

1.3. PRINCIPLE OF OPERATION AND BLOCK DIAGRAM

SAILOR Compact HF SSB AT2110 is a 250W PEP aerial coupler in SAILOR Compact HF SSB Programme 2000. It contains the following circuits.

CONNECTION AND INTERFACE UNIT

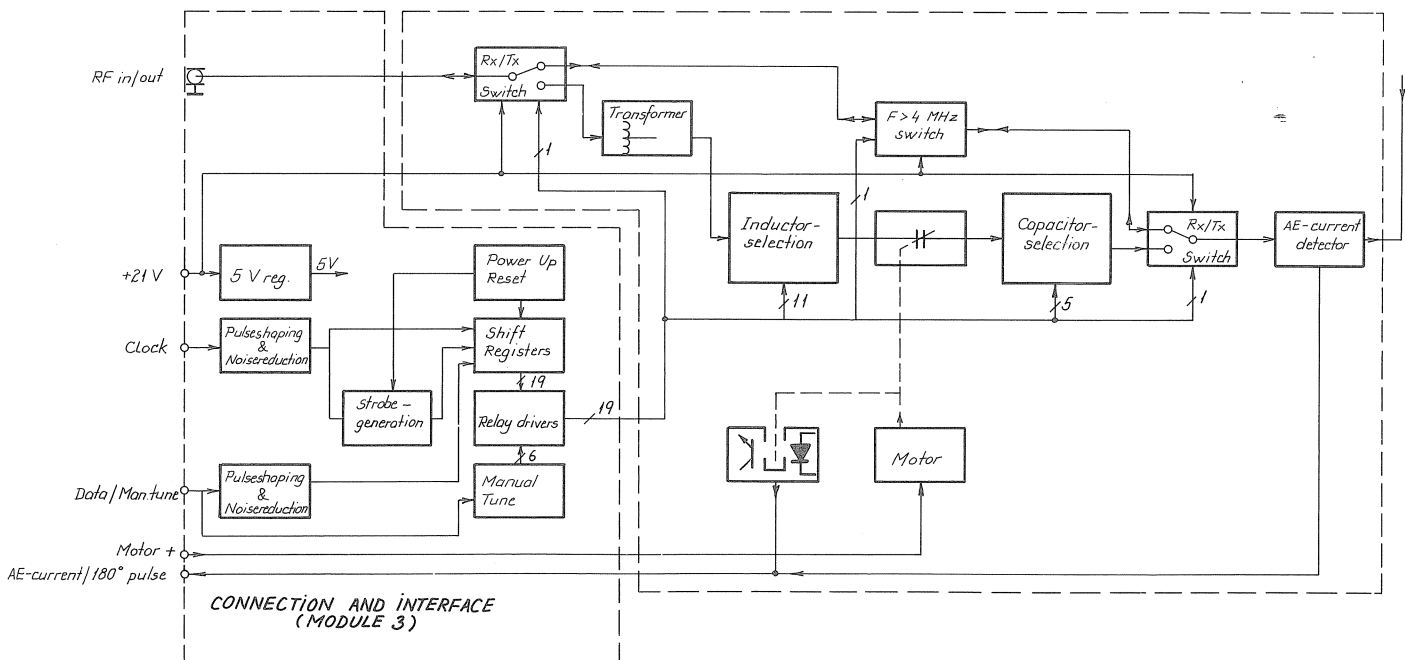
This unit contains a bus receiver, specially constructed to work in noisy environments. The bus receiver is followed by a detector/latch and shift registers, which controls the relay drivers.

MAIN BOARD

This unit contains the components for the aerial matching. It also contains the aerial current detector.

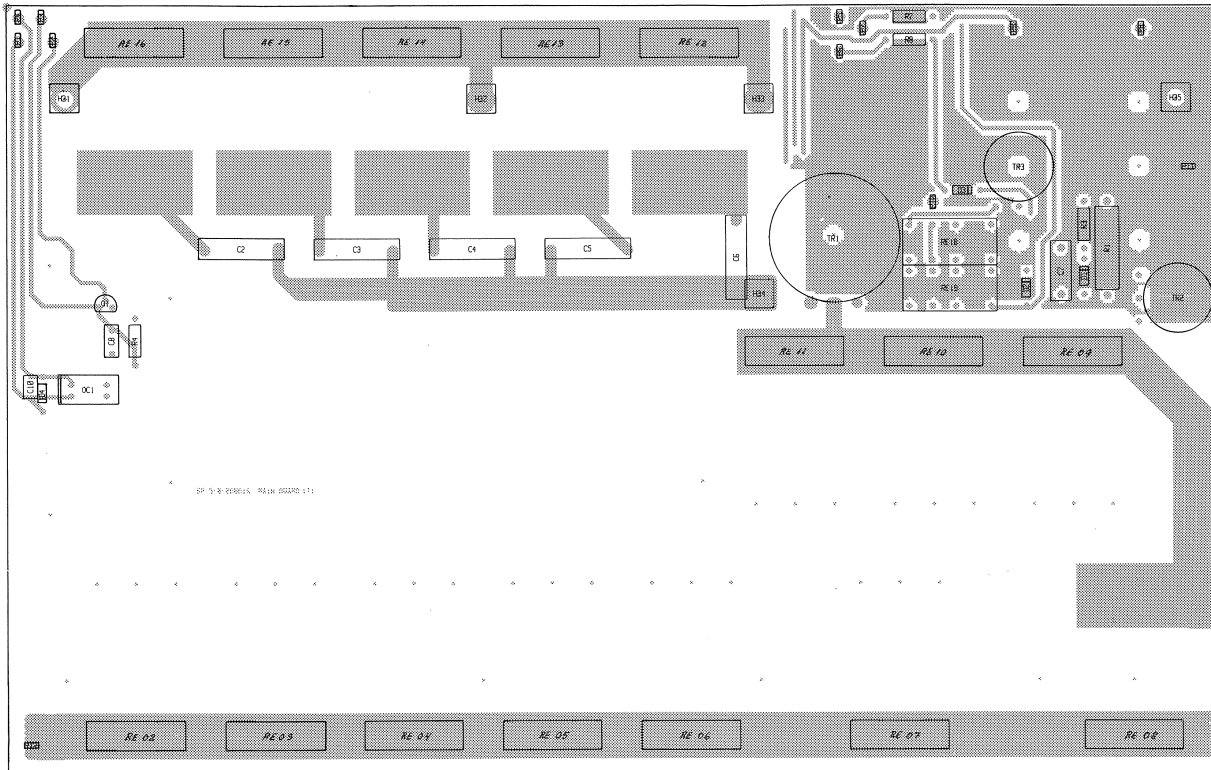
The RF signal from the transmitter T2130 is fed to a transformer, and then through a serial inductor, which is variable in steps, in series with a motor driven variable capacitor. After the variable capacitor there is a shunt capacitor to ground. This capacitor is variable in steps. From here the signal is fed to the aerial relay and then through the aerial current detector circuit to the aerial.

AT2110 A 4-0-25849A

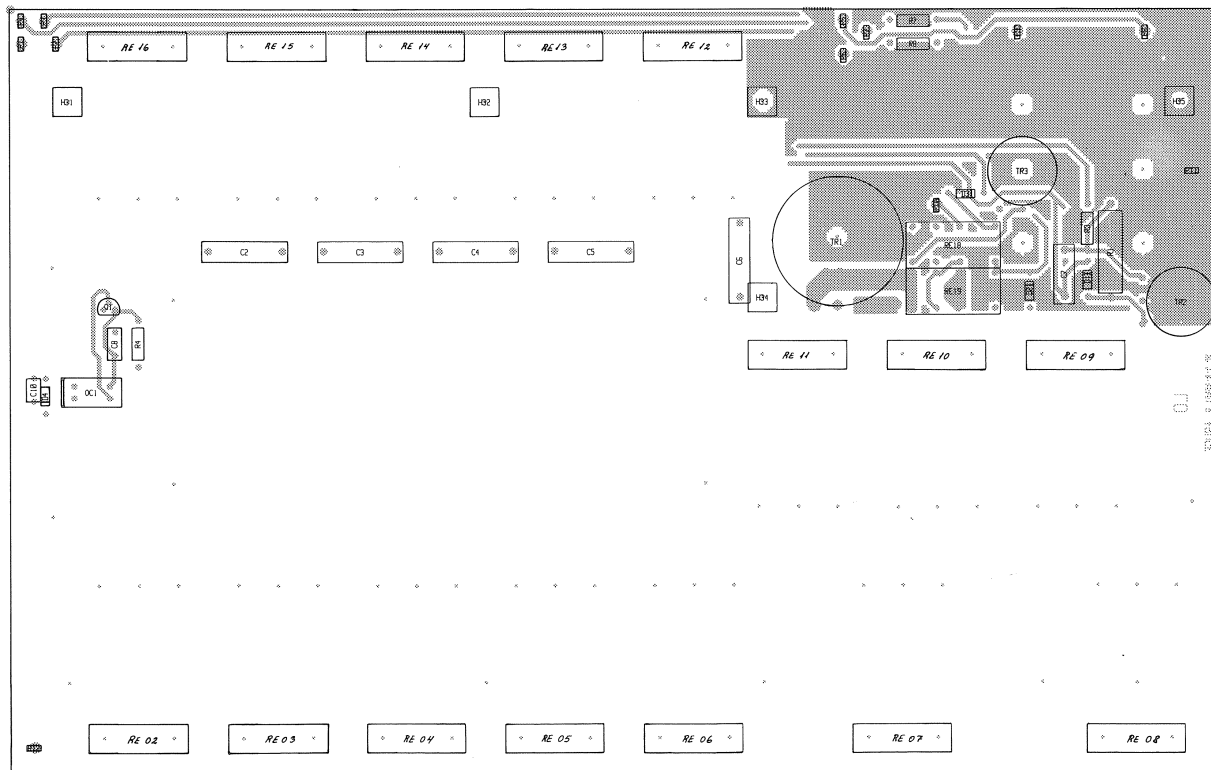


BLOCK DIAGRAM AT2110

COMPONENT LOCATION MAIN BOARD MODULE 1

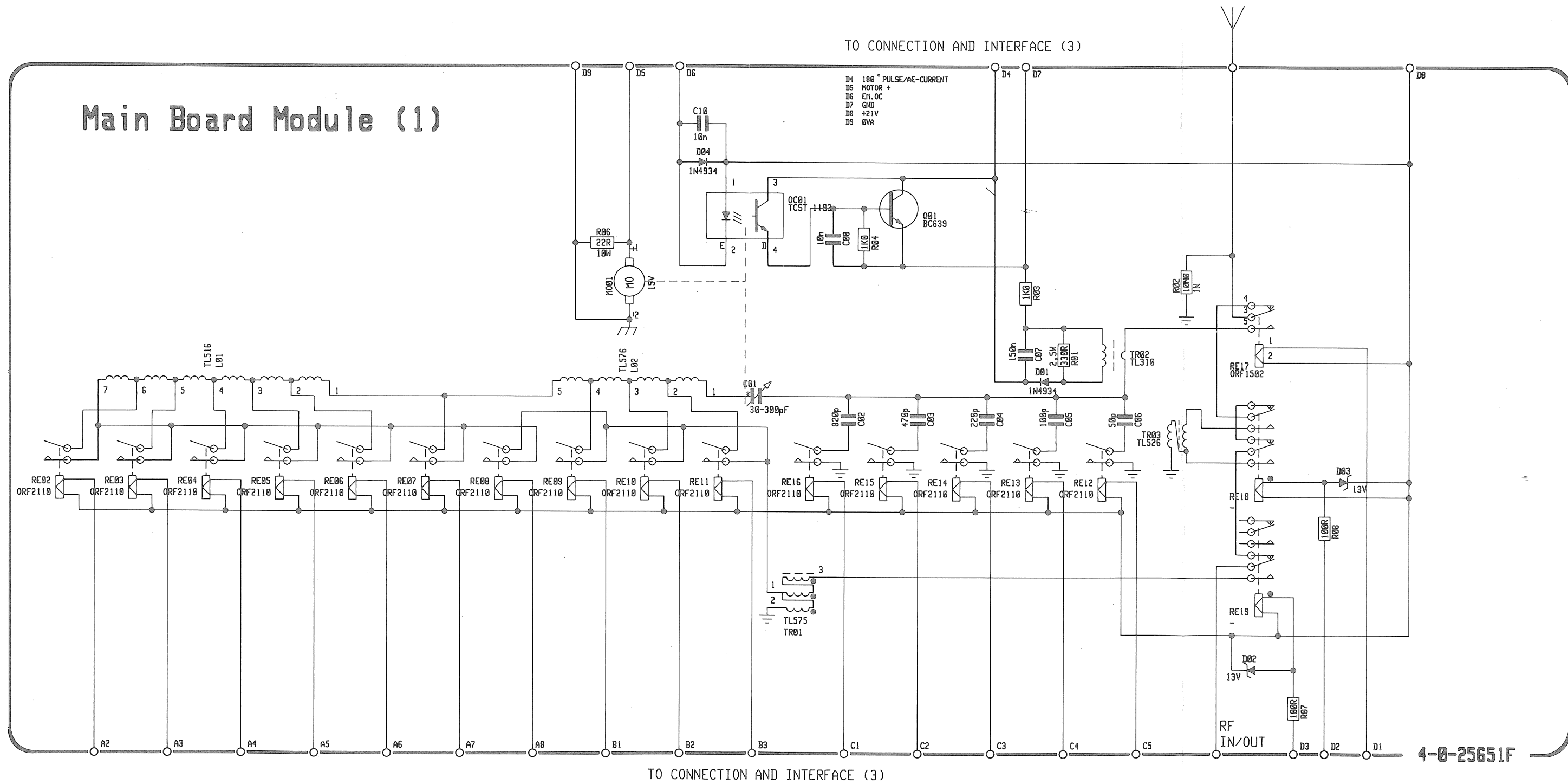


View from component side with upper side tracks.



View from component side with lower side tracks.

MAIN BOARD MODULE 1



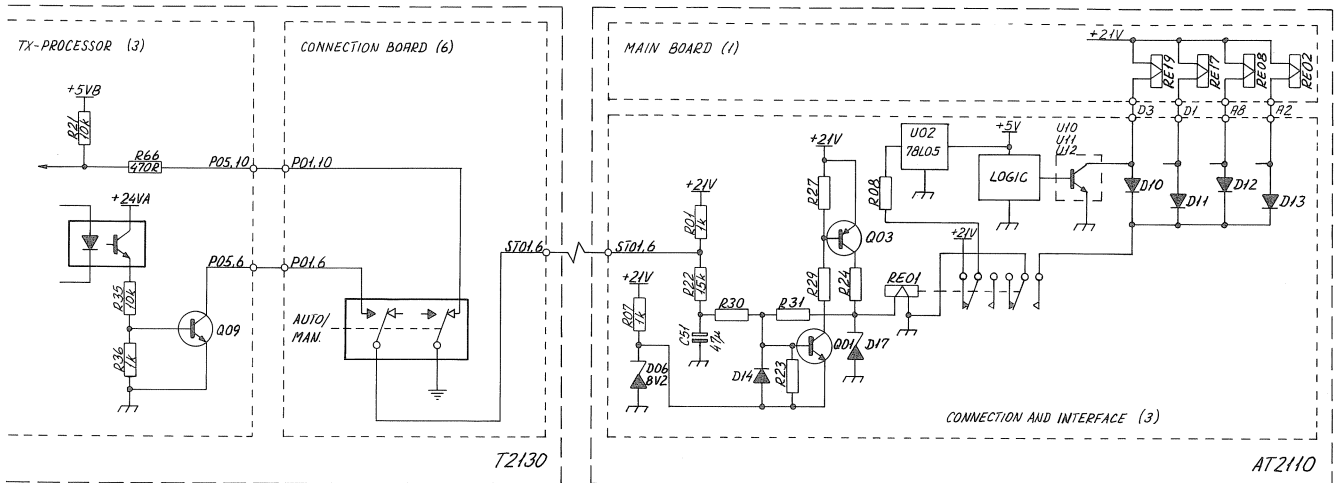
This diagram is valid for PCB rev. 25651G

5.3 CONNECTION AND INTERFACE UNIT (MODULE 3) cont.:

MANUAL TUNE

When the 'Automatic/manual tune' switch on the Connection Board (6) in the T2130 is shifted to 'Manual Tune' two signals are changed.

Figure 2: Manual Tuning Overview.



Manual Tuning Overview.

26042B

The 'Manual Tune' wire (P01 pin 10 on the Connection Board (6) and P05 pin 10 on the TX-processor (3, T2130)) is set to 0 Volt. This tells the TX-processor (3, T2130) (and the RE2100) that a manual tune is to be done and tune tones are started.

The 'Data' wire (ST01 pin 6 in the Connection Board (6) in T2130) is interrupted. The 'Data' line is normally kept low (<+1 Volt) when no data is transferred to the AT2110. The 'Data' wire is shifting to a high state (approx. +21 Volt) by the resistor R30 on the Connection and Interface Board (3) in the AT2110. This permanent shift of the 'Data' wire is detected by the 'Manual Tune' circuit. The capacitor C51 is slowly charged by the resistor R22. The relay RE01 is activated when the voltage on the C51 has reached approximately 12 Volt. The transistors Q01 and Q03 conform a Schmitt-trigger.

The activating of the relay RE01 disconnects the +21 for the U02, +5V supply for the logic. This means that all relays on the Main Board (1) are released from the drivers U10, U11, and U12.

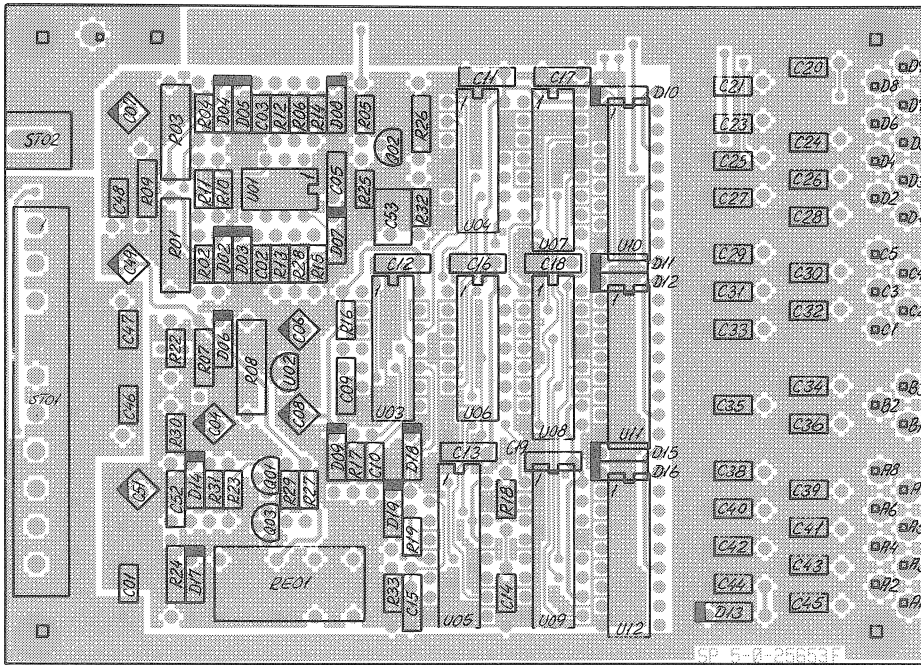
The specific relays for tuning 2182 kHz are activated by the relay RE01 and the diodes D10 (RE19), D11 (RE17), D12 (RE08), D13 (RE02).

+5 VOLT REGULATOR

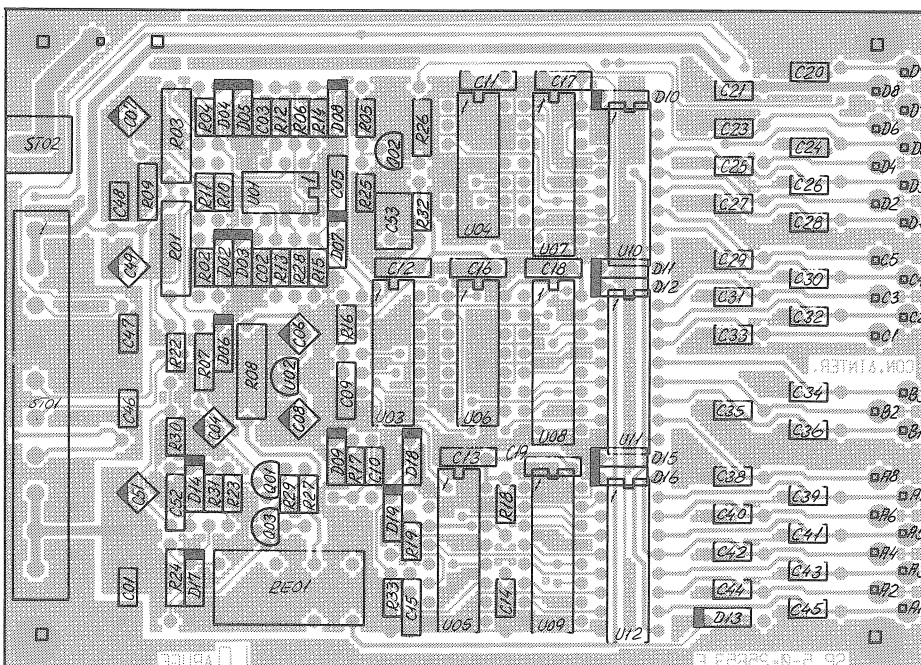
This regulator delivers the supply for the logic circuits on the Connection and Interface Board (3).

Part of 'Motor Control Circuitry'. This consists of the transistor Q02 and surrounding resistors R05, R25, R26. The transistor turns on the LED in the optocoupler OC01 on the Main Board (1) when supply voltage is applied to the tune motor MO1.

COMPONENT LOCATION CONNECTION AND INTERFACE UNIT MODULE 3



View from component side with upper side tracks.



View from component side with lower side tracks.

6 PARTS LIST

HF SSB AT2110		AERIAL COUPLER		ESPERA	HF SSB AT2110	802110
POSITION	DESCRIPTION			MANUFACTOR	TYPE	S.P.NUMBER
VARIOUS	MANUAL AT2110 ENGLISH			S.P.RADIO A/S		M2110GB
BASE UNIT AT2110				ESPERA		702110
POSITION	DESCRIPTION			MANUFACTOR	TYPE	S.P.NUMBER
VARIOUS	MAIN HAIRNESS AT2110			ESPERA	3-0-26093B	526093
VARIOUS				ESPERA	526169 KABLING f. AT2110	526169
-1	MAIN BOARD MODULE 1	AT2110		ESPERA	5-0-25651G / 4-0-25651F	625651
-3	CONNECTION & INTERFACE	MODULE 3 AT2110		ESPERA	5-0-25653G / 4-0-25653G	625653
R2-1	RESISTOR HIGH VOLTAGE	10M OHM 10% 10kVDC		PHILIPS	2322 244 13106	06.050
R6-1	RESISTOR WIRE WOUND	22 OHM 5% 10W		ARCOL	HS-10-22R-5%	06.357
MAIN BOARD MODULE 1		AT2110		ESPERA	5-0-25651G / 4-0-25651F	625651
POSITION	DESCRIPTION			MANUFACTOR	TYPE	S.P.NUMBER
C1-1	VARIABLE CAPACITOR	AERIAL COUPLER AT2110		SP.RADIO A/S	3-0-25840	725840
C2-1	CAPACITOR CERAMIC	820pF 10% 2kVDC		UNILATOR	102/1/8200K/EJO	18.190
C3-1	CAPACITOR CERAMIC	470pF 10% 2kVDC		UNILATOR	102/1/4700K/EJO	18.185
C4-1	CAPACITOR CERAMIC	220pF 10% 2kVDC		UNILATOR	102/1/2200K/EJO	18.180
C5-1	CAPACITOR CERAMIC	100pF 10% 2kVDC		UNILATOR	102/1/1000K/EJO	18.175
C6-1	CAPACITOR CERAMIC	50pF 10% 2kVDC		UNILATOR	102/1/0500K/EJO	18.170
C7-1	CAPACITOR POLYESTER	150nF 10% 100VDC		PHILIPS	2222 372 21154	11.074
C8-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC		NKE	DT 350 758L F 103 Z 50V	15.170
C10-1	CAPACITOR CERAMIC	10nF -20/+80% 50VDC CL2		KEMET	C 317 C 103 Z 5U5CA-C7301	16.302
D1-1	DIODE HIGH SPEED	1N4448		PHILIPS	1N4448	25.147
D2-1	DIODE ZENER	13V 5% 0.4W BZX79C13		PHILIPS	BZX79C13	26.560
D3-1	DIODE ZENER	13V 5% 0.4W BZX79C13		PHILIPS	BZX79C13	26.560
D4-1	DIODE HIGH SPEED	1N4448		PHILIPS	1N4448	25.147
L1-1	COIL TL516			ESPERA	6-0-25789C	400516
L2-1	CHOKE TL576			ESPERA	6-0-28021	400576
M01-1	MOTOR W. GEARBOX	C1065		MAXON	SP SPEC.: C1065	60.010
OC1-1	PHOTO INTERRUPTER			TELEFUNKEN	TCST 1103	32.521
Q1-1	TRANSISTOR AF	NPN BC639 TO-92		PHILIPS	BC639	28.120
R1-1	RESISTOR PMF	330 OHM 5% 3W		PHILIPS	2322 195 13331	04.687
R3-1	RESISTOR MF	1k0 OHM 5% 0.4W		PHILIPS	2322 181 53102	01.200
R4-1	RESISTOR MF	1k0 OHM 5% 0.4W		PHILIPS	2322 181 53102	01.200
R7-1	RESISTOR MF	100 OHM 5% 0.4W		PHILIPS	2322 181 53101	01.175
R8-1	RESISTOR MF	100 OHM 5% 0.4W		PHILIPS	2322 181 53101	01.175
RE2-1	RELAY ORF2110	FOR SERVICE ONLY		ESPERA	3-0-25810A / 4-0-26184	725810
RE3-1	RELAY ORF2110	FOR SERVICE ONLY		ESPERA	3-0-25810A / 4-0-26184	725810
RE4-1	RELAY ORF2110	FOR SERVICE ONLY		ESPERA	3-0-25810A / 4-0-26184	725810
RE5-1	RELAY ORF2110	FOR SERVICE ONLY		ESPERA	3-0-25810A / 4-0-26184	725810
RE6-1	RELAY ORF2110	FOR SERVICE ONLY		ESPERA	3-0-25810A / 4-0-26184	725810
RE7-1	RELAY ORF2110	FOR SERVICE ONLY		ESPERA	3-0-25810A / 4-0-26184	725810
RE8-1	RELAY ORF2110	FOR SERVICE ONLY		ESPERA	3-0-25810A / 4-0-26184	725810
RE9-1	RELAY ORF2110	FOR SERVICE ONLY		ESPERA	3-0-25810A / 4-0-26184	725810
RE10-1	RELAY ORF2110	FOR SERVICE ONLY		ESPERA	3-0-25810A / 4-0-26184	725810
RE11-1	RELAY ORF2110	FOR SERVICE ONLY		ESPERA	3-0-25810A / 4-0-26184	725810
RE12-1	RELAY ORF2110	FOR SERVICE ONLY		ESPERA	3-0-25810A / 4-0-26184	725810
RE13-1	RELAY ORF2110	FOR SERVICE ONLY		ESPERA	3-0-25810A / 4-0-26184	725810
RE14-1	RELAY ORF2110	FOR SERVICE ONLY		ESPERA	3-0-25810A / 4-0-26184	725810
RE15-1	RELAY ORF2110	FOR SERVICE ONLY		ESPERA	3-0-25810A / 4-0-26184	725810
RE16-1	RELAY ORF2110	FOR SERVICE ONLY		ESPERA	3-0-25810A / 4-0-26184	725810
RE17-1	RELAY	ORF1502		ESPERA	ORF1502 SKIFTERELÆ	705061
RE18-1	RELAY 12VDC DPDT 1.25A	M1B-12-H/AZ 820-2C212DE		MEISEI	M1B-12-H	21.295
RE19-1	RELAY 12VDC DPDT 1.25A	M1B-12-H/AZ 820-2C212DE		MEISEI	M1B-12-H	21.295
TR1-1	TRANSFORMER 9:1	TL575		S.P.RADIO	6-0-28020	400575
TR2-1	TRANSFORMER	TL310		BB	6-0-23162E	400310
TR3-1	TRANSFORMER	TL526		S.P.RADIO	6-0-25867B	400526

POSITION	DESCRIPTION		MANUFACTURER	TYPE	S.P.NUMBER
CONNECTION & INTERFACE		MODULE 3 AT2110	ESPERA	5-0-25653G/4-0-25653G	625653
POSITION	DESCRIPTION		MANUFACTURER	TYPE	S.P.NUMBER
C1-3	CAPACITOR MKT	100nF 10% 100VDC	PHILIPS	2222 371 28104	11.180
C2-3	CAPACITOR MKT	1000pF 10% 400VDC	SIEMENS	B32520-A6102-K-289	11.139
C3-3	CAPACITOR MKT	1000pF 10% 400VDC	SIEMENS	B32520-A6102-K-289	11.139
C4-3	CAPACITOR ELECTROLYTIC	4.7uF 20% 50VDC	ELNA	RJ2-50-V-4R7-M-T34	14.510
C5-3	CAPACITOR MKT	0.1uF 10% 63VDC	PHILIPS	2222 370 78104	11.136
C6-3	CAPACITOR ELECTROLYTIC	4.7uF 20% 50VDC	ELNA	RJ2-50-V-4R7-M-T34	14.510
C7-3	CAPACITOR ELECTROLYTIC	4.7uF 20% 50VDC	ELNA	RJ2-50-V-4R7-M-T34	14.510
C8-3	CAPACITOR ELECTROLYTIC	4.7uF 20% 50VDC	ELNA	RJ2-50-V-4R7-M-T34	14.510
C9-3	CAPACITOR MKT	100nF 5% 63VDC	PHILIPS	2222 370 79104	11.135
C10-3	CAPACITOR MKT	1000pF 10% 400VDC	SIEMENS	B32520-A6102-K-289	11.139
C11-3	CAPACITOR MKT	0.1uF 10% 63VDC	PHILIPS	2222 370 78104	11.136
C12-3	CAPACITOR MKT	0.1uF 10% 63VDC	PHILIPS	2222 370 78104	11.136
C13-3	CAPACITOR MKT	0.1uF 10% 63VDC	PHILIPS	2222 370 78104	11.136
C14-3	CAPACITOR MKT	1000pF 10% 400VDC	SIEMENS	B32520-A6102-K-289	11.139
C15-3	CAPACITOR MKT	100nF 5% 63VDC	PHILIPS	2222 370 79104	11.135
C16-3	CAPACITOR MKT	0.1uF 10% 63VDC	PHILIPS	2222 370 78104	11.136
C17-3	CAPACITOR MKT	0.1uF 10% 63VDC	PHILIPS	2222 370 78104	11.136
C18-3	CAPACITOR MKT	0.1uF 10% 63VDC	PHILIPS	2222 370 78104	11.136
C19-3	CAPACITOR MKT	0.1uF 10% 63VDC	PHILIPS	2222 370 78104	11.136
C20-3	CAPACITOR MKT	100nF 10% 100VDC	PHILIPS	2222 371 28104	11.180
C21-3	CAPACITOR MKT	100nF 10% 100VDC	PHILIPS	2222 371 28104	11.180
C23-3	CAPACITOR MKT	100nF 10% 100VDC	PHILIPS	2222 371 28104	11.180
C24-3	CAPACITOR MKT	100nF 10% 100VDC	PHILIPS	2222 371 28104	11.180
C25-3	CAPACITOR MKT	10nF 10% 250VDC	PHILIPS	2222 371 48103	11.148
C26-3	CAPACITOR MKT	100nF 10% 100VDC	PHILIPS	2222 371 28104	11.180
C27-3	CAPACITOR MKT	100nF 10% 100VDC	PHILIPS	2222 371 28104	11.180
C28-3	CAPACITOR MKT	100nF 10% 100VDC	PHILIPS	2222 371 28104	11.180
C29-3	CAPACITOR MKT	100nF 10% 100VDC	PHILIPS	2222 371 28104	11.180
C30-3	CAPACITOR MKT	100nF 10% 100VDC	PHILIPS	2222 371 28104	11.180
C31-3	CAPACITOR MKT	100nF 10% 100VDC	PHILIPS	2222 371 28104	11.180
C32-3	CAPACITOR MKT	100nF 10% 100VDC	PHILIPS	2222 371 28104	11.180
C33-3	CAPACITOR MKT	100nF 10% 100VDC	PHILIPS	2222 371 28104	11.180
C34-3	CAPACITOR MKT	100nF 10% 100VDC	PHILIPS	2222 371 28104	11.180
C35-3	CAPACITOR MKT	100nF 10% 100VDC	PHILIPS	2222 371 28104	11.180
C36-3	CAPACITOR MKT	100nF 10% 100VDC	PHILIPS	2222 371 28104	11.180
C38-3	CAPACITOR MKT	100nF 10% 100VDC	PHILIPS	2222 371 28104	11.180
C39-3	CAPACITOR MKT	100nF 10% 100VDC	PHILIPS	2222 371 28104	11.180
C40-3	CAPACITOR MKT	100nF 10% 100VDC	PHILIPS	2222 371 28104	11.180
C41-3	CAPACITOR MKT	100nF 10% 100VDC	PHILIPS	2222 371 28104	11.180
C42-3	CAPACITOR MKT	100nF 10% 100VDC	PHILIPS	2222 371 28104	11.180
C43-3	CAPACITOR MKT	100nF 10% 100VDC	PHILIPS	2222 371 28104	11.180
C44-3	CAPACITOR MKT	100nF 10% 100VDC	PHILIPS	2222 371 28104	11.180
C45-3	CAPACITOR MKT	100nF 10% 100VDC	PHILIPS	2222 371 28104	11.180
C46-3	CAPACITOR MKT	100nF 10% 100VDC	PHILIPS	2222 371 28104	11.180
C47-3	CAPACITOR MKT	100nF 10% 100VDC	PHILIPS	2222 371 28104	11.180
C48-3	CAPACITOR MKT	100nF 10% 100VDC	PHILIPS	2222 371 28104	11.180
C49-3	CAPACITOR ELECTROLYTIC	4.7uF 20% 50VDC	ELNA	RJ2-50-V-4R7-M-T34	14.510
C51-3	CAPACITOR ELECTROLYTIC	47uF 20% 25VDC	ELNA	RJ2-25-V-470-M-F1	14.524
C52-3	CAPACITOR MKT	0.1uF 10% 63VDC	PHILIPS	2222 370 78104	11.136
C53-3	CAPACITOR MKT	220nF 10% 63VDC	PHILIPS	2222 370 78224	11.095
D2-3	DIODE HIGH SPEED	1N4448	PHILIPS	1N4448	25.147
D3-3	DIODE HIGH SPEED	1N4448	PHILIPS	1N4448	25.147
D4-3	DIODE HIGH SPEED	1N4448	PHILIPS	1N4448	25.147
D5-3	DIODE HIGH SPEED	1N4448	PHILIPS	1N4448	25.147
D6-3	DIODE ZENER	8V2 5% 0.4W BZX79C8V2	PHILIPS	BZX79C8V2	26.542
D7-3	DIODE ZENER	5.1V 5% 0.4W BZX79C5V1	PHILIPS	BZX79C5V1	26.527
D8-3	DIODE ZENER	5.1V 5% 0.4W BZX79C5V1	PHILIPS	BZX79C5V1	26.527
D9-3	DIODE HIGH SPEED	1N4448	PHILIPS	1N4448	25.147
D10-3	DIODE HIGH SPEED	1N4448	PHILIPS	1N4448	25.147
D11-3	DIODE HIGH SPEED	1N4448	PHILIPS	1N4448	25.147
D12-3	DIODE HIGH SPEED	1N4448	PHILIPS	1N4448	25.147
D13-3	DIODE HIGH SPEED	1N4448	PHILIPS	1N4448	25.147
D14-3	DIODE HIGH SPEED	1N4448	PHILIPS	1N4448	25.147
D17-3	DIODE ZENER	13V 5% 0.4W BZX79C13	PHILIPS	BZX79C13	26.560
D18-3	DIODE HIGH SPEED	1N4448	PHILIPS	1N4448	25.147

POSITION	DESCRIPTION		MANUFACTOR	TYPE	S.P.NUMBER
D19-3	DIODE HIGH SPEED	1N4448	PHILIPS	1N4448	25.147
D20-3	DIODE HIGH SPEED	1N4448	PHILIPS	1N4448	25.147
Q1-3	TRANSISTOR AF	BC548B NPN TO-92	PHILIPS	BC548B	28.076
Q2-3	TRANSISTOR AF	BC548B NPN TO-92	PHILIPS	BC548B	28.076
Q3-3	TRANSISTOR AF	BC558B	PHILIPS	BC558B	28.100
R1-3	RESISTOR PMF	1k0 OHM 5% 2W	PHILIPS	2322 194 13102	04.200
R2-3	RESISTOR MF	1k0 OHM 5% 0.33W	PHILIPS	2322 180 73102	02.472
R3-3	RESISTOR PMF	1k0 OHM 5% 2W	PHILIPS	2322 194 13102	04.200
R4-3	RESISTOR MF	1k0 OHM 5% 0.33W	PHILIPS	2322 180 73102	02.472
R5-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 180 73103	02.496
R6-3	RESISTOR MF	3k9 OHM 5% 0.33W	PHILIPS	2322 180 73392	02.486
R7-3	RESISTOR MF	820 OHM 5% 0.4W	PHILIPS	2322 181 53821	01.197
R8-3	RESISTOR PMF	390 OHM 5% 2W	PHILIPS	2322 194 13391	04.189
R9-3	RESISTOR MF	100 OHM 5% 0.4W	PHILIPS	2322 181 53101	01.175
R10-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 180 73103	02.496
R11-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 180 73103	02.496
R12-3	RESISTOR MF	3k9 OHM 5% 0.33W	PHILIPS	2322 180 73392	02.486
R13-3	RESISTOR MF	3k9 OHM 5% 0.33W	PHILIPS	2322 180 73392	02.486
R14-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 180 73103	02.496
R15-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 180 73103	02.496
R16-3	RESISTOR MF	100k OHM 5% 0.33W	PHILIPS	2322 180 73104	02.520
R17-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 180 73103	02.496
R18-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 180 73103	02.496
R19-3	RESISTOR MF	47k OHM 5% 0.33W	PHILIPS	2322 180 73473	02.512
R22-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 180 73103	02.496
R23-3	RESISTOR MF	100k OHM 5% 0.33W	PHILIPS	2322 180 73104	02.520
R24-3	RESISTOR MF	100 OHM 5% 0.4W	PHILIPS	2322 181 53101	01.175
R25-3	RESISTOR MF	3k9 OHM 5% 0.33W	PHILIPS	2322 180 73392	02.486
R26-3	RESISTOR MF	820 OHM 5% 0.4W	PHILIPS	2322 181 53821	01.197
R27-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 180 73103	02.496
R28-3	RESISTOR MF	3k9 OHM 5% 0.33W	PHILIPS	2322 180 73392	02.486
R29-3	RESISTOR MF	3k9 OHM 5% 0.33W	PHILIPS	2322 180 73392	02.486
R30-3	RESISTOR MF	47k OHM 5% 0.33W	PHILIPS	2322 180 73473	02.512
R31-3	RESISTOR MF	100k OHM 5% 0.33W	PHILIPS	2322 180 73104	02.520
R32-3	RESISTOR MF	100k OHM 5% 0.33W	PHILIPS	2322 180 73104	02.520
R33-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 180 73103	02.496
RE1-3	RELAY 12VDC DPDT 1.25A	M1B-12-H/AZ 820-2C212DE	MEISEI	M1B-12-H	21.295
ST1-3	TERMINAL BLOCK	10 POLES 1.5mm2	PTR	AK300/10b m.MESS.SKRUER	81.017
ST2-3	TERMINAL BLOCK	SINGLE POLE	RIACON	360291	81.028
U1-3	DUAL DIFF.COMPARATOR	LM393	TEXAS	LM393P	31.105
U2-3	POS. VOLTAGE REG. FIXED	5V 5% 0.1A 78L05AC	MOTOROLA*	MC78L05ACP	31.135
U3-3	INVERTER w.SCHMIDT TRIGG.	74HC14	TEXAS	SN74HC14	34.518
U4-3	QUAD 2-INP.POS.AND GATE	74HC08	TEXAS	SN74HC08N	34.517
U5-3	MONOSTAB.MULTIVIB.DUAL	74HC4538	MOTOROLA	MC74HC4538AN	34.563
U6-3	COUNTER 7 STATE BIN.RIPP.	74HC4024	TEXAS	SN74HC4024	34.555
U7-3	8 BIT SHIFT REG.SERIAL IO	74HC595	NATIONAL	MM74HC595N	34.502
U8-3	8 BIT SHIFT REG.SERIAL IO	74HC595	NATIONAL	MM74HC595N	34.502
U9-3	8 BIT SHIFT REG.SERIAL IO	74HC595	NATIONAL	MM74HC595N	34.502
U10-3	DARL.DRIVERS HI.CURR/VOLT	ULN2003/MC1413/L203	TEXAS	ULN2003A	31.077
U11-3	DARL.DRIVERS HI.CURR/VOLT	ULN2003/MC1413/L203	TEXAS	ULN2003A	31.077
U12-3	DARL.DRIVERS HI.CURR/VOLT	ULN2003/MC1413/L203	TEXAS	ULN2003A	31.077