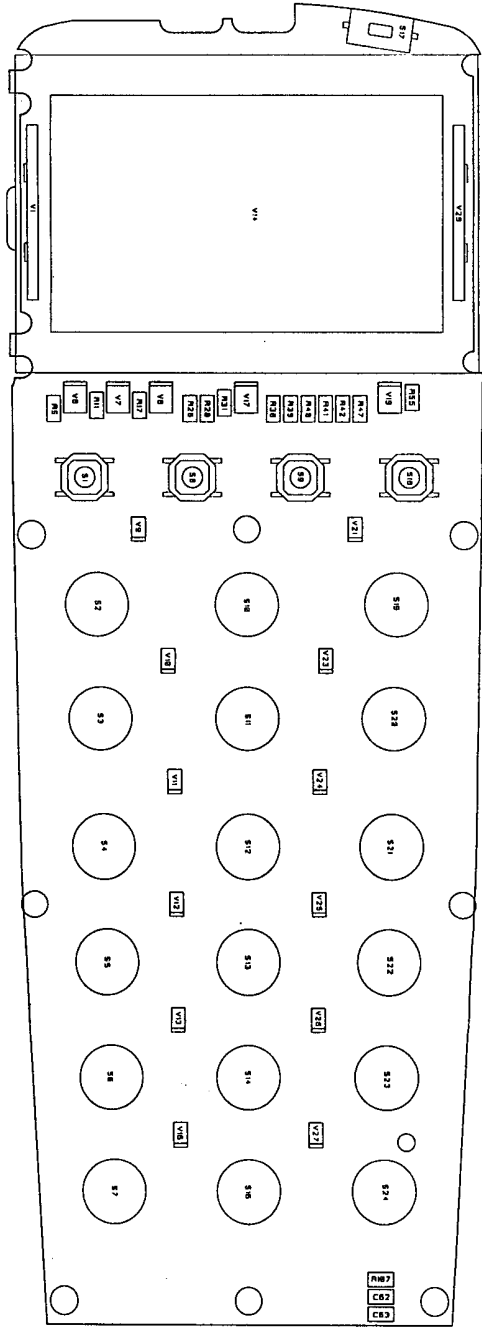


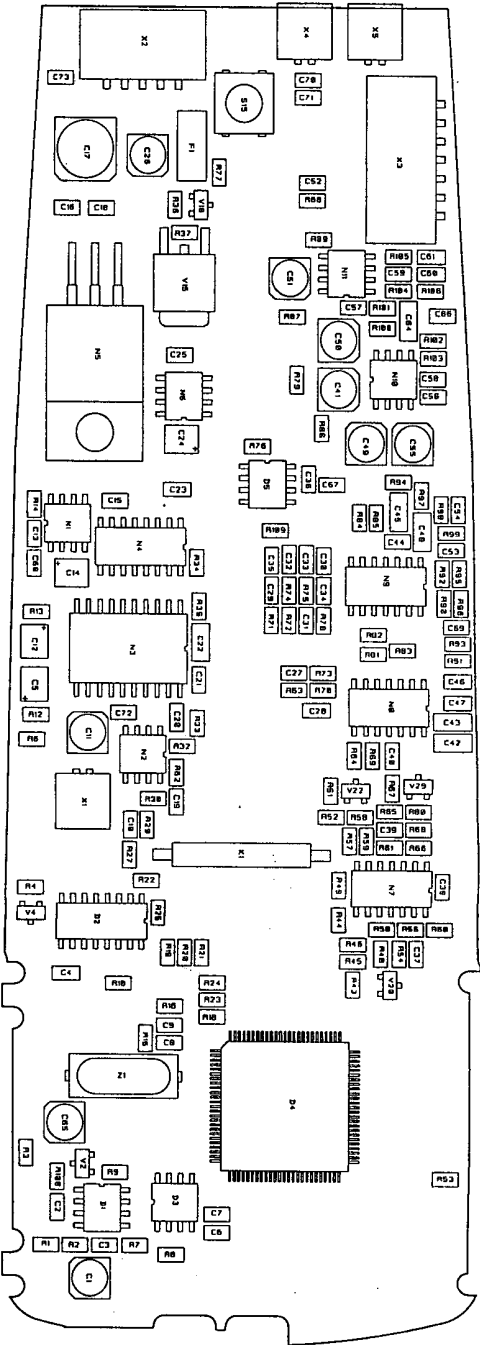
5.1 HXC AF & MMI Unit 632261

Component location HXC AF & MMI Unit 632261

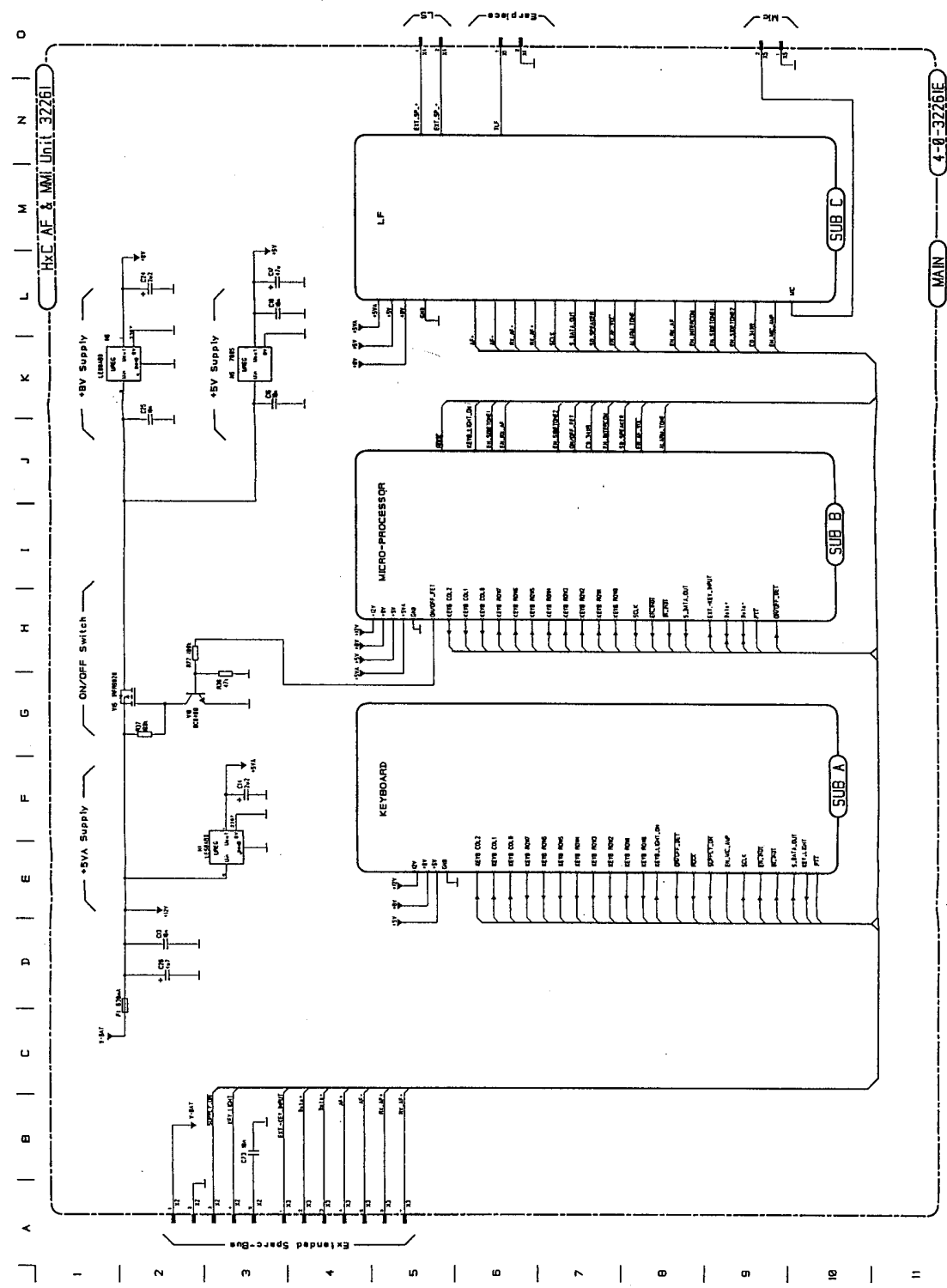


Seen from primary side with primary side tracks.

PCB rev. 32261E

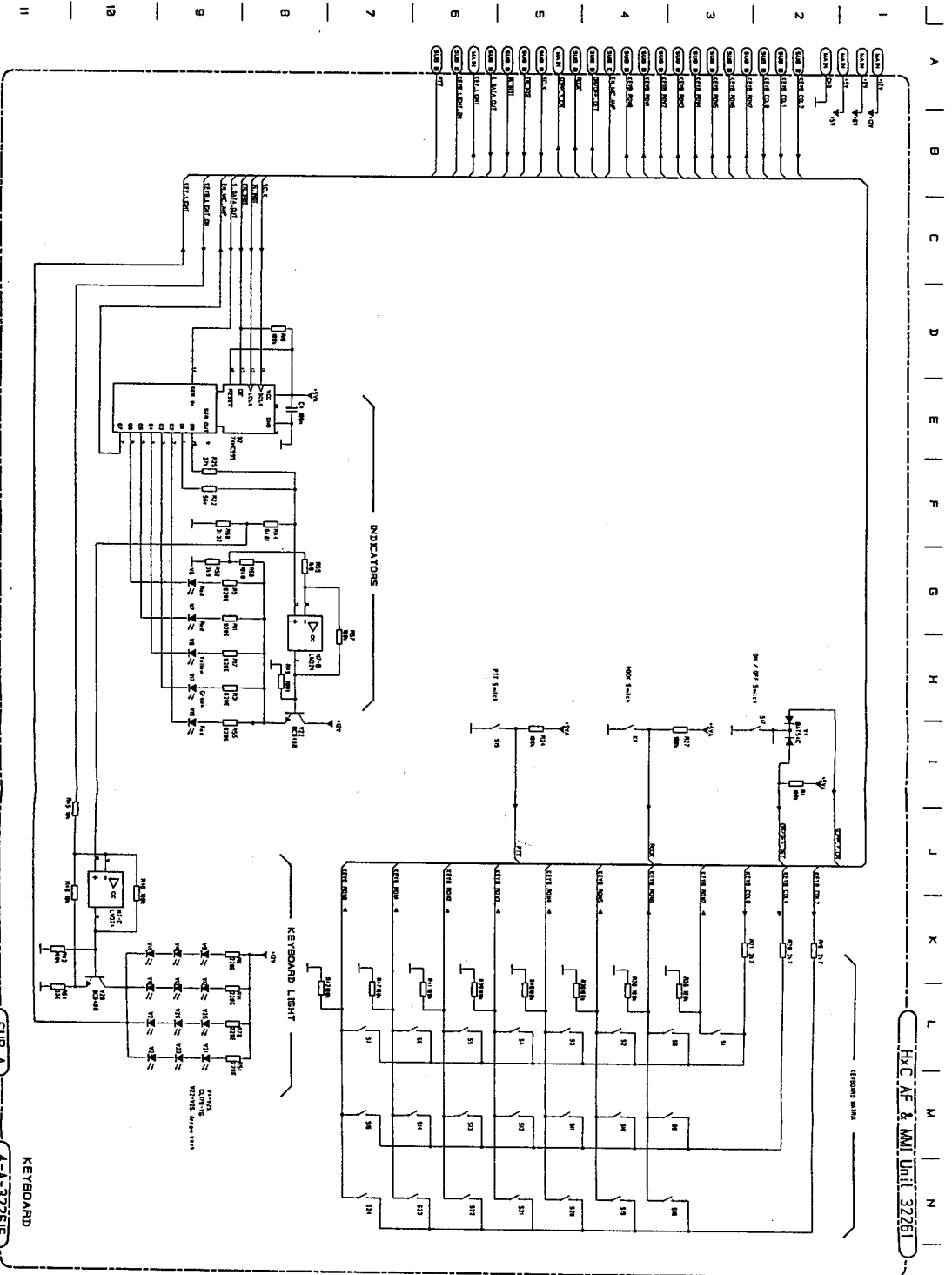


Seen from secondary side with secondary side tracks.
PCB rev. 32261E



HXC AF & MMI UNIT 6932261

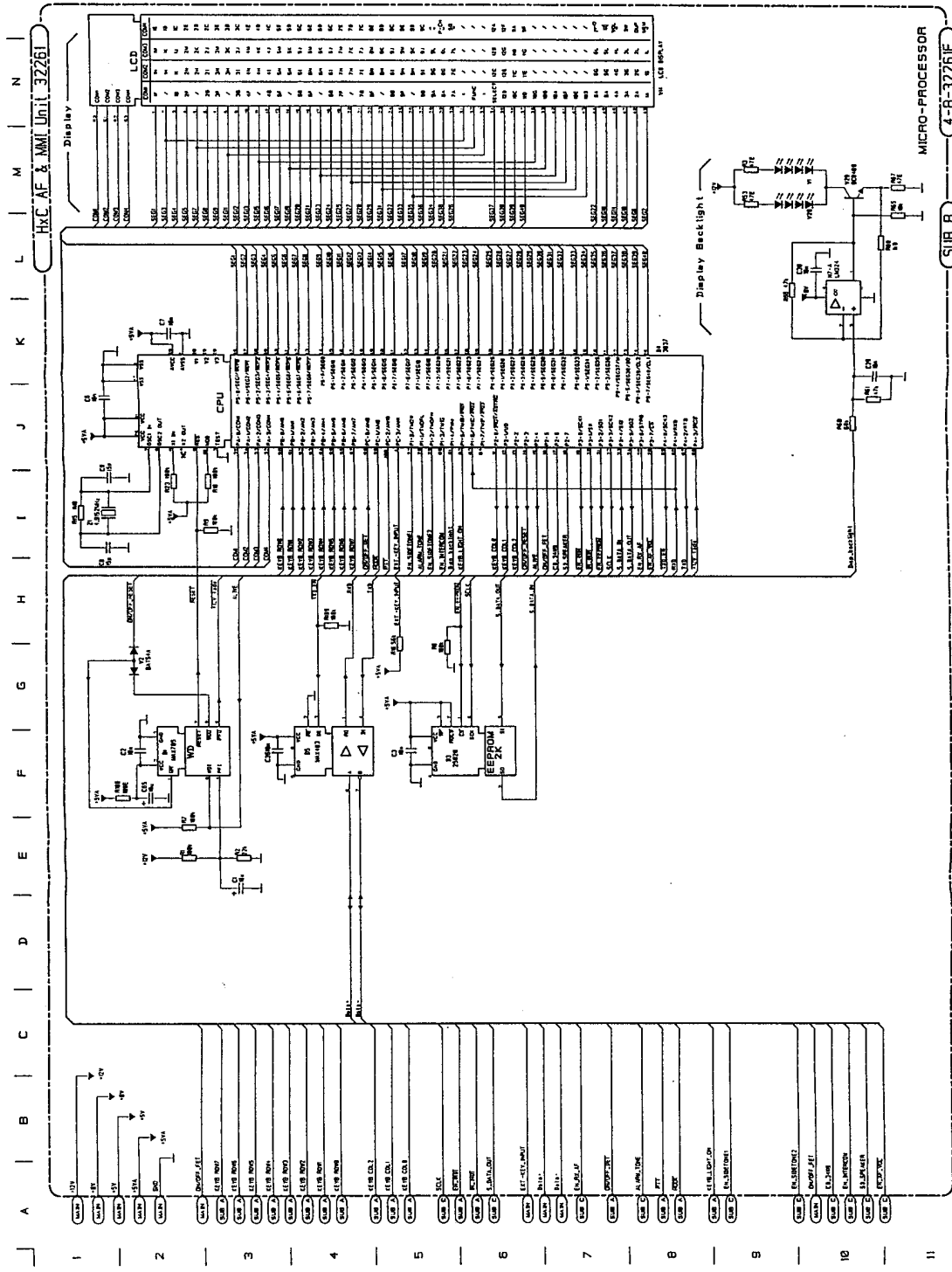
Handset control units C4900/C4901



This diagram is valid for PCB rev. 32261E

Handset control units C-4900/C4901

HxC AF & MMI Unit 32261



This diagram is valid for PCB rev. 32261E

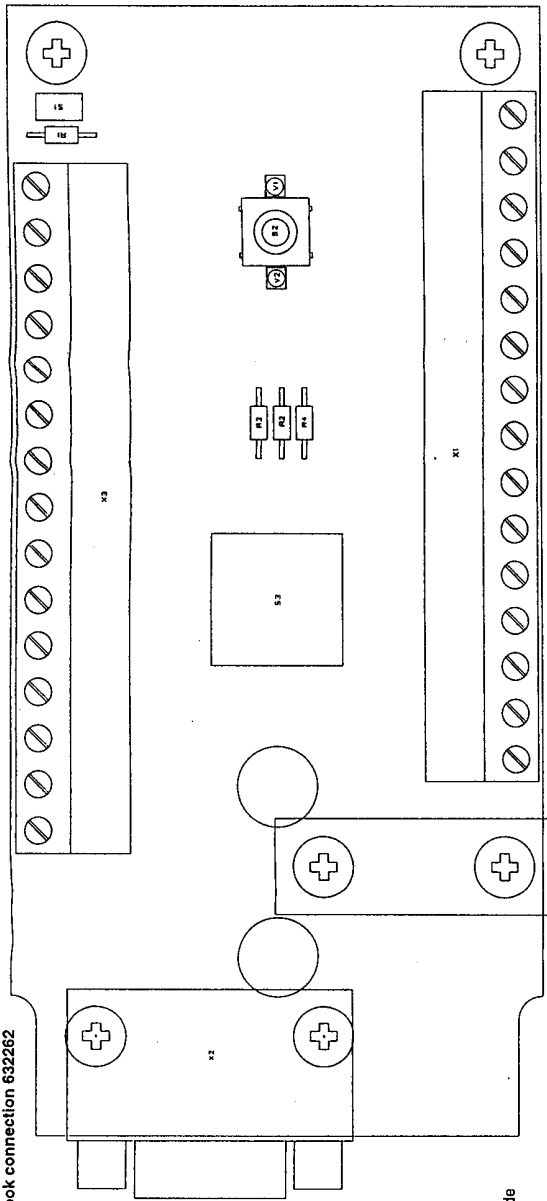
HxC AF & MMI Unit 32261



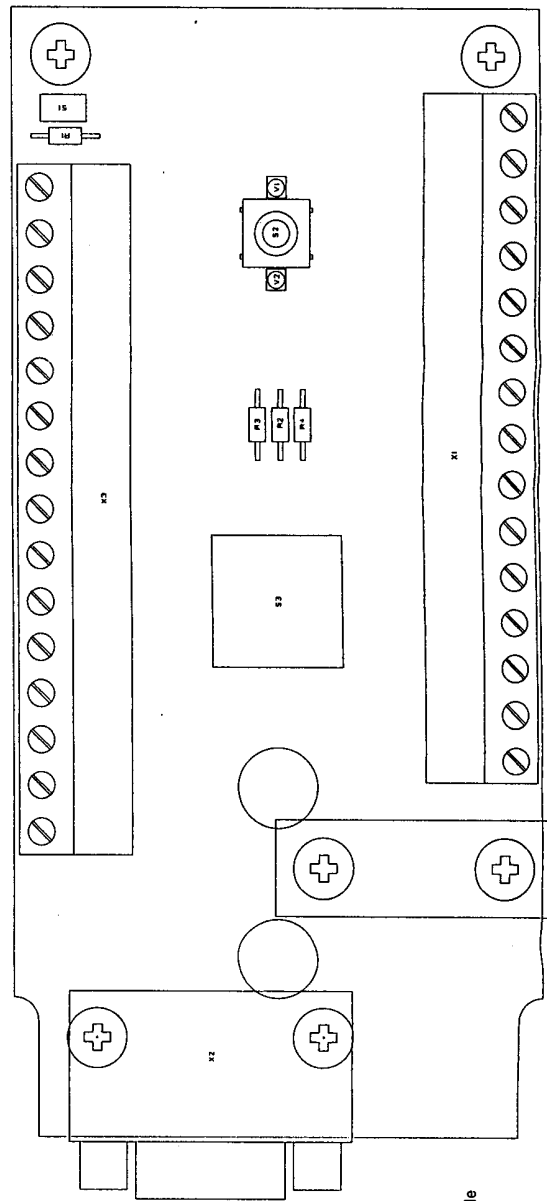
This diagram is valid for PCB rev. 32261E

5.2 Hook Connection 632262

Component location Hook connection 632262



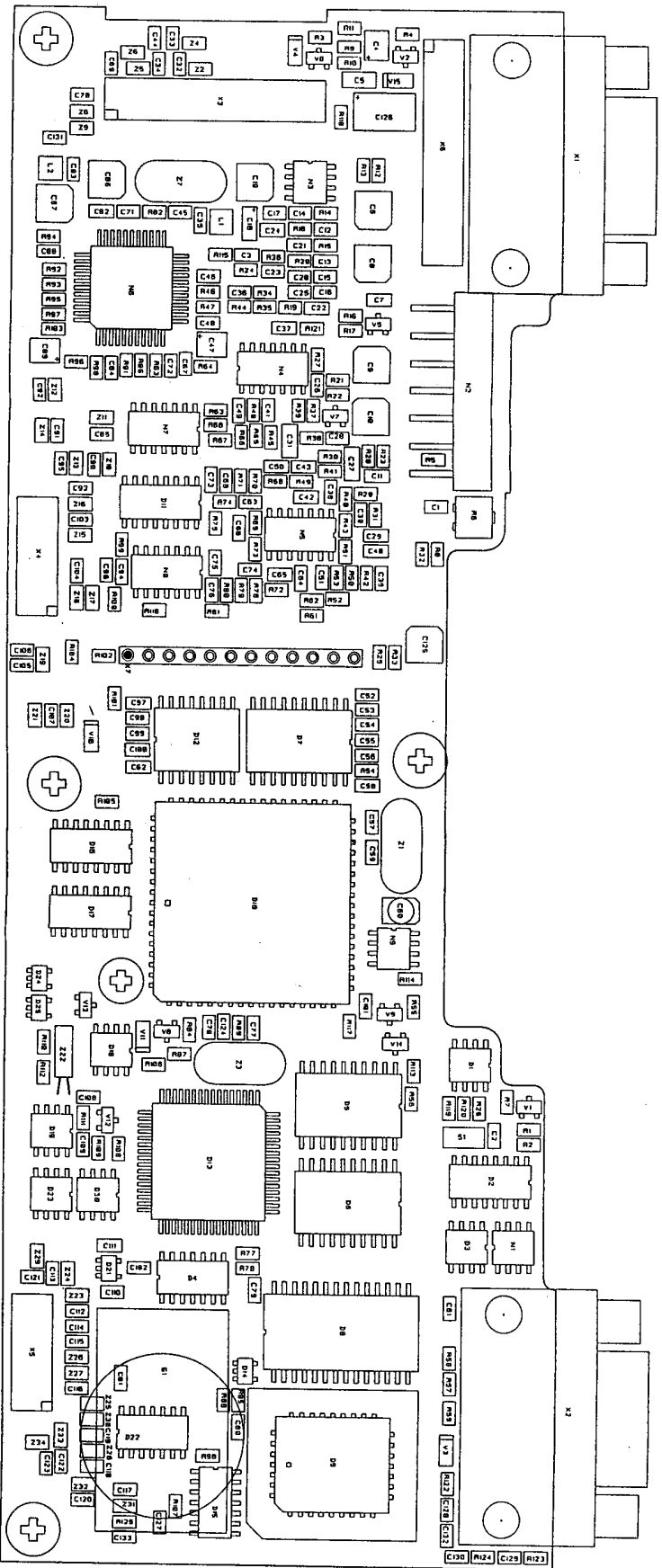
Seen from component side
with upper side tracks.



Seen from component side
with lower side tracks.

PCB rev. 32262C

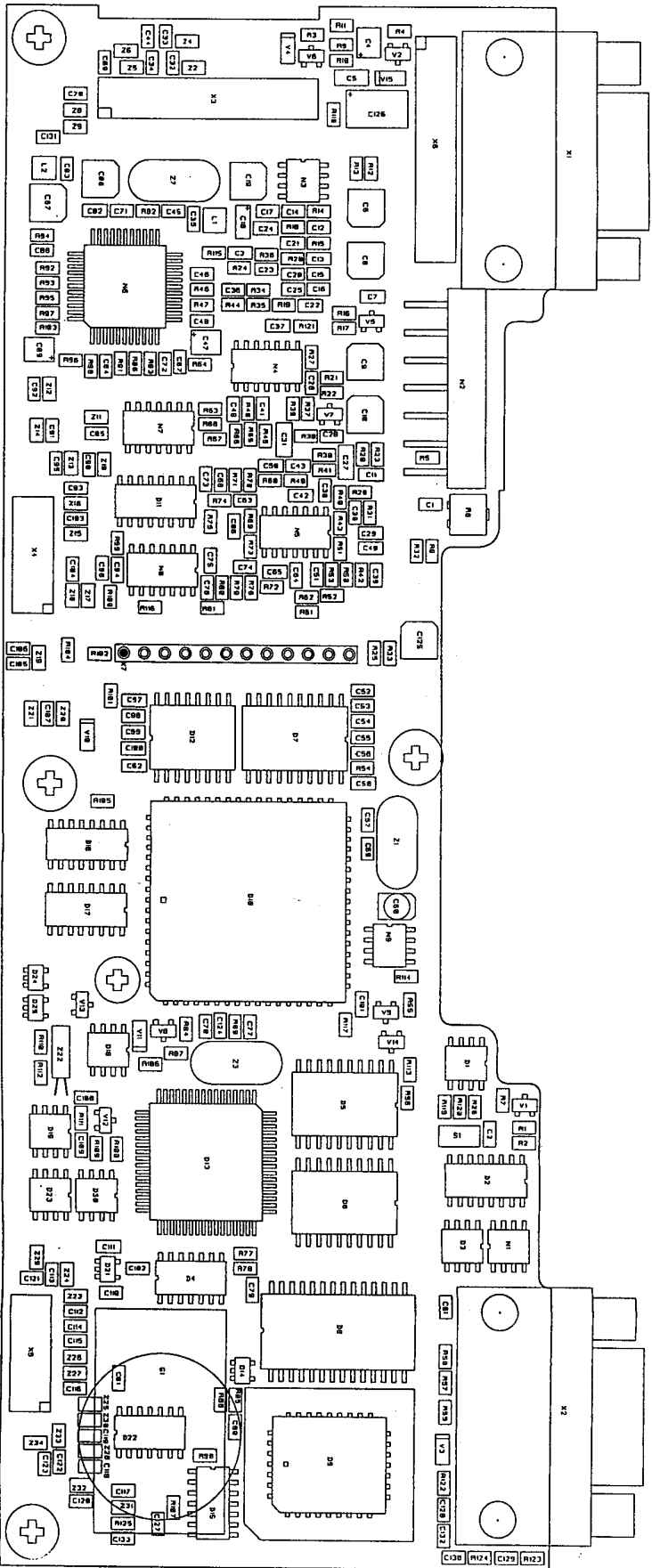
Component location AF and processor unit 69225001/02



Seen from component side with upper side tracks.

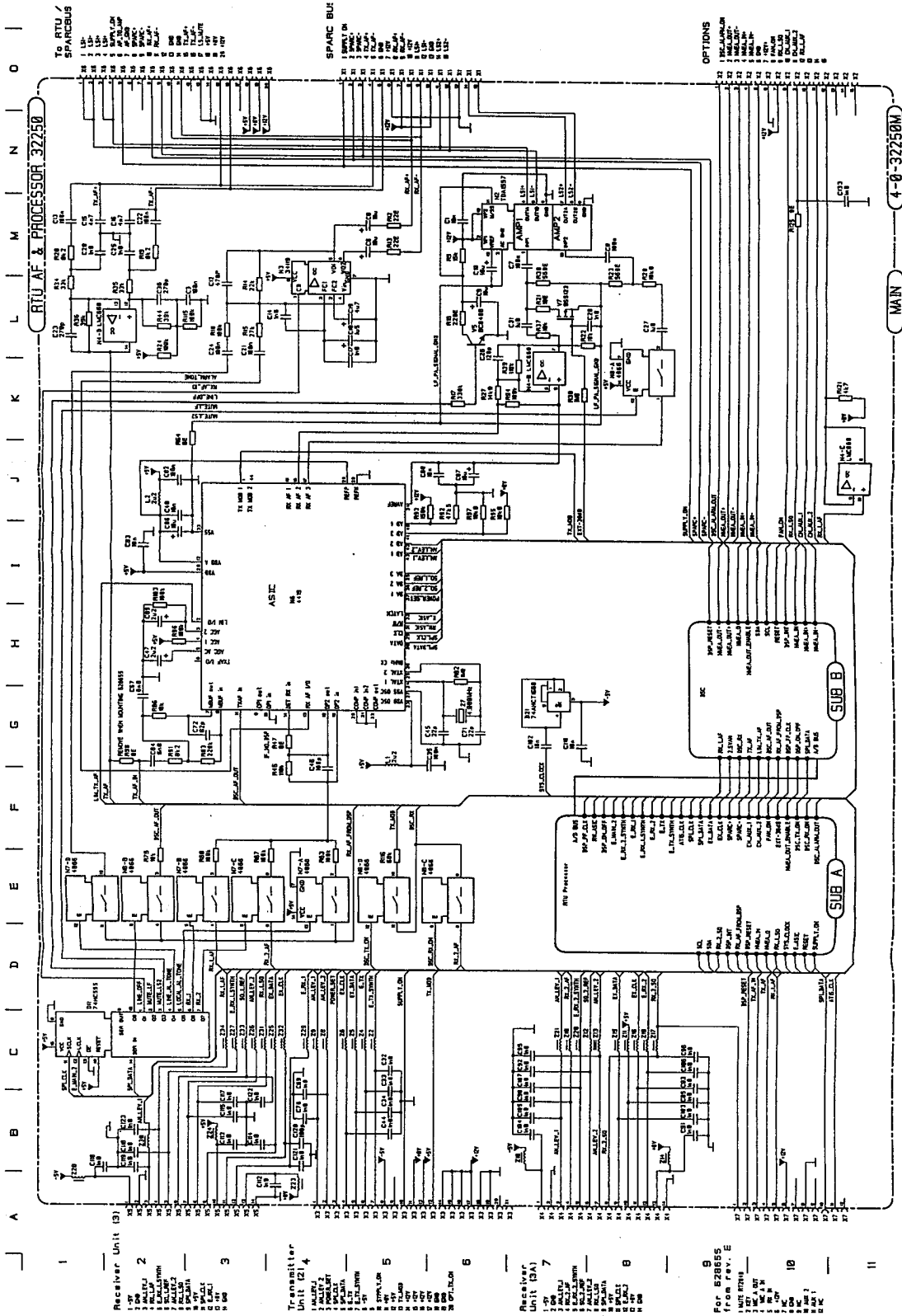
PCB rev. 32250G

Transceiver units RT4800/-01/-22, and RT47xx duplex



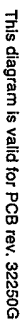
PCB rev. 32250G

AF and processor unit 63225001/02

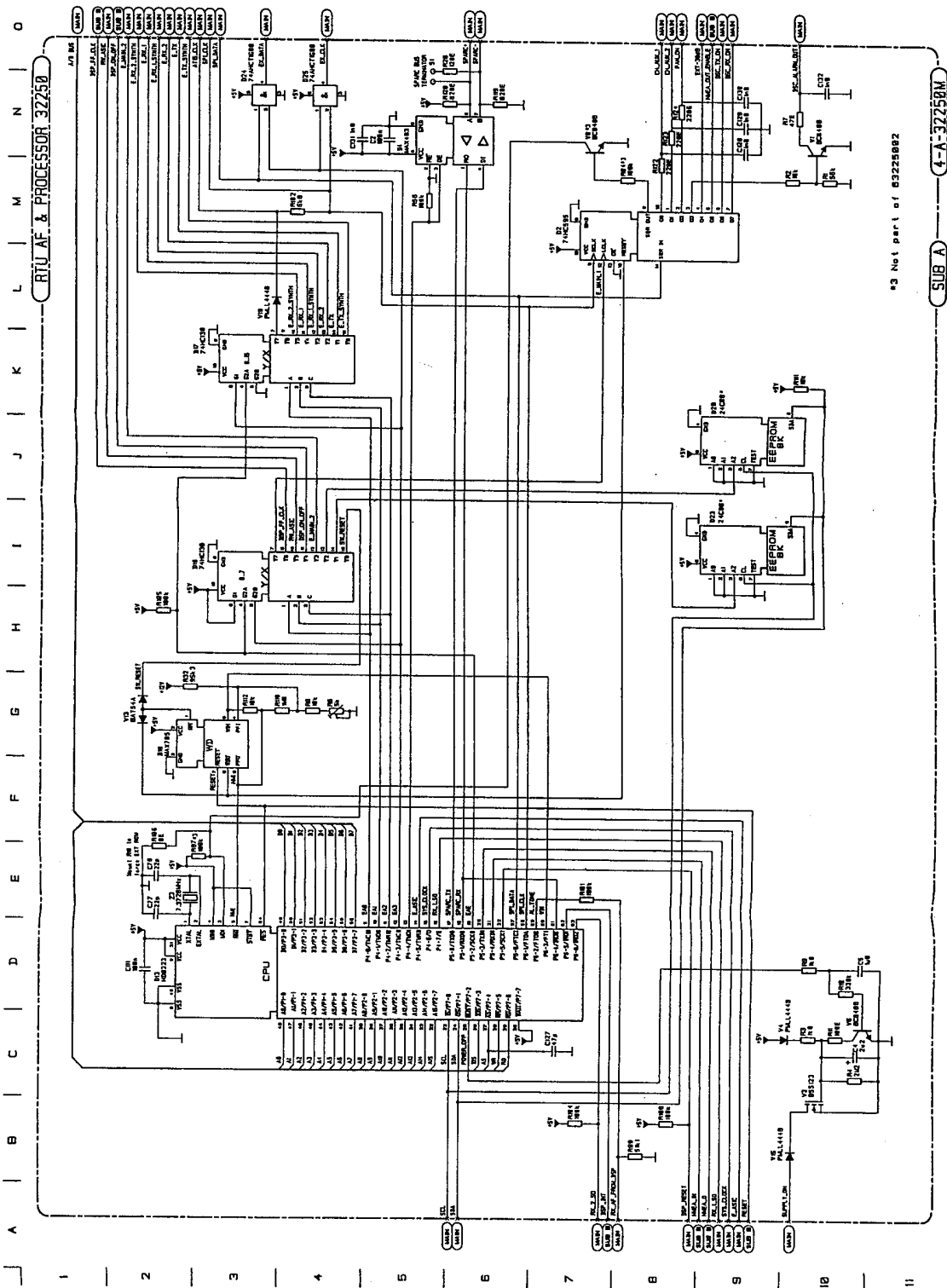


This diagram is valid for PCB rev. 32250G

A
 B
 C
 D
 E
 F
 G
 H
 I
 J
 K
 L
 M
 N
 O

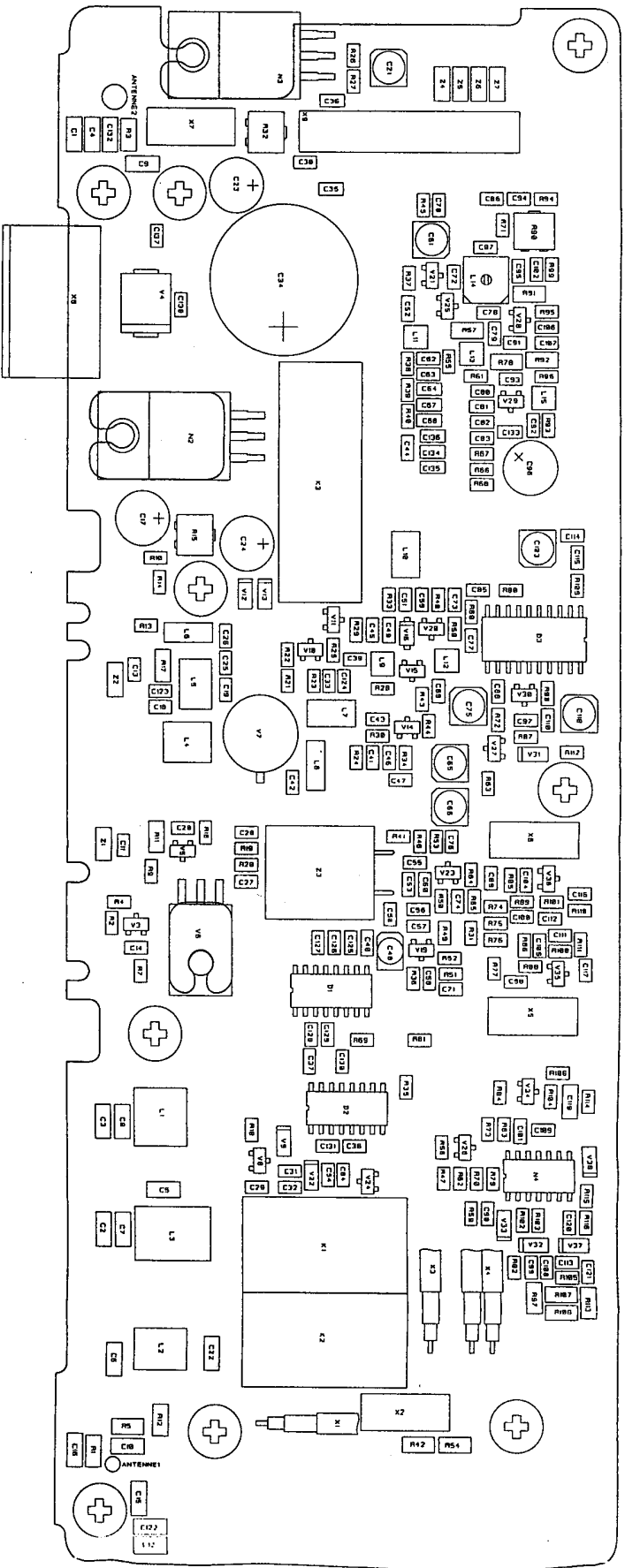


AF and processor unit 63225001/02



This diagram is valid for PCB rev. 32250G

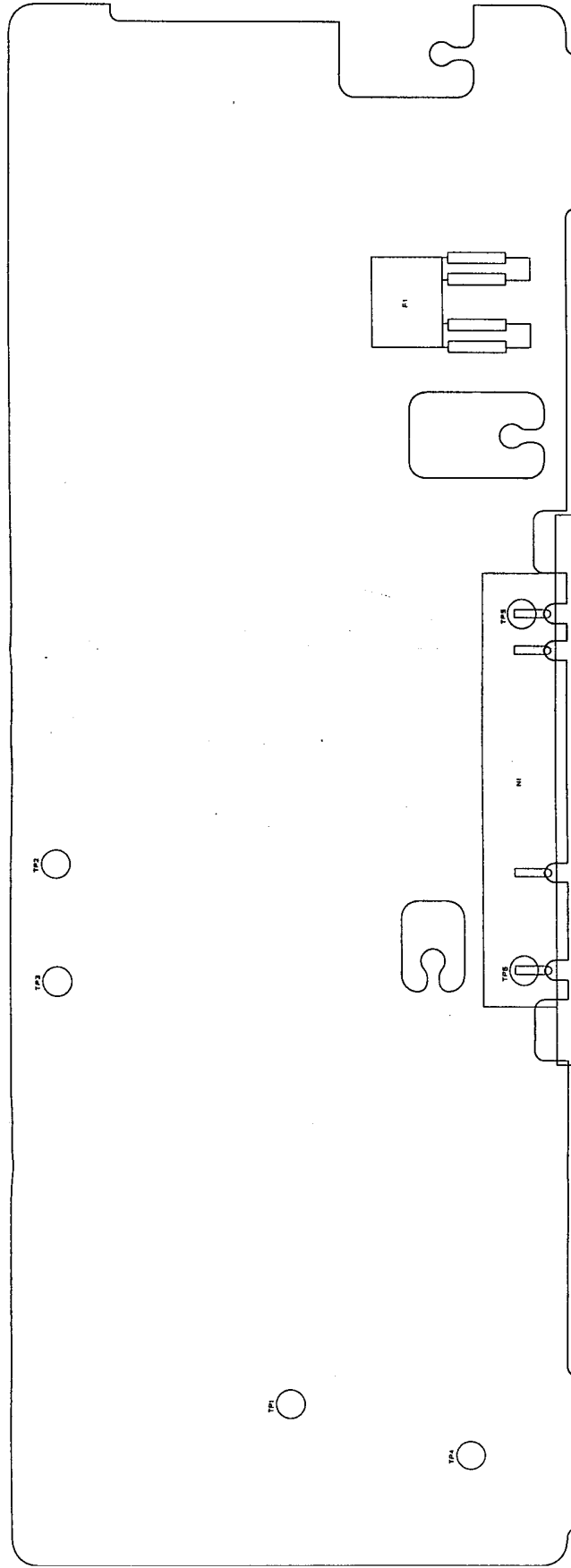
Component location Transmitter unit 632251



Seen from primary side with primary side tracks.

PCB rev. 32251H

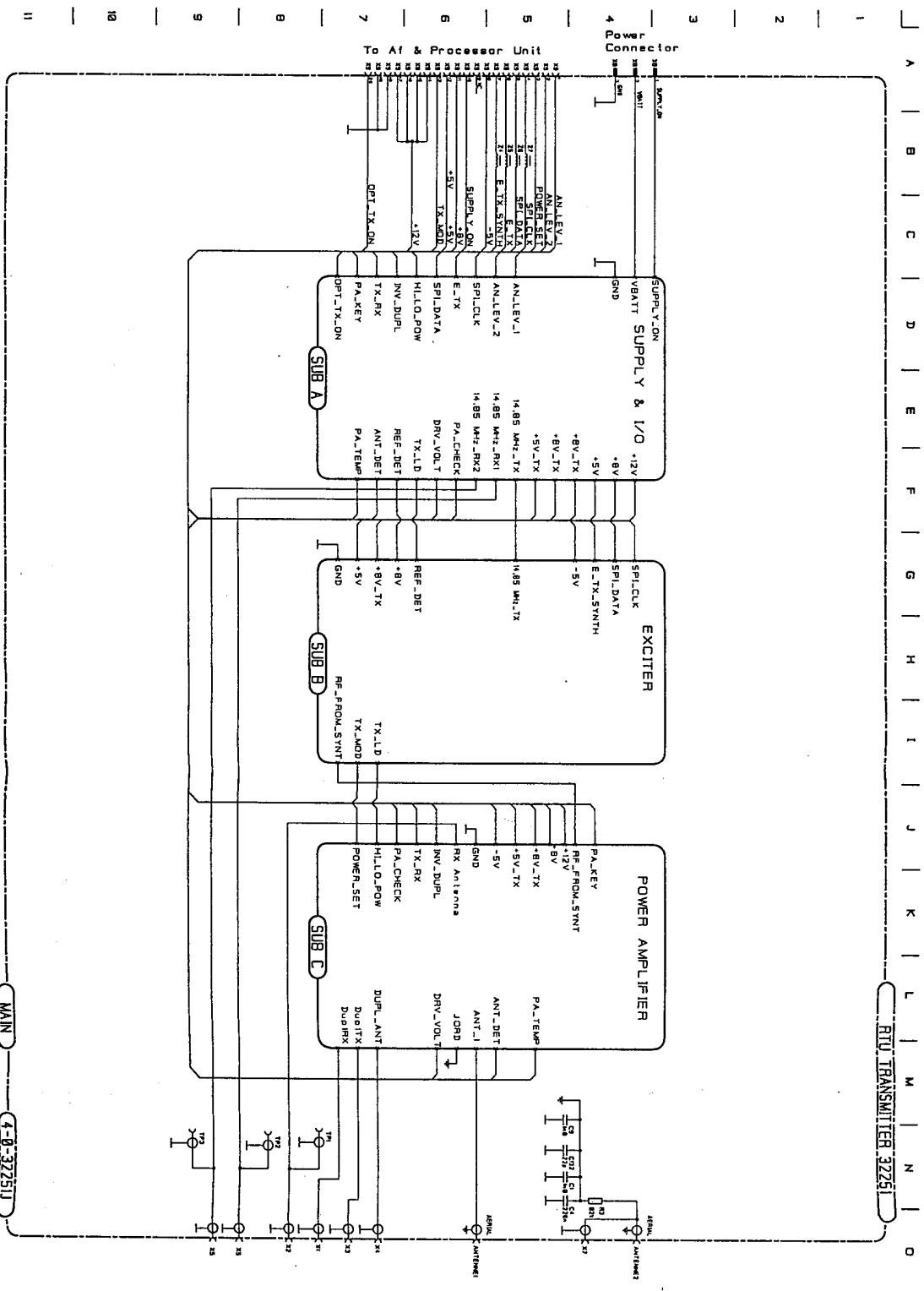
Component location Transmitter unit 632251



Seen from secondary side with secondary side tracks.

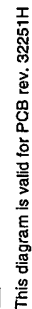
PCB rev. 32251H

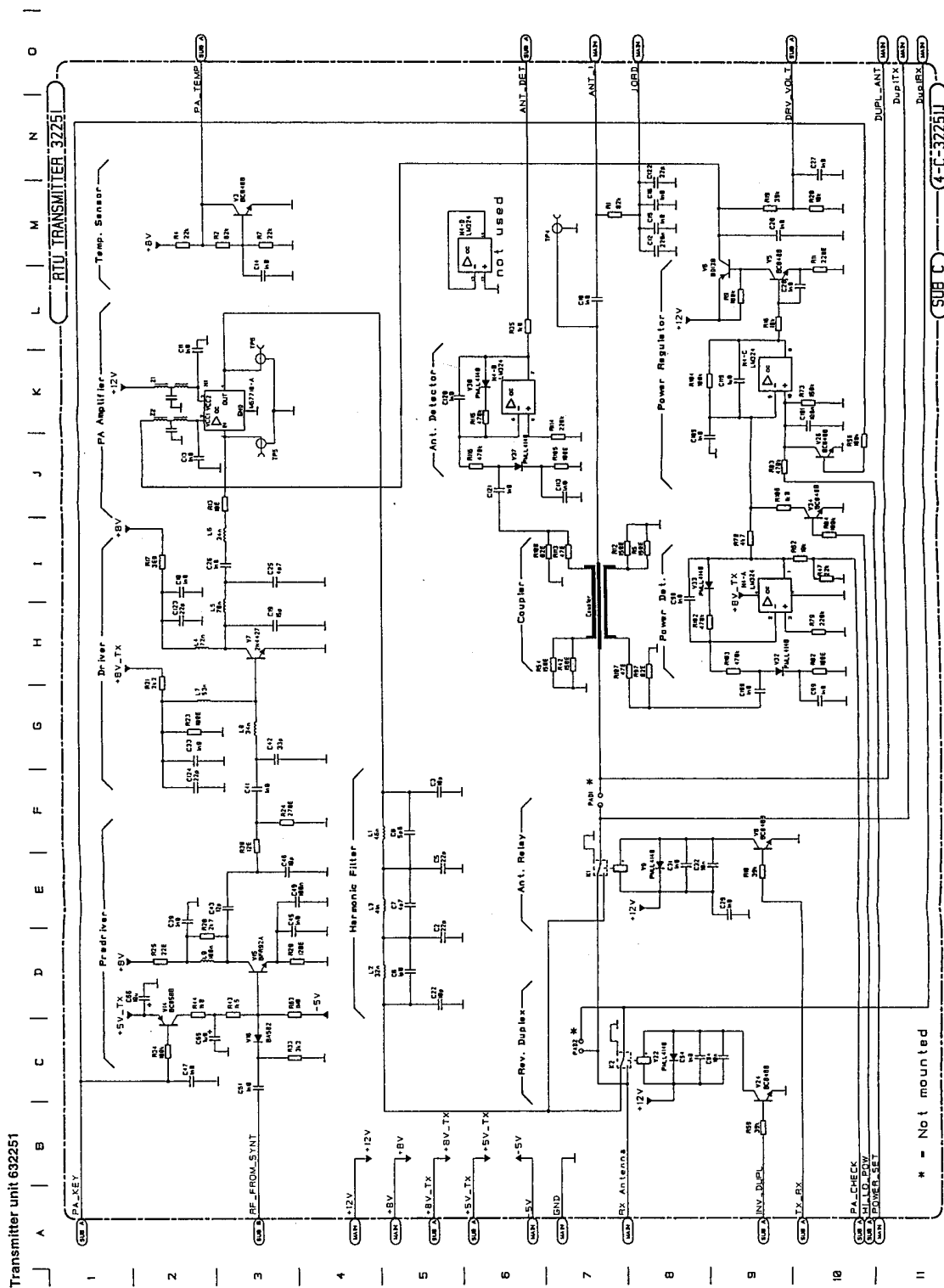
RTU_TRANSMITTER_32251



This diagram is valid for PCB rev. 32251H

RTU TRANSMITTER 32251



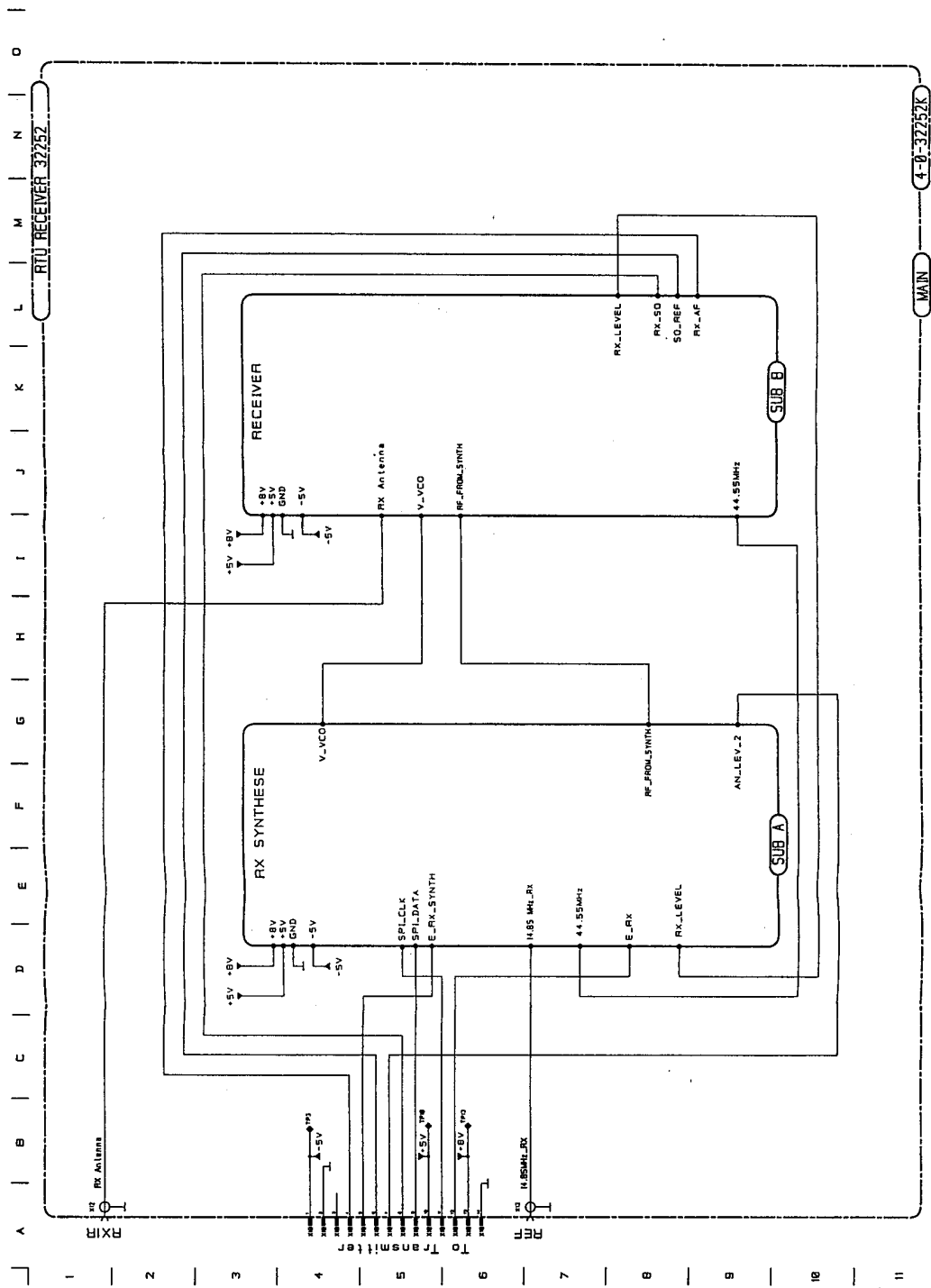


This diagram is valid for PCB rev. 32251H

PCB rev. 32252F

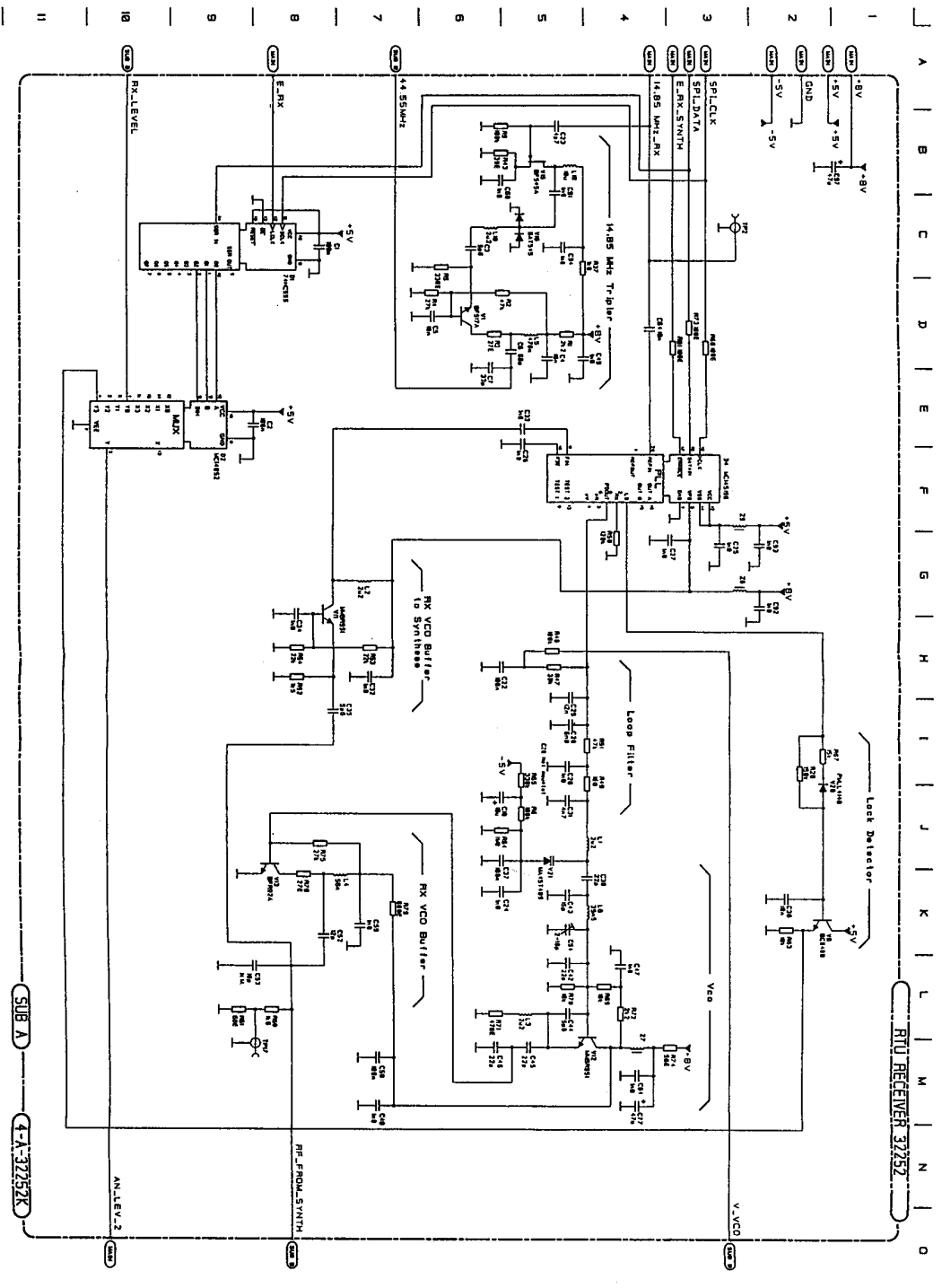
Transceiver units RT4800/-01/-22, and RT47xx duplex

Receiver unit 632252



This diagram is valid for PCB rev. 32252F

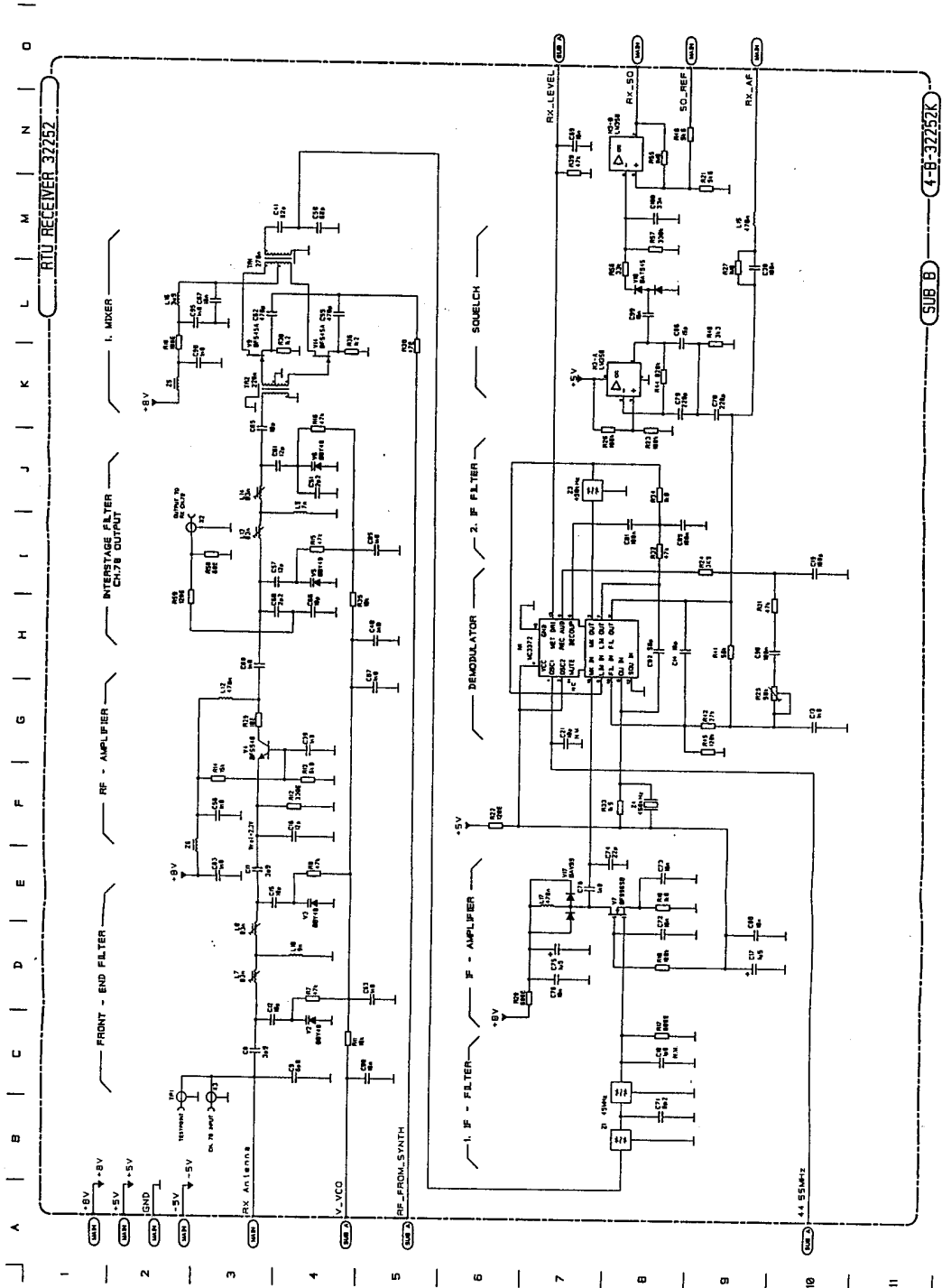
Receiver unit 632252



This diagram is valid for PCB rev. 32252F

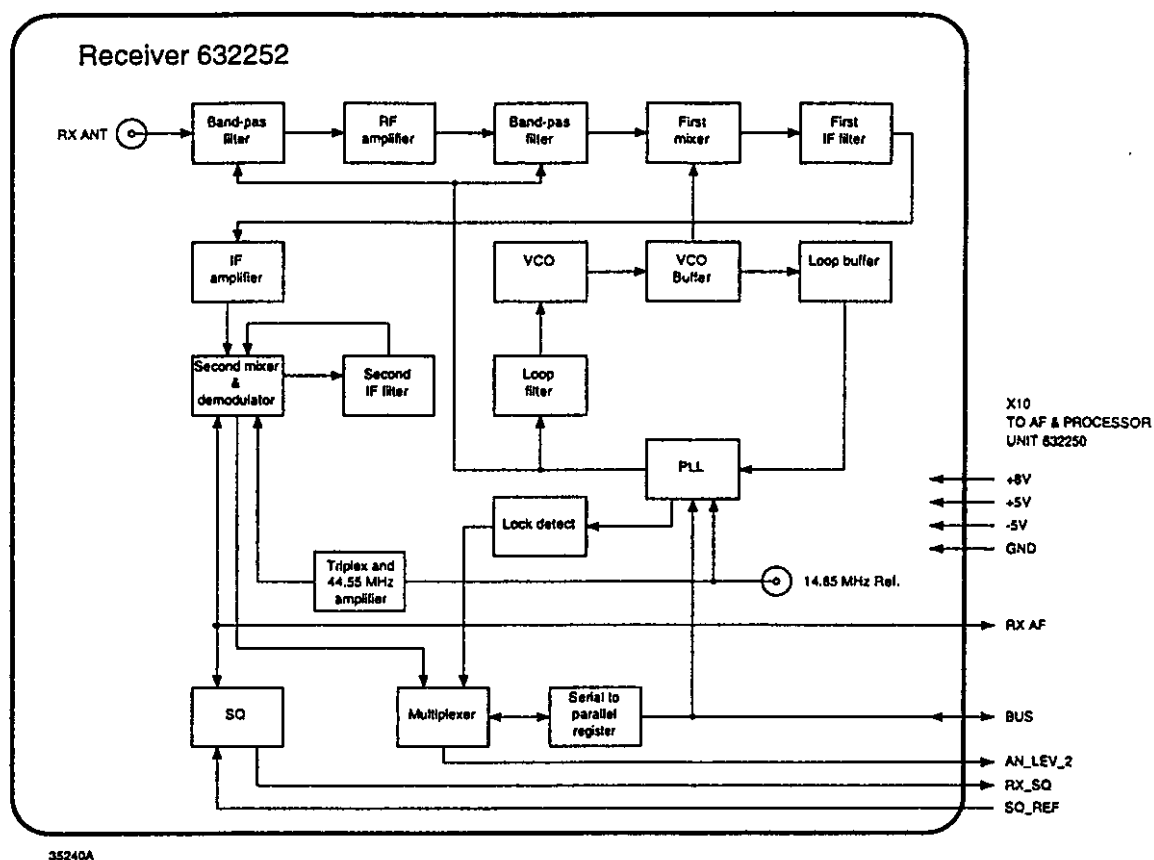
Transceiver units RT4800/-01/-22, and RT47xx duplex

Receiver unit 632252



This diagram is valid for PCB rev. 32252F

4.3 Receiver unit 632252



The receiver is of the type FM double superheterodyne with a first intermediate frequency of 45 MHz and upper-injection first LO. Second intermediate frequency is 450 kHz with lower-injection second LO.

Band-pass filters

The received signal is led through an aerial relay to the input band-pass filter. This filter and the intermediate band-pass filter are controlled by a DC voltage on the diodes capacitors V2, V3, V5 and V6. This DC voltage is driven from the RX-VCO control voltage, and it secures an optimum filter response in the whole frequency range of the receiver. These two filters can be adjusted by L7, L8, L13 and L14 to create the necessary attenuation of unwanted signals and obtain maximum sensitivity.

RF amplifier

The RF amplifier covers the frequency range from 150.8MHz to 163.6MHz, and has high gain and low noise figure. The amplifier is implemented with V4.

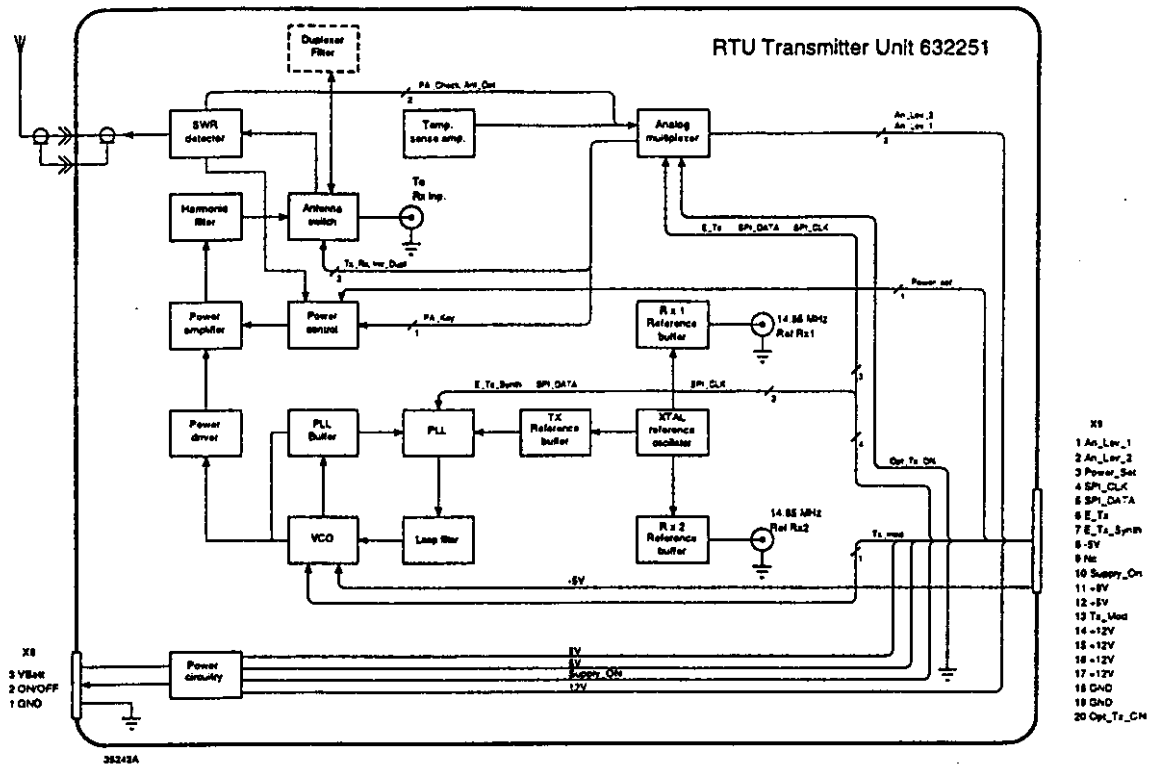
First mixer

The first mixer is a balanced mixer implemented with V9 and V14, which are of the J-FET type. The RF signal is led to the balanced input transformer TR2 and then to the gates of the J-FET's, which are switched by injecting the first LO signal in to the sources of the V9 and V14. The mixed signals are fed to the balanced output transformer TR1 where the wanted signal on 45MHz is selected by the tune circuit consisting of TR1, C41 and C58.

First IF filter

The receiver adjacent channel selectivity is maintained by means of a 4-pole crystal filter Z1 in co-operation with the ceramic filter Z3. R17 gives the impedance matching of output of the crystal filter.

4.2 Transmitter unit 632251



Power circuitry

A power relay, K3, switches the transceiver on and off. Polarity inversion is avoided by means of a fuse, F1, and a high current zener diode, V4. The power supply also includes two voltage regulators, N2 and N3, providing +5V and +8V, respectively. These supplies are adjustable since they provide a voltage which is used as a reference.

Reference oscillator

In order to accomplish a constant and stable transmitting and receiving frequency, the transceiver includes a 14.850 MHz crystal oscillator with a precision of 10 ppm (5 ppm. is optional). The oscillator, which is of the Colpitts type, is built around V19 and Z3, and its frequency can be adjusted with trimmer capacitor C48. In order to avoid frequency pulling, three identical common base amplifiers are used. These three amplifiers have their inputs connected to the reference oscillator, while their outputs provide separate reference signals to the transmitter and the receiver(s).

Analogue multiplexer

An analogue multiplexer, D2, provides the capability of monitoring 6 analogue voltages carrying information about the functionality of the transmitter. This multiplexer is controlled by an 8 bit serial to parallel register, D1. This register also controls the transmitter state (ON/OFF) and output power.

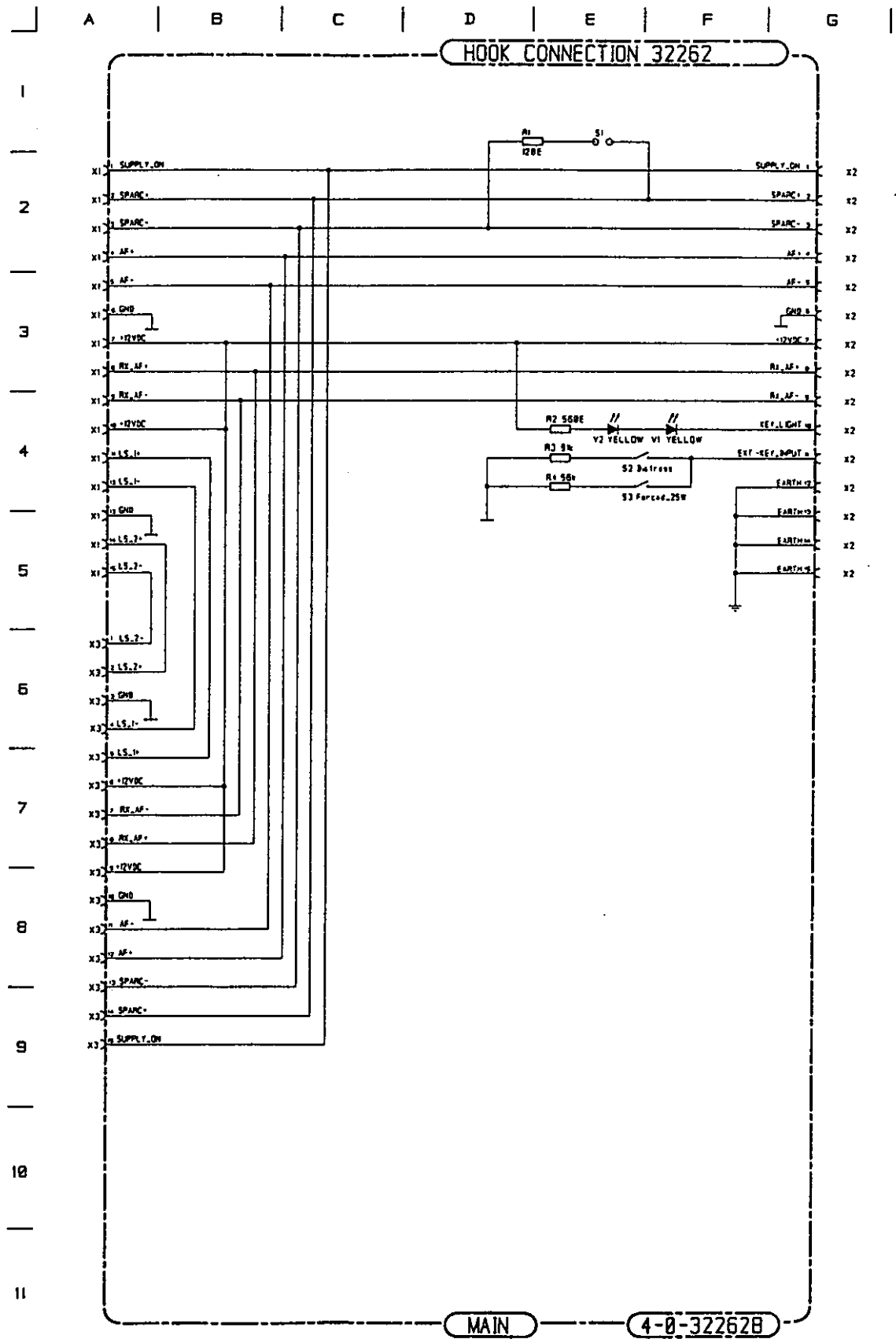
Voltage controlled oscillator

The oscillator of the transmitter is a series tuned colpitts around V28, containing two varicaps in order to accomplish frequency tuning by V21 and modulation by V25, independently. This oscillator with its buffer, V29, is capable of delivering 4 dBm over the frequency range 150.8 MHz to 163.6 MHz.

Phase locked loop, PLL buffer and loop filter

The transmitting frequency is maintained constant and stable by a serial controlled PLL, D3, with on-chip prescaler. An isolating amplifier containing V20 is used between the VCO and the PLL to ensure good spectral purity of the transmitted signal. A passive loop filter interfaces the PLL unit with the VCO. A lock detector around V27 is included to ensure that the transmitter frequency is correct during transmissions.

HOOK CONNECTION 632262



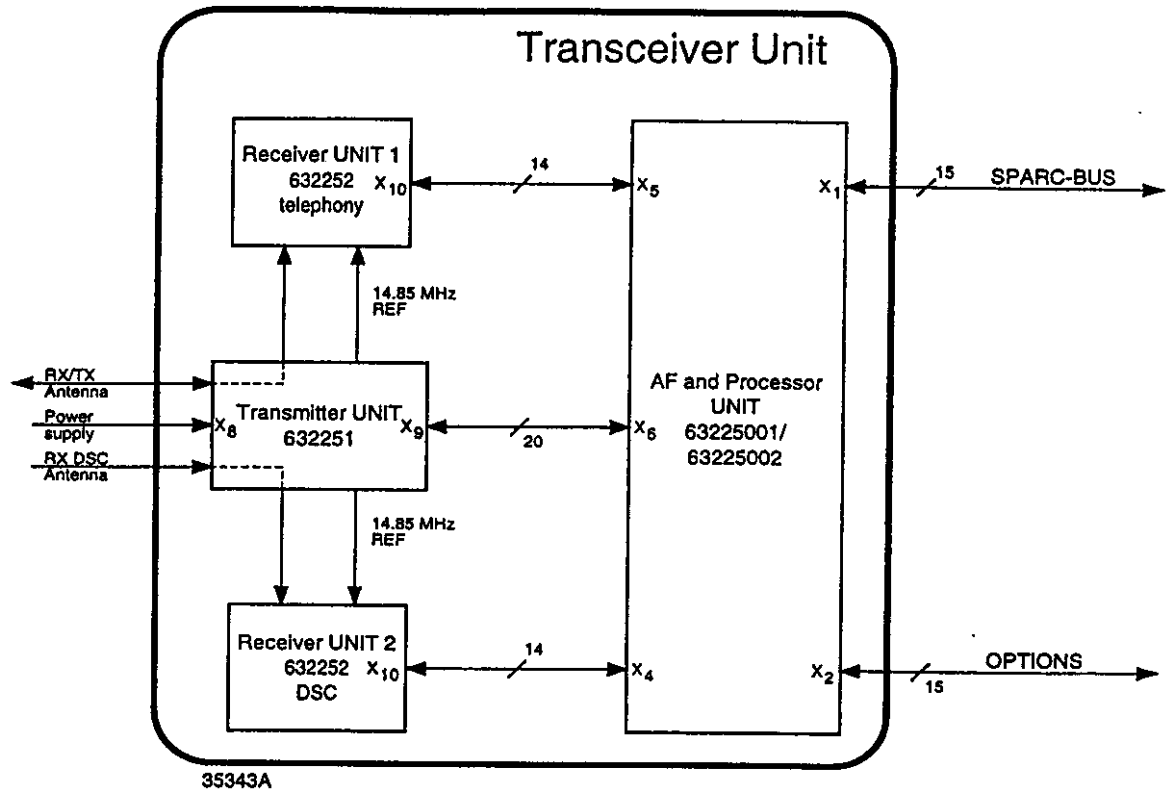
6 Parts lists

HxC AF & MMI UNIT 32261			ECI A/S	5-5-32261D / 5-6-32261D	632261
POSITION	DESCRIPTION		MANUFACTURER	TYPE	PART NO.
C1	CAPACITOR ELECTROLYTIC SM	10uF 20% 16VDC	EUROPE CHEMICON	Al-Chip-MKV 16V/10 M	333.079
C2	CAPACITOR CERAM. SMD 0805	10nF 10% X7R 50VDC	MURATA	GRM40 X7R 103 K 50 PT	328.336
C3	CAPACITOR CERAM. SMD 0805	10nF 10% X7R 50VDC	MURATA	GRM40 X7R 103 K 50 PT	328.336
C4	CAPACITOR CERAM. SMD 0805	100nF 10% X7R 25VDC	MURATA	GRM40 X7R 104 K 25 PT	328.348
C5	CAPACITOR TANTALUM	4u7F 10% 10VDC	SIEMENS	B45196-E2475-K209	67701100
C6	CAPACITOR CERAM. SMD 0805	10nF 10% X7R 50VDC	MURATA	GRM40 X7R 103 K 50 PT	328.336
C7	CAPACITOR CERAM. SMD 0805	10nF 10% X7R 50VDC	MURATA	GRM40 X7R 103 K 50 PT	328.336
C8	CAPACITOR CERAM. SMD 0805	15pF 5% NPO 50VDC	TDK	C2012 COG 1H 150 J T NiBa	323.076
C9	CAPACITOR CERAM. SMD 0805	15pF 5% NPO 50VDC	TDK	C2012 COG 1H 150 J T NiBa	323.076
C10	CAPACITOR CERAM. SMD 0805	10nF 10% X7R 50VDC	MURATA	GRM40 X7R 103 K 50 PT	328.336
C11	CAPACITOR ELECTROLYTIC SM	10uF 20% 16VDC	EUROPE CHEMICON	Al-Chip-MKV 16V/10 M	333.079
C12	CAPACITOR TANTALUM	4u7F 10% 10VDC	SIEMENS	B45196-E2475-K209	67701100
C13	CAPACITOR CERAM. SMD 0805	10nF 10% X7R 50VDC	MURATA	GRM40 X7R 103 K 50 PT	328.336
C14	CAPACITOR TANTALUM 3528	2u2F 20% 16VDC	ERO	CB 225020 M E17	334.028
C15	CAPACITOR CERAM. SMD 0805	10nF 10% X7R 50VDC	MURATA	GRM40 X7R 103 K 50 PT	328.336
C16	CAPACITOR CERAM. SMD 0805	10nF 10% X7R 50VDC	MURATA	GRM40 X7R 103 K 50 PT	328.336
C17	CAPACITOR ELECTROLYTIC SM	47uF 20% 16VDC	ERO	ECV 00 AD 247 D A0	333.175
C18	CAPACITOR CERAM. SMD 0805	10nF 10% X7R 50VDC	MURATA	GRM40 X7R 103 K 50 PT	328.336
C19	CAPACITOR CERAM. SMD 0805	47pF 5% N150 50VDC	MURATA	GRM40 P2H 470 J 50 PT	323.482
C20	CAPACITOR CERAM. SMD 0805	100nF 10% X7R 25VDC	MURATA	GRM40 X7R 104 K 25 PT	328.348
C21	CAPACITOR CERAM. SMD 0805	10nF 10% X7R 50VDC	MURATA	GRM40 X7R 103 K 50 PT	328.336
C22	CAPACITOR CERAM. SMD 1206	1u0F -20/80% Y5V 16VDC	MURATA	GRM42-6 Y5V 105 Z 16 PT10	328.806
C23	CAPACITOR CERAM. SMD 0805	100nF 10% X7R 25VDC	MURATA	GRM40 X7R 104 K 25 PT	328.348
C24	CAPACITOR TANTALUM 3528	2u2F 20% 16VDC	ERO	CB 225020 M E17	334.028
C25	CAPACITOR CERAM. SMD 0805	10nF 10% X7R 50VDC	MURATA	GRM40 X7R 103 K 50 PT	328.336
C26	CAPACITOR ELECTROLYTIC SM	4u7F 20% 25VDC	EUROPE CHEMICON	Al-Chip-MKV 35V/4.7 M	333.075
C27	CAPACITOR CERAM. SMD 0805	270pF 5% NPO 50VDC	TDK	C2012 COG 1H 271 J T NiBa	323.091
C28	CAPACITOR CERAM. SMD 0805	100nF 10% X7R 25VDC	MURATA	GRM40 X7R 104 K 25 PT	328.348
C29	CAPACITOR CERAM. SMD 0805	1n0F 10% X7R 50VDC	MURATA	GRM40 X7R 102 K 50 PT	328.324
C30	CAPACITOR CERAM. SMD 0805	4n7F 10% X7R 50VDC	TDK	C2012 X7R 1H 472 K T NiBa	328.332
C31	CAPACITOR CERAM. SMD 0805	270pF 5% NPO 50VDC	TDK	C2012 COG 1H 271 J T NiBa	323.091
C32	CAPACITOR CERAM. SMD 0805	100nF 10% X7R 25VDC	MURATA	GRM40 X7R 104 K 25 PT	328.348
C33	CAPACITOR CERAM. SMD 0805	100nF 10% X7R 25VDC	MURATA	GRM40 X7R 104 K 25 PT	328.348
C34	CAPACITOR CERAM. SMD 0805	1n0F 10% X7R 50VDC	MURATA	GRM40 X7R 102 K 50 PT	328.324
C35	CAPACITOR CERAM. SMD 0805	4n7F 10% X7R 50VDC	TDK	C2012 X7R 1H 472 K T NiBa	328.332
C36	CAPACITOR CERAM. SMD 0805	10nF 10% X7R 50VDC	MURATA	GRM40 X7R 103 K 50 PT	328.336
C37	CAPACITOR CERAM. SMD 0805	10nF 10% X7R 50VDC	MURATA	GRM40 X7R 103 K 50 PT	328.336
C38	CAPACITOR CERAM. SMD 0805	10nF 10% X7R 50VDC	MURATA	GRM40 X7R 103 K 50 PT	328.336
C39	CAPACITOR CERAM. SMD 0805	10nF 10% X7R 50VDC	MURATA	GRM40 X7R 103 K 50 PT	328.336
C40	CAPACITOR CERAM. SMD 0805	10nF 10% X7R 50VDC	MURATA	GRM40 X7R 103 K 50 PT	328.336
C41	CAPACITOR ELECTROLYTIC SM	10uF 20% 16VDC	EUROPE CHEMICON	Al-Chip-MKV 16V/10 M	333.079
C42	CAPACITOR CERAM. SMD 1206	1u0F -20/80% Y5V 16VDC	MURATA	GRM42-6 Y5V 105 Z 16 PT10	328.806
C43	CAPACITOR CERAM. SMD 1206	1u0F -20/80% Y5V 16VDC	MURATA	GRM42-6 Y5V 105 Z 16 PT10	328.806
C44	CAPACITOR CERAM. SMD 0805	10nF 10% X7R 50VDC	MURATA	GRM40 X7R 103 K 50 PT	328.336
C45	CAPACITOR CERAM. SMD 1206	100nF 10% X7R 50VDC	MURATA	GRM42-6 X7R 104 K 50 PT	328.848
C46	CAPACITOR CERAM. SMD 0805	100nF 10% X7R 25VDC	MURATA	GRM40 X7R 104 K 25 PT	328.348
C47	CAPACITOR CERAM. SMD 0805	100nF 10% X7R 25VDC	MURATA	GRM40 X7R 104 K 25 PT	328.348
C48	CAPACITOR CERAM. SMD 1206	100nF 10% X7R 50VDC	MURATA	GRM42-6 X7R 104 K 50 PT	328.848
C49	CAPACITOR ELECTROLYTIC SM	4u7F 20% 25VDC	EUROPE CHEMICON	Al-Chip-MKV 35V/4.7 M	333.075
C50	CAPACITOR ELECTROLYTIC SM	10uF 20% 16VDC	EUROPE CHEMICON	Al-Chip-MKV 16V/10 M	333.079
C51	CAPACITOR ELECTROLYTIC SM	10uF 20% 16VDC	EUROPE CHEMICON	Al-Chip-MKV 16V/10 M	333.079
C52	CAPACITOR CERAM. SMD 0805	10nF 10% X7R 50VDC	MURATA	GRM40 X7R 103 K 50 PT	328.336
C53	CAPACITOR CERAM. SMD 0805	10nF 10% X7R 50VDC	MURATA	GRM40 X7R 103 K 50 PT	328.336
C54	CAPACITOR CERAM. SMD 0805	10nF 10% X7R 50VDC	MURATA	GRM40 X7R 103 K 50 PT	328.336
C55	CAPACITOR ELECTROLYTIC SM	1u0F 20% 50VDC	PANASONIC	EEV HA 1H V 010 R	333.657
C56	CAPACITOR CERAM. SMD 0805	1n0F 10% X7R 50VDC	MURATA	GRM40 X7R 102 K 50 PT	328.324
C57	CAPACITOR CERAM. SMD 0805	1n0F 10% X7R 50VDC	MURATA	GRM40 X7R 102 K 50 PT	328.324
C58	CAPACITOR CERAM. SMD 0805	1n0F 10% X7R 50VDC	MURATA	GRM40 X7R 102 K 50 PT	328.324
C59	CAPACITOR CERAM. SMD 0805	100pF 5% NPO 50VDC	TDK	C2012 COG 1H 101 J T NiBa	323.086
C60	CAPACITOR CERAM. SMD 0805	100nF 10% X7R 25VDC	MURATA	GRM40 X7R 104 K 25 PT	328.348
C61	CAPACITOR CERAM. SMD 0805	100nF 10% X7R 25VDC	MURATA	GRM40 X7R 104 K 25 PT	328.348
C62	CAPACITOR CERAM. SMD 0805	15pF 5% NPO 50VDC	TDK	C2012 COG 1H 150 J T NiBa	323.076
C63	CAPACITOR CERAM. SMD 0805	1n0F 10% X7R 50VDC	MURATA	GRM40 X7R 102 K 50 PT	328.324
C64	CAPACITOR CERAM. SMD 1206	1u0F -20/80% Y5V 16VDC	MURATA	GRM42-6 Y5V 105 Z 16 PT10	328.806
C65	CAPACITOR ELECTROLYTIC SM	10uF 20% 16VDC	EUROPE CHEMICON	Al-Chip-MKV 16V/10 M	333.079
C66	CAPACITOR CERAM. SMD 0805	100pF 5% NPO 50VDC	TDK	C2012 COG 1H 101 J T NiBa	323.086
C67	CAPACITOR CERAM. SMD 0805	100pF 5% NPO 50VDC	TDK	C2012 COG 1H 101 J T NiBa	323.086
C68	CAPACITOR CERAM. SMD 0805	10nF 10% X7R 50VDC	MURATA	GRM40 X7R 103 K 50 PT	328.336

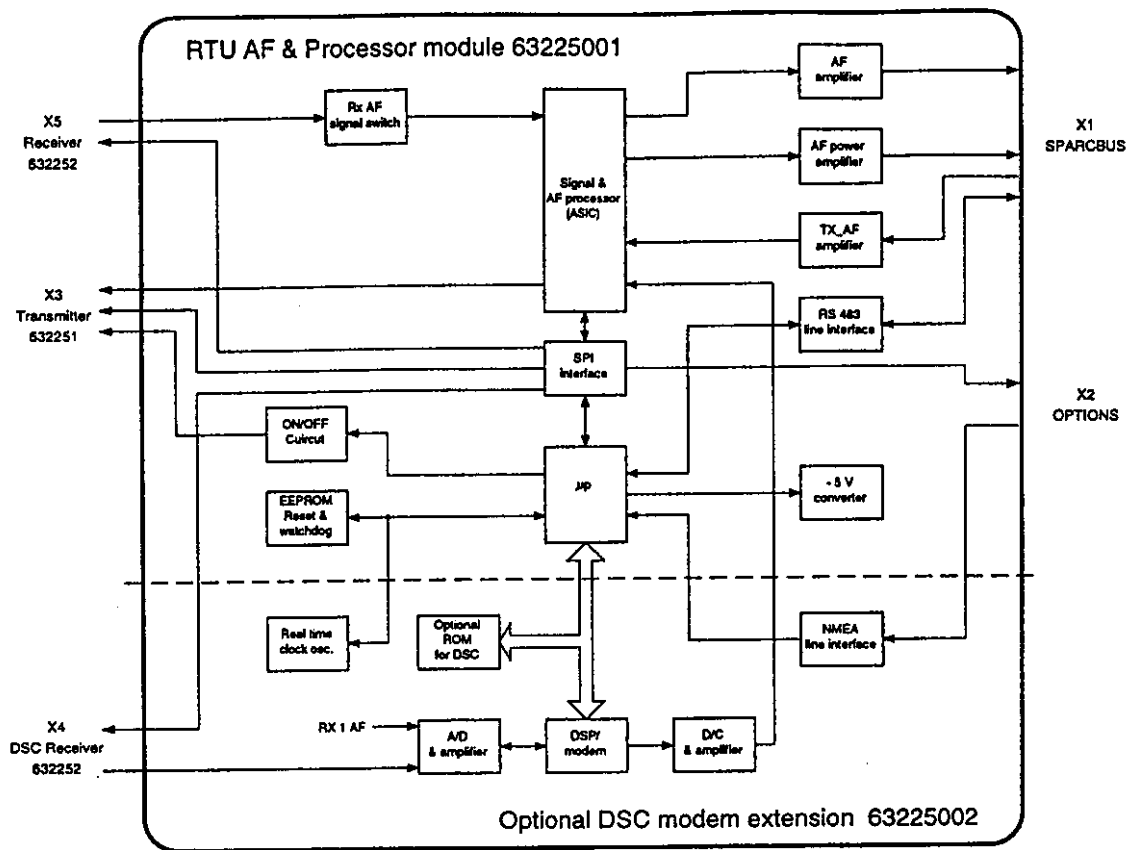
3 RT4822 VHF-DSC

4 Circuit description and schematic diagrams

Block diagram and circuit description of transceiver unit



4.1 AF and processor unit 63225001/02



35241

Input selector

N7-A -> N7-C is used as input selector. Selection is made by the microcontroller via latch D11.

Summation amplifier

The inputs are added together in ASIC OP2. To compensate for the lost signal in the Input selector the gain is set to 1.1. Output from the summation is fed into ASIC "DET RX in".

ASIC N6

The received signal is de-emphasized for LS1 and LS2 amplifier. The buffered signal is passed on to LF amplifier N2.

Balanced amplifier N3

This amplifier converts the signal from single end to balanced. Alarm tone can be added to the signal.

dB attenuator

V7, R21 is used to attenuate LS1 by 30dB.

LF switch

N8-A is used to mute LS2.

LF amplifier

N2 is a double amplifier with two inputs and outputs; one for LS1 and the other for LS2.

LS1 is for an internal speaker and goes up to 4W in 4W.

LS2 is for an external speaker and goes up to 6W in 4W.

Pre-emphasis

Pre-emphasis is made by C84, R91 and limited by R83, C72, R86 and C67 together with the input amplifier in the ASIC N6.

3.1 Manuals

Installation manual RT4822 VHF-DSC
RT 4822 VHF-DSC Operating Instructions

POSITION	DESCRIPTION		MANUFACTURER	TYPE	PART NO.
C69	CAPACITOR CERAM. SMD 0805	1n0F 10% X7R 50VDC	MURATA	GRM40 X7R 102 K 50 PT	328.324
C70	CAPACITOR CERAM. SMD 0805	1n0F 10% X7R 50VDC	MURATA	GRM40 X7R 102 K 50 PT	328.324
C71	CAPACITOR CERAM. SMD 0805	1n0F 10% X7R 50VDC	MURATA	GRM40 X7R 102 K 50 PT	328.324
C72	CAPACITOR CERAM. SMD 0805	1n0F 10% X7R 50VDC	MURATA	GRM40 X7R 102 K 50 PT	328.324
C73	CAPACITOR CERAM. SMD 0805	10nF 10% X7R 50VDC	MURATA	GRM40 X7R 103 K 50 PT	328.336
D1	WATCH DOG 5V INCL. TIMER	MAX705, ADM705	MAXIM	MAX705CSA (ESA) REEL	356.642
D2	8-BIT SHIFT REG. W.LATCH	74HC595	MOTOROLA	MC74HC595D R2	355.296
D3	EEPROM 2k BIT SERIAL	X25020, AT25020	XICOR	X25020S T5, (X25020S-3 T5)	355.319
D4	PROGRAMMED OTP-CPU, D4 I.	632261 & 632263	ECI A/S	0-0-32461B	73246100
D5	RS485 LOW EMI TRANCEIVER	MAX483, LTC1483	MAXIM	MAX483 CSA(ESA) TAPE&REEL	356.606
F1	FUSE SMD 2914	630mA FF	SHURTER	3402.0008.24	374.005
X1	PLUG 2 POLES CC=1.5mm	PCB VERSION	JST	S 2B-ZR-SM3A-TF	375.060
X2	PLUG 5 POLES RIGHT ANGLE	CC=2mm, PCB VERSION	JST	S 5B-PH-SM3-TB	375.125
X3	PLUG 7 POLES RIGHT ANGLE	CC=2mm, PCB VERSION	JST	S 7B-PH-SM3-TB	375.127
X4	PLUG 2 POLES CC=1.5mm	PCB VERSION	JST	S 2B-ZR-SM3A-TF	375.060
X5	PLUG 2 POLES CC=1.5mm	PCB VERSION	JST	S 2B-ZR-SM3A-TF	375.060
K1	REED SWITCH	SPST 10VA FR2024	CP CLARE	FR2024	339.400
R1	RESISTOR SMD 0805	100k OHM 1% 50mW	PHILIPS	2322 734 2/61004	302.570
R2	RESISTOR SMD 0805	22k OHM 5% 0.1W	ROHM	MCR 10 EZH J 223	302.064
R3	RESISTOR SMD 0805	47 OHM 5% 0.1W	ROHM	MCR 10 EZH J 47R	302.032
R4	RESISTOR SMD 0805	100k OHM 1% 50mW	PHILIPS	2322 734 2/61004	302.570
R5	RESISTOR SMD 0805	820 OHM 5% 0.1W	ROHM	MCR 10 EZH J 821	302.047
R6	RESISTOR SMD 0805	220 OHM 5% 0.1W	ROHM	MCR 10 EZH J 221	302.040
R7	RESISTOR SMD 0805	100k OHM 1% 50mW	PHILIPS	2322 734 2/61004	302.570
R8	RESISTOR SMD 0805	100k OHM 1% 50mW	PHILIPS	2322 734 2/61004	302.570
R9	RESISTOR SMD 0805	100k OHM 1% 50mW	PHILIPS	2322 734 2/61004	302.570
R10	RESISTOR SMD 0805	100k OHM 1% 50mW	PHILIPS	2322 734 2/61004	302.570
R11	RESISTOR SMD 0805	820 OHM 5% 0.1W	ROHM	MCR 10 EZH J 821	302.047
R12	RESISTOR SMD 0805	220 OHM 5% 0.1W	ROHM	MCR 10 EZH J 221	302.040
R13	RESISTOR SMD 0805	220 OHM 5% 0.1W	ROHM	MCR 10 EZH J 221	302.040
R14	RESISTOR SMD 0805	220 OHM 5% 0.1W	ROHM	MCR 10 EZH J 221	302.040
R15	RESISTOR SMD 0805	1M0 OHM 5% 0.1W	ROHM	MCR 10 EZH J 105	302.084
R16	RESISTOR SMD 0805	56k OHM 5% 0.1W	ROHM	MCR 10 EZH J 563	302.069
R17	RESISTOR SMD 0805	820 OHM 5% 0.1W	ROHM	MCR 10 EZH J 821	302.047
R18	RESISTOR SMD 0805	100k OHM 1% 50mW	PHILIPS	2322 734 2/61004	302.570
R19	RESISTOR SMD 0805	2k7 OHM 5% 0.1W	ROHM	MCR 10 EZH J 272	302.053
R20	RESISTOR SMD 0805	2k7 OHM 5% 0.1W	ROHM	MCR 10 EZH J 272	302.053
R21	RESISTOR SMD 0805	2k7 OHM 5% 0.1W	ROHM	MCR 10 EZH J 272	302.053
R22	RESISTOR SMD 0805	56k OHM 5% 0.1W	ROHM	MCR 10 EZH J 563	302.069
R23	RESISTOR SMD 0805	100k OHM 1% 50mW	PHILIPS	2322 734 2/61004	302.570
R24	RESISTOR SMD 0805	100k OHM 1% 50mW	PHILIPS	2322 734 2/61004	302.570
R25	RESISTOR SMD 0805	27k OHM 5% 0.1W	ROHM	MCR 10 EZH J 273	302.065
R26	RESISTOR SMD 0805	100k OHM 1% 50mW	PHILIPS	2322 734 2/61004	302.570
R27	RESISTOR SMD 0805	100k OHM 1% 50mW	PHILIPS	2322 734 2/61004	302.570
R28	RESISTOR SMD 0805	100k OHM 1% 50mW	PHILIPS	2322 734 2/61004	302.570
R29	RESISTOR SMD 0805	100k OHM 1% 50mW	PHILIPS	2322 734 2/61004	302.570
R30	RESISTOR SMD 0805	270k OHM 5% 0.1W	ROHM	MCR 10 EZH J 274	302.077
R31	RESISTOR SMD 0805	820 OHM 5% 0.1W	ROHM	MCR 10 EZH J 821	302.047
R32	RESISTOR SMD 0805	100k OHM 1% 50mW	PHILIPS	2322 734 2/61004	302.570
R33	RESISTOR SMD 0805	100k OHM 1% 50mW	PHILIPS	2322 734 2/61004	302.570
R34	RESISTOR SMD 0805	10k OHM 5% 0.1W	ROHM	MCR 10 EZH J 103	302.060
R35	RESISTOR SMD 0805	10k OHM 5% 0.1W	ROHM	MCR 10 EZH J 103	302.060
R36	RESISTOR SMD 0805	47k OHM 5% 0.1W	ROHM	MCR 10 EZH J 473	302.068
R37	RESISTOR SMD 0805	100k OHM 1% 50mW	PHILIPS	2322 734 2/61004	302.570
R38	RESISTOR SMD 0805	100k OHM 1% 50mW	PHILIPS	2322 734 2/61004	302.570
R39	RESISTOR SMD 0805	100k OHM 1% 50mW	PHILIPS	2322 734 2/61004	302.570
R40	RESISTOR SMD 0805	100k OHM 1% 50mW	PHILIPS	2322 734 2/61004	302.570
R41	RESISTOR SMD 0805	100k OHM 1% 50mW	PHILIPS	2322 734 2/61004	302.570
R42	RESISTOR SMD 0805	100k OHM 1% 50mW	PHILIPS	2322 734 2/61004	302.570
R43	RESISTOR SMD 0805	100k OHM 1% 50mW	PHILIPS	2322 734 2/61004	302.570
R44	RESISTOR SMD 0805	6k81 OHM 1% 50mW	PHILIPS	2322 734 2/68812	302.450
R45	RESISTOR SMD 0805	10k OHM 5% 0.1W	ROHM	MCR 10 EZH J 103	302.060
R46	RESISTOR SMD 0805	100k OHM 1% 50mW	PHILIPS	2322 734 2/61004	302.570
R47	RESISTOR SMD 0805	100k OHM 1% 50mW	PHILIPS	2322 734 2/61004	302.570
R48	RESISTOR SMD 0805	10k OHM 5% 0.1W	ROHM	MCR 10 EZH J 103	302.060
R49	RESISTOR SMD 0805	100k OHM 1% 50mW	PHILIPS	2322 734 2/61004	302.570
R50	RESISTOR SMD 0805	3k32 OHM 1% 50mW	PHILIPS	2322 734 2/63322	302.420
R51	RESISTOR SMD 0805	220 OHM 5% 0.1W	ROHM	MCR 10 EZH J 221	302.040
R52	RESISTOR SMD 0805	3k9 OHM 5% 0.1W	ROHM	MCR 10 EZH J 392	302.055
R53	RESISTOR SMD 0805	47 OHM 5% 0.1W	ROHM	MCR 10 EZH J 47R	302.032
R54	RESISTOR SMD 0805	33 OHM 5% 0.1W	ROHM	MCR 10 EZH J 33R	302.030
R55	RESISTOR SMD 0805	820 OHM 5% 0.1W	ROHM	MCR 10 EZH J 821	302.047
R56	RESISTOR SMD 0805	100k OHM 1% 50mW	PHILIPS	2322 734 2/61004	302.570
R57	RESISTOR SMD 0805	100k OHM 1% 50mW	PHILIPS	2322 734 2/61004	302.570

Power driver

This part of the transmitter chain consists of two amplifier stages. The first stage of amplification is accomplished by a common emitter buffer, V15. A switching transistor, V14, shuts this stage down during reception. This stage delivers 13 dBm and the output power rise and decay times are shaped in such a way that frequency pulling of the VCO is avoided.

The final discrete stage of amplification contains a medium power VHF transistor, V7, running in class C. This amplifier puts 25 dBm out during transmission and is turned off during reception in order to save current.

PA stage

The final boost of amplification consists of an integrated power module, N1, capable of delivering 30W and withstanding a large amount of load mismatch. This stage provides a minimum gain of 20 dB, which can be reduced by varying the supply voltage to the first amplifier in the power module. This feature is used in order to obtain two output powers: 1W and 25W.

Harmonic filter

All of the harmonic signals of the carrier frequency are suppressed by a 7th order elliptic filter.

Aerial switch

The aerial is switched between the transmitter and the receiver by relay K1. As an option the transceiver can be operated as a coast station in reverse duplex by means of a second aerial relay, K2.

SWR Detector

The SWR detector consists of three elements: a directional coupler and two power detectors. The coupler samples forward and reverse going power in the transceiver.

A temperature compensated power detector consisting of an operational amplifier, N4-A, and two fast switching diodes, V32 and V33, provides the regulating circuitry with a voltage proportional to the output power.

The same circuitry used in the power detector is used in the reverse power detector around N4-B, V37 and V38. This is done to avoid transmitting at a high power level in case of aerial failure or high SWR.

Power regulator

The heart of the power regulator is the operational amplifier N4-C, which compares the detected output power with a power setting voltage. In this way the output power from the transmitter can be regulated by adjusting the voltage at pin 10 of N4-C. The transistor V26 is one of the shutdown mechanisms incorporated in the transmitter. This transistor and the surrounding RC network also contribute to the power envelope shaping done at the first stage of the power driver.

The HIGH-LOW power selection is done by shunting the output voltage from the forward power detector with V34.

Finally, the output from N4-C is buffered by the amplifier around V5 and V6, which is capable of driving the PA stage.

Temperature sensor

A forward biased transistor, V3, placed near the PA stage is used as a temperature sensor to alert the controlling circuitry and thereby prevent damage at the PA stage due to high temperatures.

IF amplifier

The transistor V7 amplifies the 45MHz output signal from the crystal filter to the second mixer, which has a tuned drain circuit consisting of L17, C70 and C74.

Second mixer, demodulator, second IF filter and multiplexer

The 45 MHz signal is down converted to 450 kHz by the second LO of 44.55 MHz. The mixer output is fed through the ceramic filter Z3 to the limiter amplifier and demodulator in the N1. The AF signal is amplified by an internal operation amplifier. The output signal can be adjusted by R25. The RX_level, which is an output from N1 to indicate the strength of the received signal, is multiplexed with the lock detector signal, from the PLL (D4), by D2 and the output is routed to AN_LEV_2.

VCO and VCO buffer

The VCO, which is built around V12, is oscillating at +45 MHz above the selected channel frequency. The oscillator can shift the band by means of the trimmer capacitor C54. The output voltage of the VCO is fed to the VCO buffer, which is implemented with V13.

Loop buffer, PLL and loop filter

The output of the VCO buffer is fed to the prescaler of the PLL, which is implemented by IC MC145190, via the loop buffer. This is realized by V11. The output from the phase detector of the PLL is fed to the VCO through the loop filter providing optimum settling and filtering of the VCO.

Tripler and 44.55 MHz amplifier

The second LO is generated from the 14.85 MHz, which is amplified and clipped by a dual schottky diode V16 generating 3rd harmonic signal. This signal is selectively amplified at 44.55 MHz by V1.