

# Compact HF SSB DSC Watchreceiver RM2152

## Workshop Manual



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## How to use this manual

This workshop manual provides technicians with detailed information on RM2152 the new version of the old RM2150 DSC Watch Receiver and the old RM2151 DSC/Telex Receiver.

### **Please note:**

Any responsibility or liability for loss or damage in connection with the use of this product and the accompanying documentation is disclaimed.

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## Overview of RM2152

The RM2152 may have a number of names, depending on whether it is a SAILOR, NORCONTROL, Husun or Sperry product. In this manual, however, only the SAILOR names are used.

The table below shows the different names used for each unit, emphasizing the SAILOR names

<b>Compact HF SSB DSC Watchreceiver RM2152</b>	<b>SAILOR</b>	<b>NORCONTROL</b>	<b>Husun</b>	<b>Sperry</b>
	RM2152	RM2152	2152	RM2152

# PART 1

## Compact HF SSB RM2152

### Technical

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# 1 GENERAL INFORMATION

## 1.1 INTRODUCTION

Compact HF SSB RM2152 is the DSC and TELEX scanning receiver with built-in DSC and TELEX modem.

It has been developed on the basis of SAILOR's many years of experience with short wave communication equipment.

It has the same high reliability as all SAILOR equipment is known for.

It has been constructed so that it fits in with other units in the Compact Programme 2000.

### **SAILOR HF SSB PROGRAMME 2000 CONSISTS OF THE FOLLOWING UNITS:**

RE2100: Control unit with integral receiver and exciter.

T2130: 250W PEP SSB transmitter with integral power supply for RE2100.  
Supply voltage 24V DC.

AT2110: 250W PEP aerial coupler for outdoor use.

N2160: 12V DC power supply for T2130.

N2161: 110/220/240V AC, 50 Hz power supply for T2130.

N2165: AC/DC power supply for RM2152

## 1.2 GENERAL DESCRIPTION

### **RM2152**

- is an all solid state constructed microcomputer controlled SSB short wave radio modem.
- covers the frequency range 100 kHz to 30 MHz.
- is a scanning receiver with integral DSC and TELEX modem.
- has a special serial input/output (SP-BUS) enabling RM2152 to communicate with the other units in the Compact 2000 programme.
- is fully synthesized and has a high stability reference oscillator (TCXO).
- has an- easy-to-read display with controlable backlight.
- has a push-button keyboard offering an attractive tactile feeling and a safe finger-guide in the metal front. The keyboard is fitted with night-illumination of the lettering.
- is a fully automatic ARQ telex unit with HF SSB RE2100 and the terminal equipment H2098A/H2099/H1253B. The terminal equipment can be replaced by a personal computer.
- is a fully automatic DSC unit with HF SSB RE2100.
- has a read-out in alpha numerical display of received DSC information. Printer not necessary.
- has easy to understand menu-controlled DSC calls.

**1.3 TECHNICAL DATA****SYSTEMS SPECIFICATIONS**

<b>Communication protocol</b>	DSC: CCIR Rec. 493-9 (class A), 541-8. ETS 300 338, IEC 945. Telex: CCIR Rec. 625, 476-3, 490, 491(1978), CCITT Rec. 130.
<b>Other Rec's:</b>	In compliance with ETSI, CEPT, MPT, FTZ and FCC.
<b>Modes of operation:</b>	ARQ, FEC, SELEC, and DSC.
<b>Line signal:</b>	Two tone keyed, 100 baud synchronous. DSC: 10 unit code, 7 bits information and 3 bits parity. TELEX: 7 unit code, constant 4B/3Y ratio.
<b>Call codes:</b>	DSC: 9 digits station identification. TELEX: 5 digits and 9 digits with dual ship ID-codes for individual and group calls.
<b>Keys:</b>	All keys are back-illuminated.
<b>Display:</b>	" Graphic LCD display with adjustable backlight angle.
<b>Acoustic Alarm:</b>	DISTRESS and URGENCY alert, alert for other type of received calls. Warning for wrong or missing entries.
<b>Scanning facilities:</b>	10 scan programmes containing up to 6 different frequencies.
<b>Call stacks:</b>	The 5 last received ordinary calls. Not older than 48 hours. The 20 last received DISTRESS calls. Not older than 48 hours.
<b>Program memory:</b>	384 kilobyte main memory in EPROM. 512 kilobyte volatile RAM. 64 kilobyte Nonvolatile RAM (battery back-up). 32 kilobyte Nonvolatile EEPROM.

**RECEIVER SPECIFICATIONS**

<b>Receive System:</b>	Double conversion super heterodyne 1st IF 70 MHz. 2nd IF 10.73 MHz.
<b>Frequency Range:</b>	100 kHz to 29999.9 kHz.
<b>Antenna impedance:</b>	50 $\Omega$
<b>Frequency Stability:</b>	Better than 0.39 ppm.
<b>IF selectivity:</b>	Passband ripple better than 1 dB. 3 dB bandwidth at $\pm 150$ Hz to $\pm 350$ Hz. 60 dB bandwidth at $\pm 750$ Hz.
<b>Sensitivity:</b>	DSC calling sensitivity -18 dB/V. TELEX calling sensitivity -18 dB/V. (CEPT method of test.)
<b>Adjacent Channel:</b>	40 dB at $\pm 500$ Hz.
<b>Selectivity:</b>	(CEPT method of test).
<b>Automatic gain control:</b>	Less than 2 dB variation of detector output level for 90 dB input signal variation. (0 dB/V to 90 dB/V) Fast attack time and slow decay time.

<b>Blocking:</b>	Better than 55 dB for unwanted signals in the band 1 kHz to 3 kHz away from the wanted signal. Better than 75 dB for unwanted signals more than 3 kHz away from the wanted signal. (CEPT method of test)
<b>Co-channel rejection:</b>	Less than 6 dB. (CEPT method of test).
<b>Intermodulation:</b>	IP3 better than 8 dBm. (CEPT method of test).
<b>Spurious and IF Rejection:</b>	Better than 70 dB. (CEPT method of test).
<b>Spurious Emission:</b>	Better than 1nW at antenna connector.
<b>Audio Power:</b>	1 Watt into 8 ohm, less than 10% distort.
<b>LOCAL INTERFACE</b>	
<b>Printer interface:</b>	Parallel centronics.
<b>Remote control:</b>	CCITT Rec V.10 SPECIAL (RS-423, T-BUS), multidrop addressing for control of transmitter and data equipment control/polling.
<b>Navigator interface:</b>	NMEA 0183.
<b>Terminal interface:</b>	CCITT Rec. V.24/V.28 (rs-232C)
<b>External alarm:</b>	Alarm output, rs-410 type N (open drain).
<b>LINE INTERFACE</b>	
<b>Tone frequencies:</b>	1700 ± 85 Hz, accuracy within 0.5 Hz.
<b>Modulation:</b>	Phase-continues AFSK keying.
<b>Frequency stability:</b>	Better than 0.1 Hz.
<b>Filter tracking:</b>	Adaptive tracking within ± 85 Hz.
<b>Decision filtering:</b>	Bit-slicing with multipath correction.
<b>Demodulation filter:</b>	4 pole bessel.
<b>RX-tone input:</b>	Strap selectable internal/external. +10 dBm to -20 dBm, continues adjustable, 600 Ohm balanced.
<b>RX dynamic range:</b>	35 dB.
<b>TX-tone output:</b>	+10 dBm to -20 dBm, continues adjustable, 600 Ohm balanced.
<b>Free-signal detection:</b>	Automatic detection and handling of free-signals.
<b>Radio control input:</b>	RS-410 type N.
<b>Radio control output:</b>	RS-410 type N (open drain).

**GENERAL**

<b>DC power source:</b>	+18Vdc ± 5%, 0.5 Amp. -18Vdc ± 5%, 0.2 Amp. +9Vdc ± 5%, 0.5 Amp.
<b>Ambient temperature:</b>	-15°C to 55°C operating. -20°C to 70°C storage.
<b>Relative humidity:</b>	95% non-condensing.
<b>Vibration:</b>	IEC, CEPT and MPT 1204.
<b>Dimension:</b>	H*W*D, 98 mm * 210 mm * 300 mm.
<b>Weight:</b>	3.7 Kg.

**1.4 CONTROLS**

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Volumen control and on/off switch for the mains.



Access to the functions <Display>, <Pos>, <Stns>, <Time>, <Test>, <Options>, <Print> and <Sun>.

<Display>: Give access to the display set up menu.

<Pos>: Give access to the position set menu.

<Stns>: Give access to key data in the station table.

<Time>: Give access to set the internal clock.

<Test>: Give access to the internal/external test menu.

<Options>: Give access to the radiomodem set up menu.

<Print>: Give access to a printer set up and a print menu.

<Sun>: Give access to key in the number of sun-spots, used in the MUF-program.



Give access to the distress menu or transmits the distress signal when **distress** and **send** are activated simultaneously.



Give access to the scan menu or to the scan edit menu when **scan** and then the **edit** key is activated.



Give access to select 2187.5 kHz.



Give access to a message book of received DSC calls, distress as well as ordinary calls. MSG



Give access to make a DSC call to a telecom. subscriber with keyed in data or to make any other DSC call when **call** and then the **edit** key is activated. A distress relay call can be composed when **call** and then the **edit** key is activated.



Used in combination with other keys. **Scan** and **edit** give access to edit a scan programme. **Addr book** and **edit** give access to edit data stored in the address book. **Call** and **edit** give access to compose a DSC call of any kind.



When activated the DSC call will be transmitted. Transmits the distress signal when **distress** and **send** are activated simultaneously.



**Next** is used to activate the next display menu, **last** is used to activate the previous display menu.



When activated the cursor will move in counter clock-wise direction. If the cursor is placed in a writing -space and the left arrow is used, the cursor will move one step to the left and the information will be deleted.



When the up/down arrow show in the display menu the up/down key can be used to extend the display menu.



When the up/down arrow show in the display menu the up/down key can be used to extend the display menu.



When activated the cursor will move in the clock-wise direction.



Digits from 0 to 9 or letters from A to Z.



Terminate a key-in sequence and stop a transmission of a Distress or ordinary DSC call.



Set the decimal point or the deg sign.

## 1.5 PRINCIPLE OF OPERATION AND BLOCK DIAGRAM

### MAIN PROCESSOR UNIT

#### FILTER UNIT

#### DISPLAY UNIT

This unit contains a graphical LCD display.

#### SYNTHESIZER UNIT

This unit contains all frequency generating parts.

The reference oscillator which is a temperature compensated crystal oscillator (TCXO) with a frequency of 10,73152 MHz.

The receiver needs two LO-signals. These signals are generated in two separate PLL's, one having output frequencies from 70 MHz to 100 MHz and the other having output frequency of 59,26912 MHz. The synthesizer which covers from 70 MHz to 100 MHz is a fractional synthesizer with a resolution of 10 Hz. This PLL is used as LO-injection to the first mixer at the receiver front end.

#### RECEIVER FRONT END UNIT

This unit contains input protection circuit, input filters, 1st mixer and 70 MHz IF filter.

The input filter is a mixture of lowpass, highpass and bandpass filter to obtain max. performance in the entire band from 100 kHz to 30 MHz.

The mixer is a FET mixer with high level LO-injection to give the mixer good high signal quality. This mixer converts the incoming radio signal to a 70 MHz IF signal. The mixer is followed by a 70 MHz bilitic quartz filter with a bandwidth of 15 kHz.

#### RECEIVER UNIT

This unit contains all necessary circuits to convert the 70 MHz IF signal to an audio signal.

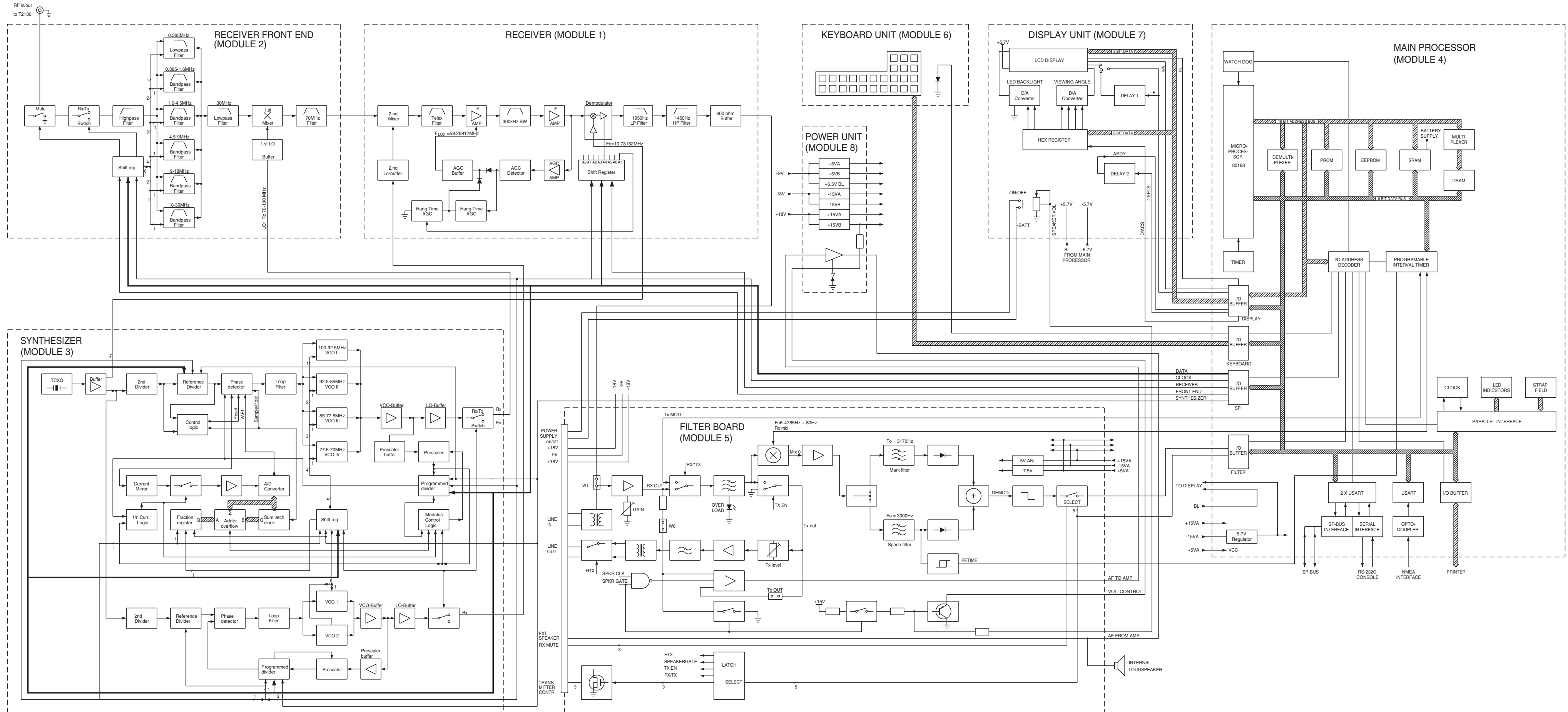
The 70 MHz IF signal from the front end is fed to the second mixer which converts the signal to a 10,73 MHz second IF signal. This 2nd IF signal is fed through a high order monolithic quartz filter to the input of the 10,73 MHz IF amplifier. The gain of this amplifier is regulated from the AGC amplifier/detector. The IF amplifier is followed by a ceramic filter to reduce the wideband noise. From the ceramic filter the signal is fed to the signal detector, which operates as an SSB demodulator. The AF signal from the demodulator is fed through a lowpass/highpass filter unit to an amplifier from which the output signal is about 0 dBm/ 600 ohm.

#### POWER UNIT

This unit produces all the necessary supply voltages for the modules in RM2152.

The input voltages from N2165 is +18V, -18V and +9V. These voltages pass through seven series regulators to produce the necessary supply voltages to RM2152.

BLOCK DIAGRAMME



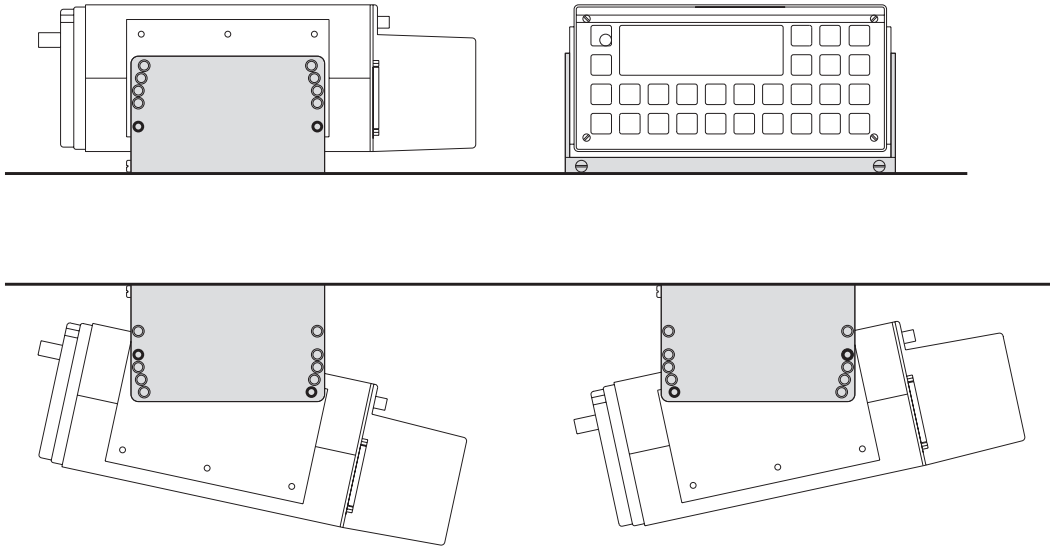
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27453B

## 2 INSTALLATION

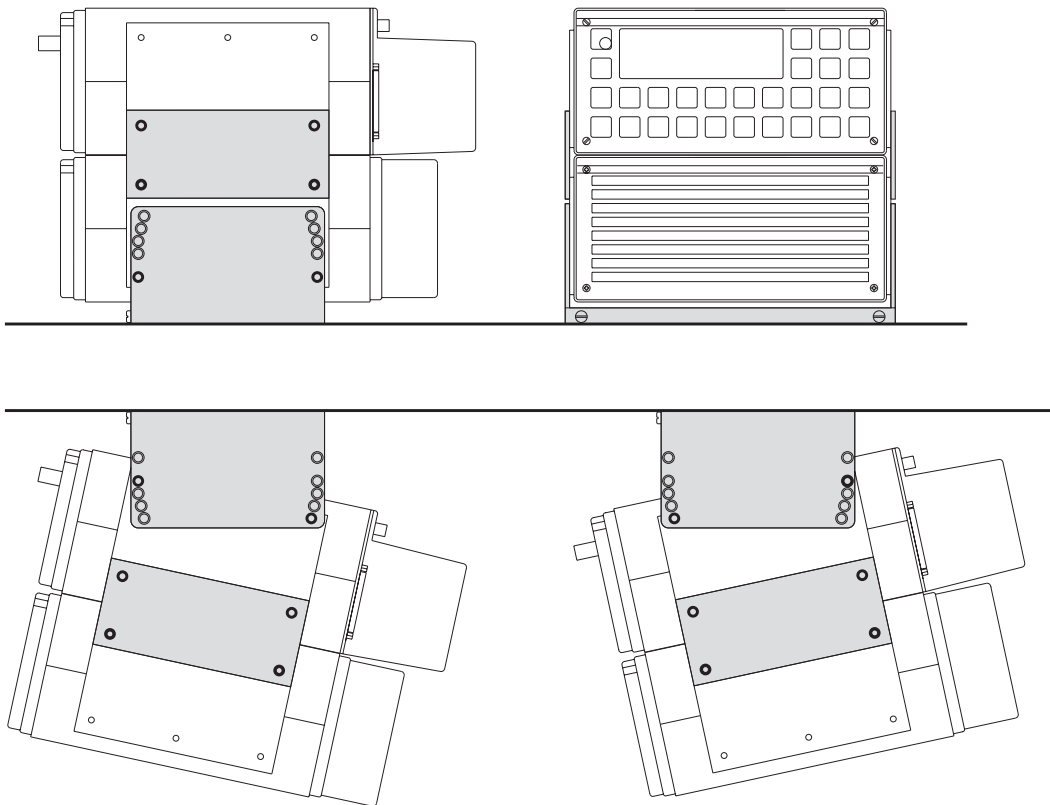
### 2.1 MOUNTING POSSIBILITIES

#### TABLETOP AND DECKHEAD



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Mounting bracket H2055 which offers the same possibilities for the loudspeakers H2054 and H2074.

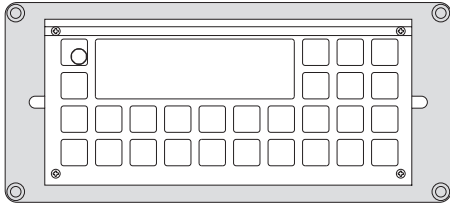


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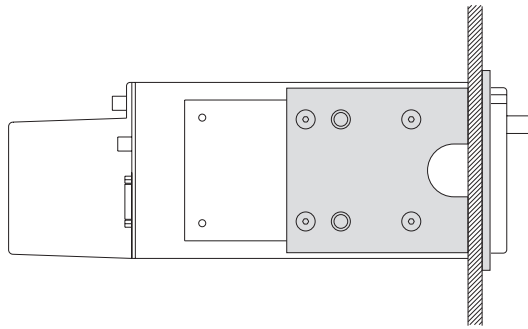
Mounting kit H2068 and H2055



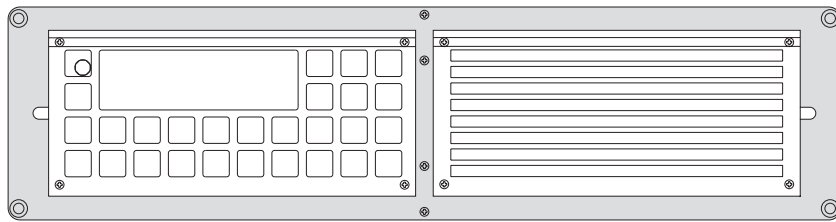
**BULKHEAD AND CONSOLE**



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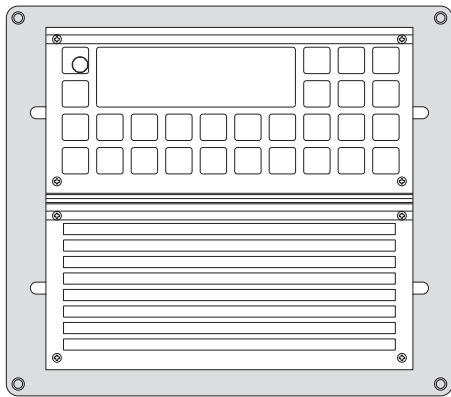


Mounting kit H2063 which offers the same possibilities for the loudspeakers H2054 and H2074.

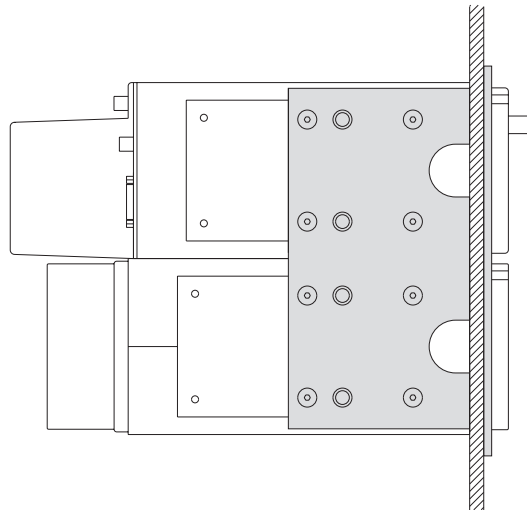


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Mounting kit H2062 or



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Mounting kit H2064.

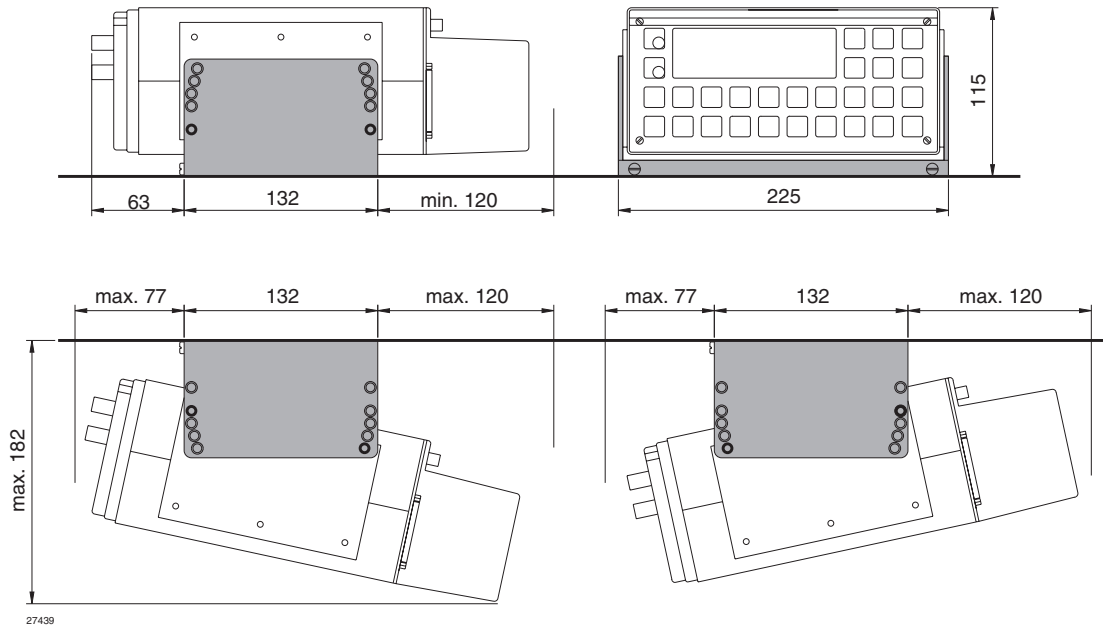
**IN CONJUNCTION WITH OTHER SAILOR EQUIPMENT**

Look up the INSTALLATION section for the SAILOR unit in question.

**2.2 DIMENSIONS AND DRILLING PLAN**

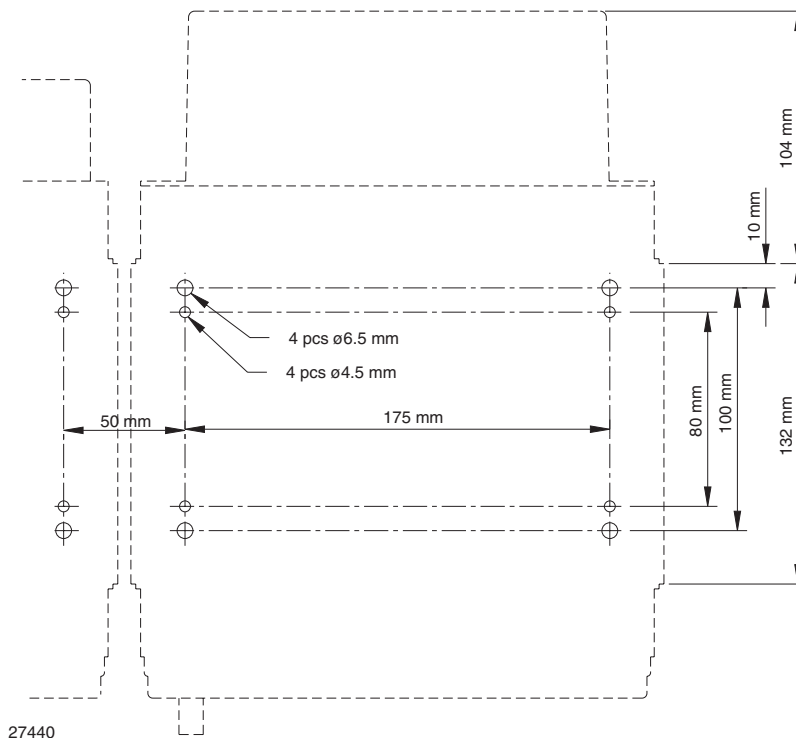
**UNIVERSAL MOUNTING BRACKET H2055**

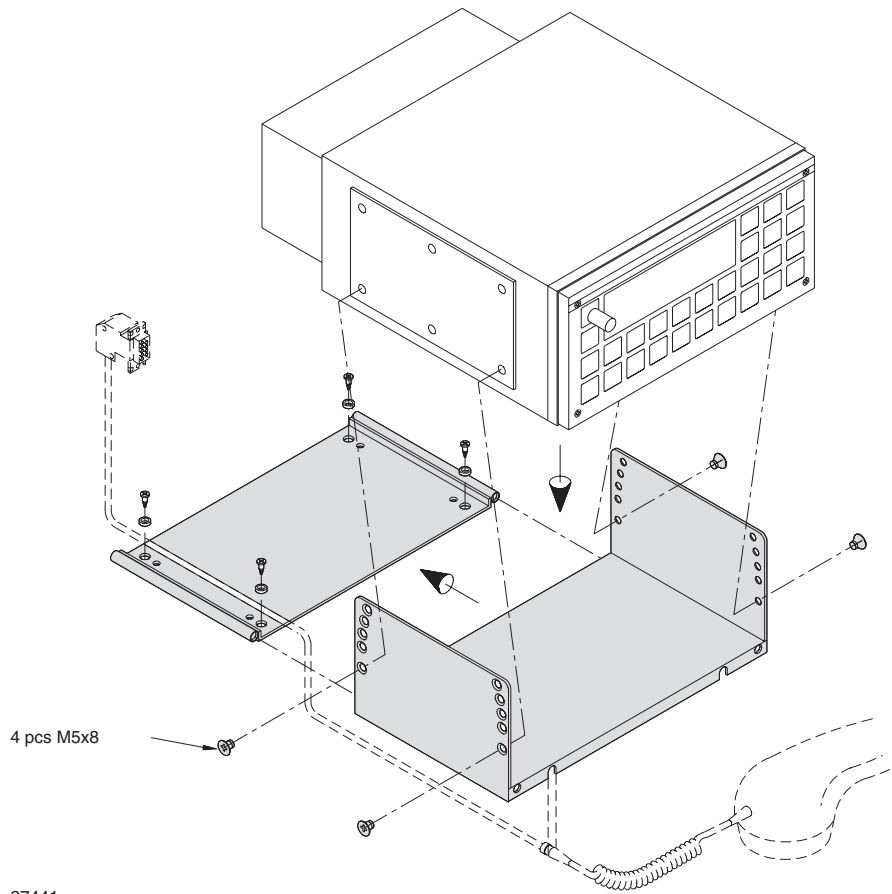
permits a wide variety of installation possibilities, such as tabletop, bulkhead or deckhead. For other possibilities such as console installation, the 19" rack or all units in the Compact programme assembled on the bulkhead, see special information concerning installation of the Compact programme.



**WEIGHT**

Mounting kit H2055:	1.5 kg
Loudspeaker H2054:	5.5 kg
Loudspeaker H2074:	4.0 kg
HF SSB RM2152:	4.0 kg

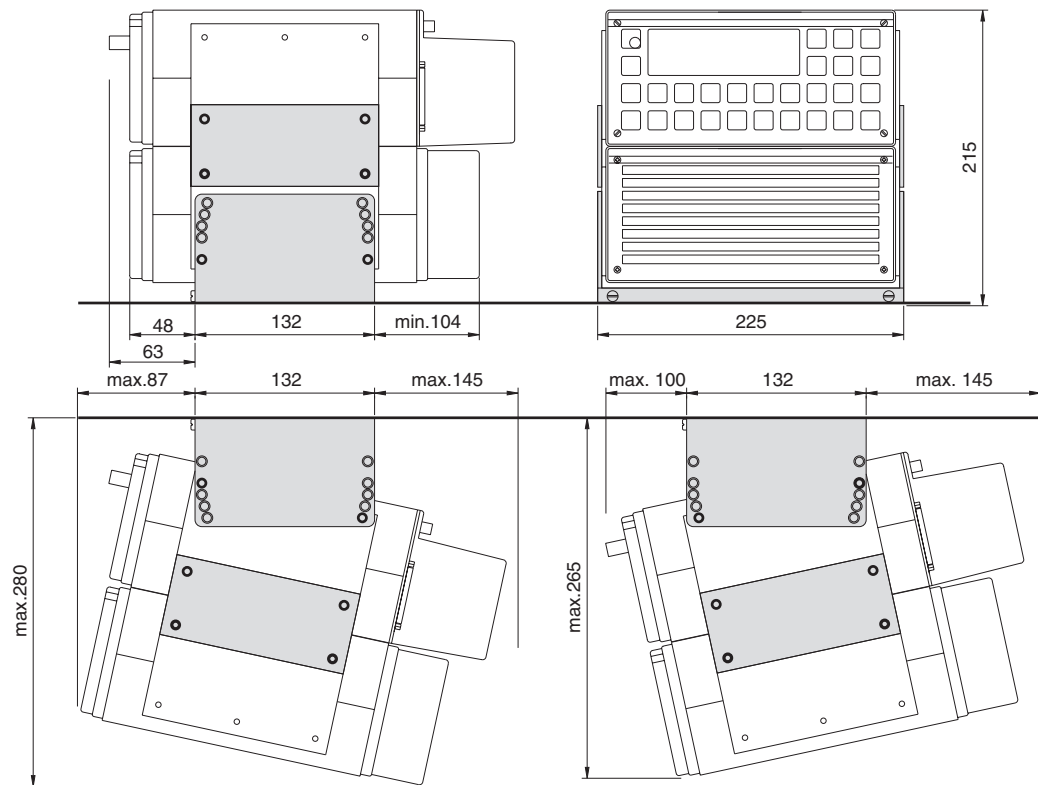




**WEIGHT**

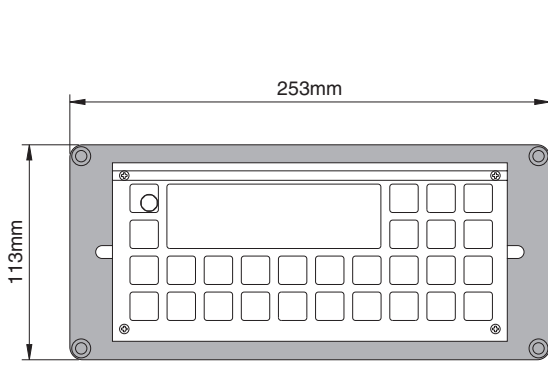
Lashing kit H2068:	1.5 kg
Mounting kit H2055:	1.5 kg
Loudspeaker H2054:	5.5 kg
Loudspeaker H2074:	4.0 kg
HF SSB RM2152:	4.0 kg

**MOUNTING KIT H2068 AND H2055**

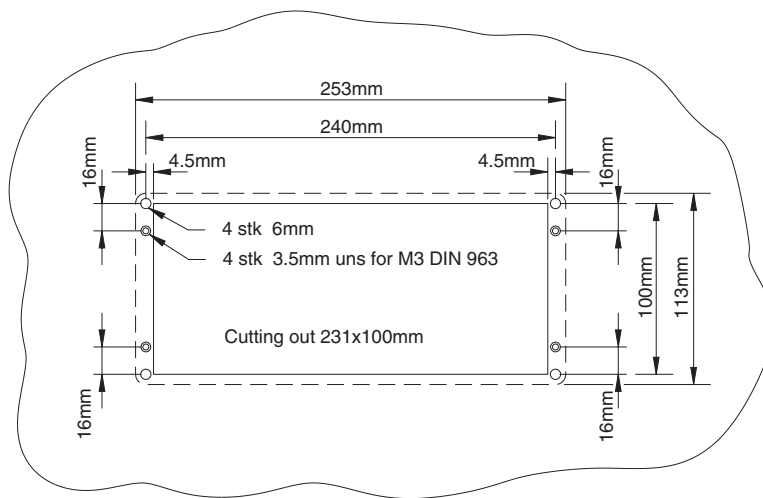
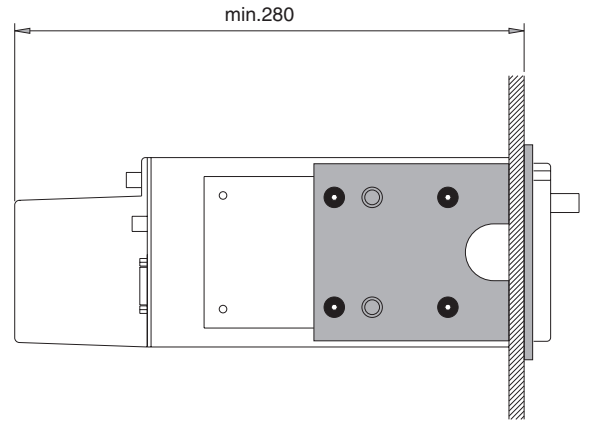


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**MOUNTING KIT H2063**



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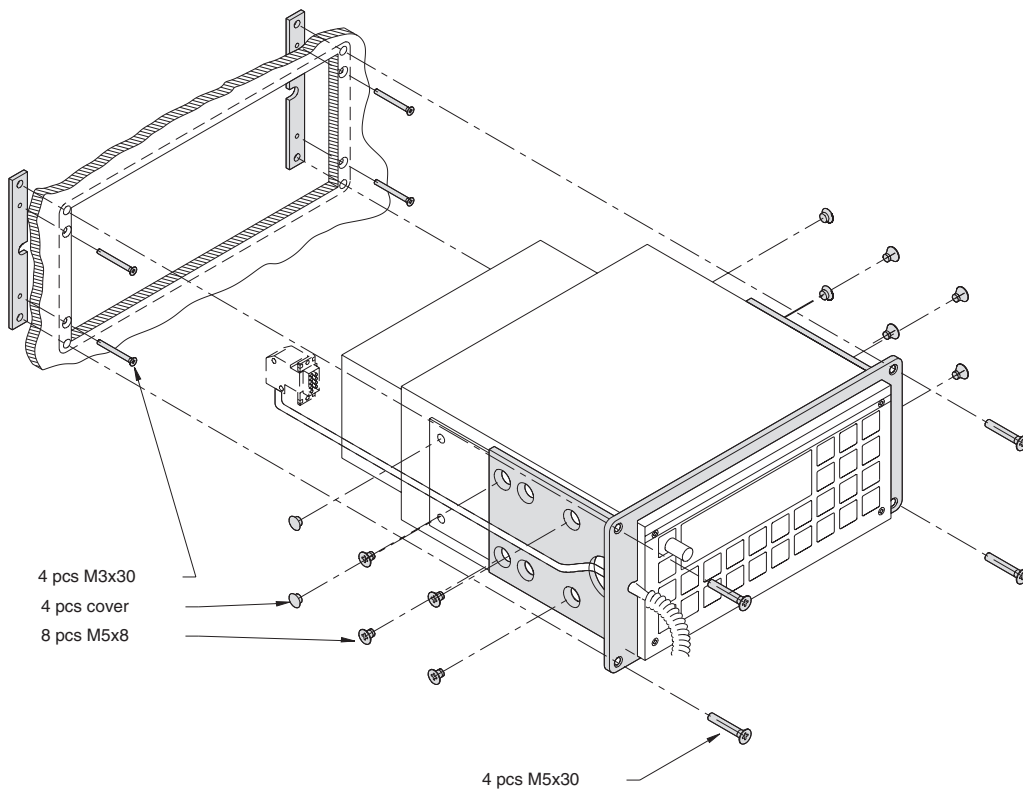


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Free distance must be kept to allow free air circulation ambient temperature max. 40°C.

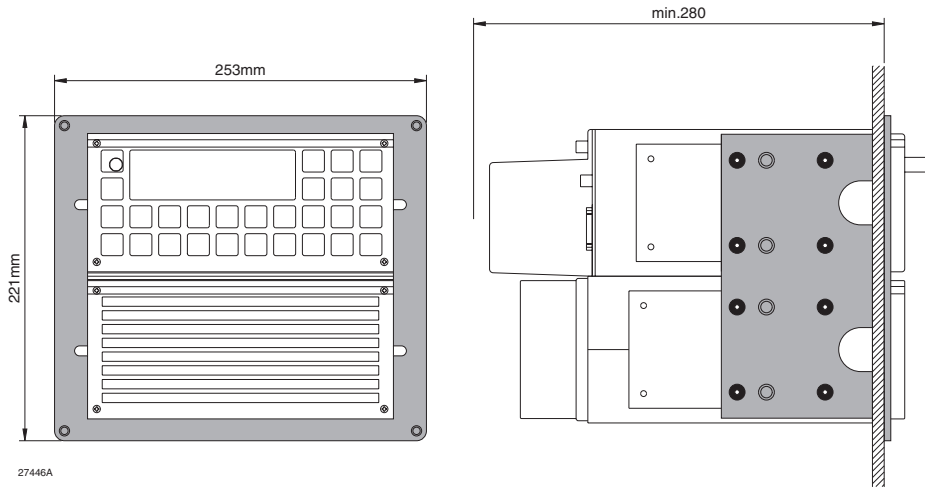
**WEIGHT**

Mounting kit H2063:	1.0 kg
Loudspeaker H2054:	5.5 kg
Loudspeaker H2074:	4.0 kg
HF SSB RM2152:	4.0 kg

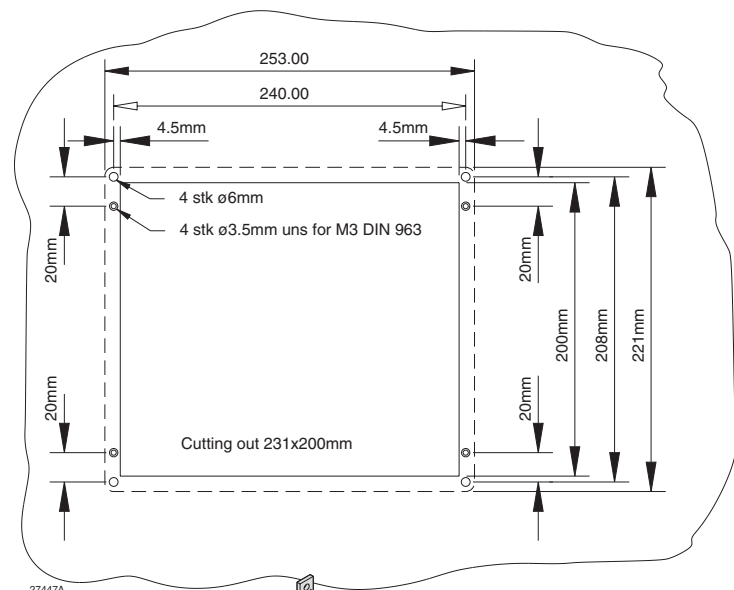


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**MOUNTING KIT H2064**



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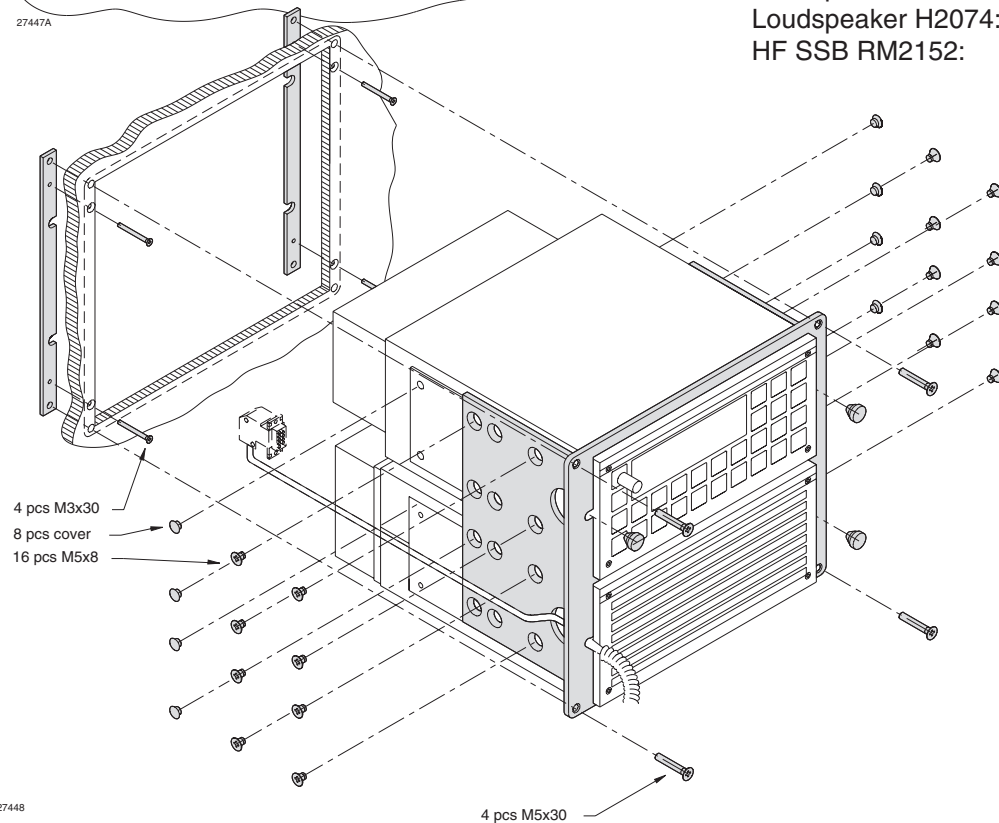


27447A

Free distance must be kept to allow free air circulation ambient temperature max. 40°C.

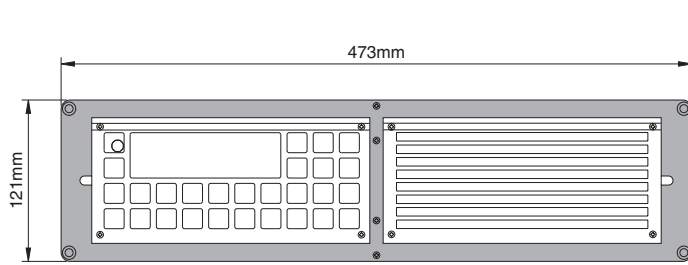
**WEIGHT**

Mounting kit H2064:	1.5 kg
Loudspeaker H2054:	5.5 kg
Loudspeaker H2074:	4.0 kg
HF SSB RM2152:	4.0 kg

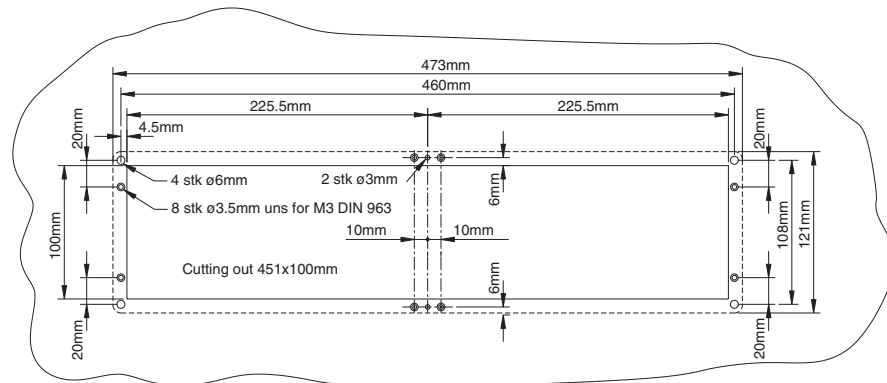
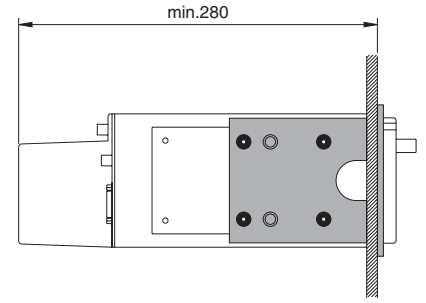


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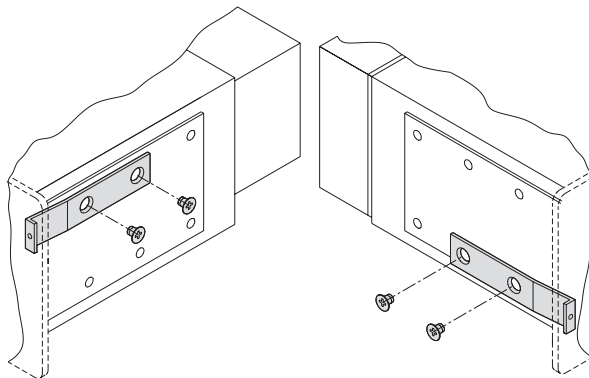
**MOUNTING KIT H2062**



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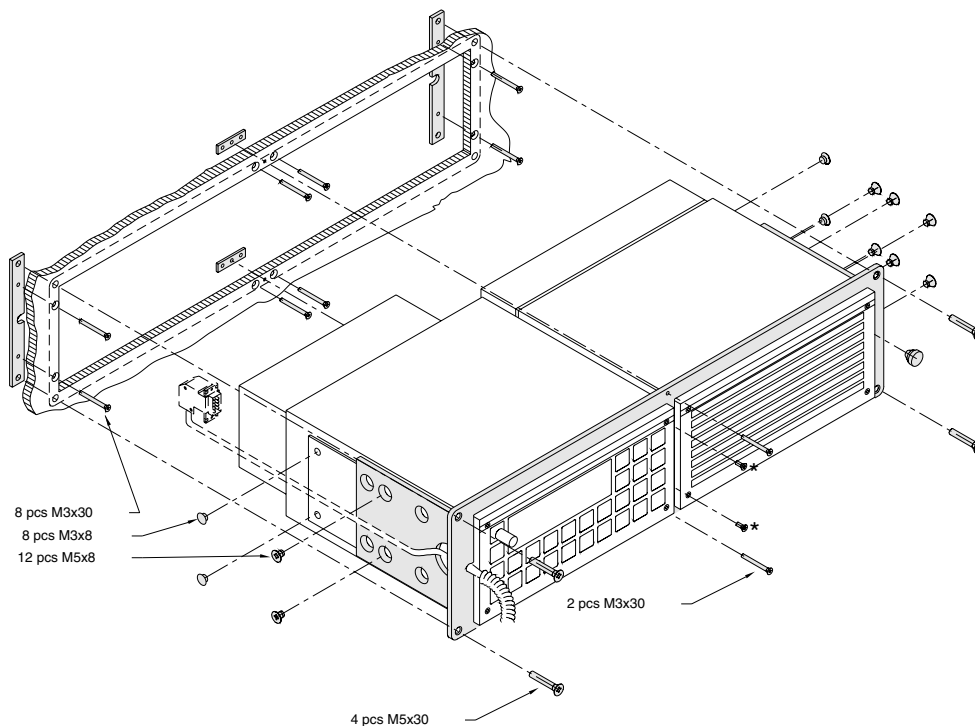


27451

Free distance must be kept to allow free air circulation ambient temperature max. 40°C.

**WEIGHT**

Mounting kit H2062:	1.5 kg
Loudspeaker H2054:	5.5 kg
Loudspeaker H2074:	4.0 kg
HF SSB RM2152:	4.0 kg



## 2.3 INSTALLATION INSTRUCTION

The electrical installation of the DSC/Telex modem RM2152, can be carried out as an installation with the power supply N2165, or as an installation using an existing possibility for power supply.

To see what kind of installation you have to use, identify your system among the three following possibilities:

- System that incorporates the 250W transmitter T2130.  
Use the power supply N2165.
- System that incorporates the 600W or 1200W transmitter T2131/T2135.  
Use the internal power supply inside the transmitter.
- System that incorporates the 600W or 1200W transmitter T2131/T2135, but where the capacity of the internal power supply inside T2131/T2135 is already used.  
Use the power supply N2165.

The above mentioned systems are described on the following pages in further details.

An installation guide is given below, and it is advisable to use this guide to make a no problem and proper installation. The installation guide is divided into two different chapters - one for installations including the power supply N2165, and one for installations without the N2165.

If the installation of the DSC/Telex modem RM2152, is carried out in an existing transmitter system please read the chapter 2.3.1 "INSTALLATION OF DSC/Telex modem RM2152 IN EXISTING TRANSMITTER SYSTEMS".

### 2.3.1 INSTALLATION OF DSC/TELEX MODEM RM2152 IN EXISTING TRANSMITTER SYSTEMS

The Control unit RE2100 and the transmitter T2130 has gone through some changes during the period it has been produced. It is therefor possible that an old installation will not support a system with a DSC/Telex modem RM2152. Depending the ages of the equipment some modifications has to be done in the control unit RE2100 and the transmitter T2130.

There is no change in transmitters T2131 and T2135.

Further information on software and pc. board versions, please refer to part 3 of this manual "Service" chapter "SOFTWARE AND PC. BOARD SUMMARY".

**RE2100 UPDATE**

The key to find out whether the RE2100 has to be modified or not, is the software version used. There is some overlapping where it is necessary to know the version of the receiver module and the processor module. The table below will give you the information needed.

Present version of RE2100	Necessary changes of RE2100				Ordering information	
SOFTWARE	RECEIVER MODULE PART NO. 625631	EXCITER MODULE PART NO.625634	PROCESSOR MODULE PART NO.625635	SOFTWARE EPROM U06-5	KIT DESCRIPTION	PART NO.
1084-1084D	Change to version H or higher	Change to version E or higher	Change to version H or higher	Change software to 1086S or higher	Remote control update kit "1A" and 2A for RE2100	726655 and 726656
1085-1085F						
1086-1086D						
1086E-1086F						
1086H-1086R	No change	No change	No change	No change	Remote control update kit "2A" for RE2100	726656
1086S	No change				No change	No change

**T2130 UPDATE**

The key to find out whether T2130 has to be modified or not, is the software version used. There is some overlapping where it is necessary to know the version of the connection module. The table below will give you the information needed.

Present version of T2130		Necessary changes of T2130		Ordering information	
SOFTWARE EPROM U01-3	CONNECTION BOARD PART NO. 625646	CONNECTION BOARD PART NO. 625646	SOFTWARE EPROM U01-3	KIT DESCRIPTION	PART NUMBER
1083-1083E	Versions A,B,C,D,E & F	Change to version G or higher	Change to version P or higher	Remote control update KIT ""1A"" for T2130	726665
1083G-1083O	Versions G or higher	No change		EPPROM U01-3 with software 1083P or higher	726103

If the connection board 625646 contains 4 connector strips with the writing ST1, ST2, ST3 and ST7, it is version G, and therefore it is only the software at the processor module which must be changed.



### 2.3.2 INSTALLATION GUIDE FOR RM2152 USED AS DSC WATCH RECEIVER

Cable and wiring is illustrated in chapter "2.4 ELECTRICAL CONNECTIONS AND ASSEMBLING".

1. In an installation with a 250W transmitter T2130 the radiointerface, plug at the back of RM2152 shall be connected to the power supply N2165, and from the power supply the wires:

S.P. BUS-interrupt  
AF to TX  
AF to TX com.  
TX-KEY  
GND

Shall be connected to the transmitter T2130 connection board.

In an installation with a 600/1200W transmitter T2131/T2135 the radiointerface plug at the back of RM2152, can be connected directly to the connection board in the transmitter. the following connections are necessary:

S.P. BUS-interrupt  
AF to TX  
AF to TX com.  
TX-KEY  
+18V  
-18V  
+9V  
GND

If the installation consist of a watch receiver and a radiotelex modem only one of this units can be connected directly to the transmitter. The other radio unit shall be connected through a power supply N2165. Further information concerning cabling please consult the chapter 2.4 "ELECTRICAL CONNECTIONS AND ASSEMBLING ".

2. The S.P.BUS shall be connected to RE2100 or to the transmitter T2130.  
The serial S.P.BUS must be terminated with 50 Ohm in each end of the cable. In all units there is a strap, which terminates the cable with 50 Ohm, in case the strap is fitted. A 50 Ohm strap is always mounted from factory, this strap must therefore be removed in case the unit is not mounted in the end of the S.P.BUS cable.  
In RM2152 the 50 Ohm strap is placed at the main processor module and is called W5.
3. The handset holder to RE2100 shall have a switch to indicate whether the handset is placed in the holder or not. The handset holder has SP No. 726233.
4. The RX antenna input terminal shall be connected to a separate antenna, through the receiver protection unit H1223.
5. The NMEA navigation interface can be connected to a GPS unit.  
  
The printer interface can be connected to a printer
6. Check the software version, check if the versions are in agreement with the list in part 3 of this manual "Service" chapter "SOFTWARE AND PC. BOARD SUMMARY".  
There shall be agreement between the software versions of RE2100. the transmitter (T2130/T2131/T2135) and DSC modem RM2152.
7. Is a GMDSS ALARM UNIT C2149 connected to the system, it shall be connected to the power supply N2165 or to the connection board in T2131/2135.

Check that the software in the C2149 have the right version number, this information can be found in part 3 of this manual "Service" chapter "SOFTWARE AND PC. BOARD SUMMARY".

8. The Watch receiver RM2152 is from factory set to work with S.P. BUS-address number 2. This has to be programmed into RE2100.

Turn on RE2100.

On RE2100 Press **0** and **1** simultaneously.

The display show:



Key in **0** **7** and **2**

The display show:



Key in **1**

The display show:



Activate **STOP** **ENT**

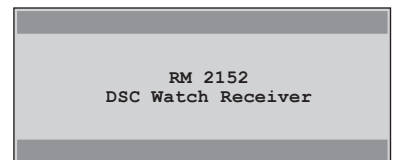
The display show:



This SP-menu **07-2** can be entered at any time and be used to control that the SP-BUS works properly. The zero in the TX display line is changed to a one if the SP-BUS works

On RE2100 activate the **TUNE** **CLARIF** key to leave the SP menu.

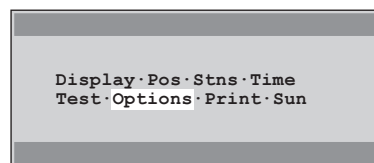
9. Switch on the watch receiver RM2152 and control that the display menu after the initializing menu show the following menu.



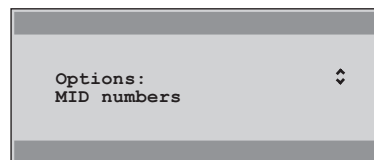
Is the indication of type different from RM2152 then please refer to part 3 of this manual "Service" for information how to change to type RM2152.

10. Verify that the SP-BUS setting in the watch receiver RM2152 is correct.  
Turn on the RM2152 and wait until the display menu show the scan running menu.

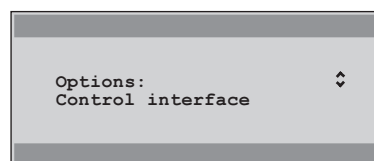
Activate **FUNC** and the display menu change to.



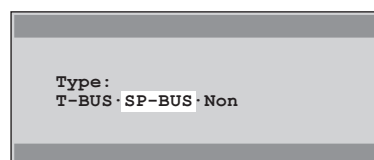
Select the Options menu and activate the **NEXT** key, the display menu change to.



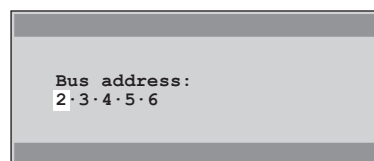
Use the up/down arrow key until the display menu show.



Activate the **NEXT** key, the display menu change to.



The SP-Bus is chosen for serial communication  
activate the **NEXT** key, the display menu change to.

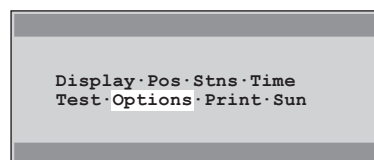


The SP-Bus address number 2 is blinking, indicating that SP-Bus address 2 is chosen.  
Is another type or address chosen, it is necessary to correct this, please refer to part 3 of this manual "Service" for information how to change to SP-Bus and to address 2.

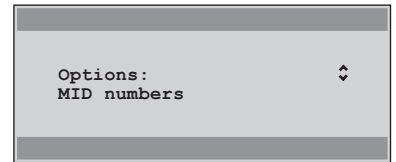
11. The Self-identification number (**MID**) has to be programmed into the watch receiver RM2152.  
Please refer to part 3 of this manual "Service" for information how to programme the ships identifications number.

Control the ships identifications as illustrated below.  
Turn on the RM2152 and wait until the display menu show the scan running menu.

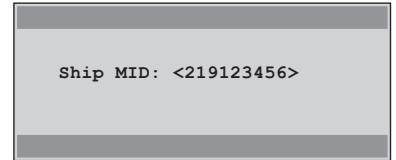
Activate **FUNC** and the display menu change to.



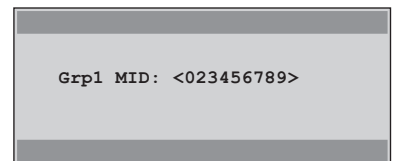
Select the Options menu and activate the **NEXT** key, the display menu change to.



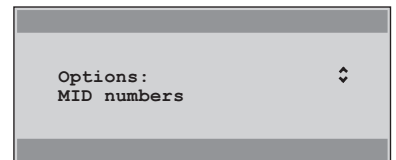
Activate the **NEXT** key, the display menu will show the ships identification number.



Activate the **NEXT** key, the display menu will display the ships group call number



Activate the **NEXT** key the display menu change to a menu which display the second group call number. The ship can have up to four group call numbers and you can display this numbers in the next three menus, before the display menu again change to



The set up of the DSC watch receiver is now completed.

12. To make sure that the system works again:

Use the external test function to send a DSC test call to a coaststation. The called coaststation shall be enclosed into the stations table.

### 2.3.3 INSTALLATION GUIDE FOR RM2152 USED AS DSC/TELEX RECEIVER

Cable and wiring is illustrated in chapter "2.4 ELECTRICAL CONNECTIONS AND ASSEMBLING".

- In an installation with a 250W transmitter T2130 the radiointerface plug, at the back of radiotelex modem RM2152 shall be connected to the power supply N2165, and from the power supply the wires:

S.P. BUS-interrupt  
 AF to TX  
 AF to TX com.  
 TX-KEY  
 GND

Shall be connected to the connection board in transmitter T2130.

In an installation with a 600/1200W transmitter T2131/T2135 the radiointerface plug at the back of RM2152 can be connected directly to the connection board in the transmitter. the following connections are necessary:

S.P. BUS-interrupt  
 AF to TX  
 AF to TX com.  
 TX-KEY  
 +18V  
 -18V  
 +9V  
 GND

If the installation consist of a watch receiver and a radiotelex modem only one of them can be connected directly to the transmitter. The other radio unit shall be connected through a power supply N2165. Further information concerning cabling please consult the chapter 2.4 "ELECTRICAL CONNECTIONS AND ASSEMBLING ".

2. The S.P.BUS shall be connected to RE2100 or to the transmitter T2130.  
 The serial S.P.BUS must be terminated with 50 Ohm in each end of the cable. In all units there is a strap, which terminates the cable with 50 Ohm, in case the strap is fitted. A 50 Ohm strap is always mounted from factory, this strap must therefore be removed in case the unit is not mounted in the end of the S.P.BUS cable.  
 In RM2152 the 50 Ohm strap is placed on the main processor board and is called W5.
3. The handset holder to RE2100 shall have a switch to indicate whether the handset is placed in the holder or not. The handset holder has SP No. 726233.
4. The RX antenna input terminal shall be connected to a separate antenna, through the receiver protection unit H1223.
5. The console plug on the RM2152 shall be connected to the message terminal H2098 console plug (COM.1).
6. The NMEA navigation interface can be connected to a GPS unit.
7. The printer can be connected to the radiotelex modem or the message terminal.  
 For safety reasons the printer shall be connected to the radiotelex modem.  
 The Keyboard shall be connected to the message terminal.
8. The message terminal and the monitor shall be connected to a 24VDC power supply and the message terminal and the monitor shall be interconnected.
9. Check the software version, check if the versions are in agreement with the list in part 3 of this manual "Service" chapter "SOFTWARE AND PC. BOARD SUMMARY".  
 There shall be agreement between the software versions of RE2100. the transmitter (T2130/T2131/T2135), the DSC/radiotelex modem RM2152 and the Message terminal H2098A to get the system to work properly.
10. Is a GMDSS ALARM UNIT C2149 connected to the system, it shall be connected to the power supply N2165 or to the connection board in T2131/2135.  
  
 Check that the software in the C2149 have the right version number, this information can be found in part 3 of this manual "Service" chapter "SOFTWARE AND PC. BOARD SUMMARY".
11. The radiotelex modem RM2152 has to work with S.P. BUS address number 3, this has to be programmed into RE2100.

Turn on RE2100.

On RE2100 Press **0** and **1** simultaneously.

The display show:



Key in **0** **7** and **3**

The display show:



Key in **2**

The display show:



Activate **STOP** **ENT**

The display show:

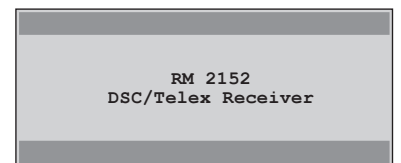


This SP-menu **07-3** can be entered at any time and be used to control that the SP-BUS works properly. The zero in the TX display line is changed to a one if the SP-BUS works

On RE2100 activate the **TUNE** **CLARIF** key to leave the SP menu.

12. Switch on the Radiotelex modem RM2152 and control that the display menu after the initializing menu show the following menu.

Is the indication of type different from RM2152 then please refer to part 3 of this manual "Service" " for information how to change to type RM2152.



13. The Radiotelex modem RM2152 is from factory set to work at SP-BUS address number 2. This has to be changed to SP-BUS address 3. For information how to change the SP-BUS address please refer to part 3 of this manual "Service" " .
14. The Self-identification numbers for **DSC** (MID), **TELEX** as well as the **answerback** has to be programmed into the Radiotelex modem RM2152. For information how to programme the Self-identification numbers into the Radiotelex modem RM2152, please refer to part 3 of this manual "Service" " .
15. To control that the setting of the radiotelex modem RM2152 is done correct, the settings can be displayed.

Activate the key **F3** and the Radiotelex menu will be displayed.

Select the **OPTION** menu and activate the **Enter** key, the OPTION menu will be displayed.

Select the **TERMINAL MODE** menu and activate the **Enter** key, the TERMINAL MODE menu will be displayed.

Write **set-a** and activate the **Enter** key, the CRT show now the settings of the radiotelex modem.

		Terminal			
ALARM	= 1	ALPHA	= 0	ANGLE	= 3
ANSWERBACK	= 7E-0D-0A-31-32-33-34-35-7F-20-6F-78-6A-7A-20-7E-36-0A-0D	BAUDRATE	= 4800	CAPTURE	= 0
ARQERROR	= 0	DELAY	= 3	DIVERSITY	= 2
DATABITS	= 8	ECHO	= 1	ERROR	= 30
DWELL	= 4500	FEC9	= 219000015		
FEC4	= 07700	GRP1	= 000000000		
FINITE_START	= 0	GRP2	= 0	GRP3	= 0
GRP2	= 0	GRP3	= 0	GRP4	= 0
HARDFLOW	= 1	LIGHT	= 3	LINEFEED	= 1
LOG	= 0	MODE	= 111	PARITY	= NO
POLL	= 1	POSITION	= 57N01,009E53		
POSTKEY	= 3	POSTMUTE	= 3	PREKEY	= 1
PRINTER	= LPT:	QMIN	= 3	RESTART	= FINITE
RETRY	= 5	RXADDRESS	= 2	RXENABLE	= 1
RXFREQ	= 1700	SEL4	= 07700		
SEL9	= 219000015				
SOFTFLOW	= 0	SPADDRESS	= 2	SPBUS	= S
STOPBITS	= 1	SUNSPOT	= 120	TERM	= T+T
TIMEZONE	= -1	TRACK	= 1	TXADDRESS	= 3
TXENABLE	= 1	TXFREQ	= 1700		
>					

The set up of the radiotelex modem is now completed.

16. To make sure that the system works:

1. Use the external test function to send a DSC test call to a coaststation. The called coaststation shall be enclosed into the stations table.
2. Check that the stations table works correct.
3. Send a telex prepared in the editor.  
Remember to check your answerback.

## 2.5 APPENDIX

### 2.5.1 ANSWERBACK CHARACTER SETTING





## 2.4 ELECTRICAL CONNECTIONS AND ASSEMBLING

Cables between RE2100 and the transmitter T2130, the transmitter T2130 and the Antenna coupler AT2110 can be found in the TECHNICAL MANUAL for T2130.

The connection cables for the REMOTE ALARM UNIT C2149 can be found in the TECHNICAL MANUAL for C2149.

The printer interface cable for RM2152 is equal to the printer cable used for RM2152.

### CABLES BETWEEN CABINETS:

HF SSB 250W DC WITH DSC WATCH RECEIVER RM2152 and N2165.

#### CABLE 1: RM2152 - N2165.

Factory supplied: Multicable: 10 metres 21 \* 0,5 mm<sup>2</sup> Part no. 164.192  
Max. length 30 metres.

RM2152		N2165		COLOUR	SIGNAL
P2-5		ST1	ST3		
1	IN		12	BLACK	RX MUTE
2	IN		8	BROWN	ALARM IN
3	IN		13	RED	TX READY
4	OUT		7	PINK	EXT. ALARM
5		SHIELD		SHIELD	GROUND
6	OUT	2		YELLOW	SP INTERRUPT
7	OUT		9	GREEN	ALARM OUT
8	OUT				SCAN STOP
9	OUT	5		BLUE	AF TO TX COMM
10	IN		4	VIOLET	-18V DC
11	IN		5	GREY	+9V DC
12	IN		3	WHITE	+18V DC
13	OUT		1	BROWN/PINK	SUPPLY ON/OFF
14	OUT	9		BROWN/YELLOW	RX MUTE
15	OUT	3		BROWN/GREEN	TX KEY
16	OUT	1		BROWN/GREY	HIGH TENSION
17	OUT	6		WHITE/PINK	
18	OUT	4		WHITE/YELLOW	AF TO TX
19	IN				LINE IN 1
20	IN				LINE IN 2
21	OUT	7		WHITE/GREEN	
22			6	WHITE/BLUE	GROUND
23			14	WHITE/GREY	GROUND
24	OUT	8		GREY/PINK	EXT.SPEAKER
25	IN		2	RED/BLUE	-BATT

#### CABLE 2: T2130 - N2165.

Multicable: 4 \* 0,5 mm<sup>2</sup>. Max. length 30 metres.

N2165	T2130		SIGNAL	T2130
ST4	ST2	ST3		Interconnection board
1			EXT. MUTE	NOTE 1: At T2130 connection board the terminals ST2-4 and ST3-6 must be interconnected.
2			TX READY	
3			GROUND	
4			HIGH TENSION	NOTE 2: The shield of the cable between the power supply N2165 and the transmitter T2130 must be connected in both N2165 and T2130.
5	16		SP INTERRUPT	
6		5	TX KEY (NOTE 1)	
7		7	AF TO TX	
8		8	AF TO TX COMM	

#### CABLE 3-4: BATTERY TO N2165.

2,5 mm<sup>2</sup>. Max. length 30 metres.

#### CABLE 6: RM2152 to T2130 SP-BUS.

cable: RG58C/U coax cable.  
Factory supplied: 10 metres RG58C/U coax cable marked blue. Part no. 527082

The total length of the SP-BUS cable from RE2100 to RM2152 must not exceed 100 metres.

#### CABLE 7: RM2152 to H1223 RF INPUT.

cable: RG58C/U coax cable. Max. length 10 metres.  
Factory supplied: 3 metres RG58C/U coax cable. Part no. 506090

#### CABLE 8: RH1223 to RF ANTENNA.

cable: Triaxial cable H1213. Max. length 200 metres.

#### CABLE 9: RM2152 to GPS unit (NMEA 183c).

cable: RG58C/U coax cable. Max. length 30 metres.

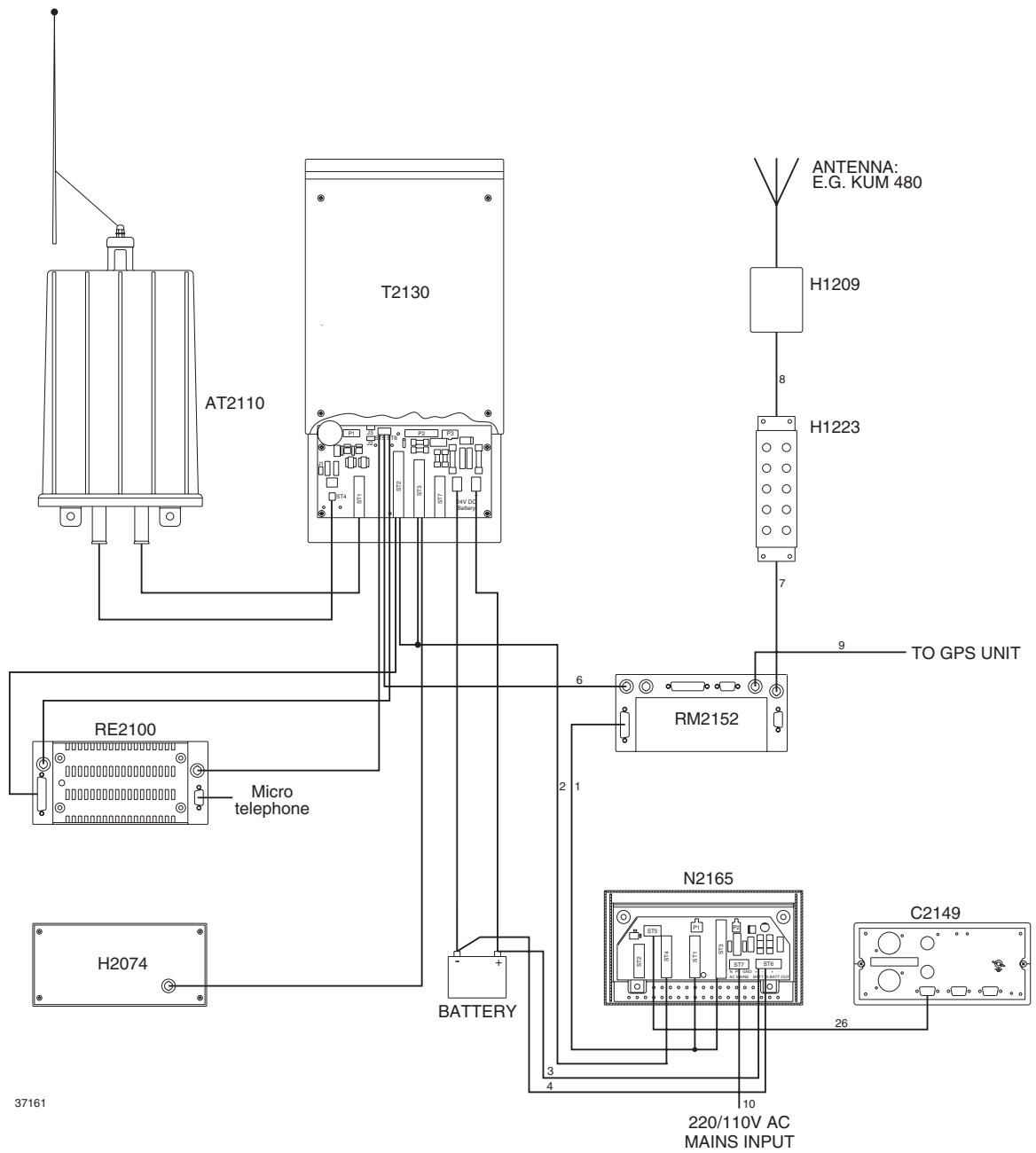
#### CABLE 10: MAINS TO N2165.

cable: 3 \* 1,0 mm<sup>2</sup>. Max. length 30 metres.

#### CABLE 26: C2149 TO N2165.

cable: Consult chapter 2 in TECHNICAL MANUAL for C2149 for cable dimensions.

**CABLES BETWEEN CABINETS:**  
HF SSB 250W DC WITH DSC WATCH RECEIVER RM2152 AND N2165.



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**CABLES BETWEEN CABINETS:**

HF SSB 250W DC WITH DSC WATCH RECEIVER RM2152, RADIOTELEX MODEM RM2152 AND N2165.

**CABLE 1: RM2152/51 - N2165.**Factory supplied: Multicable: 10 metres 21 \* 0,5 mm<sup>2</sup> Part no. 164.192

Max. length 30 metres.

RM2152		N2165		COLOUR	SIGNAL
P2-5		ST1	ST3		
1	IN		12	BLACK	RX MUTE
2	IN		8	BROWN	ALARM IN
3	IN		13	RED	TX READY
4	OUT		7	PINK	EXT. ALARM
5		SHIELD		SHIELD	GROUND
6	OUT	2		YELLOW	SP INTERRUPT
7	OUT		9	GREEN	ALARM OUT
8	OUT				SCAN STOP
9	OUT	5		BLUE	AF TO TX COMM
10	IN		4	VIOLET	-18V DC
11	IN		5	GREY	+9V DC
12	IN		3	WHITE	+18V DC
13	OUT		1	BROWN/PINK	SUPPLY ON/OFF
14	OUT	9		BROWN/YELLOW	RX MUTE
15	OUT	3		BROWN/GREEN	TX KEY
16	OUT	1		BROWN/GREY	HIGH TENSION
17	OUT	6		WHITE/PINK	
18	OUT	4		WHITE/YELLOW	AF TO TX
19	IN				LINE IN 1
20	IN				LINE IN 2
21	OUT	7		WHITE/GREEN	
22			6	WHITE/BLUE	GROUND
23			14	WHITE/GREY	GROUND
24	OUT	8		GREY/PINK	EXT.SPEAKER
25	IN		2	RED/BLUE	-BATT

**CABLE 2: T2130 - N2165.**Multicable: 4 \* 0,5 mm<sup>2</sup>. Max. length 30 metres.

N2165	T2130		SIGNAL	T2130
ST4	ST2	ST3		Interconnection board
1			EXT. MUTE	NOTE 1: At T2130 connection board the terminals ST2-4 and ST3-6 must be interconnected.
2			TX READY	
3			GROUND	
4			HIGH TENSION	
5	16		SP INTERRUPT	
6		5	TX KEY (NOTE 1)	
7		7	AF TO TX	NOTE 2: The shield of the cable between the power supply N2165 and the transmitter T2130 must be connected in both N2165 and T2130.
8		8	AF TO TX COMM	

**CABLE 3-4: BATTERY TO N2165.**cable: 2,5 mm<sup>2</sup>. Max. length 30 metres.**CABLE 5: RM2152 to RM2152 SP-BUS.**

cable: RG58C/U coax cable.

Factory supplied: 1 metre RG58C/U coax cable marked blue. Part no. 527115

The total length of the SP-BUS cable from RE2100 to RM2152 must not exceed 100 metres.

**CABLE 6: RM2152 to T2130 SP-BUS.**

cable: RG58C/U coax cable.

Factory supplied: 10 metres RG58C/U coax cable marked blue. Part no. 527082

The total length of the SP-BUS cable from RE2100 to RM2152 must not exceed 100 metres.

**CABLE 7: RM2152 to H1223 RF INPUT.**

cable: RG58C/U coax cable. Max. length 10 metres.

Factory supplied: 3 metres RG58C/U coax cable marked red. Part no. 506090

**CABLE 8: RH1223 to RF ANTENNA.**

cable: Triaxial cable H1213. Max. length 200 metres.

**CABLE 9: RM2152 to GPS unit (NMEA 183c).**

cable: RG58C/U coax cable. Max. length 30 metres.

**CABLE 10: MAINS TO N2165.**cable: 3 \* 1,0 mm<sup>2</sup>. Max. length 30 metres.**CABLE 11-12: BATTERY TO C2149.**

cable: 2,5 mm<sup>2</sup>. Max. length 30 metres.

**CABLE 13: MAINS TO N2161.**

cable: Consult chapter 2 in TECHNICAL MANUAL for N2161 for cable dimensions

**CABLE 14-15-16: 24V DC/BATTERY SUPPLY TO PRINTER(H1253B), MONITOR(H1253B), AND MESSAGE TERMINALH(2098A).**

cable: 3\*0.75 mm<sup>2</sup>. Max. Length 10 metres.  
 Factory supplied: 2 metres 3\*0.75 mm<sup>2</sup>. Part no. 56.066

**CABLE 17: RM2152 TO H2098A RS232 cable.**

cable: 7\*0,22 mm<sup>2</sup>. Max. length 4 metres.  
 Factory supplied: 1 metre 7\*0,22 mm<sup>2</sup>. Part no. 56.071  
 The radiotelex moden can be connected to a personal computer (PC) for this use a cable:  
 Factory supplied: 2 metre RS232 cable with 9/25 (SUB-D). Part no. 56.063

Pin	Name	Signal description	Direction
1 (8)	DCD	Data Carrier Detect	Input
2 (3)	RxD	# Received Data	Input
3 (2)	TxD	# Transmitted Data	Output
4 (20)	DTR	# Data Terminal Ready	Output
5 (7)	GND	# Ground	
6 (6)	DSR	# Data Set Ready	Input
7 (4)	RTS	Request To Send	Output
8 (5)	CTS	# Clear To Send	Input
9 (22)	RI	# Ring Indicator	Input

(x) The numbers shown in (brackets) are the corresponding numbers for a 25 pin D-type connector.

# The pin marked with a # sign are used in the enclosed communication cable.

**CABLE 18: H2098A TO H1253B video cable.**

cable: RG58C/U coax cable.  
 Factory supplied: 2 metre RG58C/U coax cable. Part no. 56.072

**CABLE 19: H2098A TO H2099 (keyboard).**

Keyboard cable supplied with the keyboard.

**CABLE 20: H1252B TO RM2152 PRINTER cable. (Centronics).**

Factory supplied: 1,5 metre standard printer cable. Part no. 56.013  
 A special low-impedance cable is available for printer locations up to 20 meters from H2098A.

Pin	Name	Signal description	Direction
1	STRB	Strobe	Output
2	DAT0	Data Bit 0	Output
3	DAT1	Data Bit 1	Output
4	DAT2	Data Bit 2	Output
5	DAT3	Data Bit 3	Output
6	DAT4	Data Bit 4	Output
7	DAT5	Data Bit 5	Output
8	DAT6	Data Bit 6	Output
9	DAT7	Data Bit 7	Output
10	ACKN	Acknowledge	Input
11	BUSY	Busy Signal	Input
12	PE	Paper End (out of paper)	Input
13	SEL	Select	Input
14	ALFD	Auto Line Feed	Output
15	ERR	Error	Input
16	INIT	Initialize Printer	Output
17	SLCT	Select Input	Output
18	GND	Ground	
19	GND	Ground	
20	GND	Ground	
21	GND	Ground	
22	GND	Ground	
23	GND	Ground	
24	GND	Ground	
25	GND	Ground	

**CABLE 21-22: BATTERY TO N2161.**

cable: Consult chapter 2 in TECHNICAL MANUAL for N2161 for cable dimensions.

**CABLE 23-24: 24V DC/BATTERY SUPPLY TO T2130**

cable: Consult chapter 2 in TECHNICAL MANUAL for T2130 for cable dimensions.

**CABLE 25: T2130 TO N2161 SUPPLY ON/OFF.**

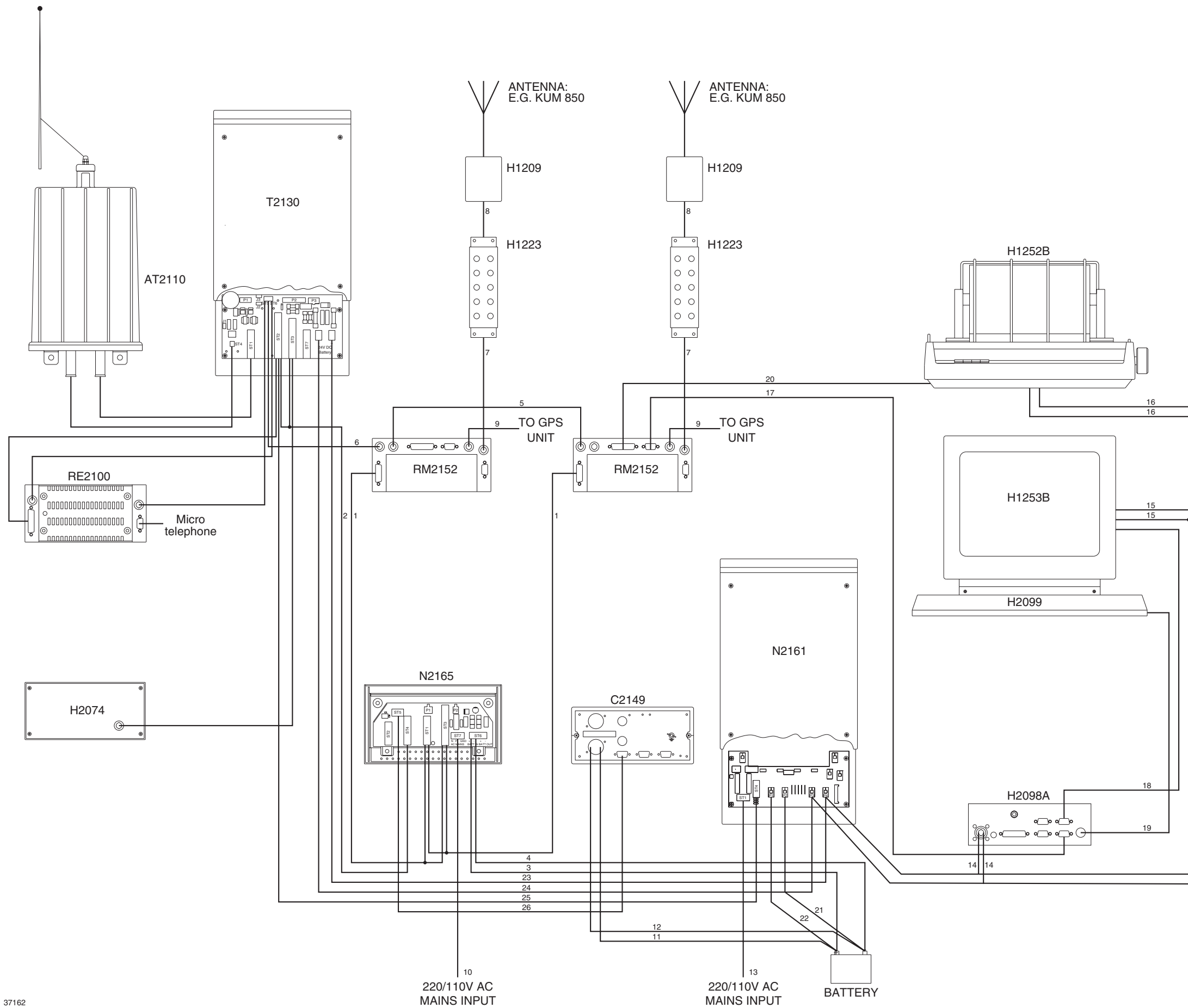
cable: 1\*.22 mm<sup>2</sup> Max. length 30 metres.

**CABLE 26: C2149 TO N2165.**

cable: Consult chapter 2 in TECHNICAL MANUAL for C2149 for cable dimensions.

**CABLES BETWEEN CABINETS:**

HF SSB 250W WITH DSC WATCH RECEIVER RM2152, RADIOTELEX MODEM RM2152 and N2165.



**CABLES BETWEEN CABINETS:**

HF SSB 600W AC/DC WITH DSC WATCH RECEIVER RM2152.

**CABLE 6: RM2152 to T2131 SP-BUS.**

cable: RG58C/U coax cable.  
 Factory supplied: 10 metres RG58C/U coax cable marked blue. Part.No 527082

The total length of the SP-BUS cable from RE2100 to RM2152 must not exceed 100 metres.

**CABLE 7: RM2152 to H1223 RF INPUT**

cable: RG58C/U coax cable. Max. length 10 metres.  
 Factory supplied: 3 metres RG58C/U coax cable marked red. Part.No 506090

**CABLE 8: RH1223 to RF ANTENNA.**

cable: Triaxial cable H1213. Max. length 200 metres.

**CABLE 9: RM2152 to GPS unit (NMEA 183).**

cable: RG58C/U coax cable. Max. length 30 metres.

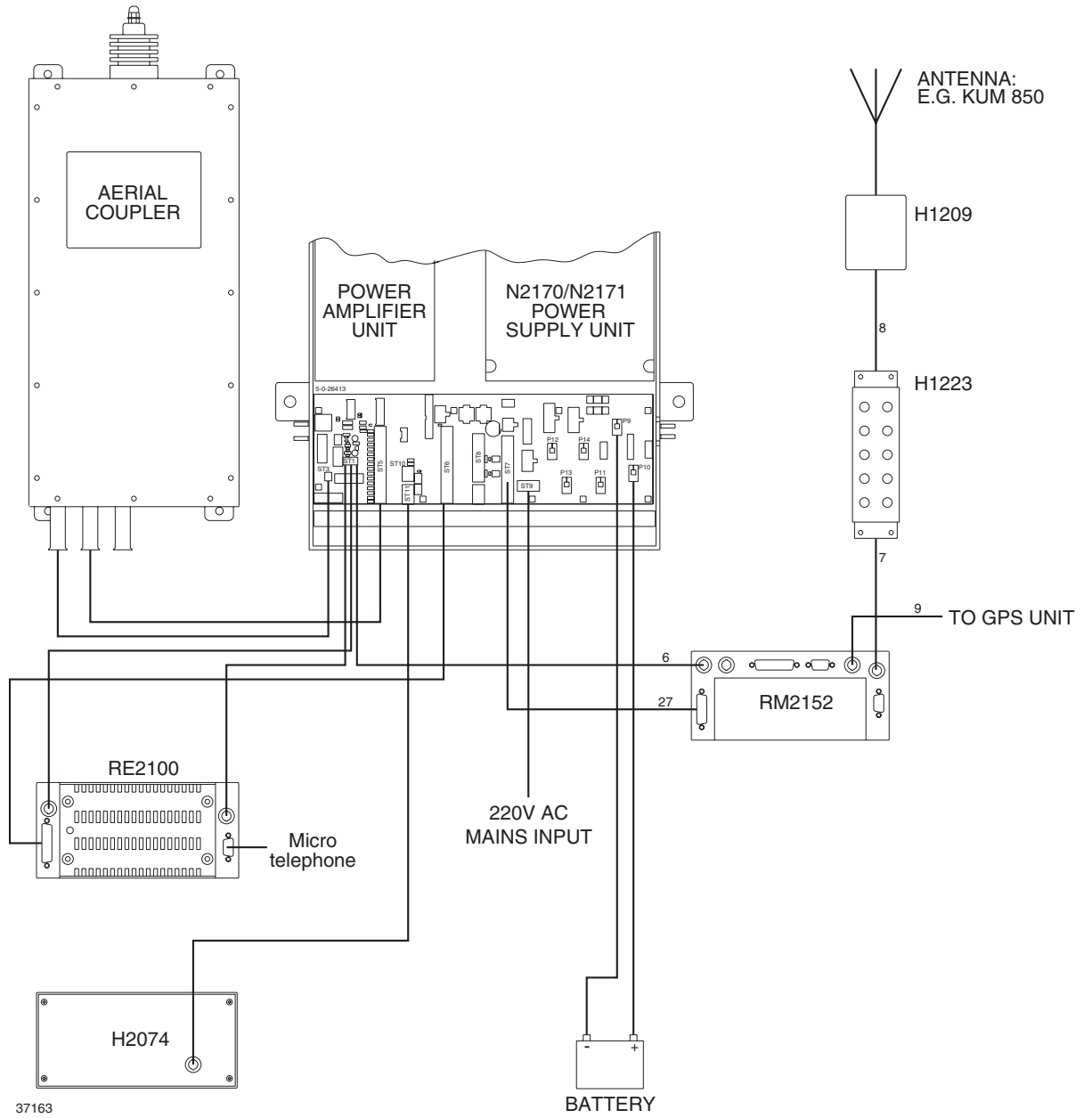
**CABLE 27: RM2152 - T2131.**

Factory supplied: Multicable: 10 metres 21 \* 0,5 mm<sup>2</sup> Part.No 164.192  
 Max. length 30 metres.

RM2150	T2135	COLOUR	SIGNAL
P2-5	ST7		
11	1	GREY	+9V
12	2	WHITE	+18V
10	3	VIOLET	-18V
13	4	BROWN/PINK	SUPPLY ON/OFF
25	5	RED/BLUE	-BATT
15	8	BROWN/GREEN	-TX KEY
	9	At T2135 connection board the terminals ST7-2 and ST7-9 must be interconnected.	
18	10	WHITE/YELLOW	AF TO TX
9	11	BLUE	AF TO TX
6	12	YELLOW	SP-BUS interrupt

**NOTE:** The shield of the cable between the DSC Watch receiver RM2152 and the transmitter T2131 must be connected in T2131 and in the 25 pol (SUB-D) connector.

**CABLES BETWEEN CABINETS:**  
 HF SSB 600W AC/DC WITH DSC WATCH RECEIVER RM2152.







**CABLES BETWEEN CABINETS:**

HF SSB 600W AC/DC WITH DSC WATCH RECEIVER RM2152, RADIOTELEX MODEM RM2152 AND N2165.

**CABLE 1: RM2152 - N2165.**

Factory supplied: Multicable: 10 metres 21 \* 0,5 mm<sup>2</sup> Part no. 164.192  
Max. length 30 metres.

RM2152		N2165		COLOUR	SIGNAL
P2-5		ST1	ST3		
1	IN		12	BLACK	RX MUTE
2	IN		8	BROWN	ALARM IN
3	IN		13	RED	TX READY
4	OUT		7	PINK	EXT. ALARM
5		SHIELD		SHIELD	GROUND
6	OUT	2		YELLOW	SP INTERRUPT
7	OUT		9	GREEN	ALARM OUT
8	OUT				SCAN STOP
9	OUT	5		BLUE	AF TO TX COMM
10	IN		4	VIOLET	-18V DC
11	IN		5	GREY	+9V DC
12	IN		3	WHITE	+18V DC
13	OUT		1	BROWN/PINK	SUPPLY ON/OFF
14	OUT	9		BROWN/YELLOW	RX MUTE
15	OUT	3		BROWN/GREEN	TX KEY
16	OUT	1		BROWN/GREY	HIGH TENSION
17	OUT	6		WHITE/PINK	
18	OUT	4		WHITE/YELLOW	AF TO TX
19	IN				LINE IN 1
20	IN				LINE IN 2
21	OUT	7		WHITE/GREEN	
22			6	WHITE/BLUE	GROUND
23			14	WHITE/GREY	GROUND
24	OUT	8		GREY/PINK	EXT.SPEAKER
25	IN		2	RED/BLUE	-BATT

**CABLE 2: T2131 - N2165.**

Multicable: 4 \* 0,5 mm<sup>2</sup>. Max. length 30 metres.

N2165	T2131	SIGNAL	T2131 Interconnection board
ST4	ST7		
1	NC	EXT. MUTE	NOTE 1: At T2130 connection board the terminals ST7-2 and ST7-9 must be interconnected.
2	NC	TX READY	
3	NC	GROUND	
4	NC	HIGH TENSION	NOTE 2: The shield of the cable between the power supply N2165 and the transmitter T2131 must be connected in both N2165 and T2135.
5	12	SP INTERRUPT	
6	8	TX KEY (NOTE 1)	
7	10	AF TO TX	
8	11	AF TO TX COMM	

**CABLE 3-4: BATTERY TO N2165.**

2,5 mm<sup>2</sup>. Max. length 30 metres.

**CABLE 5: RM2152 to RM2152 SP-BUS.**

cable: RG58C/U coax cable.  
Factory supplied: 1 metre RG58C/U coax cable marked blue. Part no. 527115

The total length of the SP-BUS cable from RE2100 to RM2152 must not exceed 100 metres.

**CABLE 6: RM2152 to T2130 SP-BUS.**

RG58C/U coax cable.  
Factory supplied: 10 metres RG58C/U coax cable marked blue. Part no. 527082

The total length of the SP-BUS cable from RE2100 to RM2152 must not exceed 100 metres.

**CABLE 7: RM2152 to H1223 RF INPUT**

cable: RG58C/U coax cable. Max. length 10 metres.  
Factory supplied: 3 metres RG58C/U coax cable marked red. Part no. 506090

**CABLE 8: RH1223 to RF ANTENNA.**

cable: Triaxial cable H1213. Max. length 200 metres.

**CABLE 9: RM2152 to GPS unit (NMEA 183).**

cable: RG58C/U coax cable. Max. length 30 metres.

**CABLE 10: MAINS TO N2165.**

cable: 3 \* 1,0 mm<sup>2</sup>. Max. length 30 metres.

**CABLE 11-12: BATTERY TO C2149.**

cable: 2,5 mm<sup>2</sup>. Max. length 30 metres.

**CABLE 14-15-16: 24V DC/BATTERY SUPPLY TO PRINTER (H1253B), MONITOR (H1253B), AND MESSAGE TERMINALH (2098A).**

cable: 3\*0.75 mm<sup>2</sup>. Max. Length 10 metres.  
 Factory supplied: 2 metres 3\*0.75 mm<sup>2</sup>. Part no. 56.066

**CABLE 17: RM2152 TO H2098A RS232 cable.**

cable: 7\*0,22 mm<sup>2</sup>. Max. length 4 metres.  
 Factory supplied: 1 metre 7\*0,22 mm<sup>2</sup>. Part no. 56.071  
 The radiotelex moden can be connected to a personal computer (PC) for this use a cable:  
 Factory supplied: 7 metre RS232 cable with 9/25 (SUB-D). Part no. 56.063

Pin	Name	Signal description	Direction
1 (8)	DCD	Data Carrier Detect	Input
2 (3)	RxD	# Received Data	Input
3 (2)	TxD	# Transmitted Data	Output
4 (20)	DTR	# Data Terminal Ready	Output
5 (7)	GND	# Ground	
6 (6)	DSR	# Data Set Ready	Input
7 (4)	RTS	Request To Send	Output
8 (5)	CTS	# Clear To Send	Input
9 (22)	RI	# Ring Indicator	Input

(x) The numbers shown in (brackets) are the corresponding numbers for a 25 pin D-type connector.

# The pin marked with a # sign are used in the enclosed communication cable.

**CABLE 18: H2098A TO H1253B video cable.**

cable: RG58C/U coax cable.  
 Factory supplied: 2 metre RG58C/U coax cable. Part no. 56.072

**CABLE 19: H2098A TO H2099 (keyboard).**

Keyboard cable supplied with the keyboard.

**CABLE 20: H1252B TO RM2152 PRINTER cable. (Centronics).**

Factory supplied: 1,5 metre standard printer cable. Part no. 56.013  
 A special low-impedance cable is available for printer locations up to 20 meters from H2098A.

Pin	Name	Signal description	Direction
1	STRB	Strobe	Output
2	DAT0	Data Bit 0	Output
3	DAT1	Data Bit 1	Output
4	DAT2	Data Bit 2	Output
5	DAT3	Data Bit 3	Output
6	DAT4	Data Bit 4	Output
7	DAT5	Data Bit 5	Output
8	DAT6	Data Bit 6	Output
9	DAT7	Data Bit 7	Output
10	ACKN	Acknowledge	Input
11	BUSY	Busy Signal	Input
12	PE	Paper End (out of paper)	Input
13	SEL	Select	Input
14	ALFD	Auto Line Feed	Output
15	ERR	Error	Input
16	INIT	Initialize Printer	Output
17	SLCT	Select Input	Output
18	GND	Ground	
19	GND	Ground	
20	GND	Ground	
21	GND	Ground	
22	GND	Ground	
23	GND	Ground	
24	GND	Ground	
25	GND	Ground	

**CABLE 26: C2149 TO N2165.**

cable: consult chapter 2 in TECHNICAL MANUAL for C2149 for cable dimensions.

**CABLE 28: MAINS TO H2096B.**

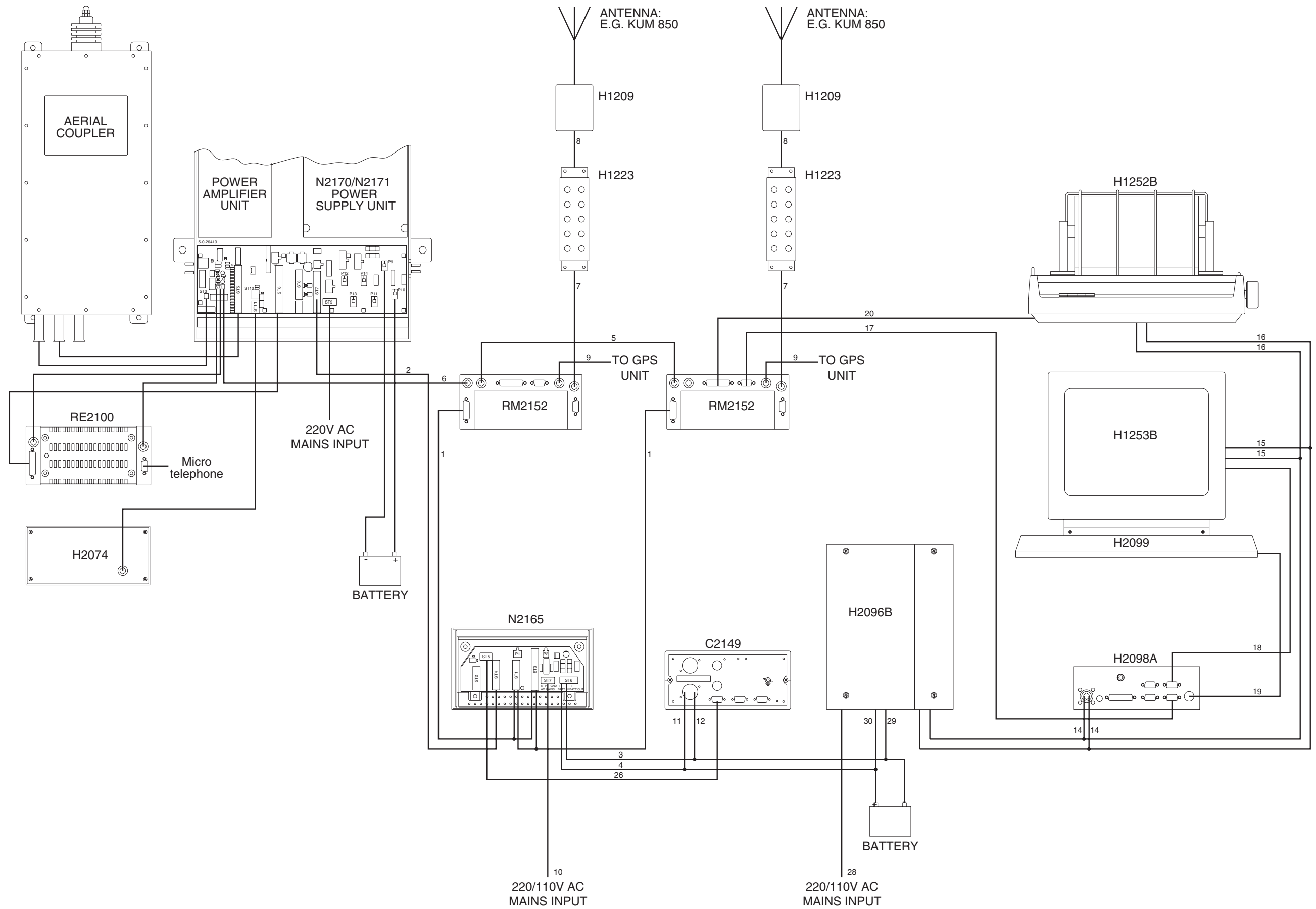
cable: 3 \* 1,0 mm<sup>2</sup>. Max. length 30 metres.

**CABLE 29-30: BATTERY TO H2096B.**

cable: 2,5 mm<sup>2</sup>. Max. length 30 metres.

**CABLES BETWEEN CABINETS:**

HF SSB 600W AC/DC WITH DSC WATCH RECIVER RM2152, RADIOTELEX MODEM RM2152 AND N2165.



**CABLES BETWEEN CABINETS:**

HF SSB 1200W AC/DC WITH DSC WATCH RECEIVER RM2152.

**CABLE 6: RM2152 to T2135 SP-BUS.**

cable: RG58C/U coax cable.  
 Factory supplied: 10 metres RG58C/U coax cable marked blue. Part no. 527082

The total length of the SP-BUS cable from RE2100 to RM2152 must not exceed 100 metres.

**CABLE 7: RM2152 to H1223 RF INPUT**

cable: RG58C/U coax cable. Max. length 10 metres.  
 Factory supplied: 3 metres RG58C/U coax cable marked red. Part no. 506090

**CABLE 8: RH1223 to RF ANTENNA.**

cable: Triaxial cable H1213. Max. length 200 metres.

**CABLE 9: RM2152 to GPS unit (NMEA 183).**

cable: RG58C/U coax cable. Max. length 30 metres.

**CABLE 27: RM2152 - T2135.**

Factory supplied: Multicable: 10 metres 21 \* 0,5 mm<sup>2</sup> Part no. 164.192  
 Max. length 30 metres.

RM2152	T2135		
P2-5	ST7	COLOUR	SIGNAL
11	1	GREY	+9V
12	2	WHITE	+18V
10	3	VIOLET	-18V
13	4	BROWN/PINK	SUPPLY ON/OFF
25	5	RED/BLUE	-BATT
15	8	BROWN/GREEN	-TX KEY
	9	At T2135 connection board the terminals ST7-2 and ST7-9 must be interconnected.	
18	10	WHITE/YELLOW	AF TO TX
9	11	BLUE	AF TO TX
6	12	YELLOW	SP-BUS interrupt

**CABLES BETWEEN CABINETS:**

HF SSB 1200W AC/DC WITH DSC WATCH RECEIVER RM2152, RADIOTELEX MODEM RM2152 AND N2165.

**CABLE 1: RM2152/RM2152 - N2165.**

Factory supplied: Multicable:10 metres 21 \* 0,5 mm<sup>2</sup> Part no. 164.192  
Max. length 30 metres.

RM2152		N2165		COLOUR	SIGNAL
P2-5		ST1	ST3		
1	IN		12	BLACK	RX MUTE
2	IN		8	BROWN	ALARM IN
3	IN		13	RED	TX READY
4	OUT		7	PINK	EXT. ALARM
5		SHIELD		SHIELD	GROUND
6	OUT	2		YELLOW	SP INTERRUPT
7	OUT		9	GREEN	ALARM OUT
8	OUT				SCAN STOP
9	OUT	5		BLUE	AF TO TX COMM
10	IN		4	VIOLET	-18V DC
11	IN		5	GREY	+9V DC
12	IN		3	WHITE	+18V DC
13	OUT		1	BROWN/PINK	SUPPLY ON/OFF
14	OUT	9		BROWN/YELLOW	RX MUTE
15	OUT	3		BROWN/GREEN	TX KEY
16	OUT	1		BROWN/GREY	HIGH TENSION
17	OUT	6		WHITE/PINK	
18	OUT	4		WHITE/YELLOW	AF TO TX
19	IN				LINE IN 1
20	IN				LINE IN 2
21	OUT	7		WHITE/GREEN	
22			6	WHITE/BLUE	GROUND
23			14	WHITE/GREY	GROUND
24	OUT	8		GREY/PINK	EXT.SPEAKER
25	IN		2	RED/BLUE	-BATT

**CABLE 2: T2135 - N2165.**

Multicable: 4 \* 0,5 mm<sup>2</sup>. Max. length 30 metres.

N2165	T2130		SIGNAL	T2130
ST4	ST2	ST3		Interconnection board
1			EXT.MUTE	NOTE 1: At T2130 connection board the terminals ST2-4 and ST3-6 must be interconnected
2			TX READY	
3			GROUND	
4			HIGH TENSION	
5	16		SP INTERRUPT	NOTE 2: At T2130 connection board the terminals ST2-4 and ST3-6 must be interconnected
6		5	TX KEY (NOTE 1)	
7		7	AF TO TX	
8		8	AF TO TX COMM	

**CABLE 3-4: BATTERY TO N2165.**

cable: 2,5 mm<sup>2</sup>. Max. length 30 metres.

**CABLE 5: RM2152 to RM2152 SP-BUS.**

cable: RG58C/U coax cable.  
Factory supplied: 1 metre RG58C/U coax cable marked blue. Part no. 527115

The total length of the SP-BUS cable from RE2100 to RM2152 must not exceed 100 metres.

**CABLE 6: RM2152 to T2135 SP-BUS.**

cable: RG58C/U coax cable.  
Factory supplied: 10 metres RG58C/U coax cable marked blue. Part no. 527082

The total length of the SP-BUS cable from RE2100 to RM2152 must not exceed 100 metres.

**CABLE 7: RM2152 to H1223 RF INPUT**

cable: RG58C/U coax cable. Max. length 10 metres.  
Factory supplied: 3 metres RG58C/U coax cable marked red. Part no. 506090

**CABLE 8: RH1223 to RF ANTENNA.**

cable: Triaxial cable H1213. Max. length 200 metres.

**CABLE 9: RM2152 to GPS unit (NMEA 183).**

cable: RG58C/U coax cable. Max. length 30 metres.

**CABLE 10: MAINS TO N2165.**

cable: 3 \* 1,0 mm<sup>2</sup>. Max. length 30 metres.

**CABLE 11-12: BATTERY TO C2149.**

cable: 2,5 mm<sup>2</sup>. Max. length 30 metres.

**CABLE 14-15-16: 24V DC/BATTERY SUPPLY TO PRINTER (H1253B), MONITOR (H1253B), AND MESSAGE TERMINALH (2098A).**

cable: 3\*0.75 mm<sup>2</sup>. Max. Length 10 metres.  
 Factory supplied: 2 metres 3\*0.75 mm<sup>2</sup>. Part no. 56.066

**CABLE 17: RM2152 TO H2098A RS232 cable.**

cable: 7\*0,22 mm<sup>2</sup>. Max. length 4 metres.  
 Factory supplied: 1 metre 7\*0,22 mm<sup>2</sup>. Part no. 56.071  
 The radiotelex moden can be connected to a personal computer (PC) for this use a cable:  
 Factory supplied: 2 metre RS232 cable with 9/25 (SUB-D). Part no. 56.063

Pin	Name	Signal description	Direction
1 (8)	DCD	Data Carrier Detect	Input
2 (3)	RxD	# Received Data	Input
3 (2)	TxD	# Transmitted Data	Output
4 (20)	DTR	# Data Terminal Ready	Output
5 (7)	GND	# Ground	
6 (6)	DSR	# Data Set Ready	Input
7 (4)	RTS	Request To Send	Output
8 (5)	CTS	# Clear To Send	Input
9 (22)	RI	# Ring Indicator	Input

(x) The numbers shown in (brackets) are the corresponding numbers for a 25 pin D-type connector.

# The pin marked with a # sign are used in the enclosed communication cable.

**CABLE 18: H2098A TO H1253B video cable.**

cable: RG58C/U coax cable.  
 Factory supplied: 2 metre RG58C/U coax cable. Part no. 56.072

**CABLE 19: H2098A TO H2099 (keyboard).**

Keyboard cable supplied with the keyboard.

**CABLE 20: H1252B TO RM2152 PRINTER cable. (Centronics).**

Factory supplied: 1,5 metre standard printer cable. Part no. 56.013  
 A special low-impedance cable is available for printer locations up to 20 meters from H2098A.

Pin	Name	Signal description	Direction
1	STRB	Strobe	Output
2	DAT0	Data Bit 0	Output
3	DAT1	Data Bit 1	Output
4	DAT2	Data Bit 2	Output
5	DAT3	Data Bit 3	Output
6	DAT4	Data Bit 4	Output
7	DAT5	Data Bit 5	Output
8	DAT6	Data Bit 6	Output
9	DAT7	Data Bit 7	Output
10	ACKN	Acknowledge	Input
11	BUSY	Busy Signal	Input
12	PE	Paper End (out of paper)	Input
13	SEL	Select	Input
14	ALFD	Auto Line Feed	Output
15	ERR	Error	Input
16	INIT	Initialize Printer	Output
17	SLCT	Select Input	Output
18	GND	Ground	
19	GND	Ground	
20	GND	Ground	
21	GND	Ground	
22	GND	Ground	
23	GND	Ground	
24	GND	Ground	
25	GND	Ground	

**CABLE 26: C2149 TO N2165.**

cable: consult chapter 2 in TECHNICAL MANUAL for C2149 for cable dimensions.

**CABLE 28: MAINS TO H2096B.**

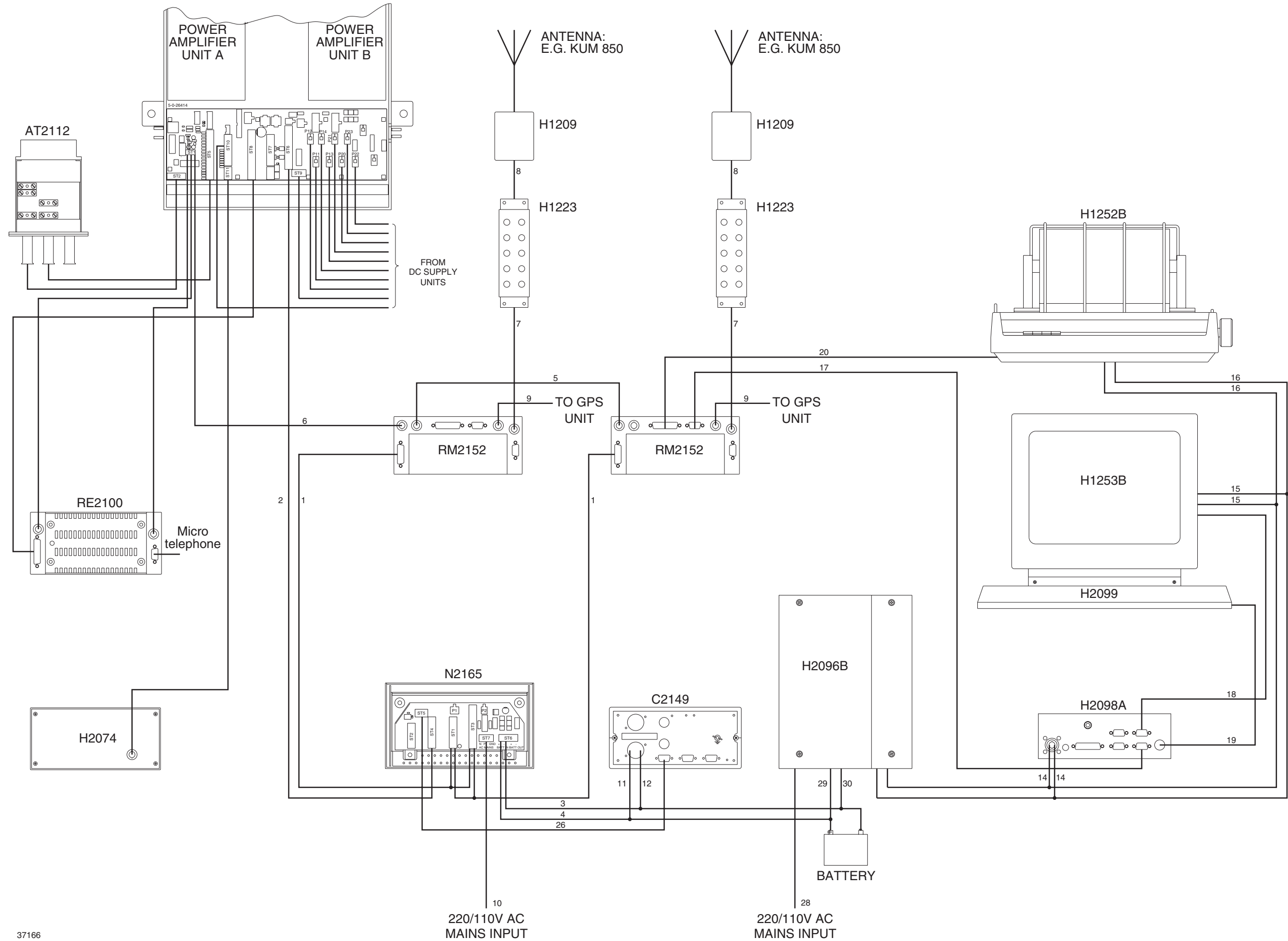
cable: 3 \* 1,0 mm<sup>2</sup>. Max. length 30 metres.

**CABLE 29-30: BATTERY TO H2096B.**

cable: 2,5 mm<sup>2</sup>. Max. length 30 metres.

**CABLES BETWEEN CABINETS:**

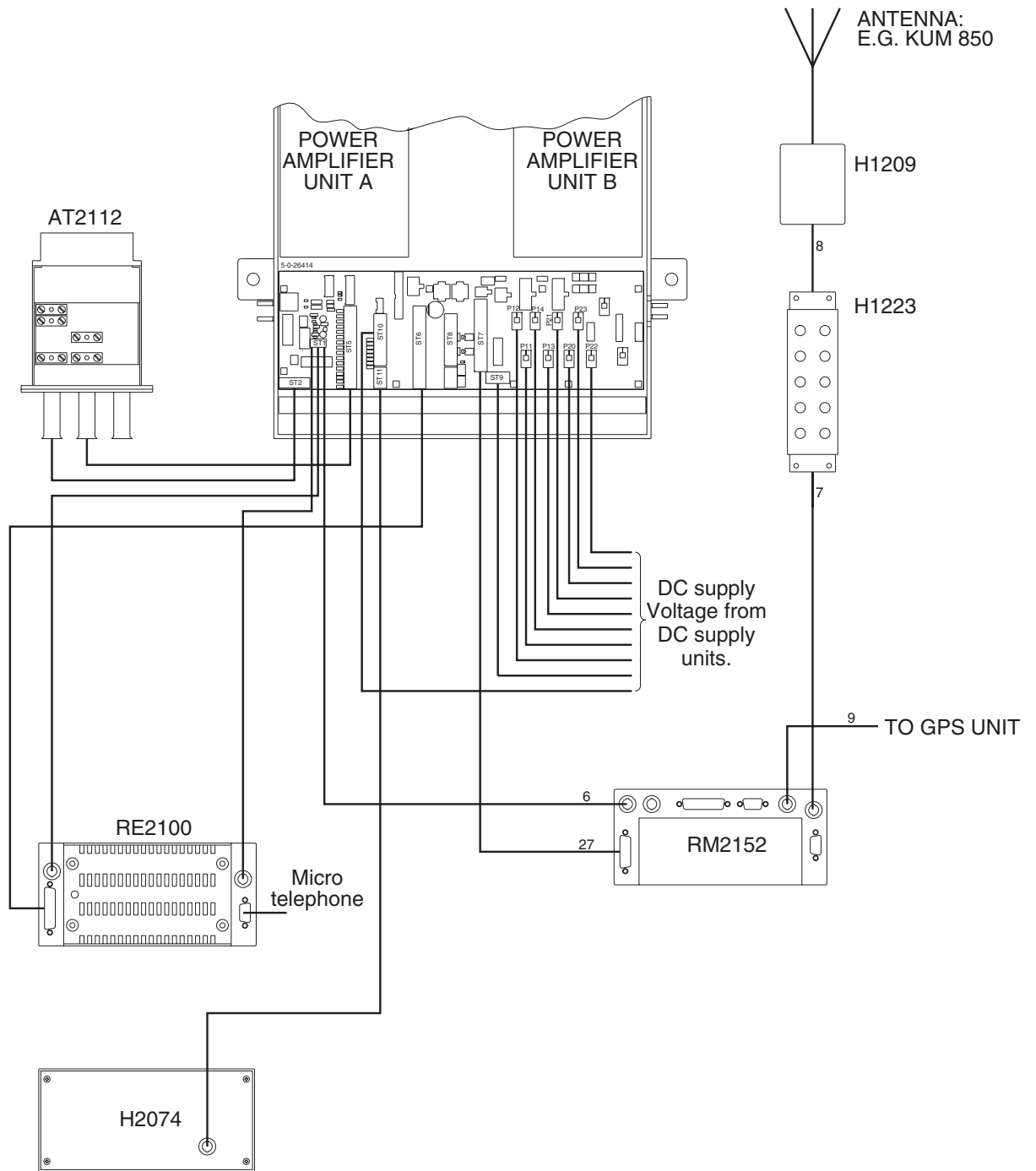
HF SSB 1200W AC/DC WITH DSC WATCH RECEIVER RM2152, RADIOTELEX MODEM RM2152 AND N2165.







**CABLES BETWEEN CABINETS:**  
 HF SSB 1200W AC/DC WITH DSC WATCH RECEIVER RM2152.



37165



The character codes used when entering the answerback sequence are based on the ASCII-code and CCITT rec. F.130.

Each character is represented by a 2-digit/letter code as follows:

### Digits

Char	ASCII	Char	ASCII
0	30	5	35
1	31	6	36
2	32	7	37
3	33	8	38
4	34	9	39

### Letters

Char	ASCII	Char	ASCII
A	61	N	6E
B	62	O	6F
C	63	P	70
D	64	Q	71
E	65	R	72
F	66	S	73
G	67	T	74
H	68	U	75
I	69	V	76
J	6A	W	77
K	6B	X	78
L	6C	Y	79
M	6D	Z	7A

### Special characters

Char	ASCII
Carriage return	0D
Line feed	0A
Figure shift	7E
Letter shift	7F
Space	20

## 2.5.2 MAIN PROCESSOR BOARD VERSION 4 DIP SWITCHES

DIP SWITCH **S1** MAIN PROCESSOR PRINTED CIRCUIT VERSION 4 and higher.

No	OFF	ON
1	Use of SP-BUS	Use of T-BUS
2	Use of SP-BUS	Use of T-BUS
3	Not used	
4	Don't initialize EEPROM	Initialize EEPROM
5	Scan all distress frequencies when in Watch Receiver mode (RM2150)	Scan only 2187.5 kHz when in Watch Receiver mode (RM2150)
6	Not used	

DIP SWITCH **S2** MAIN PROCESSOR PRINTED CIRCUIT VERSION 4 and higher.

No	OFF	ON
1	Only for factory test	Normaly used
2	DSC/Radio Telex modem (RM2151)	DSC/Watch Receiver (RM2150)
3	Only for factory test	Normaly used
4	Function mode of	Function mode on

### 2.5.3 MAIN PROCESSOR BOARD VERSION 3 DIP SWITCHES

DIP SWITCH **S1** MAIN PROCESSOR PRINTED CIRCUIT VERSION 3.

No	OFF	ON
1	Not used	
2	Don't initialize EEPROM	Initialize EEPROM
3	Scan all distress frequencies when in Watch Receiver mode (RM2150)	Scan only 2187.5 kHz when in Watch Receiver mode (RM2150)
4	Not used	

DIP SWITCH **S2** MAIN PROCESSOR PRINTED CIRCUIT VERSION 3.

No	OFF	ON
1	Only for factory test	Normaly used
2	DSC/Radio Telex modem (RM2151)	DSC/Watch Receiver (RM2150)
3	Only for factory test	Normaly used
4	Function mode of	Function mode on

### 3 SERVICE

#### 3.1 MAINTENANCE

##### PREVENTIVE MAINTENANCE

If the HF SSB RM2152 has been installed in a proper way the maintenance can, dependent on the environments and working hours, be reduced to a performance check at the service workshop at intervals, not exceeding 12 months. A complete performance check list is enclosed in this manual, chapter 3.5 PERFORMANCE CHECK.

Inspection of the antenna, cables, and plugs for mechanical defects, salt deposits, corrosion, and any foreign bodies shall be done at regular intervals not exceeding 12 months.

Along with each RM2152 a test sheet is delivered in which all the measurements, made in the test department of the factory, are listed. If the control measurements made in the service workshop should not show the same values as those listed in the test sheet, the set must be adjusted.

#### 3.2 ALIGNMENT INSTRUCTIONS

##### INTRODUCTION

The measuring values indicated in chapter 5. CIRCUIT DESCRIPTION AND SCHEMATIC DIAGRAMS are typical values and as indicated it will be necessary to use instruments in absolute conformity with the below list:

#### 3.3 PROPOSAL FOR NECESSARY TEST EQUIPMENT

##### OSCILLOSCOPE:

Bandwidth DC-35 MHz  
 Sensitivity 2mV/div  
 Output Impedance 1 Mohm//20 pF  
 E.g. Philips type PM3050

##### PASSIVE PROBE:

Attenuator 20 dB  
 Input Impedance 10 Mohm//15 pF  
 Compensation Range 10-30 pF  
 E.g. Philips type PM8936/091

##### MULTIMETER:

Sensitivity DC (f.s.d.) 100 mV  
 Input Impedance 10 Mohm  
 Accuracy DC (f.s.d.) 1.5%  
 E.g. Philips type PM2505

##### FREQUENCY COUNTER:

Frequency Range 100 Hz - 120 MHz  
 Resolution 1 Hz at  $\square f = 100$  MHz  
 Accuracy  $1 \times 10^{-7}$   
 Sensitivity 100 mV<sub>RMS</sub>  
 Input Impedance 1 Mohm/30 pF  
 E.g. Philips type PM6669/031

##### HF SIGNAL GENERATOR:

Frequency Range 100 kHz - 100 MHz  
 Output Voltage: 0dB/ $\mu$ V - 120 dB/ $\mu$ V  
 Output Impedance 50 ohm  
 Type of Modulation AM  
 Modulation Frequency External  
 E.g. Marconi type 2019

##### LF SIGNAL GENERATOR:

Frequency Range 10 Hz - 10 kHz  
 Output Voltage 20 mV<sub>RMS</sub> - 1V<sub>RMS</sub>  
 Output Impedance 600 ohm  
 Output Waveform sine wave  
 E.g. Philips type PM5110

##### LF DISTORTION METER:

Frequency Range  $\square f = 1200$  Hz  
 Distortion Range (f.s.d.) 1-10%  
 Input Impedance 100 kohm  
 Accuracy (f.s.d.) 3%  
 E.g. Hewlett-Packard HP 8903B

## 5 CIRCUIT DESCRIPTION AND SCHEMATIC DIAGRAMS

### 5.1 RECEIVER UNIT (MODULE 1) PART NO. 626301

The receiver unit consist of a 70.0 MHz to 10.7 MHz mixer followed by a TELEX filter and a gain regulated amplifier. From the gain regulated amplifier the signal is fed to the detector and to the AGC amplifier. From the detector the low frequency signal is fed through a low/high pass filter to the 600 ohm output buffer.

#### **SECOND MIXER AND CRYSTAL FILTER.**

The signal from the 70 MHz selectivity (module 2) is led through the balanced transformer TR01 to the gates of the J-FET mixer transistors Q01 and Q02.

The second LO signal 59.3/80.7 MHz from the frequency synthesizer ( module 3 ) is led through the amplifier transistor Q03 and the band pass filter ( L03, L07, L10 and C07, C09, C15) to the sources of mixer transistors Q01 and Q02. The LO signal level at the sources of the mixer transistors is approx 17 dBm.

The mixer 10.7 MHz output signal from the drain's is fed through a balanced transformer TR02 to the crystal filter. The capacitor C26 controls the resonans frequency of TR02.

#### **IF AMPLIFIER.**

The 10.7 MHz signal from the crystal filter is fed to the input of the IF amplifier.

The 10.7 MHz IF amplifier consists of the trasistors Q04, Q05, Q08, Q10, Q11 and the filter FL02 in cascade Q04, Q05, Q08 and Q10 are dual gate MOS-FET's with the IF signal fed to gate 1. Gate 2 of the transistors Q04, Q05 and Q08 is connected to the output of the AGC detector. The output voltage from the AGC detector is used to control the gain of the IF amplifier which is necessary to protect the signal detector from overload.

From the drain of Q08 the IF signal is amplified in Q10 and fed through the ceramic filter FL02, which reduces the noise bandwidth to about 300 kHz, to the emitter follower Q11. from the emmitter of Q11 the IF signal is fed to the signal detector and to the AGC amplifier.

#### **AGC GENERATOR**

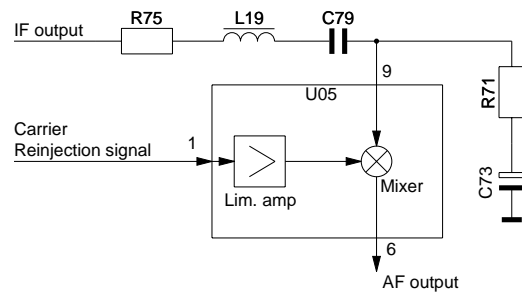
The IF signal is fed through the common emitter amplifier Q09 to the AGC detector consisting of the transistor Q07 and the network R42, R48 and C54 which together is a voltage detector. The voltage gain of Q09 and the detector level of Q07 controls the output level of the IF amplifier, the level at the emitter of Q11.

The output voltage from the AGC detector is via the diode D04 and the buffer amplifier U1.2 fed to gate 2 of Q04, Q05 and Q08 as a fast gain control voltage. A slow gain control of the IF amplifier is obtained by supplying the AGC detector output voltage to the amplifier U1.1. U1.1 buffers the charging of C91 through the diode D08 and the resistor R99. The voltage on C91 is fed through the diode D07 to the input of the amplifier U1.1, where it is added to the AGC detector voltage. The charging and discharging of C91 is slow compaired to the charging and discharging of C54 this means that the network C54, R42 and R48 ensures noise immunity and the network C91, R99 and R98 will decrease distortion.

The transistor Q12 is when conducting discharging the capacitor C91 which means that the slow AGC is inoperative, this is used when the riceiver is channing. Q12 is controlled by the signal at ( U03/pin7 ).

**SIGNAL DETECTOR**

The signal detector U02 consist of a limiting amplifier and a signal mixer.



29039

A 10.73152 MHz signal ,the synthsizer referance signal,is connected to ( U02/pin1 ), this signal is fed through the limiting amplifier to the injection port of the mixer. The IF signal is from the emitter of Q11 fed to the signal port ( U02/pin9 ) of the mixer. The output signal ( U02/pin6 ) from the mixer contain an audiofrequency component which is fed to the AF FILTERS.

The signal detector can be muted by a 5 volt dc signal from ( U03/pin4 ) supplied to ( U02/pin5 ).

**AF FILTERS AND AF BUFFER AMPLIFIER.**

To reduce noise from the non-tuned IF amplifier, the AF signal from the signal detector is led through two active filters in cascade.

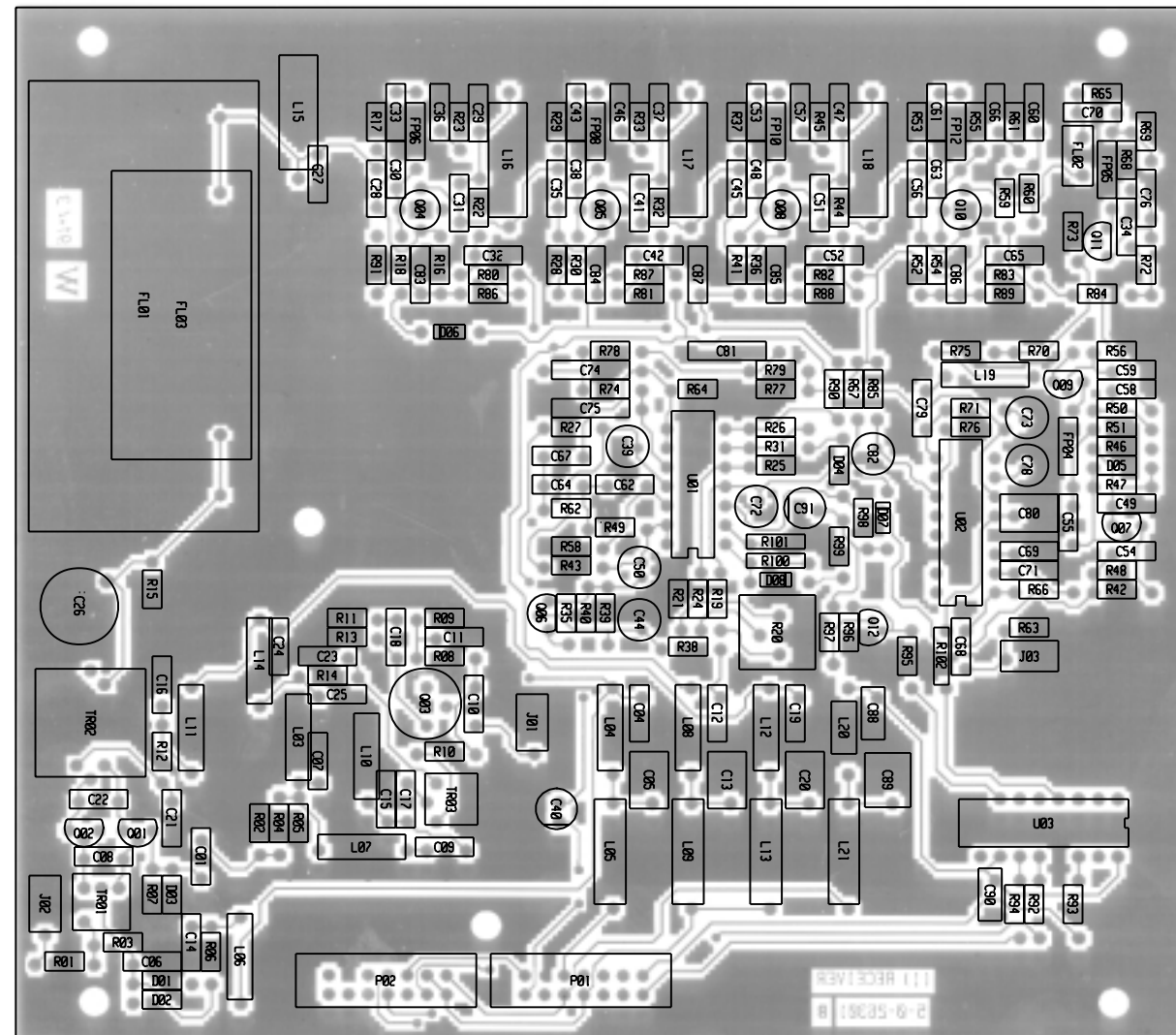
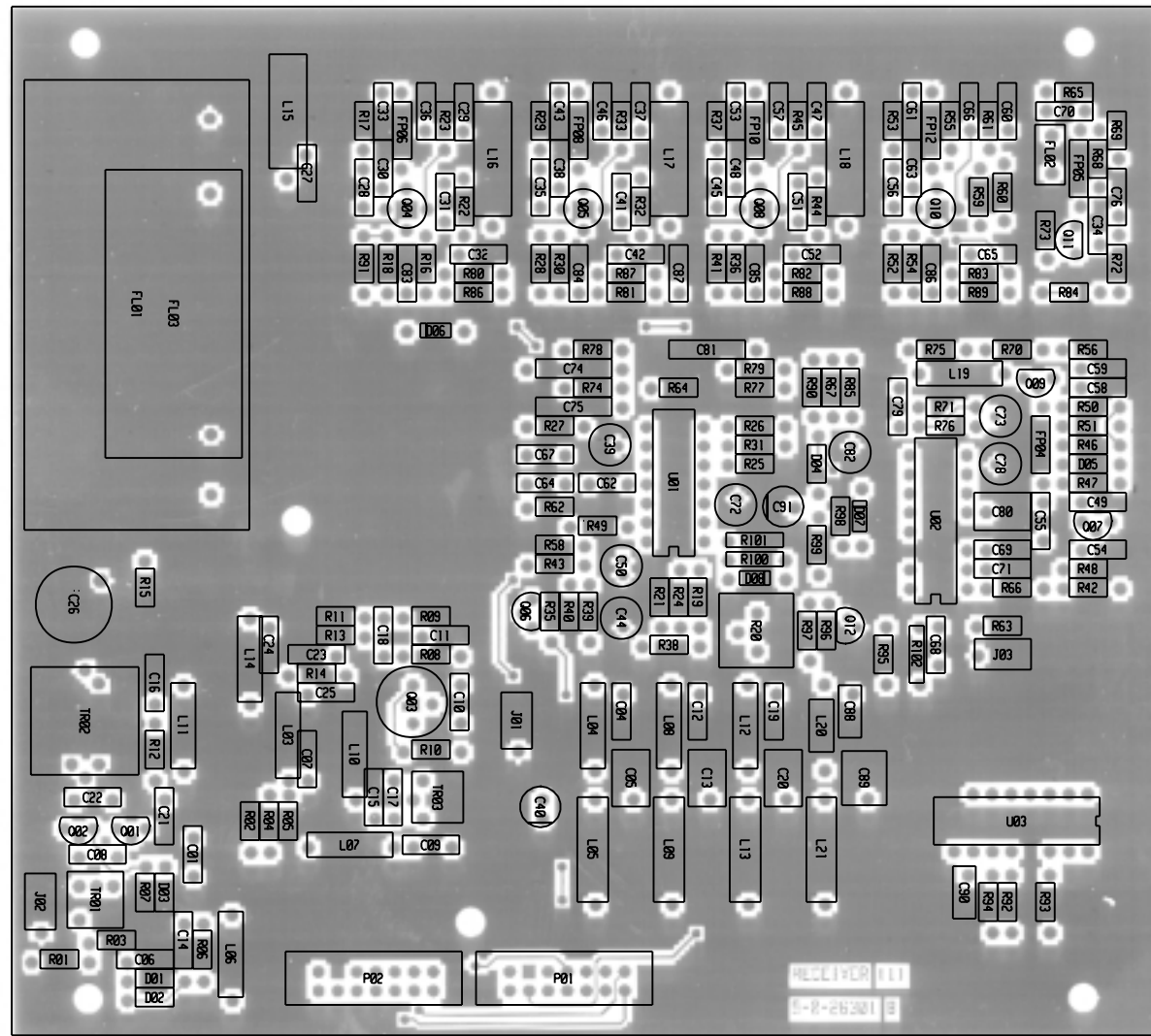
The AF filters are build as two 3th order filters, one low pass filter with a 3 dB cut off frequency at 2250 Hz. and one high pass filter with a 3 dB cut off frequency at 1200 Hz.

The output from the AF filters is fed through the buffer transistor Q06, which buffers the 0 dBm AF signal to a 600 ohm load.





COMPONENT LOCATION RECEIVER UNIT MODULE 1

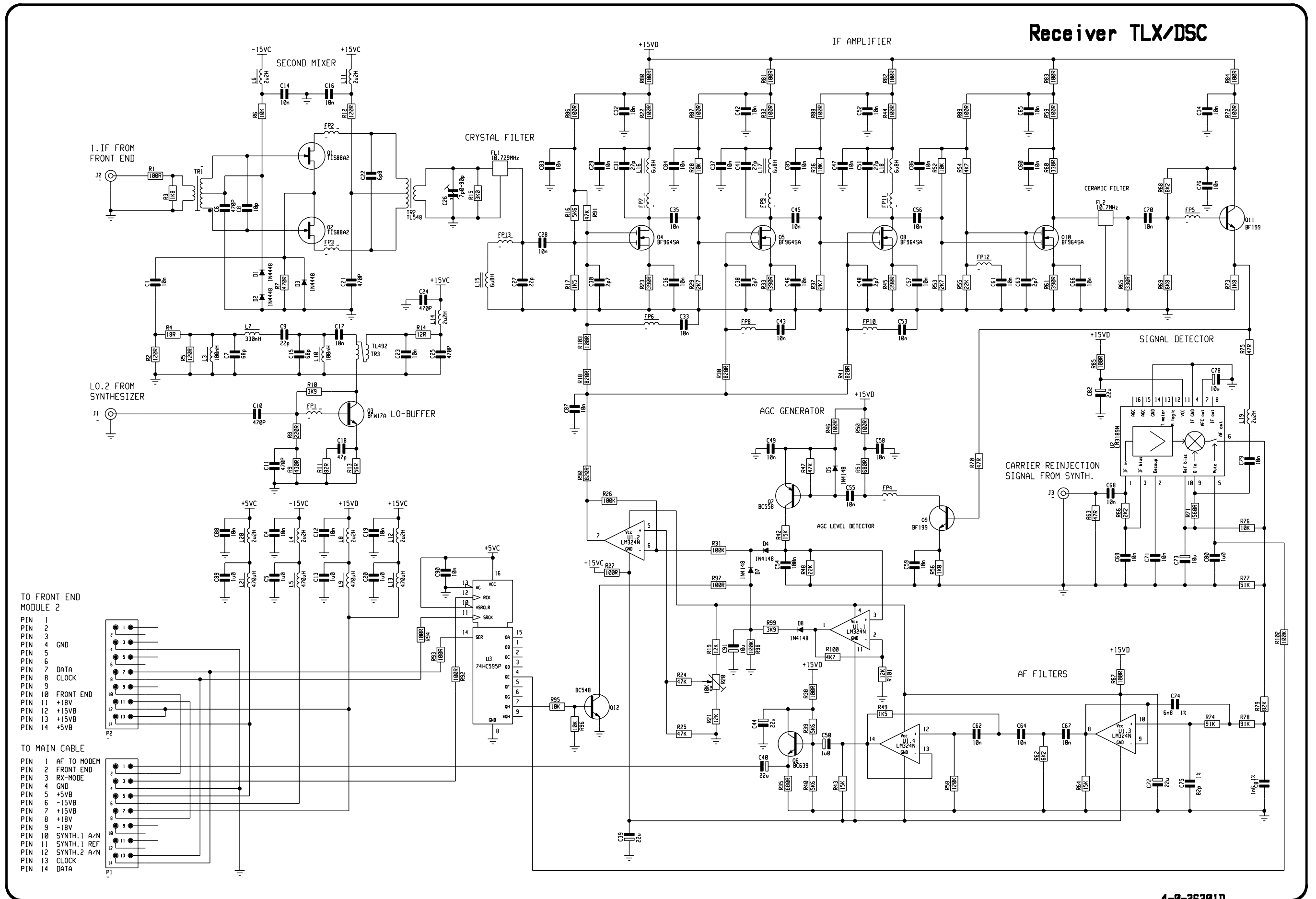


View from component side with upper side tracks.

View from component side with lower side tracks.

PCB rev. 26301B

RECEIVER UNIT MODULE 1



4-0-26301D

This diagram is valid for PCB rev. 26301B



## 5.2 FRONT END UNIT (MODULE 2) PART NO. 625632

This module consists of a transmit/receive relay and the receiver front end. The front end consists of a receiver input protection circuit, a radio frequency filter unit, a radio frequency to first intermediate frequency (70 MHz) mixer, and a first IF (70 MHz) filter unit.

### AERIAL/EXCITER SWITCH

The aerial signal enters the receiver through the aerial/exciter socket J01, when relay RE02 is in RX position. The exciter signal from the power module (8) is connected to relay RE02 through the EX socket J04. When relay RE02 is in TX position the exciter signal will pass through the aerial/exciter socket J01 and a coax cable to the HF power amplifier in T2130. Switching between RX and TX with RE02 is controlled from the microprocessor through register U01 and Q02.

### INPUT PROTECTION

Protection of the pre-filters and the first mixer is done with R02, R03, TR01 and the circuit around D05, and it guaranties that the voltages to the pre-filters cannot be higher than about 4.5V. In addition the RX input is grounded with relay RE01 when the transceiver is switched off.

### PRE-FILTERS

The pre-filters consists of the following units:

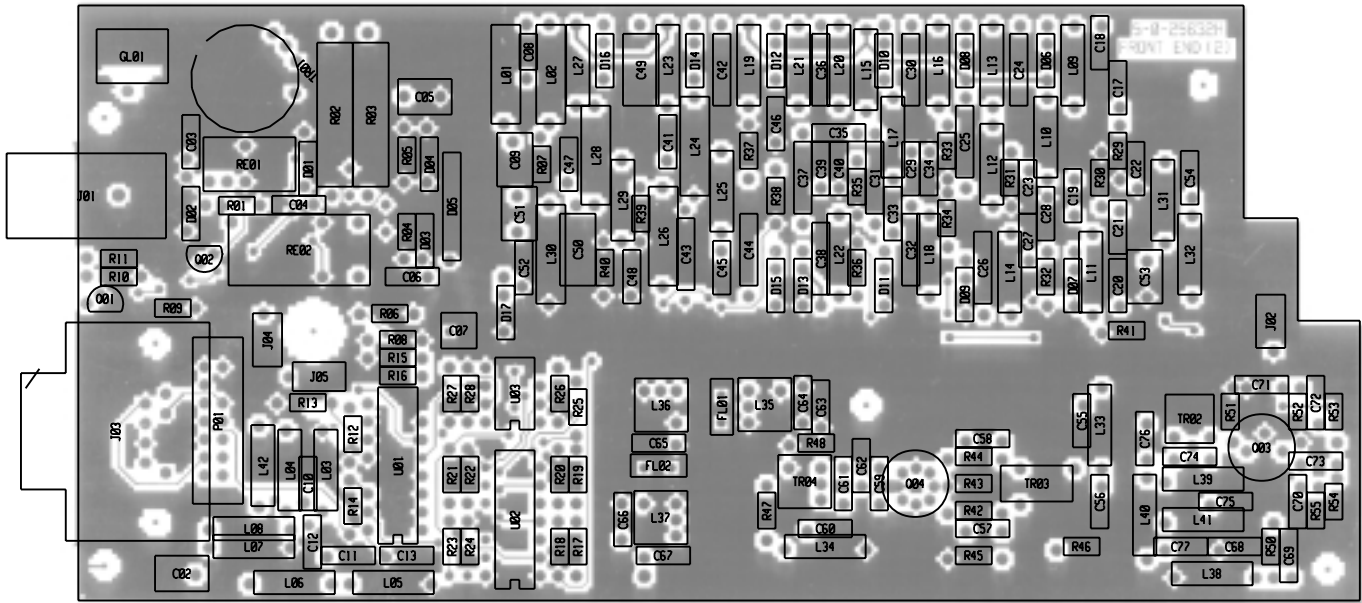
-	100 kHz	HPF	consisting of L01-L02 and C08
-	385 kHz	LPF (1)	consisting of L29, C49-C50 and D16-D17
-	385 kHz - 1.6 MHz	BPF (2)	consisting of L24-L26, C42-C44 and D14-D15
-	1.6 MHz - 4.5 MHz	BPF (3)	consisting of L20-L22, C36-C38 and D12-D13
-	4.5 MHz - 9 MHz	BPF (4)	consisting of L16-L18, C30-C32 and D10-D11
-	9 MHz - 18 MHz	BPF (5)	consisting of L12-L14, C24-C26 and D08-D09
-	18 MHz - 30 MHz	BPF (6)	consisting of L09-L11, C18-C20 and D06-D07
-	30 MHz	LPF	consisting of L31-L33, and C54-C56

The switching between the filters is controlled from the microprocessor through U01, U02 and U03.

### FIRST MIXER AND IF-FILTER

The first mixer is an active J-FET mixer with good, large signal properties and low noise factor. The signal is led through the balanced transformer TR03 to the sources of the dual J-FET Q04. The first LO signal from the frequency synthesizer (module 3) is led through the LO buffer (Q03) to give about +17 dBm signal to the gates of the two J-FET transistors. The mixed signals are fed through the balanced output transformer TR04 to the two high order bilitich crystal filters FL01 and FL02 where the wanted 70 MHz signal is selected. The selected signal is then fed on to the receiver PCB (module 1).

COMPONENT LOCATION FRONT END MODULE 2



View from component side with upper side tracks.



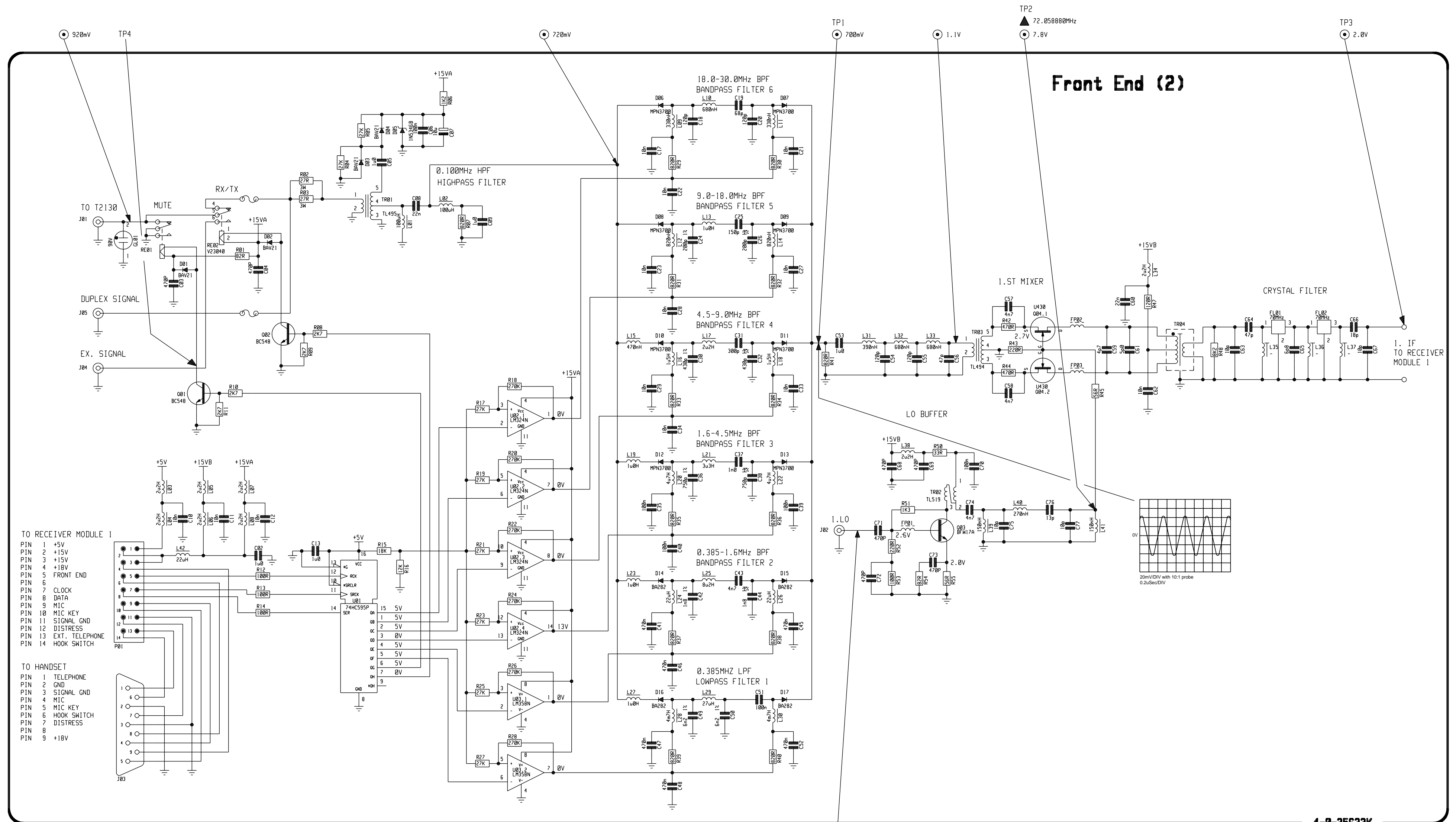
View from component side with lower side tracks.

FRONT END MODULE 2

TEST CONDITIONS

Receiver Frequency:  $f_{rx} = 2058.24 \text{ kHz}$   
 Receiver Mode: J3E/USB  
 Generator frequency:  $f_G = 2059.24 \text{ kHz}$   
 Generator level:  $V_G = 117 \text{ dB}/\mu\text{V}$   $P_G = 4 \text{ dBm}$   
 Generator mode: CW

The generator signal must be fed to the aerial socket at the Front End Unit.



4-0-25632K

● Diode probe measurements  
 ▲ Frequency counter measurements





### 5.3 SYNTHESIZER UNIT (MODULE 3) PART NO. 625633

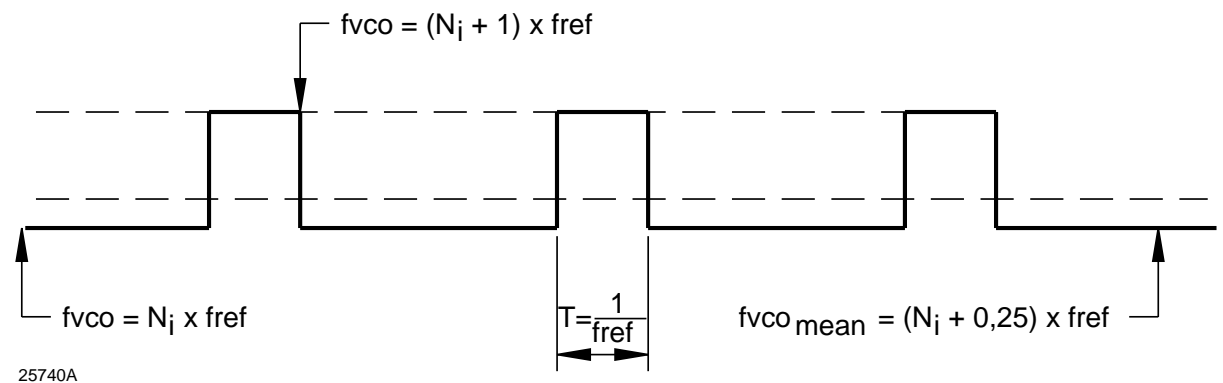
The synthesizer unit consists of two phase locked loops. Phase locked loop 1 generates the signal used as injection to the first mixer in the front end module and as the injection to the second mixer in the exciter unit. The PLL1 signal has a frequency range from 70 MHz to 100 MHz in steps of 10 Hz.

Phase locked loop 2 generates the injection signal to the first mixer in the exciter unit and the injection signal to the second mixer in the receiver unit. The PLL2 signal changes between two frequencies 80.7 MHz and 59.3 MHz when the transmitted or received sideband is changed between upper and lower sideband.

#### PHASE LOCKED LOOP 1

PLL1 operates as a fractional synthesizer. This means that the dividing figure in the loop can be set to a non-integer number, making it possible to get a frequency resolution at the VCO output which is smaller than the reference frequency in the loop. The reference frequency is 40.96 kHz and the frequency resolution is 10 Hz. The reference frequency is derived from a TCXO, which oscillates at 10.73152 MHz. Furthermore the TCXO signal is used as carrier signal for both detector in the receiver and SSB generator in the exciter.

The principle in a fractional synthesizer is that the integer number dividing figure  $N_i$  in the loop is changed at particular times to  $(N_i+1)$  determined by the value of fraction number  $F$ . By this method the mean frequency of the VCO is increased as illustrated in the example below:



In the example the integer dividing figure is changed every fourth reference cycle implying an increase in mean VCO frequency.

Because of the change in the integer number, dividing figure spurious sidebands occur at the VCO output. These sidebands have to be reduced and this is done through a correction signal fed to the phase detector. The correction signal is generated in the API (Analog Phase Interpolator) circuit.

#### VOLTAGE CONTROLLED OSCILLATORS

The frequency range from 70-100 MHz is covered with four independent oscillators:

VCO I:	70.0 - 77.5 MHz
VCO II:	77.5 - 85.0 MHz
VCO III:	85.0 - 92.5 MHz
VCO IV:	92.5 - 100 MHz

The oscillators are in principle identical and each of them is built-up around an earthen drain FET amplifier, where the output signal is fed back to the input by means of two capacitors. The ratio of the capacitors determines the amount of feed-back in the oscillator. The oscillator frequency is determined by the LC circuit located on the gate of the FET, and the tuning of oscillator frequency is done by means of variable capacitance diodes.

The output signal from the VCO's is led through switch diodes D2, D5, D7, and D10 to a common buffer amplifier Q13, which buffers the VCO signal for prescaler buffer and LO buffer respectively.

Selection of the wanted VCO circuit is done by Q1, Q3, Q4, Q6, Q7, Q9, Q10, and Q12. The control of these transistors is done by serial to parallel register U1.

**PASSIVE LOOP FILTER**

The components R28, R31, C11, C51, C54, and L22 constitute a chebychev lowpass filter with cut-off frequency equal to approximately 10 kHz.

The major task of the passive filter is to prevent spurious signals, arise from the phase detector and divider circuit, to modulate the VCO and generate sidebands to the VCO output signal.

**ACTIVE LOOP FILTER**

The filter consists of U16, C66, R33, and R38. The filter secures stabilization in the loop system and is of vital importance in determination of the loop system bandwidth.

**PHASE DETECTOR**

The phase detector is of the sample and hold type. The detector consists of a sequential phase detector followed by the current switch, the ramp generator and the sample and hold circuit.

U26 together with U27 form the sequential phase detector which converts the phase difference between the reference signal and the signal from the programmable divider to a square wave signal measurable on U26 pin 6. The duty cycle of the square wave signal is inverse proportional to the phase difference. The sequential phase detector controls the current switch, which is built-up around Q25, D17, R93, D16, and D15. When the signal on basis of Q25 is at high state, D16 is switched on, the potential on the cathode of D15 is increased, and D15 is switched off.

When the signal on basis of Q25 is at low state, D16 is switched off, the potential on the cathode of D15 is decreased, and D15 is switched on. The amount of current flowing through D15 and D16 respectively is determined by the current mirror circuit described elsewhere.

The ramp generator, built-up around U21 and C112, integrates the current drawn from U21 pin 2 in regard to time. The ramp generator output voltage is then linear in regard to the size of current flowing through the switch diode D15 and the period of time the diode is switched on.

Q24 connected in parallel to C112 constitutes a switch, which resets the ramp generator by discharging C112.

The switch is open when the gate voltage is at low state and vice versa.

The ramp generator and current switch connected with the sequential phase detector imply a phase detector where the output voltage, in a certain period of time in every reference cycle, is linear in regard to the phase difference between the reference signal and the signal from the programmable divider. In this period the output voltage has to be sampled and held and this is done by the sample & hold circuit, consisting of U19, R64, C95, Q19, and R77.

Q19 functions as the switch, which carries out the sampling. The switch is open when the gate voltage is at low state and vice versa.

C95 is charged to the phase detector voltage through R77 when the sample switch is closed, and carries out the hold function when the sample switch is open.

The voltage on C95 is led to the active loop filter through the voltage follower U19.

**CURRENT MIRROR**

The current mirror is built-up around transistor array U20 and the circuit generates reference circuit for the phase detector and the API-circuit.

The current mirror is so designed that the ratio between reference current for phase detector and API-circuit respectively will be kept as a constant regardless of the temperature. A change in one of the currents will be reflected or mirrored into the other.

The nominal value of reference current for the API circuit can be adjusted by means of potentiometer R88.

**CONTROL SIGNAL LOGIC**

The circuit is built-up around one 8-bit counter U32, which is clocked by the input signal to the reference divider. The clock frequency is 5.36576 MHz.

The counter is reset by the output signal from the reference divider.

The control logic delivers reset signal to the ramp generator and sample signal for the sample & hold circuit. The output signals from the circuit are generated through detection of which state the 8-bit counter is in, and the detection is done by means of the logical circuitry formed by U25 and U29.

**API CIRCUIT**

The circuit delivers signal to the modulus control logic and correction signal (API voltage) for the phase detector. The circuit is built-up around a 12-bit digital accumulator constituted by U2, U3, U4, U7, U8, U9, and U12 containing a fraction register, a binary adder, and a sum latch.

Overflow information from the binary adder is led to the modulus control logic and implies a change in the integer number dividing figure in one reference cycle.

In every reference cycle the contents of the accumulator is renewed by clocking the sum latch, the clocking is controlled by the control logic circuit.

The output from the binary adder is led to a 12-bit D/A converter U14, which in connection with OP. AMP U18 generates the API voltage.

The reference current to the D/A converter is derived from the reference current to the phase detector by means of the current mirror and is led through the current switch and current buffer & filter to the D/A converter.

D11, D12, Q16, and Q15 constitute the current switch, which adjusts the mean value of the reference current to the D/A converter as a function of the integer number dividing figure in the loop.

When the signal on basis of Q15 is at high state, D11 is switched on and D12 off and vice versa, and by changing the duty cycle of a square wave signal on basis of Q15 the mean value of the current to the D/A converter can be adjusted.

Control of the current switch is carried out by the 1/N correction logic, which as a function of the output from the programmable divider and the output from the prescaler produces a square wave signal measurable on U13 pin 13 where the duty cycle is varied as function of the integer number loop dividing figure so that the duty cycle increases for decreasing VCO frequency and vice versa.

From the current switch the current is led to buffer & filter constituted by Q14, C84, and C85, which buffers and filters out the reference current to the D/A converter.

### **MODULUS CONTROL LOGIC**

The modulus control logic is constituted by U28 and U23, which as a function of overflow signal from the accumulator, prescaler output, modulus control signal from the programmable divider and output from the 1/N correction logic, generates modulus control signal for the prescaler.

The circuit does not effect the modulus control signal from the programmable divider when the loop dividing figure includes a fraction part, the prescaler modulus shall be changed in one prescaler output period from 32 to 33, if there is a reference cycle where overflow signal is given from the digital accumulator. This change of prescaler modulus implies the needed change of dividing figure to increase the mean frequency of the VCO with a fraction of the reference frequency, and the change is timed through the modulus control logic.

### **DIVIDER CIRCUITS**

The programmable divider consists of a dual modulus prescaler U22 dividing by 32/33 and a programmable divider included in U24. The integer number dividing figure is latched into U24.

The reference divider consists of a D-FF U31 followed by the programmable reference divider U30. The division ratio of U31 is 2 and the division ratio of U30 is 131. This implies a total division ratio of 262.

### **BUFFER CIRCUITS**

The VCO signal is led from the VCO buffer into LOI buffer and prescaler buffer.

The LOI buffer consists of Q17 and Q22 and the buffer generates the necessary power level for both receiver and exciter modules.

The output of the buffer is led to relay RE01, which feeds the signal to receiver and exciter respectively, dependent upon whether the transceiver is in transmit or receive mode.

The control of RE01 is carried out by serial to parallel register.

The prescaler buffer consists of Q18 and Q21 and the major task of the circuit is to prevent spurious signals created in the prescaler from being added to the VCO signal and through that imply spectral impurity of the LOI signal.

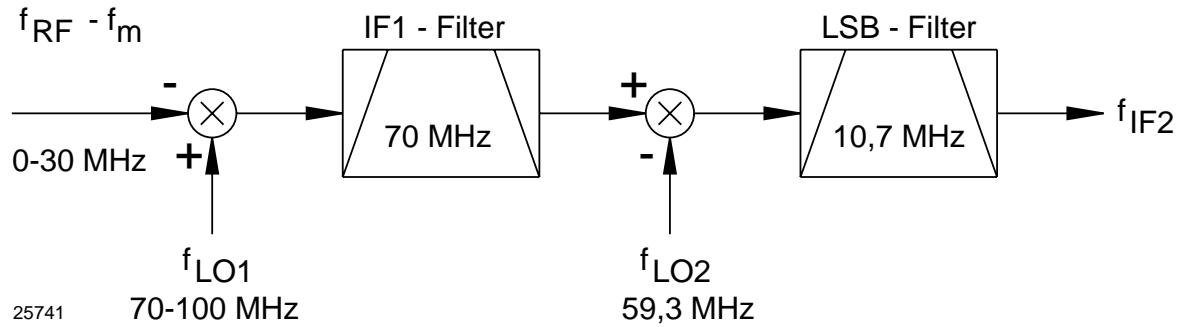
The TCXO signal is led to the TCXO buffer, which consists of Q27 and Q26.

The buffer delivers signal for the reference divider and carrier reinjection signal for both receiver and exciter modules.

**PHASE LOCKED LOOP 2**

The change between transmitted and received upper and lower sideband is generated by a frequency change in PLL2 as illustrated below.

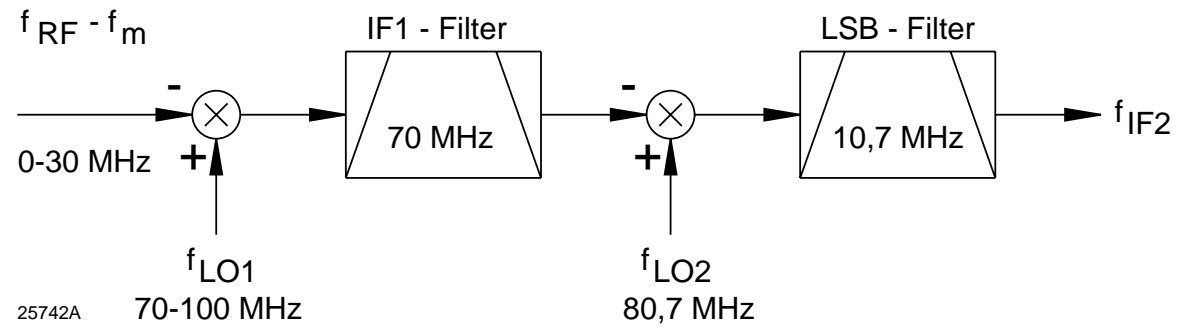
USB Receiver



$f_m$  = Modulation frequency  
 $f_{IF2} = f_{LO1} - f_{LO2} - f_{RF} - f_m$ .

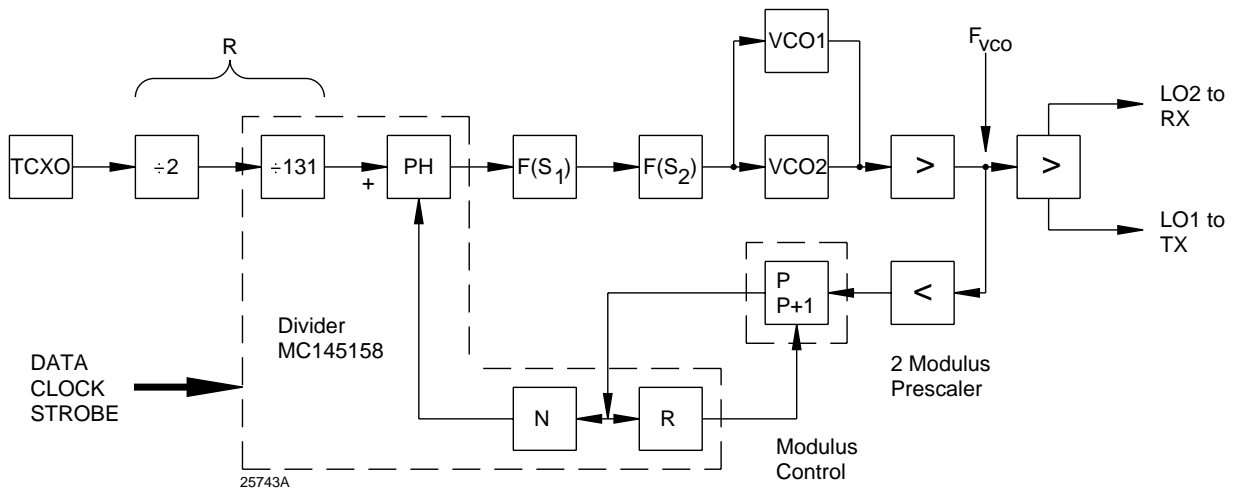
The modulation frequency  $f_m$  changes sign meaning that a received upper sideband signal will pass through the 10.7 MHz lower sideband IF-filter.

LSB Receiver



$f_m$  = Modulation frequency  
 $f_{IF2} = f_{LO2} - f_{LO1} + (f_{RF} - f_m)$

The modulation frequency  $f_m$  does not change sign meaning that a received lower sideband signal will pass through the 10.7 MHz lower sideband IF filter.

**BLOCK DIAGRAM OF USB/LSB SYNTHESIZER**

From the block diagram it can be shown that the output frequency  $f_{VCO}$  has the following function of  $f_{TCXO}$ :

$$f_{VCO} = f_{TCXO} \frac{1}{R} (N * P + A) \quad P \text{ chosen to } 32.$$

$$f_{TCXO} = 10.73152 \text{ MHz}$$

When upper sideband is chosen the following counts are read into the divider U35.  $R = 2 * 131$ ,  $N = 45$ ,  $A = 7$ , this gives  $N * P + A = 1447$  and the lock frequency is  $f_{VCO} = 59,269.120 \text{ MHz}$ .

When lower sideband is chosen the following counts are read into the divider U35.  $R = 2 * 131$ ,  $N = 61$ ,  $A = 19$ , this gives  $N * P + A = 1971$  and the lock frequency is  $f_{VCO} = 80,732.160 \text{ MHz}$ .

**VOLTAGE CONTROLLED OSCILLATOR**

The circuit contains two similar VCO's. One is active in LSB mode and the other is active in USB mode. The oscillator which is active in the LSB mode is built around the transistor Q30. Coil L31, paralleled with C130 and C129 in combination with the variable capacitor D19 form the main part of the frequency determining elements.

D20 and R120 which are connected to the gate of the oscillator transistor prevent the gate source voltage from becoming positive which will cause the oscillator noise to increase.

To activate the oscillator U01 - pin Qg is "LOW" which means that transistor Q28 is off and the transistors Q29, Q31 are on supplying the oscillator transistor with DC voltage.

The oscillator which is active in the USB mode is built around the transistor Q33. Coil L37 parallel with C150 and C149 in combination with the variable capacitor D22 form the main part of the frequency determining elements.

D23 and R133 which are connected to the gate of the oscillator transistor prevent the gate source voltage from becoming positive which will cause the oscillator noise to increase.

To activate the oscillator U01. Pin Qg is "high" which means that the transistors Q32 and Q35 are on supplying the oscillator transistor with DC voltage.

When one oscillator is supplied with DC voltage the other is off.

The DC supply to the oscillator switches the diode D21 or D24 on and thereby supplies DC voltage to the oscillator buffer transistor Q36. From this transistor the local oscillator signal is fed to the prescaler buffer and to the output local oscillator buffer.

**PRESCALER BUFFER**

From the oscillator buffer transistor Q36 the signal is fed through the network consisting of R159 and C180 to the grounded basis transistor Q38. The local oscillator signal is amplified here and fed through the attenuator R168/R170 and the amplifier transistor Q40. The result is an amplitude stabilized signal which is fed to the prescaler U36.

**PRESCALER AND DIVIDER**

The programmable divider consists of a dual modulus divider U36, dividing by 32/33 and a programmable divider included in U35.

The division ratio is determined by the number latched into U35 and together with U36 the divider works as a conventional dual modulus divider with the modulus control from U35 controlling the prescaler U36. The reference frequency divider is included in U35.

The reference frequency input on pin 1 has the frequency 5,365.760 MHz and the reference division ratio R read into U35 is 131 leading to a reference frequency of 40.96 kHz which can be monitored on pin 13. This 40.96 kHz signal is used as the reference signal to the phase detector. The variable frequency to the phase detector is the VCO frequency divided with the read in "division ratio". This ratio is 1447 when USB mode is chosen, and by LSB mode 1971 leading to the two phase lock frequencies in USB of 59,269.120 MHz and in LSB mode 80,732.160 MHz.

**PHASE DETECTOR AND LOOP FILTER**

The phase detector is an integrated part of U35. The input reference frequency  $f_R$  is 40.96 kHz which can be monitored on pin 13 and the input variable frequency  $f_V$  can be monitored on pin 3. The three-state output of the phase detector produces a loop error signal which is used with the loop filter to control the VCO. The phase detector output is for frequency  $f_V > f_R$  or  $f_V$  leading, negative pulses. For frequency  $f_V < f_R$  or  $f_V$  lagging, positive pulses and for  $f_V = f_R$  and phase coincidence, the output is in high impedance state.

The loop filter consists of two parts. The first part of the loop filter built around the amplifier U34 and the R/C network R118 and C131 take care of the loop characteristic. The second part of the filter consisting of L34, L35 and C141/C143/C146 is a passive lowpass filter which removes the remaining part of the 40.96 kHz reference signal from the VCO control signal.

**OUTPUT LOCAL OSCILLATOR BUFFER**

From the oscillator buffer transistor Q36 the VCO signal is amplified in transistor Q34 and filtered in the lowpass filter consisting of C176, L40, and C177. Before the signal is fed to the output terminal it is amplified in transistor Q37 and fed through the relay RE2.

When the relay is activated the VCO signal is fed into the first mixer on the transmitter module. The diode D26 is conducting and thereby grounding the remaining part of the signal to the receiver module. When the relay RE2 is not activated the diode D26 is reversed and the VCO signal is fed to second mixer on the receiver module.

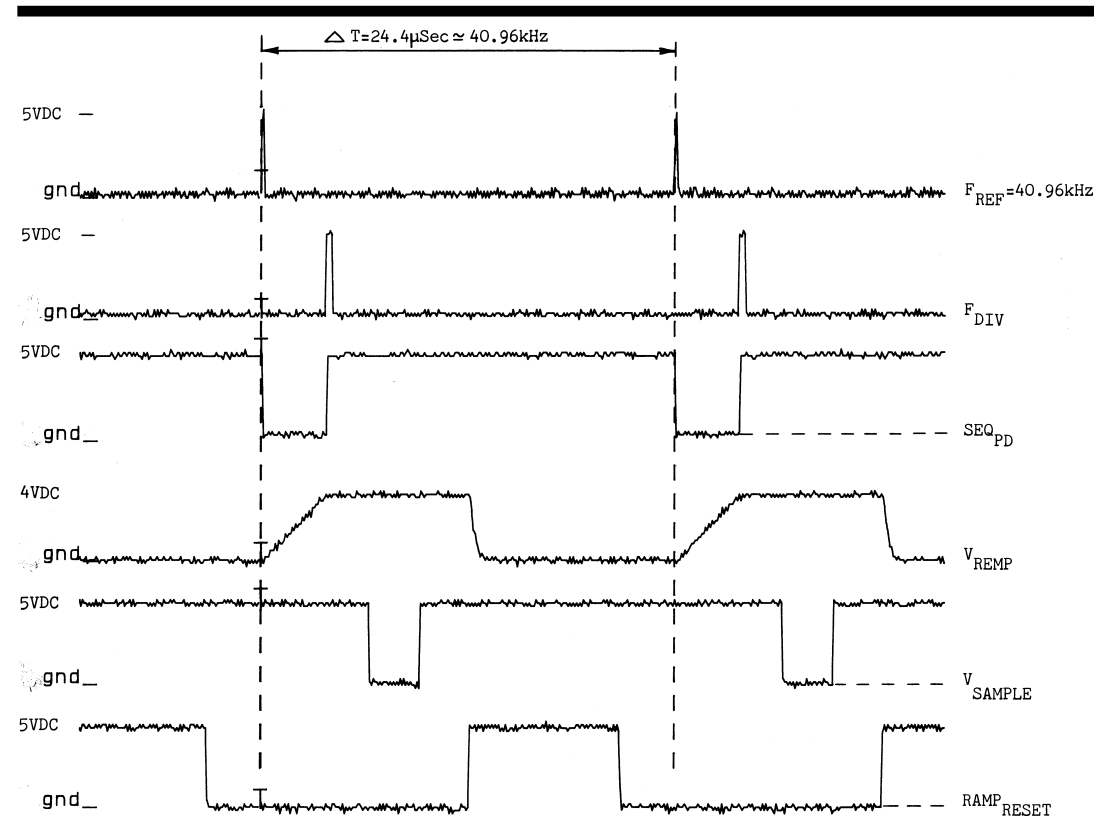
**SYNTHESIZER WAVEFORMS**

The below waveforms are identified with a signal name, which can be found in the diagram of the Synthesizer module (3).

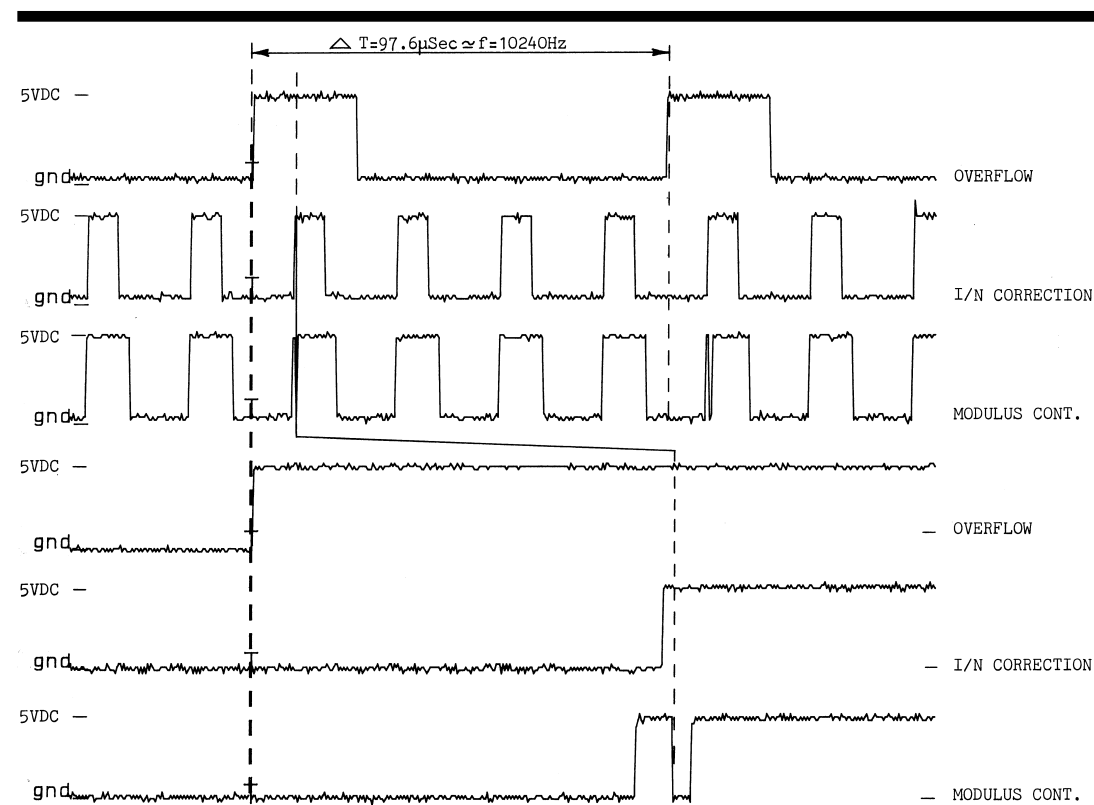
**TEST CONDITIONS**

Frequency setting  $f_{RX} = 2058.24 \text{ kHz}$

Mode = J3E/USB

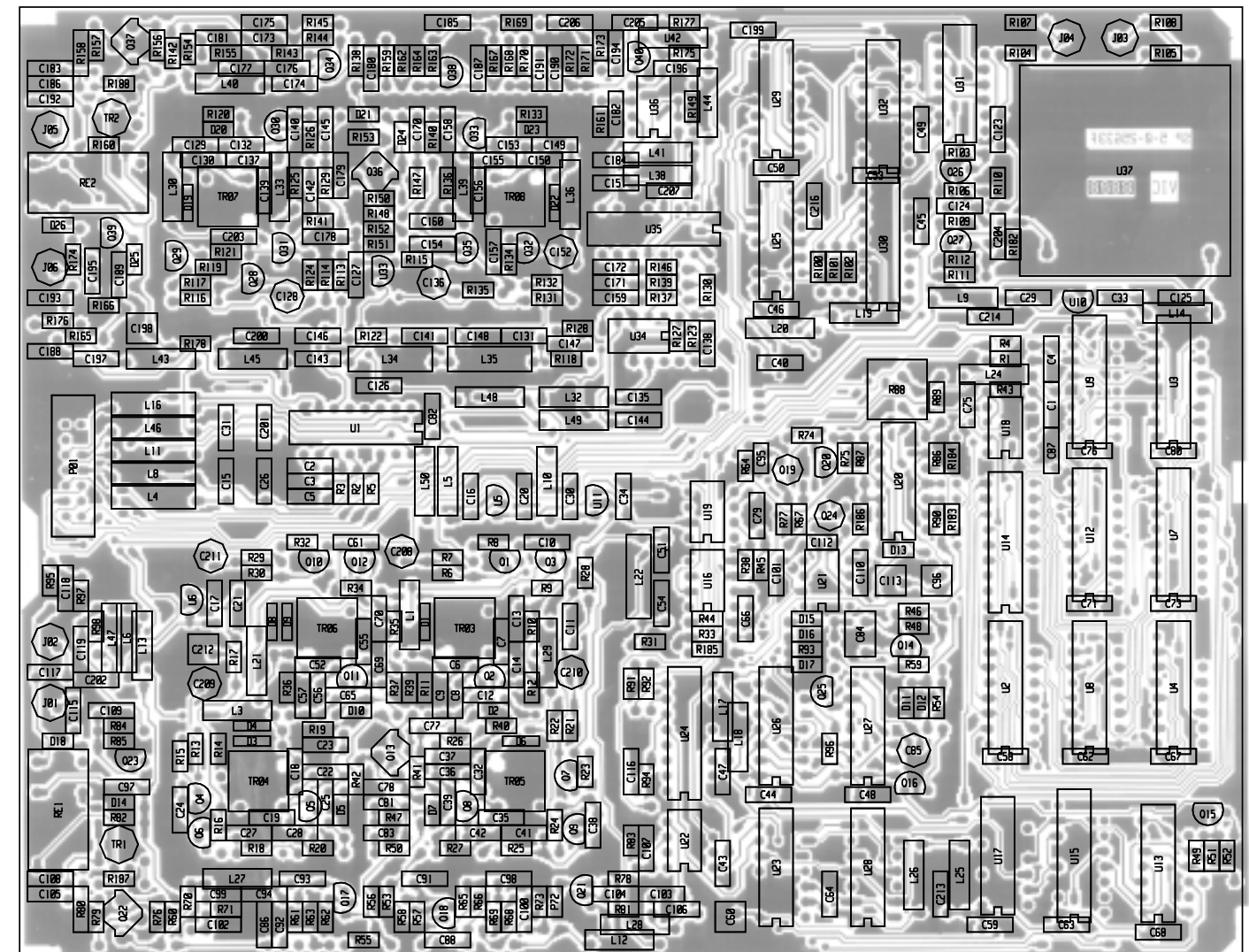
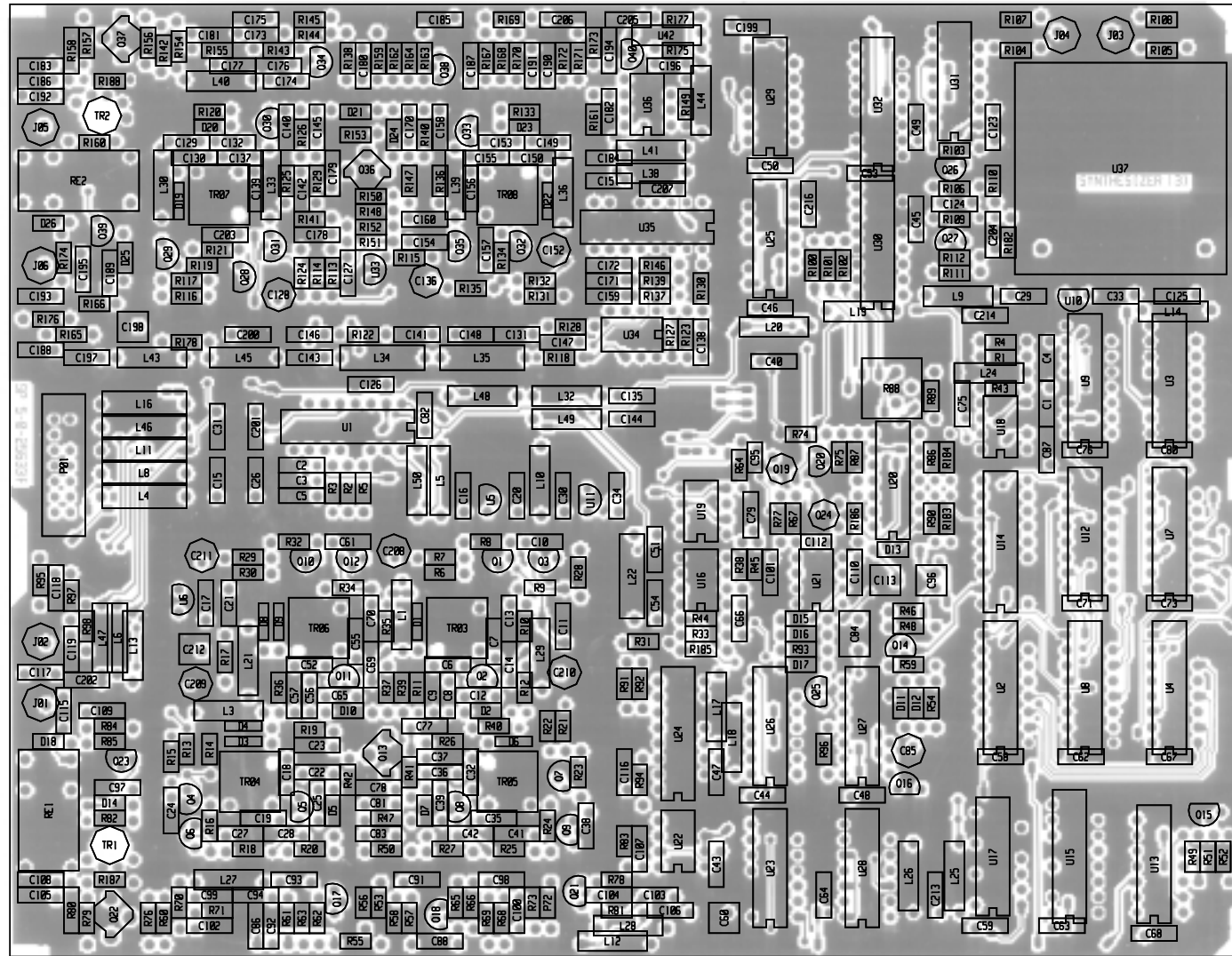


27487



27488

COMPONENT LOCATION SYNTHESIZER UNIT MODULE 3



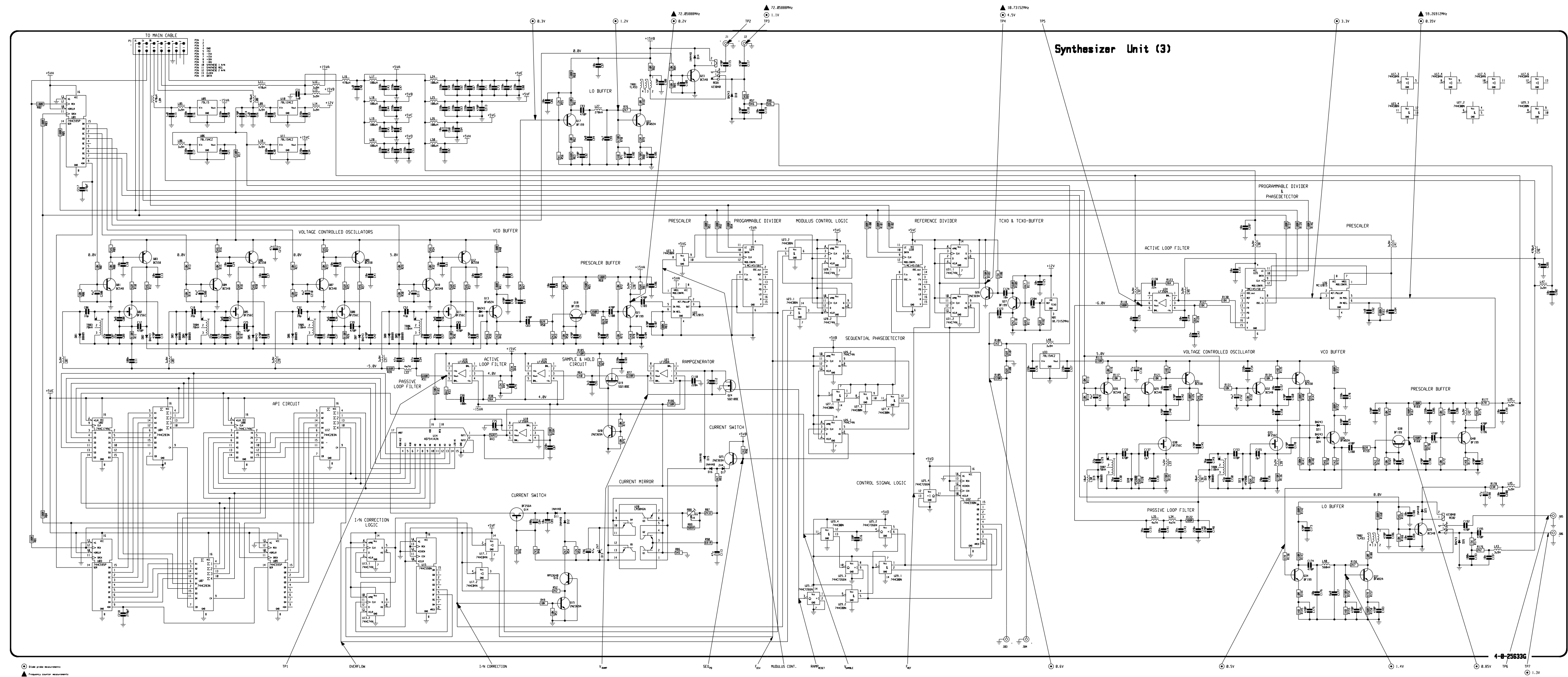
View from component side with upper side tracks.

View from component side with lower side tracks.

PCB rev. 25633F



SYNTHESIZER UNIT MODULE 3



This diagram is valid for PCB rev. 25633F



## 5.4 MAIN PROCESSOR UNIT (MODULE 4) PART NO. 55.150

### INTRODUCTION

The following part gives a description of the circuit principles on the CPU board and the Filter board, referring to the schematics and component lists.

Control lines which are active at a logic high level, will be printed like **THIS**.

Control lines which are active at a logic low level, will be printed like **!THIS**.

### TT-3820A MAIN PROCESSOR BOARD

The main processor board includes the host processor circuits for the complete control of

- Display Module
- Keyboard Module
- Filter Module
- Receiver set-up and control, SPI-BUS

Memory configuration

- 3x128 Kbyte of program memory
- 64 Kbyte RAM disk (battery backed-up)
- 32 Kbyte NON volatile system configuration memory
- 512 Kbyte scratch pad memory combined with text- and input/output buffer

memory.

Various

- CCITT V.24/V.28 serial input/output circuit
- T-BUS interface
- Parallel Centronic Printer interface,
- NMEA 0183 interface

### CENTRAL PROCESSOR UNIT (CPU).

The CPU (U6) used on the Main Processor Board is a 8 bit 10 MHz 80188 processor with multiplexed data and lower address bits.

The CPU clock frequency is generated using a 20 MHz crystal connected directly to the processor.

Control signals and address bits from the CPU are buffered in U4 and U8 by means of the **ALE** signal.

The U5 and U7 forms the I/O mapped chip selects not supplied by the CPU.

The U3 is a combined watch-dog, battery switchover and chips select protection.

**Battery power**      The voltage on VOUT (pin 2) will always be whatever is highest of the supply voltage (pin 3) and the battery voltage (pin 1).

**Chip select**      When the supply voltage (pin 3) drops below 4.65 volts the **!CE** signal (pin 12) goes high to block chips select signals to the SRAM U26 and U27.

**Watch-dog**      For proper software operation the **WDI** input (pin 11) needs to be toggled every 1.6 seconds. If not a 50 msec **!RESET** signal will be issued on pin 15 restarting the microprocessor.

U1A and U2A forms a circuit for controlling the watch-dog function. The first activation of the chip select signal U5 pin 15 will enable the watch-dog. The jumper W1 can disable the watch-dog function if inserted during start-up.

### PROGRAMMING MEMORY AND DYNAMIC RAM.

U10, U11 and U12 forms the program memory available on the main processor board (3x128 Kbyte). The program memory layout is as follows:

U13 is a EEPROM containing system configuration and data which needs to be stored in NON volatile memory.

U7B, U9B, U14, U16A/B/C and U17A forms a circuit for protecting part of the EEPROM. To be able to write into the protected part of the EEPROM two keys on the keyboard has to be pressed simultaneously to provide the **!E2WR** signal.

The W4 strap determines which part of the EEPROM to be protected.

The dynamic RAM consists of the RAM circuits U19, U20, U21 and U22, the read/write row/column address gate circuits U15, U18 and U23, the pulse forming network U1B, U7D, U9C/D/E/F, U24A and U25.

The RAM circuits are each organized as 4x256 Kbyte. The refresh of the DRAM is done by the microprocessor using DMA. R12 and C4 ensures the right timing of the **!RAS** and **!CAS** signals to the RAM circuits and multiplexing the row/column addresses.

#### **STATIC RAM CIRCUIT.**

The static RAM consists of the RAM circuits U26 and U27 together with chip select protecting circuit U28A/B/C and U29A. U26, U27, U28 and U29 are all powered by battery power and the

**CSDIS** signal comes from U3 will disable the chip select signals to U26 and U27 if the supply voltage drops below 4.65 volts.

The RAM circuits are each organized as 8x32 Kbyte.

U30 is a dedicated real time clock circuit accessible on a serial basis. The U30 is battery powered to keep running continuously. The timing is based on a 32.768 KHz crystal and for fine tuning C5 can be adjusted for a 128 Hz signal in TP8.

#### **NMEA. SP-BUS AND CONSOLE INTERFACE.**

The NMEA 0183 interface consists of U31, U35 and U50. U50 provides the optically isolation and U31 is a Universal Serial Asynchronous Receiver/Transmitter (USART) in which only the receiver part is used. U35 divides the system clock by 16 before feeding the clock signal to the USART. Internally the USART divides the clock signal by 64 to achieve a baud rate of 4800.

The programmable timer U36 generates 2 auxiliary clock signals for the demodulator/modulator. The clock signals are derived from the system clock of 4.1952 MHz.

The last part of the programmable timer is used to measure the period time of the incoming space tone detected in the demodulator. U17B and U39B are converting the analog space signal to a logical TTL gate for controlling the period measurement counter.

The system clock oscillator consists of U38A/B and the frequency is based on a 4.9152 MHz crystal. The U38B serves as buffer for the oscillator signal. For fine tuning C19 can be adjusted for 4.9152 MHz in TP13.

The U37 contains 2 Serial Communications Controllers serving the console port J2 and TÄBUS port J3 and J4, and interface circuits U24C/D/E, U32 and U34A are converting between TTL levels to/from the SCC and the CCITT V.24/V.28 levels. U24B/F, U33A, Q1, Q2 and Q3 forms the network to interface between TTL levels to/from the SCC and the CCITT V.10 levels.

To ensure the output voltage on the SP-BUS to be either +5V or -5V two voltage regulators U40 and U41 are supplying +5.7V and -5.7V to the Q1 and Q3.

#### **INPUT/OUTPUT AND CONTROL INTERFACE.**

U42 contains 3 input/output ports.

- |        |   |
|--------|---|
| Port A | used as an input port reading 2x4 DIP switches.   |
| Port B | used as an input port reading the keyboard columns and the serial data line to the real time clock circuit U30.                               |
| Port C | used for controlling 3 LEDs DS2, DS3 and DS4, also control of the keyboard light using U33F and Q4, selecting rows for scanning the keyboard. |

U38F and U43A ensures the hardware protection for writing in the EEPROM. The **!E2WR** is only generated if a key from column 0 and column 1 are pressed simultaneously.

The Centronics printer port J6 consists of U44, U45 and part of U46. The status signals from the printer are read using the U44 buffer and the 8 data bits are latched on U45. Two outputs on the U46 latch are used for the control signals to the printer.

One output of the U46 latch is used for serial data for the real time clock circuit U30. The SPI-BUS (J7) consists of 5 outputs from U46 and 2 output from U47. The 5 outputs on U46 are select signals and 3 of these needs to be inverted (U33C/D/E). The 2 outputs on U47 are clock signal and data signal.

The rest of the outputs on U47 are used as follows:

**!PECLR** used for clearing the 2 flip/flops (U17B and U39A) in the period time measurement.

**!E2DI, !E2EN** Disable and enable signal for writing in the EEPROM.

**DSRTTL, RITTL** Control signals for the console port J2.

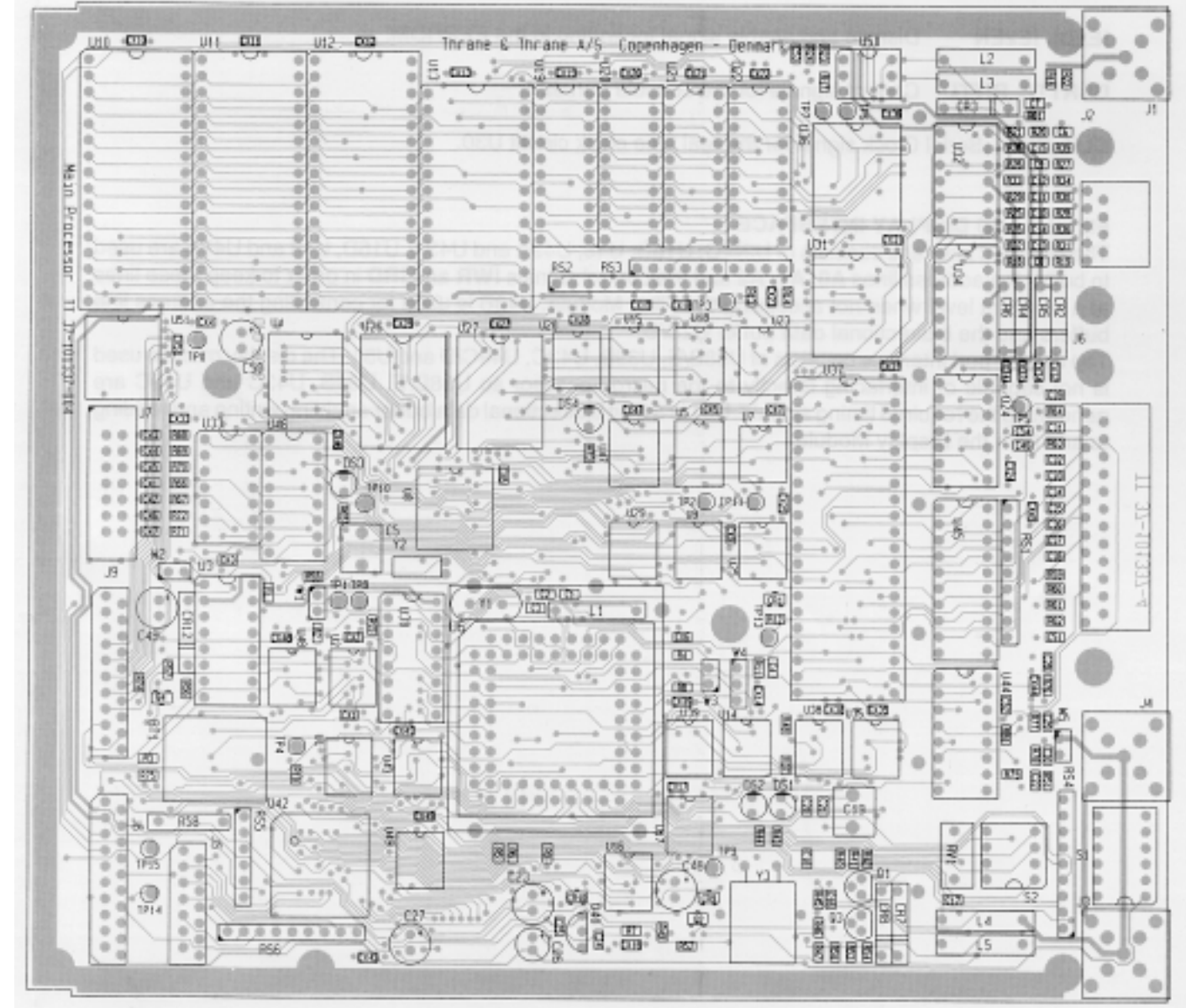
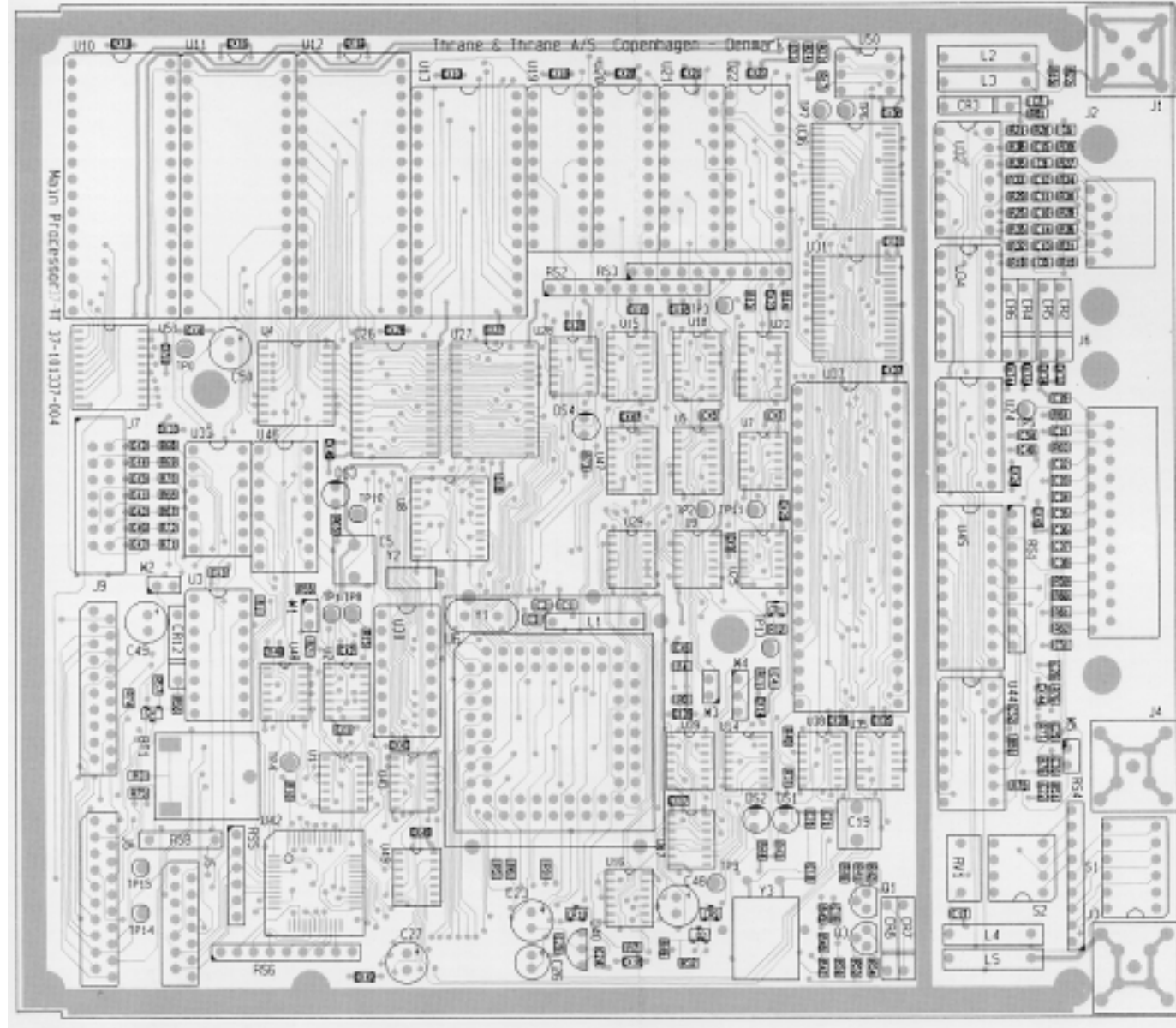
**CLK\_CLK** Serial Clock signal for the real time clock circuit U30.

#### **FILTER AND DISPLAY INTERFACE.**

The filter port interface consists of U2B/C, U16D, U48, U49A and U43A. U16D, U48 and U49A are used to buffer the address lines **A0, A1, A2** and the control signals **!WR** and **!RD** in order to keep these lines at a constant level when not accessing the Filter Module. U43B is used for controlling the address line buffers and the bidirectional data buffer U2B/C.

The display port interface consists of U38B/E, U39B, U43C, U49C/D and U51. The display module used is not capable of interfacing directly to the microprocessor so U38D/E, U39B, U43C and U49C are generating the required timing signals. U51 is a 8 bit bidirectional data buffer enabling writing and reading to and from the Display Module.

COMPONENT LOCATION MAIN PROCESSOR UNIT MODULE 4

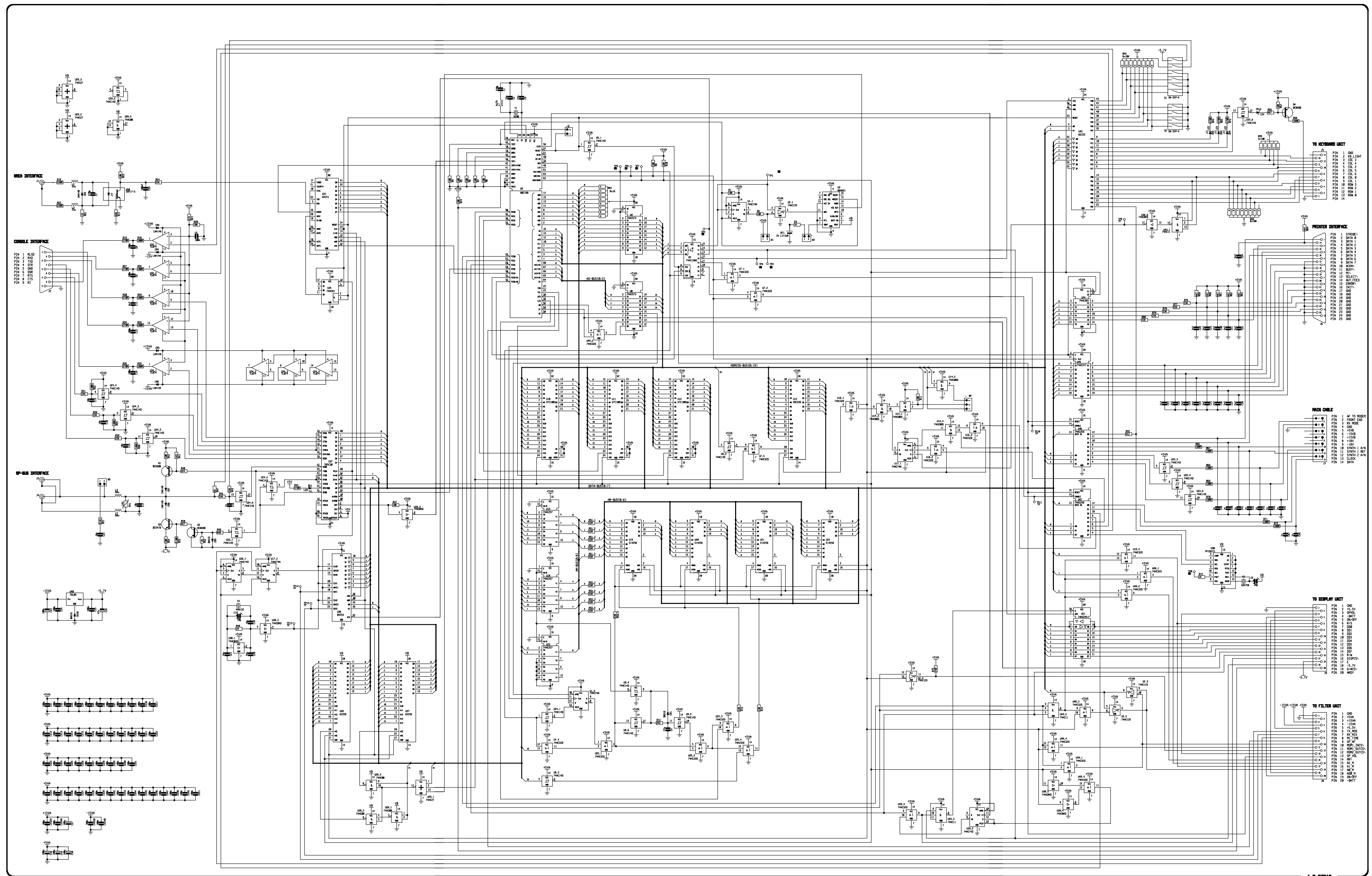


View from component side with upper side tracks.

View from component side with lower side tracks.

PCB rev. TT37-101337-004

MAIN PROCESSOR UNIT MODULE 4



**5.5 FILTER UNIT (MODULE 5) PART NO. 55.151****INTERNAL AND EXTERNAL CONTROL CIRCUIT.**

J1 is the internal connector which connects the filter board to the Main Processor Board.

J2 is the radio interface plug, the control signals from and to other units and the DC supply from the external power source is supplied through this plug.

P3 is the power connector which delivers power from and to the power module. Different analogue speaker control- and AF signals also pass through this connector.

Two circuits, U1 and U2, provide the control signals. U1 only handles signals to the external connector J2, while U2 also handles internal control signals, for the external connector J2. Each external control signal has protective hardware circuitry to help against noise, short circuits e.t.c..

U3 handles input signals from the connector J2 and the demodulated signal DEMOD from the filters. Also here, there is protective hardware circuitry.

**MODEM CIRCUIT.**

Received signal modem part.

The incoming signal AF-IN from the receiver module, is fed through the power module to the amplifier circuit U6.1, and from U6.1 to the analogue mixer U5 pin 13. When U5 pin 11 the RX/TX signal, is set high, U5 pin 14 and pin 15 are selected. The incoming AF signal then passes via pin 14, through a low pass filter, U15.1, U4.2, U4.4 and U4.3, where only frequencies below 2100 Hz pass. The low pass filtered AF signal, is through the buffer amplifier U4.1 returned to the mixer U5 pin 1 where it is mixed with the RXMIX signal. This signal, which is constant 4785 Hz is connected to U5 pin 10. On the way to U5, a detector circuit checks for an overload of signal amplification. This is done via U4.1 and Q10 with DS1 being the LED overload indicator. When there is an overload the R32 potentiometer can be adjusted so U6.1 can be set correctly.

As mentioned before, the low pass filtered AF signal is mixed with the RXMIX signal in U5. The mixed signal at U5 pin 15 MIXO consist of:

Mark: 4785 Hz - 1615 Hz = 3170 Hz  
Space: 4785 Hz - 1785 Hz = 3000 Hz

This two frequencies are present in the MIXO signal, deriving from U5 pin 15, depending on whether the incoming signal is 1615 Hz (mark) or 1785 Hz (space).

MIXO carries the 3170 Hz or 3000 Hz signal to the mark and space filters. The mark filter incorporates U9.1, U9.2, U9.3, U9.4 and U10.2. The characteristics of the mark filter are:

F(centre) = 3170 Hz  
F(generated) = 1615 Hz  
Band width = 100 Hz

The space filter incorporates U9.1, U10.3, U11.1, U11.2, and U11.3. The characteristics of the space filter are:

F(centre) = 3000 Hz  
F(generated) = 1785 Hz  
Band width = 100 Hz

At test point 18 (TP18) the output for the mark filter is between appr. -3,0 V and 0,0 V. The output for the space filter is between appr. 0,0 V and 3,0 V.

U11.4 generates the correct TTL signal based on the positive or negative voltages. U11.4 generates 5,0 V for a mark signal and 0,0 V for a space signal.

Transmitter signal modem part:

The TXMOD signal is a 1615 Hz or 1785 Hz digital signal used for indicating the mark or space tone of the message sent. When the RX/TX signal connected to U5 pin 11 is set low, the TXMOD signal from the main processor module is fed through U5 to pin 14.

The same filter as the one used for reception, is applied again, using 15.1, U4.2, U4.4 and U4.3.

This circuitry assures that the signal is converted to an analogue signal, where only the signal's first



harmonic is present. The signal continues through the buffer amplifier U4.1 back to U5 and becomes present on U5 pin 4 as TXOUT. The TXEN signal is high in the sending state so U5, which also is an analogue switch, selects the right output pins. The TXOUT signal at U5 pin 4 continues through two 4th order filters, which consist of the amplifiers U8.1 and U8.2, to exclude additional harmonics and the final output signal then ends at J2 pin 18 and pin 9 LINE OUT 1 and LINE OUT 2.

#### **LOUDSPEAKER CIRCUIT.**

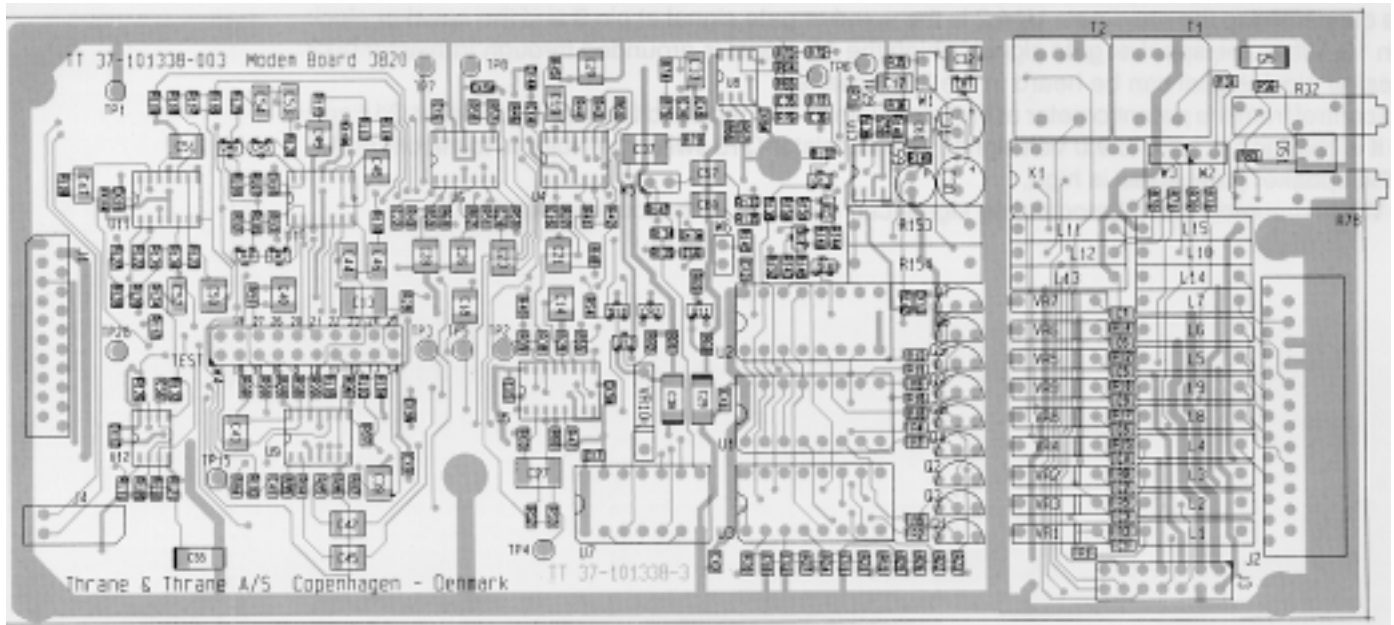
The input AF signal from the receiver module is fed through the amplifier U6.1 to the amplifier U13.2. The output signal of U13.2 is fed to the power module where the signal is amplified and fed back to the filter module to the radio interface plug J2 and to the loudspeaker plug J4.

The signals connected to the nand gate U14.2 is the speaker gate signal at pin 9 and the speaker clock signal at pin 10. When the speaker gate signal is high the AF signal is grounded through transistor Q13 and the speaker clock signal can be heard in the loudspeaker.

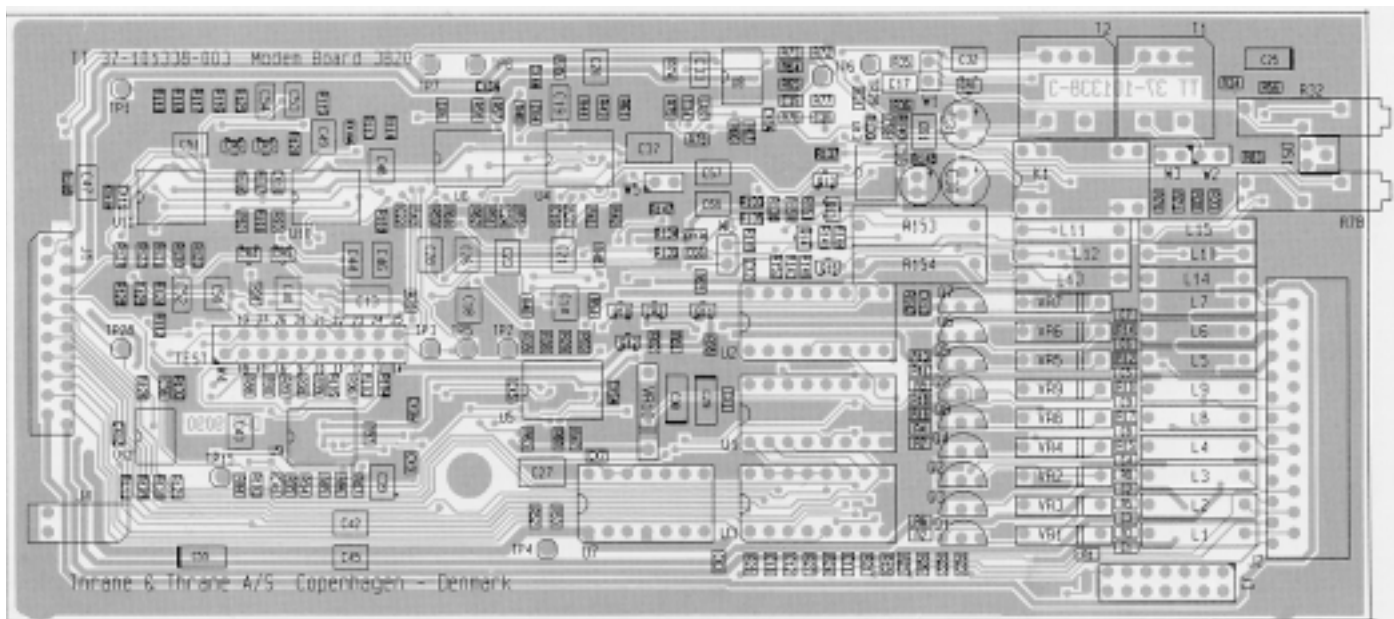
The volume control from the potentiometer at the front plate, is connected to the transistor circuit Q14 and Q16 where it is changed to a 0.0 to 9.0 Volt signal. The transistor Q15 switch the volume to maximum AF out, when the speaker gate signal is high.

If the strap W5 is mounted the TX modulating signal can be heard in the loudspeaker too.

## COMPONENT LOCATION FILTER UNIT MODULE 5



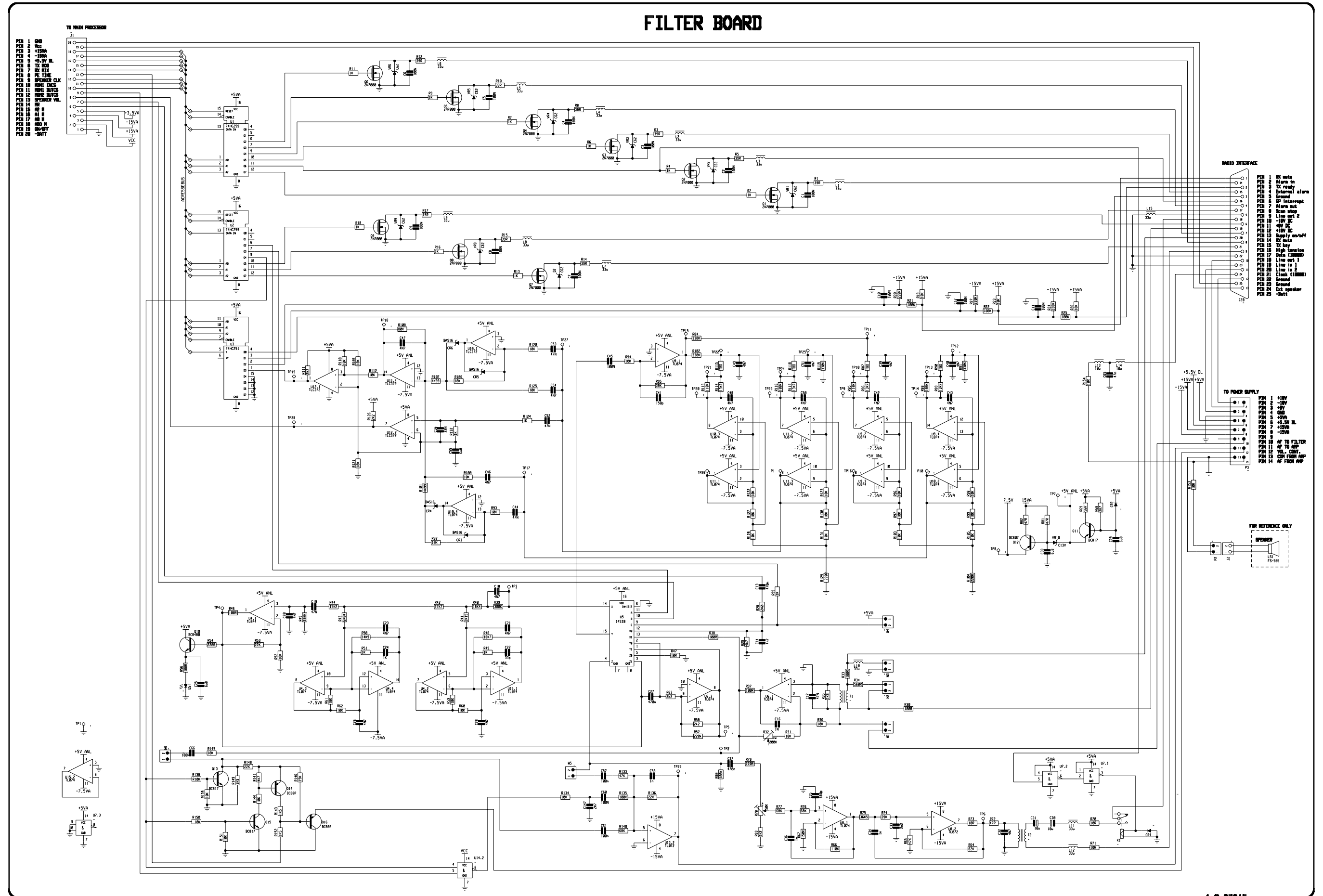
View from component side with upper side tracks.



View from component side with lower side tracks.

PCB rev. TT37-101338-3

FILTER UNIT MODULE 5



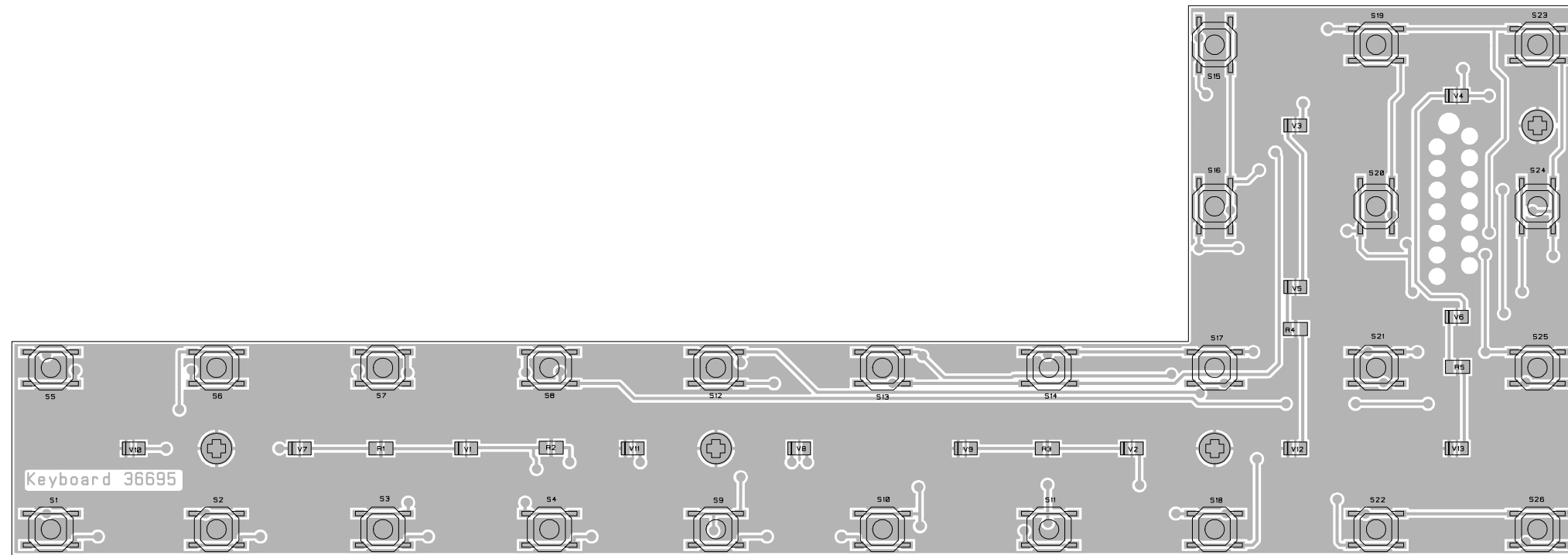
4-8-27215

### 5.6 KEYBOARD UNIT (MODULE 6) PART NO. 636695

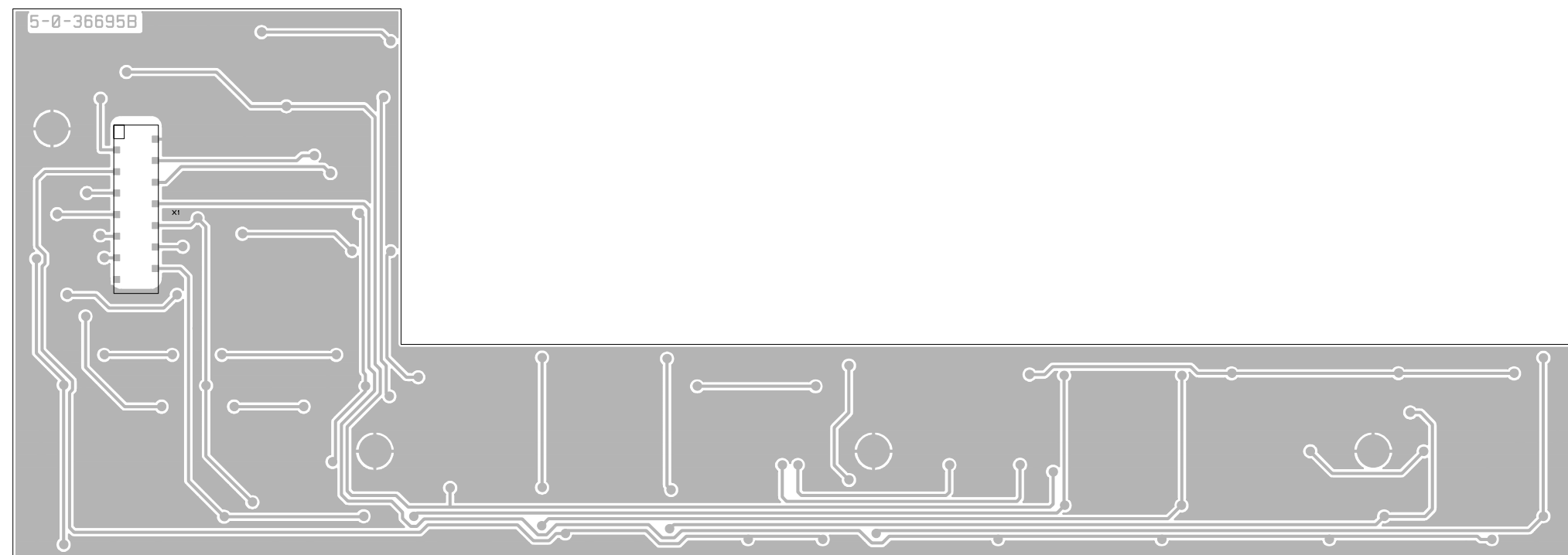
The keyboard consists of a 4\*8 matrix of which 26 keys are used.

The 4 rows are set high alternately and by reading the output on the 8 columns it is possible to determine which key has been activated. This scanning of the keyboard takes place 100 times per second.

The keyboard can be illuminated by 13 LEDs. The voltage across the LEDs are controlled by a transistor Q04 placed on the MAIN PROCESSOR board ( module 4 ) and the current in each LED is approx. 8,5 mA.

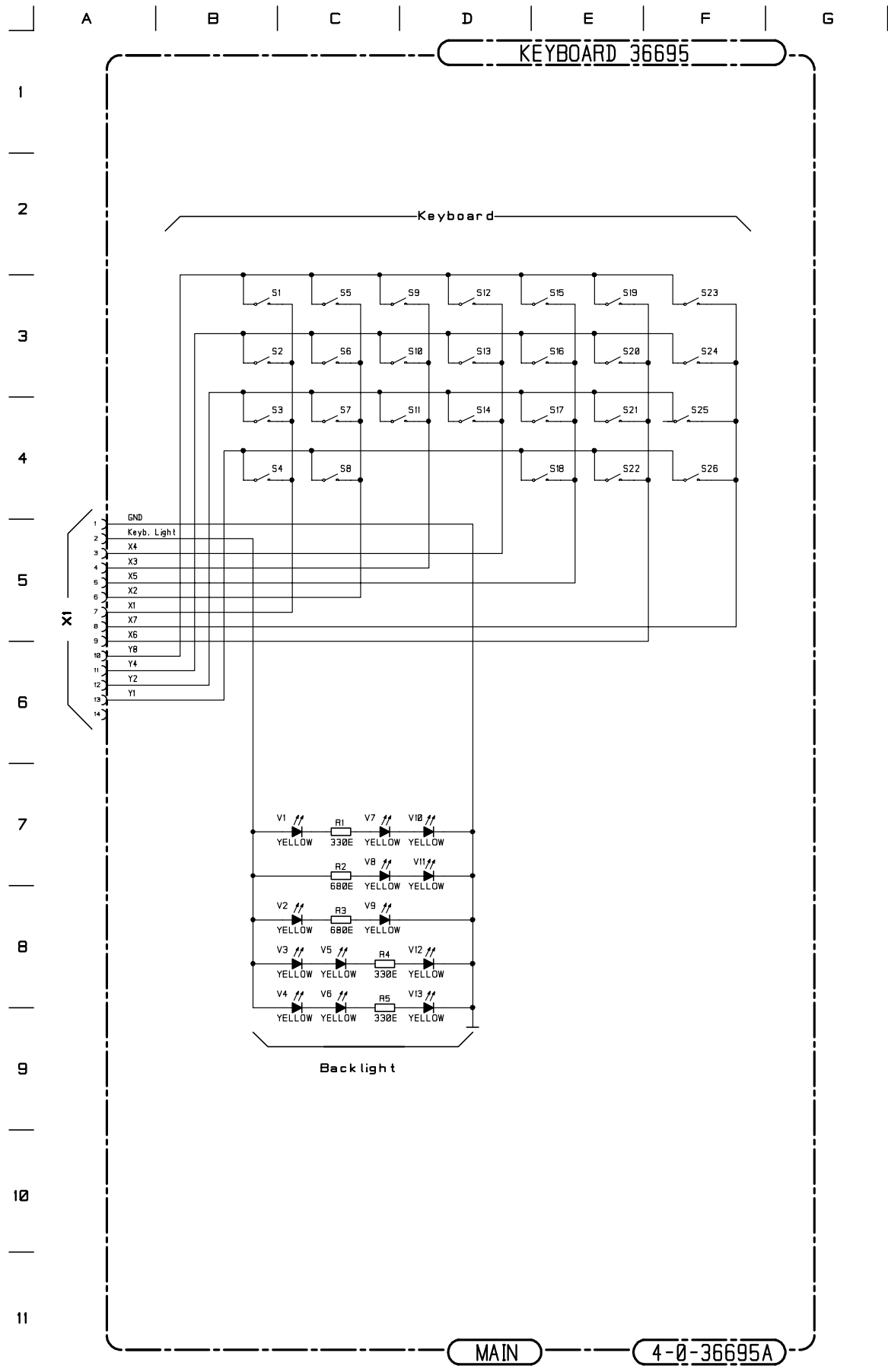


Seen from primary side with primary side tracks.



Seen from secondary side with secondary side tracks.

KEYBOARD UNIT MODULE 6





## 5.7 DISPLAY UNIT (MODULE 7) PART NO. 636696

A LCD display of 240 X 64 dots with LED backlight is used to read out information to the operator.

### DISPLAY MODULE

The display module has a graphical LCD display, 240 X 64 pixels, and a CMOS LCD driver controller built in. The controller has a built-in character generator and display data RAM. All the display functions are controlled by instructions from the MAIN PROCESSOR.

### DISPLAY INTERFACE

PCB 636696 interfaces the MAIN PROCESSOR unit with the LCD-display module.

The PCB is interfaced with the MAIN PROCESSOR (module 4) through the cable terminals X1.

Parallel data DD0-DD7, found in connector X1 pin 7-14 to/from MAIN PROCESSOR, is fed directly to the display connector X2 pins 11-18.

The main processor "E" signal is fed directly to the display-connector X2 pin 7.

The main processor "R/W" signal in X1 pin 15 is fed directly to the display-connector X2 pin 5 to form the display signal "\*WR", and the "R/W" signal, inverted by D2-D, is fed to the display-connector X2 pin 6 to form the display "\*RD" signal.

The "DISPCS" signal at pin 16 in X1 is fed through the delay circuit consisting of D2-A, D2-B, D2-E, D2-F and the resistor/capacitor R24/C5 to pin 20 in X1.

### CONTRAST CONTROL

Contrast control is performed by a four (three) bit digital to the analogue converter consisting of the circuit built around D3, N1-A and N1-D. D3 is a parallel input/output latch with the output pins Q2-Q3-Q4 connected to the resistors R13, R14 and R15 (R12 is not mounted) which are connected to the inverting input of the amplifier N1-A. This circuit forms an 8 step D/A converter (16 steps if R12 had also been mounted. However, the software does not support this). The output of the D/A converter is connected to the non-inverting input of a differential amplifier built around N1-D. The inverting input of the same differential amplifier N1-D is connected to a resistor network consisting of R18, R19 and the NTC resistor R17. This circuit compensates for the display's varying contrast level in respect to temperature changes. The output of N1-D is connected to the display contrast control pin 20.

Negative supply voltage for this circuit is taken from the display module's built-in voltage inverter, X2 pin 4.

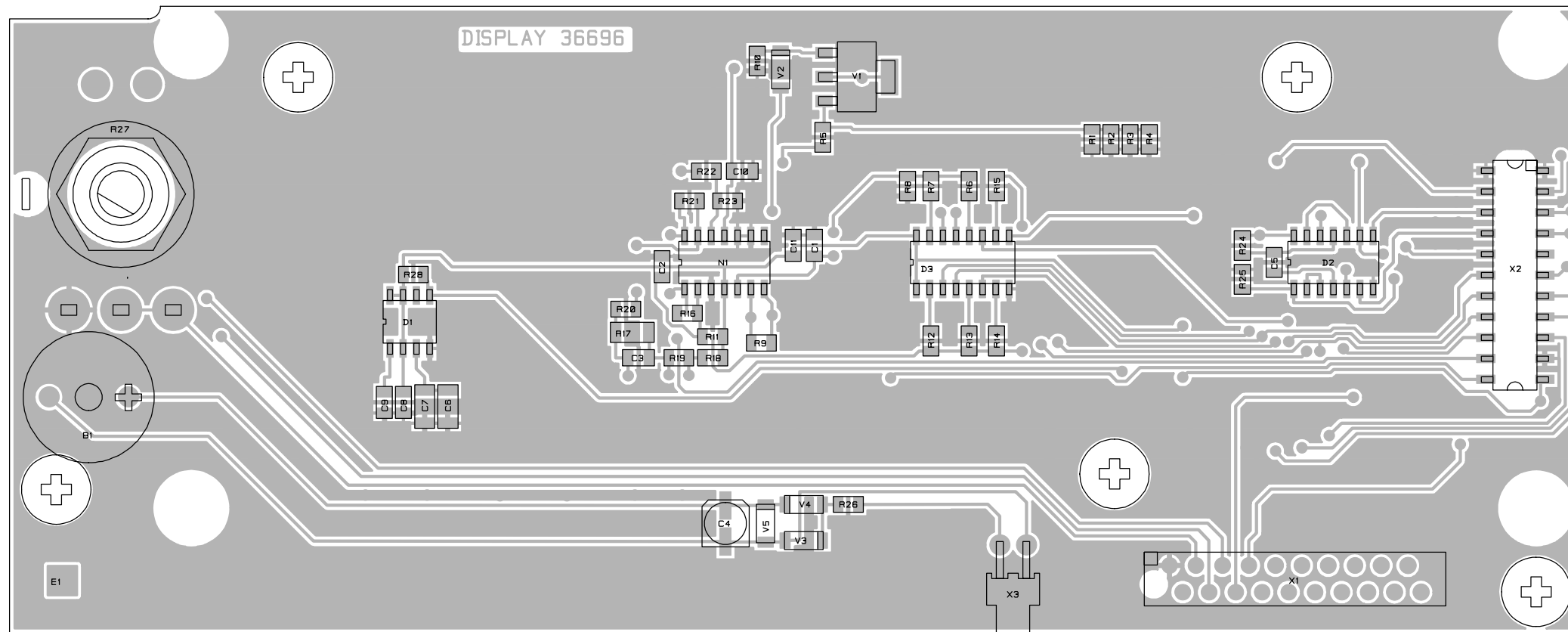
### BACKLIGHT CONTROL

The current passing through the backlight LEDs are controlled by the transistor V1. Emitter of V1 is through the resistor R5 connected to the inverting input of the amplifier N1-B. The non-inverting input of N1-B is passing through the resistors R6 and R7 connected to the output of D3 ( Q5 and Q6 ). The current passing through the backlight LEDs is the same as the current passing through the resistors R1-R4. This means that the voltage across R1-R4 is dependent on the current passing through the LEDs. The gain of the amplifier N1-B is 100. This means that the voltage across R1-R4 is the same as the voltage across R8. The voltage across R8 is controlled by the output pins Q5 and Q6 of D3. This means that the current passing through the backlight LEDs can be controlled by D3 in four steps, with step 1 as 0 mA and step 4 as approx. 350 mA. Diode D2 protects transistor V1's base input against negative voltage, which otherwise could occur briefly on power up.

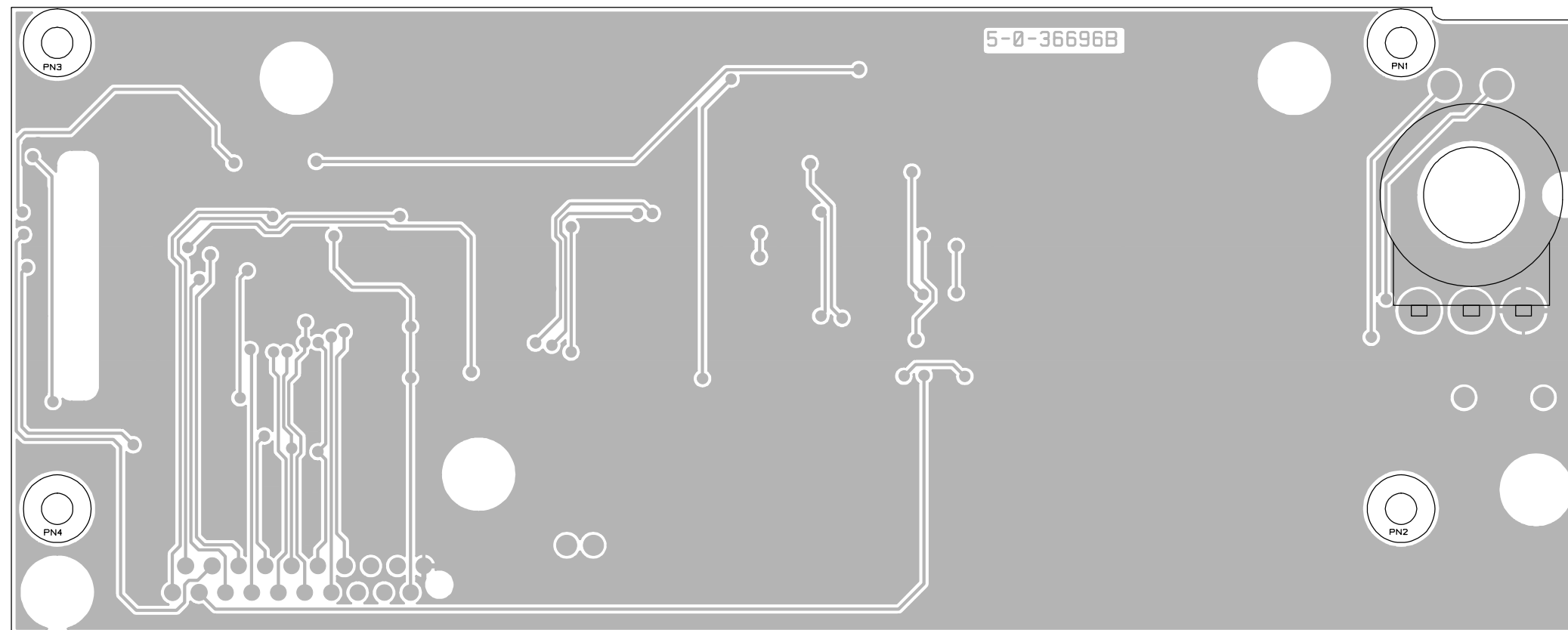
### BUZZER CIRCUIT

The circuit around Buzzer B1 is a rectifier circuit, converting the normal AC loudspeaker signal into an DC-voltage which is then applied to DC-buzzer B1. A DC-buzzer is chosen in stead of a loudspeaker, because of lacking mechanical space for a loudspeaker, and because it is used only to announce received calls.

COMPONENT LOCATION DISPLAY UNIT MODULE 7



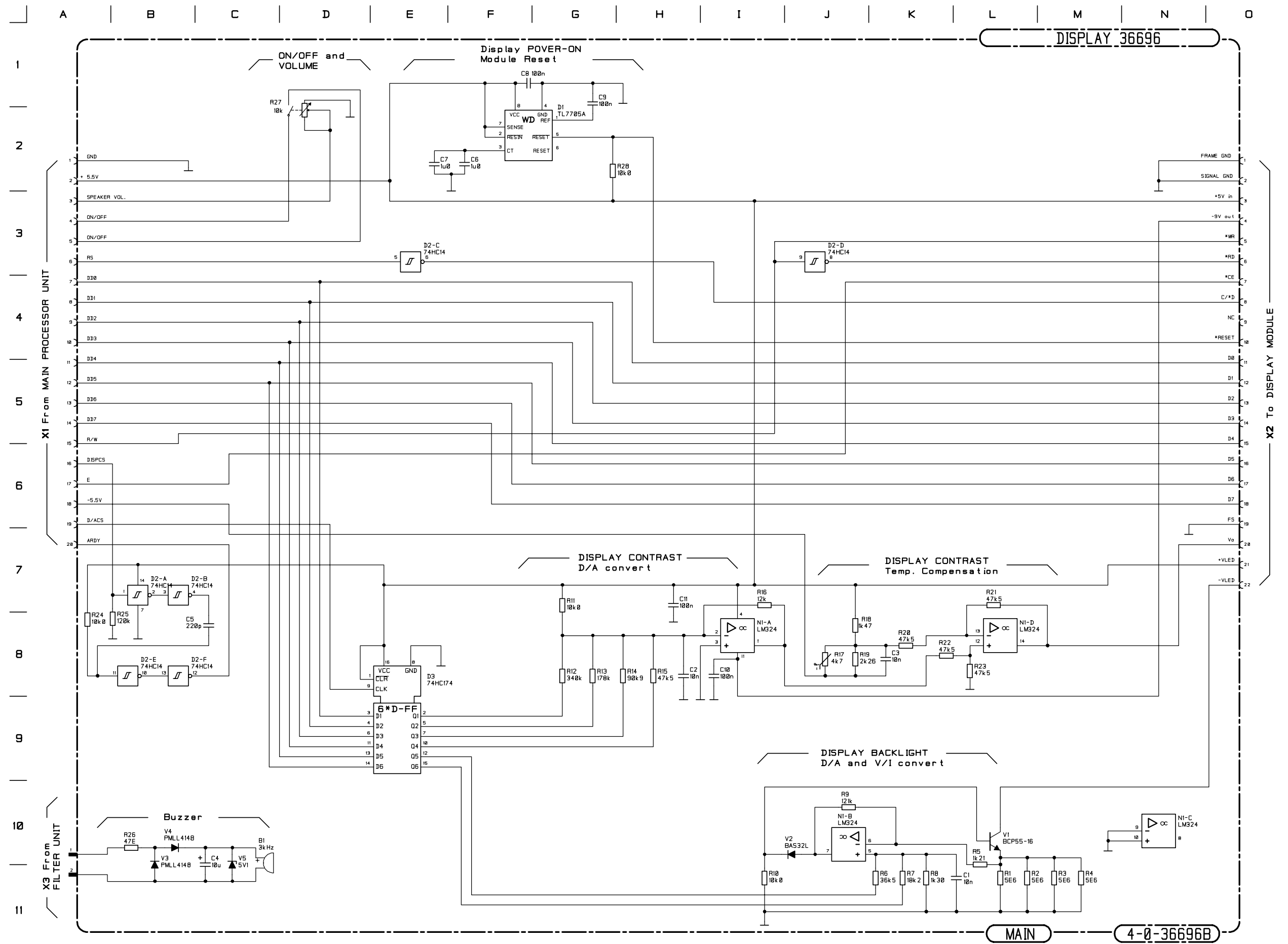
Seen from primary side with primary side tracks.



Seen from secondary side with secondary side tracks.



DISPLAY UNIT MODULE 7



This diagram is valid for PCB rev. 36996B

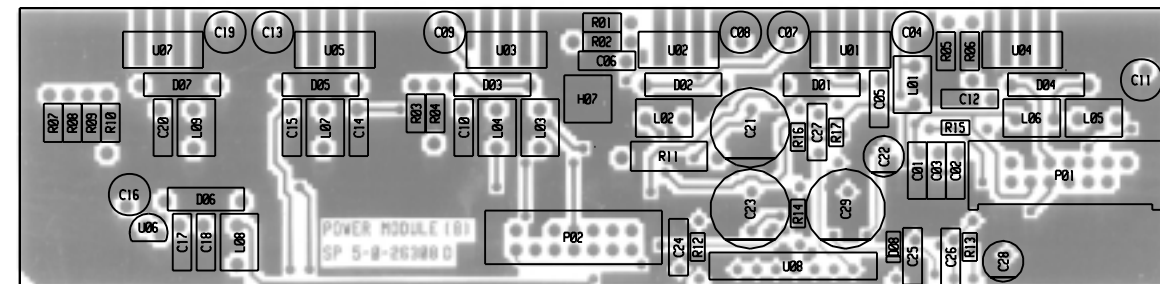
### 5.8 POWER UNIT (MODULE 8) PART NO. 726308

From the external power supply the power unit is supplied with +9V, +18V and -18V this voltages are through the seven regulators filtered and stabilized and fed to the other units.

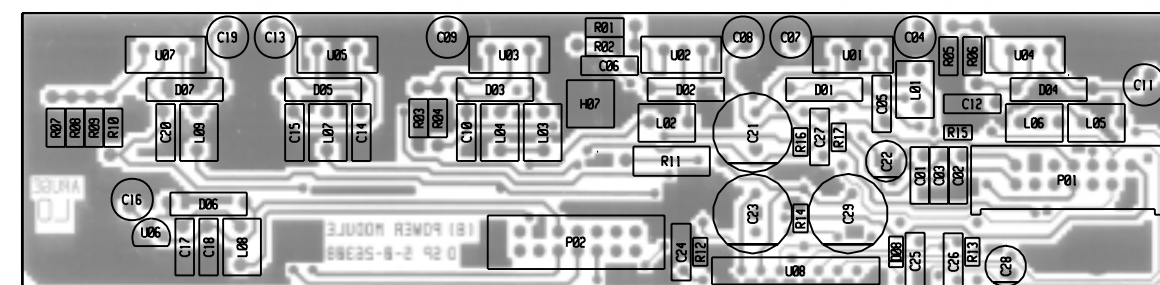
#### REGULATORS.

The regulators U01, U02, and U03 supply the main processor and the filter unit with +15V, -15V and +5V and the regulator U04 supply the display backlight with +5.5V. The regulators U05, U06 and U07 supply the receiver, the front end and the synthesizer unit with +15V, -15V and 5.2V. The regulator U07 can be adjusted by cutting one of the resistors R07 or R08.

#### COMPONENT LOCATION POWER UNIT MODULE 8



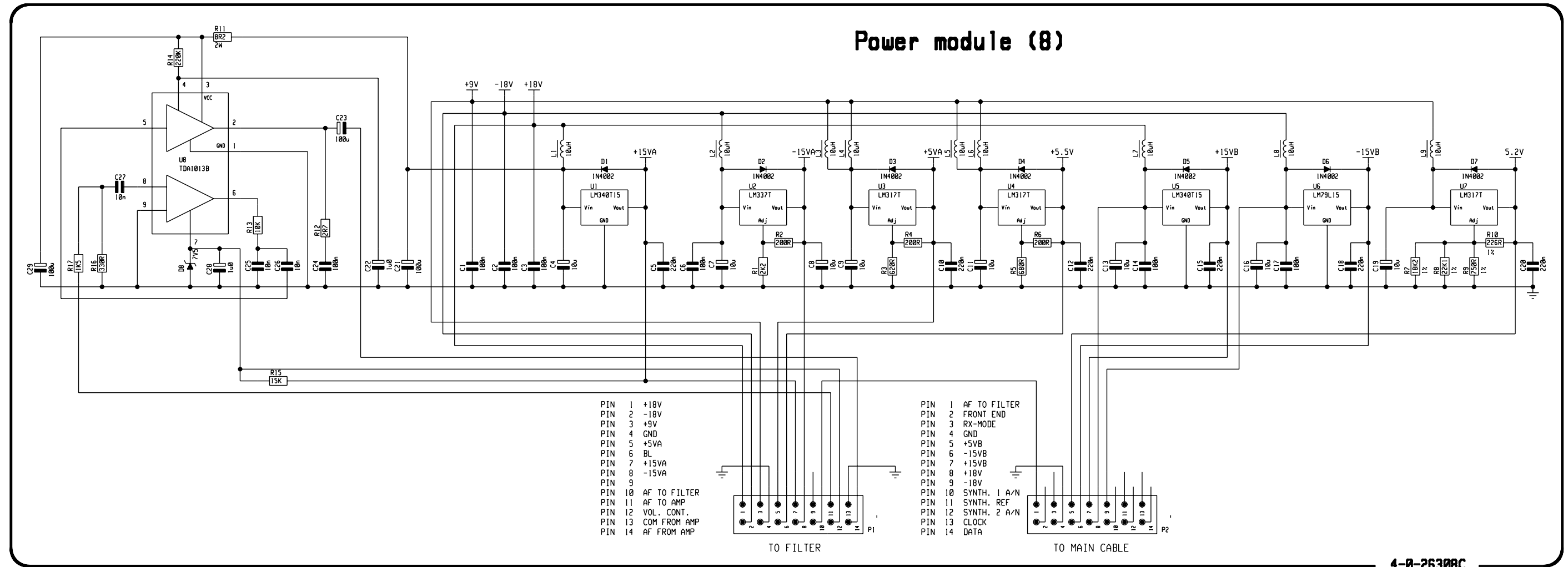
View from component side with upper side tracks.



View from component side with lower side tracks.

PCB rev. 26308D

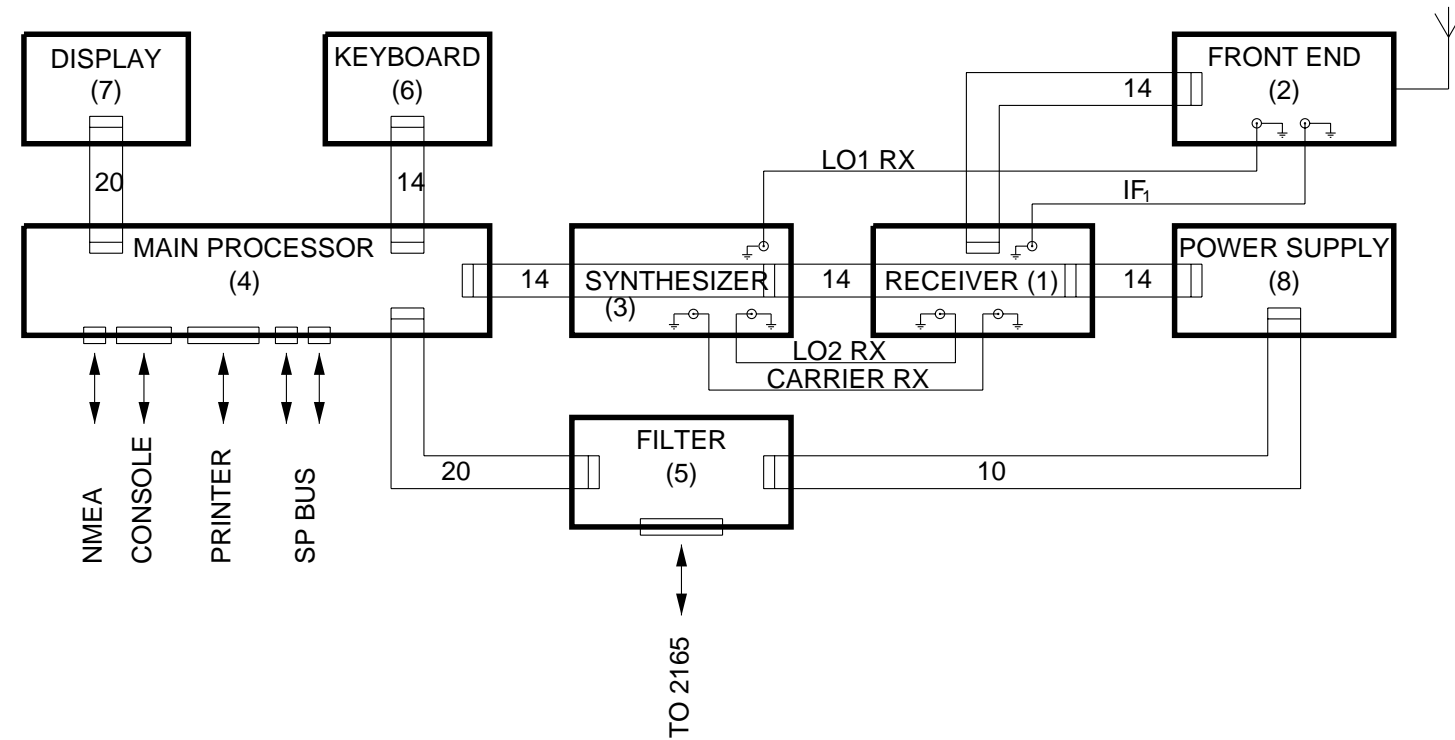
POWER UNIT MODULE 8



4-0-26308C

This diagram is valid for PCB rev. 26308D

5.9 INTERCONNECTION CABLE PLAN



CABLE 1:  
MAIN CABLE-RM2152

POWER SUPPLY (8)	RECEIVER (1)	SYNTHESIZER (3)	MAIN PROCESSOR (4)
1 AF TO MODEM	1	1	1
2 FRONT END	2	2	2
3 RX-MODULE	3	3	3
4 GND	4	4	4
5 +5VB	5	5	5
6 -15VB	6	6	6
7 +15VB	7	7	7
8 +18V	8	8	8
9 -18V	9	9	9
10 SYNTHESIZER 1 A/N	10	10	10
11 SYNTHESIZER REF	11	11	11
12 SYNTHESIZER 2 A/N	12	12	12
13 CLOCK	13	13	13
14 DATA	14	14	14

CABLE 2:  
FILTER TO POWER MODULE

POWER SUPPLY (8)	MODEM (5)
1 +18V	1
2 -18V	2
3 +9V	3
4 GND	4
5 +5VA	5
6 +3.5V	6
7 +15VA	7
8 -15VA	8
9 NC	9
10 AF TO MODEM	10

CABLE 3:  
FRONT END TO RECEIVER MODULE

RECEIVER (1)	FRONT END (2)
1 NC	1
2 NC	2
3 NC	3
4 GND	4
5 NC	5
6 NC	6
7 DATA	7
8 CLOCK	8
9 NC	9
10 FRONT END	10
11 +18V	11
12 +15VB	12
13 +15VB	13
14 +5VB	14

CABLE 4:  
FILTER TO MAIN PROCESSOR MODULE

MODEM (5)	DISPLAY (7)
1 GND	1
2 +5VA	2
3 +15VA	3
4 -15VA	4
5 BL	5
6 TX MODULATION	6
7 RX MIX	7
8 PE-TIME	8
9 SPEAKER AF	9
10 MDM1 INC5	10
11 MDM1 OUTC5	11
12 MDM2 OUTC5	12
13 -BATT	13
14 MASTER RESET	14
15 A2 TO MODEM	15
16 A1 TO MODEM	16
17 A0 TO MODEM	17
18 ADD MODEM	18
19 ON/OFF	19
20 SPEAKER VOL.	20

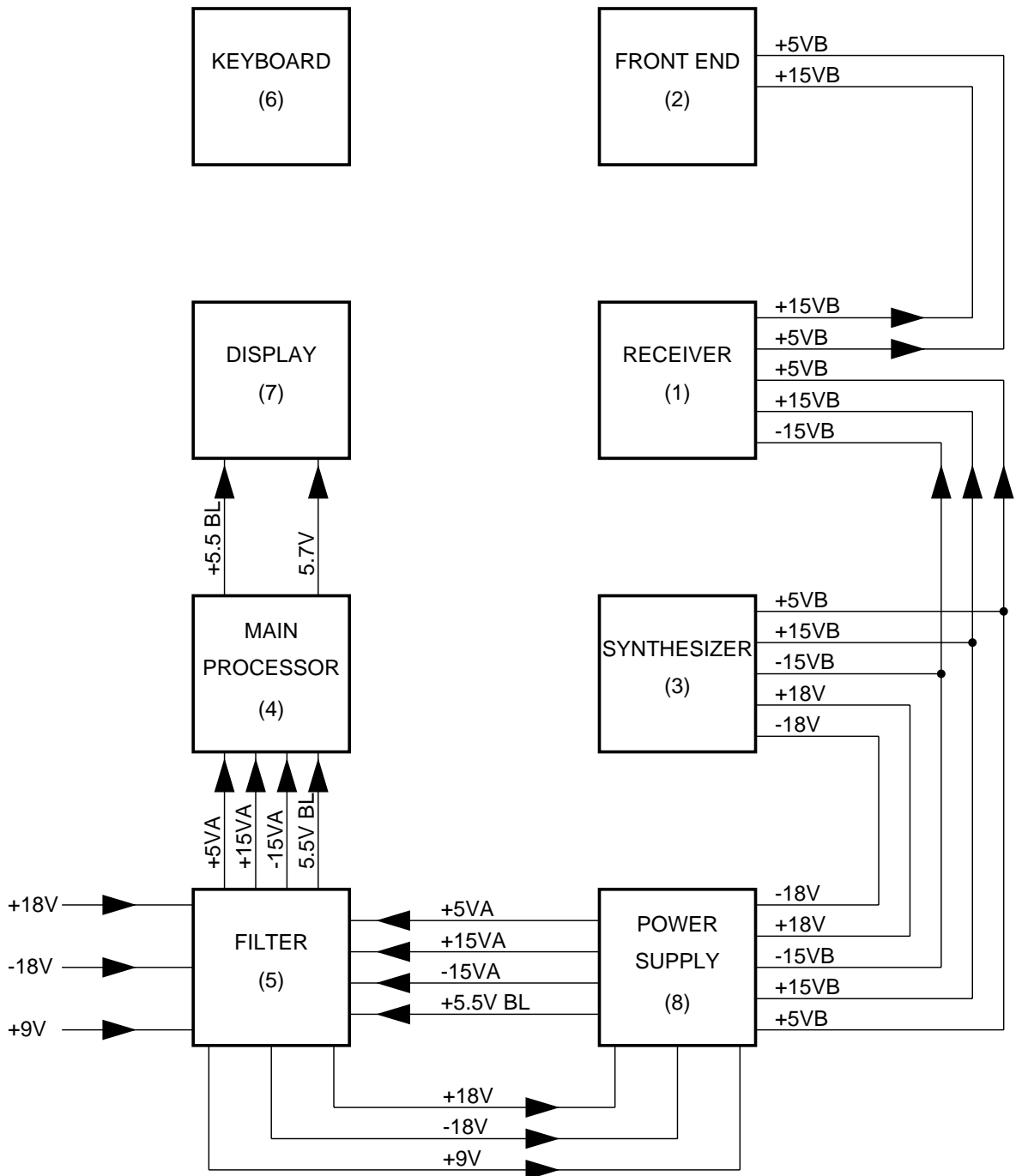
CABLE 5:  
MAIN PROCESSOR TO DISPLAY MODULE

DISPLAY (7)	MAIN PROCESSOR (4)
1 GND	1
2 Vcc + 5.5V	2
3 SPEAKER VOL.	3
4 -BATT	4
5 ON/OFF	5
6 RS	6
7 DD0	7
8 DD1	8
9 DD2	9
10 DD3	10
11 DD4	11
12 DD5	12
13 DD6	13
14 DD7	14
15 R/W	15
16 DISPCS	16
17 E	17
18 -5.7V	18
19 D/ACS	19
20 ARDY	20

CABLE 6:  
MAIN PROCESSOR TO KEYBOARD MODULE

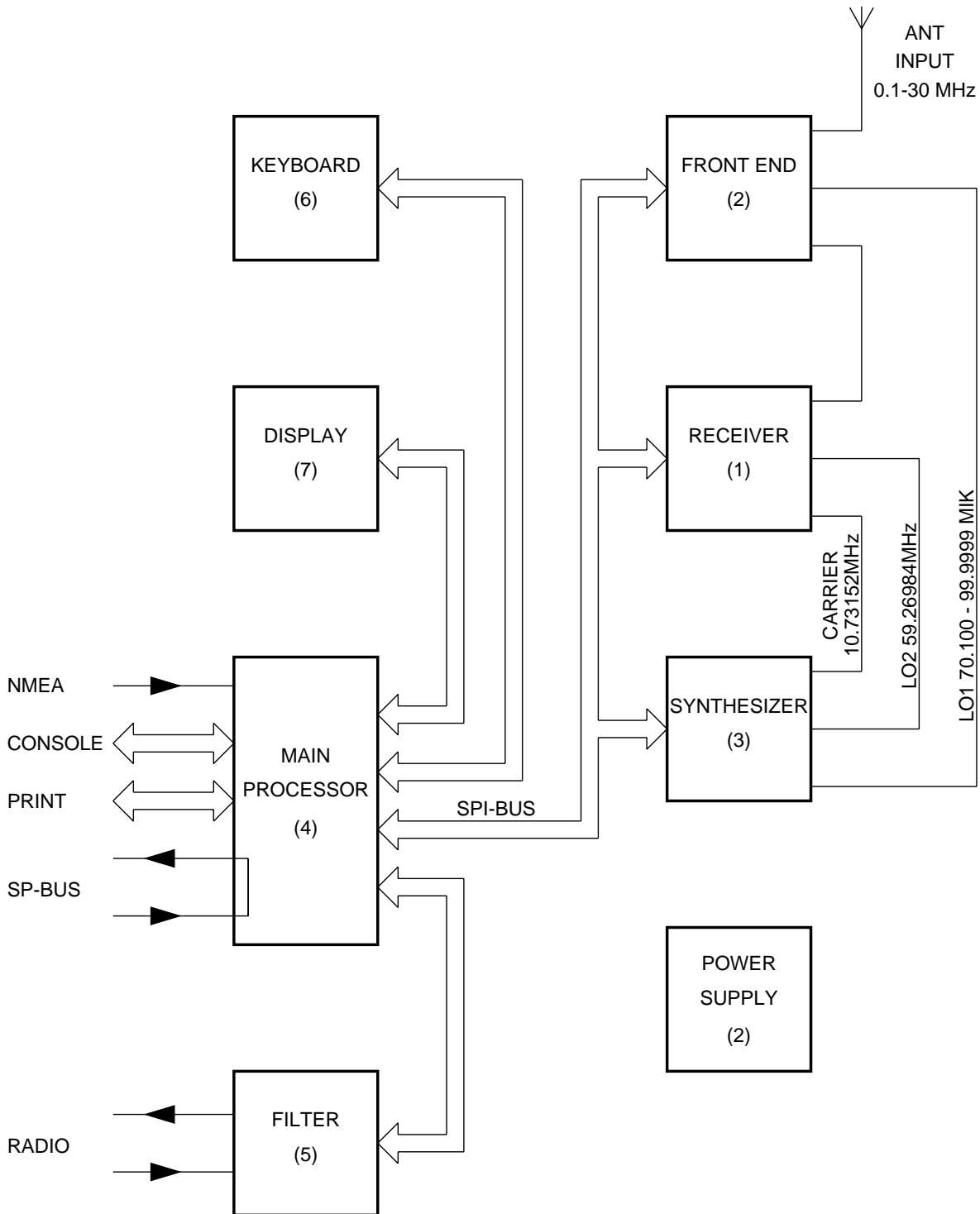
MAINPROCESSOR (4)	KEYBOARD (6)
1 GND	1
2 KEYBOARD LIGHT	2
3 COLUMN 3	3
4 COLUMN 4	4
5 COLUMN 2	5
6 COLUMN 5	6
7 COLUMN 6	7
8 COLUMN 0	8
9 COLUMN 1	9
10 ROW 3	10
11 ROW 2	11
12 ROW 1	12
13 ROW 0	13
14 NC	14

**5.10 BLOCK DIAGRAM SUPPLY CABLING**



27458

5.11 CABLING BLOCK DIAGRAM



27459

## 6 PARTS LIST

MF/HF DSC WATCHKEEPING RECEIVER RM2152		ECI A/S		80215200
POSITION	DESCRIPTION	MANUFACTURER	TYPE	PART NO.
MISC.	INTERCONN. CABLE, FEMALE SUB D 22 POLES L=10m	ELFAC	3-0-27584	164.192
MISC.	1/4 BOX CABINET SAILOR GREEN	200101 GRØN RILSAN		20010100
MISC.	FRONTPLATE 2152	ECI A/S	236391	23639100
MISC.	COAX CABLE BNC/PL259 LENGHT 2m	ECI A/S	506090	506090
MISC.	COAX CABLE RE2100 (BLUE) LENGHT 10m	ECI A/S	3-0-27082	527082
MISC.	COAX CABLE BNC/BNC (BLUE) LENGTH 1M	ECI A/S	0-0-27115	527115
MISC.	DISTRESS PROCEDURE FOR SAILOR RM2150/51 ENGLISH	HESTBECH	4-0-28320A 92x206MM KACHERES	53.780
MISC.	DISTRESS PROCEDURE FOR SAILOR RM2150/51 DANSK	HESTBECH	4-0-28321A 92x206MM KACHERES	53.781
MISC.	DISTRESS PROCEDURE FOR SAILOR RM2150/51 FRANSK	HESTBECH	4-0-31995 92x206MM KACHERES	53.804
MISC.	BASE UNIT TELEX/DSC MODEM RM2152	ECI A/S		702152
MISC.	Operating instruction RM2152	Hestbech & co.	A9950	B2152GB0
VARIOUS	DISC NICKEL PLATED BRASS Ø9x4.3x0.8mm	HFC	HFC 9203 (DIN 125A)	88.865

BASE UNIT TELEX/DSC MODEM RM2152		ECI A/S		702152
POSITION	DESCRIPTION	MANUFACTURER	TYPE	PART NO.
-1	RECEIVER TLX/DSC MODULE 1 RM2150/51	ECI A/S	4-6-26301B / 4-0-26301D	626301
-2	Rx FRONT END MODULE 2 RE2100	ECI A/S	5-0-25632H / 4-0-25632K 625632-HK	625632
-3	SYNTHESIZER MODULE 3 R2122, RM2150/51	ECI A/S	625633 w. 1.3ppm TCXO	727071
-4	MAIN PROCESSOR BOARD RM2150/51	THRANE & THRANE	60-101337S 37-101337-00X	55.150
-5	FILTER BOARD RM2150/RM2151	THRANE & THRANE	60-101338S.ver.3/4-09/92 37-101338-004	55.151
-8	POWER SUPPLY RM2150/51	ECI A/S	POWER SUPPLY RM2150/51	726308
MISC.	KNOB BLACK Ø9.5xØ6x27mm	SANDER PLAST	TG.0-3-25750A	48.689
MISC.	COAX CABLE Ø3x5,8cm	ECI A/S	3-0-26086A	526086
MISC.	COAX CABLE Ø3x5,1,5cm	ECI A/S	3-0-26096	526096
MISC.	INTERCONNECTION CABLE 20 POLES L=118mm	ECI A/S	3-0-26926A	526926
MISC.	COAX CABLE Ø3x19,5cm	ECI A/S	3-0-26927	526927
MISC.	COAX CABLE Ø3x24,5cm/RED	ECI A/S	3-0-26928	526928
MISC.	INTERCONNECTION CABLE 14 POLES L=125mm	ECI A/S	3-0-27587A	527587
MISC.	INTERCONNECTION CABLE 14 POLES L=138mm	3M	3-0-26922A	56.048
MISC.	INTERCONNECTION CABLE 4x14 POLES L=368mm	3M	3-0-26923A	56.049
MISC.	Ribboncable 14 poles, u-Match M/u-Match M, L=91mm		3-0-36756A	56.149

RECEIVER TLX/DSC MODULE 1 RM2150/51		ECI A/S		5-0-26301B / 4-0-26301D	626301
POSITION	DESCRIPTION	MANUFACTURER	TYPE	PART NO.	
C1-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C4-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C5-1	CAPACITOR MKT	1uF 5% 63VDC	PHILIPS	2222 370 79105	11.190
C6-1	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C7-1	CAPACITOR CERAMIC	68pF 5% N150 50VDC	KCK	RT-HE70-SK PH 680 J	15.115
C8-1	CAPACITOR CERAMIC	10pF 5% N470 50VDC	KCK	RT-HE40-SK TH 100 D	15.848
C9-1	CERAMIC CAPACITOR	22pF 5% N150 50VDC	KCK	RT-HE40-SK-PH 220 J	15.075
C10-1	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C11-1	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C12-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C13-1	CAPACITOR MKT	1uF 5% 63VDC	PHILIPS	2222 370 79105	11.190
C14-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C15-1	CAPACITOR CERAMIC	68pF 5% N150 50VDC	KCK	RT-HE70-SK PH 680 J	15.115
C16-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C17-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C18-1	CAPACITOR CERAMIC	47pF 5% N150 50VDC	KCK	RT-HE60-SK PH 470 J	15.100
C19-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C20-1	CAPACITOR MKT	1uF 5% 63VDC	PHILIPS	2222 370 79105	11.190
C21-1	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C22-1	CAPACITOR CERAMIC	6p8F +-0.5pF N150 50VDC	KCK	RT-HE40 SK PH 6R8 D	15.020
C23-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C24-1	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C25-1	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C26-1	CAPACITOR TRIMMING	9-80pF PTFE	DAU	109.6901.090	17.205
C27-1	CERAMIC CAPACITOR	22pF 5% N150 50VDC	KCK	RT-HE40-SK-PH 220 J	15.075
C28-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170

POSITION	DESCRIPTION		MANUFACTOR	TYPE	PART NO.
C29-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C30-1	CAPACITOR CERAMIC	2p7F +/-0.25pF N150 50VDC	KCK	RT-HE40 SK PJ 2R7 C	15.001
C31-1	CAPACITOR CERAMIC	27pF 5% N150 50VDC	KCK	RT-HE50-SK PH 270 J	15.076
C32-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C33-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C34-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C35-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C36-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C37-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C38-1	CAPACITOR CERAMIC	2p7F +/-0.25pF N150 50VDC	KCK	RT-HE40 SK PJ 2R7 C	15.001
C39-1	CAPACITOR ELECTROLYTIC	22uF 20% 25VDC	ELNA	RJ2-25-V-220-M-T34	14.514
C40-1	CAPACITOR ELECTROLYTIC	22uF 20% 25VDC	ELNA	RJ2-25-V-220-M-T34	14.514
C41-1	CAPACITOR CERAMIC	27pF 5% N150 50VDC	KCK	RT-HE50-SK PH 270 J	15.076
C42-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C43-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C44-1	CAPACITOR ELECTROLYTIC	22uF 20% 25VDC	ELNA	RJ2-25-V-220-M-T34	14.514
C45-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C46-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C47-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C48-1	CAPACITOR CERAMIC	2p7F +/-0.25pF N150 50VDC	KCK	RT-HE40 SK PJ 2R7 C	15.001
C49-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C50-1	CAPACITOR ELECTROLYTIC	1uF 20% 50VDC	ELNA	RJ2-50-V-010-M-T34	14.506
C51-1	CAPACITOR CERAMIC	27pF 5% N150 50VDC	KCK	RT-HE50-SK PH 270 J	15.076
C52-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C53-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C54-1	CAPACITOR MKT	100nF 5% 63VDC	PHILIPS	2222 370 79104	11.135
C55-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C56-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C57-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C58-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C59-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C60-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C61-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C62-1	CAPACITOR MKT	10nF 5% 63VDC	PHILIPS	2222 370 89103	11.134
C63-1	CAPACITOR CERAMIC	2p7F +/-0.25pF N150 50VDC	KCK	RT-HE40 SK PJ 2R7 C	15.001
C64-1	CAPACITOR MKT	10nF 5% 63VDC	PHILIPS	2222 370 89103	11.134
C65-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C66-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C67-1	CAPACITOR MKT	10nF 5% 63VDC	PHILIPS	2222 370 89103	11.134
C68-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C69-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C70-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C71-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C72-1	CAPACITOR ELECTROLYTIC	22uF 20% 25VDC	ELNA	RJ2-25-V-220-M-T34	14.514
C73-1	CAPACITOR ELECTROLYTIC	10uF 20% 35VDC	ELNA	RJ2-35-V-100-M-T34(T58)	14.512
C74-1	CAPACITOR POLYSTYRENE	6.8nF 1% 63V	PHILIPS	2222 428 86802	10.221
C75-1	CAPACITOR POLYSTYRENE	82pF 1% 630V	PHILIPS	2222 431 88209	10.398
C76-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C78-1	CAPACITOR ELECTROLYTIC	10uF 20% 35VDC	ELNA	RJ2-35-V-100-M-T34(T58)	14.512
C79-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C80-1	CAPACITOR MKT	1uF 5% 63VDC	PHILIPS	2222 370 79105	11.190
C81-1	CAPACITOR POLYSTYRENE	1.6nF 1% 250V	PHILIPS	2222 430 81602	10.356
C82-1	CAPACITOR ELECTROLYTIC	22uF 20% 25VDC	ELNA	RJ2-25-V-220-M-T34	14.514
C83-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C84-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C85-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C86-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C87-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C88-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C89-1	CAPACITOR MKT	1uF 5% 63VDC	PHILIPS	2222 370 79105	11.190
C90-1	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C91-1	CAPACITOR ELECTROLYTIC	10uF 20% 35VDC	ELNA	RJ2-35-V-100-M-T34(T58)	14.512
D1-1	DIODE HIGH SPEED	1N4448	PHILIPS	1N4448	25.146
D2-1	DIODE HIGH SPEED	1N4448	PHILIPS	1N4448	25.146
D3-1	DIODE HIGH SPEED	1N4448	PHILIPS	1N4448	25.146
D4-1	DIODE	1N4148 HIGH SPEED	PHILIPS	1N4148-143	25.131
D5-1	DIODE	1N4148 HIGH SPEED	PHILIPS	1N4148-143	25.131
D7-1	DIODE	1N4148 HIGH SPEED	PHILIPS	1N4148-143	25.131
D8-1	DIODE	1N4148 HIGH SPEED	PHILIPS	1N4148-143	25.131
FL1-1	CRYSTAL FILTER	TERLEX Fc=10.7298MHz	NDK	C1080	40.037
FL2-1	CERAMIC FILTER	Fc=10.7MHz +/-30kHz	MURATA	SFE 10.7 MS2-A	41.511
FP1-1	FERRITE BEAD	Ø3.7xØ1.2x3.5mm GRADE 4B1	PHILIPS	4322 020 34420	35.181
FP2-1	FERRITE BEAD	Ø3.7xØ1.2x3.5mm GRADE 4B1	PHILIPS	4322 020 34420	35.181
FP3-1	FERRITE BEAD	Ø3.7xØ1.2x3.5mm GRADE 4B1	PHILIPS	4322 020 34420	35.181



POSITION	DESCRIPTION		MANUFACTOR	TYPE	PART NO.
FP4-1	FERRITE BEAD INDUCTOR		MURATA	BLO1RN1-A62T5	35.188
FP5-1	FERRITE BEAD INDUCTOR		MURATA	BLO1RN1-A62T5	35.188
FP6-1	FERRITE BEAD INDUCTOR		MURATA	BLO1RN1-A62T5	35.188
FP7-1	FERRITE BEAD	Ø3.7xØ1.2x3.5mm GRADE 4B1	PHILIPS	4322 020 34420	35.181
FP8-1	FERRITE BEAD INDUCTOR		MURATA	BLO1RN1-A62T5	35.188
FP9-1	FERRITE BEAD	Ø3.7xØ1.2x3.5mm GRADE 4B1	PHILIPS	4322 020 34420	35.181
FP10-1	FERRITE BEAD INDUCTOR		MURATA	BLO1RN1-A62T5	35.188
FP11-1	FERRITE BEAD	Ø3.7xØ1.2x3.5mm GRADE 4B1	PHILIPS	4322 020 34420	35.181
FP12-1	FERRITE BEAD INDUCTOR		MURATA	BLO1RN1-A62T5	35.188
FP13-1	FERRITE BEAD	Ø3.7xØ1.2x3.5mm GRADE 4B1	PHILIPS	4322 020 34420	35.181
J1-1	SOCKET COAX FOR PCB	45 DEG. HORIZONTAL	TAIKO	TMP-J01X-A2	78.517
J2-1	SOCKET COAX FOR PCB	45 DEG. HORIZONTAL	TAIKO	TMP-J01X-A2	78.517
J3-1	SOCKET COAX FOR PCB	45 DEG. HORIZONTAL	TAIKO	TMP-J01X-A2	78.517
L3-1	CHOKE FIXED	100nH 10%	SIEMENS	B78108-T3101-K	20.335
L4-1	CHOKE FIXED	2u2H 10%	SIEMENS	B78108-T1222-K	20.351
L5-1	CHOKE FIXED	470uH 5%	SIEMENS	B78108-S1474-J	20.318
L6-1	CHOKE FIXED	2u2H 10%	SIEMENS	B78108-T1222-K	20.351
L7-1	CHOKE FIXED	330nH 10%	SIEMENS	B78108-T3331-K	20.341
L8-1	CHOKE FIXED	2u2H 10%	SIEMENS	B78108-T1222-K	20.351
L9-1	CHOKE FIXED	470uH 5%	SIEMENS	B78108-S1474-J	20.318
L10-1	CHOKE FIXED	100nH 10%	SIEMENS	B78108-T3101-K	20.335
L11-1	CHOKE FIXED	2u2H 10%	SIEMENS	B78108-T1222-K	20.351
L12-1	CHOKE FIXED	2u2H 10%	SIEMENS	B78108-T1222-K	20.351
L13-1	CHOKE FIXED	470uH 5%	SIEMENS	B78108-S1474-J	20.318
L14-1	CHOKE FIXED	2u2H 10%	SIEMENS	B78108-T1222-K	20.351
L15-1	CHOKE FIXED SHILDED	6u8H 10%	FRONTIER ELECT.1501-23 K		20.143
L16-1	CHOKE FIXED SHILDED	6u8H 10%	FRONTIER ELECT.1501-23 K		20.143
L17-1	CHOKE FIXED SHILDED	6u8H 10%	FRONTIER ELECT.1501-23 K		20.143
L18-1	CHOKE FIXED SHILDED	6u8H 10%	FRONTIER ELECT.1501-23 K		20.143
L19-1	CHOKE FIXED	2u2H 10%	SIEMENS	B78108-T1222-K	20.351
L20-1	CHOKE FIXED	2u2H 10%	SIEMENS	B78108-T1222-K	20.351
L21-1	CHOKE FIXED	470uH 5%	SIEMENS	B78108-S1474-J	20.318
P1-1	PLUG	2x7 POLES	3M	3598-6002 / 7614-6002 JL	78.254
P2-1	PLUG	2x7 POLES	3M	3598-6002 / 7614-6002 JL	78.254
Q1-1	TRANSISTOR N-CHAN. JFET	TIS88A2	MOTOROLA	TM00 044-2	29.736
Q2-1	TRANSISTOR N-CHAN. JFET	TIS88A2	MOTOROLA	TM00 044-2	29.736
Q3-1	TRANSISTOR RF	BFW17A PNP TO-39	SGS	BFW17A	29.151
Q4-1	TRANSISTOR MOSFET	DUAL GATE N-CHAN.BF964SA	TFK	BF964SA	28.240
Q5-1	TRANSISTOR MOSFET	DUAL GATE N-CHAN.BF964SA	TFK	BF964SA	28.240
Q6-1	TRANSISTOR AF	NPN BC639 TO-92	PHILIPS	BC639	28.120
Q7-1	TRANSISTOR AF	BC558 PNP TO-92	PHILIPS	BC558 (-A/-B/-C)	28.095
Q8-1	TRANSISTOR MOSFET	DUAL GATE N-CHAN.BF964SA	TFK	BF964SA	28.240
Q9-1	TRANSISTOR RF	BF199	PHILIPS	BF199	28.178
Q10-1	TRANSISTOR MOSFET	DUAL GATE N-CHAN.BF964SA	TFK	BF964SA	28.240
Q11-1	TRANSISTOR RF	BF199	PHILIPS	BF199	28.178
Q12-1	TRANSISTOR AF	BC548 NPN TO-92	PHILIPS	BC548 (-A/-B/-C)	28.070
R1-1	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R2-1	RESISTOR MF	120 OHM 5% 0.33W	PHILIPS	2322 187 73121	02.450
R3-1	RESISTOR MF	1k8 OHM 5% 0.33W	PHILIPS	2322 187 73182	02.478
R4-1	RESISTOR MF	18 OHM 5% 0.33W	PHILIPS	2322 187 73189	02.430
R5-1	RESISTOR MF	120 OHM 5% 0.33W	PHILIPS	2322 187 73121	02.450
R6-1	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R7-1	RESISTOR MF	470 OHM 5% 0.33W	PHILIPS	2322 187 73471	02.464
R8-1	RESISTOR MF	220 OHM 5% 0.33W	PHILIPS	2322 187 73221	02.456
R9-1	RESISTOR MF	430 OHM 5% 0.33W	PHILIPS	2322 187 73431	02.463
R10-1	RESISTOR MF	3k9 OHM 5% 0.33W	PHILIPS	2322 187 73392	02.486
R11-1	RESISTOR MF	82 OHM 5% 0.33W	PHILIPS	2322 187 73829	02.446
R12-1	RESISTOR MF	120 OHM 5% 0.33W	PHILIPS	2322 187 73121	02.450
R13-1	RESISTOR MF	56 OHM 5% 0.33W	PHILIPS	2322 187 73569	02.442
R14-1	RESISTOR MF	12 OHM 5% 0.33W	PHILIPS	2322 187 73129	02.426
R15-1	RESISTOR MF	3k0 OHM 5% 0.33W	PHILIPS	2322 187 73302	02.483
R16-1	RESISTOR MF	5k6 OHM 5% 0.33W	PHILIPS	2322 187 73562	02.490
R17-1	RESISTOR MF	1k5 OHM 5% 0.33W	PHILIPS	2322 187 73152	02.476
R18-1	RESISTOR MF	820 OHM 5% 0.33W	PHILIPS	2322 187 73821	02.470
R19-1	RESISTOR MF	12k OHM 5% 0.33W	PHILIPS	2322 187 73123	02.498
R20-1	PRESET CERMET	10k OHM 10% 0.5W	BOURNS	3386P-1-103	07.889
R21-1	RESISTOR MF	12k OHM 5% 0.33W	PHILIPS	2322 187 73123	02.498
R22-1	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R23-1	RESISTOR MF	390 OHM 5% 0.33W	PHILIPS	2322 187 73391	02.462
R24-1	RESISTOR MF	47k OHM 5% 0.33W	PHILIPS	2322 187 73473	02.512
R25-1	RESISTOR MF	47k OHM 5% 0.33W	PHILIPS	2322 187 73473	02.512
R26-1	RESISTOR MF	100k OHM 5% 0.33W	PHILIPS	2322 187 73104	02.520
R27-1	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R28-1	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496

POSITION	DESCRIPTION		MANUFACTOR	TYPE	PART NO.
R29-1	RESISTOR MF	2k7 OHM 5% 0.33W	PHILIPS	2322 187 73272	02.482
R30-1	RESISTOR MF	820 OHM 5% 0.33W	PHILIPS	2322 187 73821	02.470
R31-1	RESISTOR MF	100k OHM 5% 0.33W	PHILIPS	2322 187 73104	02.520
R32-1	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R33-1	RESISTOR MF	390 OHM 5% 0.33W	PHILIPS	2322 187 73391	02.462
R35-1	RESISTOR MF	680 OHM 5% 0.33W	PHILIPS	2322 187 73681	02.468
R36-1	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R37-1	RESISTOR MF	2k7 OHM 5% 0.33W	PHILIPS	2322 187 73272	02.482
R38-1	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R39-1	RESISTOR MF	5k6 OHM 5% 0.33W	PHILIPS	2322 187 73562	02.490
R40-1	RESISTOR MF	5k6 OHM 5% 0.33W	PHILIPS	2322 187 73562	02.490
R41-1	RESISTOR MF	820 OHM 5% 0.33W	PHILIPS	2322 187 73821	02.470
R42-1	RESISTOR MF	15k OHM 5% 0.33W	PHILIPS	2322 187 73153	02.500
R43-1	RESISTOR MF	15k OHM 5% 0.33W	PHILIPS	2322 187 73153	02.500
R44-1	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R45-1	RESISTOR MF	390 OHM 5% 0.33W	PHILIPS	2322 187 73391	02.462
R46-1	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R47-1	RESISTOR MF	47k OHM 5% 0.33W	PHILIPS	2322 187 73473	02.512
R48-1	RESISTOR MF	22k OHM 5% 0.33W	PHILIPS	2322 187 73223	02.504
R49-1	RESISTOR MF	1k5 OHM 5% 0.33W	PHILIPS	2322 187 73152	02.476
R50-1	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R51-1	RESISTOR MF	680 OHM 5% 0.33W	PHILIPS	2322 187 73681	02.468
R52-1	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R53-1	RESISTOR MF	2k7 OHM 5% 0.33W	PHILIPS	2322 187 73272	02.482
R54-1	RESISTOR MF	4k7 OHM 5% 0.33W	PHILIPS	2322 187 73472	02.488
R55-1	RESISTOR MF	22k OHM 5% 0.33W	PHILIPS	2322 187 73223	02.504
R56-1	RESISTOR MF	1k0 OHM 5% 0.33W	PHILIPS	2322 187 73102	02.472
R58-1	RESISTOR MF	120k OHM 5% 0.33W	PHILIPS	2322 187 73124	02.522
R59-1	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R60-1	RESISTOR MF	330 OHM 5% 0.33W	PHILIPS	2322 187 73331	02.460
R61-1	RESISTOR MF	390 OHM 5% 0.33W	PHILIPS	2322 187 73391	02.462
R62-1	RESISTOR MF	6k2 OHM 5% 0.33W	PHILIPS	2322 187 73622	02.491
R63-1	RESISTOR MF	47 OHM 5% 0.33W	PHILIPS	2322 187 73479	02.440
R64-1	RESISTOR MF	15k OHM 5% 0.33W	PHILIPS	2322 187 73153	02.500
R65-1	RESISTOR MF	330 OHM 5% 0.33W	PHILIPS	2322 187 73331	02.460
R66-1	RESISTOR MF	2k2 OHM 5% 0.33W	PHILIPS	2322 187 73222	02.480
R67-1	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R68-1	RESISTOR MF	8k2 OHM 5% 0.33W	PHILIPS	2322 187 73822	02.494
R69-1	RESISTOR MF	6k8 OHM 5% 0.33W	PHILIPS	2322 187 73682	02.492
R70-1	RESISTOR MF	47 OHM 5% 0.33W	PHILIPS	2322 187 73479	02.440
R71-1	RESISTOR MF	560 OHM 5% 0.33W	PHILIPS	2322 187 73561	02.466
R72-1	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R73-1	RESISTOR MF	1k8 OHM 5% 0.33W	PHILIPS	2322 187 73182	02.478
R74-1	RESISTOR MF	91k OHM 5% 0.33W	PHILIPS	2322 187 73913	02.519
R75-1	RESISTOR MF	47 OHM 5% 0.33W	PHILIPS	2322 187 73479	02.440
R76-1	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R77-1	RESISTOR MF	50k OHM 5% 0.33W	PHILIPS	2322 187 73513	02.513
R78-1	RESISTOR MF	91k OHM 5% 0.33W	PHILIPS	2322 187 73913	02.519
R79-1	RESISTOR MF	82k OHM 5% 0.33W	PHILIPS	2322 187 73823	02.518
R80-1	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R81-1	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R82-1	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R83-1	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R84-1	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R85-1	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R86-1	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R87-1	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R88-1	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R89-1	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R90-1	RESISTOR MF	820 OHM 5% 0.33W	PHILIPS	2322 187 73821	02.470
R91-1	RESISTOR MF	47k OHM 5% 0.33W	PHILIPS	2322 187 73473	02.512
R92-1	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R93-1	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R94-1	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R95-1	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R96-1	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R97-1	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R98-1	RESISTOR MF	100k OHM 5% 0.33W	PHILIPS	2322 187 73104	02.520
R99-1	RESISTOR MF	3k9 OHM 5% 0.33W	PHILIPS	2322 187 73392	02.486
R100-1	RESISTOR MF	4k7 OHM 5% 0.33W	PHILIPS	2322 187 73472	02.488
R101-1	RESISTOR MF	12k OHM 5% 0.33W	PHILIPS	2322 187 73123	02.498
R102-1	RESISTOR MF	100k OHM 5% 0.33W	PHILIPS	2322 187 73104	02.520
R103-1	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
TR1-1	TRANSFORMER	ADJUSTABLE Fr=70MHz	MITSUMI	L-2M7-D3/DM-7141	38.438

POSITION	DESCRIPTION		MANUFACTOR	TYPE	PART NO.
TR2-1	COIL	TL548	ECI A/S	6-0-26460	400548
TR3-1	TRANSFORMER	TL492	ECI A/S	6-0-25811	400492
U1-1	QUAD OP.AMP.	324	THOMSON	LM324N	31.065
U2-1	FM IF SYSTEM	3189	NATIONAL	LM3189N	31.752
U3-1	8 BIT SHIFT REG.SERIAL IO	74HC595	MOTOROLA	MC74HC595P	34.502

Rx FRONT END MODULE 2	RE2100	ECI A/S	5-0-25632H / 4-0-25632K	625632
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POSITION	DESCRIPTION		MANUFACTOR	TYPE	PART NO.
VARIOUS	DISTANCE DISC	TO-5	FISCHER ELEK.	MS 54-25	30.556
C2-2	CAPACITOR MKT	1uF 5% 63VDC	ERO	MKT 1826-510/06 4-G	11.190
C3-2	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C4-2	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C5-2	CAPACITOR MKT	1uF 5% 63VDC	ERO	MKT 1826-510/06 4-G	11.190
C6-2	CAPACITOR MKT	0.1uF 10% 63VDC	PHILIPS	2222 370 78104	11.136
C7-2	CAPACITOR ELECTROLYTIC	10uF 20% 35VDC	ELNA	RJ2-35-V-100-M-T34(T58)	14.512
C8-2	CAPACITOR MKT	22nF 5% 250VDC	ERO	MKT 1818-322/25 4-G	11.174
C9-2	CAPACITOR MKT	1uF 5% 63VDC	ERO	MKT 1826-510/06 4-G	11.190
C10-2	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C11-2	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C12-2	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C13-2	CAPACITOR MKT	1uF 5% 63VDC	ERO	MKT 1826-510/06 4-G	11.190
C17-2	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C18-2	CAPACITOR CERAMIC	120pF 2% N150 100VDC	PHILIPS	2222 689 34121	15.143
C19-2	CAPACITOR CERAMIC	68pF 2% N150 100VDC	PHILIPS	2222 683 34689	15.120
C20-2	CAPACITOR CERAMIC	120pF 2% N150 100VDC	PHILIPS	2222 689 34121	15.143
C21-2	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C22-2	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C23-2	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C24-2	CAPACITOR POLYSTYRENE	200pF 1% 630VDC	PHILIPS	2222 431 82001	10.408
C25-2	CAPACITOR POLYSTERENE	150pF 1% 630VDC	PHILIPS	2222 431 81501	10.405
C26-2	CAPACITOR POLYSTYRENE	200pF 1% 630VDC	PHILIPS	2222 431 82001	10.408
C27-2	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C28-2	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C29-2	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C30-2	CAPACITOR POLYSTYRENE	430pF 1% 630VDC	PHILIPS	2222 431 84301	10.428
C31-2	CAPACITOR POLYSTYRENE	300pF 1% 630VDC	PHILIPS	2222 431 83001	10.414
C32-2	CAPACITOR POLYSTYRENE	430pF 1% 630VDC	PHILIPS	2222 431 84301	10.428
C33-2	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C34-2	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C35-2	CAPACITOR MKT	0.1uF 10% 63VDC	PHILIPS	2222 370 78104	11.136
C36-2	CAPACITOR POLYSTYRENE	750pF 1% 250VDC	PHILIPS	2222 430 87501	10.347
C37-2	CAPACITOR POLYSTYRENE	1n00F 1% 250VDC	PHILIPS	2222 430 81002	10.350
C38-2	CAPACITOR POLYSTYRENE	750pF 1% 250VDC	PHILIPS	2222 430 87501	10.347
C39-2	CAPACITOR MKT	0.1uF 10% 63VDC	PHILIPS	2222 370 78104	11.136
C40-2	CAPACITOR MKT	0.1uF 10% 63VDC	PHILIPS	2222 370 78104	11.136
C41-2	CAPACITOR MKT	470nF 5% 63VDC	ERO	MKT 1826-447/06 4-G	11.187
C42-2	CAPACITOR POKYSTYRENE	1n80F 1% 160VDC	PHILIPS	2222 429 81802	10.282
C43-2	CAPACITOR POLYSTERENE	4n70F 1% 63VDC	PHILIPS	2222 428 84702	10.217
C44-2	CAPACITOR POKYSTYRENE	1n80F 1% 160VDC	PHILIPS	2222 429 81802	10.282
C45-2	CAPACITOR MKT	470nF 5% 63VDC	ERO	MKT 1826-447/06 4-G	11.187
C46-2	CAPACITOR MKT	470nF 5% 63VDC	ERO	MKT 1826-447/06 4-G	11.187
C47-2	CAPACITOR MKT	470nF 5% 63VDC	ERO	MKT 1826-447/06 4-G	11.187
C48-2	CAPACITOR MKT	470nF 5% 63VDC	ERO	MKT 1826-447/06 4-G	11.187
C49-2	CAPACITOR POLYSTYRENE	6n20F 1% 63VDC	PHILIPS	2222 428 86202	10.220
C50-2	CAPACITOR POLYSTYRENE	6n20F 1% 63VDC	PHILIPS	2222 428 86202	10.220
C51-2	CAPACITOR MKT	0.1uF 10% 63VDC	PHILIPS	2222 370 78104	11.136
C52-2	CAPACITOR MKT	470nF 5% 63VDC	ERO	MKT 1826-447/06 4-G	11.187
C53-2	CAPACITOR MKT	1uF 5% 63VDC	ERO	MKT 1826-510/06 4-G	11.190
C54-2	CAPACITOR CERAMIC	120pF 2% N150 100VDC	PHILIPS	2222 689 34121	15.143
C55-2	CAPACITOR CERAMIC	120pF 2% N150 100VDC	PHILIPS	2222 689 34121	15.143
C56-2	CAPACITOR CERAMIC	47pF 2% N150	PHILIPS	2322 683 34479	15.102
C57-2	CAPACITOR CERAMIC	4n7F 20% CL2 50VDC	KCK	RT-HE80-SK YD 472 M	15.165
C58-2	CAPACITOR CERAMIC	4n7F 20% CL2 50VDC	KCK	RT-HE80-SK YD 472 M	15.165
C59-2	CAPACITOR CERAMIC	4p7F +/-0.25pF N750 50VDC	KCK	RT-HE40-SK UJ 47R C	15.872
C60-2	CAPACITOR MKT	22nF 10% 100VDC	PHILIPS	2222 370 88223	11.175
C61-2	CAPACITOR CERAMIC	5p0F +/-0.25pF N470 50VDC	KCK	RT-HE40-SK TH 5R0 C	15.847
C62-2	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C63-2	CAPACITOR CERAMIC	10pF +/-0.5pF N150 50VDC	KCK	RT-HE40 SK PH 100 D	15.035
C64-2	CAPACITOR CERAMIC	47pF 5% N150 50VDC	KCK	RT-HE60-SK PH 470 J	15.100
C65-2	CAPACITOR CERAMIC	6p8F +/-0.5pF N150 50VDC	KCK	RT-HE40 SK PH 6R8 D	15.020

POSITION	DESCRIPTION		MANUFACTURER	TYPE	PART NO.
C66-2	CAPACITOR CERAMIC	18pF 5% N150 50VDC	KCK	RT-HE40-SK PH 180 J	15.061
C67-2	CAPACITOR CERAMIC	10pF +/-0.5pF N150 50VDC	KCK	RT-HE40 SK PH 100 D	15.035
C68-2	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C69-2	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C70-2	CAPACITOR MKT	0.1uF 10% 63VDC	PHILIPS	2222 370 78104	11.136
C71-2	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C72-2	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C73-2	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C74-2	CAPACITOR CERAMIC	4n7F 20% CL2 50VDC	KCK	RT-HE80-SK YD 472 M	15.165
C75-2	CAPACITOR CERAMIC	10pF +/-0.5pF N150 50VDC	KCK	RT-HE40 SK PH 100 D	15.035
C76-2	CAPACITOR CERAMIC	13pF 5% N150 50VDC	KCK	RT-HE40 SK PH 130 J	15.051
C77-2	CAPACITOR CERAMIC	10pF +/-0.5pF N150 50VDC	KCK	RT-HE40 SK PH 100 D	15.035
D1-2	DIODE GENERAL PURPOSE	BAV21 200V/0.25A	TFK	BAV21	25.340
D2-2	DIODE GENERAL PURPOSE	BAV21 200V/0.25A	TFK	BAV21	25.340
D3-2	DIODE GENERAL PURPOSE	BAV21 200V/0.25A	TFK	BAV21	25.340
D4-2	DIODE GENERAL PURPOSE	BAV21 200V/0.25A	TFK	BAV21	25.340
D5-2	DIODE ZENER	9V1 5% 5W 1N5346B	MOTOROLA	1N5346B	26.964
D6-2	DIODE SWITCH	MPN3700	MOTOROLA	MPN3700	26.115
D7-2	DIODE SWITCH	MPN3700	MOTOROLA	MPN3700	26.115
D8-2	DIODE SWITCH	MPN3700	MOTOROLA	MPN3700	26.115
D9-2	DIODE SWITCH	MPN3700	MOTOROLA	MPN3700	26.115
D10-2	DIODE SWITCH	MPN3700	MOTOROLA	MPN3700	26.115
D11-2	DIODE SWITCH	MPN3700	MOTOROLA	MPN3700	26.115
D12-2	DIODE SWITCH	MPN3700	MOTOROLA	MPN3700	26.115
D13-2	DIODE SWITCH	MPN3700	MOTOROLA	MPN3700	26.115
D14-2	DIODE SWITCH	BA282	TFK	BA 282 TAPED	25.390
D15-2	DIODE SWITCH	BA282	TFK	BA 282 TAPED	25.390
D16-2	DIODE SWITCH	BA282	TFK	BA 282 TAPED	25.390
D17-2	DIODE SWITCH	BA282	TFK	BA 282 TAPED	25.390
FL1-2	CRYSTAL FILTER	Fc=70MHz,BILIT	NDK	70N20B D360B	40.031
FL2-2	CRYSTAL FILTER	Fc=70MHz,BILIT	NDK	70N20B D360B	40.031
FP1-2	FERRITE BEAD	Ø3.7xØ1.2x3.5mm GRADE 4B1	PHILIPS	4322 020 34420	35.181
FP2-2	FERRITE BEAD	Ø3.7xØ1.2x3.5mm GRADE 4B1	PHILIPS	4322 020 34420	35.181
FP3-2	FERRITE BEAD	Ø3.7xØ1.2x3.5mm GRADE 4B1	PHILIPS	4322 020 34420	35.181
GL1-2	NEON LAMP	90V 5kA/5A	SIEMENS	B1-C90/20L-Q69-X184	45.074
J1-2	RECEPTACLE	BNC RIGHT ANGLE	ROSENBERGER	51K-201-400 A4	78.443
J2-2	SOCKET COAX	PCB MOUNT.	TAIKO	TMP-J02X-A1	78.516
J3-2	SOCKET 9 POLES	SUB D RIGHT ANGLE	AMP	343705-2	78.167
J4-2	SOCKET COAX	PCB MOUNT.	TAIKO	TMP-J02X-A1	78.516
J5-2	SOCKET COAX	PCB MOUNT.	TAIKO	TMP-J02X-A1	78.516
L1-2	CHOKE FIXED	100uH 5%	FASTRON	SMCC-101J-02	20.310
L2-2	CHOKE FIXED	100uH 5%	FASTRON	SMCC-101J-02	20.310
L3-2	CHOKE FIXED	2u2H 10%	FASTRON	MICC-2R2K-02	20.351
L4-2	CHOKE FIXED	2u2H 10%	FASTRON	MICC-2R2K-02	20.351
L5-2	CHOKE FIXED	2u2H 10%	FASTRON	MICC-2R2K-02	20.351
L6-2	CHOKE FIXED	2u2H 10%	FASTRON	MICC-2R2K-02	20.351
L7-2	CHOKE FIXED	2u2H 10%	FASTRON	MICC-2R2K-02	20.351
L8-2	CHOKE FIXED	2u2H 10%	FASTRON	MICC-2R2K-02	20.351
L9-2	CHOKE FIXED	330nH 10%	FASTRON	MICC-R33K-02	20.341
L10-2	CHOKE FIXED	680nH 10%	FASTRON	MICC-R68K-02	20.345
L11-2	CHOKE FIXED	330nH 10%	FASTRON	MICC-R33K-02	20.341
L12-2	CHOKE FIXED	820nH 10%	FASTRON	MICC-R82K-02	20.346
L13-2	CHOKE FIXED	1u0H 10%	FASTRON	MICC-1R0K-02	20.347
L14-2	CHOKE FIXED	820nH 10%	FASTRON	MICC-R82K-02	20.346
L15-2	CHOKE FIXED	470nH 10%	SIEMENS	B78108-T3471-K	20.342
L16-2	CHOKE FIXED	1u5H 10%	FASTRON	MICC-1R5K-02	20.349
L17-2	CHOKE FIXED	2u2H 10%	FASTRON	MICC-2R2K-02	20.351
L18-2	CHOKE FIXED	1u5H 10%	FASTRON	MICC-1R5K-02	20.349
L19-2	CHOKE FIXED	1u0H 10%	FASTRON	MICC-1R0K-02	20.347
L20-2	CHOKE FIXED	4u7H 10%	FASTRON	MICC-4R7K-02	20.355
L21-2	CHOKE FIXED	3u3H 10%	SIEMENS	B78108-T1332-K	20.353
L22-2	CHOKE FIXED	4u7H 10%	FASTRON	MICC-4R7K-02	20.355
L23-2	CHOKE FIXED	1u0H 10%	FASTRON	MICC-1R0K-02	20.347
L24-2	CHOKE FIXED	22uH 5%	SIEMENS	B78108-S1223-J	20.302
L25-2	CHOKE FIXED	8u2H 10%	FASTRON	MICC-8R2K-02	20.358
L26-2	CHOKE FIXED	22uH 5%	SIEMENS	B78108-S1223-J	20.302
L27-2	CHOKE FIXED	1u0H 10%	FASTRON	MICC-1R0K-02	20.347
L28-2	CHOKE FIXED	4m7H 5%	FASTRON	SMCC-472J-02	20.330
L29-2	CHOKE FIXED	27uH 10%	SIEMENS	B78108-T1273-K	20.364
L30-2	CHOKE FIXED	4m7H 5%	FASTRON	SMCC-472J-02	20.330
L31-2	CHOKE FIXED	390nH 10%	SIEMENS	B78108-T3391-K	20.340
L32-2	CHOKE FIXED	680nH 10%	FASTRON	MICC-R68K-02	20.345
L33-2	CHOKE FIXED	680nH 10%	FASTRON	MICC-R68K-02	20.345
L34-2	CHOKE FIXED	2u2H 10%	FASTRON	MICC-2R2K-02	20.351

POSITION	DESCRIPTION		MANUFACTOR	TYPE	PART NO.
L35-2	COIL RF	586nH ADJUSTABLE	MITSUMI	L-2M7-D3/DM-8100	38.439
L36-2	COIL RF	586nH ADJUSTABLE	MITSUMI	L-2M7-D3/DM-8100	38.439
L37-2	COIL RF	586nH ADJUSTABLE	MITSUMI	L-2M7-D3/DM-8100	38.439
L38-2	CHOKE FIXED	2u2H 10%	FASTRON	MICC-2R2K-02	20.351
L39-2	CHOKE FIXED	150nH 10%	FASTRON	MICC-R15K-02	20.337
L40-2	CHOKE FIXED	270nH 10%	FASTRON	MICC-R27K-02	20.339
L41-2	CHOKE FIXED	150nH 10%	FASTRON	MICC-R15K-02	20.337
L42-2	CHOKE FIXED	22uH 5%	SIEMENS	B78108-S1223-J	20.302
Q1-2	PLUG	2x7 POLES	3M	3598-6002 / 7614-6002 JL	78.254
Q1-2	TRANSISTOR AF	BC548 NPN TO-92	PHILIPS	BC548 (-A/-B/-C)	28.070
Q2-2	TRANSISTOR AF	BC548 NPN TO-92	PHILIPS	BC548 (-A/-B/-C)	28.070
Q3-2	TRANSISTOR RF	BFW17A PNP TO-39	SGS	BFW17A	29.151
Q4-2	TRANSISTOR FET DUAL	N-CHANNEL J-FET U430	SILICONIX	U430	29.717
R1-2	RESISTOR MF	82 OHM 5% 0.33W	PHILIPS	2322 187 73829	02.446
R2-2	RESISTOR PMF	27 OHM 5% 3W	PHILIPS	2322 195 13279	04.660
R3-2	RESISTOR PMF	27 OHM 5% 3W	PHILIPS	2322 195 13279	04.660
R4-2	RESISTOR MF	27k OHM 5% 0.33W	PHILIPS	2322 187 73273	02.506
R5-2	RESISTOR MF	27k OHM 5% 0.33W	PHILIPS	2322 187 73273	02.506
R6-2	RESISTOR MF	1k2 OHM 5% 0.33W	PHILIPS	2322 187 73122	02.474
R7-2	RESISTOR MF	820 OHM 5% 0.33W	PHILIPS	2322 187 73821	02.470
R8-2	RESISTOR MF	2k7 OHM 5% 0.33W	PHILIPS	2322 187 73272	02.482
R9-2	RESISTOR MF	2k7 OHM 5% 0.33W	PHILIPS	2322 187 73272	02.482
R10-2	RESISTOR MF	2k7 OHM 5% 0.33W	PHILIPS	2322 187 73272	02.482
R11-2	RESISTOR MF	2k7 OHM 5% 0.33W	PHILIPS	2322 187 73272	02.482
R12-2	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R13-2	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R14-2	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R15-2	RESISTOR MF	18k OHM 5% 0.33W	PHILIPS	2322 187 73183	02.502
R16-2	RESISTOR MF	12k OHM 5% 0.33W	PHILIPS	2322 187 73123	02.498
R17-2	RESISTOR MF	27k OHM 5% 0.33W	PHILIPS	2322 187 73273	02.506
R18-2	RESISTOR MF	270k OHM 5% 0.33W	PHILIPS	2322 187 73274	02.530
R19-2	RESISTOR MF	27k OHM 5% 0.33W	PHILIPS	2322 187 73273	02.506
R20-2	RESISTOR MF	270k OHM 5% 0.33W	PHILIPS	2322 187 73274	02.530
R21-2	RESISTOR MF	27k OHM 5% 0.33W	PHILIPS	2322 187 73273	02.506
R22-2	RESISTOR MF	270k OHM 5% 0.33W	PHILIPS	2322 187 73274	02.530
R23-2	RESISTOR MF	27k OHM 5% 0.33W	PHILIPS	2322 187 73273	02.506
R24-2	RESISTOR MF	270k OHM 5% 0.33W	PHILIPS	2322 187 73274	02.530
R25-2	RESISTOR MF	27k OHM 5% 0.33W	PHILIPS	2322 187 73273	02.506
R26-2	RESISTOR MF	270k OHM 5% 0.33W	PHILIPS	2322 187 73274	02.530
R27-2	RESISTOR MF	27k OHM 5% 0.33W	PHILIPS	2322 187 73273	02.506
R28-2	RESISTOR MF	270k OHM 5% 0.33W	PHILIPS	2322 187 73274	02.530
R29-2	RESISTOR MF	820 OHM 5% 0.33W	PHILIPS	2322 187 73821	02.470
R30-2	RESISTOR MF	820 OHM 5% 0.33W	PHILIPS	2322 187 73821	02.470
R31-2	RESISTOR MF	820 OHM 5% 0.33W	PHILIPS	2322 187 73821	02.470
R32-2	RESISTOR MF	820 OHM 5% 0.33W	PHILIPS	2322 187 73821	02.470
R33-2	RESISTOR MF	820 OHM 5% 0.33W	PHILIPS	2322 187 73821	02.470
R34-2	RESISTOR MF	820 OHM 5% 0.33W	PHILIPS	2322 187 73821	02.470
R35-2	RESISTOR MF	820 OHM 5% 0.33W	PHILIPS	2322 187 73821	02.470
R36-2	RESISTOR MF	820 OHM 5% 0.33W	PHILIPS	2322 187 73821	02.470
R37-2	RESISTOR MF	820 OHM 5% 0.33W	PHILIPS	2322 187 73821	02.470
R38-2	RESISTOR MF	820 OHM 5% 0.33W	PHILIPS	2322 187 73821	02.470
R39-2	RESISTOR MF	820 OHM 5% 0.33W	PHILIPS	2322 187 73821	02.470
R40-2	RESISTOR MF	820 OHM 5% 0.33W	PHILIPS	2322 187 73821	02.470
R41-2	RESISTOR MF	820 OHM 5% 0.33W	PHILIPS	2322 187 73821	02.470
R42-2	RESISTOR MF	470 OHM 5% 0.33W	PHILIPS	2322 187 73471	02.464
R43-2	RESISTOR MF	220 OHM 5% 0.33W	PHILIPS	2322 187 73221	02.456
R44-2	RESISTOR MF	470 OHM 5% 0.33W	PHILIPS	2322 187 73471	02.464
R45-2	RESISTOR MF	56 OHM 5% 0.33W	PHILIPS	2322 187 73569	02.442
R47-2	RESISTOR MF	120 OHM 5% 0.33W	PHILIPS	2322 187 73121	02.450
R48-2	RESISTOR MF	8k2 OHM 5% 0.33W	PHILIPS	2322 187 73822	02.494
R50-2	RESISTOR MF	33 OHM 5% 0.33W	PHILIPS	2322 187 73339	02.436
R51-2	RESISTOR MF	1k3 OHM 5% 0.33W	PHILIPS	2322 187 73132	02.475
R52-2	RESISTOR MF	220 OHM 5% 0.33W	PHILIPS	2322 187 73221	02.456
R53-2	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R54-2	RESISTOR MF	82 OHM 5% 0.33W	PHILIPS	2322 187 73829	02.446
R55-2	RESISTOR MF	56 OHM 5% 0.33W	PHILIPS	2322 187 73569	02.442
RE1-2	RELAY	12VDC 1SH. 2A.	ORIGINAL ELEC.	UC-SS-112D (-S/-SH-)	21.300
RE2-2	RELAY	15V DC 2A 1SH.	SIEMENS	V23040-A0003-B201	21.062
TR1-2	TRANSFORMER	TL495	S.P.RADIO	6-0-25788A	400495
TR2-2	TRANSFORMER	TL519	ESPERA	6-0-25721	400519
TR3-2	TRANSFORMER	TL494	S.P.RADIO	6-0-25813	400494
TR4-2	TRANSFORMER	ADJUSTABLE Fr=70MHz	MITSUMI	L-2M7-D3/DM-7141	38.438
U1-2	8 BIT SHIFT REG.SERIAL IO	74HC595	MOTOROLA	MC74HC595P	34.502
U2-2	QUAD OP.AMP.	324	NAT/SGS	LM324N	31.065

POSITION	DESCRIPTION	MANUFACTURER	TYPE	PART NO.	
U3-2	DUAL OP AMP	LM358N	MOTOTOLA	LM 358N	31.100
<b>SYNTHESIZER MODULE 3</b>					
<b>RE2100</b>		<b>ECI A/S</b>	<b>4-6-25633F / 4-0-25633G</b>	<b>625633</b>	
POSITION	DESCRIPTION	MANUFACTURER	TYPE	PART NO.	
C6-3	CAPACITOR CERAMIC	33pF 5% N150 50VDC	KCK	RT-HE50 SK PH 330 J	15.092
jC7-3	CERAMIC CAPACITOR	22pF 5% N150 50VDC	KCK	RT-HE40-SK-PH 220 J	15.075
C8-3	CAPACITOR CERAMIC	5p6F +/-0.5pF N150 50VDC	KCK	RT-HE40-SK PH 5R6 D	15.013
C9-3	CERAMIC CAPACITOR	22pF 5% N150 50VDC	KCK	RT-HE40-SK-PH 220 J	15.075
C10-3	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C11-3	CAPACITOR MKT	100nF 5% 63VDC	PHILIPS	2222 370 79104 (76104)	11.135
C12-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C13-3	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C14-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C15-3	CAPACITOR MKT	1u0F 10% 63VDC	PHILIPS	2222 370 78105	11.137
C16-3	CAPACITOR MKT	330nF 10% 63VDC	PHILIPS	2222 370 78334	11.189
C17-3	CAPACITOR MKT	330nF 10% 63VDC	PHILIPS	2222 370 78334	11.189
C18-3	CAPACITOR CERAMIC	39pF 5% N150 50VDC	KCK	RT-HE50 SK PH 390 J	15.090
C19-3	CERAMIC CAPACITOR	22pF 5% N150 50VDC	KCK	RT-HE40-SK-PH 220 J	15.075
C20-3	CAPACITOR MKT	220nF 10% 63VDC	PHILIPS	2222 370 78224	11.095
C21-3	CAPACITOR MKT	220nF 10% 63VDC	PHILIPS	2222 370 78224	11.095
C22-3	CAPACITOR CERAMIC	5p6F +/-0.5pF N150 50VDC	KCK	RT-HE40-SK PH 5R6 D	15.013
C23-3	CERAMIC CAPACITOR	22pF 5% N150 50VDC	KCK	RT-HE40-SK-PH 220 J	15.075
C24-3	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C25-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C26-3	CAPACITOR MKT	1u0F 10% 63VDC	PHILIPS	2222 370 78105	11.137
C27-3	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C28-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C29-3	CAPACITOR MKT	330nF 10% 63VDC	PHILIPS	2222 370 78334	11.189
C30-3	CAPACITOR MKT	330nF 10% 63VDC	PHILIPS	2222 370 78334	11.189
C31-3	CAPACITOR MKT	1u0F 10% 63VDC	PHILIPS	2222 370 78105	11.137
C32-3	CAPACITOR CERAMIC	39pF 5% N150 50VDC	KCK	RT-HE50 SK PH 390 J	15.090
C33-3	CAPACITOR MKT	220nF 10% 63VDC	PHILIPS	2222 370 78224	11.095
C34-3	CAPACITOR MKT	220nF 10% 63VDC	PHILIPS	2222 370 78224	11.095
C35-3	CAPACITOR CERAMIC	15pF 5% N150 50VDC	KCK	RT-HE40-SK PH 150 J	15.055
C36-3	CAPACITOR CERAMIC	5p6F +/-0.5pF N150 50VDC	KCK	RT-HE40-SK PH 5R6 D	15.013
C37-3	CAPACITOR CERAMIC	33pF 5% N150 50VDC	KCK	RT-HE50 SK PH 330 J	15.092
C38-3	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C39-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C40-3	CAPACITOR MKT	1u0F 10% 63VDC	PHILIPS	2222 370 78105	11.137
C41-3	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C42-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C43-3	CAPACITOR MKT	220nF 10% 63VDC	PHILIPS	2222 370 78224	11.095
C44-3	CAPACITOR MKT	220nF 10% 63VDC	PHILIPS	2222 370 78224	11.095
C45-3	CAPACITOR MKT	220nF 10% 63VDC	PHILIPS	2222 370 78224	11.095
C46-3	CAPACITOR MKT	220nF 10% 63VDC	PHILIPS	2222 370 78224	11.095
C47-3	CAPACITOR MKT	220nF 10% 63VDC	PHILIPS	2222 370 78224	11.095
C48-3	CAPACITOR MKT	220nF 10% 63VDC	PHILIPS	2222 370 78224	11.095
C49-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C50-3	CAPACITOR MKT	220nF 10% 63VDC	PHILIPS	2222 370 78224	11.095
C51-3	CAPACITOR MKT	47nF 5% 63VDC	PHILIPS	2222 370 79473	11.156
C52-3	CAPACITOR CERAMIC	43pF 5% N150 50VDC	KCK	RT-HE60-SK-PH 430 J	15.097
C53-3	CAPACITOR MKT	220nF 10% 63VDC	PHILIPS	2222 370 78224	11.095
C54-3	CAPACITOR MKT	47nF 5% 63VDC	PHILIPS	2222 370 79473	11.156
C55-3	CAPACITOR CERAMIC	15pF 5% N150 50VDC	KCK	RT-HE40-SK PH 150 J	15.055
C56-3	CAPACITOR CERAMIC	5p6F +/-0.5pF N150 50VDC	KCK	RT-HE40-SK PH 5R6 D	15.013
C57-3	CAPACITOR CERAMIC	33pF 5% N150 50VDC	KCK	RT-HE50 SK PH 330 J	15.092
C58-3	CAPACITOR MKT	220nF 10% 63VDC	PHILIPS	2222 370 78224	11.095
C59-3	CAPACITOR MKT	220nF 10% 63VDC	PHILIPS	2222 370 78224	11.095
C60-3	CAPACITOR ELECTROLYTIC	10uF 20% 35VDC	ERO	EKI 00 AA 210 F M5K	14.512
C61-3	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C62-3	CAPACITOR MKT	220nF 10% 63VDC	PHILIPS	2222 370 78224	11.095
C63-3	CAPACITOR MKT	220nF 10% 63VDC	PHILIPS	2222 370 78224	11.095
C64-3	CAPACITOR MKT	220nF 10% 63VDC	PHILIPS	2222 370 78224	11.095
C65-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C66-3	CAPACITOR MKT	100nF 5% 63VDC	PHILIPS	2222 370 79104 (76104)	11.135
C67-3	CAPACITOR MKT	220nF 10% 63VDC	PHILIPS	2222 370 78224	11.095
C68-3	CAPACITOR MKT	220nF 10% 63VDC	PHILIPS	2222 370 78224	11.095
C69-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C70-3	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170

POSITION	DESCRIPTION		MANUFACTOR	TYPE	PART NO.
C71-3	CAPACITOR MKT	220nF 10% 63VDC	PHILIPS	2222 370 78224	11.095
C73-3	CAPACITOR MKT	220nF 10% 63VDC	PHILIPS	2222 370 78224	11.095
C75-3	CAPACITOR MKT	220nF 10% 63VDC	PHILIPS	2222 370 78224	11.095
C76-3	CAPACITOR MKT	220nF 10% 63VDC	PHILIPS	2222 370 78224	11.095
C77-3	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C78-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C79-3	CAPACITOR MKT	1u0F 10% 63VDC	PHILIPS	2222 370 78105	11.137
C80-3	CAPACITOR MKT	220nF 10% 63VDC	PHILIPS	2222 370 78224	11.095
C81-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C82-3	CAPACITOR MKT	220nF 10% 63VDC	PHILIPS	2222 370 78224	11.095
C83-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C84-3	CAPACITOR ELECTROLYTIC	100uF -10/+50% 25VDC	ERO	EKM 00 CC 310 E G5	14.610
C85-3	CAPACITOR ELECTROLYTIC	10uF 20% 35VDC	ERO	EKI 00 AA 210 F M5K	14.512
C86-3	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C87-3	CAPACITOR MKT	220nF 10% 63VDC	PHILIPS	2222 370 78224	11.095
C88-3	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C91-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C92-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C93-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C94-3	CAPACITOR CERAMIC	1p8F +/-0.25pF NP0 100VDC	PHILIPS	2222 689(679) 09188	15.008
C95-3	CAPACITOR MULTILAYER	3n3F 2% NPO 50DC	VITRAMON	VP32 BA332GA-T-AMMO PACK	16.295
C96-3	CAPACITOR ELECTROLYTIC	47uF 20% 25VDC	ERO	EKI 00 BB 247 E M0E	14.524
C97-3	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C98-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C99-3	CAPACITOR CERAMIC	4p7F +/-0.25pF N150 50VDC	KCK	RT-HE40 SK PH 4R7 C	15.005
C100-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C101-3	CAPACITOR MKT	220nF 10% 63VDC	PHILIPS	2222 370 78224	11.095
C102-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C103-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C104-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C105-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C106-3	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C107-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C108-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C109-3	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C110-3	CAPACITOR MKT	220nF 10% 63VDC	PHILIPS	2222 370 78224	11.095
C112-3	CAPACITOR MULTILAYER	3n3F 2% NPO 50DC	VITRAMON	VP32 BA332GA-T-AMMO PACK	16.295
C113-3	CAPACITOR ELECTROLYTIC	47uF 20% 25VDC	ERO	EKI 00 BB 247 E M0E	14.524
C115-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C117-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C118-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C119-3	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C123-3	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C124-3	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C125-3	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C126-3	CAPACITOR MKT	220nF 10% 63VDC	PHILIPS	2222 370 78224	11.095
C127-3	CAPACITOR MKT	220nF 10% 63VDC	PHILIPS	2222 370 78224	11.095
C128-3	CAPACITOR ELECTROLYTIC	4.7uF 20% 50VDC	ERO	EKI 00 AA 147 H M5K	14.510
C129-3	CERAMIC CAPACITOR	22pF 5% N150 50VDC	KCK	RT-HE40-SK-PH 220 J	15.075
C130-3	CAPACITOR CERAMIC	36pF 5% N150 50VDC	KCK	RT-HE50-SK-PH 360 J	15.088
C131-3	CAPACITOR MKT	39nF 5% 63VDC	PHILIPS	2222 370 79393/86393	11.155
C132-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C135-3	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C136-3	CAPACITOR ELECTROLYTIC	47uF 20% 25VDC	ERO	EKI 00 BB 247 E M0E	14.524
C137-3	CAPACITOR CERAMIC	2p7F +/-0.25pF N150 50VDC	KCK	RT-HE40 SK PJ 2R7 C	15.001
C138-3	CAPACITOR MKT	22nF 5% 100VDC	PHILIPS	2222 370 89223	11.169
C139-3	CAPACITOR CERAMIC	13pF 5% N150 50VDC	KCK	RT-HE40 SK PH 130 J	15.051
C140-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C141-3	CAPACITOR MKT	68nF 5% 63VDC	PHILIPS	2222 370 79683	11.178
C142-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C143-3	CAPACITOR MKT	39nF 5% 63VDC	PHILIPS	2222 370 79393/86393	11.155
C144-3	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C145-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C146-3	CAPACITOR MKT	220nF 10% 63VDC	PHILIPS	2222 370 78224	11.095
C147-3	CAPACITOR MKT	22nF 5% 100VDC	PHILIPS	2222 370 89223	11.169
C148-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C149-3	CAPACITOR CERAMIC	36pF 5% N150 50VDC	KCK	RT-HE50-SK-PH 360 J	15.088
C150-3	CAPACITOR CERAMIC	43pF 5% N150 50VDC	KCK	RT-HE60-SK-PH 430 J	15.097
C151-3	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C152-3	CAPACITOR ELECTROLYTIC	4.7uF 20% 50VDC	ERO	EKI 00 AA 147 H M5K	14.510
C153-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C154-3	CAPACITOR MKT	220nF 10% 63VDC	PHILIPS	2222 370 78224	11.095
C155-3	CAPACITOR CERAMIC	2p7F +/-0.25pF N150 50VDC	KCK	RT-HE40 SK PJ 2R7 C	15.001
C156-3	CAPACITOR CERAMIC	20pF 5% N150 50VDC	KCK	RT HE40 SM PH 200 J	15.065

POSITION	DESCRIPTION		MANUFACTURER	TYPE	PART NO.
C157-3	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C158-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C160-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C170-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C173-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C174-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C175-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C176-3	CAPACITOR CERAMIC	10pF +/-0.5pF N150 50VDC	KCK	RT-HE40 SK PH 100 D	15.035
C177-3	CAPACITOR CERAMIC	6p8F +/-0.5pF N150 50VDC	KCK	RT-HE40 SK PH 6R8 D	15.020
C178-3	CAPACITOR MKT	220nF 10% 63VDC	PHILIPS	2222 370 78224	11.095
C179-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C180-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C181-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C182-3	CAPACITOR CERAMIC	1n0F 10% CL2 500VDC	KCK	RT-HM60 SK YB 102 K	15.160
C183-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C184-3	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C185-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C186-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C187-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C188-3	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C189-3	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C190-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C191-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C192-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C193-3	CAPACITOR MKT	100nF 10% 63VDC	PHILIPS	2222 370 75104 (78104)	11.136
C194-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C195-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C196-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C197-3	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C198-3	CAPACITOR ELECTROLYTIC	47uF 20% 25VDC	ERO	EKI 00 BB 247 E MOE	14.524
C199-3	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C200-3	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C201-3	CAPACITOR MKT	1u0F 10% 63VDC	PHILIPS	2222 370 78105	11.137
C202-3	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C203-3	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C204-3	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C205-3	CAPACITOR MKT	220nF 10% 63VDC	PHILIPS	2222 370 78224	11.095
C206-3	CAPACITOR MKT	220nF 10% 63VDC	PHILIPS	2222 370 78224	11.095
C207-3	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	KCK	RT-HE70 SK YF 103 Z	15.170
C208-3	CAPACITOR ELECTROLYTIC	4.7uF 20% 50VDC	ERO	EKI 00 AA 147 H M5K	14.510
C209-3	CAPACITOR ELECTROLYTIC	4.7uF 20% 50VDC	ERO	EKI 00 AA 147 H M5K	14.510
C210-3	CAPACITOR ELECTROLYTIC	4.7uF 20% 50VDC	ERO	EKI 00 AA 147 H M5K	14.510
C211-3	CAPACITOR ELECTROLYTIC	4.7uF 20% 50VDC	ERO	EKI 00 AA 147 H M5K	14.510
C212-3	CAPACITOR ELECTROLYTIC	47uF 20% 25VDC	ERO	EKI 00 BB 247 E MOE	14.524
C213-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C214-3	CAPACITOR CERAMIC	470pF 10% 500VDC	KCK	RT-HM60 SK YB 471 K	16.095
C216-3	CAPACITOR CERAMIC	330pF 20% 500VDC	KCK	RT-HM60-SK YB 331 M	16.093
C217-3	CAPACITOR CERAMIC	270pF 10% CL2 500VDC	KCK	RT-HM60-SK YB 271 K	16.092
C218-3	CAPACITOR CERAMIC	270pF 10% CL2 500VDC	KCK	RT-HM60-SK YB 271 K	16.092
D1-3	DIODE CAPACITANCE	4.5pF/28VDC	PHILIPS	BB809	26.125
D2-3	DIODE SWITCH	BA243, BA282	TFK	BA282 TAPED	25.386
D3-3	DIODE CAPACITANCE	4.5pF/28VDC	PHILIPS	BB809	26.125
D4-3	DIODE CAPACITANCE	4.5pF/28VDC	PHILIPS	BB809	26.125
D5-3	DIODE SWITCH	BA243, BA282	TFK	BA282 TAPED	25.386
D6-3	DIODE CAPACITANCE	4.5pF/28VDC	PHILIPS	BB809	26.125
D7-3	DIODE SWITCH	BA243, BA282	TFK	BA282 TAPED	25.386
D8-3	DIODE CAPACITANCE	4.5pF/28VDC	PHILIPS	BB809	26.125
D9-3	DIODE CAPACITANCE	4.5pF/28VDC	PHILIPS	BB809	26.125
D10-3	DIODE SWITCH	BA243, BA282	TFK	BA282 TAPED	25.386
D11-3	DIODE HIGH SPEED	1N4448	PHILIPS	1N4448	25.147
D12-3	DIODE HIGH SPEED	1N4448	PHILIPS	1N4448	25.147
D13-3	DIODE ZENER	2V7 5% 0.4W BZX79C2V7	PHILIPS	BZX79C2V7	26.506
D14-3	DIODE HIGH SPEED	1N4448	PHILIPS	1N4448	25.147
D15-3	DIODE HIGH SPEED	1N4448	PHILIPS	1N4448	25.147
D16-3	DIODE HIGH SPEED	1N4448	PHILIPS	1N4448	25.147
D17-3	DIODE ZENER	2V4 5% 0.4W BZX79C2V4	PHILIPS	BZX79C2V4	26.505
D18-3	DIODE SWITCH	BA243, BA282	TFK	BA282 TAPED	25.386
D19-3	DIODE CAPACITANCE	4.5pF/28VDC	PHILIPS	BB809	26.125
D20-3	DIODE SCHOTTKY BARRIER	70V/15mA 1N5711/5082-2800	SGS-THOMSON	1N5711	27.500
D21-3	DIODE SWITCH	BA243, BA282	TFK	BA282 TAPED	25.386
D22-3	DIODE CAPACITANCE	4.5pF/28VDC	PHILIPS	BB809	26.125
D23-3	DIODE SCHOTTKY BARRIER	70V/15mA 1N5711/5082-2800	SGS-THOMSON	1N5711	27.500
D24-3	DIODE SWITCH	BA243, BA282	TFK	BA282 TAPED	25.386
D25-3	DIODE HIGH SPEED	1N4448	PHILIPS	1N4448	25.147



POSITION	DESCRIPTION		MANUFACTOR	TYPE	PART NO.
D26-3	DIODE SWITCH	BA243, BA282	TFK	BA282 TAPED	25.386
J1-3	SOCKET COAX 90 DEG.	PCB VERSION	TAIKO	TMP-J01X-V6	78.518
J2-3	SOCKET COAX 90 DEG.	PCB VERSION	TAIKO	TMP-J01X-V6	78.518
J3-3	SOCKET COAX 90 DEG.	PCB VERSION	TAIKO	TMP-J01X-V6	78.518
J4-3	SOCKET COAX 90 DEG.	PCB VERSION	TAIKO	TMP-J01X-V6	78.518
J5-3	SOCKET COAX 90 DEG.	PCB VERSION	TAIKO	TMP-J01X-V6	78.518
J6-3	SOCKET COAX 90 DEG.	PCB VERSION	TAIKO	TMP-J01X-V6	78.518
L1-3	CHOKE FIXED	3u9H 10%	SIEMENS	B78108-T1392-K	20.354
L3-3	CHOKE FIXED	3u9H 10%	SIEMENS	B78108-T1392-K	20.354
L4-3	CHOKE FIXED	470uH 5%	SIEMENS	B78108-S1474-J	20.318
L5-3	CHOKE FIXED	3u9H 10%	SIEMENS	B78108-T1392-K	20.354
L6-3	CHOKE FIXED	3u9H 10%	SIEMENS	B78108-T1392-K	20.354
L8-3	CHOKE FIXED	470uH 5%	SIEMENS	B78108-S1474-J	20.318
L9-3	CHOKE FIXED	3u9H 10%	SIEMENS	B78108-T1392-K	20.354
L10-3	CHOKE FIXED	3u9H 10%	SIEMENS	B78108-T1392-K	20.354
L11-3	CHOKE FIXED	470uH 5%	SIEMENS	B78108-S1474-J	20.318
L12-3	CHOKE FIXED	3u9H 10%	SIEMENS	B78108-T1392-K	20.354
L13-3	CHOKE FIXED	3u9H 10%	SIEMENS	B78108-T1392-K	20.354
L14-3	CHOKE FIXED	3u9H 10%	SIEMENS	B78108-T1392-K	20.354
L16-3	CHOKE FIXED	470uH 5%	SIEMENS	B78108-S1474-J	20.318
L17-3	CHOKE FIXED	100uH 10%	SIEMENS	B78108-T1104-K	20.371
L18-3	CHOKE FIXED	100uH 10%	SIEMENS	B78108-T1104-K	20.371
L19-3	CHOKE FIXED	100uH 10%	SIEMENS	B78108-T1104-K	20.371
L20-3	CHOKE FIXED	100uH 10%	SIEMENS	B78108-T1104-K	20.371
L21-3	CHOKE FIXED	3u9H 10%	SIEMENS	B78108-T1392-K	20.354
L22-3	CHOKE FIXED	4m7H 5%	SIEMENS	B78108-S1475-J	20.330
L24-3	CHOKE FIXED	100uH 10%	SIEMENS	B78108-T1104-K	20.371
L25-3	CHOKE FIXED	100uH 10%	SIEMENS	B78108-T1104-K	20.371
L26-3	CHOKE FIXED	100uH 10%	SIEMENS	B78108-T1104-K	20.371
L27-3	CHOKE FIXED	270nH 10%	SIEMENS	B78108-T3271-K	20.339
L28-3	CHOKE FIXED	3u9H 10%	SIEMENS	B78108-T1392-K	20.354
L29-3	CHOKE FIXED	3u9H 10%	SIEMENS	B78108-T1392-K	20.354
L30-3	CHOKE FIXED	10uH 10%	SIEMENS	B78108-T1103-K	20.359
L32-3	CHOKE FIXED	3u9H 10%	SIEMENS	B78108-T1392-K	20.354
L33-3	CHOKE FIXED	1u5H 10%	SIEMENS	B78108-T1152-K	20.349
L34-3	CHOKE FIXED	4m7H 5%	SIEMENS	B78108-S1475-J	20.330
L35-3	CHOKE FIXED	4m7H 5%	SIEMENS	B78108-S1475-J	20.330
L36-3	CHOKE FIXED	10uH 10%	SIEMENS	B78108-T1103-K	20.359
L38-3	CHOKE FIXED	3u9H 10%	SIEMENS	B78108-T1392-K	20.354
L39-3	CHOKE FIXED	2u2H 10%	SIEMENS	B78108-T1222-K	20.351
L40-3	CHOKE FIXED	0.56uH 10%	SIEMENS	B78108-T3561-K	20.344
L41-3	CHOKE FIXED	3u9H 10%	SIEMENS	B78108-T1392-K	20.354
L42-3	CHOKE FIXED	3u9H 10%	SIEMENS	B78108-T1392-K	20.354
L43-3	CHOKE FIXED	3u9H 10%	SIEMENS	B78108-T1392-K	20.354
L44-3	CHOKE FIXED	3u9H 10%	SIEMENS	B78108-T1392-K	20.354
L45-3	CHOKE FIXED	3u9H 10%	SIEMENS	B78108-T1392-K	20.354
L46-3	CHOKE FIXED	470uH 5%	SIEMENS	B78108-S1474-J	20.318
L47-3	CHOKE FIXED	3u9H 10%	SIEMENS	B78108-T1392-K	20.354
L48-3	CHOKE FIXED	3u9H 10%	SIEMENS	B78108-T1392-K	20.354
L49-3	CHOKE FIXED	3u9H 10%	SIEMENS	B78108-T1392-K	20.354
L50-3	CHOKE FIXED	100uH 10%	SIEMENS	B78108-T1104-K	20.371
P1-3	PLUG	2x7 POLES	3M	3598-6002 / 7614-6002 JL	78.254
Q1-3	TRANSISTOR AF	BC548 NPN TO-92	PHILIPS	BC548 (-A/-B/-C)126	28.070
Q2-3	TRANSISTOR FET.	BF256C	PHILIPS	BF256C	29.707
Q3-3	TRANSISTOR AF	BC558 PNP TO-92	MOTOROLA	BC558 (-A/-B/-C)ZL1	28.095
Q4-3	TRANSISTOR AF	BC548 NPN TO-92	PHILIPS	BC548 (-A/-B/-C)126	28.070
Q5-3	TRANSISTOR FET.	BF256C	PHILIPS	BF256C	29.707
Q6-3	TRANSISTOR AF	BC558 PNP TO-92	MOTOROLA	BC558 (-A/-B/-C)ZL1	28.095
Q7-3	TRANSISTOR AF	BC548 NPN TO-92	PHILIPS	BC548 (-A/-B/-C)126	28.070
Q8-3	TRANSISTOR FET.	BF256C	PHILIPS	BF256C	29.707
Q9-3	TRANSISTOR AF	BC558 PNP TO-92	MOTOROLA	BC558 (-A/-B/-C)ZL1	28.095
Q10-3	TRANSISTOR AF	BC548 NPN TO-92	PHILIPS	BC548 (-A/-B/-C)126	28.070
Q11-3	TRANSISTOR FET.	BF256C	PHILIPS	BF256C	29.707
Q12-3	TRANSISTOR AF	BC558 PNP TO-92	MOTOROLA	BC558 (-A/-B/-C)ZL1	28.095
Q13-3	TRANSISTOR RF	BFW92A	TFK	BFW92A	29.160
Q14-3			PHILIPS	BF256A	29.705
Q15-3	TRANSISTOR RF SWITCH	2N2369A	MOTOROLA	2N2369A	28.315
Q16-3	TRANSISTOR RF SWITCH	MPS3640	MOTOROLA	MPS-3640	28.405
Q17-3	TRANSISTOR RF	BF199	MOTOROLA	BF199ZL1	28.178
Q18-3	TRANSISTOR RF	BF199	MOTOROLA	BF199ZL1	28.178
Q19-3	TRANS. MOSFET N-CHANNEL	ENHANCEMENT SD210/BSD214	PHILIPS	BSD214	29.719
Q20-3	TRANSISTOR RF SWITCH	2N2369A	MOTOROLA	2N2369A	28.315
Q21-3	TRANSISTOR RF	BF199	MOTOROLA	BF199ZL1	28.178
Q22-3	TRANSISTOR RF	BFW92A	TFK	BFW92A	29.160

POSITION	DESCRIPTION	MANUFACTURER	TYPE	PART NO.	
Q23-3	TRANSISTOR AF	BC548 NPN TO-92	PHILIPS	BC548 (-A/-B/-C)126	28.070
Q24-3	TRANS. MOSFET N-CHANNEL	ENHANCEMENT SD210/BS214	PHILIPS	BS214	29.719
Q25-3	TRANSISTOR RF SWITCH	2N2369A	MOTOROLA	2N2369A	28.315
Q26-3	TRANSISTOR RF SWITCH	2N2369A	MOTOROLA	2N2369A	28.315
Q27-3	TRANSISTOR RF	BF199	MOTOROLA	BF199ZL1	28.178
Q28-3	TRANSISTOR AF	BC548 NPN TO-92	PHILIPS	BC548 (-A/-B/-C)126	28.070
Q29-3	TRANSISTOR AF	BC548 NPN TO-92	PHILIPS	BC548 (-A/-B/-C)126	28.070
Q30-3	TRANSISTOR FET.	BF256C	PHILIPS	BF256C	29.707
Q31-3	TRANSISTOR AF	BC558 PNP TO-92	MOTOROLA	BC558 (-A/-B/-C)ZL1	28.095
Q32-3	TRANSISTOR AF	BC548 NPN TO-92	PHILIPS	BC548 (-A/-B/-C)126	28.070
Q33-3	TRANSISTOR FET.	BF256C	PHILIPS	BF256C	29.707
Q34-3	TRANSISTOR RF	BF199	MOTOROLA	BF199ZL1	28.178
Q35-3	TRANSISTOR AF	BC558 PNP TO-92	MOTOROLA	BC558 (-A/-B/-C)ZL1	28.095
Q36-3	TRANSISTOR RF	BFW92A	TFK	BFW92A	29.160
Q37-3	TRANSISTOR RF	BFW92A	TFK	BFW92A	29.160
Q38-3	TRANSISTOR RF	BF199	MOTOROLA	BF199ZL1	28.178
Q39-3	TRANSISTOR AF	BC548 NPN TO-92	PHILIPS	BC548 (-A/-B/-C)126	28.070
Q40-3	TRANSISTOR RF	BF199	MOTOROLA	BF199ZL1	28.178
R1-3	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R2-3	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R3-3	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R4-3	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R5-3	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R6-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R7-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R8-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R9-3	RESISTOR MF	5k6 OHM 5% 0.33W	PHILIPS	2322 187 73562	02.490
R10-3	RESISTOR MF	56 OHM 5% 0.33W	PHILIPS	2322 187 73569	02.442
R11-3	RESISTOR MF	910 OHM 5% 0.33W	PHILIPS	2322 187 73911	02.471
R12-3	RESISTOR MF	5k6 OHM 5% 0.33W	PHILIPS	2322 187 73562	02.490
R13-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R14-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R15-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R16-3	RESISTOR MF	5k6 OHM 5% 0.33W	PHILIPS	2322 187 73562	02.490
R17-3	RESISTOR MF	330 OHM 5% 0.33W	PHILIPS	2322 187 73331	02.460
R18-3	RESISTOR MF	56 OHM 5% 0.33W	PHILIPS	2322 187 73569	02.442
R19-3	RESISTOR MF	910 OHM 5% 0.33W	PHILIPS	2322 187 73911	02.471
R20-3	RESISTOR MF	5k6 OHM 5% 0.33W	PHILIPS	2322 187 73562	02.490
R21-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R22-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R23-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R24-3	RESISTOR MF	5k6 OHM 5% 0.33W	PHILIPS	2322 187 73562	02.490
R25-3	RESISTOR MF	56 OHM 5% 0.33W	PHILIPS	2322 187 73569	02.442
R26-3	RESISTOR MF	910 OHM 5% 0.33W	PHILIPS	2322 187 73911	02.471
R27-3	RESISTOR MF	5k6 OHM 5% 0.33W	PHILIPS	2322 187 73562	02.490
R28-3	RESISTOR MF	680 OHM 5% 0.33W	PHILIPS	2322 187 73681	02.468
R29-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R30-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R31-3	RESISTOR MF	680 OHM 5% 0.33W	PHILIPS	2322 187 73681	02.468
R32-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R33-3	RESISTOR MF	8k2 OHM 5% 0.33W	PHILIPS	2322 187 73822	02.494
R34-3	RESISTOR MF	5k6 OHM 5% 0.33W	PHILIPS	2322 187 73562	02.490
R35-3	RESISTOR MF	56 OHM 5% 0.33W	PHILIPS	2322 187 73569	02.442
R36-3	RESISTOR MF	910 OHM 5% 0.33W	PHILIPS	2322 187 73911	02.471
R37-3	RESISTOR MF	5k6 OHM 5% 0.33W	PHILIPS	2322 187 73562	02.490
R38-3	RESISTOR MF	36k OHM 5% 0.33W	PHILIPS	2322 187 73363	02.509
R39-3	RESISTOR MF	5k6 OHM 5% 0.33W	PHILIPS	2322 187 73562	02.490
R40-3	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R41-3	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R42-3	RESISTOR MF	1k2 OHM 5% 0.33W	PHILIPS	2322 187 73122	02.474
R43-3	RESISTOR MF	56R2 OHM 1% 0.25W	PHILIPS	2322 157 15629	02.222
R44-3	RESISTOR MF	33k OHM 5% 0.33W	PHILIPS	2322 187 73333	02.508
R45-3	RESISTOR MF	12k OHM 5% 0.33W	PHILIPS	2322 187 73123	02.498
R46-3	RESISTOR MF	15k OHM 5% 0.33W	PHILIPS	2322 187 73153	02.500
R47-3	RESISTOR MF	82 OHM 5% 0.33W	PHILIPS	2322 187 73829	02.446
R48-3	RESISTOR MF	7k5 OHM 5% 0.33W	PHILIPS	2322 187 73752	02.493
R49-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R50-3	RESISTOR MF	82 OHM 5% 0.33W	PHILIPS	2322 187 73829	02.446
R51-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R52-3	RESISTOR MF	2k2 OHM 5% 0.33W	PHILIPS	2322 187 73222	02.480
R53-3	RESISTOR MF	2k2 OHM 5% 0.33W	PHILIPS	2322 187 73222	02.480
R54-3	RESISTOR MF	2k7 OHM 5% 0.33W	PHILIPS	2322 187 73272	02.482
R55-3	RESISTOR MF	12k OHM 5% 0.33W	PHILIPS	2322 187 73123	02.498
R56-3	RESISTOR MF	5k1 OHM 5% 0.33W	PHILIPS	2322 187 73512	02.489

POSITION	DESCRIPTION		MANUFACTOR	TYPE	PART NO.
R57-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R58-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R59-3	RESISTOR MF	12k OHM 5% 0.33W	PHILIPS	2322 187 73123	02.498
R60-3	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R61-3	RESISTOR MF	220 OHM 5% 0.33W	PHILIPS	2322 187 73221	02.456
R62-3	RESISTOR MF	10 OHM 5% 0.33W	PHILIPS	2322 187 73109	02.424
R63-3	RESISTOR MF	680 OHM 5% 0.33W	PHILIPS	2322 187 73681	02.468
R64-3	RESISTOR MF	1k0 OHM 5% 0.33W	PHILIPS	2322 187 73102	02.472
R65-3	RESISTOR MF	390 OHM 5% 0.33W	PHILIPS	2322 187 73391	02.462
R66-3	RESISTOR MF	390 OHM 5% 0.33W	PHILIPS	2322 187 73391	02.462
R67-3	RESISTOR MF	5k6 OHM 5% 0.33W	PHILIPS	2322 187 73562	02.490
R68-3	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R69-3	RESISTOR MF	82 OHM 5% 0.33W	PHILIPS	2322 187 73829	02.446
R70-3	RESISTOR MF	470 OHM 5% 0.33W	PHILIPS	2322 187 73471	02.464
R71-3	RESISTOR MF	1k0 OHM 5% 0.33W	PHILIPS	2322 187 73102	02.472
R72-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R73-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R74-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R75-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R76-3	RESISTOR MF	2k7 OHM 5% 0.33W	PHILIPS	2322 187 73272	02.482
R77-3	RESISTOR MF	220 OHM 5% 0.33W	PHILIPS	2322 187 73221	02.456
R78-3	RESISTOR MF	1k8 OHM 5% 0.33W	PHILIPS	2322 187 73182	02.478
R79-3	RESISTOR MF	33 OHM 5% 0.33W	PHILIPS	2322 187 73339	02.436
R80-3	RESISTOR MF	470 OHM 5% 0.4W	PHILIPS	2322 181 53471	01.191
R81-3	RESISTOR MF	56 OHM 5% 0.33W	PHILIPS	2322 187 73569	02.442
R82-3	RESISTOR MF	10 OHM 5% 0.33W	PHILIPS	2322 187 73109	02.424
R83-3	RESISTOR MF	100k OHM 5% 0.33W	PHILIPS	2322 187 73104	02.520
R84-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R85-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R86-3	RESISTOR MF	5k6 OHM 5% 0.33W	PHILIPS	2322 187 73562	02.490
R87-3	RESISTOR MF	2k32 OHM 1% 0.25W	PHILIPS	2322 157 12322	02.225
R88-3	PRESET CERMET	1k0 OHM 10% 0.5W	BOURNS	3386P-Y91-102	07.886
R89-3	RESISTOR MF	909 OHM 1% 0.25W	PHILIPS	2322 157 19091	02.218
R90-3	RESISTOR MF	681 OHM 1% 0.25W	PHILIPS	2322 157 16811	02.223
R91-3	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R92-3	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R93-3	RESISTOR MF	4k7 OHM 5% 0.33W	PHILIPS	2322 187 73472	02.488
R94-3	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R95-3	RESISTOR MF	5k6 OHM 5% 0.33W	PHILIPS	2322 187 73562	02.490
R96-3	RESISTOR MF	1k2 OHM 5% 0.33W	PHILIPS	2322 187 73122	02.474
R97-3	RESISTOR MF	5k6 OHM 5% 0.33W	PHILIPS	2322 187 73562	02.490
R98-3	RESISTOR MF	5k6 OHM 5% 0.33W	PHILIPS	2322 187 73562	02.490
R100-3	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R101-3	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R102-3	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R103-3	RESISTOR MF	470 OHM 5% 0.33W	PHILIPS	2322 187 73471	02.464
R104-3	RESISTOR MF	1k2 OHM 5% 0.33W	PHILIPS	2322 187 73122	02.474
R105-3	RESISTOR MF	220 OHM 5% 0.33W	PHILIPS	2322 187 73221	02.456
R106-3	RESISTOR MF	15k OHM 5% 0.33W	PHILIPS	2322 187 73153	02.500
R107-3	RESISTOR MF	56 OHM 5% 0.33W	PHILIPS	2322 187 73569	02.442
R108-3	RESISTOR MF	56 OHM 5% 0.33W	PHILIPS	2322 187 73569	02.442
R109-3	RESISTOR MF	560 OHM 5% 0.33W	PHILIPS	2322 187 73561	02.466
R110-3	RESISTOR MF	2k2 OHM 5% 0.33W	PHILIPS	2322 187 73222	02.480
R111-3	RESISTOR MF	4k7 OHM 5% 0.33W	PHILIPS	2322 187 73472	02.488
R112-3	RESISTOR MF	6k8 OHM 5% 0.33W	PHILIPS	2322 187 73682	02.492
R113-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R114-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R115-3	RESISTOR MF	220 OHM 5% 0.33W	PHILIPS	2322 187 73221	02.456
R116-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R117-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R118-3	RESISTOR MF	300 OHM 5% 0.33W	PHILIPS	2322 187 73301	02.459
R119-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R120-3	RESISTOR MF	56k OHM 5% 0.33W	PHILIPS	2322 187 73563	02.514
R121-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R122-3	RESISTOR MF	300 OHM 5% 0.33W	PHILIPS	2322 187 73301	02.459
R123-3	RESISTOR MF	36k OHM 5% 0.33W	PHILIPS	2322 187 73363	02.509
R124-3	RESISTOR MF	1k0 OHM 5% 0.33W	PHILIPS	2322 187 73102	02.472
R125-3	RESISTOR MF	270 OHM 5% 0.33W	PHILIPS	2322 187 73271	02.458
R126-3	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R127-3	RESISTOR MF	18k OHM 5% 0.33W	PHILIPS	2322 187 73183	02.502
R128-3	RESISTOR MF	36k OHM 5% 0.33W	PHILIPS	2322 187 73363	02.509
R129-3	RESISTOR MF	5k6 OHM 5% 0.33W	PHILIPS	2322 187 73562	02.490
R130-3	RESISTOR MF	18k OHM 5% 0.33W	PHILIPS	2322 187 73183	02.502
R131-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496

POSITION	DESCRIPTION		MANUFACTURER	TYPE	PART NO.
R132-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R133-3	RESISTOR MF	56k OHM 5% 0.33W	PHILIPS	2322 187 73563	02.514
R134-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R135-3	RESISTOR MF	1k0 OHM 5% 0.33W	PHILIPS	2322 187 73102	02.472
R136-3	RESISTOR MF	270 OHM 5% 0.33W	PHILIPS	2322 187 73271	02.458
R137-3	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R138-3	RESISTOR MF	47 OHM 5% 0.33W	PHILIPS	2322 187 73479	02.440
R139-3	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R140-3	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R141-3	RESISTOR MF	100k OHM 5% 0.33W	PHILIPS	2322 187 73104	02.520
R142-3	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R143-3	RESISTOR MF	220 OHM 5% 0.33W	PHILIPS	2322 187 73221	02.456
R144-3	RESISTOR MF	10 OHM 5% 0.33W	PHILIPS	2322 187 73109	02.424
R145-3	RESISTOR MF	1k0 OHM 5% 0.33W	PHILIPS	2322 187 73102	02.472
R146-3	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R147-3	RESISTOR MF	5k6 OHM 5% 0.33W	PHILIPS	2322 187 73562	02.490
R148-3	RESISTOR MF	100k OHM 5% 0.33W	PHILIPS	2322 187 73104	02.520
R150-3	RESISTOR MF	5k6 OHM 5% 0.33W	PHILIPS	2322 187 73562	02.490
R151-3	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R152-3	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R153-3	RESISTOR MF	1k2 OHM 5% 0.33W	PHILIPS	2322 187 73122	02.474
R154-3	RESISTOR MF	470 OHM 5% 0.33W	PHILIPS	2322 187 73471	02.464
R155-3	RESISTOR MF	1k0 OHM 5% 0.33W	PHILIPS	2322 187 73102	02.472
R156-3	RESISTOR MF	2k7 OHM 5% 0.33W	PHILIPS	2322 187 73272	02.482
R157-3	RESISTOR MF	47 OHM 5% 0.33W	PHILIPS	2322 187 73479	02.440
R158-3	RESISTOR MF	390 OHM 5% 0.4W	PHILIPS	2322 181 53391	01.189
R159-3	RESISTOR MF	82 OHM 5% 0.33W	PHILIPS	2322 187 73829	02.446
R160-3	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R161-3	RESISTOR MF	100k OHM 5% 0.33W	PHILIPS	2322 187 73104	02.520
R162-3	RESISTOR MF	2k2 OHM 5% 0.33W	PHILIPS	2322 187 73222	02.480
R163-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R164-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R165-3	RESISTOR MF	5k6 OHM 5% 0.33W	PHILIPS	2322 187 73562	02.490
R166-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R167-3	RESISTOR MF	390 OHM 5% 0.33W	PHILIPS	2322 187 73391	02.462
R168-3	RESISTOR MF	390 OHM 5% 0.33W	PHILIPS	2322 187 73391	02.462
R169-3	RESISTOR MF	100 OHM 5% 0.33W	PHILIPS	2322 187 73101	02.448
R170-3	RESISTOR MF	82 OHM 5% 0.33W	PHILIPS	2322 187 73829	02.446
R171-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R172-3	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R173-3	RESISTOR MF	1k8 OHM 5% 0.33W	PHILIPS	2322 187 73182	02.478
R174-3	RESISTOR MF	15k OHM 5% 0.33W	PHILIPS	2322 187 73153	02.500
R175-3	RESISTOR MF	56 OHM 5% 0.33W	PHILIPS	2322 187 73569	02.442
R176-3	RESISTOR MF	2k2 OHM 5% 0.33W	PHILIPS	2322 187 73222	02.480
R177-3	RESISTOR MF	47 OHM 5% 0.33W	PHILIPS	2322 187 73479	02.440
R178-3	RESISTOR MF	33 OHM 5% 0.33W	PHILIPS	2322 187 73339	02.436
R182-3	RESISTOR MF	56 OHM 5% 0.33W	PHILIPS	2322 187 73569	02.442
R183-3	RESISTOR MF	220 OHM 5% 0.33W	PHILIPS	2322 187 73221	02.456
R184-3	RESISTOR MF	220 OHM 5% 0.33W	PHILIPS	2322 187 73221	02.456
R185-3	RESISTOR MF	150 OHM 5% 0.33W	PHILIPS	2322 187 73151	02.452
R186-3	RESISTOR MF	150 OHM 5% 0.33W	PHILIPS	2322 187 73151	02.452
R187-3	RESISTOR MF	10 OHM 5% 0.33W	PHILIPS	2322 187 73109	02.424
R188-3	RESISTOR MF	10 OHM 5% 0.33W	PHILIPS	2322 187 73109	02.424
RE1-3	RELAY	15V DC 2A 1SH.	SIEMENS	V23040-A0003-B201	21.062
RE2-3	RELAY	15V DC 2A 1SH.	SIEMENS	V23040-A0003-B201	21.062
TR1-3	TRANSFORMER	TL493	S.P.RADIO	6-0-25812	400493
TR2-3	TRANSFORMER	TL493	S.P.RADIO	6-0-25812	400493
TR3-3	TRAFO RF 70nH ADJUSTABLE		TOKO	E526HN-110440	38.408
TR4-3	TRAFO RF 70nH ADJUSTABLE		TOKO	E526HN-110440	38.408
TR5-3	TRAFO RF 110nH ADJUSTABLE		TOKO	E526-110436	38.407
TR6-3	TRAFO RF 110nH ADJUSTABLE		TOKO	E526-110436	38.407
TR7-3	TRAFO RF 70nH ADJUSTABLE		TOKO	E526HN-110440	38.408
TR8-3	TRAFO RF 110nH ADJUSTABLE		TOKO	E526-110436	38.407
U1-3	8 BIT SHIFT REG.SERIAL IO	74HC595	MOTOROLA	MC74HC595P / MC74HC595AN	34.502
U2-3	HEX D-FLIP-FLOP w.CLEAR	74HC174	MOTOROLA	MC74HC174AN	34.504
U3-3	8 BIT SHIFT REG.SERIAL IO	74HC595	MOTOROLA	MC74HC595P / MC74HC595AN	34.502
U4-3	4-BIT BIN. FULL ADDERS	WITH FAST CARRY 74HC283	TEXAS	SN74HC283N	34.540
U5-3	NEG. VOLTAGE REG. FIXED	-15V 5% 0.1A 79L15AC	MOTOROLA	MC79L15ACP RA	31.143
U6-3	VOLTAGE REGULATOR	15V 5% 0.1A 78L15AC	MOTOROLA	MC78L15ACP RA	31.140
U7-3	4-BIT BIN. FULL ADDERS	WITH FAST CARRY 74HC283	TEXAS	SN74HC283N	34.540
U8-3	HEX D-FLIP-FLOP w.CLEAR	74HC174	MOTOROLA	MC74HC174AN	34.504
U9-3	8 BIT SHIFT REG.SERIAL IO	74HC595	MOTOROLA	MC74HC595P / MC74HC595AN	34.502
U10-3	VOLTAGE REGULATOR	12V 5% 0.1A 78L12AC	MOTOROLA	MC78L12ACP RA	31.139
U11-3	VOLTAGE REGULATOR	15V 5% 0.1A 78L15AC	MOTOROLA	MC78L15ACP RA	31.140

POSITION	DESCRIPTION		MANUFACTOR	TYPE	PART NO.
U12-3	4-BIT BIN. FULL ADDERS	WITH FAST CARRY	TEXAS	SN74HC283N	34.540
U13-3	DUAL D-FF POS TRIG.	74HC74	TEXAS	SN74HC74N	34.501
U14-3	12-BIT D/A CONVERTER		NATIONAL	DAC1220LCN	32.810
U15-3	8-BIT BIN.COUNT.3-ST OUT	74HC590	TEXAS	SN74HC590AN (HC590N)	34.530
U16-3	OPERATIONAL AMPLIFIER	JFET INPUT LF356	MOTOROLA	LF356N	31.076
U17-3	HEX INVERTERS	74HC04	TEXAS	SN74HC04N	34.520
U18-3	OPERATIONAL AMPLIFIER	JFET INPUT LF356	MOTOROLA	LF356N	31.076
U19-3	OPERATIONAL AMPLIFIER	JFET INPUT LF356	MOTOROLA	LF356N	31.076
U20-3	TRANSISTOR ARRAY	3046	NATIONAL	LM3046N	31.025
U21-3	OPERATIONAL AMPLIFIER	JFET INPUT LF356	MOTOROLA	LF356N	31.076
U22-3	ELC PRESCALER	MC12015P	MOTOROLA	MC12015P	32.850
U23-3	QUAD 2-INP.POS.AND GATE	74HC08	TEXAS	SN74HC08N	34.517
U24-3	SERIAL INPUT PLL SYNTHES.	MC145158P2	MOTOROLA	MC145158P2	33.492
U25-3	QUAD EXCL.NOR GATE	74HC266	PHILIPS	PC74HC7266P	34.500
U26-3	DUAL D-FF POS TRIG.	74HC74	TEXAS	SN74HC74N	34.501
U27-3	QUAD 2-INPUT NAND GATE	74HC00	TEXAS	SN74HC00N	34.515
U28-3	DUAL D-FF POS TRIG.	74HC74	TEXAS	SN74HC74N	34.501
U29-3	QUAD 2-INPUT NAND GATE	74HC00	TEXAS	SN74HC00N	34.515
U30-3	SERIAL INPUT PLL SYNTHES.	MC145158P2	MOTOROLA	MC145158P2	33.492
U31-3	DUAL D-FF POS TRIG.	74HC74	TEXAS	SN74HC74N	34.501
U32-3	8-BIT BIN.COUNT.3-ST OUT	74HC590	TEXAS	SN74HC590AN (HC590N)	34.530
U33-3	VOLTAGE REGULATOR	15V 5% 0.1A 78L15AC	MOTOROLA	MC78L15ACP RA	31.140
U34-3	OPERATIONAL AMPLIFIER	JFET INPUT LF356	MOTOROLA	LF356N	31.076
U35-3	SERIAL INPUT PLL SYNTHES.	MC145158P2	MOTOROLA	MC145158P2	33.492
U36-3	ELC PRESCALER	MC12015P	MOTOROLA	MC12015P	32.850

POWER SUPPLY	RM2150/51	ECI A/S	POWER SUPPLY RM2150/51	726308
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POSITION	DESCRIPTION		MANUFACTOR	TYPE	PART NO.
-8	POWER SUPPLY MODULE 8	RM2150/51		5-0-26308D / 4-0-26308C	626308
U1-8	POS. VOLTAGE REG. 15V/1A	MC7815, LM340T-15	MOTOROLA	MC7815CT (MC7815BT)	31.090
U2-8	NEG. VOLTAGE REG. ADJUST.	Io=1.5A LM337T	NATIONAL	LM337T	31.070
U3-8	POS. VOLTAGE REG. ADJUST.	Io=1.5A LM317T	MOTOROLA	LM317T	31.055
U4-8	POS. VOLTAGE REG. ADJUST.	Io=1.5A LM317T	MOTOROLA	LM317T	31.055
U5-8	POS. VOLTAGE REG. 15V/1A	MC7815, LM340T-15	MOTOROLA	MC7815CT (MC7815BT)	31.090
U7-8	POS. VOLTAGE REG. ADJUST.	Io=1.5A LM317T	MOTOROLA	LM317T	31.055
R12-8	RESISTOR MF	2R7 OHM 5% 0.33W	PHILIPS	2322 187 73278	02.410
R13-8	RESISTOR MF	10k OHM 5% 0.33W	PHILIPS	2322 187 73103	02.496
R14-8	RESISTOR MF	220k OHM 5% 0.33W	PHILIPS	2322 187 73224	02.528
R15-8	RESISTOR MF	15k OHM 5% 0.33W	PHILIPS	2322 187 73153	02.500
R16-8	RESISTOR MF	330 OHM 5% 0.33W	PHILIPS	2322 187 73331	02.460
R17-8	RESISTOR MF	1k5 OHM 5% 0.33W	PHILIPS	2322 187 73152	02.476
U1-8	POS. VOLTAGE REG. 15V/1A	MCT7815-MC7815-LM340T-15	MOTOROLA	MCT7815CT (MCT7815BT)	31.090
U2-8	NEG. VOLTAGE REG. ADJUST.	Io=1.5A LM337T	NATIONAL	LM337T	31.070
U3-8	POS. VOLTAGE REG. ADJUST.	Io=1.5A LM317T	MOTOROLA	LM317T	31.055
U4-8	POS. VOLTAGE REG. ADJUST.	Io=1.5A LM317T	MOTOROLA	LM317T	31.055
U5-8	POS. VOLTAGE REG. 15V/1A	MCT7815-MC7815-LM340T-15	MOTOROLA	MCT7815CT (MCT7815BT)	31.090
U6-8	NEG. VOLTAGE REG. FIXED	-15V 5% 0.1A 79L15AC	NATIONAL	LM79L15ACZ	31.143
U7-8	POS. VOLTAGE REG. ADJUST.	Io=1.5A LM317T	MOTOROLA	LM317T	31.055
U8-8	AF POWER AMPLIFIER	TDA1013A	PHILIPS	TDA1013A	31.455

POWER SUPPLY MODULE 8	RM2150/51	5-0-26308D / 4-0-26308C	626308
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POSITION	DESCRIPTION		MANUFACTOR	TYPE	PART NO.
C1-8	CAPACITOR MKT	0.1uF 10% 63VDC	PHILIPS	2222 370 78104	11.136
C2-8	CAPACITOR MKT	0.1uF 10% 63VDC	PHILIPS	2222 370 78104	11.136
C3-8	CAPACITOR MKT	0.1uF 10% 63VDC	PHILIPS	2222 370 78104	11.136
C4-8	CAPACITOR ELECTROLYTIC	10uF 20% 35VDC	ELNA	RJ2-35-V-100-M-T34(T58)	14.512
C5-8	CAPACITOR MKT	220nF 20% 63VDC	ERO	MKT 1826-422/06 6-G	11.183
C6-8	CAPACITOR MKT	0.1uF 10% 63VDC	PHILIPS	2222 370 78104	11.136
C7-8	CAPACITOR ELECTROLYTIC	10uF 20% 35VDC	ELNA	RJ2-35-V-100-M-T34(T58)	14.512
C8-8	CAPACITOR ELECTROLYTIC	10uF 20% 35VDC	ELNA	RJ2-35-V-100-M-T34(T58)	14.512
C9-8	CAPACITOR ELECTROLYTIC	10uF 20% 35VDC	ELNA	RJ2-35-V-100-M-T34(T58)	14.512
C10-8	CAPACITOR MKT	220nF 20% 63VDC	ERO	MKT 1826-422/06 6-G	11.183
C11-8	CAPACITOR ELECTROLYTIC	10uF 20% 35VDC	ELNA	RJ2-35-V-100-M-T34(T58)	14.512
C12-8	CAPACITOR MKT	220nF 20% 63VDC	ERO	MKT 1826-422/06 6-G	11.183

POSITION	DESCRIPTION		MANUFACTURER	TYPE	PART NO.
C13-8	CAPACITOR ELECTROLYTIC	10uF 20% 35VDC	ELNA	RJ2-35-V-100-M-T34(T58)	14.512
C14-8	CAPACITOR MKT	0.1uF 10% 63VDC	PHILIPS	2222 370 78104	11.136
C15-8	CAPACITOR MKT	220nF 20% 63VDC	ERO	MKT 1826-422/06 6-G	11.183
C16-8	CAPACITOR ELECTROLYTIC	10uF 20% 35VDC	ELNA	RJ2-35-V-100-M-T34(T58)	14.512
C17-8	CAPACITOR MKT	0.1uF 10% 63VDC	PHILIPS	2222 370 78104	11.136
C18-8	CAPACITOR MKT	220nF 20% 63VDC	ERO	MKT 1826-422/06 6-G	11.183
C19-8	CAPACITOR ELECTROLYTIC	10uF 20% 35VDC	ELNA	RJ2-35-V-100-M-T34(T58)	14.512
C20-8	CAPACITOR MKT	220nF 20% 63VDC	ERO	MKT 1826-422/06 6-G	11.183
C21-8	CAPACITOR ELECTROLYTIC	100uF -10/+50% 25VDC	ERO	EKM 00 CC 310 E G5	14.610
C22-8	CAPACITOR ELECTROLYTIC	1uF 20% 50VDC	ELNA	RJ2-50-V-010-M-T34	14.506
C23-8	CAPACITOR ELECTROLYTIC	100uF -10/+50% 25VDC	ERO	EKM 00 CC 310 E G5	14.610
C24-8	CAPACITOR MKT	0.1uF 10% 63VDC	PHILIPS	2222 370 78104	11.136
C25-8	CAPACITOR MKT	10nF 20% 100VDC	PHILIPS	2222 370 38103	11.168
C26-8	CAPACITOR MKT	10nF 20% 100VDC	PHILIPS	2222 370 38103	11.168
C27-8	CAPACITOR MKT	10nF 20% 100VDC	PHILIPS	2222 370 38103	11.168
C28-8	CAPACITOR ELECTROLYTIC	1uF 20% 50VDC	ELNA	RJ2-50-V-010-M-T34	14.506
C29-8	CAPACITOR ELECTROLYTIC	100uF -10/+50% 25VDC	ERO	EKM 00 CC 310 E G5	14.610
D1-8	DIODE RECTIFIER	1N4002 100V/1A	THOMSON	1N4002 (03/04/05/06/07)	25.100
D2-8	DIODE RECTIFIER	1N4002 100V/1A	THOMSON	1N4002 (03/04/05/06/07)	25.100
D3-8	DIODE RECTIFIER	1N4002 100V/1A	THOMSON	1N4002 (03/04/05/06/07)	25.100
D4-8	DIODE RECTIFIER	1N4002 100V/1A	THOMSON	1N4002 (03/04/05/06/07)	25.100
D5-8	DIODE RECTIFIER	1N4002 100V/1A	THOMSON	1N4002 (03/04/05/06/07)	25.100
D6-8	DIODE RECTIFIER	1N4002 100V/1A	THOMSON	1N4002 (03/04/05/06/07)	25.100
D7-8	DIODE RECTIFIER	1N4002 100V/1A	THOMSON	1N4002 (03/04/05/06/07)	25.100
D8-8	DIODE ZENER	7.5V 5% 0.4W BZX79C7V5	PHILIPS	BZX79C7V5	26.539
L1-8	CHOKE FIXED	10uH 5%	NEOSID	00 6122 00	20.118
L2-8	CHOKE FIXED	10uH 5%	NEOSID	00 6122 00	20.118
L3-8	CHOKE FIXED	10uH 5%	NEOSID	00 6122 00	20.118
L4-8	CHOKE FIXED	10uH 5%	NEOSID	00 6122 00	20.118
L5-8	CHOKE FIXED	10uH 5%	NEOSID	00 6122 00	20.118
L6-8	CHOKE FIXED	10uH 5%	NEOSID	00 6122 00	20.118
L7-8	CHOKE FIXED	10uH 5%	NEOSID	00 6122 00	20.118
L8-8	CHOKE FIXED	10uH 5%	NEOSID	00 6122 00	20.118
L9-8	CHOKE FIXED	10uH 5%	NEOSID	00 6122 00	20.118
P1-8	PLUG	2x7 POLES	3M	3598-6002 / 7614-6002 JL	78.254
P2-8	PLUG	2x7 POLES	3M	3598-6002 / 7614-6002 JL	78.254
R1-8	RESISTOR MF	2k2 OHM 5% 0.33W	PHILIPS	2322 187 73222	02.480
R2-8	RESISTOR MF	200 OHM 5% 0.33W	PHILIPS	2322 187 73201	02.455
R3-8	RESISTOR MF	620 OHM 5% 0.33W	PHILIPS	2322 187 73621	02.467
R4-8	RESISTOR MF	200 OHM 5% 0.33W	PHILIPS	2322 187 73201	02.455
R5-8	RESISTOR MF	680 OHM 5% 0.33W	PHILIPS	2322 187 73681	02.468
R6-8	RESISTOR MF	200 OHM 5% 0.33W	PHILIPS	2322 187 73201	02.455
R7-8	RESISTOR MF	18k2 OHM 1% 0.25W	PHILIPS	2322 157 11823	02.233
R8-8	RESISTOR MF	22k1 OHM 1% 0.25W	PHILIPS	2322 157 12213	02.234
R9-8	RESISTOR MF	750 OHM 1% 0.25W	PHILIPS	2322 157 17501	02.240
R10-8	RESISTOR MF	226 OHM 1% 0.25W	PHILIPS	2322 157 12261	02.213
R11-8	RESISTOR PMF	8R2 OHM 5% 2W	PHILIPS	2322 194 13828	04.130

**Keyboard 36695****ECI A/S****5-x-36695B / 4-0-36695A****636695**

POSITION	DESCRIPTION		MANUFACTURER	TYPE	PART NO.
R1	RESISTOR SMD 0805 330 OHM 5% 0.1W		ROHM	MCR 10 EZH J 331	302.042
R2	RESISTOR SMD 0805 680 OHM 5% 0.1W		ROHM	MCR 10 EZH J 681	302.046
R3	RESISTOR SMD 0805 680 OHM 5% 0.1W		ROHM	MCR 10 EZH J 681	302.046
R4	RESISTOR SMD 0805 330 OHM 5% 0.1W		ROHM	MCR 10 EZH J 331	302.042
R5	RESISTOR SMD 0805 330 OHM 5% 0.1W		ROHM	MCR 10 EZH J 331	302.042
S1	PUSHBUTTON SWITCH 1 MAKE PCB VERSION 5.2x5.2x1.5mm		ALPS	SKQGAB	373.021
S2	PUSHBUTTON SWITCH 1 MAKE PCB VERSION 5.2x5.2x1.5mm		ALPS	SKQGAB	373.021
S3	PUSHBUTTON SWITCH 1 MAKE PCB VERSION 5.2x5.2x1.5mm		ALPS	SKQGAB	373.021
S4	PUSHBUTTON SWITCH 1 MAKE PCB VERSION 5.2x5.2x1.5mm		ALPS	SKQGAB	373.021
S5	PUSHBUTTON SWITCH 1 MAKE PCB VERSION 5.2x5.2x1.5mm		ALPS	SKQGAB	373.021
S6	PUSHBUTTON SWITCH 1 MAKE PCB VERSION 5.2x5.2x1.5mm		ALPS	SKQGAB	373.021
S7	PUSHBUTTON SWITCH 1 MAKE PCB VERSION 5.2x5.2x1.5mm		ALPS	SKQGAB	373.021
S8	PUSHBUTTON SWITCH 1 MAKE PCB VERSION 5.2x5.2x1.5mm		ALPS	SKQGAB	373.021
S9	PUSHBUTTON SWITCH 1 MAKE PCB VERSION 5.2x5.2x1.5mm		ALPS	SKQGAB	373.021
S10	PUSHBUTTON SWITCH 1 MAKE PCB VERSION 5.2x5.2x1.5mm		ALPS	SKQGAB	373.021
S11	PUSHBUTTON SWITCH 1 MAKE PCB VERSION 5.2x5.2x1.5mm		ALPS	SKQGAB	373.021
S12	PUSHBUTTON SWITCH 1 MAKE PCB VERSION 5.2x5.2x1.5mm		ALPS	SKQGAB	373.021
S13	PUSHBUTTON SWITCH 1 MAKE PCB VERSION 5.2x5.2x1.5mm		ALPS	SKQGAB	373.021
S14	PUSHBUTTON SWITCH 1 MAKE PCB VERSION 5.2x5.2x1.5mm		ALPS	SKQGAB	373.021

POSITION	DESCRIPTION	MANUFACTOR	TYPE	PART NO.
S15	PUSHBUTTON SWITCH 1 MAKE PCB VERSION 5.2x5.2x1.5mm	ALPS	SKQGAB	373.021
S16	PUSHBUTTON SWITCH 1 MAKE PCB VERSION 5.2x5.2x1.5mm	ALPS	SKQGAB	373.021
S17	PUSHBUTTON SWITCH 1 MAKE PCB VERSION 5.2x5.2x1.5mm	ALPS	SKQGAB	373.021
S18	PUSHBUTTON SWITCH 1 MAKE PCB VERSION 5.2x5.2x1.5mm	ALPS	SKQGAB	373.021
S19	PUSHBUTTON SWITCH 1 MAKE PCB VERSION 5.2x5.2x1.5mm	ALPS	SKQGAB	373.021
S20	PUSHBUTTON SWITCH 1 MAKE PCB VERSION 5.2x5.2x1.5mm	ALPS	SKQGAB	373.021
S21	PUSHBUTTON SWITCH 1 MAKE PCB VERSION 5.2x5.2x1.5mm	ALPS	SKQGAB	373.021
S22	PUSHBUTTON SWITCH 1 MAKE PCB VERSION 5.2x5.2x1.5mm	ALPS	SKQGAB	373.021
S23	PUSHBUTTON SWITCH 1 MAKE PCB VERSION 5.2x5.2x1.5mm	ALPS	SKQGAB	373.021
S24	PUSHBUTTON SWITCH 1 MAKE PCB VERSION 5.2x5.2x1.5mm	ALPS	SKQGAB	373.021
S25	PUSHBUTTON SWITCH 1 MAKE PCB VERSION 5.2x5.2x1.5mm	ALPS	SKQGAB	373.021
S26	PUSHBUTTON SWITCH 1 MAKE PCB VERSION 5.2x5.2x1.5mm	ALPS	SKQGAB	373.021
V1	LED SMD 0805 YELLOW 5mCd/20mA CL170Y	CITIZEN	CL-170 Y-C D-T	342.026
V2	LED SMD 0805 YELLOW 5mCd/20mA CL170Y	CITIZEN	CL-170 Y-C D-T	342.026
V3	LED SMD 0805 YELLOW 5mCd/20mA CL170Y	CITIZEN	CL-170 Y-C D-T	342.026
V4	LED SMD 0805 YELLOW 5mCd/20mA CL170Y	CITIZEN	CL-170 Y-C D-T	342.026
V5	LED SMD 0805 YELLOW 5mCd/20mA CL170Y	CITIZEN	CL-170 Y-C D-T	342.026
V6	LED SMD 0805 YELLOW 5mCd/20mA CL170Y	CITIZEN	CL-170 Y-C D-T	342.026
V7	LED SMD 0805 YELLOW 5mCd/20mA CL170Y	CITIZEN	CL-170 Y-C D-T	342.026
V8	LED SMD 0805 YELLOW 5mCd/20mA CL170Y	CITIZEN	CL-170 Y-C D-T	342.026
V9	LED SMD 0805 YELLOW 5mCd/20mA CL170Y	CITIZEN	CL-170 Y-C D-T	342.026
V10	LED SMD 0805 YELLOW 5mCd/20mA CL170Y	CITIZEN	CL-170 Y-C D-T	342.026
V11	LED SMD 0805 YELLOW 5mCd/20mA CL170Y	CITIZEN	CL-170 Y-C D-T	342.026
V12	LED SMD 0805 YELLOW 5mCd/20mA CL170Y	CITIZEN	CL-170 Y-C D-T	342.026
V13	LED SMD 0805 YELLOW 5mCd/20mA CL170Y	CITIZEN	CL-170 Y-C D-T	342.026
X1	SOCKET PCB VERSION 2x7 POLES u-MATCH F S	AMP	1-100411-4	78.200

Display 36696	ECI A/S	5-x-36696B / 4-0-36696B	63696
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POSITION	DESCRIPTION	MANUFACTOR	TYPE	PART NO.
B1	PIEZOELECTRIC ACOUSTIC GENERATOR 5VDC ø12x9.5mm	ECHO	B26-5 INCL. MASKING LABEL	46.023
C1	CAPACITOR CERAM. SMD 0805 10nF 10% X7R 100VDC	MURATA	GRM40 X7R 103 K 100 PT	328.375
C2	CAPACITOR CERAM. SMD 0805 10nF 10% X7R 100VDC	MURATA	GRM40 X7R 103 K 100 PT	328.375
C3	CAPACITOR CERAM. SMD 0805 10nF 10% X7R 100VDC	MURATA	GRM40 X7R 103 K 100 PT	328.375
C4	CAPACITOR ELECTROLYTIC SMD 10uF 20% 16VDC	EUROPE CHEMICON	AI-Chip-MKV 16V/10 M	333.079
C5	CAPACITOR CERAM. SMD 0805 220pF 5% NPO 50VDC	TDK	C2012 COG 1H 221 J T NiBa	323.090
C6	CAPACITOR CERAM. SMD 1206 1u0F -20/80% Y5V 16VDC	MURATA	GRM42-6 Y5V 105 Z 16 PT10	328.806
C7	CAPACITOR CERAM. SMD 1206 1u0F -20/80% Y5V 16VDC	MURATA	GRM42-6 Y5V 105 Z 16 PT10	328.806
C8	CAPACITOR CERAM. SMD 0805 100nF 10% X7R 25VDC	MURATA	GRM40 X7R 104 K 25 PT	328.348
C9	CAPACITOR CERAM. SMD 0805 100nF 10% X7R 25VDC	MURATA	GRM40 X7R 104 K 25 PT	328.348
C10	CAPACITOR CERAM. SMD 0805 100nF 10% X7R 25VDC	MURATA	GRM40 X7R 104 K 25 PT	328.348
C11	CAPACITOR CERAM. SMD 0805 100nF 10% X7R 25VDC	MURATA	GRM40 X7R 104 K 25 PT	328.348
D1	SUPPLY VOLTAGE SUPERVISOR TL7705A	TEXAS	TL7705ACD R (AID R)	356.641
D2	SCHMITT-TRIGGER INVERTERS 74HC14	TEXAS*	SN74HC14DR	355.213
D3	Hex D-FF with clear, 74HC174	FAIRCHILD	#MM74HC174MX	355.252
N1	QUAD OP.AMP. LM324	MOTOROLA	LM324D R2	350.530
R1	RESISTOR SMD 0805 5R6 OHM 5% 0.1W	ROHM	MCR 10 EZH J 5R6	302.021
R2	RESISTOR SMD 0805 5R6 OHM 5% 0.1W	ROHM	MCR 10 EZH J 5R6	302.021
R3	RESISTOR SMD 0805 5R6 OHM 5% 0.1W	ROHM	MCR 10 EZH J 5R6	302.021
R4	RESISTOR SMD 0805 5R6 OHM 5% 0.1W	ROHM	MCR 10 EZH J 5R6	302.021
R5	RESISTOR SMD 0805 1k21 OHM 1% 50mW	PHILIPS	2322 734 2/61212	302.378
R6	RESISTOR SMD 0805 36k5 OHM 1% 50mW	PHILIPS	2322 734 2/63653	302.524
R7	RESISTOR SMD 0805 18k2 OHM 1% 50mW	PHILIPS	2322 734 2/61823 REEL a 5000 STK	302.495
R8	RESISTOR SMD 0805 1k30 OHM 1% 50mW	PHILIPS	2322 734 2/61302	302.381
R9	RESISTOR SMD 0805 121k OHM 1% 50mW	PHILIPS	2322 734 2/61214	302.578
R10	RESISTOR SMD 0805 10k0 OHM 1% 50mW	PHILIPS	2322 734 2/61003	302.470
R11	RESISTOR SMD 0805 10k0 OHM 1% 50mW	PHILIPS	2322 734 2/61003	302.470
R12	RESISTOR SMD 0805 340k OHM 1% 50mW	PHILIPS	2322 734 2/63404	302.631
R13	RESISTOR SMD 0805 178k OHM 1% 50mW	PHILIPS	2322 734 2/61784	302.594
R14	RESISTOR SMD 0805 90k9 OHM 1% 50mW	PHILIPS	2322 734 2/69093	302.562
R15	RESISTOR SMD 0805 47k5 OHM 1% 50mW	PHILIPS	2322 734 2/64753	302.535
R16	RESISTOR SMD 0805 12k OHM 5% 0.1W	ROHM	MCR 10 EZH J 123	302.061
R17	RESISTOR NTC 4K7 OHM 10% 0.25W	SIEMENS	B57621-C472-K62	306.810
R18	RESISTOR SMD 0805 1k47 OHM 1% 50mW	PHILIPS	2322 734 2/61472	302.386
R19	RESISTOR SMD 0805 2k26 OHM 1% 50mW	PHILIPS	2322 734 2/62262	302.404
R20	RESISTOR SMD 0805 47k5 OHM 1% 50mW	PHILIPS	2322 734 2/64753	302.535
R21	RESISTOR SMD 0805 47k5 OHM 1% 50mW	PHILIPS	2322 734 2/64753	302.535
R22	RESISTOR SMD 0805 47k5 OHM 1% 50mW	PHILIPS	2322 734 2/64753	302.535
R23	RESISTOR SMD 0805 47k5 OHM 1% 50mW	PHILIPS	2322 734 2/64753	302.535
R24	RESISTOR SMD 0805 10k0 OHM 1% 50mW	PHILIPS	2322 734 2/61003	302.470

R25	RESISTOR SMD 0805 120k OHM 5% 0.1W	ROHM	MCR 10 EZH J 124	302.073
R26	RESISTOR SMD 0805 47 OHM 5% 0.1W	ROHM	MCR 10 EZH J 47R	302.032
R27	Potm. 08.257 med monteringsråd	ECI A/S	0-0-36861	736861
R28	RESISTOR SMD 0805 10k0 OHM 1% 50mW	PHILIPS	2322 734 2/61003	302.470
V1	TRANSISTOR AF NPN BCP55-16	SIEMENS	BCP55-16 Q62702-C2123	345.355
V2	DIODE SMALL SIGNAL HIGH-SPEED, BAS32L	PHILIPS	BAS32L 115(135) ID=KROP ORANGE	340.032
V3	DIODE SWITCH HIGH SPEED PMLL4148, 4446, 4448	PHILIPS	PMLL4148(4446)(4448) 115	83710000
V4	DIODE SWITCH HIGH SPEED PMLL4148, 4446, 4448	PHILIPS	PMLL4148(4446)(4448) 115	83710000
V5	DIODE ZENER 5.1V 2% 0.5W SOD-80	PHILIPS	BZV55 B5V1	340.417
X1	Ribboncable 20 pol, u-Match M/Cable Term, L=112mm		3-0-36396A	56.150
X2	SOCKET 2x11 POLES CC=2mm PCB VERSION	BERG ELECTRONIC	92429-322 (-122)	376.089
X3	Plug 2 Poles, Right Angle, 7395-series CC=1/10"	MOLEX	22-05-7028	75000164

Thrane &amp; Thrane A/S

## PARTS LIST

REF.D.PART NO.	QTY DESCRIPTION	MFRC MFR PART NO.
60-101337	3820 Main Proc. Board	
Diagram 93-101337	Comp. Drawing 37-101337-004	
01 37-101337-004	1 PCB, 3820 Main Proc. Board	56 TT 37-101337-004
BT1 20-200237-030	1 Battery, Lithium 3V 160mAh	M049 CR-1/3N-PSP
C1 Not Used	0	56
C2 22-200058-339	1 Cap. SMD, Cer 33pF/50V 5%	M004 CM21 CG 330 J50 AT
C3 22-200058-229	1 Cap. SMD, Cer 22pF/50V 5%	M004 CM21 CG 220 J50 AT
C4 22-200058-279	1 Cap. SMD, Cer 27pF/50V 5%	M000 2222 861 15279
C5 22-200254-209	1 Capacitor, Var 20pF/100V Red	M006 TZ 03 R 200 E
C6 22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
C7 22-200058-471	3 Cap. SMD, Cer 470pF/50V 5%	M004 CM21 CG 471 J50 AT
C8 22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
C9 22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
C10 22-200058-102	8 Cap. SMD, Cer 1nF/50V 5%	M004 CM21 CG 102 J50 AT
C11 22-200246-472	1 Cap. SMD, Cer 4n7F/50V 10%	M004 CM21 X7R 472 K50 AT
C12 22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
C13 22-200246-103	4 Cap. SMD, Cer 10nF/50V 10%	M004 CM21 X7R 103 K50 AT
C14 22-200249-104	Cap. SMD, Cer 18pF/50V +80%	M136 CM21 Y5V 104 Z50 AT
C15 22-200246-103	Cap. SMD, Cer 10nF/50V 10%	M004 CM21 X7R 103 K50 AT
C16 22-200058-102	Cap. SMD, Cer 1nF/50V 5%	M004 CM21 CG 102 J50 AT
C17 22-200246-103	Cap. SMD, Cer 10nF/50V 10%	M004 CM21 X7R 103 K50 AT
C18 22-200058-189	1 Cap. SMD, Cer 18pF/50V 5%	M000 2222 861 15189
C19 22-200091-109	1 Capacitor, Var 10pF/300V	M000 2222 809 05216
C20 22-200058-399	2 Cap. SMD, Cer 39pF/50V 5%	M000 2222 861 15399
C21 22-200058-399	Cap. SMD, Cer 39pF/50V 5%	M000 2222 861 15399
C22 22-200246-103	Cap. SMD, Cer 10nF/50V 10%	M004 CM21 X7R 103 K50 AT
C23 22-200043-101	5 Capacitor, Elct 100uF/25V	M003 CE SEM 1E 101 6.3x11
C24 22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
C25 22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
C26 22-200043-479	1 Capacitor, Elct 47uF/25V	M003 CE SEM 1E 470 5x11
C27 22-200043-101	Capacitor, Elct 100uF/25V	M003 CE SEM 1E 101 6.3x11
C28 22-200246-222	16 Cap. SMD, Cer 2n2F/50V 10%	M004 CM21 X7R 222 K50 AT
C29 22-200246-222	Cap. SMD, Cer 2n2F/50V 10%	M004 CM21 X7R 222 K50 AT
C30 22-200246-222	Cap. SMD, Cer 2n2F/50V 10%	M004 CM21 X7R 222 K50 AT
C31 22-200246-222	Cap. SMD, Cer 2n2F/50V 10%	M004 CM21 X7R 222 K50 AT
C32 22-200246-222	Cap. SMD, Cer 2n2F/50V 10%	M004 CM21 X7R 222 K50 AT
C33 22-200246-222	Cap. SMD, Cer 2n2F/50V 10%	M004 CM21 X7R 222 K50 AT
C34 22-200246-222	Cap. SMD, Cer 2n2F/50V 10%	M004 CM21 X7R 222 K50 AT
C35 22-200246-222	Cap. SMD, Cer 2n2F/50V 10%	M004 CM21 X7R 222 K50 AT



C36	22-200246-222	Cap. SMD, Cer 2n2F/50V 10%	M004 CM21 X7R 222 K50 AT
C37	22-200246-222	Cap. SMD, Cer 2n2F/50V 10%	M004 CM21 X7R 222 K50 AT
C38	22-200246-222	Cap. SMD, Cer 2n2F/50V 10%	M004 CM21 X7R 222 K50 AT
C39	22-200246-222	Cap. SMD, Cer 2n2F/50V 10%	M004 CM21 X7R 222 K50 AT
C40	22-200246-222	Cap. SMD, Cer 2n2F/50V 10%	M004 CM21 X7R 222 K50 AT
C41	22-200058-102	Cap. SMD, Cer 1nF/50V 5%	M004 CM21 CG 102 J50 AT
C42	22-200058-102	Cap. SMD, Cer 1nF/50V 5%	M004 CM21 CG 102 J50 AT
C43	22-200058-102	Cap. SMD, Cer 1nF/50V 5%	M004 CM21 CG 102 J50 AT
C44	22-200058-102	Cap. SMD, Cer 1nF/50V 5%	M004 CM21 CG 102 J50 AT
C45	22-200058-102	Cap. SMD, Cer 1nF/50V 5%	M004 CM21 CG 102 J50 AT
C46	22-200058-471	Cap. SMD, Cer 470pF/50V 5%	M004 CM21 CG 471 J50 AT
C47	22-200058-471	Cap. SMD, Cer 470pF/50V 5%	M004 CM21 CG 471 J50 AT
C48	22-200043-101	Capacitor, Elct 100uF/25V	M003 CE SEM 1E 101 6.3x11
C49	22-200043-101	Capacitor, Elct 100uF/25V	M003 CE SEM 1E 101 6.3x11
C50	22-200043-101	Capacitor, Elct 100uF/25V	M003 CE SEM 1E 101 6.3x11
C51	22-200246-222	Cap. SMD, Cer 2n2F/50V 10%	M004 CM21 X7R 222 K50 AT
C52	22-200246-222	Cap. SMD, Cer 2n2F/50V 10%	M004 CM21 X7R 222 K50 AT
C53	22-200058-102	Cap. SMD, Cer 1nF/50V 5%	M004 CM21 CG 102 J50 AT
C54	22-200246-222	Cap. SMD, Cer 2n2F/50V 10%	M004 CM21 X7R 222 K50 AT
CR1	23-200197-016	3 Diode SMD, BAS16	M000 BAS16-215 A6
CR2	23-200028-148	7 Diode, 1N4148	M030 1N4148
CR3	23-200028-148	Diode, 1N4148	M030 1N4148
CR4	23-200028-148	Diode, 1N4148	M030 1N4148
CR5	23-200028-148	Diode, 1N4148	M030 1N4148
CR6	23-200028-148	Diode, 1N4148	M030 1N4148
CR7	23-200028-148	Diode, 1N4148	M030 1N4148
CR8	23-200028-148	Diode, 1N4148	M030 1N4148
CR9	23-200197-016	Diode SMD, BAS16	M000 BAS16-215 A6
CR10	23-200197-016	Diode SMD, BAS16	M000 BAS16-215 A6
CX1	22-200249-104	55 Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX2	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX3	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX4	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX5	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX6	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX7	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX8	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX9	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX10	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX11	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX12	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX13	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX14	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX15	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX16	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX17	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX18	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX19	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX20	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX21	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX22	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX23	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX24	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX25	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX26	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX27	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX28	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX29	Not Used		56
CX30	Not Used		56
CX31	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX33	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX35	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX36	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX37	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT

CX38	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX39	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX42	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX43	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX44	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX45	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX46	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX47	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX48	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX49	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX50	Not Used		56
CX51	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX32A	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX32B	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX34A	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX34B	22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
DS1	23-200025-002	4 Diode, Led Red 3mm	M013 SLH34-VR3
DS2	23-200025-002	Diode, Led Red 3mm	M013 SLH34-VR3
DS3	23-200025-002	Diode, Led Red 3mm	M013 SLH34-VR3
DS4	23-200025-002	Diode, Led Red 3mm	M013 SLH34-VR3
H1	31-200152-000	3 Jumper, 2 Pole	M008 90059-0009
H2	31-200152-000	Jumper, 2 Pole	M008 90059-0009
H3	31-200152-000	Jumper, 2 Pole	M008 90059-0009
H4	41-200791-001	1 Frame, 3820A Shield	18 227556
H5	41-200792-001	1 Frame, 3820A Shield	18 1-0-26306B
H6	41-200793-001	1 Frame, 3820A Shield	18 1-0-26305B
H7	41-200794-001	1 Cover, 3820A Shield	18 1-0-27555
H8	41-200795-001	1 Cover, 3820A Shield	18 226304
H9	20-200551-000	1 Insulator, Crystal HC-18+Gnd	M020 NKS-4738
J1	31-200472-004	3 Connector, BNC Rig.Angle Male	M095 51K-201-400A4
J2	31-200136-009	1 Connector, 9-Pole D Female	M008 87135-3051
J3	31-200472-004	Connector, BNC Rig.Angle Male	M095 51K-201-400A4
J4	31-200472-004	Connector, BNC Rig.Angle Male	M095 51K-201-400A4
J5	31-200633-014	1 Connector, 14 Pol Female	M034 1-215079-4
J6	31-200136-025	1 Connector, 25-Pole D Female	M008 87135-3351
J7	31-200632-014	1 Connector, 14 Pol Male	M055 3598-6002
J8	31-200630-020	2 Connector, 20 Pol Female	M034 2-215079-0
J9	31-200630-020	Connector, 20 Pol Female	M034 2-215079-0
L1	Not Used		56
L2	25-200108-339	2 Coil, 33uH/190mA 10%	M118 MICC-330K-02 (Reel)
L3	25-200108-339	Coil, 33uH/190mA 10%	M118 MICC-330K-02 (Reel)
L4	25-200108-689	2 Coil, 68uH/150mA 10%	M118 MICC-680K-02
L5	25-200108-689	Coil, 68uH/150mA 10%	M118 MICC-680K-02
Q1	26-200034-560	1 Transistor, PNP BC560B	M000 BC560B
Q2	26-200090-860	2 Transistor SMD, PNP BC860B	M000 BC860B-215 4F
Q3	26-200033-547	1 Transistor, NPN BC547B	M000 BC547B
Q4	26-200090-860	Transistor SMD, PNP BC860B	M000 BC860B-215 4F
R1	21-200210-103	15 Resistor SMD, Cer 10K 5%	M013 MCR10 10K
R2	21-200210-103	Resistor SMD, Cer 10K 5%	M013 MCR10 10K
R3	21-200210-102	3 Resistor SMD, Cer 1K 5%	M013 MCR10 1K
R4	21-200210-103	Resistor SMD, Cer 10K 5%	M013 MCR10 10K
R5	21-200210-103	Resistor SMD, Cer 10K 5%	M013 MCR10 10K
R6	21-200210-103	Resistor SMD, Cer 10K 5%	M013 MCR10 10K
R7	21-200210-103	Resistor SMD, Cer 10K 5%	M013 MCR10 10K
R8	21-200210-103	Resistor SMD, Cer 10K 5%	M013 MCR10 10K
R9	21-200210-103	Resistor SMD, Cer 10K 5%	M013 MCR10 10K
R10	21-200210-103	Resistor SMD, Cer 10K 5%	M013 MCR10 10K
R11	21-200210-103	Resistor SMD, Cer 10K 5%	M013 MCR10 10K
R12	21-200210-222	2 Resistor SMD, Cer 2K2 5%	M013 MCR10 2K2
R13	21-200210-339	2 Resistor SMD, Cer 33R 5%	M013 MCR10 33R
R14	21-200210-339	Resistor SMD, Cer 33R 5%	M013 MCR10 33R
R15	21-200210-102	Resistor SMD, Cer 1K 5%	M013 MCR10 1K

R16	21-200210-331	2	Resistor SMD, Cer 330R 5%	M013 MCR10 330R
R17	21-200210-683	1	Resistor SMD, Cer 68K 5%	M013 MCR10 68K
R18	21-200210-101	12	Resistor SMD, Cer 100R 5%	M013 MCR10 100R
R19	21-200210-271	5	Resistor SMD, Cer 270R 5%	M013 MCR10 270R
R20	21-200210-103		Resistor SMD, Cer 10K 5%	M013 MCR10 10K
R21	21-200210-273	1	Resistor SMD, Cer 27K 5%	M013 MCR10 27K
R22	21-200210-331		Resistor SMD, Cer 330R 5%	M013 MCR10 330R
R23	21-200210-103		Resistor SMD, Cer 10K 5%	M013 MCR10 10K
R24	21-200210-333	11	Resistor SMD, Cer 33K 5%	M013 MCR10 33K
R25	21-200210-104	3	Resistor SMD, Cer 100K 5%	M013 MCR10 100K
R26	21-200210-101		Resistor SMD, Cer 100R 5%	M013 MCR10 100R
R27	21-200210-271		Resistor SMD, Cer 270R 5%	M013 MCR10 270R
R28	21-200210-333		Resistor SMD, Cer 33K 5%	M013 MCR10 33K
R29	21-200210-101		Resistor SMD, Cer 100R 5%	M013 MCR10 100R
R30	21-200210-271		Resistor SMD, Cer 270R 5%	M013 MCR10 270R
R31	21-200210-333		Resistor SMD, Cer 33K 5%	M013 MCR10 33K
R32	21-200210-104		Resistor SMD, Cer 100K 5%	M013 MCR10 100K
R33	21-200210-101		Resistor SMD, Cer 100R 5%	M013 MCR10 100R
R34	21-200210-271		Resistor SMD, Cer 270R 5%	M013 MCR10 270R
R35	21-200210-101		Resistor SMD, Cer 100R 5%	M013 MCR10 100R
R36	21-200210-271		Resistor SMD, Cer 270R 5%	M013 MCR10 270R
R37	21-200210-103		Resistor SMD, Cer 10K 5%	M013 MCR10 10K
R38	21-200210-104		Resistor SMD, Cer 100K 5%	M013 MCR10 100K
R39	21-200210-333		Resistor SMD, Cer 33K 5%	M013 MCR10 33K
R40	21-200210-242	1	Resistor SMD, Cer 2K4 5%	M013 MCR10 2K4
R41	21-200210-152	1	Resistor SMD, Cer 1K5 5%	M013 MCR10 1K5
R42	21-200210-109	2	Resistor SMD, Cer 10R 5%	M013 MCR10 10R
R43	21-200210-471	4	Resistor SMD, Cer 470R 5%	M013 MCR10 470R
R44	21-200210-471		Resistor SMD, Cer 470R 5%	M013 MCR10 470R
R45	21-200210-333		Resistor SMD, Cer 33K 5%	M013 MCR10 33K
R46	21-200210-333		Resistor SMD, Cer 33K 5%	M013 MCR10 33K
R47	21-200210-202	2	Resistor SMD, Cer 2K0 5%	M013 MCR10 2K0
R48	21-200210-105	2	Resistor SMD, Cer 1M 5%	M013 MCR10 1M
R49	21-200210-682	1	Resistor SMD, Cer 6K8 5%	M013 MCR10 6K8
R50	21-200210-472	8	Resistor SMD, Cer 4K7 5%	M013 MCR10 4K7
R51	21-200210-519	1	Resistor SMD, Cer 51R 5%	M013 MCR10 51R
R52	21-200210-202		Resistor SMD, Cer 2K0 5%	M013 MCR10 2K0
R53	21-200210-511	1	Resistor SMD, Cer 510R 5%	M013 MCR10 510R
R54	21-200210-109		Resistor SMD, Cer 10R 5%	M013 MCR10 10R
R55	21-200210-222		Resistor SMD, Cer 2K2 5%	M013 MCR10 2K2
R56	21-200210-472		Resistor SMD, Cer 4K7 5%	M013 MCR10 4K7
R57	21-200210-103		Resistor SMD, Cer 10K 5%	M013 MCR10 10K
R58	21-200010-181	1	Resistor, Film 180R/0.4W 5%	M000 2322 181 53181
R59	21-200210-472		Resistor SMD, Cer 4K7 5%	M013 MCR10 4K7
R60	21-200210-472		Resistor SMD, Cer 4K7 5%	M013 MCR10 4K7
R61	21-200210-472		Resistor SMD, Cer 4K7 5%	M013 MCR10 4K7
R62	21-200210-472		Resistor SMD, Cer 4K7 5%	M013 MCR10 4K7
R63	21-200210-472		Resistor SMD, Cer 4K7 5%	M013 MCR10 4K7
R64	21-200210-472		Resistor SMD, Cer 4K7 5%	M013 MCR10 4K7
R65	21-200210-471		Resistor SMD, Cer 470R 5%	M013 MCR10 470R
R66	21-200210-101		Resistor SMD, Cer 100R 5%	M013 MCR10 100R
R67	21-200210-101		Resistor SMD, Cer 100R 5%	M013 MCR10 100R
R68	21-200210-101		Resistor SMD, Cer 100R 5%	M013 MCR10 100R
R69	21-200210-101		Resistor SMD, Cer 100R 5%	M013 MCR10 100R
R70	21-200210-101		Resistor SMD, Cer 100R 5%	M013 MCR10 100R
R71	21-200210-101		Resistor SMD, Cer 100R 5%	M013 MCR10 100R
R72	21-200210-101		Resistor SMD, Cer 100R 5%	M013 MCR10 100R
R73	21-200210-471		Resistor SMD, Cer 470R 5%	M013 MCR10 470R
R74	21-200210-103		Resistor SMD, Cer 10K 5%	M013 MCR10 10K
R75	21-200210-102		Resistor SMD, Cer 1K 5%	M013 MCR10 1K
R76	21-200210-333		Resistor SMD, Cer 33K 5%	M013 MCR10 33K
R77	21-200210-333		Resistor SMD, Cer 33K 5%	M013 MCR10 33K
R78	21-200210-333		Resistor SMD, Cer 33K 5%	M013 MCR10 33K
R79	21-200210-333		Resistor SMD, Cer 33K 5%	M013 MCR10 33K
R80	21-200210-333		Resistor SMD, Cer 33K 5%	M013 MCR10 33K

R81	21-200210-105		Resistor SMD, Cer 1M 5%	M013 MCR10 1M
RS1	21-200024-102	1	Resistor, Sil 8x1K 1/8W 2%	M010 EXBF9E102G
RS2	21-200220-339	2	Resistor, Sil 5x33R 1/8W 2%	M010 EXBF10V330G
RS3	21-200220-339		Resistor, Sil 5x33R 1/8W 2%	M010 EXBF10V330G
RS4	21-200024-103	2	Resistor, Sil 8x10K 1/8W 2%	M010 EXBF9E103G
RS5	21-200294-103	1	Resistor, Sil 5x10K 1/8W 5%	M010 EXBF6E103G
RS6	21-200024-103		Resistor, Sil 8x10K 1/8W 2%	M010 EXBF9E103G
RV1	21-200126-714	1	Varistor, SIOV 14V $\phi$ =9mm	M010 ERZ-C07DK220
S1	33-200151-006	1	Switch, DIP 6 Pole, DIL-12	M037 AUTO-DIP ADE 06
S2	33-200151-004	1	Switch, DIP 4 Pole, DIL-8	M037 AUTO-DIP ADE 04
TP0	31-200103-000	3	Terminal, Test Point $\phi$ =1.3mm	71 1358
TP1	Not Used			56
TP2	Not Used			56
TP3	Not Used			56
TP4	Not Used			56
TP5	Not Used			56
TP6	Not Used			56
TP7	Not Used			56
TP8	31-200103-000		Terminal, Test Point $\phi$ =1.3mm	71 1358
TP9	Not Used			56
TP10	Not Used			56
TP11	Not Used			56
TP12	Not Used			56
TP13	31-200103-000		Terminal, Test Point $\phi$ =1.3mm	71 1358
TP14	Not Used			56
TP15	Not Used			56
U1	24-200084-074	3	IC TTL SMD, 74HCT74	M000 PC74HCT74T
U2	24-200084-125	1	IC TTL SMD, 74HCT125	M000 PC74HCT125T
U3	24-200263-691	1	IC Watchdog, 691 +/-10%	M120 MP691P
U4	24-200084-573	2	IC TTL SMD, 74HCT573	M000 PC74HCT573T
U5	24-200084-138	1	IC TTL SMD, 74HCT138	M000 PC74HCT138T
U6	24-200629-188	1	IC CPU, 80C188 10MHz PLCC	M070 N80C188
U7	24-200084-032	5	IC TTL SMD, 74HCT32	M000 PC74HCT32T
U8	24-200084-573		IC TTL SMD, 74HCT573	M000 PC74HCT573T
U9	24-200084-014	1	IC TTL SMD, 74HCT14	M000 PC74HCT14T
U10	24-200270-100	3	IC EPROM, 27C1001 200nS	M031 M27C1001-20F1
U11	24-200270-100		IC EPROM, 27C1001 200nS	M031 M27C1001-20F1
U12	24-200270-100		IC EPROM, 27C1001 200nS	M031 M27C1001-20F1
U13	24-200102-256	1	IC Memory, 28256 250nS	M059 X28C256P-25
U14	24-200084-008	1	IC TTL SMD, 74HCT08	M000 PC74HCT08T
U15	24-200084-257	3	IC TTL SMD, 74HCT257	M000 PC74HCT257T
U16	24-200084-032		IC TTL SMD, 74HCT32	M000 PC74HCT32T
U17	24-200084-074		IC TTL SMD, 74HCT74	M000 PC74HCT74T
U18	24-200084-257		IC TTL SMD, 74HCT257	M000 PC74HCT257T
U19	24-200271-256	4	IC DRAM, 514256 120nS	M033 HM514256P-80nS
U20	24-200271-256		IC DRAM, 514256 120nS	M033 HM514256P-80nS
U21	24-200271-256		IC DRAM, 514256 120nS	M033 HM514256P-80nS
U22	24-200271-256		IC DRAM, 514256 120nS	M033 HM514256P-80nS
U23	24-200084-257		IC TTL SMD, 74HCT257	M000 PC74HCT257T
U24	24-200031-014	2	IC TTL, 74HCT14	M000 PC74HCT14P
U25	24-200084-032		IC TTL SMD, 74HCT32	M000 PC74HCT32T
U26	24-200245-256	2	IC SRAM SMD, 62256 120nS	M033 HM62256LFP-12
U27	24-200245-256		IC SRAM SMD, 62256 120nS	M033 HM62256LFP-12
U28	24-200244-000	1	IC TTL SMD, 74HC00	M009 SN 74HC00 D
U29	24-200244-027	1	IC TTL SMD, 74HC27	M000 PC 74HC27 T
U30	24-200223-573	1	IC Clocks, PCF 8573	M000 PCF 8573 P
U31	24-200243-251	1	IC PER SMD, 82C51	M051 MSM82C51A-2GS
U32	24-200077-074	2	IC Analog, TL074	M009 TL074CN
U33	24-200031-014		IC TTL, 74HCT14	M000 PC74HCT14P
U34	24-200077-074		IC Analog, TL074	M009 TL074CN
U35	24-200084-093	1	IC TTL SMD, 74HCT93	M000 PC74HCT93T

U36	24-200243-253	1	IC PER SMD, 82C53 5MHz	M051 MSM82C53-5GS
U37	24-200410-530	1	IC PER, Z85C30	M082 Z85C30 08 PSC
U38	24-200084-004	1	IC TTL SMD, 74HCT04	M000 PC74HCT04T
U39	24-200084-074		IC TTL SMD, 74HCT74	M000 PC74HCT74T
U40	24-200132-905	1	IC Analog, 79L05	M030 LM320LZ-5
U42	24-200243-255	1	IC PER SMD, 82C55	M051 MSM82C55A-5GS
U43	24-200084-011	1	IC TTL SMD, 74HCT11	M000 PC74HCT11T
U44	24-200031-365	1	IC TTL, 74HCT365	M000 PC74HCT365P
U45	24-200031-377	1	IC TTL, 74HCT377	M000 PC74HCT377P
U46	24-200031-259	1	IC TTL, 74HCT259	M000 PC74HCT259P
U47	24-200084-259	1	IC TTL SMD, 74HCT259	M000 PC74HCT259T
U48	24-200084-032		IC TTL SMD, 74HCT32	M000 PC74HCT32T
U49	24-200084-032		IC TTL SMD, 74HCT32	M000 PC74HCT32T
U50	24-200127-173	1	IC Opto, CNY17-3	M029 CNY17-III
U51	24-200084-245	1	IC TTL SMD, 74HCT245	M000 PC74HCT245T
VR12	23-200085-120	1	Diode Zener, BZX79-C12V	M000 BZX79-C12V
W1	31-200140-001	11	Pin Header, 1-Pole Male Single	M008 90120-0960(Only 1 Pin)
W2	31-200140-001		Pin Header, 1-Pole Male Single	M008 90120-0960(Only 1 Pin)
W3	31-200140-001		Pin Header, 1-Pole Male Single	M008 90120-0960(Only 1 Pin)
W4	31-200140-001		Pin Header, 1-Pole Male Single	M008 90120-0960(Only 1 Pin)
W5	31-200140-001		Pin Header, 1-Pole Male Single	M008 90120-0960(Only 1 Pin)
XU6	31-200282-068	1	Socket, IC 68 pole PLCC	M170 PLCCB-068-PS-T
XU10	31-200115-032	3	Socket, IC 32 pole	M025 DILB 32P108IT
XU11	31-200115-032		Socket, IC 32 pole	M025 DILB 32P108IT
XU12	31-200115-032		Socket, IC 32 pole	M025 DILB 32P108IT
XU13	31-200115-028	1	Socket, IC 28 pole	M025 DILB 28P108T
XU19	31-200115-020	5	Socket, IC 20 pole	M025 DILB 20P108T
XU20	31-200115-020		Socket, IC 20 pole	M025 DILB 20P108T
XU21	31-200115-020		Socket, IC 20 pole	M025 DILB 20P108T
XU22	31-200115-020		Socket, IC 20 pole	M025 DILB 20P108T
XU24	31-200115-014	4	Socket, IC 14 pole	M025 DILB 14P108T
XU32	31-200115-014		Socket, IC 14 pole	M025 DILB 14P108T
XU33	31-200115-014		Socket, IC 14 pole	M025 DILB 14P108T
XU34	31-200115-014		Socket, IC 14 pole	M025 DILB 14P108T
XU37	31-200115-040	1	Socket, IC 40 pole	M025 DILB 40P108T
XU44	31-200115-016	2	Socket, IC 16 pole	M025 DILB 16P108T
XU45	31-200115-020		Socket, IC 20 pole	M025 DILB 20P108T
XU46	31-200115-016		Socket, IC 16 pole	M025 DILB 16P108T
XU50	31-200116-006	1	Socket, IC 6 pole	M121 KM376-6
Y1	20-200752-201	1	Crystal, 20.1 MHz 50ppm (AT-51)	68 HC49US 20.1MHz 16pF P
Y2	20-200224-327	1	Crystal, Watch 32.768 K Hz.	M020 MU-206 32.768 K Hz.
Y3	20-200107-049	1	Crystal, 4.9152 MHz Parallel	M020 NR-18 4.9152MHz 16pF P
Ø1	84-101337-000	1	3820 Main Proc.,PCB Assembling	56 60-101337 Assembling
Ø1	84-101337-100	1	3820 Main Proc.,Extra Hardware	56 60-101337, Hardware

## PARTS LIST

## MFR CODE NAME

ZIPCODE, CITY

## ADDRESS

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Japan

M004	AVX/Kyocera Hants GU124LT Aldershot	Hants GU124LT Aldershot United Kingdom
M006	Murata	
M008	Molex GU 11 3 ST Aldershot	GU 11 3 ST Aldershot United Kingdom
M009	Texas Instruments MS 54 Dallas TX 75265	MS 54 Dallas TX 75265 U.S.A.
M010	Panasonic 8000 Århus C	Sandstrase 3 Germany
M013	R-OHM Electronics GmbH Muhlenstrase 70	Muhlenstrase 70 Germany
M020	NDK 151 Tokyo	151 Tokyo Japan
M025	Burndy Electra N.V. B 2800 Mechelen	B 2800 Mechelen Belgique
M029	Toshiba 105 Tokyo	105 Tokyo Japan
M030	National Semiconductor Troy NY 12181-1440	Troy NY 12181-1440 U.S.A.
M031	SGS 2000 Frederiksberg	Via C Olivetti 2 Italy
M033	Hitachi	
M034	AMP Deutschland GmbH 6070 Christiansfeld	AMPeresstrasse 7-11 Germany
M037	Alcoswitch North Andover MA 01845	North Andover MA 01845 U.S.A.
M049	Varta Batterie AG D-3000 Hannover 21	D-3000 Hannover 21 West Germany
M051	Oki	
M055	3M	
M059	XICOR Inc. CA 95035, Milpitas	CA 95035, Milpitas U.S.A.
M070	Advanced Micro Devices Inc Sunnyvale, Clifornia 94088	Sunnyvale, Clifornia 94088 U.S.A.
M082	Zilog	
M095	ROSENBERGER	
M118	Fastron Haydnstrasse 11	Haydnstrasse 11 West Germany
M120	Supertex Inc.	U.S.A.
M121	Seifert Electronic GmbH D-5828 Ennepetal 1	D-5828 Ennepetal 1 W. Germany
M136	Kyocera	Japan
M170	Robinson Nugent	

PARTS LIST REF.D.PART NO.	QTY DESCRIPTION	MFRC MFR PART NO.
60-101338	3820 Filter Board	
Diagram 93-101338	Comp. Drawing 37-101338-004	
01 37-101338-004	1 PCB, 3820 Filter Board	56 TT 37-101338-004
C1 22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
C2 22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
C3 22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
C4 22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
C5 22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
C6 22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
C7 22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
C8 22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
C9 22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
C10 22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
C11 22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
C12 22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
C13 22-200053-474	3 Cap. SMD, Cer 470nF/50V 10%	M004 1812 5C 474 KAATOOA
C14 22-200054-472	14 Cap. SMD, Cer 4n7F/63V 1%	M015 VJ1210 A 472 F X AT
C16 22-200058-221	1 Cap. SMD, Cer 220pF/50V 5%	M004 CM21 CG 221 J50 AT
C17 22-200250-473	7 Cap. SMD, Cer 47nF/50V 5%	M004 1206 5C 473 JATOOJ
C18 22-200054-472	Cap. SMD, Cer 4n7F/63V 1%	M015 VJ1210 A 472 F X AT
C19 22-200258-688	6 Cap. SMD, Tantal 6u8F/20V 20%	M117 293D 685 X0020 C 2T
C20 22-200054-472	Cap. SMD, Cer 4n7F/63V 1%	M015 VJ1210 A 472 F X AT
C21 22-200054-472	Cap. SMD, Cer 4n7F/63V 1%	M015 VJ1210 A 472 F X AT
C22 22-200069-339	2 Cap. SMD, Cer 33pF/50V 2%	M004 CM21 CG 330 G50 AT
C23 22-200249-104	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
C24 22-200069-339	Cap. SMD, Cer 33pF/50V 2%	M004 CM21 CG 330 G50 AT
C25 22-200258-688	Cap. SMD, Tantal 6u8F/20V 20%	M117 293D 685 X0020 C 2T
C26 22-200054-472	Cap. SMD, Cer 4n7F/63V 1%	M015 VJ1210 A 472 F X AT
C27 22-200053-474	Cap. SMD, Cer 470nF/50V 10%	M004 1812 5C 474 KAATOOA
C28 22-200258-688	Cap. SMD, Tantal 6u8F/20V 20%	M117 293D 685 X0020 C 2T
C29 22-200258-688	Cap. SMD, Tantal 6u8F/20V 20%	M117 293D 685 X0020 C 2T
C30 22-200045-109	2 Capacitor, Elct LL 10uF/25V	M003 CE 04W 1E 100MD 6.3x11
C31 22-200045-109	Capacitor, Elct LL 10uF/25V	M003 CE 04W 1E 100MD 6.3x11
C32 22-200054-472	Cap. SMD, Cer 4n7F/63V 1%	M015 VJ1210 A 472 F X AT
C33 22-200261-222	1 Cap. SMD, Cer 2n2F/50V 5%	M004 1206 5A 222 JATOOJ
C34 22-200058-102	3 Cap. SMD, Cer 1nF/50V 5%	M004 CM21 CG 102 J50 AT
C35 22-200058-681	1 Cap. SMD, Cer 680pF/50V 5%	M004 CM21 CG 681 J50 AT
C36 22-200058-102	Cap. SMD, Cer 1nF/50V 5%	M004 CM21 CG 102 J50 AT
C37 22-200053-474	Cap. SMD, Cer 470nF/50V 10%	M004 1812 5C 474 KAATOOA
C38 22-200258-688	Cap. SMD, Tantal 6u8F/20V 20%	M117 293D 685 X0020 C 2T
C39 22-200054-472	Cap. SMD, Cer 4n7F/63V 1%	M015 VJ1210 A 472 F X AT
C40 22-200054-472	Cap. SMD, Cer 4n7F/63V 1%	M015 VJ1210 A 472 F X AT
C41 22-200058-151	1 Cap. SMD, Cer 150pF/50V 5%	M004 CM21 CG 151 J50 AT
C42 22-200054-472	Cap. SMD, Cer 4n7F/63V 1%	M015 VJ1210 A 472 F X AT
C43 22-200054-472	Cap. SMD, Cer 4n7F/63V 1%	M015 VJ1210 A 472 F X AT
C44 22-200250-473	Cap. SMD, Cer 47nF/50V 5%	M004 1206 5C 473 JATOOJ
C45 22-200251-104	4 Cap. SMD, Cer 100nF/50V 10%	M004 1210 5C 104 KATOOJ
C46 22-200250-473	Cap. SMD, Cer 47nF/50V 5%	M004 1206 5C 473 JATOOJ
C47 22-200250-473	Cap. SMD, Cer 47nF/50V 5%	M004 1206 5C 473 JATOOJ
C48 22-200054-472	Cap. SMD, Cer 4n7F/63V 1%	M015 VJ1210 A 472 F X AT
C49 22-200054-472	Cap. SMD, Cer 4n7F/63V 1%	M015 VJ1210 A 472 F X AT
C50 22-200054-472	Cap. SMD, Cer 4n7F/63V 1%	M015 VJ1210 A 472 F X AT
C51 22-200054-472	Cap. SMD, Cer 4n7F/63V 1%	M015 VJ1210 A 472 F X AT
C52 22-200250-473	Cap. SMD, Cer 47nF/50V 5%	M004 1206 5C 473 JATOOJ
C53 22-200250-473	Cap. SMD, Cer 47nF/50V 5%	M004 1206 5C 473 JATOOJ
C54 22-200250-473	Cap. SMD, Cer 47nF/50V 5%	M004 1206 5C 473 JATOOJ
C55 22-200258-688	Cap. SMD, Tantal 6u8F/20V 20%	M117 293D 685 X0020 C 2T
C56 22-200246-223	2 Cap. SMD, Cer 22nF/50V 10%	M004 CM21 X7R 223 K50 AT

C57	22-200251-104		Cap. SMD, Cer 100nF/50V 10%	M004 1210 5C 104 KATOOJ
C58	22-200058-102		Cap. SMD, Cer 1nF/50V 5%	M004 CM21 CG 102 J50 AT
C59	22-200043-339	1	Capacitor, Elct 33uF/35V	M010 ECEA 1V GE 330
C60	22-200251-104		Cap. SMD, Cer 100nF/50V 10%	M004 1210 5C 104 KATOOJ
C61	22-200251-104		Cap. SMD, Cer 100nF/50V 10%	M004 1210 5C 104 KATOOJ
C62	Not Used			56
C63	Not Used			56
C64	Not Used			56
C65	22-200246-223		Cap. SMD, Cer 22nF/50V 10%	M004 CM21 X7R 223 K50 AT
C66	22-200249-104		Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CR1	23-200197-016	5	Diode SMD, BAS16	M000 BAS16-215 A6
CR2	Not Used	0		56
CR3	23-200197-016		Diode SMD, BAS16	M000 BAS16-215 A6
CR4	23-200197-016		Diode SMD, BAS16	M000 BAS16-215 A6
CR5	23-200197-016		Diode SMD, BAS16	M000 BAS16-215 A6
CR6	23-200197-016		Diode SMD, BAS16	M000 BAS16-215 A6
CR7	Not Used			56
CR8	Not Used			56
CX1	22-200249-104	33	Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX2	22-200249-104		Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX3	22-200249-104		Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX4	22-200249-104		Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX5	22-200249-104		Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX6	22-200249-104		Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX7	22-200249-104		Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX8	22-200249-104		Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX9	22-200249-104		Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX10	22-200249-104		Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX11	22-200249-104		Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX12	22-200249-104		Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX13	22-200249-104		Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX4a	22-200249-104		Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX6a	22-200249-104		Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX8a	22-200249-104		Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX9a	22-200249-104		Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX11a	22-200249-104		Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
CX13a	22-200249-104		Cap. SMD, Cer 100nF/50V +80%	M136 CM21 Y5V 104 Z50 AT
DS1	23-200232-002	1	Diode, Led Red/Holder ø=3mm	M058 09-1010-60
H1	31-200152-000	4	Jumper, 2 Pole	M008 90059-0009
H2	31-200152-000		Jumper, 2 Pole	M008 90059-0009
H3	31-200152-000		Jumper, 2 Pole	M008 90059-0009
H4	Not Used			56
H5	31-200152-000		Jumper, 2 Pole	M008 90059-0009
H6	Not Used			56
H7	Not Used			56
J1	31-200630-020	1	Connector, 20 Pol Female	M034 2-215079-0
J2	31-200135-025	1	Connector, 25-Pole D Male	M008 87136-3351
J3	31-200632-014	1	Connector, 14 Pol Male	M055 3598-6002
J4	31-200859-002	1	Connector, 2-Pole angle male	M034 171826-2
K1	33-200594-001	1	Relay, Reed D1A05-1	M135 D1A05-1 (D)
L1	25-200108-339	12	Coil, 33uH/190mA 10%	M118 MICC-330K-02 (Reel)
L2	25-200108-339		Coil, 33uH/190mA 10%	M118 MICC-330K-02 (Reel)
L3	25-200108-339		Coil, 33uH/190mA 10%	M118 MICC-330K-02 (Reel)
L4	25-200108-339		Coil, 33uH/190mA 10%	M118 MICC-330K-02 (Reel)
L5	25-200108-339		Coil, 33uH/190mA 10%	M118 MICC-330K-02 (Reel)
L6	25-200108-339		Coil, 33uH/190mA 10%	M118 MICC-330K-02 (Reel)
L7	25-200108-339		Coil, 33uH/190mA 10%	M118 MICC-330K-02 (Reel)
L8	25-200108-339		Coil, 33uH/190mA 10%	M118 MICC-330K-02 (Reel)
L9	25-200108-339		Coil, 33uH/190mA 10%	M118 MICC-330K-02 (Reel)
L10	25-200108-339		Coil, 33uH/190mA 10%	M118 MICC-330K-02 (Reel)



L11	25-200108-339		Coil, 33uH/190mA 10%	M118 MICC-330K-02 (Reel)
L12	25-200108-339		Coil, 33uH/190mA 10%	M118 MICC-330K-02 (Reel)
L13	25-200108-109	2	Coil, 10uH/250mA 10%	M118 MICC-100K-02
L14	25-200108-109		Coil, 10uH/250mA 10%	M118 MICC-100K-02
L15	25-200108-339		Coil, 33uH/190mA 10%	M118 MICC-330K-02 (Reel)
Q1	26-200122-000	9	Transistor, N-MOSFET 2N7000	M026 2N7000
Q2	26-200122-000		Transistor, N-MOSFET 2N7000	M026 2N7000
Q3	26-200122-000		Transistor, N-MOSFET 2N7000	M026 2N7000
Q4	26-200122-000		Transistor, N-MOSFET 2N7000	M026 2N7000
Q5	26-200122-000		Transistor, N-MOSFET 2N7000	M026 2N7000
Q6	26-200122-000		Transistor, N-MOSFET 2N7000	M026 2N7000
Q7	26-200122-000		Transistor, N-MOSFET 2N7000	M026 2N7000
Q8	26-200122-000		Transistor, N-MOSFET 2N7000	M026 2N7000
Q9	26-200122-000		Transistor, N-MOSFET 2N7000	M026 2N7000
Q10	26-200089-848	1	Transistor SMD, NPN BC848B	M000 BC848B-215 1K
Q11	Not Used			56
Q12	26-200375-033	1	Transistor SMD, PNP BSR33	M000 BSR33 BR4
Q13	26-200089-817	2	Transistor SMD, NPN BC817-25	M000 BC817-25 215 6B
Q14	26-200090-807	2	Transistor SMD, PNP BC807-25	M000 BC807-25 215 5B
Q15	26-200089-817		Transistor SMD, NPN BC817-25	M000 BC817-25 215 6B
Q16	26-200090-807		Transistor SMD, PNP BC807-25	M000 BC807-25 215 5B
R1	21-200210-399	8	Resistor SMD, Cer 39R 5%	M013 MCR10 39R
R2	21-200210-102	14	Resistor SMD, Cer 1K 5%	M013 MCR10 1K
R3	21-200210-399		Resistor SMD, Cer 39R 5%	M013 MCR10 39R
R4	21-200210-102		Resistor SMD, Cer 1K 5%	M013 MCR10 1K
R5	21-200210-399		Resistor SMD, Cer 39R 5%	M013 MCR10 39R
R6	21-200210-102		Resistor SMD, Cer 1K 5%	M013 MCR10 1K
R7	21-200210-102		Resistor SMD, Cer 1K 5%	M013 MCR10 1K
R8	21-200210-399		Resistor SMD, Cer 39R 5%	M013 MCR10 39R
R9	21-200210-102		Resistor SMD, Cer 1K 5%	M013 MCR10 1K
R10	21-200210-399		Resistor SMD, Cer 39R 5%	M013 MCR10 39R
R11	21-200210-102		Resistor SMD, Cer 1K 5%	M013 MCR10 1K
R12	21-200210-399		Resistor SMD, Cer 39R 5%	M013 MCR10 39R
R13	21-200210-102		Resistor SMD, Cer 1K 5%	M013 MCR10 1K
R14	21-200210-399		Resistor SMD, Cer 39R 5%	M013 MCR10 39R
R15	21-200210-399		Resistor SMD, Cer 39R 5%	M013 MCR10 39R
R16	21-200210-102		Resistor SMD, Cer 1K 5%	M013 MCR10 1K
R17	21-200210-159	1	Resistor SMD, Cer 15R 5%	M013 MCR10 15R
R18	21-200210-102		Resistor SMD, Cer 1K 5%	M013 MCR10 1K
R19	21-200210-103	12	Resistor SMD, Cer 10K 5%	M013 MCR10 10K
R20	21-200210-224	4	Resistor SMD, Cer 220K 5%	M013 MCR10 220K
R21	21-200210-104	4	Resistor SMD, Cer 100K 5%	M013 MCR10 100K
R22	21-200210-104		Resistor SMD, Cer 100K 5%	M013 MCR10 100K
R23	21-200210-103		Resistor SMD, Cer 10K 5%	M013 MCR10 10K
R24	21-200210-224		Resistor SMD, Cer 220K 5%	M013 MCR10 220K
R25	21-200210-104		Resistor SMD, Cer 100K 5%	M013 MCR10 100K
R26	21-200210-103		Resistor SMD, Cer 10K 5%	M013 MCR10 10K
R27	21-200210-224		Resistor SMD, Cer 220K 5%	M013 MCR10 220K
R28	21-200210-183	1	Resistor SMD, Cer 18K 5%	M013 MCR10 18K
R29	21-200210-472	2	Resistor SMD, Cer 4K7 5%	M013 MCR10 4K7
R30	21-200210-101	7	Resistor SMD, Cer 100R 5%	M013 MCR10 100R
R31	21-200210-562	1	Resistor SMD, Cer 5K6 5%	M013 MCR10 5K6
R32	21-200238-204	1	Resistor, Var 200K, Multi	M007 3006 P-1-204
R33	21-200210-101		Resistor SMD, Cer 100R 5%	M013 MCR10 100R
R34	21-200210-561	1	Resistor SMD, Cer 560R 5%	M013 MCR10 560R
R35	21-200210-182	1	Resistor SMD, Cer 1K8 5%	M013 MCR10 1K8
R36	21-200210-822	1	Resistor SMD, Cer 8K2 5%	M013 MCR10 8K2
R37	21-200210-101		Resistor SMD, Cer 100R 5%	M013 MCR10 100R
R38	21-200210-101		Resistor SMD, Cer 100R 5%	M013 MCR10 100R
R39	21-200203-715	2	Resistor SMD, Cer 71K5 1%	M013 MCR10FW 71K5
R40	21-200203-560	2	Resistor SMD, Cer 56K0 1%	M013 MCR10FW 56K0
R41	Not Used			56
R42	21-200203-100	23	Resistor SMD, Cer 10K0 1%	M013 MCR10FW 10K0

R43	21-200203-560		Resistor SMD, Cer 56K0 1%	M013 MCR10FW 56K0
R44	Not Used			56
R45	21-200203-715		Resistor SMD, Cer 71K5 1%	M013 MCR10FW 71K5
R46	21-200210-101		Resistor SMD, Cer 100R 5%	M013 MCR10 100R
R47	21-200210-109	4	Resistor SMD, Cer 10R 5%	M013 MCR10 10R
R48	21-200203-215	1	Resistor SMD, Cer 21K5 1%	M013 MCR10FW 21K5
R49	21-200210-102		Resistor SMD, Cer 1K 5%	M013 MCR10 1K
R50	21-200203-100		Resistor SMD, Cer 10K0 1%	M013 MCR10FW 10K0
R51	21-200210-102		Resistor SMD, Cer 1K 5%	M013 MCR10 1K
R52	21-200210-103		Resistor SMD, Cer 10K 5%	M013 MCR10 10K
R53	21-200210-223	3	Resistor SMD, Cer 22K 5%	M013 MCR10 22K
R54	21-200210-221		3 Resistor SMD, Cer 220R 5%	M013 MCR10 220R
R55	21-200210-102		Resistor SMD, Cer 1K 5%	M013 MCR10 1K
R56	21-200210-101		Resistor SMD, Cer 100R 5%	M013 MCR10 100R
R57	21-200210-224		Resistor SMD, Cer 220K 5%	M013 MCR10 220K
R58	21-200210-222	4	Resistor SMD, Cer 2K2 5%	M013 MCR10 2K2
R59	21-200203-100		Resistor SMD, Cer 10K0 1%	M013 MCR10FW 10K0
R60	21-200203-100		Resistor SMD, Cer 10K0 1%	M013 MCR10FW 10K0
R61	21-200203-100		Resistor SMD, Cer 10K0 1%	M013 MCR10FW 10K0
R62	21-200203-100		Resistor SMD, Cer 10K0 1%	M013 MCR10FW 10K0
R63	21-200210-222		Resistor SMD, Cer 2K2 5%	M013 MCR10 2K2
R64	21-200210-823	1	Resistor SMD, Cer 82K 5%	M013 MCR10 82K
R65	21-200210-473	2	Resistor SMD, Cer 47K 5%	M013 MCR10 47K
R66	21-200204-110	1	Resistor SMD, Cer 110K 1%	M013 MCR10FW 110K
R67	21-200204-150	1	Resistor SMD, Cer 150K 1%	M013 MCR10FW 150K
R68	Not Used			56
R69	21-200440-829	1	Resistor SMD, Cer 82R 1W 5%	M013 MCR100 JZH JX 820
R70	21-200210-109		Resistor SMD, Cer 10R 5%	M013 MCR10 10R
R71	21-200210-109		Resistor SMD, Cer 10R 5%	M013 MCR10 10R
R72	21-200210-479	1	Resistor SMD, Cer 47R 5%	M013 MCR10 47R
R73	21-200210-109		Resistor SMD, Cer 10R 5%	M013 MCR10 10R
R74	21-200210-393	2	Resistor SMD, Cer 39K 5%	M013 MCR10 39K
R75	21-200203-365	1	Resistor SMD, Cer 36K5 1%	M013 MCR10F 36K5M
R76	21-200203-680	2	Resistor SMD, Cer 68K0 1%	M013 MCR10FW 68K0
R77	21-200203-680		Resistor SMD, Cer 68K0 1%	M013 MCR10FW 68K0
R78	21-200238-503	1	Resistor, Var 50K, Multi	M007 3006 P-1-503
R79	21-200210-221		Resistor SMD, Cer 220R 5%	M013 MCR10 220R
R80	21-200210-104		Resistor SMD, Cer 100K 5%	M013 MCR10 100K
R81	21-200210-272	2	Resistor SMD, Cer 2K7 5%	M013 MCR10 2K7
R82	21-200440-569	1	Resistor SMD, Cer 56R 1W 5%	M013 MCR100 JZH JX 560
R83	21-200210-152	3	Resistor SMD, Cer 1K5 5%	M013 MCR10 1K5
R84	21-200204-330	4	Resistor SMD, Cer 330K 1%	M013 MCR10FW 330K
R85	21-200204-100	4	Resistor SMD, Cer 100K 1%	M013 MCR10FW 100K
R86	21-200203-120	2	Resistor SMD, Cer 12K0 1%	M013 MCR10FW 12K0
R87	To be defined	4		56
R88	21-200204-100		Resistor SMD, Cer 100K 1%	M013 MCR10FW 100K
R89	21-200203-120		Resistor SMD, Cer 12K0 1%	M013 MCR10FW 12K0
R90	To be defined			56
R91	21-200204-330		Resistor SMD, Cer 330K 1%	M013 MCR10FW 330K
R92	21-200203-100		Resistor SMD, Cer 10K0 1%	M013 MCR10FW 10K0
R93	21-200203-100		Resistor SMD, Cer 10K0 1%	M013 MCR10FW 10K0
R94	21-200203-270	1	Resistor SMD, Cer 27K0 1%	M013 MCR10FW 27K0
R95	21-200210-393		Resistor SMD, Cer 39K 5%	M013 MCR10 39K
R96	21-200203-100		Resistor SMD, Cer 10K0 1%	M013 MCR10FW 10K0
R97	21-200203-100		Resistor SMD, Cer 10K0 1%	M013 MCR10FW 10K0
R98	21-200203-100		Resistor SMD, Cer 10K0 1%	M013 MCR10FW 10K0
R99	21-200203-100		Resistor SMD, Cer 10K0 1%	M013 MCR10FW 10K0
R100	21-200203-100		Resistor SMD, Cer 10K0 1%	M013 MCR10FW 10K0
R101	21-200202-499	2	Resistor SMD, Cer 4K99 1%	M013 MCR10FW 4K99
R102	21-200204-330		Resistor SMD, Cer 330K 1%	M013 MCR10FW 330K
R103	21-200203-100		Resistor SMD, Cer 10K0 1%	M013 MCR10FW 10K0
R104	21-200210-221		Resistor SMD, Cer 220R 5%	M013 MCR10 220R
R105	21-200203-100		Resistor SMD, Cer 10K0 1%	M013 MCR10FW 10K0

R106	21-200203-100	Resistor SMD, Cer 10K0 1%	M013 MCR10FW 10K0
R107	21-200202-499	Resistor SMD, Cer 4K99 1%	M013 MCR10FW 4K99
R108	21-200210-303	1 Resistor SMD, Cer 30K 5%	M013 MCR10 30K
R109	21-200203-100	Resistor SMD, Cer 10K0 1%	M013 MCR10FW 10K0
R110	21-200203-100	Resistor SMD, Cer 10K0 1%	M013 MCR10FW 10K0
R111	21-200210-222	Resistor SMD, Cer 2K2 5%	M013 MCR10 2K2
R112	21-200203-100	Resistor SMD, Cer 10K0 1%	M013 MCR10FW 10K0
R113	21-200204-100	Resistor SMD, Cer 100K 1%	M013 MCR10FW 100K
R114	21-200203-137	2 Resistor SMD, Cer 13K7 1%	M013 MCR10FW 13K7
R115	To be defined		56
R116	21-200204-100	Resistor SMD, Cer 100K 1%	M013 MCR10FW 100K
R117	21-200203-137	Resistor SMD, Cer 13K7 1%	M013 MCR10FW 13K7
R118	To be defined		56
R119	21-200204-330	Resistor SMD, Cer 330K 1%	M013 MCR10FW 330K
R120	21-200203-100	Resistor SMD, Cer 10K0 1%	M013 MCR10FW 10K0
R121	21-200203-100	Resistor SMD, Cer 10K0 1%	M013 MCR10FW 10K0
R122	21-200203-100	Resistor SMD, Cer 10K0 1%	M013 MCR10FW 10K0
R123	21-200203-100	Resistor SMD, Cer 10K0 1%	M013 MCR10FW 10K0
R124	21-200210-102	Resistor SMD, Cer 1K 5%	M013 MCR10 1K
R125	21-200203-232	5 Resistor SMD, Cer 23K2 1%	M013 MCR10FW 10K0
R126	21-200210-222	Resistor SMD, Cer 2K2 5%	M013 MCR10 2K2
R127	21-200203-232	Resistor SMD, Cer 23K2 1%	M013 MCR10FW 10K0
R128	21-200203-232	Resistor SMD, Cer 23K2 1%	M013 MCR10FW 10K0
R129	21-200201-220	1 Resistor SMD, Cer 220R 1%	M013 MCR10FW 220R
R130	21-200203-232	Resistor SMD, Cer 23K2 1%	M013 MCR10FW 10K0
R131	21-200203-232	Resistor SMD, Cer 23K2 1%	M013 MCR10FW 10K0
R132	21-200210-102	Resistor SMD, Cer 1K 5%	M013 MCR10 1K
R133	21-200210-473	Resistor SMD, Cer 47K 5%	M013 MCR10 47K
R134	21-200210-103	Resistor SMD, Cer 10K 5%	M013 MCR10 10K
R135	21-200210-103	Resistor SMD, Cer 10K 5%	M013 MCR10 10K
R136	21-200210-223	Resistor SMD, Cer 22K 5%	M013 MCR10 22K
R137	21-200210-103	Resistor SMD, Cer 10K 5%	M013 MCR10 10K
R138	21-200210-103	Resistor SMD, Cer 10K 5%	M013 MCR10 10K
R139	21-200210-103	Resistor SMD, Cer 10K 5%	M013 MCR10 10K
R140	21-200210-683	1 Resistor SMD, Cer 68K 5%	M013 MCR10 68K
R141	21-200210-472	Resistor SMD, Cer 4K7 5%	M013 MCR10 4K7
R142	21-200210-101	Resistor SMD, Cer 100R 5%	M013 MCR10 100R
R143	21-200210-152	Resistor SMD, Cer 1K5 5%	M013 MCR10 1K5
R144	21-200210-103	Resistor SMD, Cer 10K 5%	M013 MCR10 10K
R146	21-200210-153	1 Resistor SMD, Cer 15K 5%	M013 MCR10 15K
R147	21-200210-272	Resistor SMD, Cer 2K7 5%	M013 MCR10 2K7
R148	21-200210-223	Resistor SMD, Cer 22K 5%	M013 MCR10 22K
R149	21-200210-392	1 Resistor SMD, Cer 3K9 5%	M013 MCR10 3K9
R150	21-200210-103	Resistor SMD, Cer 10K 5%	M013 MCR10 10K
R151	21-200210-103	Resistor SMD, Cer 10K 5%	M013 MCR10 10K
R152	21-200210-152	Resistor SMD, Cer 1K5 5%	M013 MCR10 1K5
R153	21-200020-109	2 Resistor, Film 10R/2W 5%	M000 PR02 10R
R154	21-200020-109	Resistor, Film 10R/2W 5%	M000 PR02 10R
R69a	21-200210-271	1 Resistor SMD, Cer 270R 5%	M013 MCR10 270R
R82a	21-200210-201	1 Resistor SMD, Cer 200R 5%	M013 MCR10 200R
T1	25-200260-600	2 Transformer, Line 600 Ohm	M021 L04 EE 13
T2	25-200260-600	Transformer, Line 600 Ohm	M021 L04 EE 13
T3	Not Used		56
TP1	31-200103-000	2 Terminal, Test Point $\phi=1.3\text{mm}$	71 1358
TP2	Not Used		56
TP3	Not Used		56
TP4	31-200103-000	Terminal, Test Point $\phi=1.3\text{mm}$	71 1358
TP5	Not Used		56
TP6	Not Used		56
TP7	Not Used		56
TP8	Not Used		56
TP9	31-200141-001	Pin Header, 1-Pole Male Dual	M008 90131-0960(Only 1 Pin)
TP10	31-200141-001	Pin Header, 1-Pole Male Dual	M008 90131-0960(Only 1 Pin)

TP11	31-200141-001		Pin Header, 1-Pole Male Dual	M008 90131-0960(Only 1 Pin)
TP12	31-200141-001		Pin Header, 1-Pole Male Dual	M008 90131-0960(Only 1 Pin)
TP13	31-200141-001		Pin Header, 1-Pole Male Dual	M008 90131-0960(Only 1 Pin)
TP14	31-200141-001		Pin Header, 1-Pole Male Dual	M008 90131-0960(Only 1 Pin)
TP15	Not Used			56
TP16	31-200141-001		Pin Header, 1-Pole Male Dual	M008 90131-0960(Only 1 Pin)
TP17	31-200141-001		Pin Header, 1-Pole Male Dual	M008 90131-0960(Only 1 Pin)
TP18	31-200141-001		Pin Header, 1-Pole Male Dual	M008 90131-0960(Only 1 Pin)
TP19	31-200141-001		Pin Header, 1-Pole Male Dual	M008 90131-0960(Only 1 Pin)
TP20	31-200141-001		Pin Header, 1-Pole Male Dual	M008 90131-0960(Only 1 Pin)
TP21	31-200141-001		Pin Header, 1-Pole Male Dual	M008 90131-0960(Only 1 Pin)
TP22	31-200141-001		Pin Header, 1-Pole Male Dual	M008 90131-0960(Only 1 Pin)
TP23	31-200141-001		Pin Header, 1-Pole Male Dual	M008 90131-0960(Only 1 Pin)
TP24	31-200141-001		Pin Header, 1-Pole Male Dual	M008 90131-0960(Only 1 Pin)
TP25	31-200141-001		Pin Header, 1-Pole Male Dual	M008 90131-0960(Only 1 Pin)
TP26	31-200141-001		Pin Header, 1-Pole Male Dual	M008 90131-0960(Only 1 Pin)
TP27	31-200141-001		Pin Header, 1-Pole Male Dual	M008 90131-0960(Only 1 Pin)
TP28	Not Used			56
TP29	Not Used			56
TP30	Not Used			56
U1	24-200084-259	2	IC TTL SMD, 74HCT259	M000 PC74HCT259T
U2	24-200084-259		IC TTL SMD, 74HCT259	M000 PC74HCT259T
U3	24-200084-251	1	IC TTL SMD, 74HCT251	M000 PC74HCT251T
U4	24-200199-074	4	IC Analog SMD, TL074	M009 TL074 CD
U5	24-200198-053	1	IC CMOS SMD, 4053	M000 HEF 4053 BT
U6	24-200199-074		IC Analog SMD, TL074	M009 TL074 CD
U7	24-200244-000	1	IC TTL SMD, 74HC00	M009 SN 74HC00 D
U8	24-200200-072	2	IC Analog SMD, TL072	M009 TL072CD
U9	24-200199-074		IC Analog SMD, TL074	M009 TL074 CD
U10	24-200939-034	1	IC Analog, SMD TL034CD	M009 TL034CD
U11	24-200199-074		IC Analog SMD, TL074	M009 TL074 CD
U12	24-200198-372	1	IC Analog SMD, TLC372	M009 TLC372 CD
U13	24-200200-072		IC Analog SMD, TL072	M009 TL072CD
U14	24-200132-805	1	IC Analog, 78L05	M030 LM78L05ACZ
VR1	23-200088-620	9	Diode Zener, BZV85-C62V	M000 BZV85 C62V
VR2	23-200088-620		Diode Zener, BZV85-C62V	M000 BZV85 C62V
VR3	23-200088-620		Diode Zener, BZV85-C62V	M000 BZV85 C62V
VR4	23-200088-620		Diode Zener, BZV85-C62V	M000 BZV85 C62V
VR5	23-200088-620		Diode Zener, BZV85-C62V	M000 BZV85 C62V
VR6	23-200088-620		Diode Zener, BZV85-C62V	M000 BZV85 C62V
VR7	23-200088-620		Diode Zener, BZV85-C62V	M000 BZV85 C62V
VR8	23-200088-620		Diode Zener, BZV85-C62V	M000 BZV85 C62V
VR9	23-200088-620		Diode Zener, BZV85-C62V	M000 BZV85 C62V
VR10	23-200085-130	1	Diode Zener, BZX79-C13V	M000 BZX79-C13V
W1	31-200140-001	10	Pin Header, 1-Pole Male Single	M008 90120-0960(Only 1 Pin)
W2	31-200140-001		Pin Header, 1-Pole Male Single	M008 90120-0960(Only 1 Pin)
W3	31-200140-001		Pin Header, 1-Pole Male Single	M008 90120-0960(Only 1 Pin)
W4	31-200141-001	20	Pin Header, 1-Pole Male Dual	M008 90131-0960(Only 1 Pin)
W5	31-200140-001		Pin Header, 1-Pole Male Single	M008 90120-0960(Only 1 Pin)
W6	31-200140-001		Pin Header, 1-Pole Male Single	M008 90120-0960(Only 1 Pin)
XU3	Not Used			56
Ø1	84-101338-000	1	3820 Filt.Board,PCB Assembling	56 60-101338 Assembling
Ø1	84-101338-100	1	3820 Filt.Board,Extra Hardware	56 60-101338, Hardwares

PARTS LIST		
MFR CODE	NAME ZIPCODE, CITY	ADDRESS COUNTRY
31564111	Thrane & Thrane A/S 2860 Søborg	Tobaksvejen 23A Denmark
43714471	Promax A/S 2630 Tåstrup	Klovtoftegade 46
M000	Philips P.O. Box 218	P.O. Box 218 Netherlands
M003	Marcon Electronics Co. LTD. Tokyo	Tokyo Japan
M004	AVX/Kyocera Hants GU124LT Aldershot	Hants GU124LT Aldershot United Kingdom
M007	Bourns Zugerstrasse	Zugerstrasse Switzerland
M008	Molex GU 11 3 ST Aldershot	GU 11 3 ST Aldershot United Kingdom
M009	Texas Instruments MS 54 Dallas TX 75265	MS 54 Dallas TX 75265 U.S.A.
M010	Panasonic 8000 Århus C	Sandstrase 3 Germany
M013	R-OHM Electronics GmbH Muhlenstrase 70	Muhlenstrase 70 Germany
M015	Vitramon HP100HH Buckinghamshire	HP100HH Buckinghamshire United Kingdom
M021	TDK	
M026	Siliconix CA 95054 Santa Clara	CA 95054 Santa Clara U.S.A.
M030	National Semiconductor Troy NY 12181-1440	Troy NY 12181-1440 U.S.A.
M034	AMP Deutschland GmbH 6070 Christiansfeld	AMPPeresstrasse 7-11 Germany
M055	3M	
M058	ELMA Electronic AG CH-8620 Wetzikon	CH-8620 Wetzikon Swiss
M117	Sprague Electric Company Worcester Mass 01606	Worcester Mass 01606 U.S.A.
M118	Fastron Haydnstrasse 11	Haydnstrasse 11 West Germany
M135	KVAN HSI.	U.S.A.
M136	Kyocera	Japan

**PART 2**  
**Compact HF SSB RM2152**  
**Operator Manual DSC**

# PART 3

## Compact HF SSB RM2152

### Service

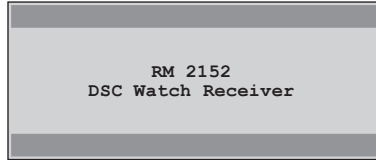
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# 1 SERVICE AND IDENTITY PROGRAMMING FOR RM2152 DSC WATCH RECEIVER

## 1.1 IDENTITY of RM2152

Turn on the Watch receiver and control that the displaymenu after the initializing menu show the following menu.



If you get the displaymenu indicating that the receiver is a Radio telex modem RM2151, you have to change the internal setting of the switch **S2-2**.

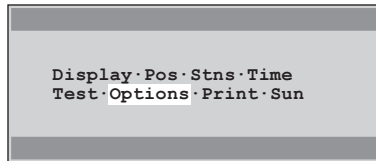
Remove the back plate and cabinet, set switch **S2-2** in on position (please see chapter 6 component location main processor module). Turn on the Watch Receiver RM2152 and check that the display menu now show the above menu. Mount the cabinet and the backplate again.

## 1.2 SP-BUS PROGRAMMING of RM2152

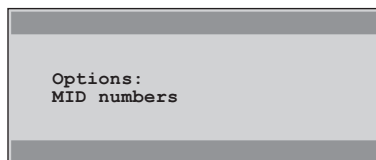
Check of right setting of control interface (**SP-BUS**) on the watch Receiver RM2152.

Turn on the RM2152 and wait until the displaymenu show the scan running menu.

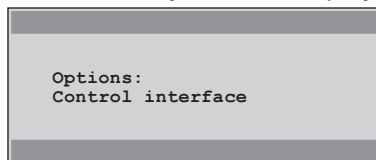
Activate **FUNC**: and the displaymenu change to.



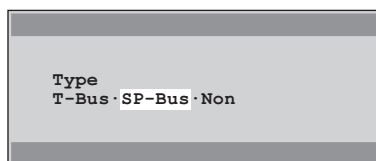
Chose the Options menu and activate the **NEXT** key, the displaymenu change to.



Use the up/down arrow key until the displaymenu show.

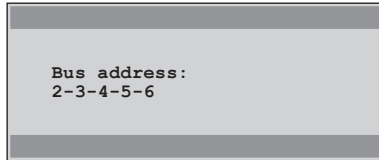


Activate the **NEXT** key, the displaymenu change to.





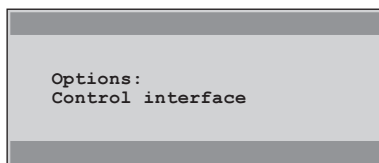
The SP-Bus is chosen for serial communication activate the **NEXT** key, the displaymenu change to.



The bus address number 2 is blinking, indicating that Bus address 2 is chosen. Is one of the other bus addresses blinking it is necessary to change it to number 2. Change of Control interface type or address can not be done unless the function switch **S2-4** is in on position. To set the function switch **S2-4** in on position it is necessary to dismount the backplate and the cabinet, set the switch **S2-4** on (please see chapter 6 component location main processor module). Turn the watch receiver RM2152 on and wait until the displaymenu show the scan running menu.

Activate **FUNC**: and the displaymenu change to the function menu again, find the **Options** menu, and go to the **control interface** menu. Correct the type and the Bus address and.

Activate the **NEXT** key, the displaymenu change again to.



Turn the RM2152 off, and if the function switch has been set in on position change the switch **S2-4** to off and mount the cabinet and the backplate again.

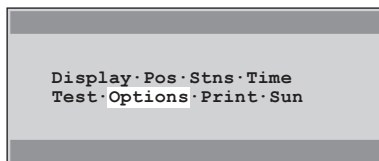
**IT IS VERY IMPORTANT TO SET THE SWITCH S2\_4 OFF.**

### 1.3 PROGRAMMING of SELF-IDENTIFICATION NUMBER

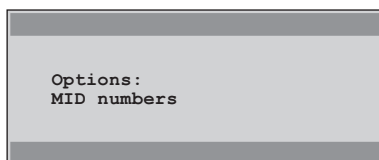
The Self-identification number (**MID**) has to be programmed into the watch receiver RM2152.

Remove the back plate and cabinet, set switch **S2-4** on (please see chapter 6 component location main processor module). Turn on the RM2152 and wait until the display menu show the scan running menu.

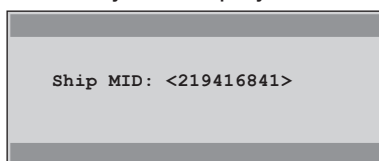
Activate **FUNC**: and the displaymenu change to.



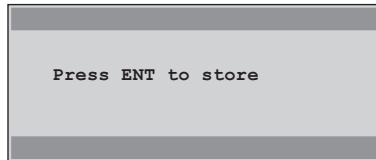
Chose the Options menu and activate the **NEXT** key, the displaymenu change to.



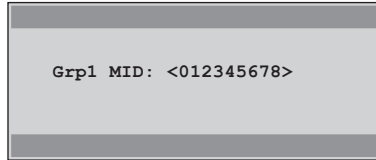
Activate the **NEXT** key, the displaymenu change to.



Key in the ships own MID number activate the **NEXT** key, the displaymenu change to.

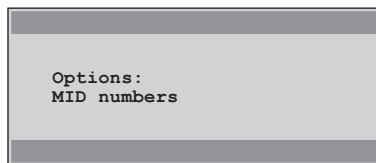


Activate **ENT** until the displaymenu change to.



The ships group number can be keyed in, activate the **NEXT** key the displaymenu change to a menu where the second group number can be keyed in.

The ship can have up to four group numbers and you can key this numbers into the next three menus, before the displaymenu again change to



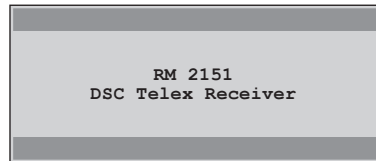
Turn the Watch receiver RM2152 off, change the switch **S2-4** to off and mount the cabinet and the backplate again.

**IT IS VERY IMPORTANT TO RESET THE SWITCH S2-4.**

## 2 SERVICE AND IDENTITY PROGRAMMING FOR RM2152 DSC/TELEX

### 2.1 IDENTITY PROGRAMMING of RM2152

Turn on the DSC/Radiotelex modem on and control that the display menu after the initializing menu show the following menu.



If you get the display menu indicating that the receiver is a DSC Watch receiver RM2152, you have to change the internal setting of the switch **S2-2**.

Remove the back plate and cabinet, set switch **S2-2** in off position (please see chapter 6 and 8-9). Turn on the DSC/Radiotelex modem RM2152 and check that the display menu now show the above menu. Mount the cabinet and the backplate again.

### 2.2 SP-BUS PROGRAMMING of RM2152

SPBUS programming using the Terminal mode on the message terminal.

To get into terminal mode activate

#### F3 - Options - Terminal Mode

Write **set -a** and activate the **Enter** key. The screen will show all the settings (please see page 17).

The showed settings include the settings of the connected radio modem RM2152. Find the parameter „SPADDRESS“, check whether this is set to the same as programmed into RE2100. If not, the value in „SPADDRESS“ is changed in the following way:

Write **set SPADDRESS X** and activate the **Enter** key, where X is the new value (2-6). The SPADDRESS shall in this case be set to 3.

Then check the parameter „SPBUS“, this must be set to „S“. In case the parameter has another value than „S“, this is changed in the following way:

Write **set SPBUS S** and activate the **Enter** key.

### 2.3 PROGRAMMING of SELF-IDENTIFICATION NUMBER

The Self-identification number (**MID**) as well as the telex numbers has to be programmed into the DSC/Radiotelex modem RM2152.

The programming of the DSC and telex number of the station using the terminal mode on the message terminal.

To get into the terminal mode.

#### F3 - Options - Terminal mode

Activate the **Enter** key a couple of times to make sure that the cursor > appear.

Write **st -operator** and activate the **Enter** key. A new cursor **th>** appear. The DSC and the Telex numbers can now be entered.

Nine digit DSC and Telex number.

Write: **set sel9 xxxxxxxx** activate **Enter**.

Wait until a new cursor „th>“ appears on the screen.

Nine digit Telex Fec group call number. This number is normally set to the same number as the nine digit DSC and Telex number.

Write: **set fec9 xxxxxxxx** activate **Enter**.

Five digit Telex number.

Write: **set sel4 yyyyy** activate **Enter**.

Five digit Telex Fec group call number. This number is normally set to the same number as the five digit Telex number.

Write: **set fec4 yyyyy** activate **Enter**.

The DSC group call numbers can be programmed in the same way.

Write: **set grp1 012345678** activate **Enter**.

The other 3 group call numbers (grp2, grp3, grp4) can be set with the same command.

When the Stations MID numbers has been set the menu st -operator can be left.

Write **exit** and activate the **Enter** key the cursor change to > and you are now in the normal operation mode.

## 2.4 PROGRAMMING of ANSWERBACK

Programming of the answerback of the station is done from the Message Terminal. The message terminal is still in terminal mode.

To programme the stations answerback write

Write **set answerback XX-XX-XX-XX-XX-XX-XX** ..... where XX is the ACIII-code for max. 20 characters in the answerback text line (please see chapter 7).

The stations answerback can be programmed as illustrated below.

The five digit telex number is : 12345

The Ships call sign : OXJZ X

1 2 3 4 5      O X J Z      X

**Set answerback 7E-0D-0A-31-32-33-34-35-7F-20-6F-78-6A-7A-20-7E-78-0A-0D**

## 2.5 GENERAL VIEW of SETTINGS for RADIOTELEX MODEM RM2152

To control that the setting of the radiotelex modem is done correct.

To get into terminal mode activate

### F3 - Options - Terminal Mode

Write **set -a** and activate the **Enter** key, the CRT show now the settings of the radiotelex modem.

Terminal			
ALARM	= 1	ALPHA	= 0
ANSWERBACK	= 7E-0D-0A-31-32-33-34-35-7F-20-6F-78-6A-7A-20-7E-36-0A-0D	ANGLE	= 3
ARQERROR	= 2	BAUDRATE	= 4800
CAPTURE	= 0	DELAY	= 3
DATABITS	= 8	DIVERSITY	= 2
DWELL	= 3000	ECHO	= 1
FEC4	= 07700	FEC9	= 219000015
ERROR	= 30	GRP1	= 000000000
FINITE_START	= 0	GRP2	= 0
GRP3	= 0	GRP4	= 0
HARDFLOW	= 1	LIGHT	= 3
LINEFEED	= 1	MODE	= 111
LOG	= 0	PARITY	= NO
POLL	= 1	POSITION	= 57N01,009E53
POSTKEY	= 3	POSTMUTE	= 3
PREKEY	= 1	QMIN	= 3
PRINTER	= LPT:	RXADDRESS	= 2
RESTART	= FINITE	SEL4	= 07700
RETRY	= 5	SEL9	= 219000015
RXFREQ	= 1700	SPADDRESS	= 2
SPBUS	= S	SUNSPOT	= 120
SEL9	= 219000015	TRACK	= 1
SOFTFLOW	= 0	TXADDRESS	= 3
STOPBITS	= 1	TXFREQ	= 1700
TIMEZONE	= -1		
TXENABLE	= 1		
>			

### 3 GOOD ADVICE AND HELP

#### 3.1 GENERAL INFORMATION

In brief the difference between RM2152 DSC Watchreceiver and RM2152 DSC/Telex, is that RM2152 DSC Watchreceiver only has one scanning programme where distress and calling frequencies are normally programmed.

#### **NO CONNECTION BETWEEN RADIOTELEX MODEM AND MESSAGE TERMINAL:**

The connection is an ordinary RS232 serial communication line.  
IF there is no communication between the two stations, the following can be tested.

On the message terminal activate the system menu by keying **F9 - Option - Serial**.  
The settings of the serial communication line in the message Terminal is opened.

Normal setting: Com1 - 4800 - N - 8 - 1.

On the radiotelex modem RM2152 the programming of the serial communication can be tested in the **FUNC.** menu.

#### **FUNC - OPTIONS**

With the up/down arrows find the menu **Terminal port settings** and check that.  
Baudrate:4800 / Parity:NON / Databits:8 / Stopbits:1 / Softflow:off / Hardflow:on.

Check whether the terminal cable is connected to the Com1 gate at the back of the message terminal.

#### 3.2 NO PRINTER RESPONSE

The printer can be installed on the radiotelex modem or on the message Terminal.  
Therefore is necessary to tell the system where the printer is placed and this is done in the radiotelex option menu on the message terminal.  
Normally the printer is installed on the message terminal.

#### **F3 - Option - Printer**

The printer setting menu is displayed highlight **Message Terminal** or **Modem**, all depending on where the printer is installed activate the enter key. The cursor >> in front of a word indicates that the word has been chosen.

In order to get all telexes sent and received printed out, **Save to printer** must be chosen.

#### **F3 - Directcall - Commands**

Highlight save to printer and activate the enter key. The cursor >> in front of „Save to printer“ indicates that save to printer is activated.

### 4 SOFTWARE AND PC BOARD SUMMARY

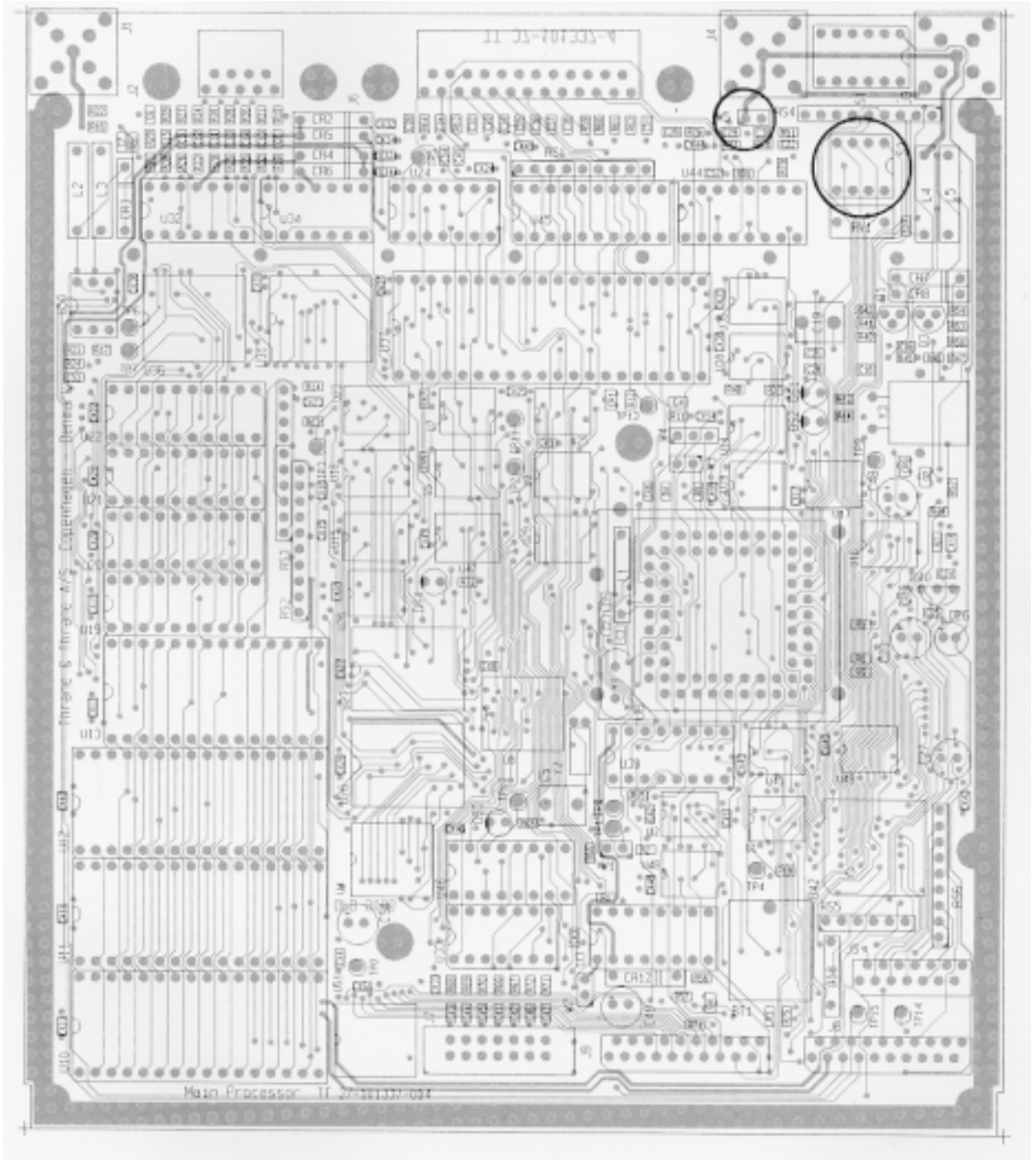
SOFTWARE AND PC BOARD SUMMARY FROM RADIOTELEX/DSC TO DUPLEX AND CW.

RE2100		UPDATE FROM EARLIER VERSION, KIT NO. 726655		T2130 - UPDATE FROM EARLIER VERSION, KIT NO. 726665		AT2110		T2131/T2135		C2140		RM2152		H2098A/B		C2149		R2120		
RECEIVER MODULE 625631	EXCITER MODULE 625634	MAIN CABLE 56.033	PROCESSOR MODULE 625635	SOFTWARE 726166	CONNECTION BOARD 625646	SOFTWARE 726103	TX-PROCESSOR 625643	REC. LABEL	SOFTWARE 727203	SOFTWARE 726545	SOFTWARE 737036	SOFTWARE 55.085	SOFTWARE 727497	SOFTWARE 728548	SOFTWARE 728548	SOFTWARE 728548	SOFTWARE 727497	SOFTWARE 728548	SOFTWARE 728548	
VERSION G&H OR HIGHER	VERSION A,B&C WITHOUT R10	WIRE NO. 1 BETWEEN RECEIVER AND EXCITER MODULES MUST BE CUT.	VERSION J,K,L&M OR HIGHER	1086I 1086L 1086N 1086O 1086P	VERSION G OR HIGHER	1083N 1083O	NO JUMPER	NO LABEL	1096 1096A 1096B 1096C 1096D 1096E 1096F 1096G 1096H	1090A 1090B 1090C	1.50	1.15	1100E 1100F 1100G 1100H 1100I							
				1086R			JUMPER IN PO2 POS. 2	REC. LABEL A OR HIGHER		1090D		1.17 1.18 1.19								1114
	VERSION E&F OR HIGHER			1086S 1086T		1083P 1083R 1083S 1083U 1083-2 1083-3 1083-4			1096I 1096O			1.22 1.30 1.31 1.32								1114A 1114B 1114C 1114D 1114E 1114F 1114G

IT IS ALWAYS RECOMMENDED TO UPDATE ALL SOFTWARE VERSIONS, WHEN INSTALLING ADDITIONAL EQUIPMENT.

37205 15.12.99

### 5 COMPONENT LOCATION MAIN PROCESSOR MODULE





## 6 ANSWERBACK CHARACTER SETTING

The character codes used when entering the answerback sequence are based on the ASCII-code and CCITT rec. F.130.

Each character is represented by a 2-digit/letter code as follows:

### Digits

Char	ASCII	Char	ASCII
0	30	5	35
1	31	6	36
2	32	7	37
3	33	8	38
4	34	9	39

### Letters

Char	ASCII	Char	ASCII
A	61	N	6E
B	62	O	6F
C	63	P	70
D	64	Q	71
E	65	R	72
F	66	S	73
G	67	T	74
H	68	U	75
I	69	V	76
J	6A	W	77
K	6B	X	78
L	6C	Y	79
M	6D	Z	7A

### Special characters

Char	ASCII
Carriage return	0D
Line feed	0A
Figure shift	7E
Letter shift	7F
Space	20

## 7 MAIN PROCESSOR MODULE VERSION 4 DIP SWITCHES

S1 VERSION 4

No	OFF	ON
1	Use of SP-BUS	Use of T-BUS
2	Use of SP-BUS	Use of T-BUS
3	Not used	
4	Dont't initialize EEPROM	Initialize EEPROM
5	Scan all distress frequencies when in Watch Receiver mode (RM2150)	Scan only 2187.5 kHz when in Watch Receiver mode. (RM2150)
6	Not used	

S2

No	OFF	ON
1	Only for factory test	Normaly used
2	DSC/Radio Telex modem (RM2151)	DSC Watch Receiver (RM2150)
3	Only for factory test	Normaly used
4	Function mode off	Function mode on

## 8 MAIN PROCESSOR MODULE VERSION 3 DIP SWITCHES

S1 VERSION 3

No	OFF	ON
1	Not used	
2	Dont't initialize EEPROM	Initialize EEPROM
3	Scan all distress frequencies when in Watch Receiver mode (RM2150)	Scan only 2187.5 kHz when in Watch Receiver mode. (RM2150)
4	Not used	

S2

No	OFF	ON
1	Only for factory test	Normaly used
2	DSC/Radio Telex modem (RM2151)	DSC Watch Receiver (RM2150)
3	Only for factory test	Normaly used
4	Function mode off	Function mode on