Chapter 8

Drawings & Diagrams

How to read the diagrams

This chapter contains circuit diagrams and component layout.

Each diagram has been completed with lists of the IC:s used in the unit. This lists indicates the connections that are not shown in the diagram, such as GND and supply voltages.

Signals

The signals in these units are named after what they do, e.g. LEAD-EDGE is used as control current to the leading edge circuits.

Two different types of arrows are used to mark references for continued connection somewhere else in the diagram.

This arrow is used if the reference is directed to a point located on the same page.

This arrow is used if the reference is directed to a point located on another page. The example means that the point is on sheet 1, coordinate A1.

Coloured areas

The coloured areas in the diagrams represent following functions:

Blue	= Integrated circuits
Green	= Trim points, test points or jumpers
Orange	= Connetors

Circuit symbols

The diagram are computer drawn. The symbols conform to the 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 input/output inverts the signal.

The component name is written below the symbol.

The signal flow through the circuit is always from left to 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

"R305" is a typical component number. The "R" indicates that it is a resistor,"3" that it is positioned on the "unit 3" and 05 that it is the fifths resistor in the component list for that unit.

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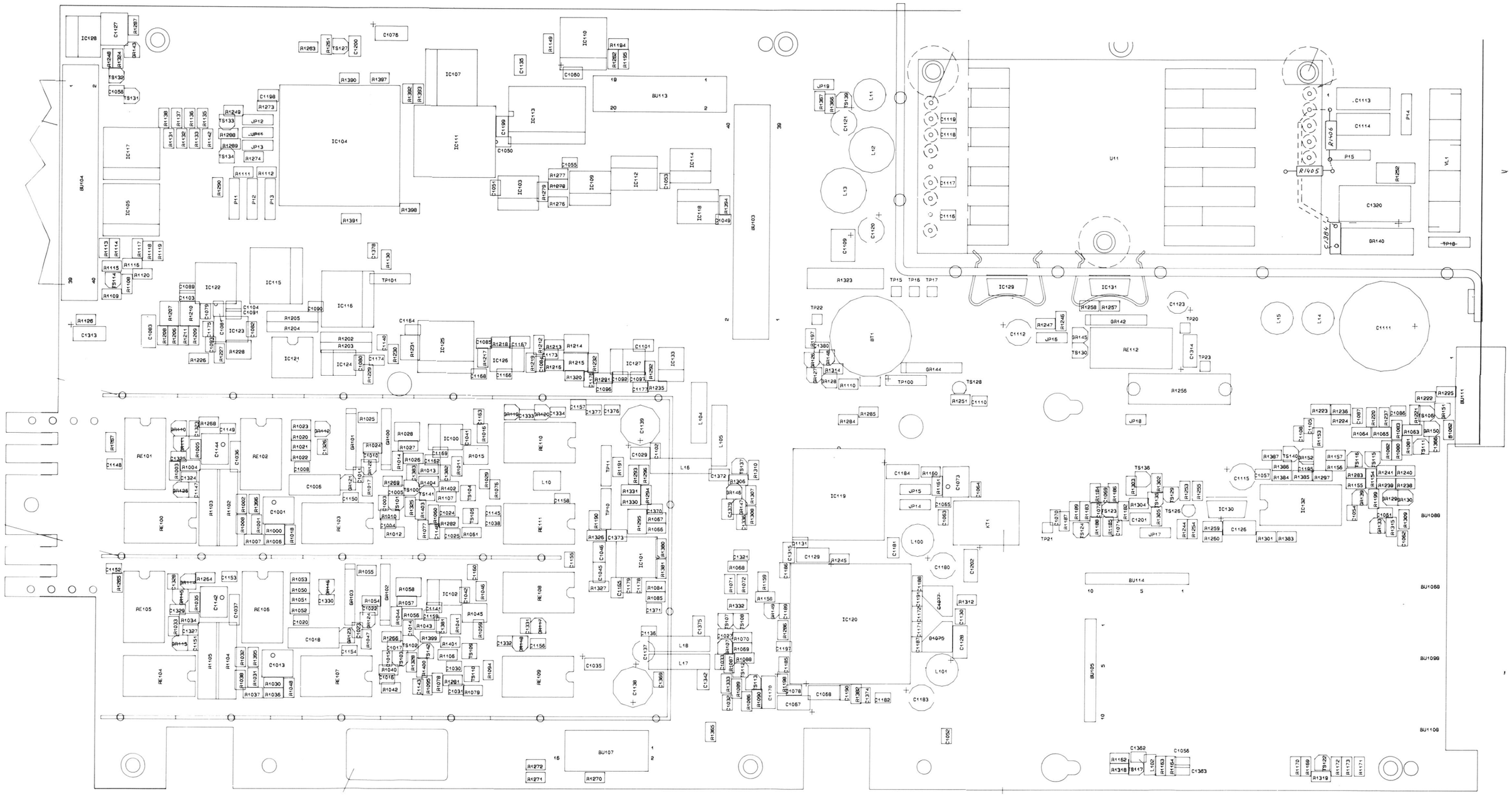
Basic board, Component layout

Input amplifier					
IC	**Type**	**-5.2**	**GND**	**+5**	**NC**
IC100	3140	4		7	
IC101	AD96687	8	4, 18	14	1, 6, 11, 16
IC102	3140	4		7	
-5.2 and +5 are generated from -5.2V resp. +5V in the input amplifier.					



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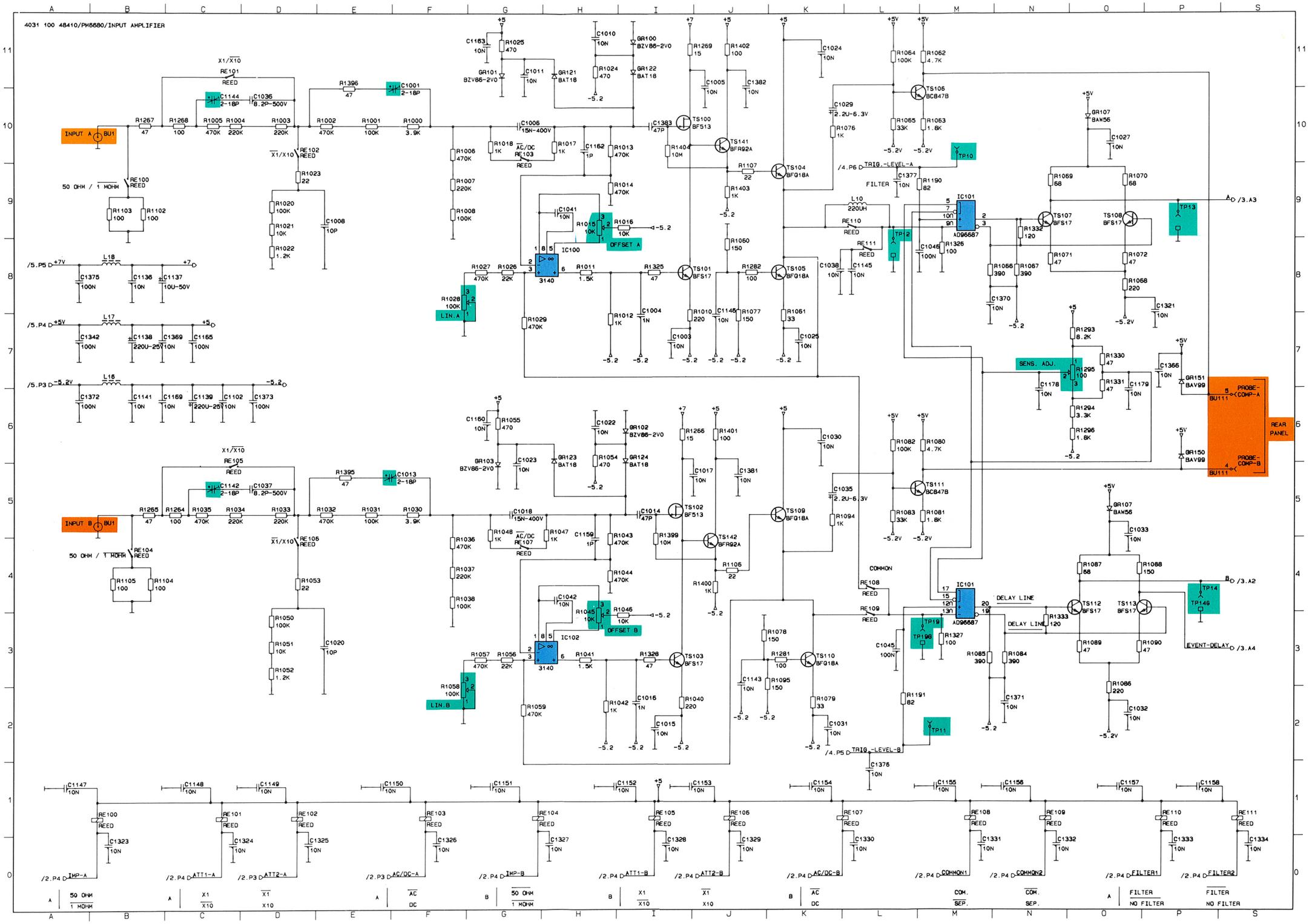
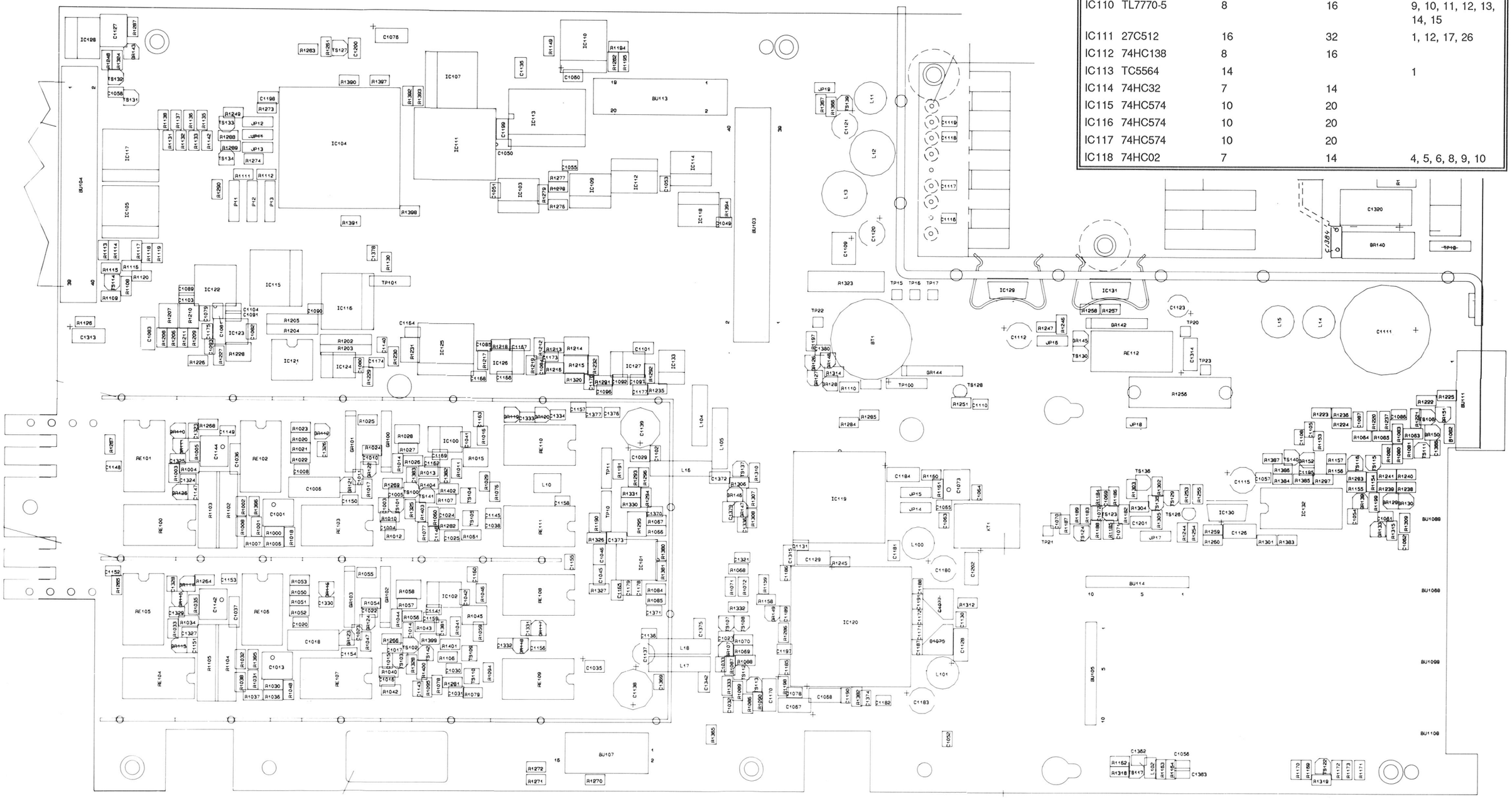
Input amplifier, Unit 1 sheet 1(5)



Basic board, Component layout

Logical circuits					
IC	**Type**	**-5.2**	**GND**	**+5**	**NC**
IC103	74HC21		7	14	3, 11
IC104	80C196		36, 68	1	
IC105	74HC573		10	20	
IC107	74HC573		10	20	
IC109	74HC00		7	14	
IC110	TL7770-5		8	16	9, 10, 11, 12, 13, 14, 15
IC111	27C512		16	32	1, 12, 17, 26
IC112	74HC138		8	16	
IC113	TC5564		14		1
IC114	74HC32		7	14	
IC115	74HC574		10	20	
IC116	74HC574		10	20	
IC117	74HC574		10	20	
IC118	74HC02		7	14	4, 5, 6, 8, 9, 10



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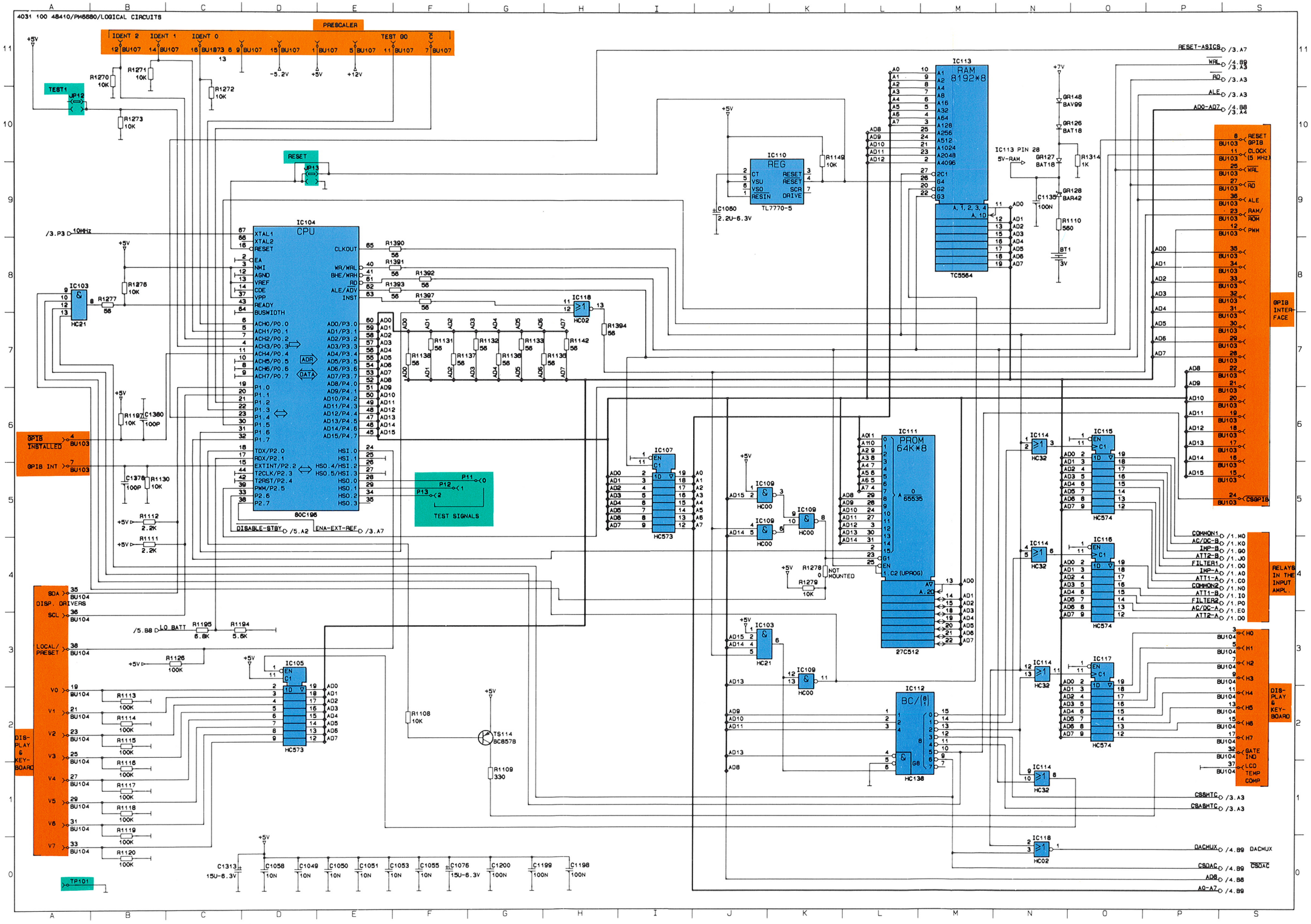
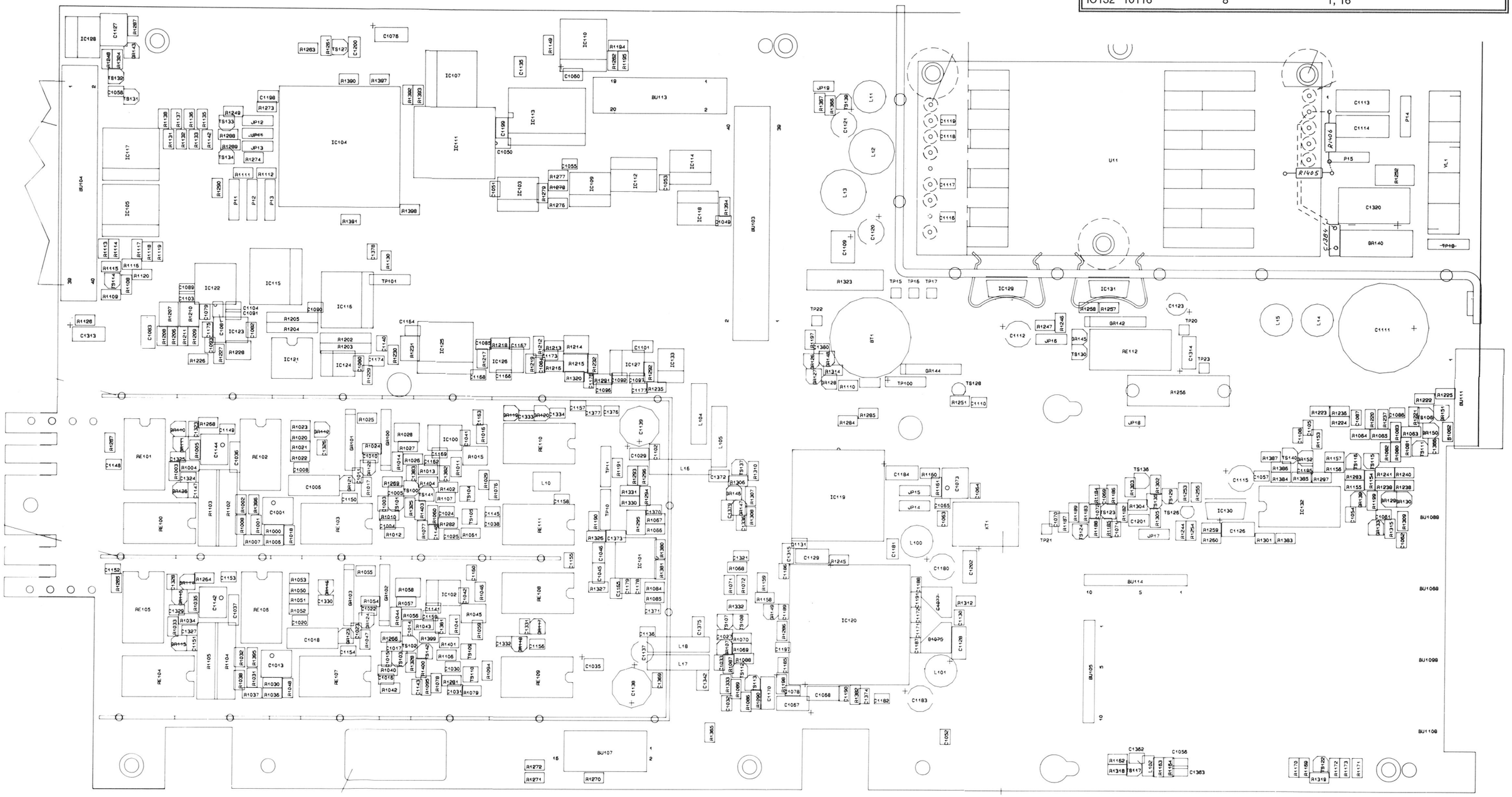
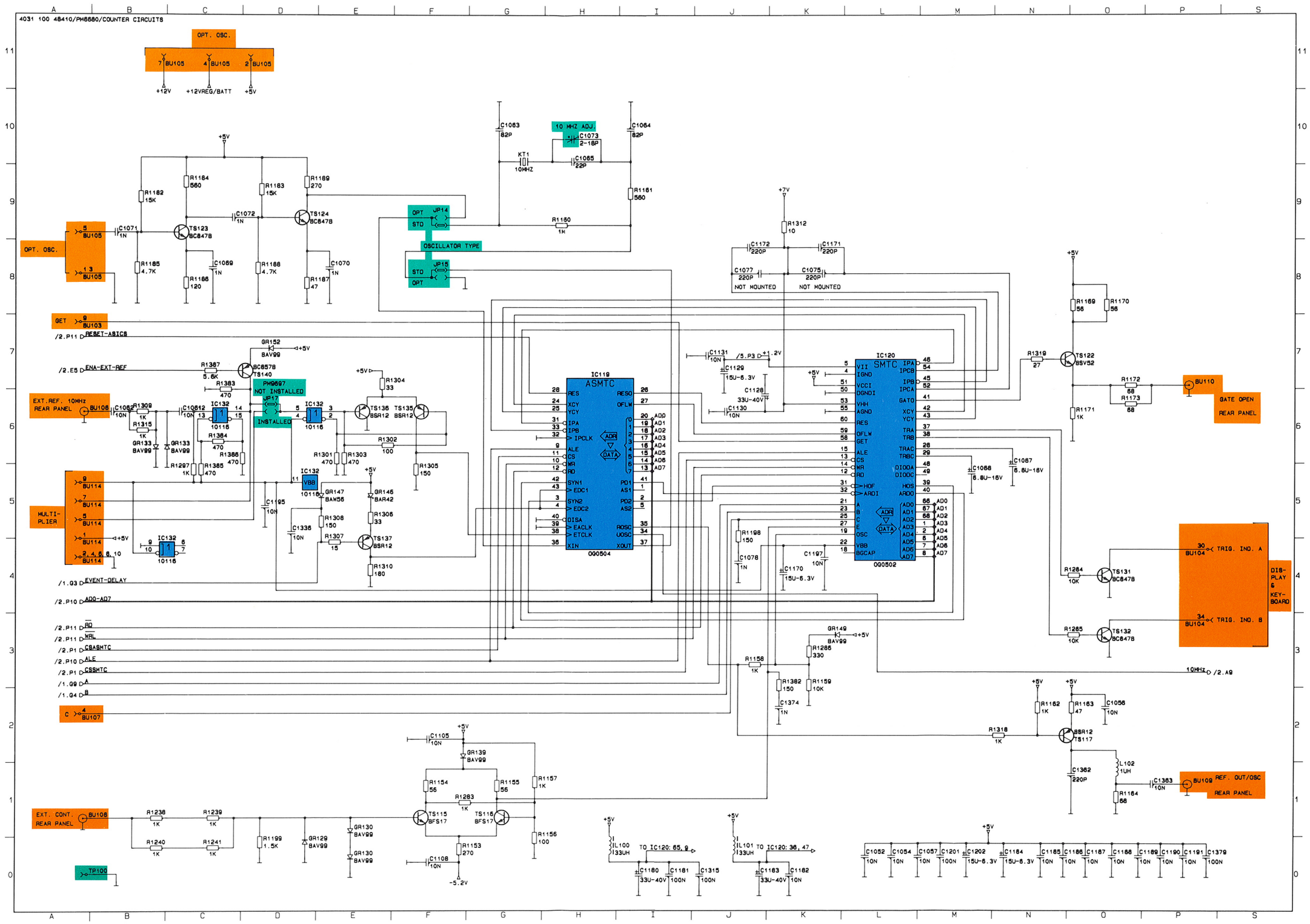


48110/01, sheet 1

Basic board, Component layout

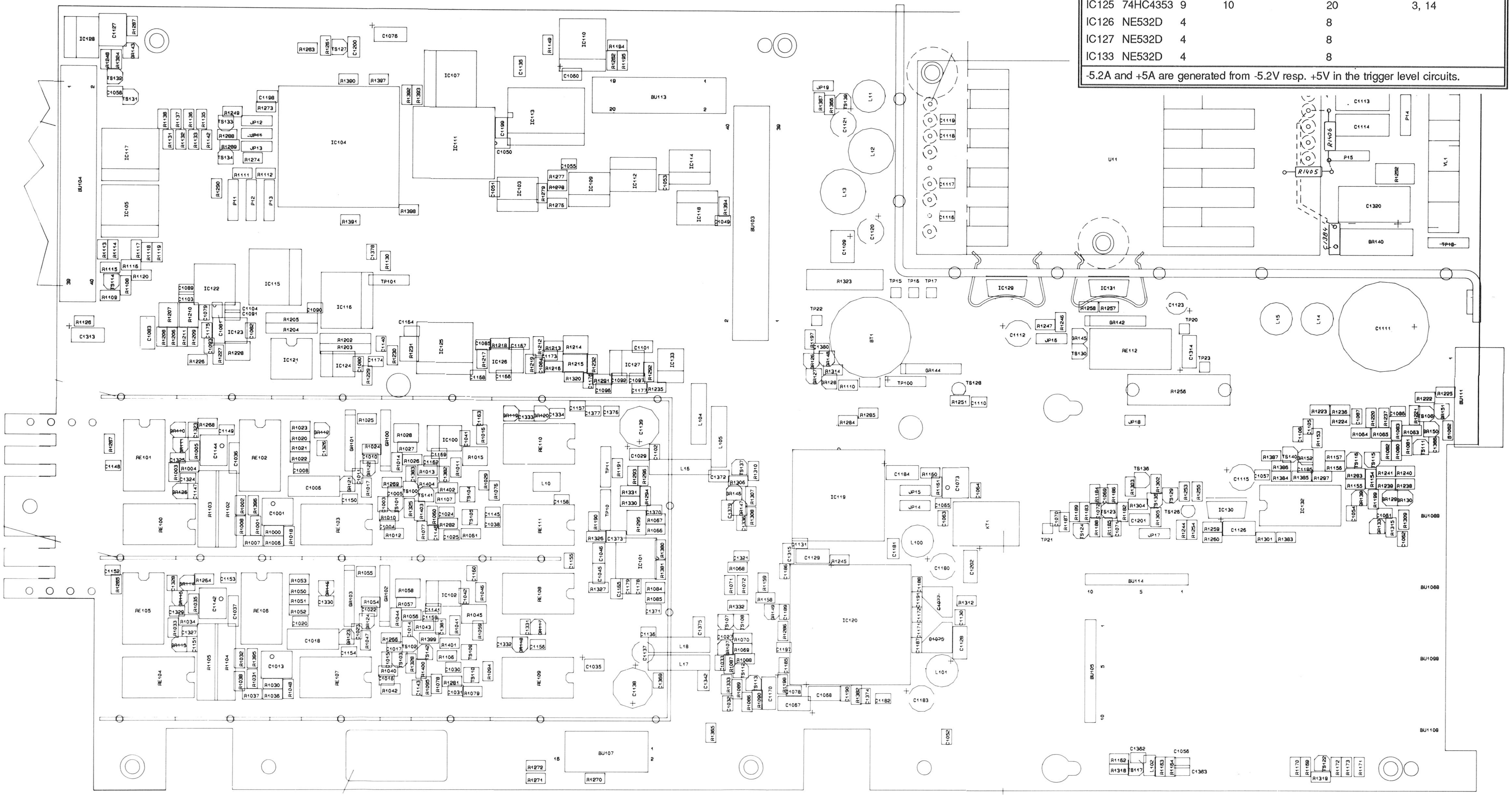
Counter circuits				
IC	**Type**	**GND**	**+5V**	**NC**
IC119	OQ0504	21	22	6, 7, 8, 23, 29, 30, 44
IC120	OQ0502	3, 16, 20, 26, 30, 34, 44, 56, 62	10, 11, 17, 24, 33, 35, 57, 63	61, 64
IC132	10116	8	1, 16	




4031 100 48410/PM6680/COUNTER CIRCUITS
OPT. OSC.
7 BU105
4 BU105
2 BU105
+12V
+12VREG/BATT
+5V
10 MHZ ADJ.
C1073 2-18P
C1063 82P
C1064 82P
KT1 10MHZ
C1065 22P
R1161 560
R1160 1K
OPT JP14 STD
OSCILLATOR TYPE
OPT JP15 STD
R1184 560
R1182 15K
R1183 15K
R1189 270
C1072 1N
TS124 BC8478
TS123 BC8478
C1071 1N
5 BU105
1 3 BU105
OPT. OSC.
R1185 4.7K
R1186 120
C1069 1N
R1188 4.7K
C1070 1N
R1187 47
GET 9 BU103
/2.P11
RESET-ABICS
GR152 BAV99
/2.E5 ENA-EXT-REF
R1387 5.6K
BC8578 TS140
R1383 470
PM9697 NOT INSTALLED
JP17 INSTALLED
EXT.REF. 10MHz REAR PANEL
BU106
C1062 10N
R1309 1K
R1315 1K
IC132 10116
C1061 10N
R1384 470
R1385 470
GR133 BAV99
R1297 1K
R1304 33
TS136 BSR12
TS135 BSR12
R1302 100
R1301 470
R1303 470
R1305 150
IC132 10116
GR147 BAW56
GR146 BAR42
R1308 150
R1306 33
C1336 10N
R1307 15
TS137 BSR12
R1310 180
C1195 10N
MULTI-PLIER
9 BU114
7 BU114
5 BU114
1 BU114
2,4,6,8,10 BU114
IC132 10116
/1.Q3 EVENT-DELAY
/2.P10 AD0-AD7
/2.P11 RD
/2.P11 WRL
/2.P1 CBASMTC
/2.P10 ALE
/2.P1 CSSMTC
/1.Q9 A
/1.Q4 B
C 4 BU107
IC119 ASMTC
RES
XCY
YCY
IPA
IPB
IPCLK
ALE
CS
WR
RD
SYN1
EDC1
SYN2
EDC2
DISA
EACLK
ETCLK
XIN
RESO
OFLW
AD0
AD1
AD2
AD3
AD4
AD5
AD6
AD7
PD1
AS1
PD2
AS2
ROSC
UOSC
XOUT
ADR
DATA
QQ0504
+7V
R1312 10
C1172 220P
C1171 220P
C1077 220P NOT MOUNTED
C1075 220P NOT MOUNTED
C1131 10N
/5.P3 +1.2V
C1129 15U-6.3V
C1126 33U-40V
C1130 10N
IC120 SMTC
VII
IGND
VCCI
DGNDI
VHH
AGND
RES
OFLW
GET
ALE
CS
WR
RD
HOF
ARDI
A
B
C
E
OSC
VBB
BGCAP
IPA
IPCB
IPB
IPCA
GATO
XCY
YCY
TRA
TRB
TRAC
TRBC
DIOOA
DIOOC
HOS
ARDO
QQ0502
C1198 150
C1078 1N
C1197 10N
C1170 15U-6.3V
C1068 6.8U-16V
C1067 6.8U-16V
+5V
R1169 56
R1170 56
R1319 27
TS122 BSV52
R1172 68
R1173 68
R1171 1K
BU110
GATE OPEN REAR PANEL
R1264 10K
TS131 BC8478
R1265 10K
TS132 BC8478
30 BU104 TRIG. IND. A
34 BU104 TRIG. IND. B
DIS-PLAY & KEY-BOARD
10MHz /2.A9
GR149 BAV99
R1286 330
R1158 1K
R1382 150
R1159 10K
C1374 1N
R1162 1K
R1163 47
C1056 10N
R1318 1K
BSR12 TS117
C1362 220P
L102 1UH
R1164 68
C1363 10N
BU109 REF. OUT/OSC REAR PANEL
C1105 10N
GR139 BAV99
R1154 56
R1155 56
R1157 1K
R1283 1K
TS115 BFS17
TS116 BFS17
R1156 100
R1153 270
C1108 10N
-5.2V
EXT. CONT. REAR PANEL
BU108
R1238 1K
R1239 1K
R1240 1K
R1241 1K
R1199 1.5K
GR129 BAV99
GR130 BAV99
GR130 BAV99
TP100
IL100 33UH
TO IC120: 65, 9
IL101 33UH
TO IC120: 36, 47
C1180 33U-40V
C1181 100N
C1315 100N
C1183 33U-40V
C1182 10N
C1052 10N
C1054 10N
C1057 10N
C1201 100N
C1202 15U-6.3V
C1184 15U-6.3V
C1185 10N
C1186 10N
C1187 10N
C1188 10N
C1189 10N
C1190 10N
C1191 10N
C1379 100N

Basic board, Component layout

Trigger level DAC					
IC	**Type**	**-5.2A**	**GND**	**+5A**	**NC**
IC121	MC1403U				4, 5, 6, 7, 8
IC122	PM7528HP C		5	17	
IC123	NE532D	4		8	
IC124	NE532D	4		8	
IC125	74HC4353	9	10	20	3, 14
IC126	NE532D	4		8	
IC127	NE532D	4		8	
IC133	NE532D	4		8	
-5.2A and +5A are generated from -5.2V resp. +5V in the trigger level circuits.					



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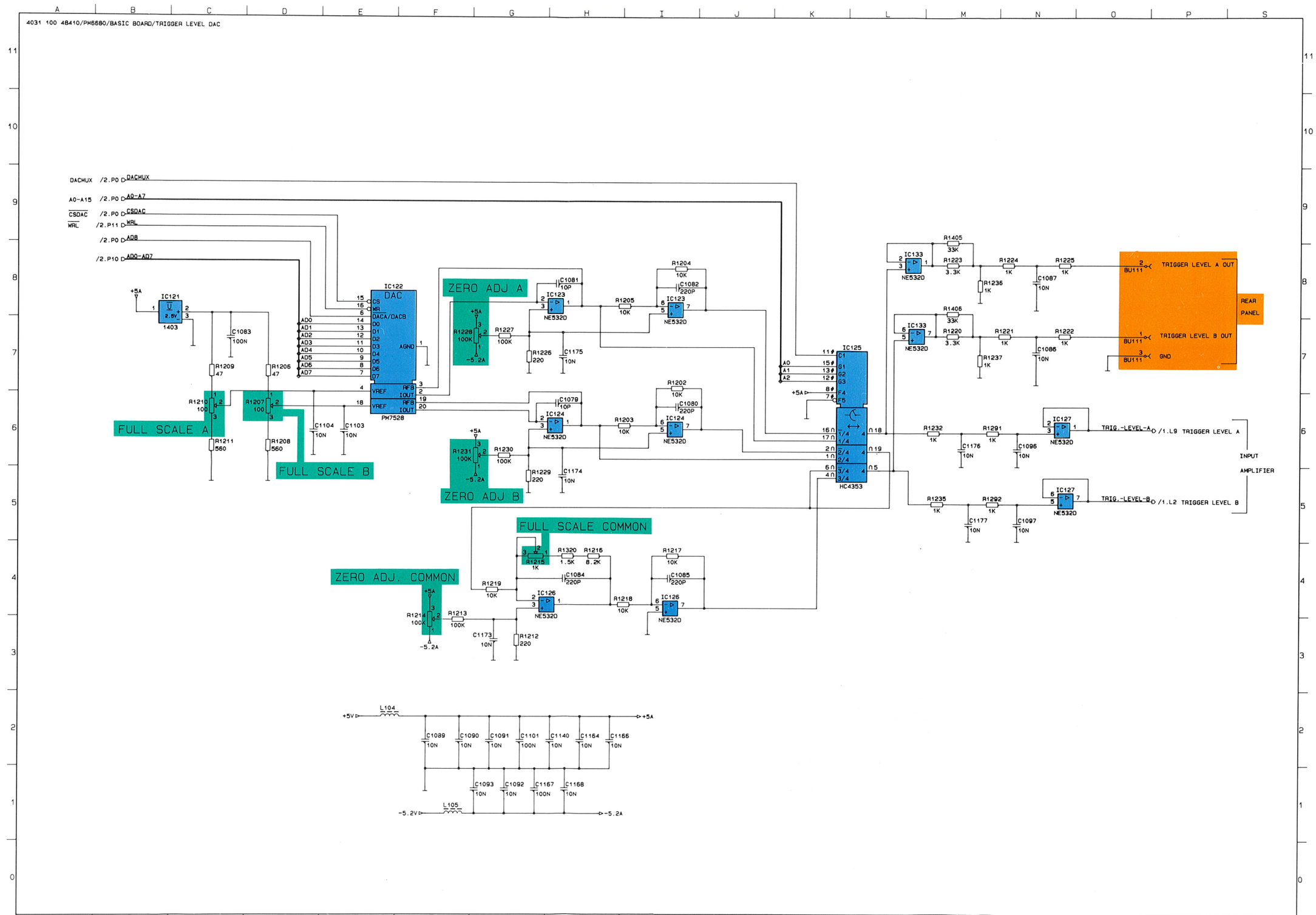
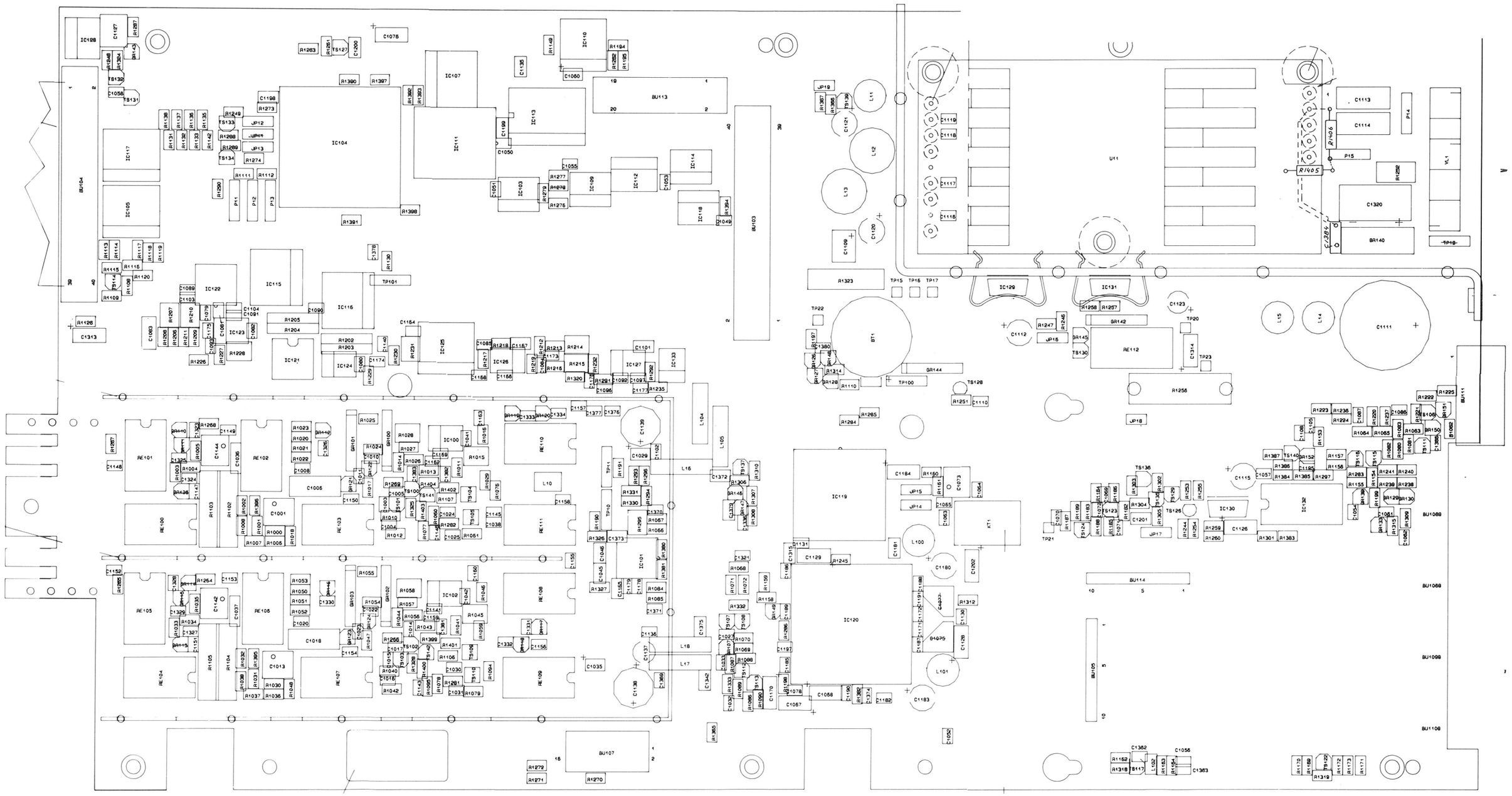
Triger level DAC, Unit 1 sheet 4(5)



Basic board, Component layout

Power supply circuits				
IC	**Type**	**GND**	**U+12V**	**NC**
IC128	4013	3, 4, 5, 6, 7	14	1, 2
Power supply generates +5V, U+12V, -5.2V				



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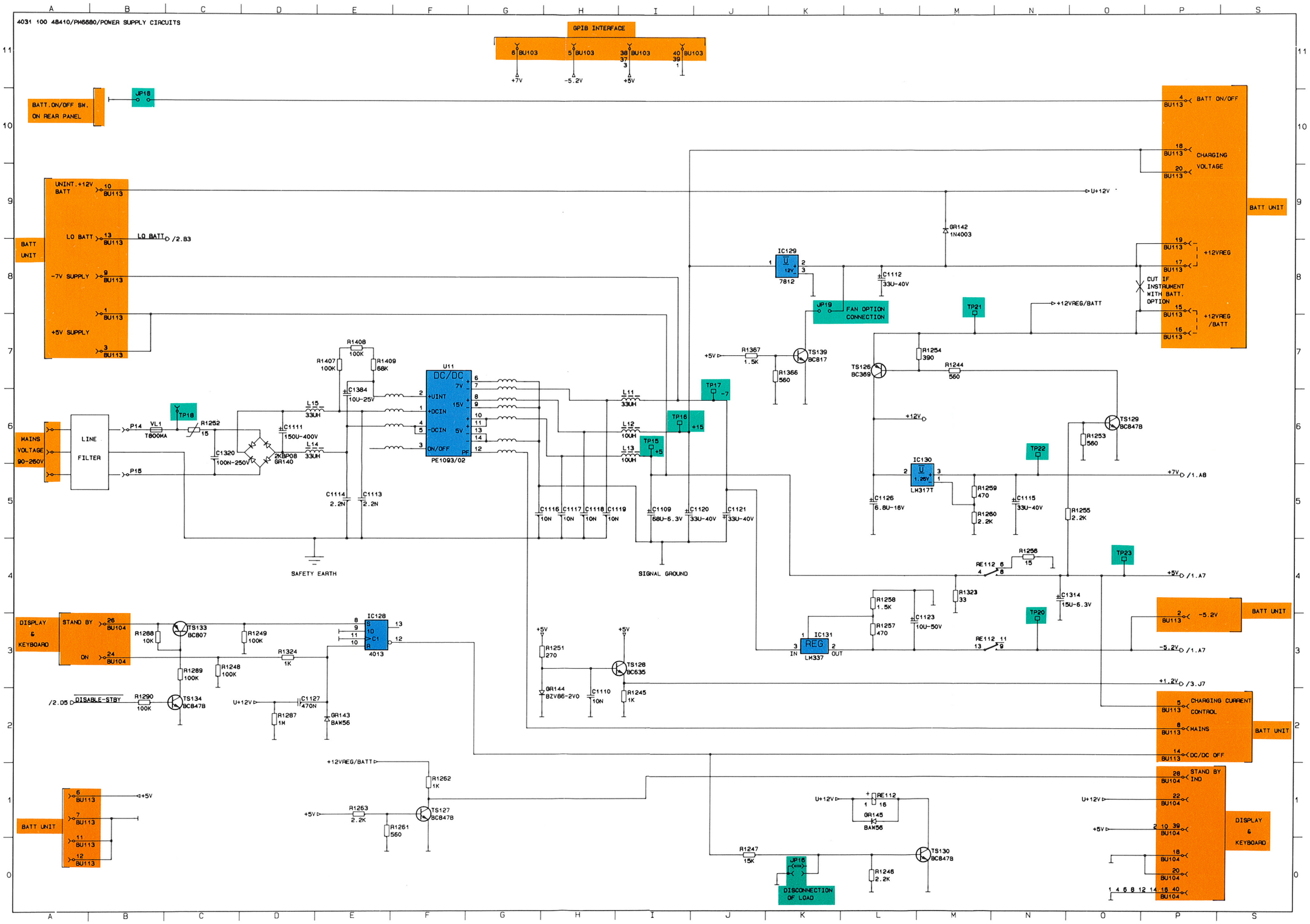
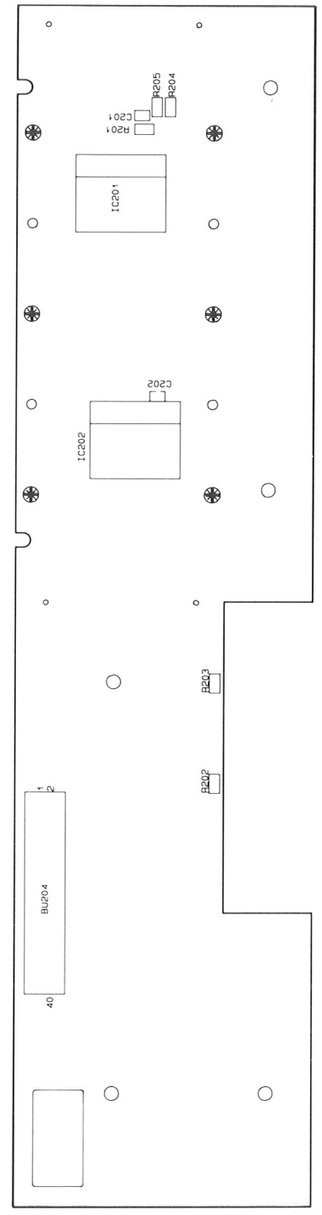
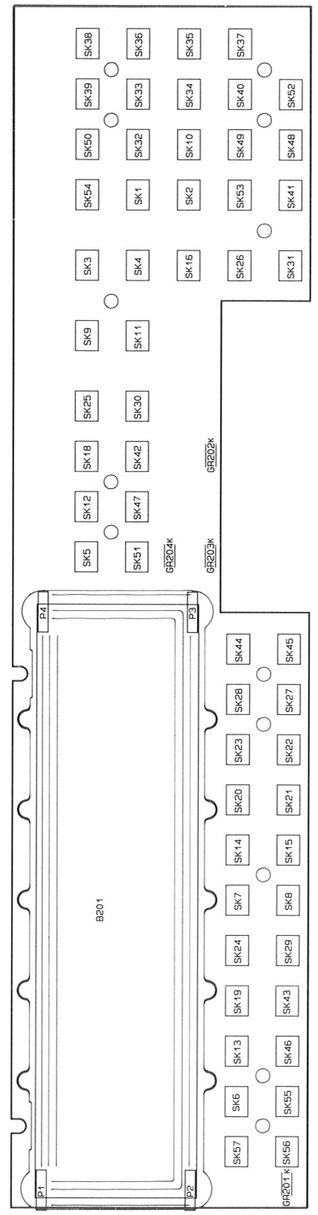
Power supply ciruits, Unit 1 sheet 5(5)



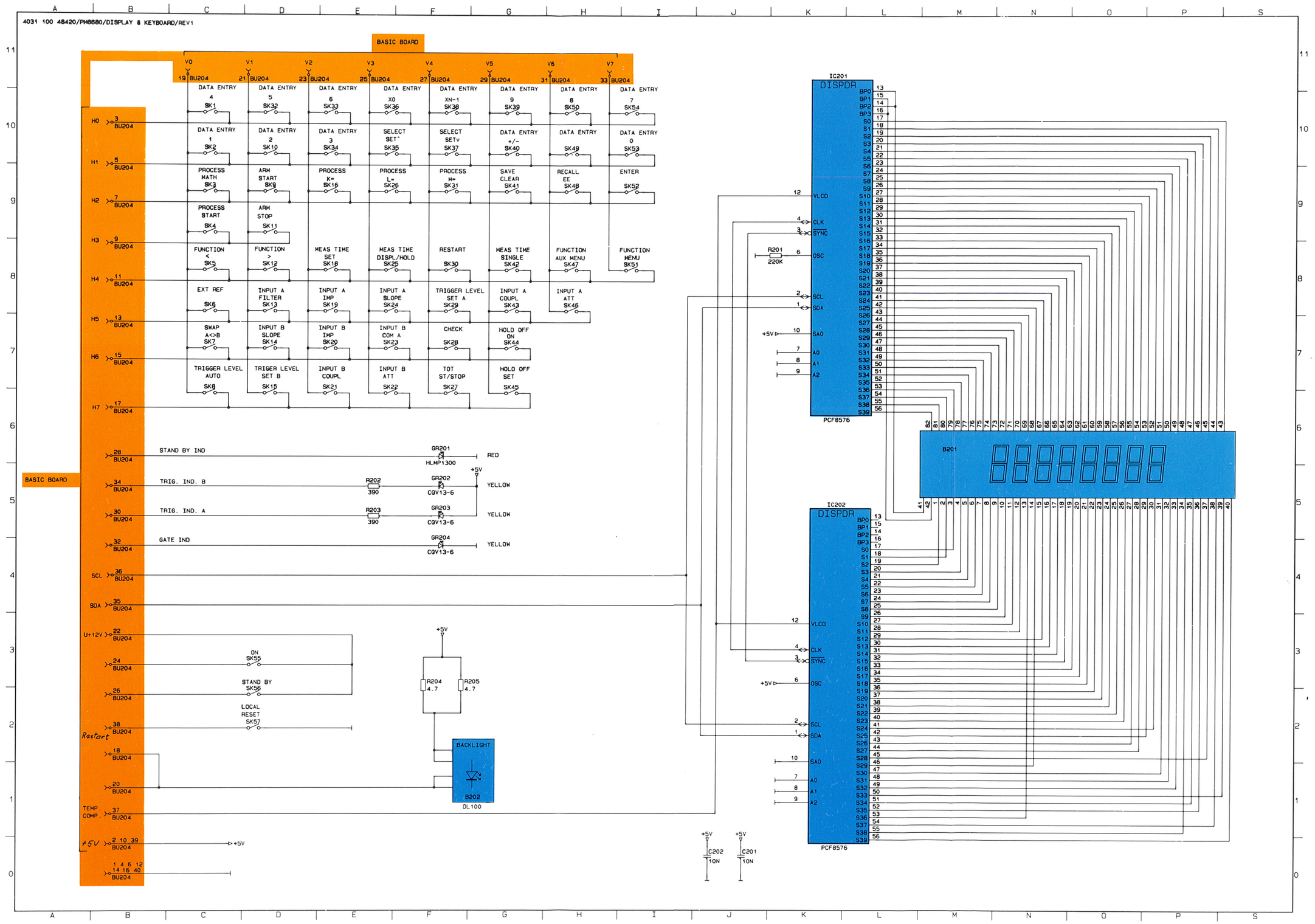
Display and keyboard board, Component layout

IC	Type	GND	+5V
IC201	PCF8576	11	5
IC202	PCF8576	11	5





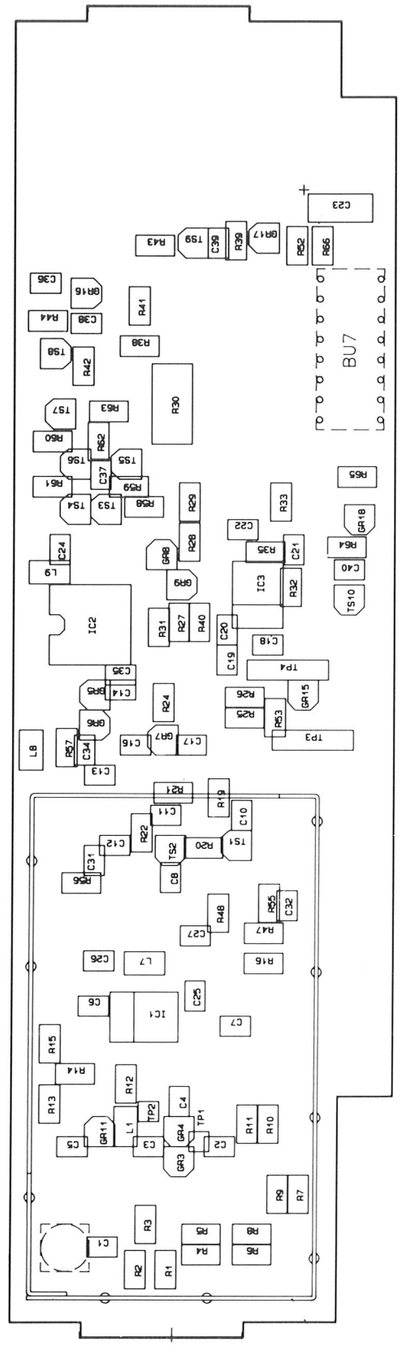
48220/03


4031 100 48420/PM6680/DISPLAY & KEYBOARD/REV1
BASIC BOARD
V0 V1 V2 V3 V4 V5 V6 V7
19 21 23 25 27 29 31 33 BU204
H0 H1 H2 H3 H4 H5 H6 H7
DATA ENTRY 4 SK1
DATA ENTRY 5 SK32
DATA ENTRY 6 SK33
DATA ENTRY XO SK36
DATA ENTRY XN-1 SK38
DATA ENTRY 9 SK39
DATA ENTRY 8 SK50
DATA ENTRY 7 SK54
DATA ENTRY 1 SK2
DATA ENTRY 2 SK10
DATA ENTRY 3 SK34
SELECT SET^ SK35
SELECT SETv SK37
DATA ENTRY +/- SK40
DATA ENTRY SK49
DATA ENTRY 0 SK53
PROCESS MATH SK3
ARM START SK9
PROCESS K= SK16
PROCESS L- SK26
PROCESS M= SK31
SAVE CLEAR SK41
RECALL EE SK48
ENTER SK52
PROCESS START SK4
ARM STOP SK11
FUNCTION < SK5
FUNCTION > SK12
MEAS TIME SET SK18
MEAS TIME DISPL/HOLD SK25
RESTART SK30
MEAS TIME SINGLE SK42
FUNCTION AUX MENU SK47
FUNCTION MENU SK51
EXT REF SK6
INPUT A FILTER SK13
INPUT A IMP SK19
INPUT A SLOPE SK24
TRIGGER LEVEL SET A SK29
INPUT A COUPL SK43
INPUT A ATT SK46
SWAP A<>B SK7
INPUT B SLOPE SK14
INPUT B IMP SK20
INPUT B COM A SK23
CHECK SK28
HOLD OFF ON SK44
TRIGGER LEVEL AUTO SK8
TRIGER LEVEL SET B SK15
INPUT B COUPL SK21
INPUT B ATT SK22
TOT ST/STOP SK27
HOLD OFF SET SK45
28 STAND BY IND GR201 HLMP1300 RED
34 TRIG. IND. B R202 390 GR202 CQV13-6 YELLOW
30 TRIG. IND. A R203 390 GR203 CQV13-6 YELLOW
32 GATE IND GR204 CQV13-6 YELLOW
+5V
SCL 36 BU204
SDA 35 BU204
U+12V 22 BU204
24 BU204
26 BU204
38 BU204
Restart
18 BU204
20 BU204
TEMP. COMP. 37 BU204
+5V 2 10 39 BU204
1 4 6 12 14 16 40 BU204
ON SK55
STAND BY SK56
LOCAL RESET SK57
R204 4.7
R205 4.7
BACKLIGHT
B202
DL100
IC201
DISPDR
PCF8576
VLCD CLK SYNC OSC SCL SDA SA0 A0 A1 A2
R201 220K
B201
IC202
C202 10N
C201 10N

48120/02

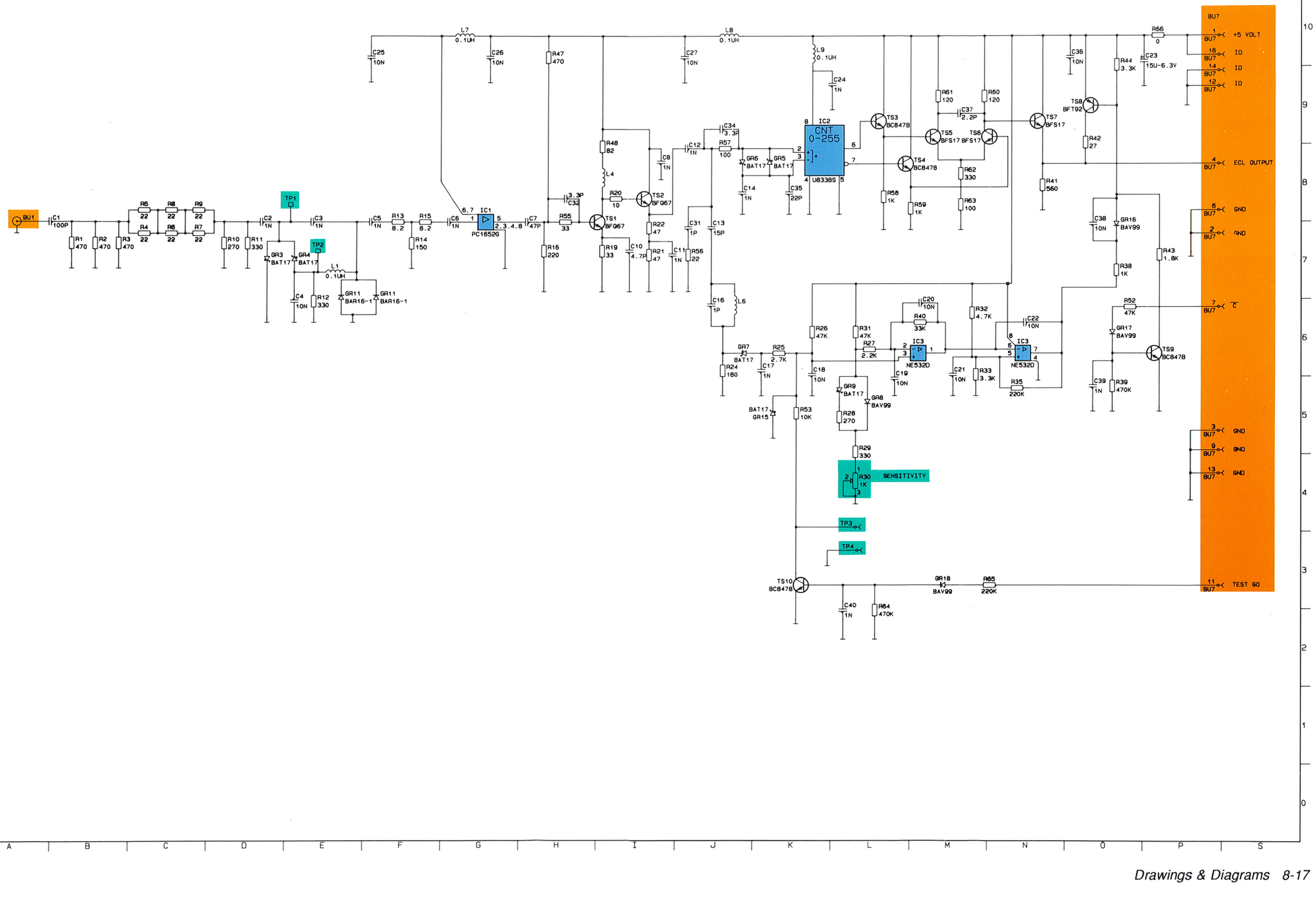
1.3 GHz HF-input, PM 9621, Component layout

IC	Type	GND	+5V
IC1	PC1652G	2, 3, 4, 8	6, 7
IC2	U833BS	4, 5	6
IC3	NE532D	4, 8	



50400/02

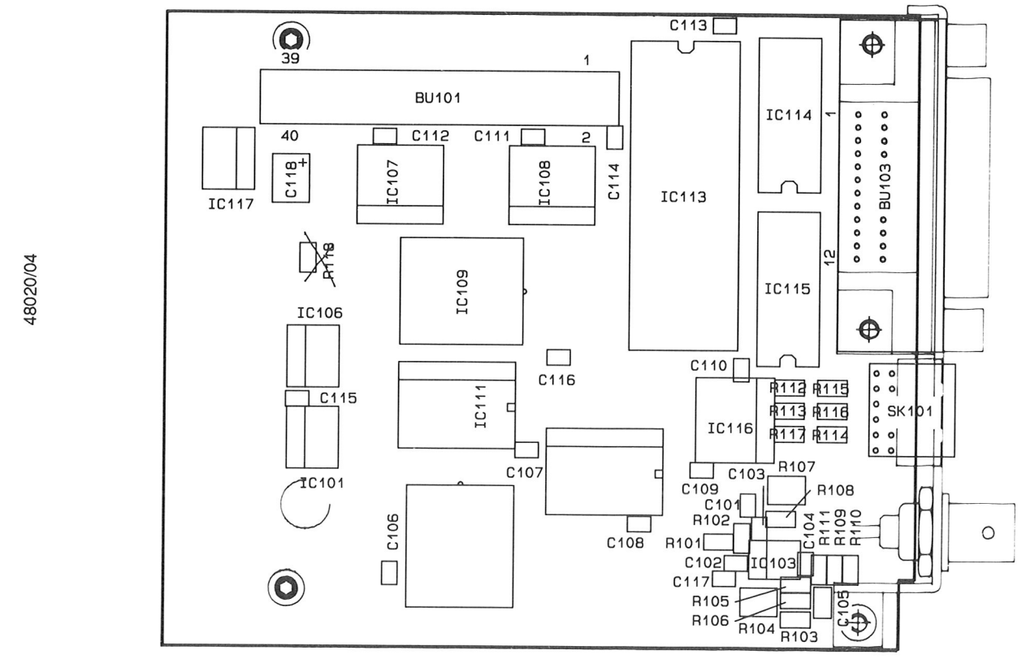
L4 AND L6 ARE PARTS OF THE PCB



50410/01

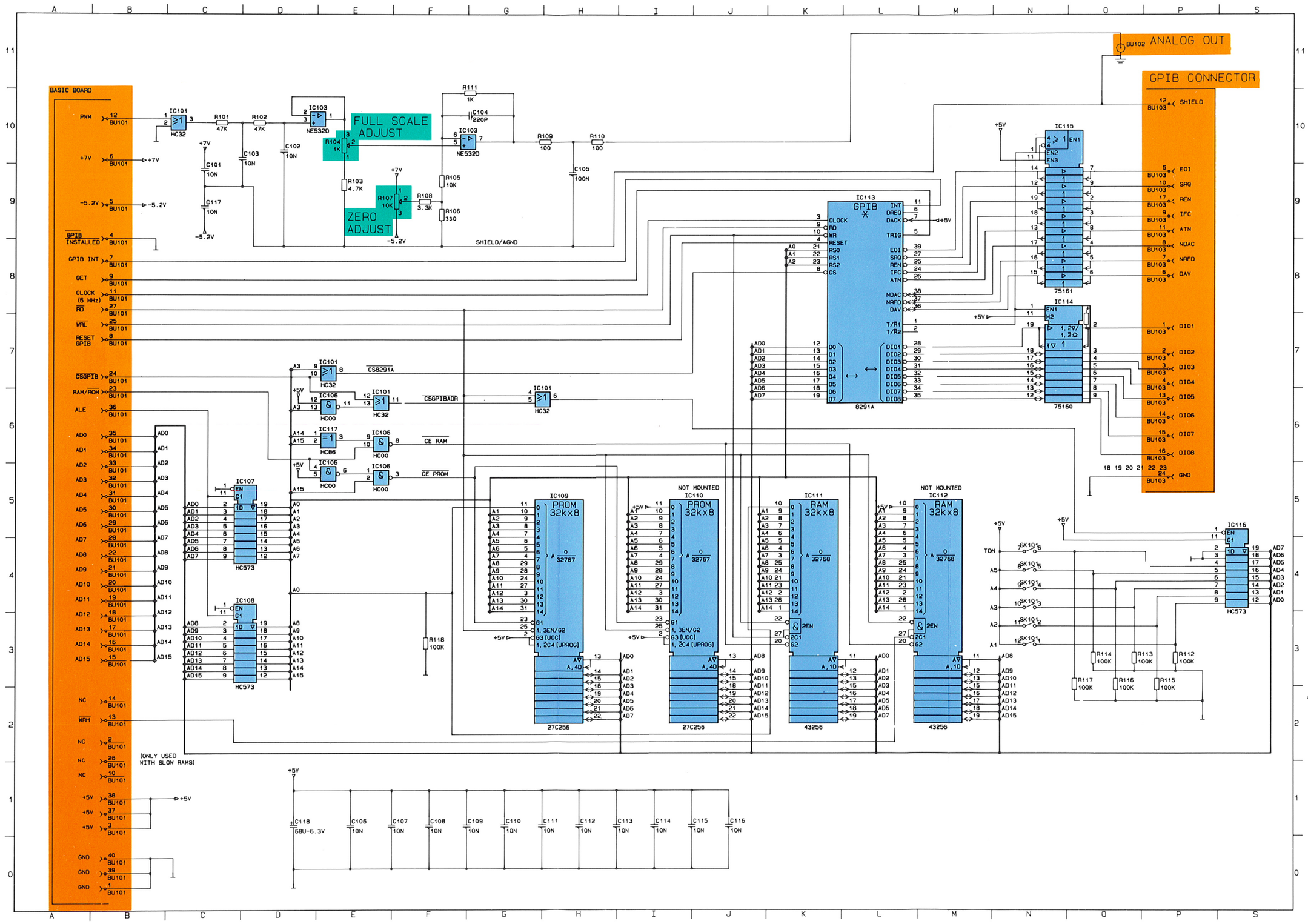
GPIB board, PM 9626, Component layout

IC	Type	-5.2V	GND	+5V	NC
IC101	74HC32		7	14	
IC103	NE532D	4			8=+7V
IC106	74HC00		7	14	
IC107	74HC573		10	20	
IC108	74HC573		10	20	
IC109	27C256-1		16	32	1, 12, 17, 26
IC110	27C256-1		16	32	1, 12, 17, 26
IC111	43256		14	28	
IC112	43256		14	28	
IC113	8291A		20	40	
IC114	75160		10	20	
IC115	75161		10	20	
IC116	74HC573		10	20	
IC117	74HC86		7	14	4, 5, 6, 8, 9, 10, 11, 12, 13



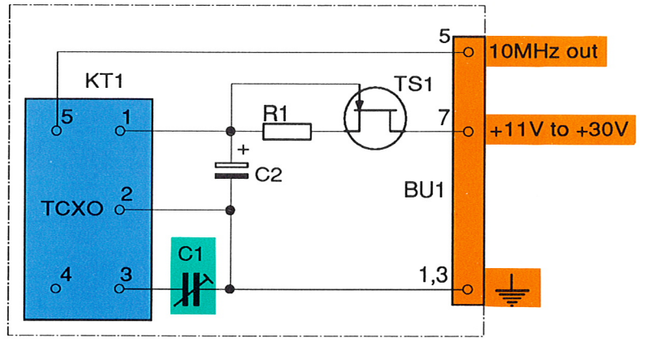
48020/04

GPIB board, PM 9626

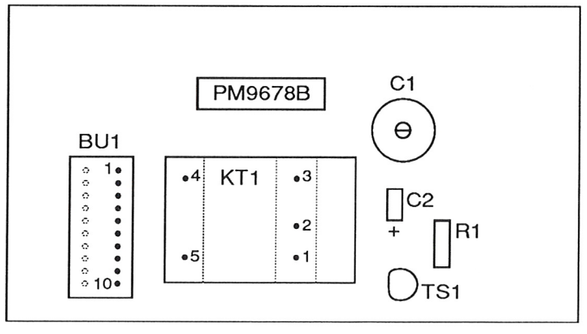


48130/02

TCXO, PM 9678B

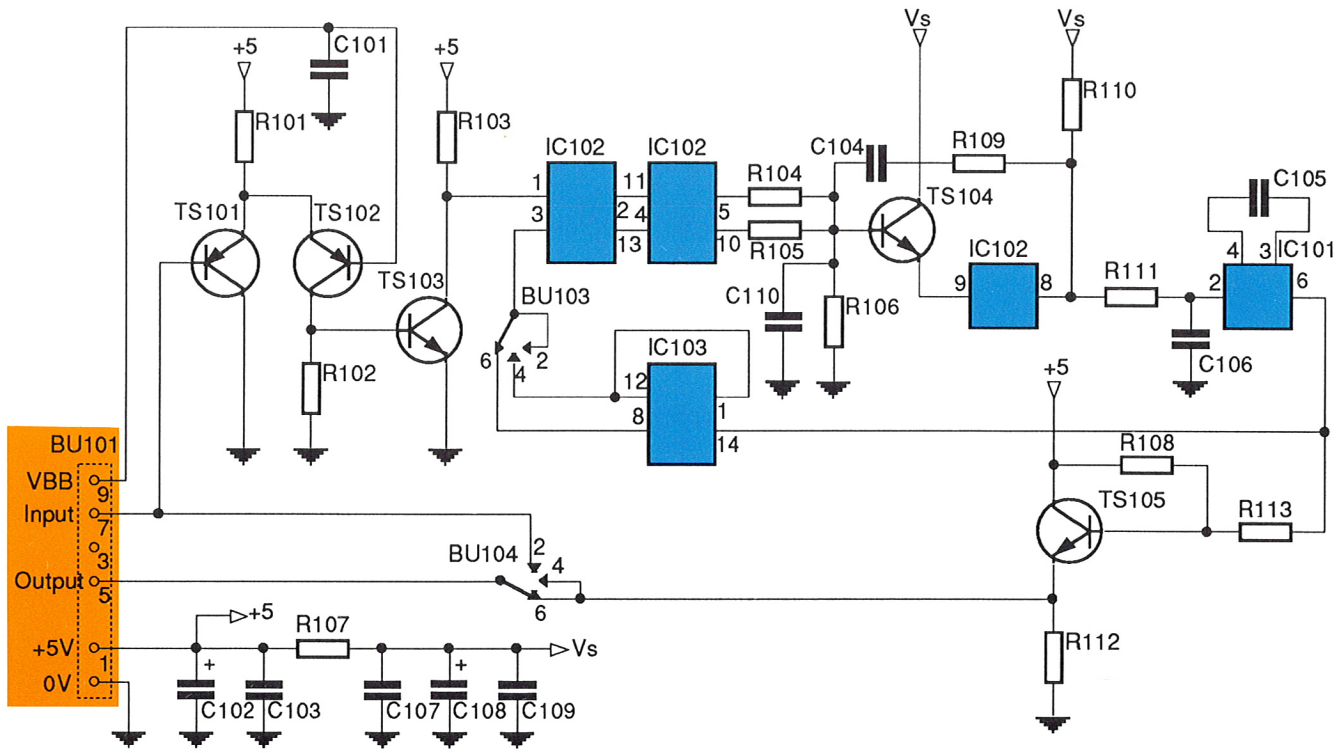


33420/06 33450/01

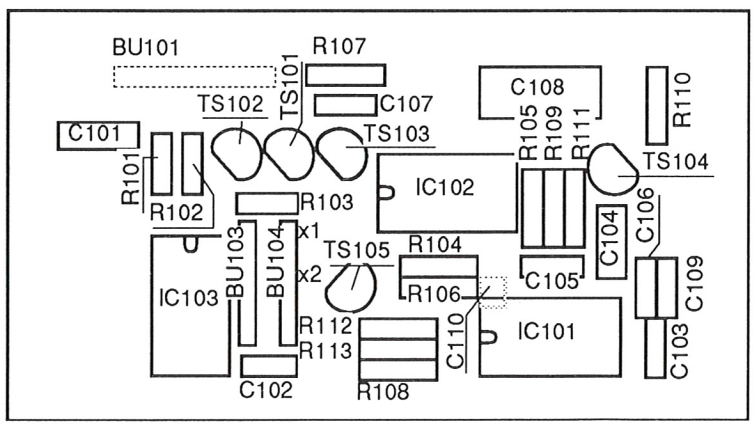


External Reference Frequency Multiplier, PM 9697

IC	Type	GND	+5V	Vs
IC101	MC4024P	5, 7, 9, 12	14	1
IC102	MC4044	7		14
IC103	SN74LS90N	2, 3, 6, 7, 10	5	



37900/02 37910/02



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