit diagrams and component layouts for PM 6652 and PM 6654. One unit, the Channel C (PM 9610), has been included in two different versions the early and the new one. The new version is equipped with surface mounted components.

Each component layout has been completed with a list of the IC's used in the unit. This list indicates the number of the pins on each IC and the connections that are not shown in the diagram, such as GND and supply voltages.

### Format

Most diagrams in this manual are drawn within an X-Y matrix. The X-coordinates (horizontal) are designated A...S and the Y-coordinates 0...11 (vertical). Any position can therefore be located with a digit and a letter coordinate.

### Circuit symbols

Most diagrams are computer drawn. The symbols conform to IEC-standards. These symbols are designed to be logical and easy to read. The component number is written above the symbol. Inside the symbol, at the top is an abbreviated description of the circuit's function. Pin numbers are written outside the symbol and, if it is a complex circuit, the pin functions are written inside. A small circle on a pin indicates that the output/input inverts the signal. The component name is written below the symbol. The signal flow through a symbol is always from the left to the right.

### Resistors, capacitors, diodes, transistors and other components.

These components are similar to the old-fashioned, hand-drawn, symbols. They have their component number above and their value or component name below. A resistor contained in a resistor network, has a frame drawn around it and one of the pin numbers is written to the left or below it.

### Component numbers

"R610" is a typical component number. The "R" indicates that it is a resistor, "6" that it is positioned on the "unit 6" and 10 that it is the tenth resistor in the component list for that unit.

### Signals

Signals are named after what they do, e.g. "writer" = WR, if a signal passes an inverter and gets "active low", it is negated by a line above the name, e.g.  $\overline{\text{WR}}$  = inverted write signal. Several signals traveling the same way can be drawn together as a bus. When a signal enters a bus it is given a code. In that way it is easy to see where it leaves.

NOTE: A signal entering a bus at one point can leave the bus at several points.

If a signal line or a bus is to go a long distance, for instance to another sheet, it can be terminated with an arrow and X-Y coordinates. These coordinates give the position where the signal continues on the next sheet.

NOTE: Two different arrows are used to indicate that the connection is continued somewhere else on the circuit diagram:



This arrow indicates a continuation on the same sheet.



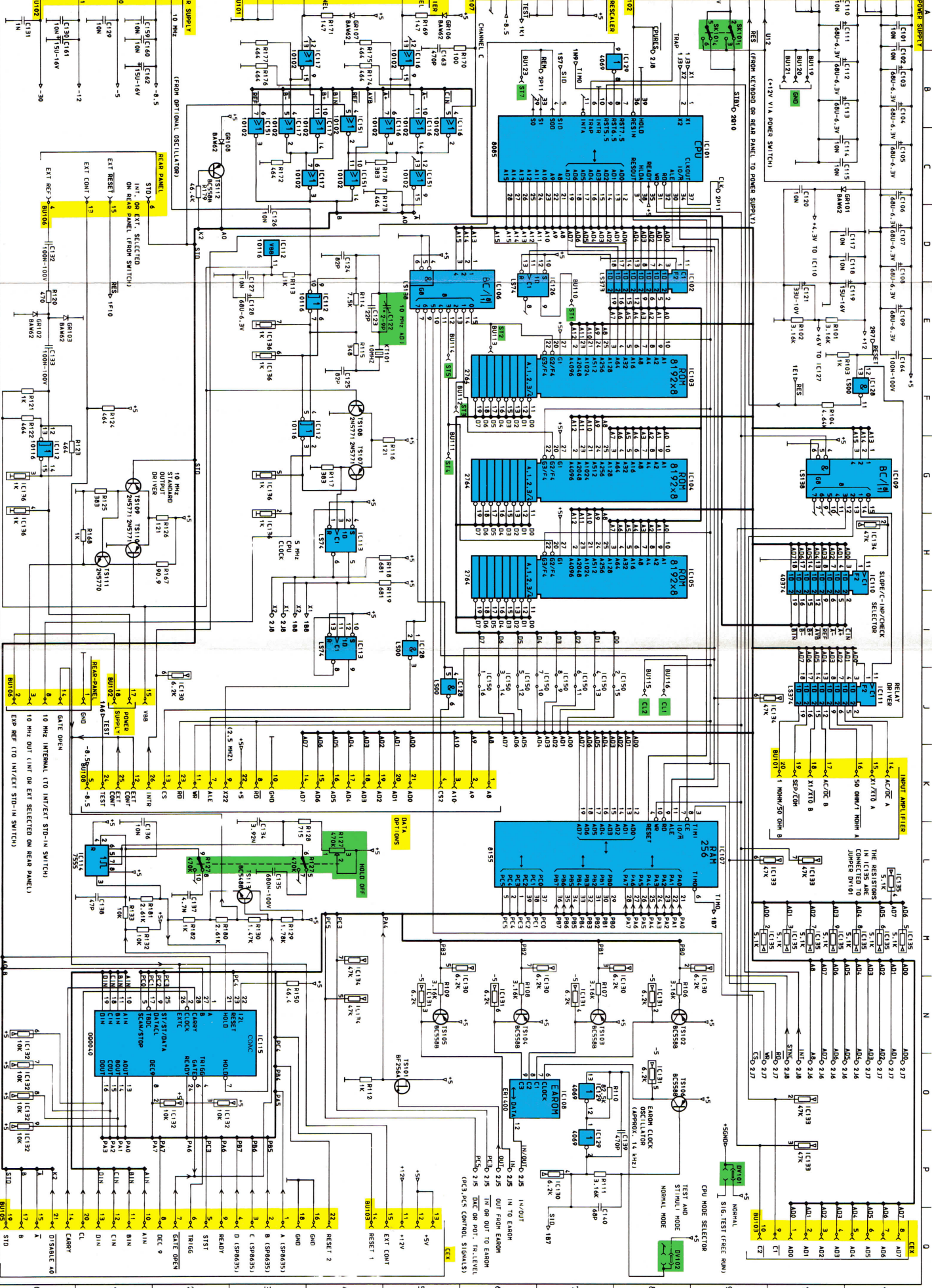
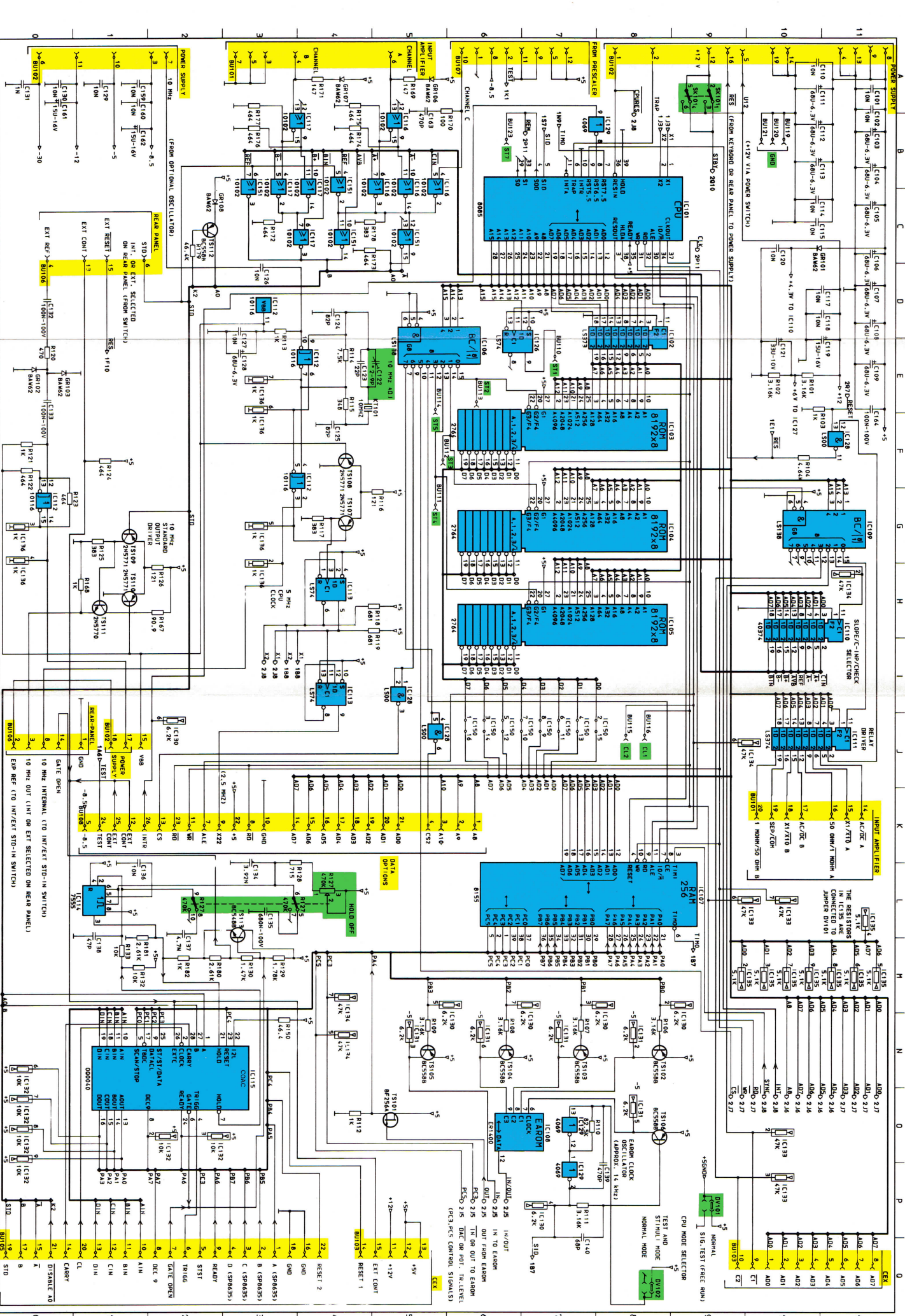
This arrow is used when the circuit diagram for a unit is divided onto two sheets and the connection continues on the other sheet, (only used on U1).

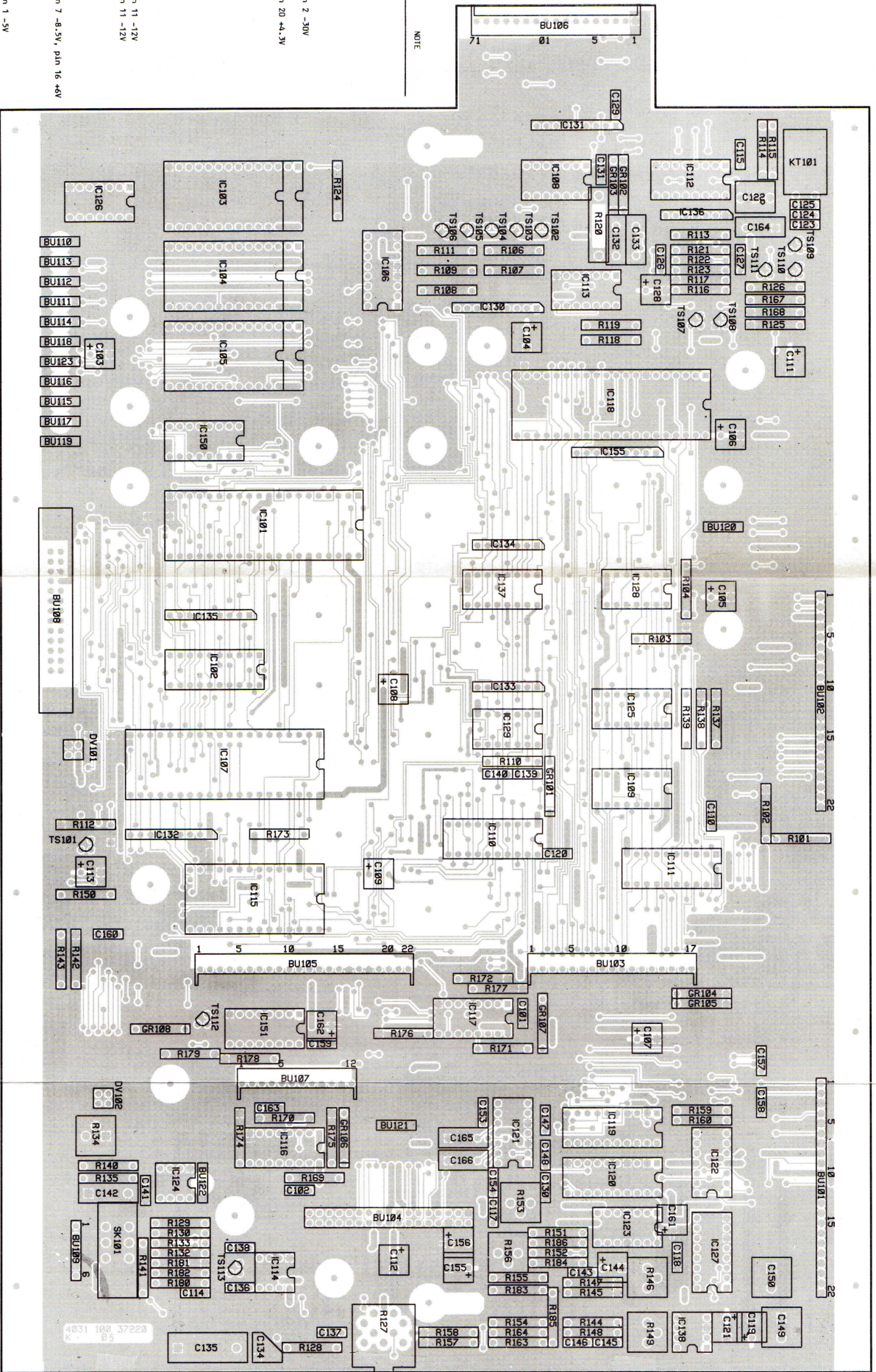
The code written on each arrow indicates where the connection continues. The first position in the code indicates the sheet number while the following two positions in the code gives the coordinates on the sheet.

## 10. CIRCUIT DIAGRAMS

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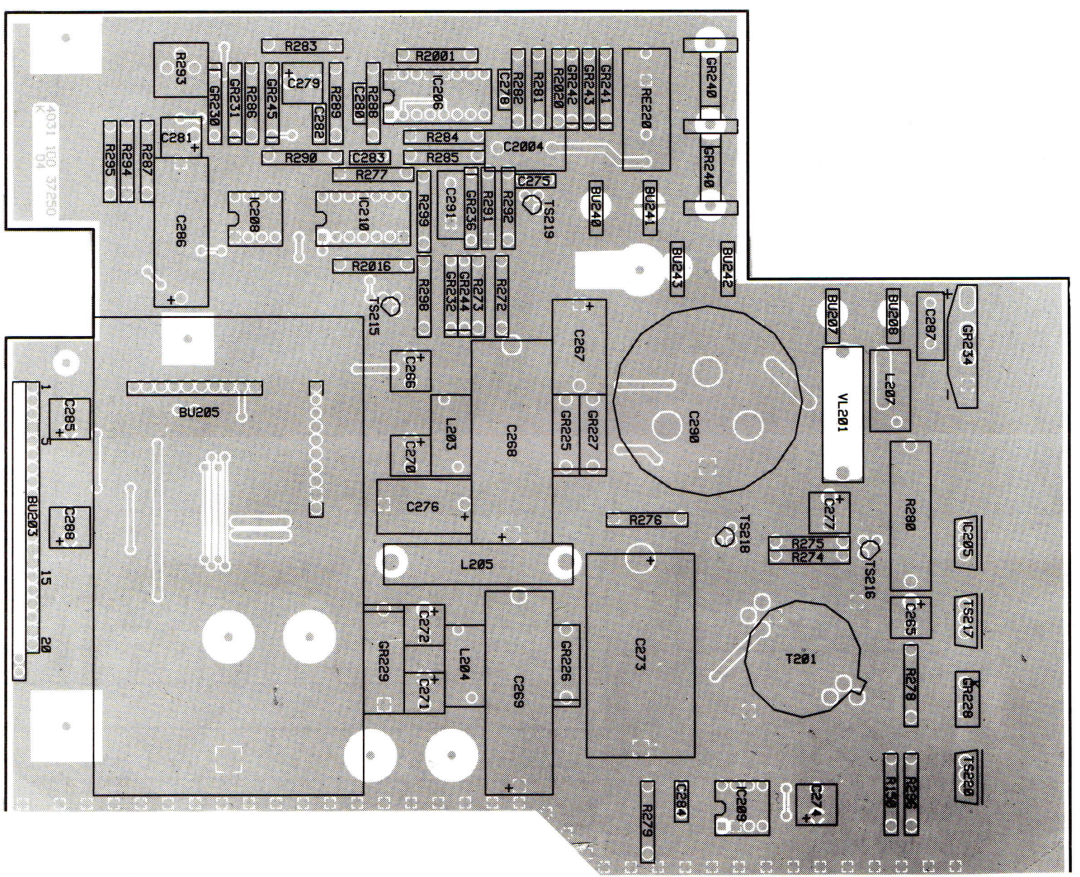
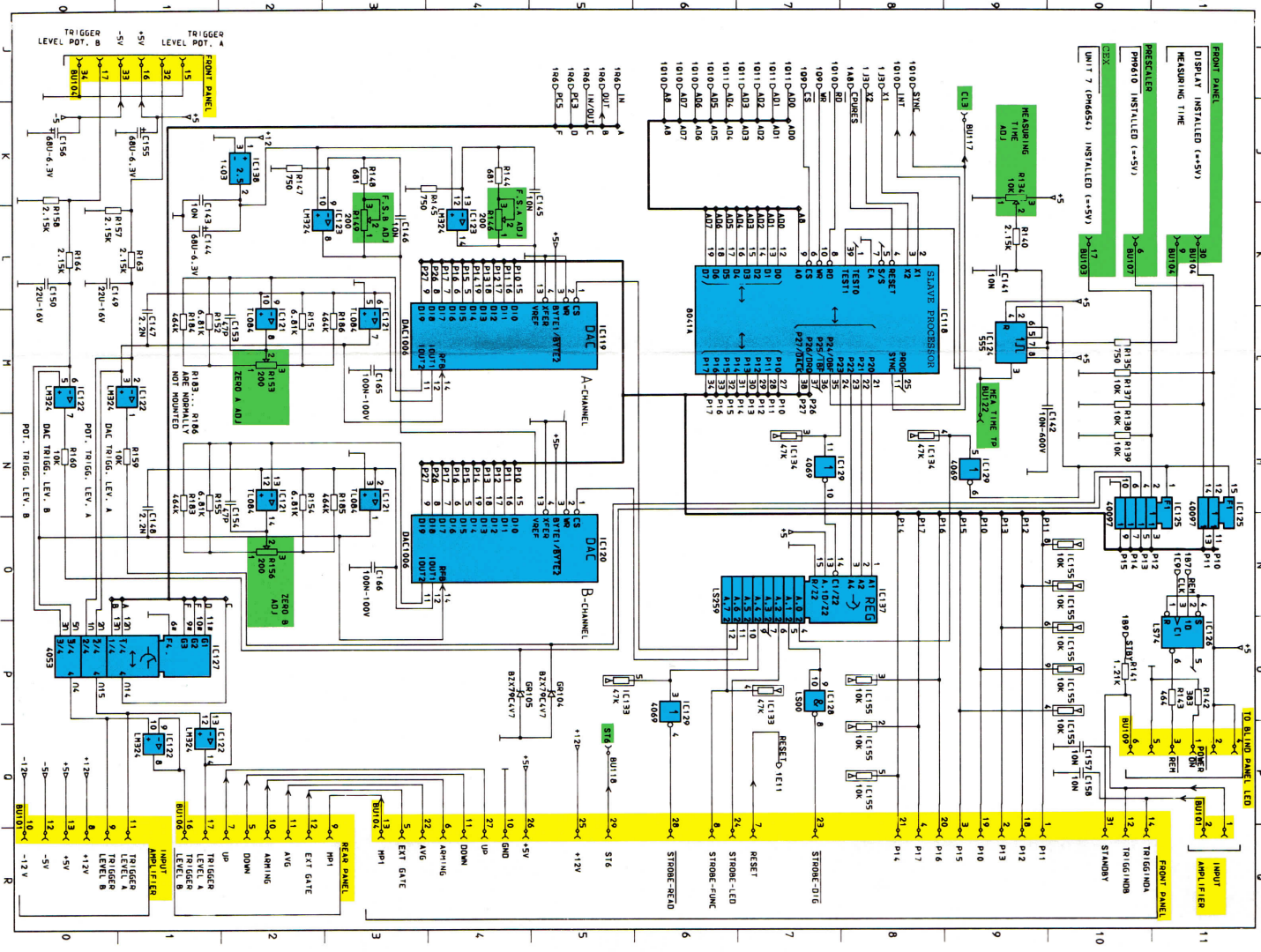
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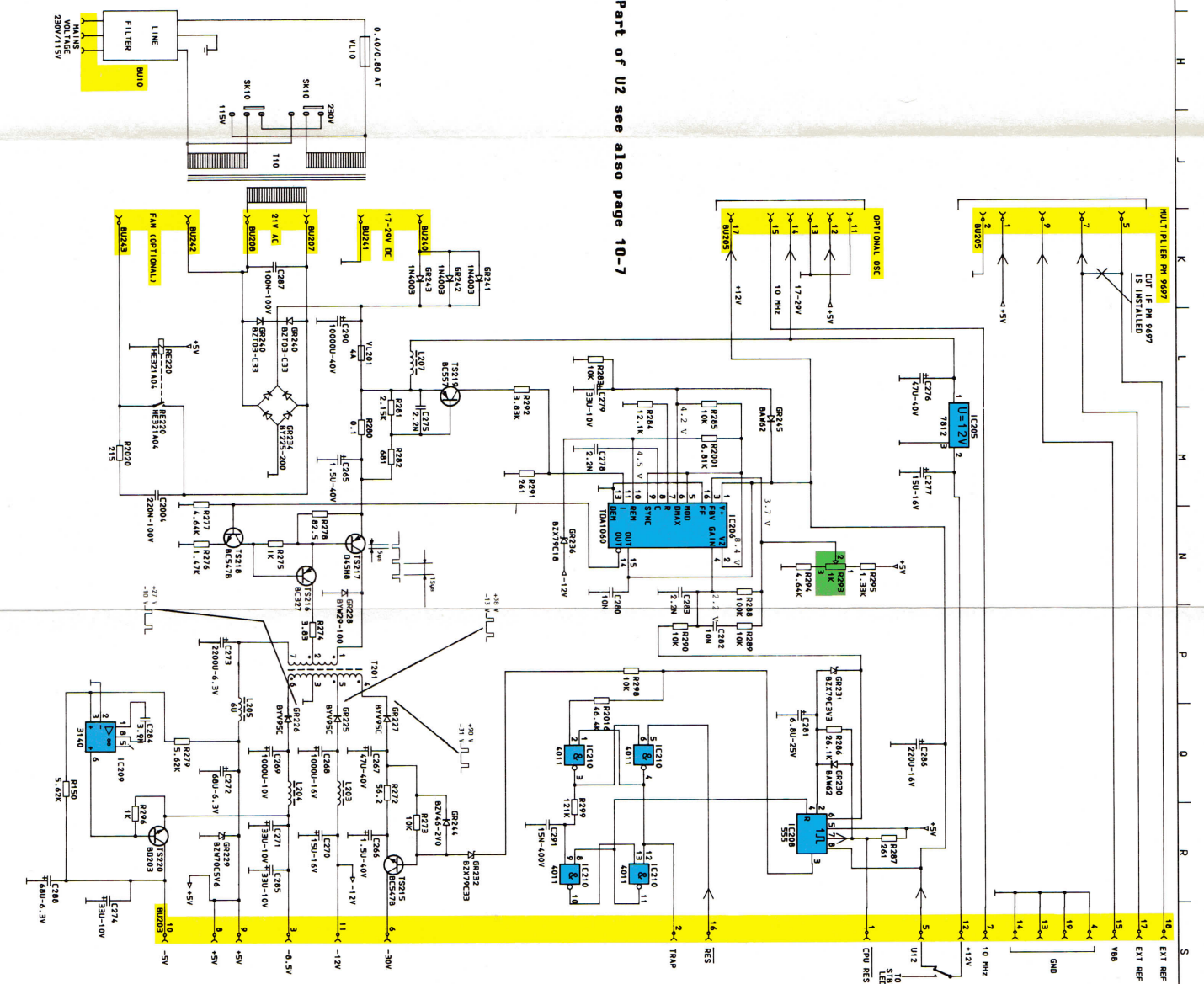
Item	Pin	QTY	+5V	+12V	NOTE
IC101	40	20	40		
IC102	20	10	20		
IC103	28	14	26-28		
IC104	28	14	26-28		
IC105	28	14	26-28		
IC106	16	8	16		
IC107	40	20	40		pin 2 -30V
IC108	16	8	16		
IC109	16	8	16		
IC110	20	10	20		pin 20 +4-3V
IC111	20	10	20		
IC112	16	8	1-16		
IC113	16	8	1-16		
IC114	8	4	8		
IC115	28	14	20		
IC116	16	8	1-16		
IC117	16	8	1-16		
IC118	40	20	40		
IC119	20	10			
IC120	20	10			
IC121	14	7			pin 11 -12V
IC122	14	7			
IC123	14	7			pin 11 -12V
IC124	8	4			
IC125	16	8			
IC126	14	7			pin 7 -8-5V, pin 16 -4V
IC127	16	8			
IC128	14	7			
IC129	14	7			
IC130	9	4			
IC131	9	4			pin 1 -5V
IC132	9	4			
IC133	7	3			
IC134	7	3			
IC135	9	4			
IC136	7	3			
IC137	7	3			
IC138	8	4			
IC139	8	4			
IC140	8	4			
IC141	8	4			
IC142	8	4			
IC143	8	4			
IC144	8	4			
IC145	8	4			
IC146	8	4			
IC147	8	4			
IC148	8	4			
IC149	8	4			
IC150	8	4			
IC151	8	4			
IC152	8	4			
IC153	8	4			
IC154	8	4			
IC155	8	4			

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K 05



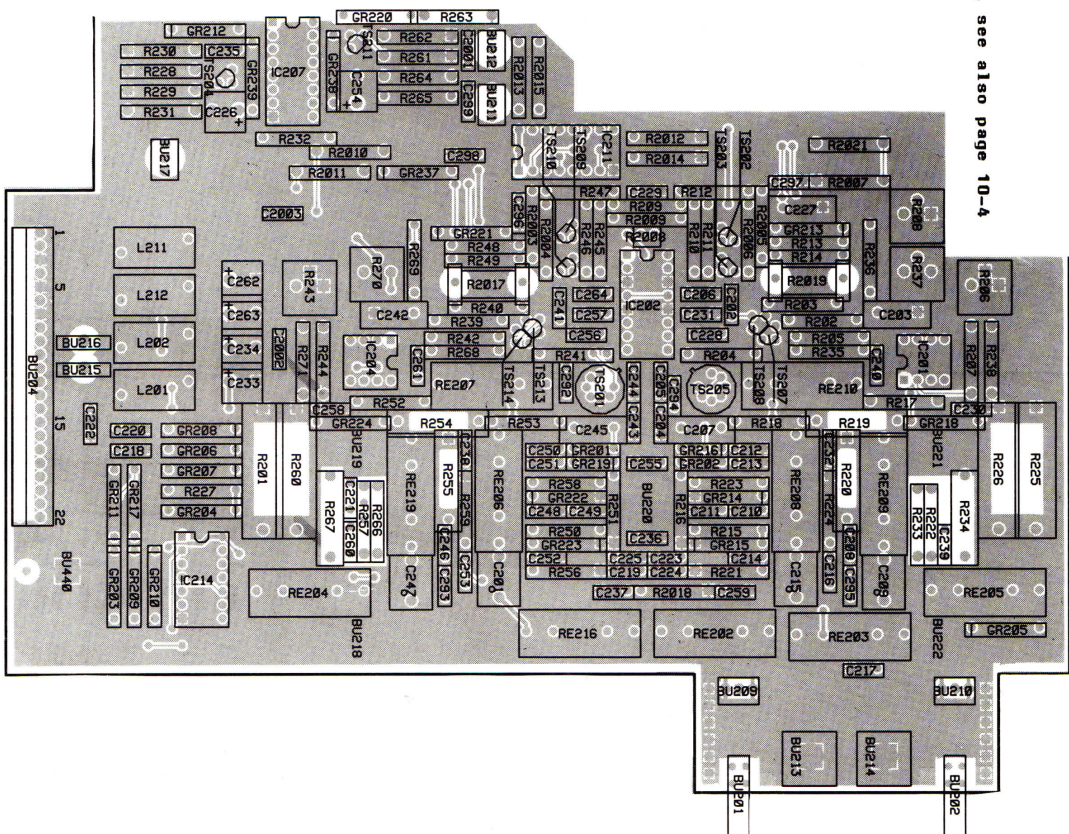
Part of U2, see also page 10-6

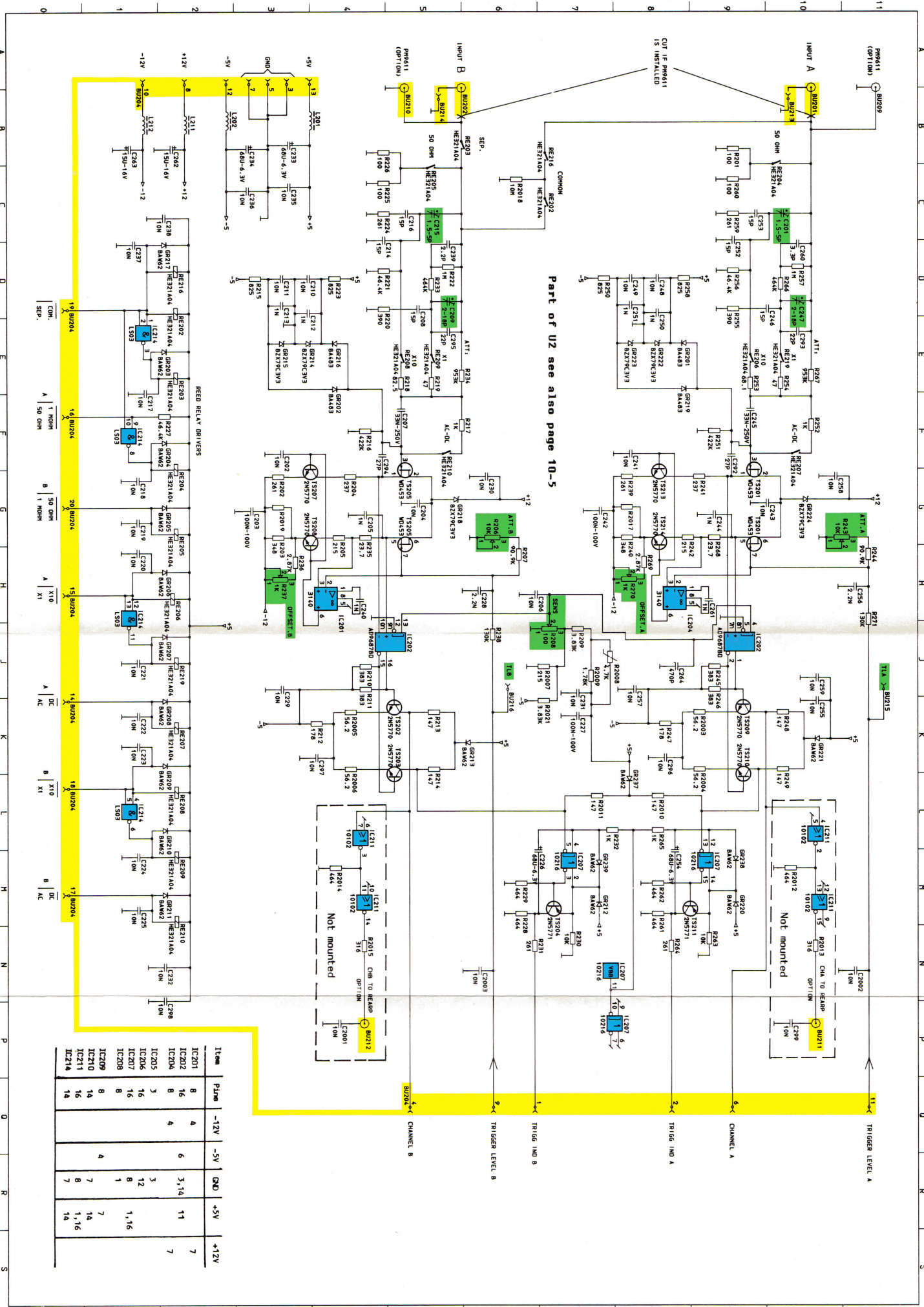
Item	Plane	-12V	-5V	GND	+5V	+12V
IC201	8	4	6	3,14	11	7
IC202	8	4				
IC204	8					
IC205	3					
IC206	16				1,16	
IC207	8					
IC208	8					
IC209	8		4			
IC210	14				7	
IC211	16				8	
IC214	14				14	



Part of U2 see also page 10-7

Part of U2, see also page 10-4

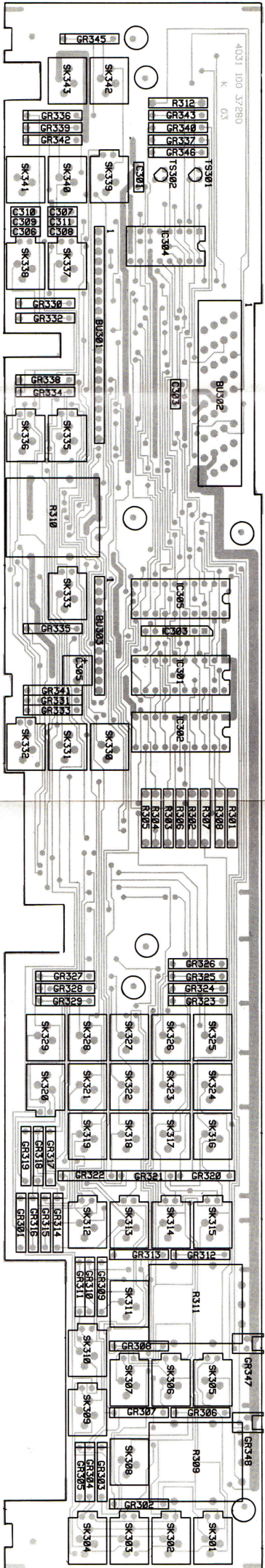




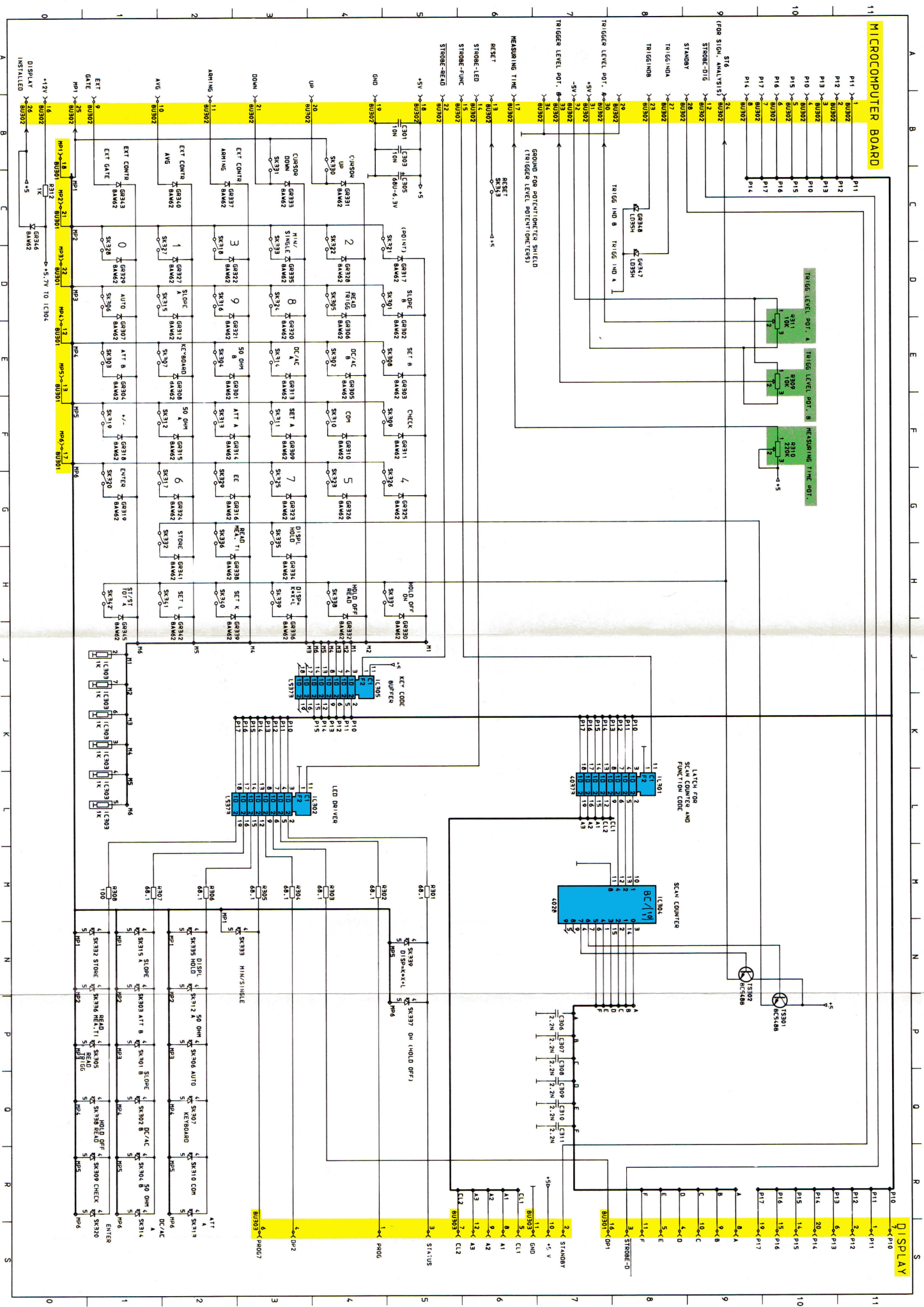
Part of U2 see also page 10-5

Item	Value	Quantity	Channel	Value	Quantity
IC201	8	4	-12V	+5V	7
IC202	16	6	-5V	+5V	11
IC204	8	4			7
IC205	3	3			
IC206	16	12			
IC207	16	8			
IC208	8	1			1,16
IC209	8	4			
IC210	14	7			7
IC211	16	8			1,16
IC214	14	14			





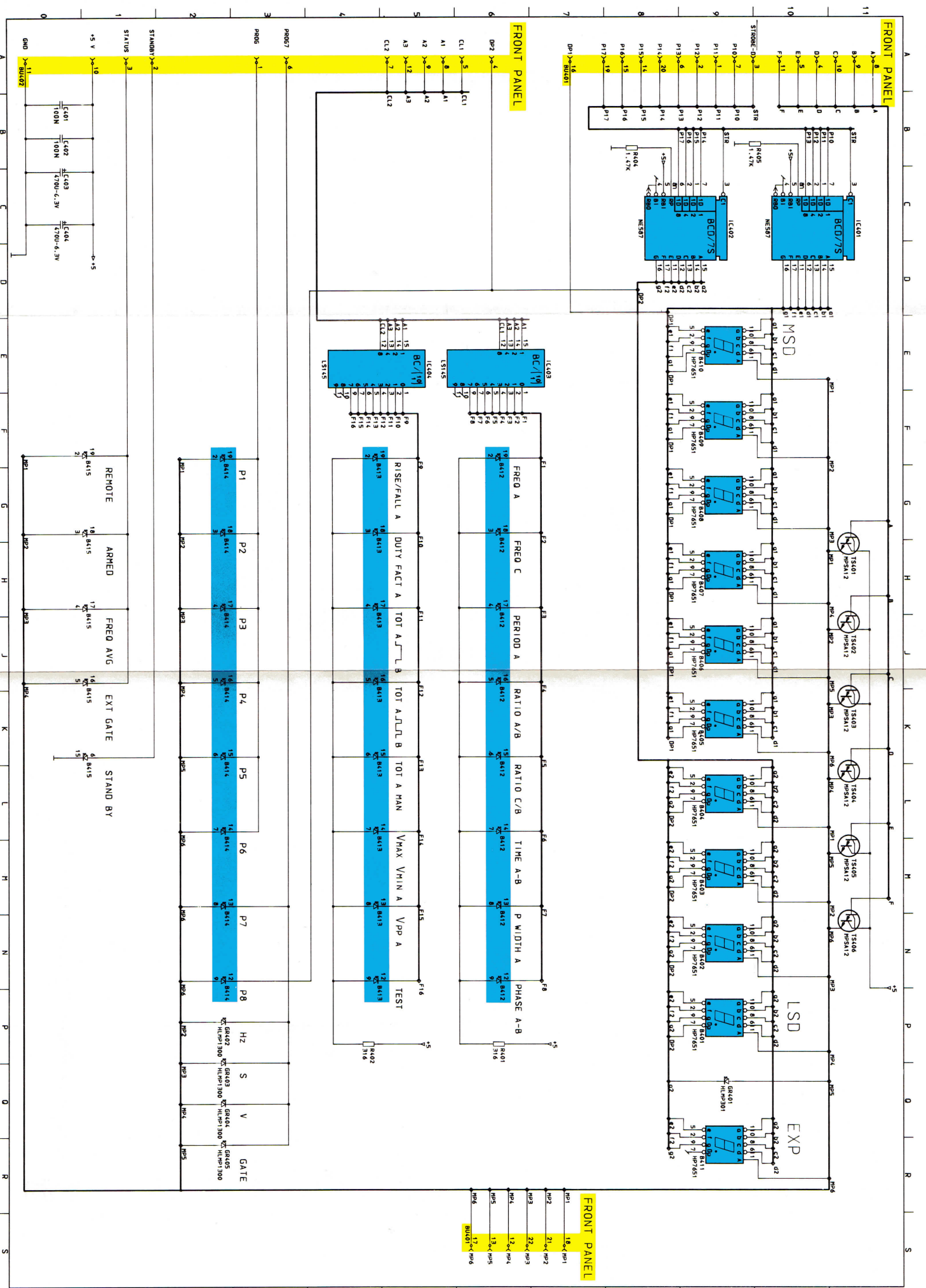
Item	Pins	GND	+5V	+5.7V
IC301	20	10	20	
IC302	20	10	20	
IC303	7	1		
IC304	16	8		16
IC305	20	10	20	



MICROCOMPUTER BOARD

DISPLAY

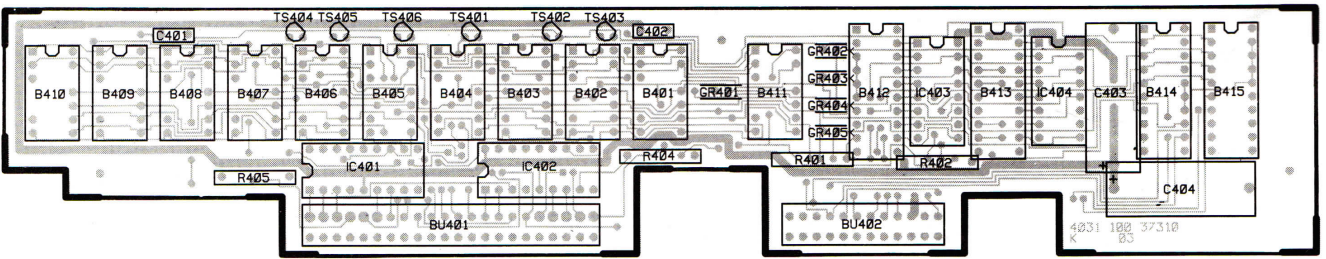
KEY-BOARD US

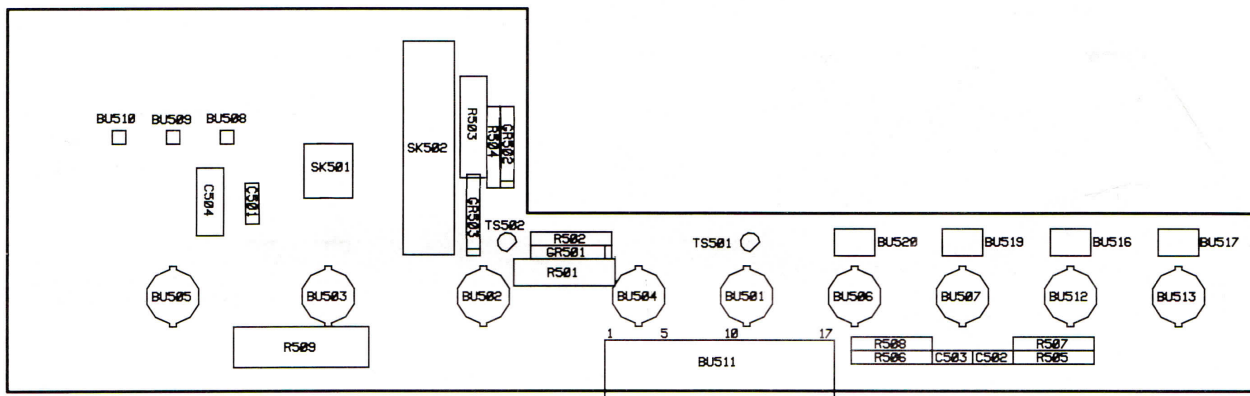


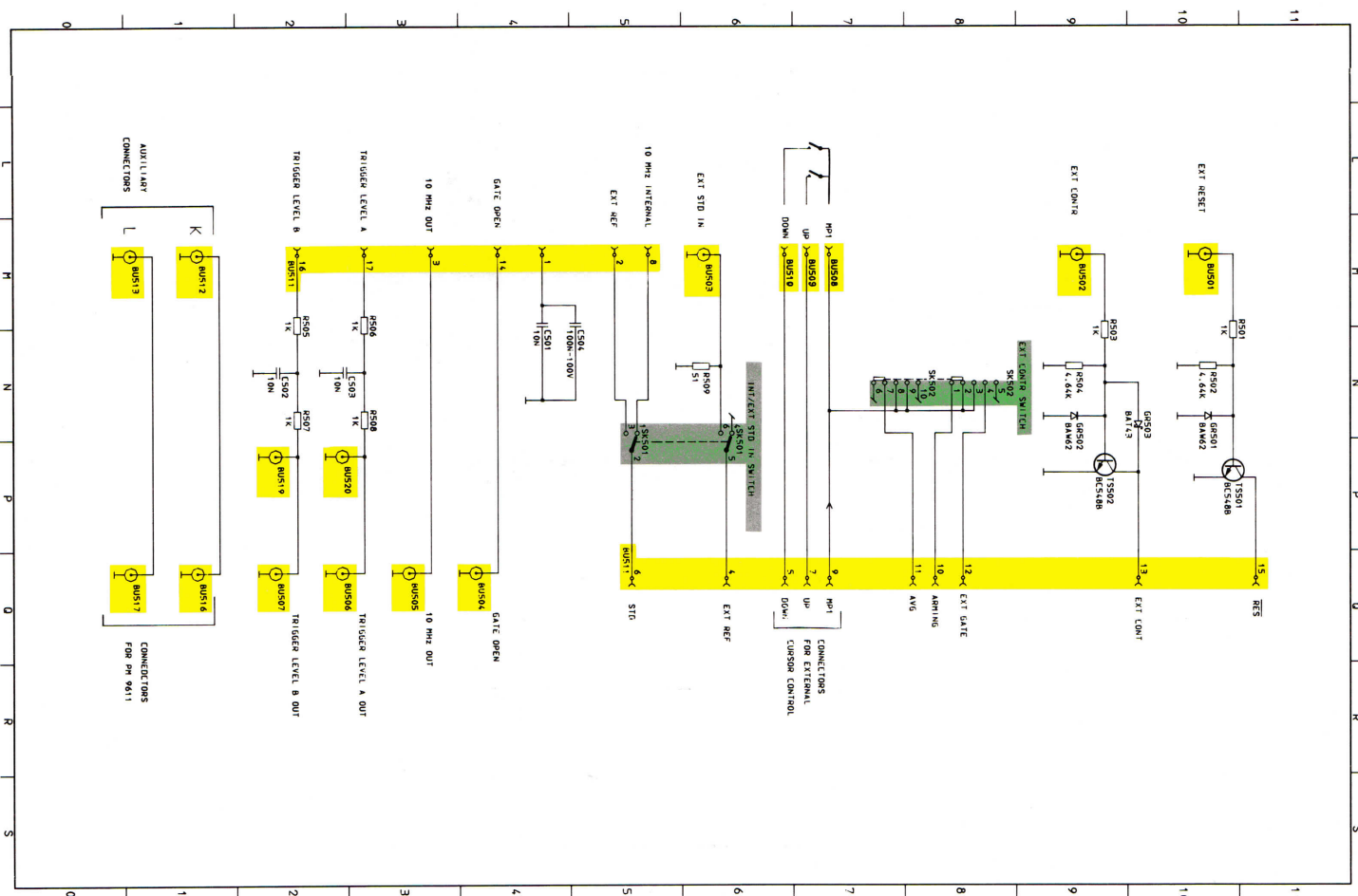
FRONT PANEL

FRONT PANEL

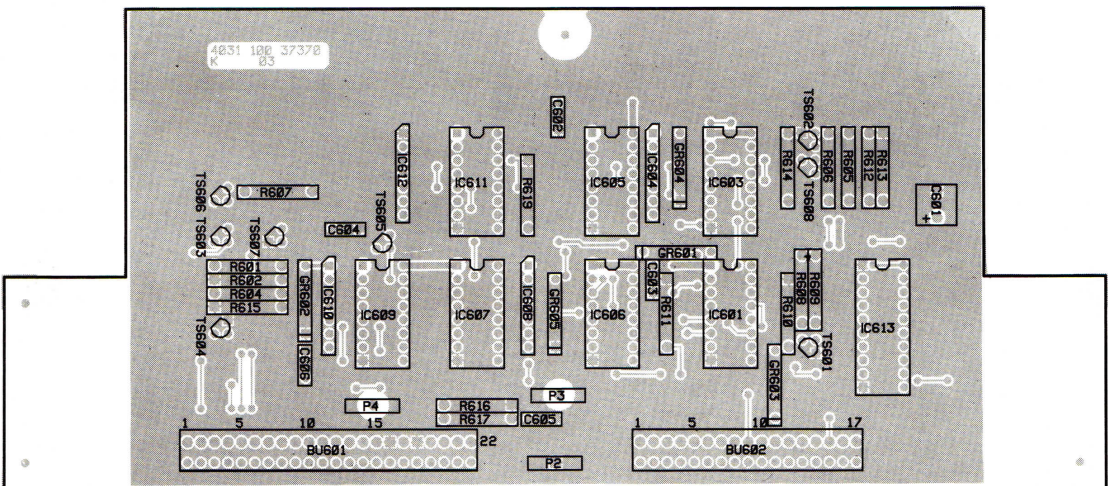
Item	Pins	GND	+5V
IC401	18	9	18
IC402	18	9, 10	18
IC403	16	8	16
IC404	16	8	16

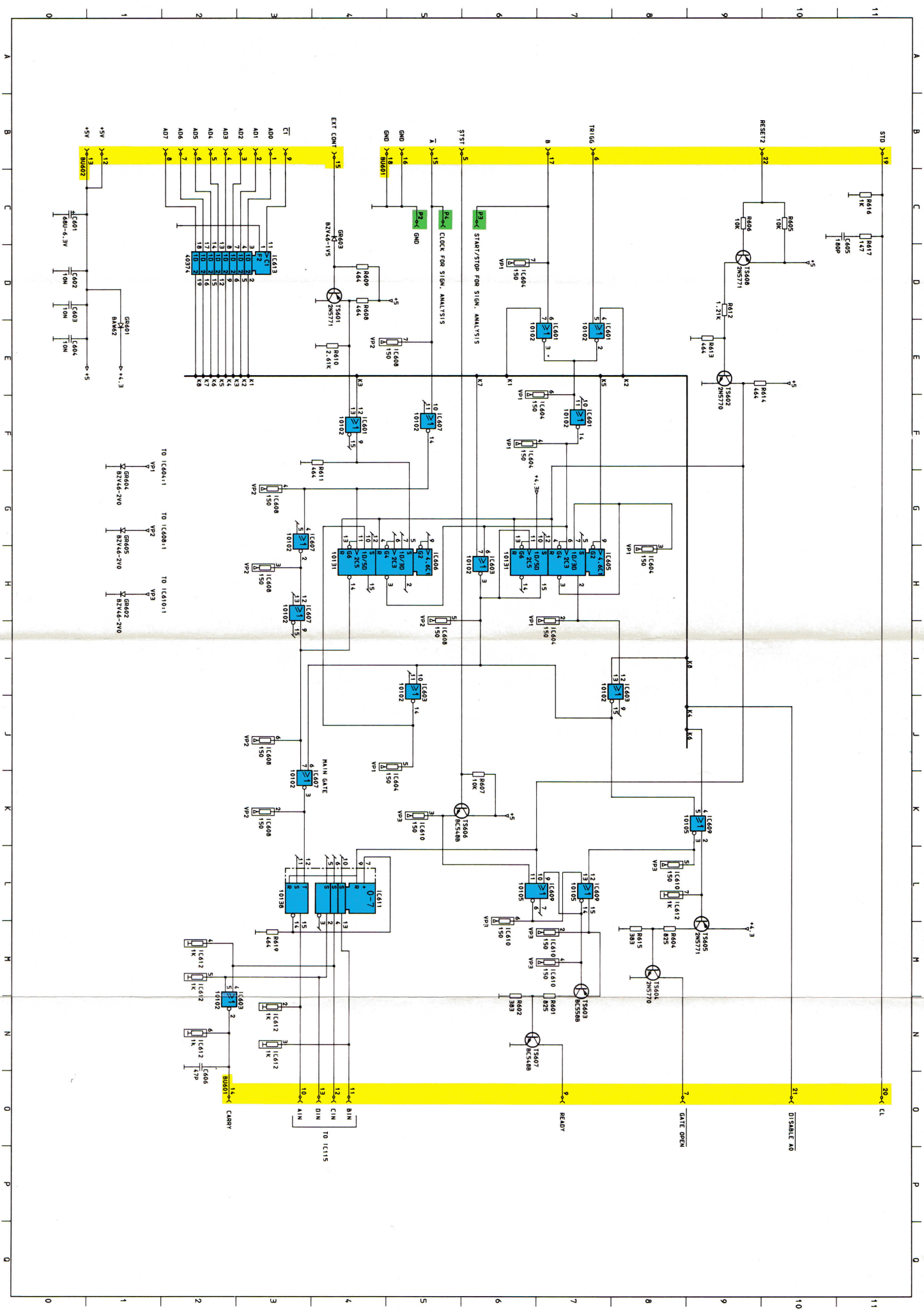






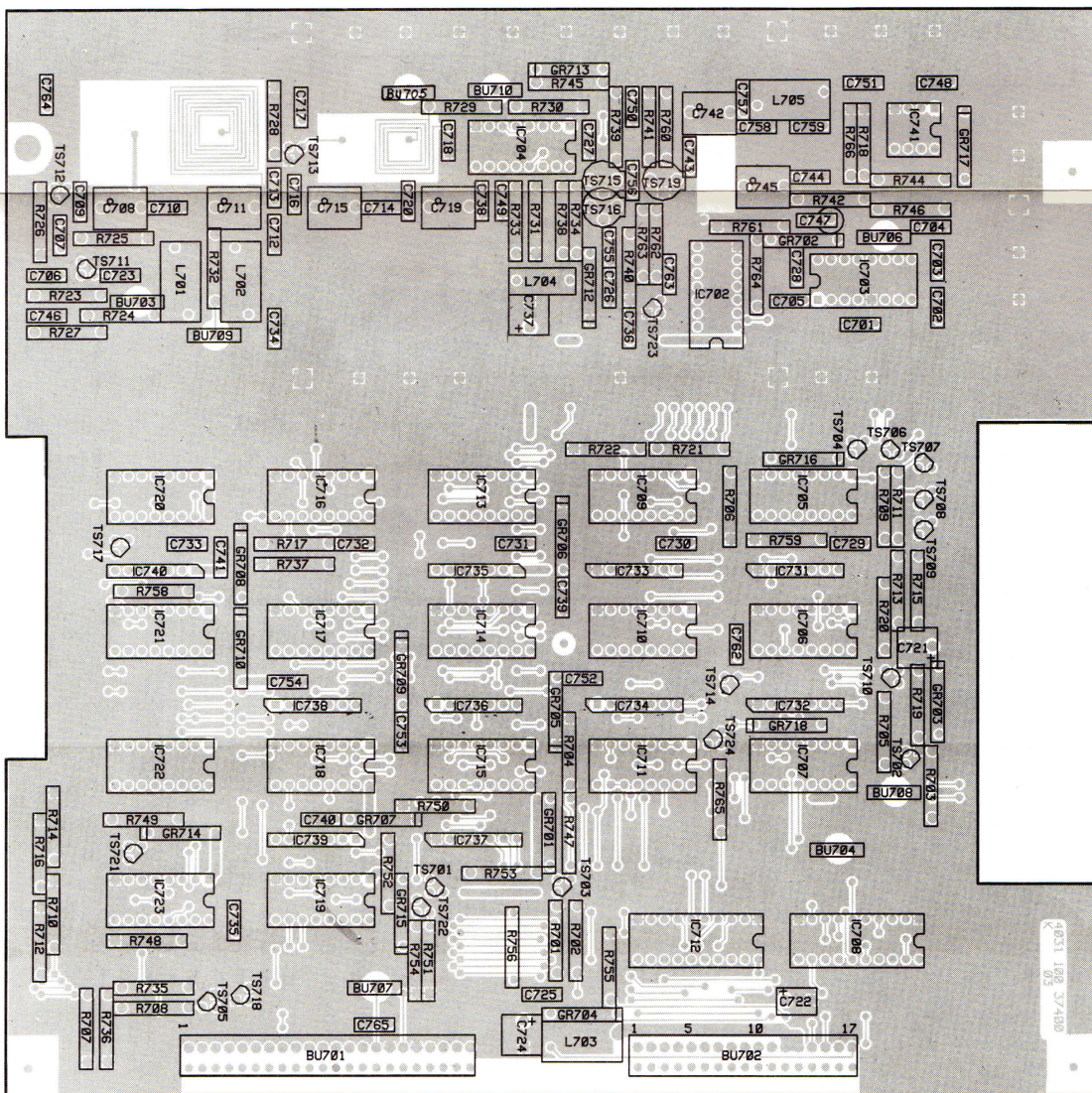
Item	Pins	GND	+2V	+4.3V	+5V
IC601	16	8			1, 16
IC603	16	8			1, 16
IC604	7		1		1, 16
IC605	16	8			1, 16
IC606	16	8			1, 16
IC607	16	8			1, 16
IC608	7		1		1, 16
IC609	16	8			1, 16
IC610	7		1		1, 16
IC611	16	8			1, 16
IC612	7	1			1, 16
IC613	20	10		20	1, 16

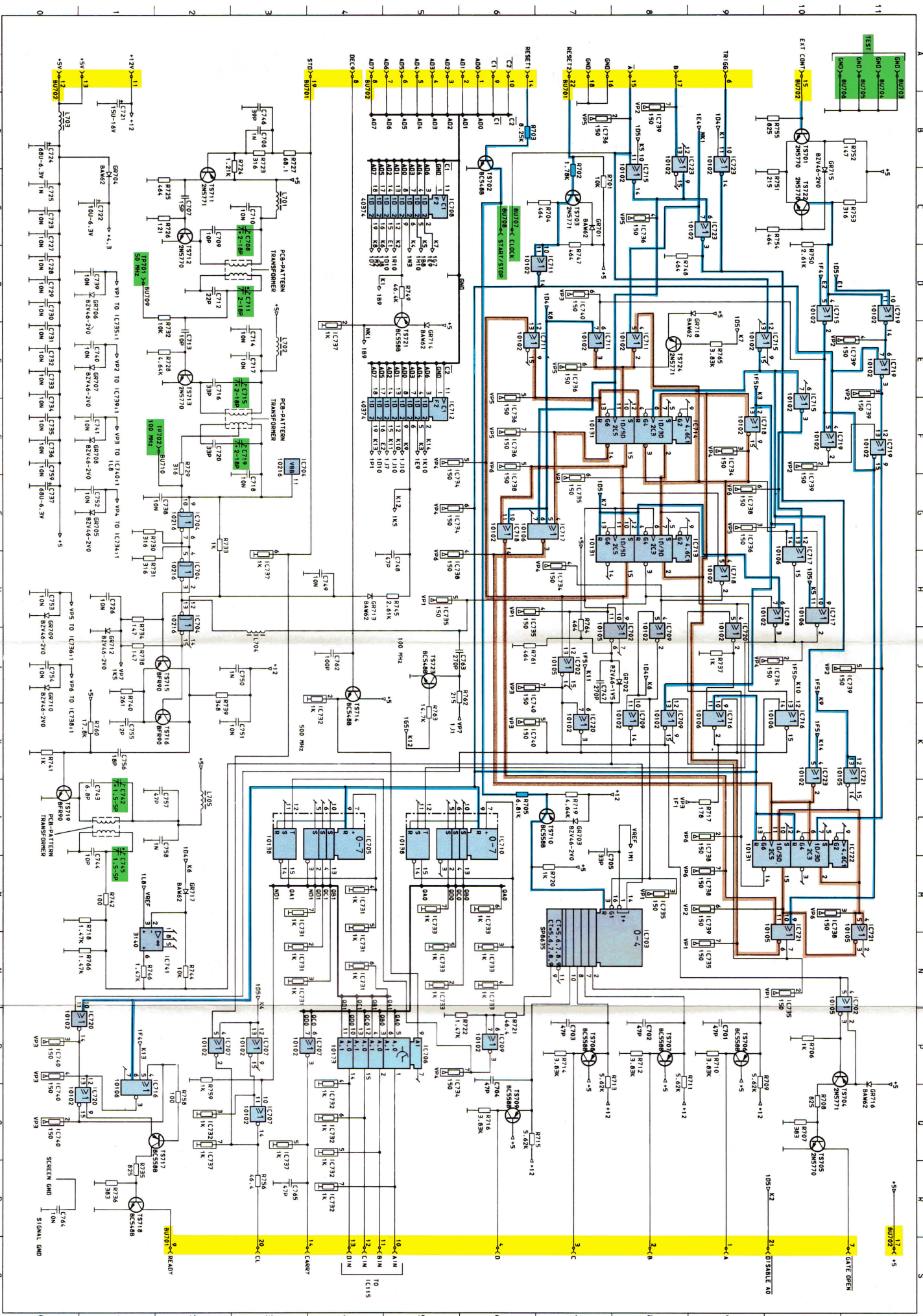


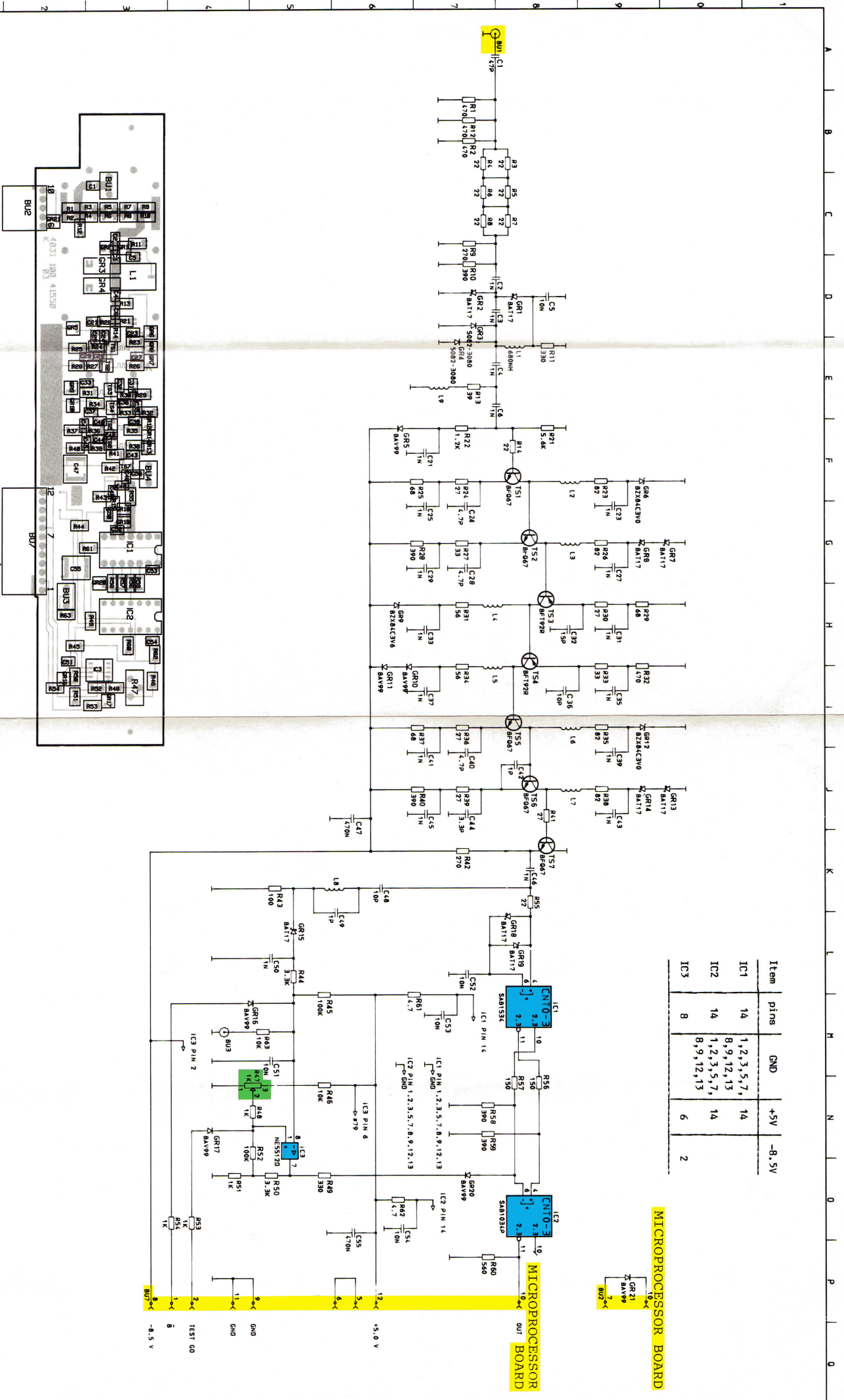




Item	Pin#	QND	+SV	NOTE
IC702	16	8	1,16	
IC703	16	5	12	
IC704	16	8	1,16	
IC705	16	8	1,16	
IC706	16	8	16	
IC707	16	8	1,16	
IC708	20	10		pin 20 +4, 3V
IC709...711	16	8	1,16	
IC712	20	10		pin 20 +4, 3V
IC713...719	16	8	1,16	
IC720...723	7	8		pin 1 +2V
IC731...740	7	7		pin 1 +2V
IC741	8	4		pin 7 +12V





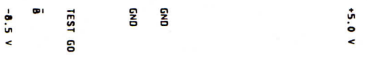


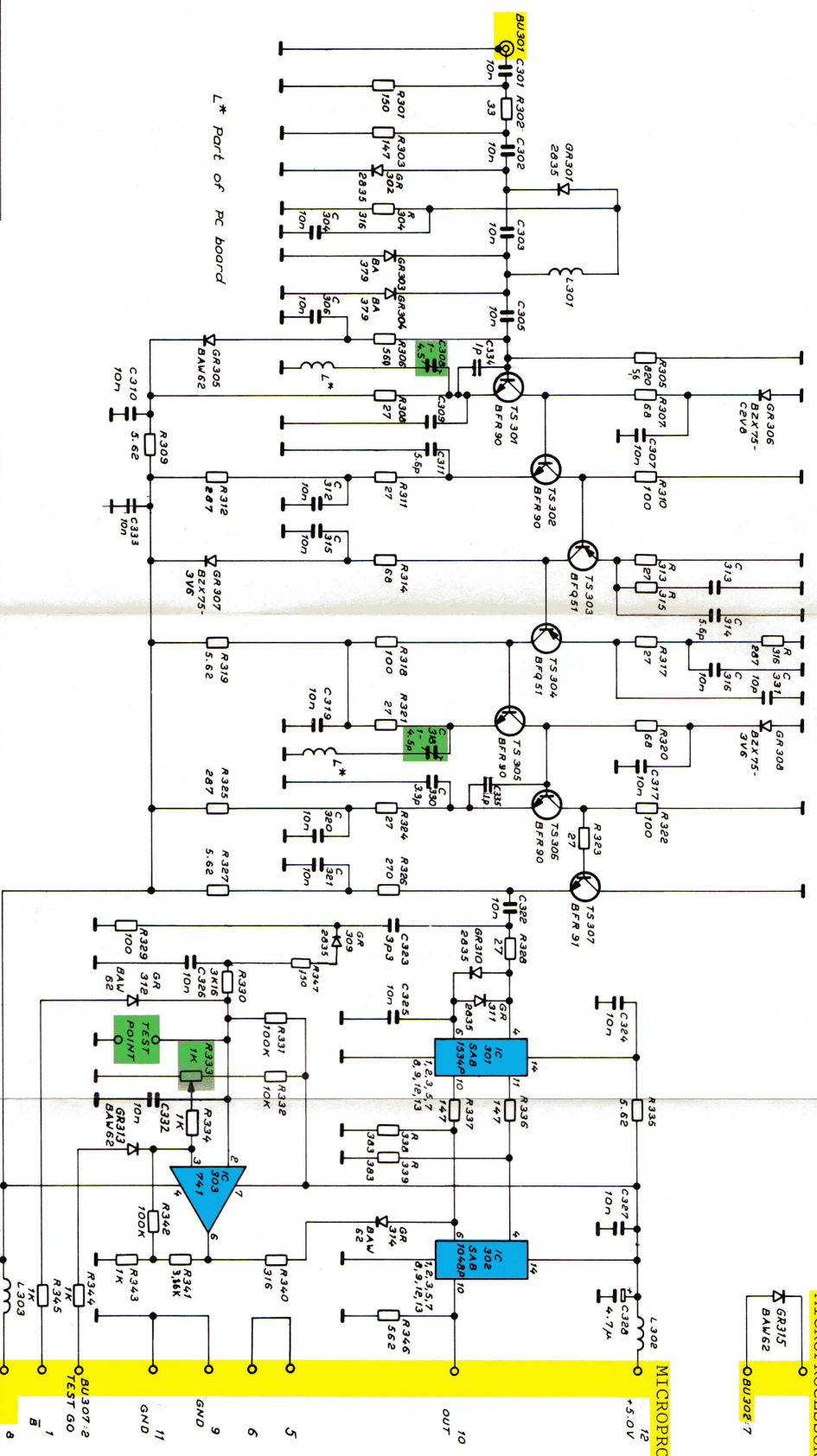
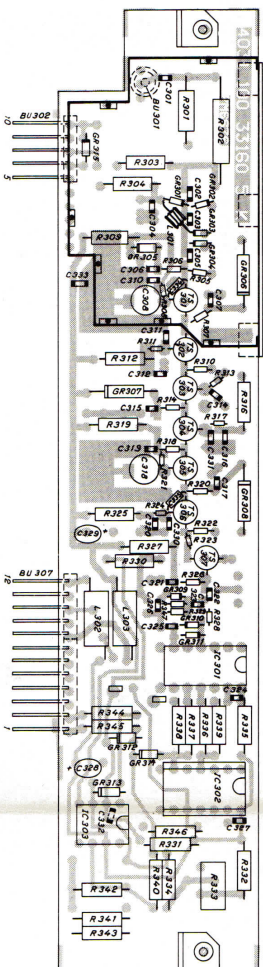
Item	pins	GND	+5V	-8.5V
IC1	14	1, 2, 3, 5, 7, 8, 9, 12, 13	14	
IC2	14	1, 2, 3, 5, 7, 8, 9, 12, 13	14	
IC3	8		6	2

**MICROPROCESSOR BOARD**

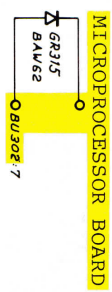


**MICROPROCESSOR BOARD**



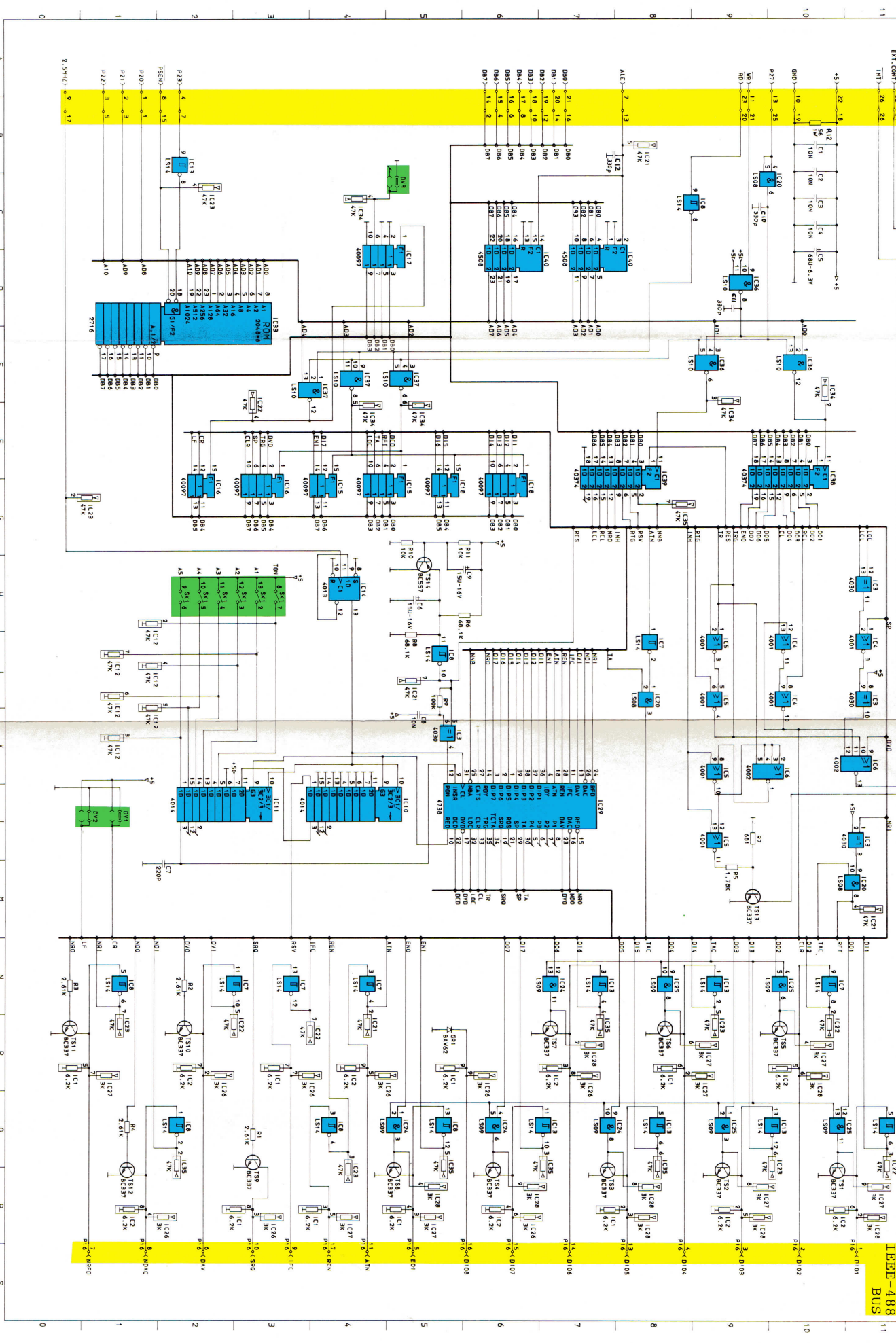


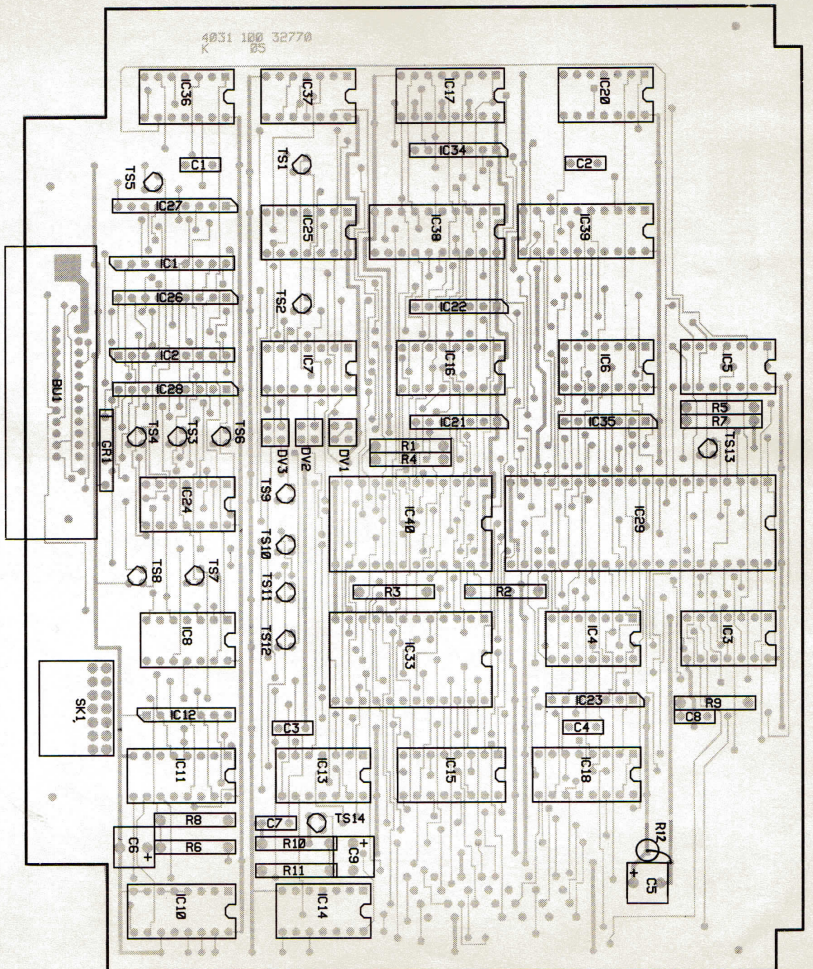
Item	pins	GND	+5V	-8.1V
IC301	14	1, 2, 3, 5, 7, 8, 9, 12, 13	14	
IC302	14	1, 2, 3, 5, 7, 8, 9, 12, 13	14	
IC303	8		7	4



MICROPROCESSOR BOARD

IEEE-488 BUS





Item	Pins	GND	+5V
IC3	14	7	2, 14, 8
IC4	14	7	14
IC5	14	7	14
IC6	14	7	14
IC7	14	7	14
IC8	14	7	14
IC10	16	4, 5, 6, 7, 8 11, 13, 14, 15 6, 8	7, 16
IC11	16	7	14
IC13	14	7	14
IC14	14	7, 8, 10	14
IC15	16	8	16
IC16	16	8	16
IC17	16	2, 4, 8, 10	16
IC18	16	8	16
IC20	14	7	14
IC24	14	7	14
IC25	14	7	14
IC29	40	20, 27	40
IC33	24	12	24
IC36	14	7	10, 11, 14
IC37	14	7	14
IC38	20	1, 10	20
IC39	20	10, 18	20
IC40	24	1, 3, 12, 13, 15	24