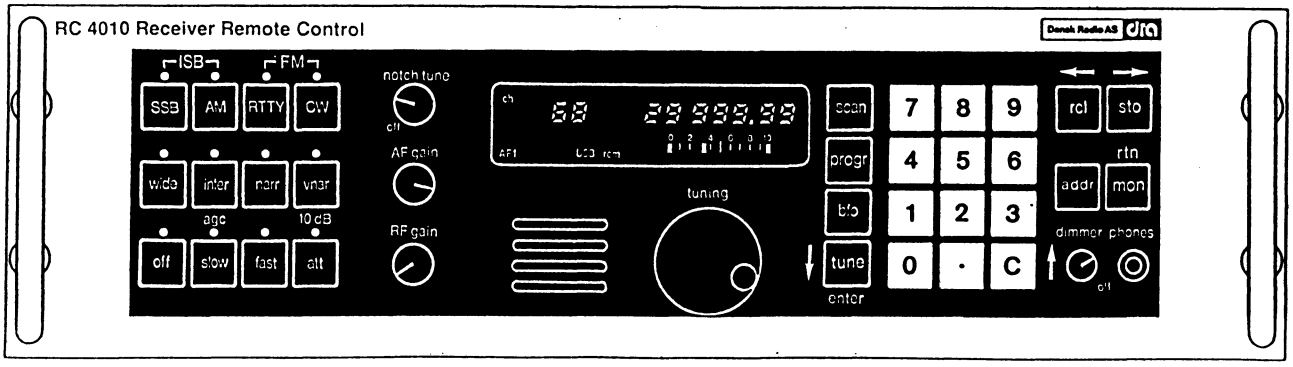
OPERATING AND SERVICE MANUAL

RC4010

Receiver Remote Control



WARNING

To prevent potential fire or shock hazard, do not expose receiver to rain or moisture.

DOCUMENT NO. 499145

ISSUE 89/11

SAFETY SUMMARY

The following general safety precautions must be observed during all phases of operation, service, and repair of this equipment. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the equipment. Dansk Radio AS assumes no liability for the customer's failure to comply with these requirements.

GROUND THE EQUIPMENT

To minimize shock hazard, the equipment chassis and cabinet must be connected to an electrical ground. The equipment is equipped with a three-conductor ac power socket. The power cable must either be plugged into an approved three-contact electrical outlet or used with a three-contact to two-contact adapter with the grounding wire (green) firmly connected to an electrical ground (safety ground) at the power outlet.

DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE

Do not operate the equipment in the presence of flammable gases or fumes. Operation of any electrical equipment in such an environment constitutes a definite safety hazard.

KEEP AWAY FROM LIVE CIRCUITS

Operating personnel must not remove equipment covers. Component replacement and internal adjustments must be made by qualified maintenance personnel. Do not replace components with power cable connected. Under certain conditions, dangerous voltages may exist even with the power cable removed. To avoid injuries, always disconnect power and discharge circuits before touching them.

SAFETY SUMMARY (continued)

DO NOT SERVICE OR ADJUST ALONE

Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.

DO NOT SUBSTITUTE PARTS OR MODIFY EQUIPMENT

Because of the danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modification to the equipment.

DANGEROUS PROCEDURE WARNINGS

Warnings, such as the example below, precede potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed.

WARNING

Dangerous voltages, capable of causing death, are present in this equipment. Use extreme caution when handling, testing, and adjusting.

TABLE OF CONTENTS

SECTION 1
GENERAL INFORMATION

1.1 Introduction

This Operating and Service Manual contains information required to install, operate, test, adjust and service the RC4010.

Specifications are listed in paragraph 1.7.
These specifications are the performance standards or limits against which the RC4010 is tested.

Due to the experience obtained from the production and operation of the equipment, minor differences between the RC4010 and the manual can occur.

Wherever possible such differences are covered in Section 7 "MANUAL CHANGES".

The electrical modules of the RC4010 are listed in Section 6.

1.2 Safety Considerations

This manual contains information, cautions and warnings which must be followed to ensure safe operation and to maintain the RC4010 in a safe condition.

1.3 Description

The RC4010 is a remote control unit for the RX4010 receiver allowing full remote control of all functions of the receiver. The remote control is carried out by means of a serial data bus. Two systems are avaiable one of which must be specified:

1) Serial Remote Control Module DRA part no. 471666. 600/1200 bps, conforms to V24/RS232C and V23, incl. AUX port for remote control of external equipment via the serial remote control system of the RX4010.

2) Serial Remote Control Module DRA part no. 490598. 75 to 9600 bps conforms to RS232C, compatible with RS422 and RS485.

1.4 Options

The following extends the usability of the RC4010.

1.4.1 8-line monitor

DRA part no. 471941. Up to four 8-line monitor modules can be installed, enabling monitoring of AF signals from up to 16 RX4010. (4 RX4010 pr. 8-line monitor)

1.4.2 Power Supply

110/220V AC/24VDC alternative power supply to the standard mains only version DRA part no.448532.

1.5 Accessories Supplied.

The following accessories are supplied with the RC4010.

One Operating and Service Manual, DRA part no. 499145
One Power Cord, DRA part no. 490199.

1.6 Accessories Available

The following items are available for use with the RC4010.

RC4010 cabinet, DRA part no. 475246

Rack Slides Kit, Slides with lock. DRA part no. 458872

Rack Slides Kit, Slides with lock and tilt. DRA part no. 496146

Connector Kit for Remote Control Module, DRA part no. 485292

Standard Spare Parts Kit, DRA part no. 475076

Depot Spares Kit. Consult factory.

Special Tools Kit, DRA part no. 475033

1.7 Specifications

1. Modem/Modem Interface Board A9 Assy 471666

Internal Modem	:	V23 CCITT compatible modem Input output impedance 600 ohm balanced Strappable level to -10, -20 or -30 dB Baudrate 1200/600 bps. Operates on either 2 wire or 4 wire leased telephone lines
Modem Interface:		V24 modem interface for interfacing an external modem. 1200/600 bps.
AUX-port	:	8/4 bit input/output AUX-port for external equipment, open collector output max. 15V 100mA.

2. Remote Interface A9 Assy 490598

Baudrate	:	75/150/300/600/1200/2400/4800/9600 bps.
Interface Standards:		1) CCITT V24/RS232C 2) RS422 compatible 3) RS485 compatible
Line Output	:	Balanced 600 ohm/0 dBm adjustable
Connection	:	Sub-D female, 25 poles.

MONITOR OUTPUT

Speaker	:	4W/4 ohm
Phones	:	10 mW/500 ohm

MEMORY

Built-in Lithium battery for appr. 2 years memory back-up

INPUT POWER

110-125 V, 220-250 V, +/-10%, 50-60 Hz, 20-30 VA (dependable of options)

Optional Power Supply: 110/220 V, +/-10%, 50-60 Hz, 20-30 VA
24 Vdc +30/-10%, 0.8-1.2 A (dependable of options)

OPERATING ENVIRONMENT

Temperature	:	Full performance range 0°C to 50°C Operating range -25°C to 55°C
Humidity	:	To 95% relative humidity at 40°C
Vibration	:	MIL-STD-810D-514.3, Category 8, 514.3-1 (10-150 Hz),514.3-34, Category 9.
Shock	:	MIL-STD-810D-516.3, Procedure II (30 g for 20 msec.).

WEIGHT

12.3 kg incl. cabinet excl. options.
Add 0.5 kg when Assy 471666 is installed.
Add 0.25 kg when Assy 490598 is installed.
Add 0.35 kg for each Assy 471941 installed.

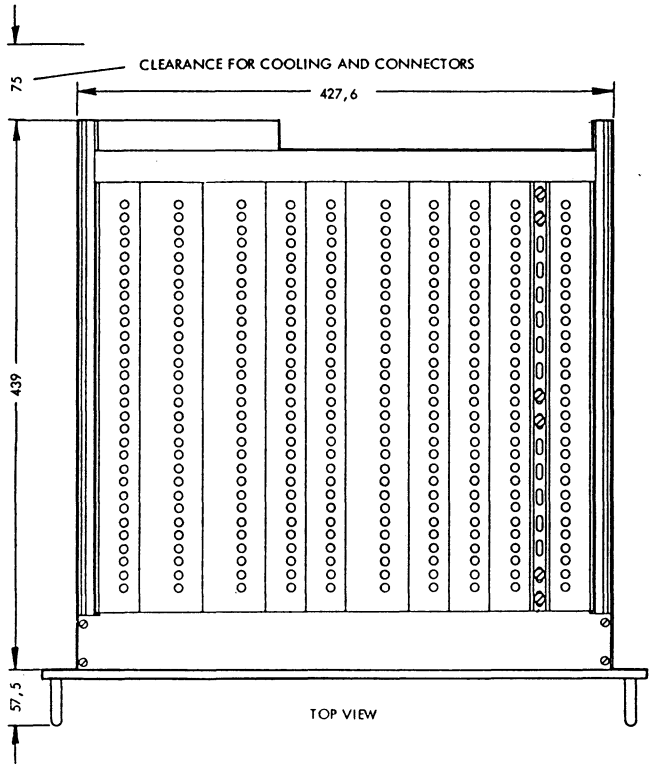
DIMENSIONS

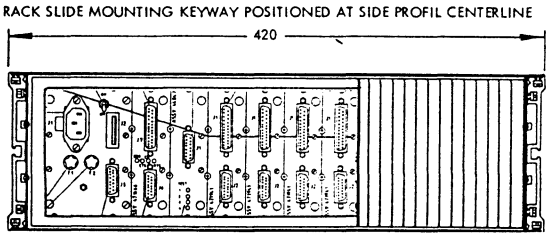
Height:	132.2 mm	INCL. front panel
Width:	482.6 mm	excl. front panel
	427.6 mm	incl. front panel
Depth:	496.5 mm	incl. front panel
	439.0 mm	excl. front panel

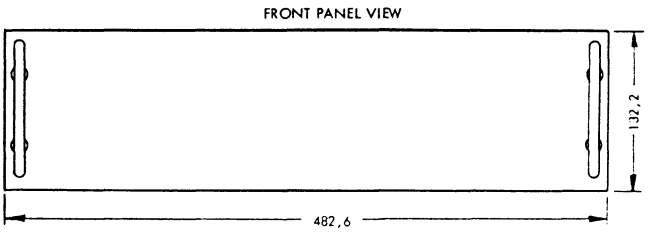
Rear panel clearance for cooling and connectors: min. 75 mm.

RC4010 Cabinet (optional)

Height:	159 mm
Width:	509 mm
Depth:	463 mm







1.8 Operational Features

DIMMER CONTROL
Continuously variable

AUTO RESTART
Readdressing of last addressed receiver during power failure

Automatic remote transmission error log.

1.9 User Programmable Features

The RC4010 is equipped with extended user programmable features such as:
- a 24 hours' clock with battery back-up.
- Blank display on addressed receiver.
- System scanning.

These information are stored in CMOS memory that maintain its content even though the receiver is turned off or disconnected from power sources.

When the RC4010 is turned on, it will readdress the last addressed receiver before the power was turned off.

1.10 Specification of Options

1.10.1 8-line monitor A5 Assy 471941

Technical specifications

Input	:	8 lines (4 RX4010 can be connected)
Input impedance	:	High impedans or 600Ω selectable.
Input sensitivity	:	0dB, 6dB, 10dB or 12dB can be selected. (gain from input to output)
Connection	:	one sub-D female, 25 poles one sub-D female, 15 poles

SECTION 2
INSTALLATION

2.1 Introduction

This section of the manual provides installation instructions for the RC4010 . It also includes information about initial inspection and damage claims, preparation for use and repacking for shipment information.

2.2 Initial Inspection

WARNING

To avoid hazardous electrical shock, do not perform electrical tests when there are signs of shipping damage to any portion of the front or rear panel or outer covers. Read the safety summary at the front of this manual before installing or operating the RC4010.

Inspect the shipping container for damage. If the shipping container or cushioning material is damaged, it should be kept until the contents of the shipment have been checked for completeness and the RC4010 has been checked mechanically and electrically. If the contents are incomplete, if there is a mechanical damage or defect, or if the RC4010 does not pass the performance tests, notify the nearest Dansk Radio agent. If the shipping container is damaged, or if the cushioning material shows signs of stress, notify the carrier as well as the Dansk Radio agent.

A full report of the damage should also be forwarded to Dansk Radio.
Include the following:

- Order number
- Model and serial number
- Name of transportation agency

2.3 Storage

The RC4010 may be stored or shipped in temperatures within the limits -40°C to +75°C. It is advisable to protect the RC4010 from extreme temperature variation which can cause excessive condensation.

2.4 Repacking for shipment

The shipping container for the RC4010 has been carefully designed to protect the RC4010 and its accessories during shipment. This container and its associated packing material should be used when repacking for shipment. If shipping to Dansk Radio for service is planned, attach a tag indicating the type of service required, return address, model number and full serial number. Mark the container FRAGILE to ensure careful handling.

If the original shipping container is not available, the following general instructions should be used for repacking with commercially available materials:

- Wrap the RC4010 in heavy paper or plastic. If shipping to Dansk Radio for service, attach a tag indicating the type of service required, return address, model number and full serial number.

- Use a strong shipping container, e.g. a double walled carton of 160 kg. test material.

- Protect the control panel with cardboard and insert a 7 to 10 cm layer of shock absorbing material between all surfaces of the equipment and the sides of the container.

- Seal the shipping container securely.

- Mark the shipping container FRAGILE to ensure careful handling.

2.5 Mounting information

The RC4010 may be conveniently mounted in a standard 19 inch rack using a pair of rack slides or chassis angles appropriate for the rack system.

The RC4010 in the rack mounted configuration requires a standard panel space 5.25 inches high.

The RC4010 may also be mounted in a cabinet for bench operation, part no. 475246. The cabinet is designed to be mounted on a table or on a shelf, fastened to the support by means of four bolts.

When operating the RC4010, provide at least 75 mm of clearance at the rear and at least 7 mm on all sides of the RC4010. Failure to allow adequate air circulation will result in excessive internal temperature, reducing RC4010 reliability.

2.6 Power Requirements

110/220V, +/-10%, 50-60 Hz. Optional: 24VDC, +30/-10%

CAUTION

The RC4010 is normally set at the factory for 220 Vac.

The selection of 110 volt nominal mains voltage is made by changing connections on A10A2 on the power supply assembly A10. To change the mains voltage setting, proceed as follows: (refer to Fig. 2.1 and Fig. 2.20).

a. Disconnect the input power cord from the RC4010.

b. Disconnect the regulation transistor cable from A10J2 and remove the power supply heat sink panel by removing the four retaining screws at the rear end of the RC4010 side profiles.

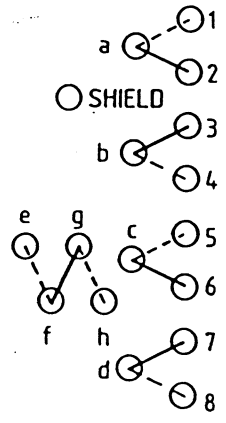
c. Remove the eight screws positioned at the edge of the power supply rear panel A10 and withdraw the power supply assembly.

d. Change connections on A10A2 as appropriate in accordance with Figure 2.1.1 for the AC only version and Figure 2.1.2 for the AC/DC version.

e. Reposition the power supply assembly in the RC4010.

f. Reposition the power supply heat sink panel and connect the regulation transistor cable to A10J2.

g. Connect the input power cord to the RC4010.



Mains strapping 220V

Voltage	Straps
110V	e-f, g-h, a-2, b-3, c-6, d-7
115V	e-f, g-h, a-2, b-4, c-6, d-8
120V	e-f, g-h, a-1, b-3, c-5, d-7
125V	e-f, g-h, a-1, b-4, c-5, d-8
220V	f-g, a-2, b-3, c-6, d-7
225V	f-g, a-2, b-4, c-6, d-7
230V	f-g, a-2, b-4, c-6, d-8
235V	f-g, a-2, b-4, c-5, d-7
240V	f-g, a-1, b-3, c-5, d-7
245V	f-g, a-1, b-4, c-5, d-7
250V	f-g, a-1, b-4, c-5, d-8

Figure 2.1.1 AC version

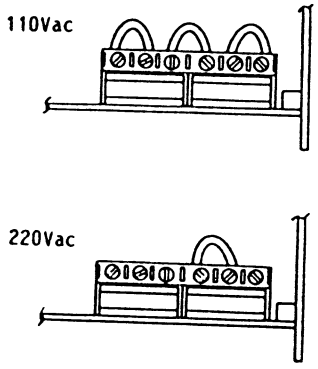


Figure 2.1.2 AC/DC version

2.7 Fuses

Table 2.1 Fuse Ratings

Fuse		Fuse Rating AC version	AC/DC version
Rear Panel	F1	1A T (220 V) 2A T (110 V)	1A T (220 V) 2A T (110 V)
" "	F2	1A T (220 V) 2A T (110 V)	6.3A T (24 V)
On A10A2	F3	6.3A T	
" "	F4	6.3A T	
" "	F5	6.3A T	

2.8 Power Cable

In accordance with international safety standards this RC4010 is equipped with a three terminal power connector. When connected with an appropriate power cable, the RC4010 cabinet should be grounded via the power connector center tap.
If the power cable is terminated with a mains plug, this should only be inserted in a socket outlet provided with a protective earth contact. The protective action must not be negated by the use of a power cable without a protective conductor (grounding).

2.9 Inputs/Outputs

2.9.1 Audio Input/Output A10J3

The audio input/output socket (refer to Figure 2.2.1 and 2.2.2) provides loudspeaker output and sidetone input (later used during simplex A1 keying).

2.9.1.1 Assembly 471720

Sub-D, Female, 15 poles, Screewing lock

The audio input/output socket connections are as follows:

pin		
3	Sidetone input	100-500 mV/600 ohms
10	Sidetone GND	
6	Line output	
7	Line output centertab	600 ohms Balanced
8	Line output	
2	Line input	600 ohms Balanced
9	Line input	
11	Line GND	
14	Speaker output	4 W/4 ohms
13	Speaker GND	

Figure 2.2.1 Audio Input/Output Plug. Assembly 471720.

Note that the outputs will follow the monitored sideband in ISB modes. (As selected by the "mon" pushbutton on the front panel).

The appropriate cable connector may be ordered from Dansk Radio. Part no. 495980.

2.9.1.2 Assembly 448532

Sub-D, Female, 9 poles, Screewing lock.

The audio input/output socket connections are as followa:

pin		
1	Sidetone input	100-500 mV/600 ohms
2	Sidetone GND	
4,7	Speaker output	4 W/4 ohms
5,6	Speaker GND	

Figure 2.2.2 Audio Input/Output Plug. Assembly 448532.

The appropriate cable connector may be ordered from Dansk Radio. Part no. 496006.

2.9.2 Remote Control RS232/422/485 A9J7

Sub-D, Female, 25 poles, Screewing lock.

The connector provides data signals, mute input (RS232C voltage level, positive logic) and a 0 dBm balanced line output adjustable by means of R12 located on the PCB.

The connections are as follows:

pin	circuit	description
1	GND	Protective GND
2	TXD	Transmitted data RS232
3	RXD	Received data RS232
4	RTS	Request to send RS232
5	CTS	Clear to send RS232
6	DSR	Data set ready RS232
7	GND	Signal GND
9	Line out	Balanced 600 ohm
10	Line out	"
11	MUTE	Receiver muting
18	TXD/A	Transmitted data RS422
19	TXD/B	Transmitted data RS422
23	RXD/TXD A	Received data RS422/Data RS485
24	RXD/TXD B	Received data RS422/Data RS485

Figure 2.7 Remote Control RS232/422/485

The appropriate cable connector may be ordered from Dansk Radio Part no. 496014.

2.9.3 Modem/Modem Interface A9J7

Sub-D, Female, 25 poles, Screewing lock.

The connector provides CCITT V24/RS232 modem interface and CCITT V23 telephone line signals.

The connections are as follows:

pin	circuit	description
9	Line A	Telephone line 600 ohms Bal.
10	Line A	"
11	Line B	Telephone line 600 ohms Bal.
25	Line B	"
2	TXD	Transmitted data
3	RXD	Received data
4	RTS	Request to send
5	CTS	Clear to send
6	DSR	Data set ready
7	GND	GND
1	GND	GND
8	CD	Carrier detect
20	DTR	Data terminal ready

Figure 2.8 Modem/Modem Interface.

The appropriate cable connector may be ordered from Dansk Radio Part no. 496014.

2.9.4 Auxiliary Input/Output A9J6 (Optional).

Sub-D, Female, 15 poles, Screewing lock.

The Connector provides a 4-bit Input port and an 8-bit Output port.

The Outputs are open collectors max. 15V/50 mA. The Inputs are RS232C level. The $\overline{\text{Enable}}$ is TTL. Input data transfer takes place only when $\overline{\text{Enable}}$ is low.

The connections are as follows:

pin	
9	+15 V
14	$\overline{\text{Enable}}$
1	Input 0
2	Input 1
3	Input 2
4	Input 3
5	Input 4
6	Input 5
7	Input 6
8	Input 7
10	Output 3
11	Output 2
12	Output 1
13	Output 0
15	GND

Figure 2.9 Auxiliary Input/Output.

The appropriate cable connector may be ordered from Dansk Radio Part no. 495980.

2.9.5 Control Input/Output, A8J1

Not used.

2.9.6 Open Collector Outputs, A8J2

Not used.

2.10 Strapping

In order to get a proper function of the RC4010, it is nescessary that some of the assemblies are strapped correctly. Normally the RC4010 is delivered from the factory with the correct strapping. If a module is exchanged, the strapping should be checked.

Strapping of the A8 Assembly are covered in the circuit description of the assemblies. See diagram section.
Strapping of the Power Supply is covered in the beginning of this section. Strapping of other assemblies that above mentioned are covered in Section 4 and Section 5.

2.11 Installation Check-out

When the installation is complete, refer to section 3 (OPERATION) and fully check the operation of the RC4010.

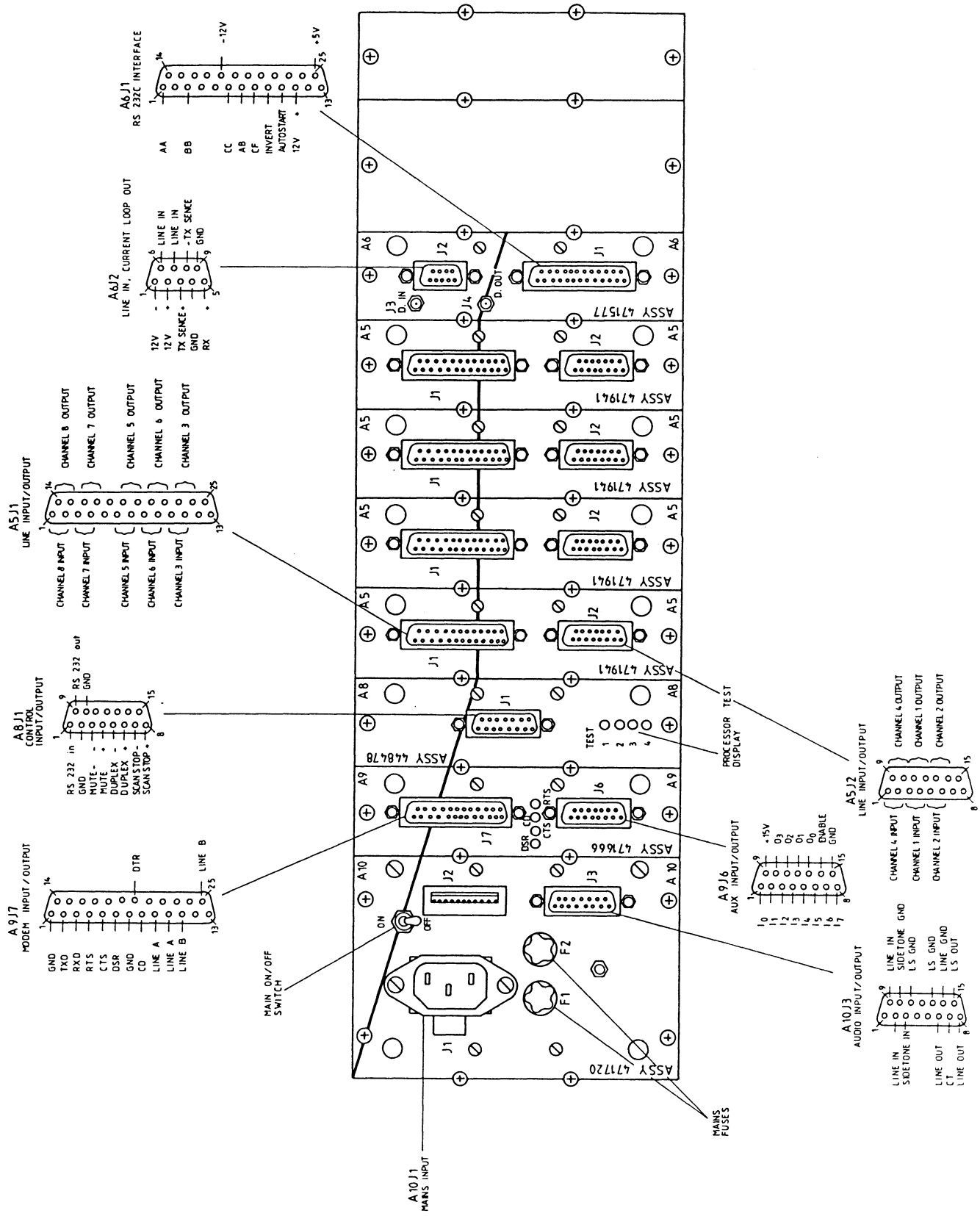


Figure 2.20 Rear Panel View.

SECTION 3
OPERATION

3.1 Introduction

This section of the manual contains instructions for proper operation of the RC4010

3.2 Introduction to remote control

For the RX4010 to be remote-controlled, a remote module A9 has to be installed in slot 9. If the remote control system includes more than one RX4010, an optionary 8-line monitor is available. The 8-line monitor module has 8 AF-inputs and one output for the RC4010, making it possible to monitor an addressed RX4010. A RC4010 can be adapted with max. 4 pcs. 8-line monitors to monitor up to 16 RX4010 receivers. When remote controlling a RX4010, the RC4010 should be operated as though the RX4010 was operated locally. See operating manual for the RX4010.

3.3 Front Panel Features

Figure 3.1 identifies and describes the functions of the front panel controls, indicators and connectors.

3.4 Initial Conditions

After the power has been switched on, the RC4010 will address the same unit as before the power was switched off. If the unit don't answer the display shows e.g. "no rEc 2". If another RC4010 has the command of the line, the display shows "OFF buSy".

NOTE

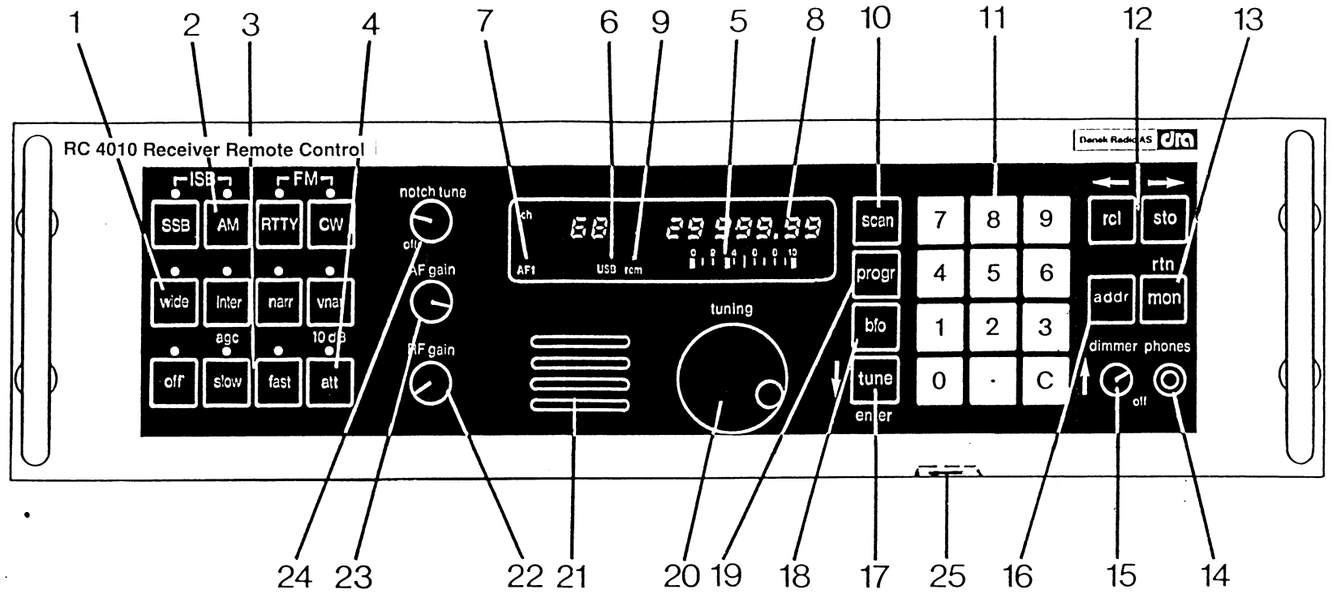
1. If the display reads "Err. bAttEry" the battery backup is faulty and all data is cleared.

2. If the display reads "no Axx" (xx is a twodigit number) the Axx module is not installed or a failure is found on the module.

3.5 Self Test

The self test operations are initiated by utilizing a program function. The self test is then carried out by the built-in microprocessor by means of a ROM-based diagnostic program package. For futher information see section 8.

Figure 3.1
Front Panel Features



1 BANDWIDTH group. These keys select the IF-bandwidth when the receiver is operated in AM- , RTTY or CW mode.

2 MODE group. These are the primary mode selection keys for reception. Pressing any mode key automatically selects default values for the secondary keys.

3 AGC control group. These keys select the proper AGC time constants. These constants are also affected by the MODE keys. In the "OFF" mode, RF-gain is manually controlled.

4 ATTENUATOR key. Inserts a 10dB attenuator in the receiver front end. Used to further improve the receiver's large-signal response.

5 S-METER. Analogue indication of the received signal strength.

6 LSB/USB indicator.

7 MONITOR indicator.

8 ALPHANUMERIC display. Displays address, the receiving frequency, the BFO-frequency, error codes and failure modes.

9 REMOTE annunciator. Indicates that the receiver is remotely controlled by a master. Flashing indicate that RC 4010 is in local programming mode.

10 SCAN key. Selects the automatic and the manual scanning mode.

11 ENTRY group. This group includes the numeric data keys an the clear key.

12 REGISTER group. These keys are used for storing and recalling of user-programmed receiver settings. The recall key is also used for selection of international communication channels.

13 MONITOR connect the speaker to LSB or USB in ISB mode.

14 PHONES output. Connection for head phones. Disconnects the internal speaker.

15 DIMMER/POWER control. Used for control of the light intensity in the front panel indicators.

16 addr key. Used to addressing a receiver

17 TUNE key. Enables/disables free tuning by the control knob.

18 BFO key. Enables/disables the BFO control mode.

19 PROGRAM key. Key for entering the program mode.

20 TUNING control. Used for free-tuning of the receiving frequency and the BFO frequency.

21 LOUDSPEAKER

22 AF-GAIN/SQUELCH control. Used during AGC " off" manually to adjust the intermediate frequency gain.

23 AF-GAIN control. Manual adjustment of the audio frequency gain.

24 NOTCH-TUNE control. Manual adjustment of an audio frequency notch filter, tunable in the range 300 Hz to 3400 Hz. Used to attenuate undesired interfering signals in the audio output.

25 LOUDSPEAKER ON/OFF switch mounted on bottom of frontpanel.

3.6 Addressing

When control of a RX4010 is wanted, the RX4010 has to be addressed.
By pressing (addr) the display shows e.g. "Adr. rEc. 2" where 'rec. 2' is the last addressed RX4010. You can now:

- Select another type of unit with "back arrow" or "forward arrow" keys. The display will then change between: "SE" (SE4010), "rEc." (RX4010), "tc" (TC4010), "rc" (RC4010), "Edp".

- Select another address with the numerics. The address has to be in the interval 1 - 31.

- execute the addressing of the unit shown by pressing enter The last adressed unit will be disaddressed and the new one addressed.

- Leave the mode without addressing by pressing (rtn) .

- Disaddress by pressing (C) . The display will show "dis rECyy", where 'rECyy' is the unit which will be disaddressed if the (enter) key is pressed.

For disaddressing of master RC4010 see paragraph 3.9.

3.7 Local mode

Local mode is selected by pushing (addr) and is indicated by a flashing "rem" annunciator. To return to remote mode press (rtn)
In local mode the following operations are possible:

3.7.1 Clear all

WARNING

This rutine erases all data stored in the programmable memory.
If the rutine is used in remote mode, all data stored in the programmable memory of the addressed RX4010 will be erased.

To clear all user programmable memories:

- press (sto) and agc(off) at the same time.

- the display will show "CLr ALL."

If the (sto) key is pressed within 2.5 sec. the command will be executed.

If no key is pressed within 2.5 sec. or if other key but (sto) is pressed, the program function will be left, and the RC4010 returns to local mode.

3.7.2 Introduction to the program function

Selecting the program function.

NOTE: Paragraph 3.7.2 describes program functions of the RC4010 when operated in local mode. For program functions useable in remote mode, please refer to the operating manual of the RX4010.

The program function is selected by pressing the (PROGR) key followed by the program number. The program number is accepted by pressing the (enter) key.

A main menu for the selected program is displayed. By using the horizontal arrow keys, sub menus will be displayed (if any).

A menu (main or sub) is accepted by pressing (enter)
Now the display is scrolled through messages using the vertical arrow buttons. If sub messages excist to a message, these are recalled by the horizontal arrow buttons.

The last messages is followed by a return to the former setting of RC4010 when the downwards arrow button is pressed.

When in a program function the (rtn) key may be used to return to the address mode.

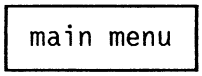
Selection of a program function does not effect the remote communication of the RC4010.

Selecting a local program causes the "rem" annunciator flashing.

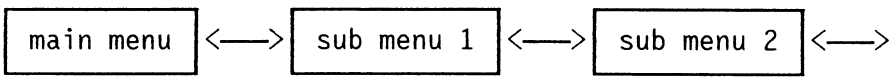
The operation of the programs can be illustrated in this way:

1) Select the program.

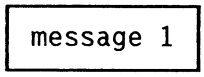
2) The main menu will be displayed.



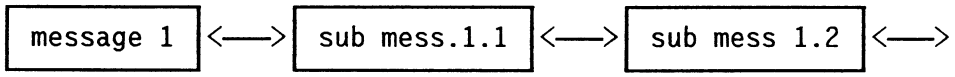
3) The menus are scrolled by (<--) and (-->) keys.



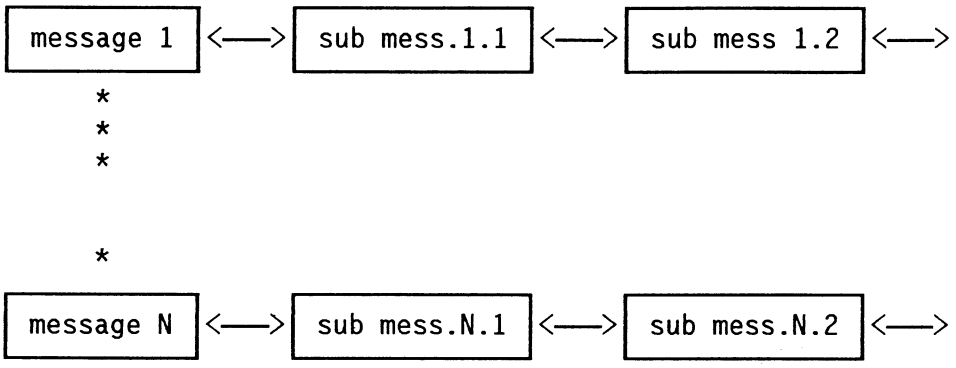
4) The first message is displayed when a menu is selected by pressing (enter) while the menu is shown.



5) Sub messages may be scrolled using (<--) and (-->) keys.



6) Messages are scrolled using the down arrow and the up arrow keys



7) Pressing the down-arrow keys after the last message returns the RC4010 to the former setting.

The RC4010 has several programs:

Program 1: 24 hours clock
Program 15: System scan programming
Program 16: System scan program start
Program 20: Baudrate selection
Program 21: Blank display setting
Program 41: Automatic Remote Transmission Error Log (ARTEL)
Program 42: Acumulated on-time.
Program 49: Self test (see section 8)

3.7.2.1 Clock Viewing and Setting

Program 1.

When program 1 is selected "CLO. rcl." will appear in the display. By using "forward arrow" key the display is changed to "CLO. Sto.".
"CLO. rcl." is for Clock Viewing and "CLO. Sto." is for Clock Setting. Scrolling between the two displays is accompliched by using "forward arrow" key and "back arrow" key.

The wanted menu is selected by the (enter) key.
Pressing the "up-arrow" key after a menu has been selected, returns display to the menu.
After selection of menu, date and time are scrolled using "up arrow" and "down arrow" keys.

In "clock store" mode a flashing digit indicates the digit which might be changed entering a new digit by the numeric keyboard.
The "forward arrow" and the "back arrow" keys are used to select the digit which is going to be changed. The date is changed first and accepted by the enter key. Then the time is displayed and changings accepted by the enter key.

Example, Clock Viewing:

keystrokes	display		
	Adr.	rEc. 10	
(progr)	PrG	no.	
(1)	PrG	no. 1	
(enter)	CLO.	rcl.	
(enter)	dAt.	91-10.12	(oct. 12. 1991)
(enter)	ti.	16-44.48	(16h 44min 48sec)
(enter)	Adr.	rEc. 10	

Example, Clock Setting:
Change date to jan. 14. 1990 and the time to 16.54.00.
(an underline denotes flashing digit).

keystrokes	display	
	Adr.	rEc. 10
(progr)	PrG	no.
(1)	PrG	no. 1
(enter)	CLO.	rcl.
(-->)	CLO.	Sto.
(enter)	dAt.	90-10.12
(-->)	dAt.	90-10.12
(-->)	dAt.	90-10.12
(0)	dAt.	90-00.12
(1)	dAt.	90-01.12
(-->)	dAt.	90-01.12
(4)	dAt.	90-01.14

enter	ti.	16-44.48
-->	ti.	16-44.48
-->	ti.	16-44.48
5	ti.	16-54.48
-->	ti.	16-54.48
0	ti.	16-54.08
0	ti.	16-54.08
enter	Adr.	rEc. 10

3.7.2.2 System scan programming
program 15

By remote systems with more than one receiver remotely controlled from one RC4010, program 15 enables scanning of the receivers in order to get status information of each receiver in a quasi continous way.

By selecting program 15 the display shows "Adr. rEc. ". Now each of the addresses of the RX4010 which wants to be scanned is keyed-in followed by enter . When all addresses are entered press enter again and the display will show "dll. ti.= ". Key-in the dwell time between 3 and 99 sec. and press enter to finish the program. Note: The dwell time includes 2 sec. displaying of the address.

After the program is entered it can be revised by selecting program 15 again and scroll the program by the "up arrow" and "down arrow" buttons. A RX4010 address is changed by entering a new address. To delete a RX4010 address press addr 0 and enter .

Example 1: Scan receivers with addresses 1, 3, 5, 2 and with dwell time = 10 sec.

keystrokes	display	comments
	Adr. rEc. 10	
progr	prG. no.	
1	prG. no. 1	
5	prG. no. 15	select program 15
enter	Adr. rEc.	
1	Adr. rEc. 1	select receiver 1
enter	Adr. rEc.	
3	Adr. rEc. 3	select receiver 3
enter	Adr. rEc.	
5	Adr. rEc. 5	select receiver 5
enter	Adr. rEc.	
2	Adr. rEc. 2	select receiver 2
enter	Adr. rEc.	
enter	dll. ti.=	
1	dll. ti.= 1	
0	dll. ti.= 10	dwell time = 10
enter	Adr. rEc. 10	

Example 2: Change program to receiver addresses 1, 5, 7, 11 with dwell time = 5 sec.

keystroke	display	comments
	Adr. rEc. 10	
progr	prG. no.	
1	prG. no. 1	
5	prG. no. 15	select program 15
enter	Adr. rEc. 1	
enter	Adr. rEc. 3	
0	Adr. rEc. 0	delete receiver 3
enter	Adr. rEc. 5	
enter	Adr. rEc. 2	change receiver 2
7	Adr. rEc. 7	to receiver 7
enter	Adr. rEc.	
1	Adr. rEc. 1	
1	Adr. rEc. 11	select receiver 11
enter	Adr. rEc.	
enter	dll. ti.= 10	change time = 10
5	dll. ti.= 5	to time = 5
enter	Adr. rEc. 10	

3.7.2.3 Start system scaning
Program 16

To start system scanning select program 16 and press enter The RC4010 will then start the scanning sequence defined by program 15. The address of the first RX4010 will be shown for 2 sec. followed by the set-up, then the address af the second RX4010 and so on. When the set-up of the last receiver in the sequence has been shown, it will start all over again. The rtn key stops the scanning and returns the RC4010 to addressing mode.

Error message:

Err. no proG.	No program is entered.
OFF buSy	This RC4010 has not the command over the line.

Example:

keystrokes	display	comments
	Adr. rEc. 10	
progr	prG. no	
1	prG. no 1	
6	prG. no 16	select program 16
enter	Scn. StArt	start scanning
enter	Adr. rEc. 1	displayed 2 sec.
	1111.11	displayed 3 sec.
	Adr. rEc. 5	displayed 2 sec.
	5555.55	displayed 3 sec.
	Adr. rEc. 7	displayed 2 sec.

```
        7777.77     displayed 3 sec.
Adr.  rEc.  11      displayed 2 sec.
       11000.00     displayed 3 sec.
Adr.  rEc.   1      displayed 2 sec.
          1111.11     displayed 3 sec.
          *
          *
          *
```

3.7.2.4 Baudrate setting

Program 20

Before using the RC4010, the baudrate must be set. When program 20 is selected the last entered baudrate e.g. "bAu 75" will appear on the display. By using "back arrow" or "forward arrow" keys the baudrate is changed. Baudrate is accepted by (enter) key.

Note: The baudrate selected must equals the baudrate strapped on the A9 module.

Example:

keystrokes	display	comments
	Adr. rEc. 10	
(progr)	prG. no	
(2)	prG. no 2	
(0)	prG. no 20	select program 20
(enter)	bAu 75	
(-->)	bAu 150	
(-->)	bAu 300	
(-->)	bAu 600	select 600 bit/sec.
(enter)	Adr. rEc. 10	

3.7.2.5 Blank display setting

Program 21

Blanking of the display of the addressed RX4010 can be carried out by program 21. "SEt. diSP" will appear on the display when the program is selected. "Back arrow" or "forward arrow" keys change the display to "SEt no diSP." Press enter key to accept. The following addressed receivers will blank the display except the "rem" annunciator. To switch on the display, address the receiver with program 21. Set to "SEt diSP." or switch the receiver off and on.

Example:

keystrokes	display	comments
	Adr. rEc. 10	
progr	prG. no	
2	prG. no 2	
1	prG. no 21	select program 21
enter	SEt diSP.	
-->	SEt no diSP.	blank display select
enter	Adr. rEc. 10	

3.7.2.6 ARTEL Automatic Remote Transmission Error Log
Program 41

By recalling program 41 information about remote transmission since the RC4010 has been switched on will be displayed.
The maximum number which can be displayed is 65535. In cases where the number exceeds 65535, the counter(s) are reset and the counting proceeds from 0.

When program 41 is selected the display shows "r.Fr. 823". The information are now scrolled using the "down arrow" and the "up arrow" keys. For explanation of remote transmission codes see section 8. Press rtn to leave program 41 or "down arrow" when the last code is displayed.

Example:

keystrokes	display
	Adr. rEc. 10
progr	PrG no.
4	PrG no. 4
1	PrG no. 41
enter	r.Fr. 111
enter	r.bt. 222
enter	Syn. 333
enter	Hd.E. 444
enter	to.E. 555
enter	Fr.E. 666
enter	or.E. 777
enter	Pt.E. 888
enter	to.S. 999
enter	Adr. rEc. 10

3.7.2.7 Acumulated on-time.
Program 42

An internal counter in the RC4010 counts the number of hours during which the RC4010 has been switched on.

When program 42 is selected the display will appear as "P.on XXXXXXX". XXXXXXX is accumulated on-time for the RC4010.

To leave the program press (enter) or (RS) .

3.8 Give command to another RC 4010

If there is more than one RC4010 connected to the line, the command can be given to another RC4010. This is done at the same way as addressing of a RX4010 see section 3.6. After addressing another RC4010 the display will show e.g. "OFF rc 4", which indicates that the command has been given to the Receiver Control Unit with address 4. The command can only be returned if the RC4010 is addressed by the equipment which presently has the command or if the mains is switched off and on.

Note: If the RC4010 is off the adressing mode can not be used.

Example: Give the command to RC4010 address 4.

keystrokes	display		
		1234.56	
(addr)	Adr.	rEc.	1
(-->)	Adr.	tc	1
(-->)	Adr.	rc	1
(4)	Adr.	rc	4
(enter)	OFF	rc	4

3.9 Master RC4010 (address 31):

When a master RC4010 is switched on, the communication on the line will be shown. When an addressing is executed on the line the address will be displayed for 2 sec.. If the (addr) key is pressed the last executed addressing on the line will be shown.

A master RC4010 can interrupt the communication and take over the command. This is done by normal addressing see section 3.6.
When disaddressing, two modes are available by toggling the (C) key:

1) "diS LinE": Disconnects the line and returns the command to the RC4010 which was interrupted.

2) "diS rECyy": Disconnects unit 'rECyy'.

The disconnecting is accepted by pressing (enter) .

3.10 Error message:

OFF buSy	Another RC4010 is communicating on the line. No address can be entered.
OFF rc xx	RC4010 has given the command to RC4010 address xx.
no rEc. xx	RC4010 tries to address RX4010 address xx, but no answer is received.
Err. OFFLinE	Error on line or some of the addressed unit is switched off.
no Adr.	No valid address.
Err. no ProG.	No system scan program is entered.

SECTION 4
OPTIONS

4.1 Introduction.

This section provides information about optional modules.

4.2 8-line Monitor assembly A5, assy 471941

The 8-line monitor is used when more than one RX4010 is connected to the RC4010, in order to monitor audio signals from the current controlled receiver.

4.2.1 Description

The functional blockdiagram of the 8-line monitor is shown in figure 4.1
Each of the eight input lines are furnished with a protection circuit. The microprocessor select one of the lines through an analog switch. The signal from the selected line is transformed from balanced to an unbalanced signal and filtred before it is send to the AF output pin.

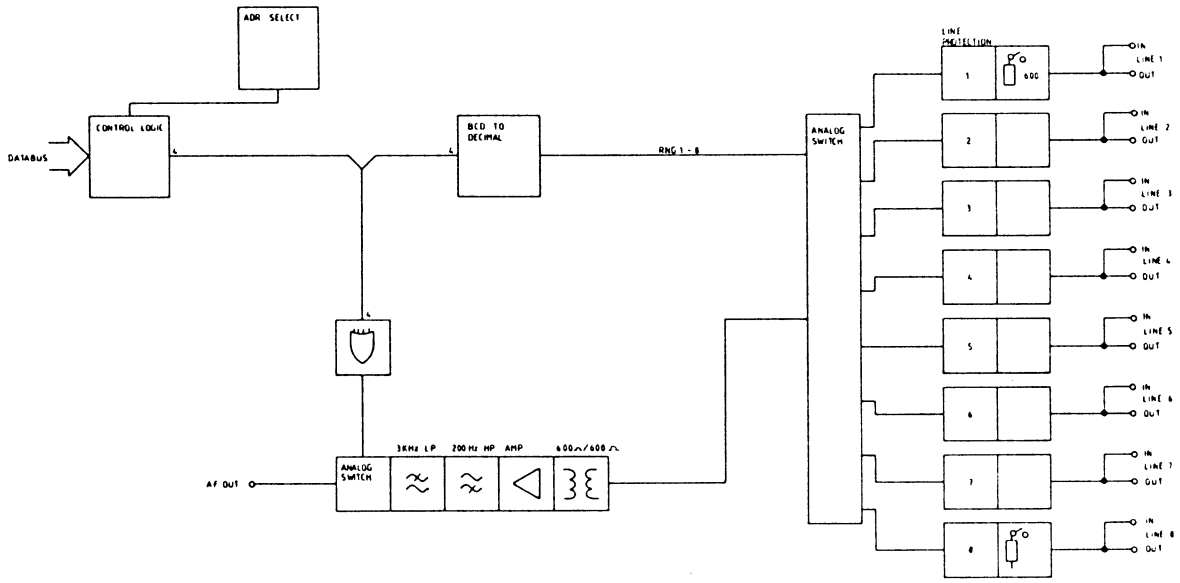


fig 4.1
blockdiagram 8-line monitor

4.2.2 Inputs

A. Monitor channels 4 - 8, A5J1
Sub-D, female, 25 poles.

The socket A5J1 provides inputs and outputs for monitor channels 4, 5, 6, 7 and 8. The inputs and outputs are coupled in parallel.

The connections are as follows:

pin	description
1	channel 7.a in
2	channel 7.b in
3	channel 8.a in
4	channel 8.b in
5	not used
6	channel 6.a in
7	channel 6.b in
8	channel 5.a in
9	channel 5.b in
10	channel 4.a in
11	channel 4.b in
12	not used
13	not used
14	channel 7.a out
15	channel 7.b out
16	channel 8.a out
17	channel 8.b out
18	not used
19	channel 6.a out
20	channel 6.b out
21	channel 5.a out
22	channel 5.b out
23	channel 4.a out
24	channel 4.b out
25	not used

fig 4.2
connections A5J1

B. Monitor channel 1 - 3, A5J2
Sub-D, female, 15 poles.

The socket A5J2 provides inputs and outputs for monitor channels 1, 2 and 3. The inputs and outputs are coupled in parallel.

The connections are as follows:

pin	description
1	channel 3.a in
2	channel 3.b in
3	channel 2.a in
4	channel 2.b in
5	channel 1.a in
6	channel 1.b in
7	not used
8	not used
9	channel 3.a out
10	channel 3.b out
11	channel 2.a out
12	channel 2.b out
13	channel 1.a out
14	channel 1.b out
15	not used

fig 4.3
connections A5J2

4.2.3 Connection between RX4010 and 8-line monitor

Up to four 8-line monitors can be installed in the RC4010. The 8-line monitor(s) shall be strapped to the correct address range, as shown in section 4.2.4. Connections between RX4010 and 8-line monitor are shown on fig 4.4 (RX4010 ISB version) and fig 4.5 (RX 4010 SSB version).

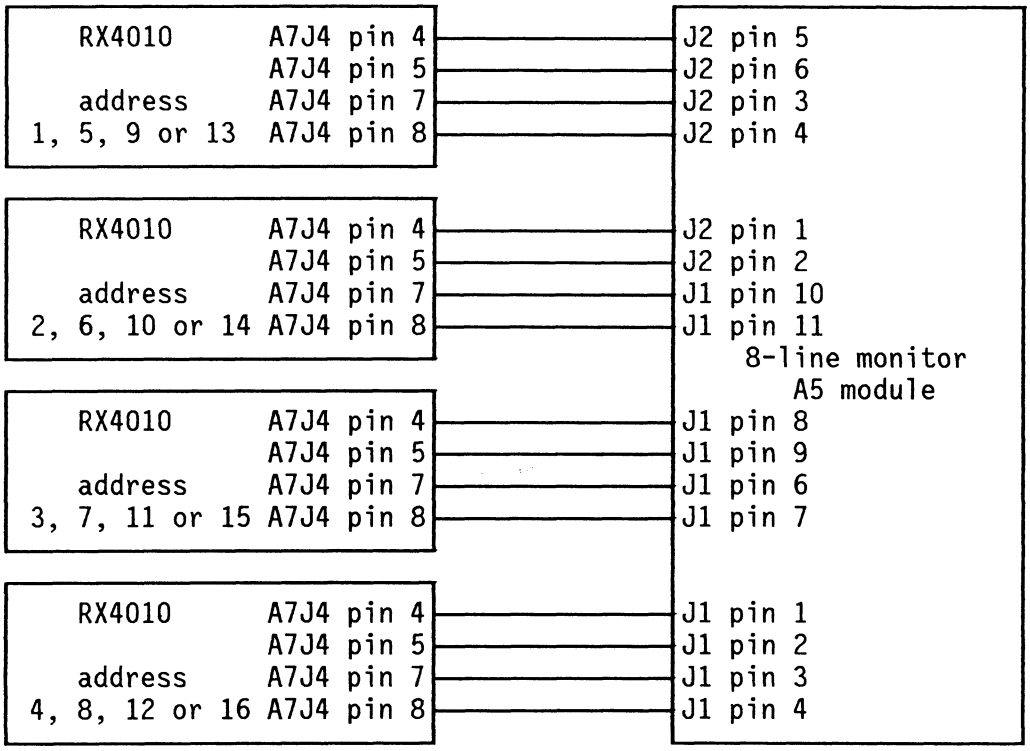


fig 4.4
Connection between RX4010 (ISB version) and 8-line monitor

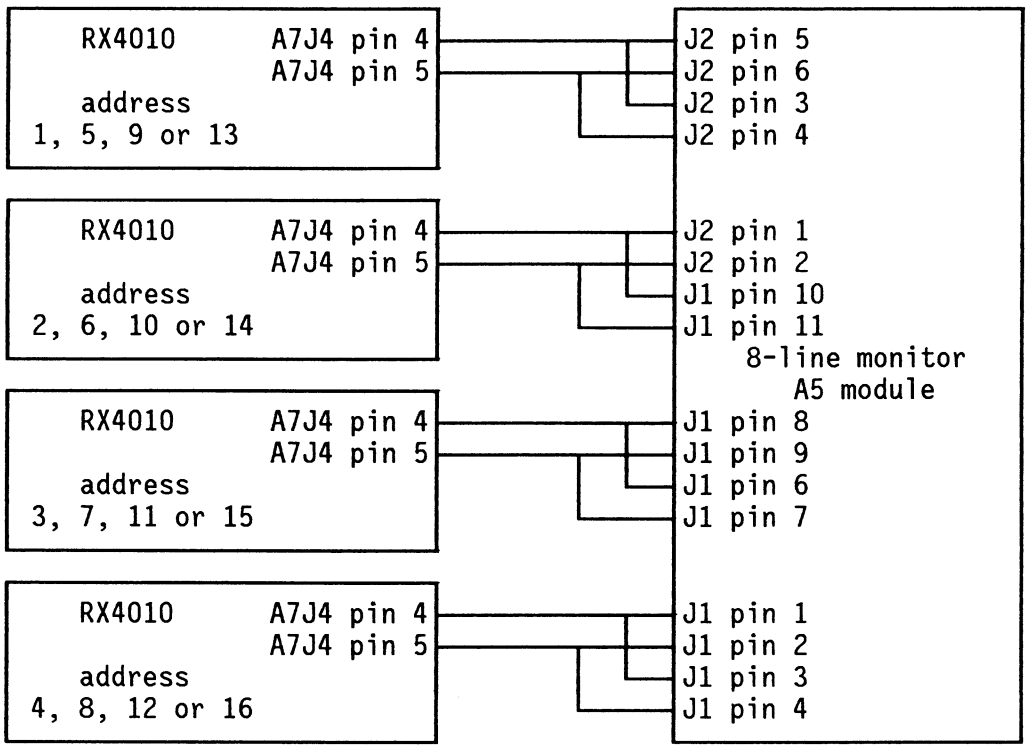


fig 4.5
Connection between RX 4010 (SSB version) and 8-line monitor

4.2.4 strapping

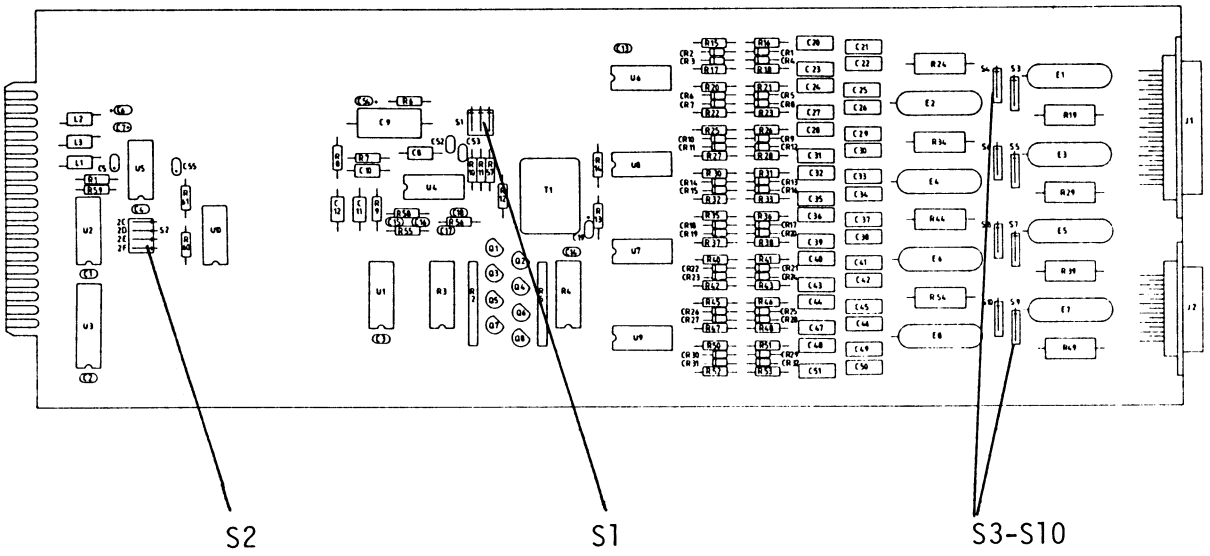


fig 4.5
Switch on A5 modul

The A5 modul are given a dedicated address strapped at S2.

modul	address area	strap
A5.1	1- 4	S2 A
A5.2	5- 8	S2 B
A5.3	9-12	S2 C
A5.4	13-16	S2 D

Input sensitivity ie. amplifier gain is adjusted by S1. Maximum sensitivity is obtained by switching all straps "on". For Minimum sensitivity all switches shall be "off".
Gainselection:

no swithes "on" : 0 dB
1 switch "on" : 6 dB
2 switches "on" : 10 dB
3 switches "on" : 12 dB

Line impedance is selectable with switches S3 to S10.
when "off" high impedance is selected
when "on" 600 ohm is selected.

SECTION 5
REMOTE SYSTEM

5.1 Introduction

This section provides information on Remote Control of the RX4010 receiver from the RC4010 receiver controller and the SE4010 synthex from the TC4010 transmitter controller. Also the Synchron and the Pair mode where a master RX4010 can control another RX4010 or a SE4010 is described in this section.

Basical two different A9 Remote Modules can be installed in the equipments: The Modem/Modem Interface Board Assy 471666 and the Remote Interface Assy 490598. The technical specifications of these modules are listed in section 1.

Configurations, definition of inputs/outputs and strapping of the modules are described in this section.

5.2 A9 Modem/Modem Interface Board Assy 471666

5.2.1 Remote Configurations

5.2.1.1 Internal modem

Depending on the attenuation of the data line between the units, up to 6 RX/SE4010's can be controlled from one RC/TC4010 when using the internal modem. Each receiver/synthex must have a unique address in the range from 01 to 31. The data transmission can either be simplex (2 wire) or half duplex (4 wire) on leased 600 ohms telephone lines. Figure 5.1 and 5.2 show the remote configuration for the RC/RX4010 while the configuration for the TC/SE4010 is shown in Figure 5.3 and 5.4.

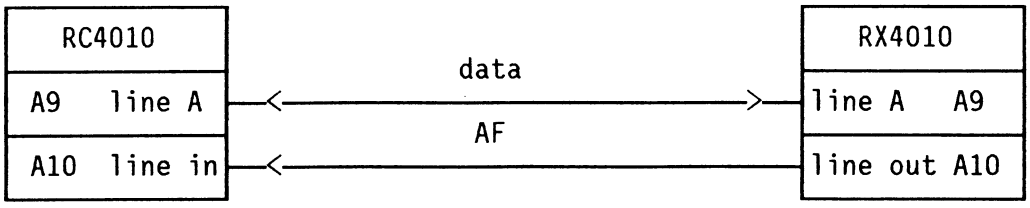


Figure 5.1
4-wire operation with separate data/AF

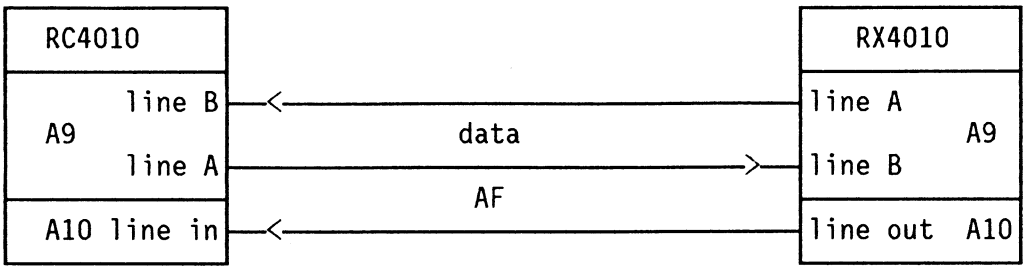


Figure 5.2
6-wire operation with separate data/AF

Note that line in/out on A10 module are not available on A10 modules with 24 Vdc input. In that case the AF output must be taken from the A7 module and an 8-line monitor module must be installed in the RC4010. This solution requires two AF lines for ISB.

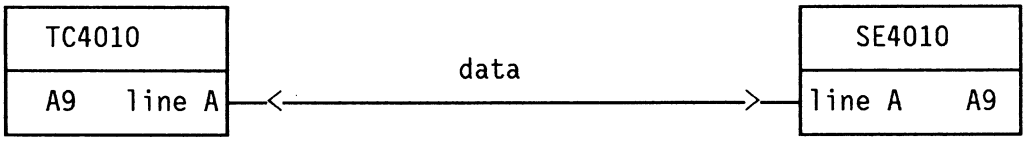


Figure 5.3
2-wire data operation of TC4010 and SE4010

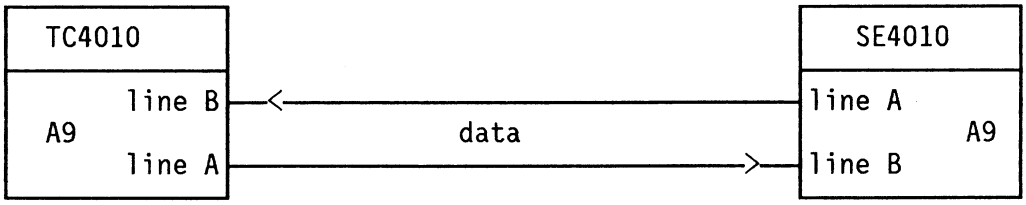


Figure 5.4
4-wire data operation of TC4010 and SE4010

Note that if the audio and key inputs of the SE4010 is needed at the TC4010 site, optional Audio and Key Modules can be installed in the TC4010 and the SE4010 which enables transmission of combined audio and key signals on a two wire telephone line for each audio channel. Up to five Audio and Key Modules can be installed in one TC4010. Each module contains two audio and key channels for one SE4010. For further information, see manual for TC4010, Section 4, Options.

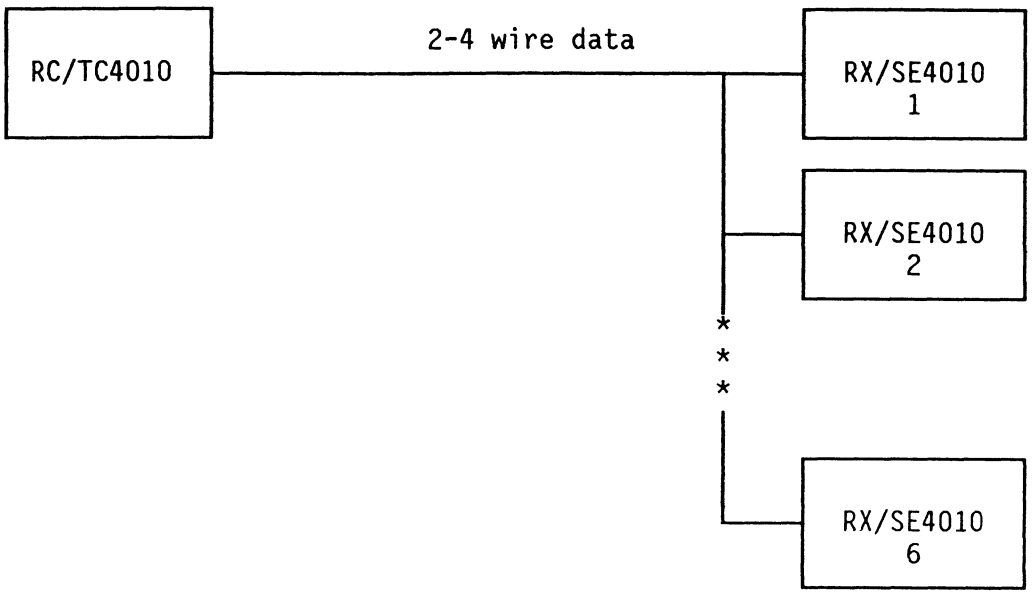


Figure 5.5

When controlling more than one receiver from a RC4010 and monitoring of the audio channels is wanted by the RC4010, optional 8-line Monitor Modules can be installed in the RC4010. Each 8-line Monitor Module contains eight audio channels for four RX4010. For further information, see Manual for RC4010, Section 4, Options.

5.2.1.2 External Modem

This can be of interest if the internal modem is not sufficient, or where the telecommunication authorities do not allow private modems.

An external 1200/600 bps modem is connected to the V24 interface on A9.

A maximum of 31 RX/SE4010 can be controlled from one RC/TC4010, when using external modem. Each receiver/synthex must have a unique address in the interval 01 to 31. A Line Sharing Unit must be added between the modem and the receiver/synthex, to allow the receiver/synthex to be connected to the same modem.

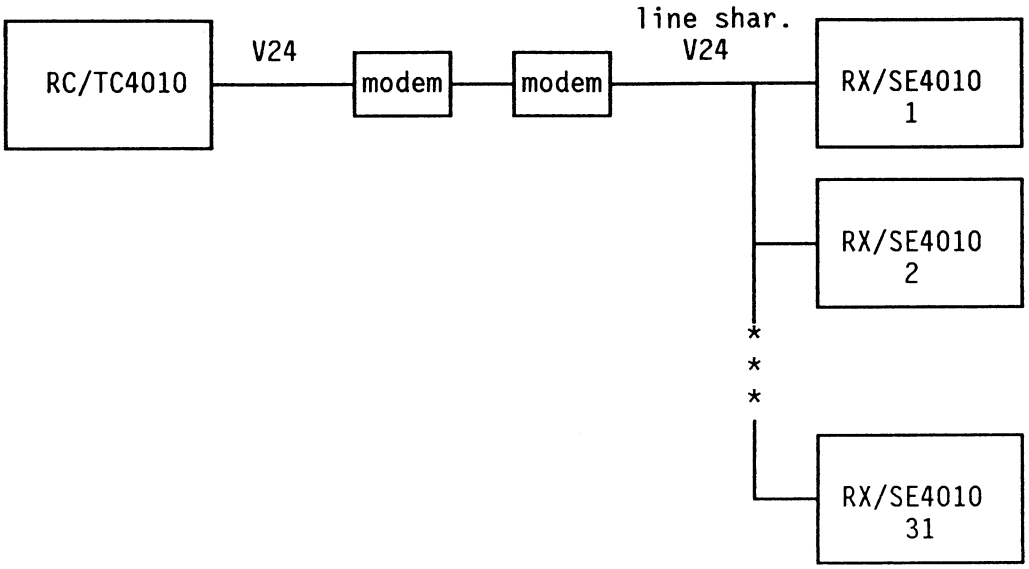


Figure 5.6

5.2.2 Module configuration

The functional block diagram of the Modem/Modem Interface Board is shown in figure 5.7.

The FSK signal is generated by the FSK generator (21) controlled by a serial data stream from the digital part of the module (not shown). The signal is amplified, filtered and fed to the Line A output. A mute signal converted to a 2990 Hz tone may be added, but is normally not used. If the mute signal is used, the FSK signal is routed through a 2990 Hz notch filter (27) in order to avoid that noise from the FSK signal disturbs the mute signal.

The received FSK signal from line A or line B is routed to the FSK demodulator (11). If the mute signal is used, the FSK signal is routed through a 2990 Hz notch filter (9) in order to avoid that the mute signal disturbs the FSK demodulator. The mute signal is detected in the detectors (14) and (15) after bandpass filtering (12).

The analogue part of the module is controlled by the digital part which, except from the RS422 and RS485 interface circuits, is as shown in figure 5.15

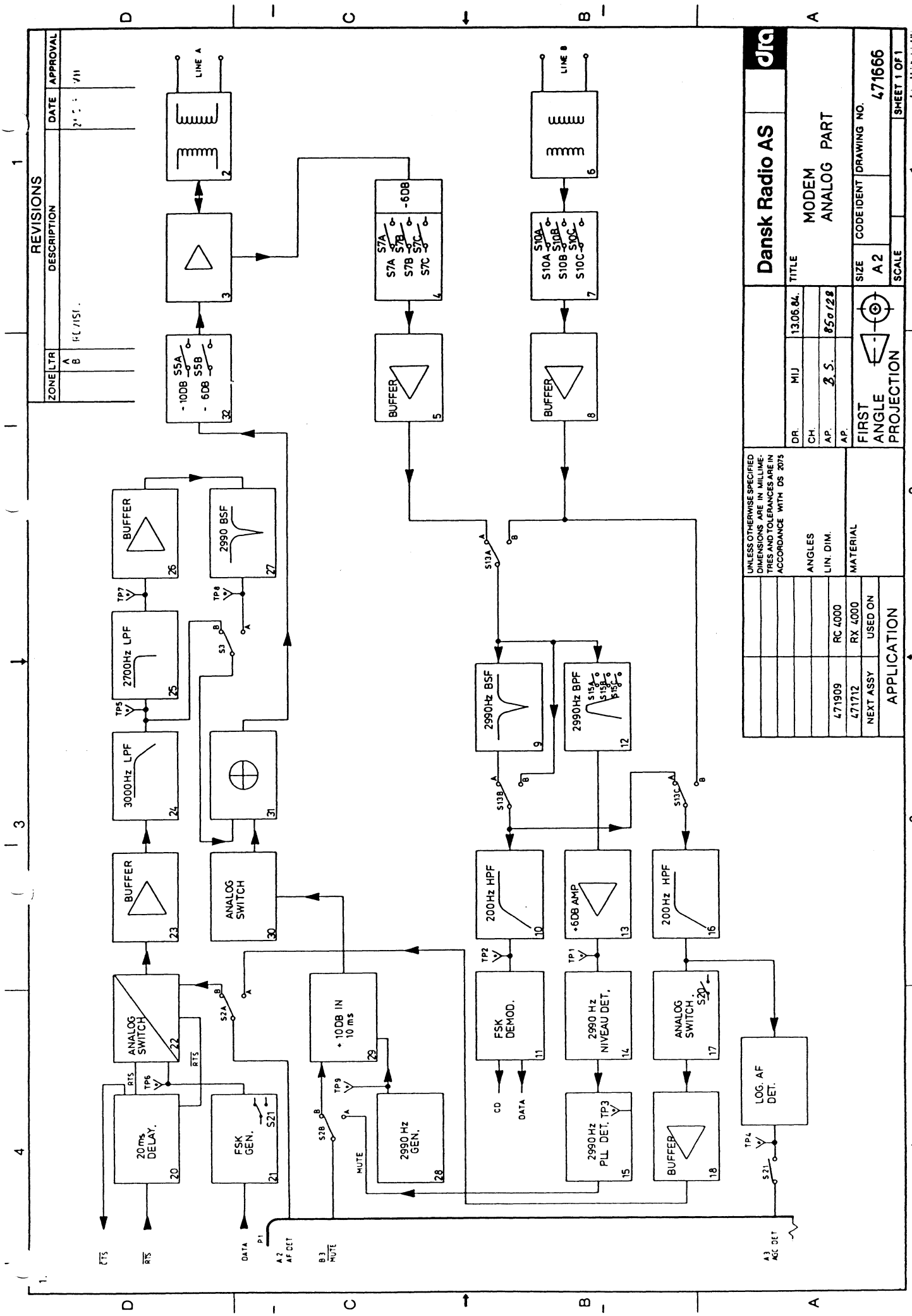

REVISIONS
ZONE LTR DESCRIPTION DATE APPROVAL
Dansk Radio AS
TITLE
MODEM
ANALOG PART
SIZE A2
CODE IDENT
DRAWING NO. 471666
SCALE
SHEET 1 OF 1
DR. MIJ 13.06.84.
CH.
AP. 850128
AP.
FIRST ANGLE PROJECTION
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETRES AND TOLERANCES ARE IN ACCORDANCE WITH DS 2075
ANGLES
LIN. DIM.
MATERIAL
APPLICATION
471909 RC 4000
471712 RX 4000
NEXT ASSY USED ON
LINE A
LINE B
-10DB S5A
-6DB S5B
S7A -6DB
S7B
S7C
S10A
S10B
S10C
BUFFER
2990 BSF
2700Hz LPF
3000Hz LPF
ANALOG SWITCH
2990Hz BSF
2990Hz BPF
200Hz HPF
+6DB AMP
+10DB IN 10 ms
20ms DELAY
FSK GEN.
2990 Hz GEN.
FSK DEMOD.
2990 Hz NIVEAU DET.
2990 Hz PLL DET. TP3
LOG. AF DET.
S13A
S13B
S13C
S15A
S15B
S15C
S2A
S2B
S3
S20
S21
TP1
TP2
TP3
TP4
TP5
TP6
TP7
TP8
TP9
RTS
CTS
DATA
MUTE
CD
P1
A2 AF DET
B3 MUTE
A3 AGC DET

Figure 5.7

5.2.3 A9 Modem/Modem Interface Board, input/output sockets

5.2.3.1 Modem input/output socket A9J7

Sub-D, Female, 25 poles, screewing lock.

The 25-pole J7 socket contains the V24 modem interface and the two 600 ohms balanced lines.

Table 5.1 data input/output A9J7

pin	circuit	description
9 10	line A line A	telephone line 600 R
11 25	line B line B	telephone line 600 R
2	TXD	transmit data
3	RXD	received data
4	RTS	request to send
5	CTS	clear to send
6	DSR	data set ready
7	GND	ground
1	GND	ground
8	CD	carry detect
20	DTR	dta terminal ready

The appropriate cable connector may be ordered from Dansk Radio, Part no. 496014.

5.2.3.2 AUX Input/Output Socket A9J6

Sub-D, Female, 15 poles, screewing lock.

The 15-pole J6 socket contains the AUX input/output port and depending on whether the module is installed in a RC/TC4010 or a RX/SE4010, the configuration is as shown in table 5.2 - 5.3

The AUX-port can be used to control an antenna switch or to turn off external devices like RTTY's or lights, etc.

The AUX-port is able to transfer an 8 bit data word from RC/TC4010 to the addressed RX/SE4010, as well as to transfer a 4 bit data word in the opposite direction.

The data transfer takes place only when the inputs are enabled by 0V or on pin 14.

The input is RS232 compatible and the output is open collector max. 15V/50mA.
The socket connections are as follows:

Table 5.2 Aux input/output A9J6, RC/TC4010 site.

pin	circuit	description
9 14	+15V enable	
1 2 3 4 5 6 7 8	I_0 I_1 I_2 I_3 I_4 I_5 I_6 I_7	input 0 input 1 input 2 input 3 input 4 input 5 input 6 input 7
10 11 12 13	O_3 O_2 O_1 O_0	output 3 output 2 output 1 output 0
15	GND	ground

Table 5.3 AUX input/output A9J6, RX/SE4010 site

pin	circuit	description
9 14	+15V enable	
1 2 3 4 5 6 7 8	I_0 I_1 I_2 I_3 O_4 O_5 O_6 O_7	input 0 input 1 input 2 input 3 output 4 output 5 output 6 output 7
10 11 12 13	O_3 O_2 O_1 O_0	output 3 output 2 output 1 output 0
15	GND	ground

The appropriate cable connector may be ordered from Dansk Radio.
Part no. 495980.

5.2.4 Strapping Modem/Modem Interface Board A9 Assy 471666

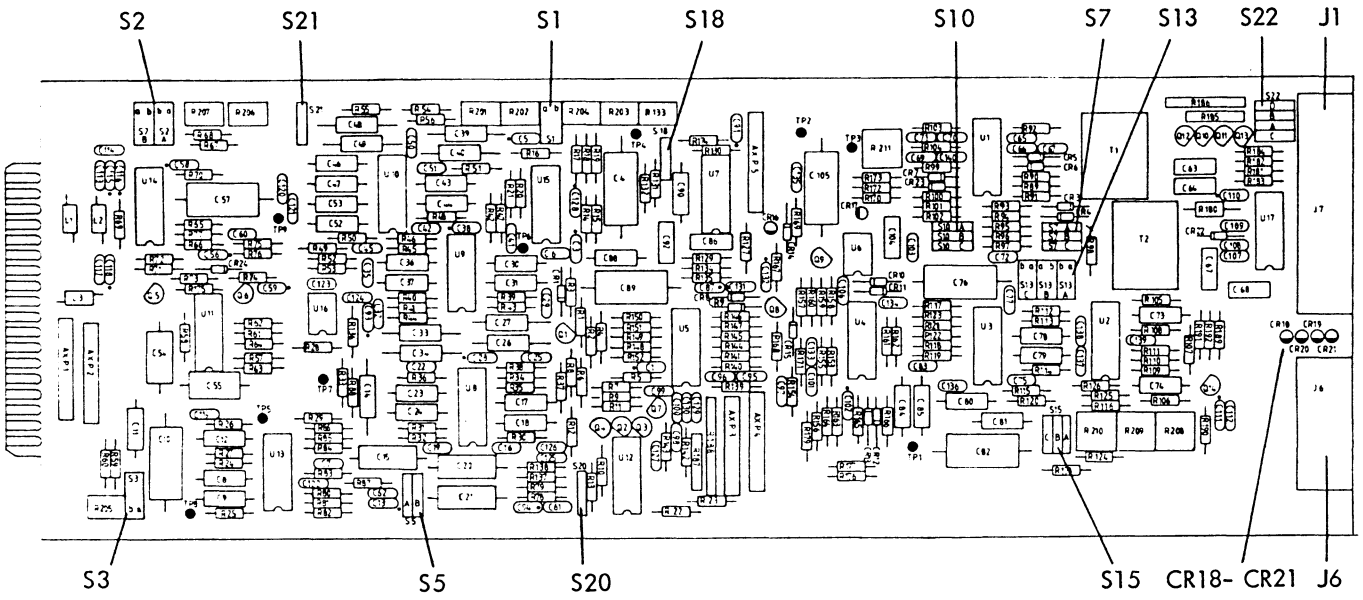


Figure 5.8
Switches on analogue modem

Table 5.4 Sensitivity Selection of the Modem

The sensitivity of the modem is about -36 dBm, but for proper operation the received FSK signal must be between -30 dBm and 0 dBm.

S7a on will attenuate the received signal on line A about 30 dB.
S7b on will attenuate the received signal on line A about 20 dB.
S7c on will attenuate the received signal on line A about 10 dB.

S10a on will attenuate the received signal on line B about 30 dB.
S10b on will attenuate the received signal on line B about 20 dB.
S10c on will attenuate the received signal on line B about 10 dB.

Table 5.5 Baud rate selection, analogue

	600 baud	1200 baud
S1	a	b
S18	on	off

Table 5.6 Transmission selection, RC/TC4010 site

	S2b	S21	S15a	S15b	S15c	S13b
All modes	a	on	x	x	x	a

With internal modem

Operation	S2a	S3	S13a	S13c
4 wire separate data/AF line A data Rx/Tx Rx audio input to line B *)	a	a	b	b
4 wire separate data/AF Rx audio input to PS/monit.	off	a	a	b
6 wire with separate data/AF line A data Tx line B data Rx Rx audio input to PS/monit.	off	a	b	x

With external modem

Operation	S2a	S3	S13a	S13c
2 or 4 wire datatransmission 2 wire AF Rx audio input to line B *)	a	x	x	x
2 or 4 wire datatransmission 2 wire AF Rx audio input to PS/monit.	off	x	x	x

*) not recommended.

Table 5.7 Transmission Selection, RX/SE4010 Site

	S2b	S21	S20	S13c	S13b
All modes	off	off	x	x	a

With internal modem

Operation	S2a	S3	S13a	S15a S15b S15c
4 wire separate data/AF line A data Rx/Tx Rx audio from PS or IF/AF	off	a	a	off
6 wire with separate data/AF line A data Tx line B data Rx Rx audio from PS or IF/AF	off	b	b	on

With external modem

Operation	S2a	S3	S13a	S15a S15b S15c
2 or 4 wire datatransmission 2 wire AF Rx audio from line A *)	b	a	a	off
2 or 4 wire datatransmission Rx audio from PS or IF/AF	off	x	x	x

*) not recommended.

(S15a, S15b, S15c off is always allowed, but on causes a faster mute response)

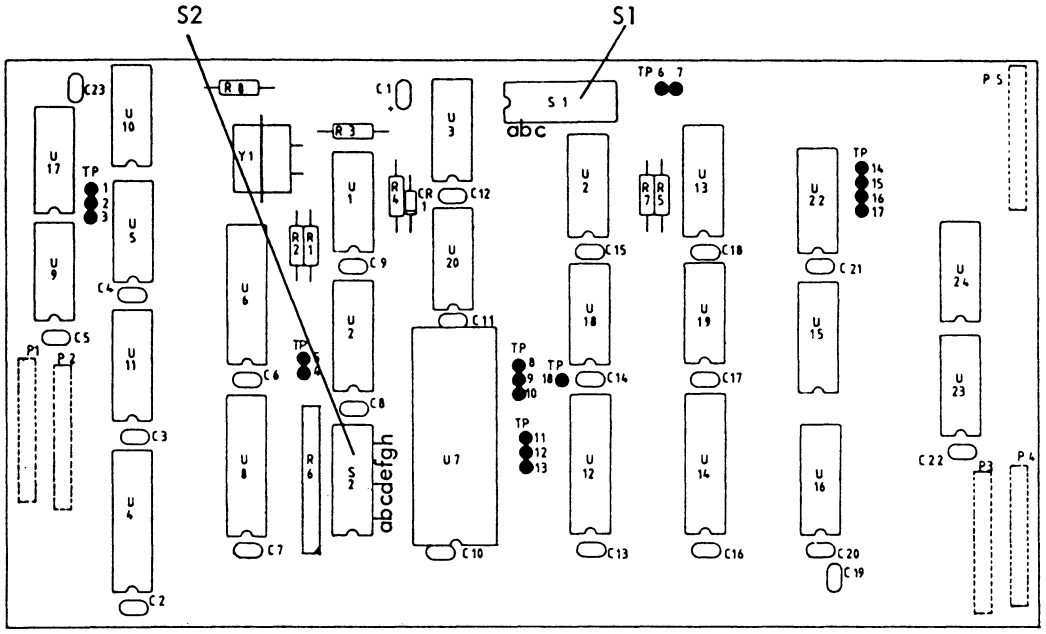


Figure 5.9
Switch positions.

Table 5.8 Baudrate Control, Switch S1

S1	600 baud	1200 baud
b	on	off
c	off	on

Note: S1-a must always be off.

Table 5.9 Remote Unit Address, Switch S2

S2	on switch value	off switch value
a	1	0
b	2	0
c	4	0
d	8	0
e	16	0

The remote unit address is the sum of the switch values.

E.g.: If an RC/TC4010-RX/SE4010 shall have an address of 21.

Then switch a, c and e must be ON and
switch b and d must be OFF

or another address e.g.27

Then switch a, b, d and e must be ON and
switch c must be OFF.

The address must not be set to 0.

5.3 A9 Remote Interface Board Assy 490598

With this module the following interface standards are possible: V24/RS 232C, RS422 and RS485.

5.3.1 Remote Configurations

5.3.1.1 V24/RS232C Standard

Only one RX/SE4010 can be controlled direct from the RC/TC4010, when using the V24/RS232C standard. The RX/SE4010 must have a unique address in the interval 01 to 31. If more than one should be controlled a line sharing unit must be placed between the RC/TC4010 and the synthex. Note that cable should be screened and that cable length of more than 25 m not can be recommended unless a low baudrate is acceptable.

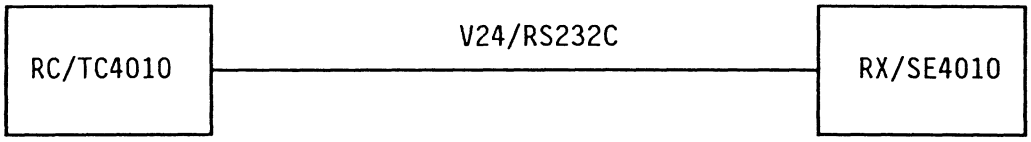


Figure 5.10

5.3.1.2 RS422 Standard

A maximum of 10 RX/SE4010 can be controlled from RC/TC4010, when using the RS422 standard. The RX/SE4010 must have a unique address in interval 01 to 31. Cable should be screened and twisted and a terminating resistor of approx. 470 ohms should be mounted across each pair in the far end of the cable. Cable length should be limited to approx. 250 m depending on selected baudrate and environmental conditions as EMC.

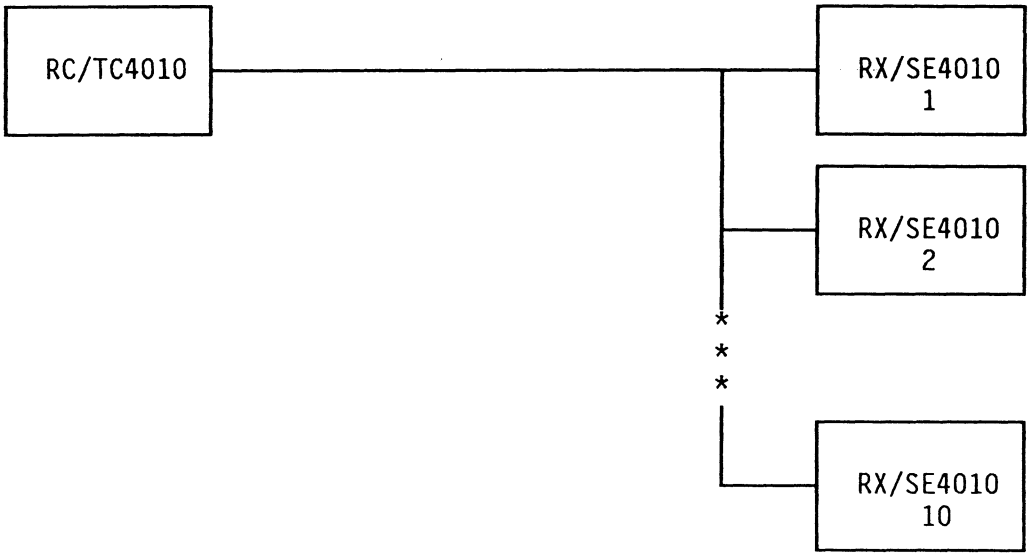


Figure 5.11

5.3.1.3 RS485 Standard

A maximum of 31 RX/SE4010 and RC/TC4010 can be connected when using the RS485 standard. All RX/SE4010 and RC/TC4010 must have a unique address in the interval 01 to 31 (RC/TC4010 with address 31 is called a master controller). The line must be a screened twisted-pair line terminated in 100 ohms in both ends, and one of the differential lines connected to ground by 1 Kohms. Depending on baudrate and environmental conditions as EMC, cable length should be limited to 500 m. The network can be establised as shown in the following examples fig 5.12 to fig 5.14.

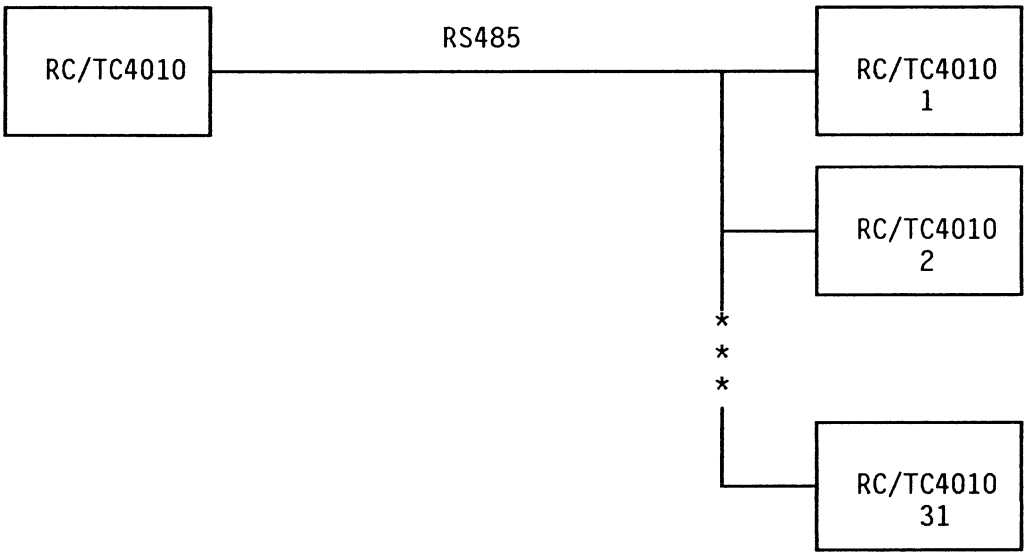


Figure 5.12

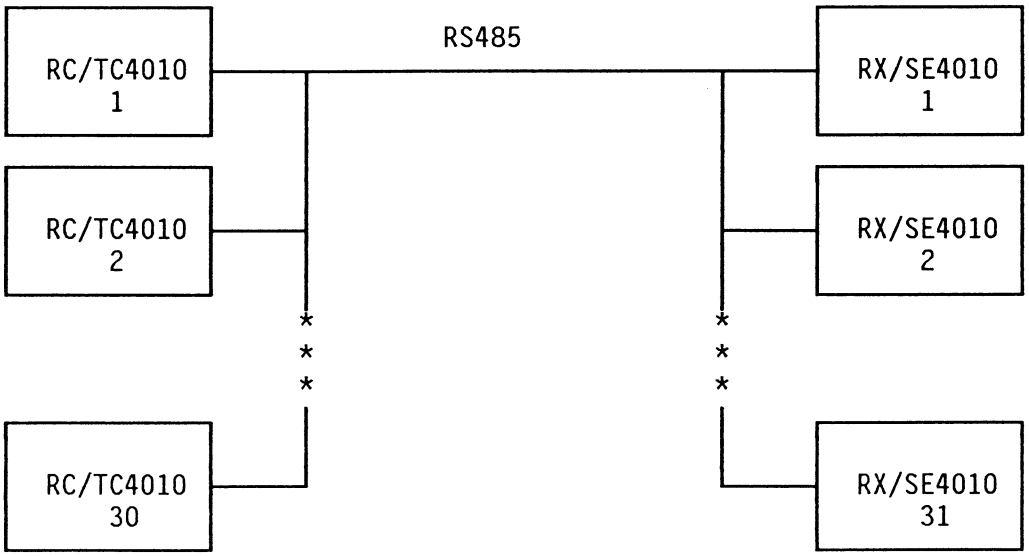


Figure 5.13

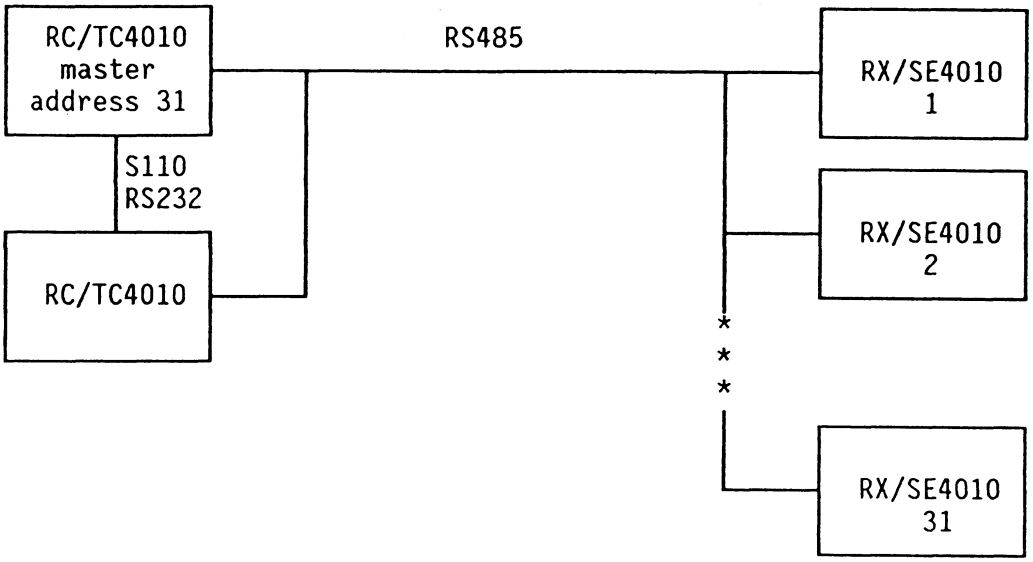


Figure 5.14

The master RC/TC4010 uses the S110/RS232 connection of the A8 module in order to take over the command at any time. Cable length between the two controllers should be limited to 100 m. Screened cable is recommended.
For Audio connections please see paragraph 5.2.1.1.

5.3.2 Module Configuration

The functional block diagram of the Remote Interface Assembly is shown in figure 5.15

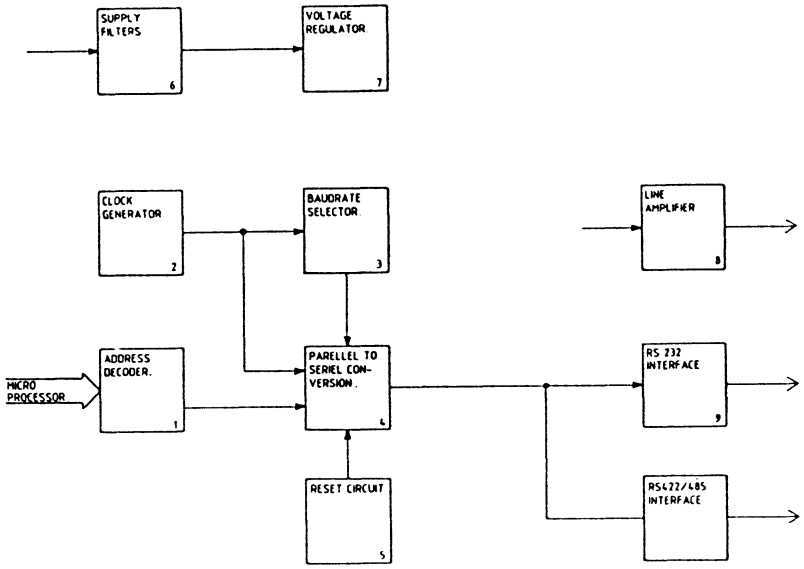


Figure 5.15

The clock generator (2) running at 6.144 MHz delivers clock pulses to the parallel to serial conversion circuit (4) with a frequency of 1.2288 MHz. The baudrate generator (3) controls the baudrate of the remote communication. The parallel to serial conversion circuit (4) interfaces the serial databus to an 8-bit databus which is controlled by the microprocessor of the equipment via the address decoder (1). The serial databus is converted to RS232C, RS422 or RS485 levels in the interface circuits. A balanced line output (8) is available when the module is installed in a RX4010 receiver.

5.3.3 A9 Remote Interface Board, input/output socket A9J7

Sub-D, Female, 25 poles, Screewing lock.

This connector carries the data signals, a mute input (RS232 voltage level, positive logic) and a 0 dBm balanced 600 ohms line output adjustable by means of R12 located on the PCB.

Table 5.10 input/output socket A9J7

pin	circuit	description
1	GND	protective GND
2	TXD	transmit data RS232
3	RXD	received data RS232
4	RTS	request to send RS232
5	CTS	clear to send RS232
6	DSR	data set ready RS232
7	GND	signal GND
9	line	line output
10	line	
11	mute	receiver muting
18	TXD/A	transmit data RS422
19	TXD/B	transmit data RS422
23	RXD/TXD A	received data RS422/data RS485
24	RXD/TXD B	received data RS422/data RS485

The appropriate cable connector may be ordered from Dansk Radio. Part no. 496014.

5.3.4 Strapping Remote Interface Board A9, assy 490598

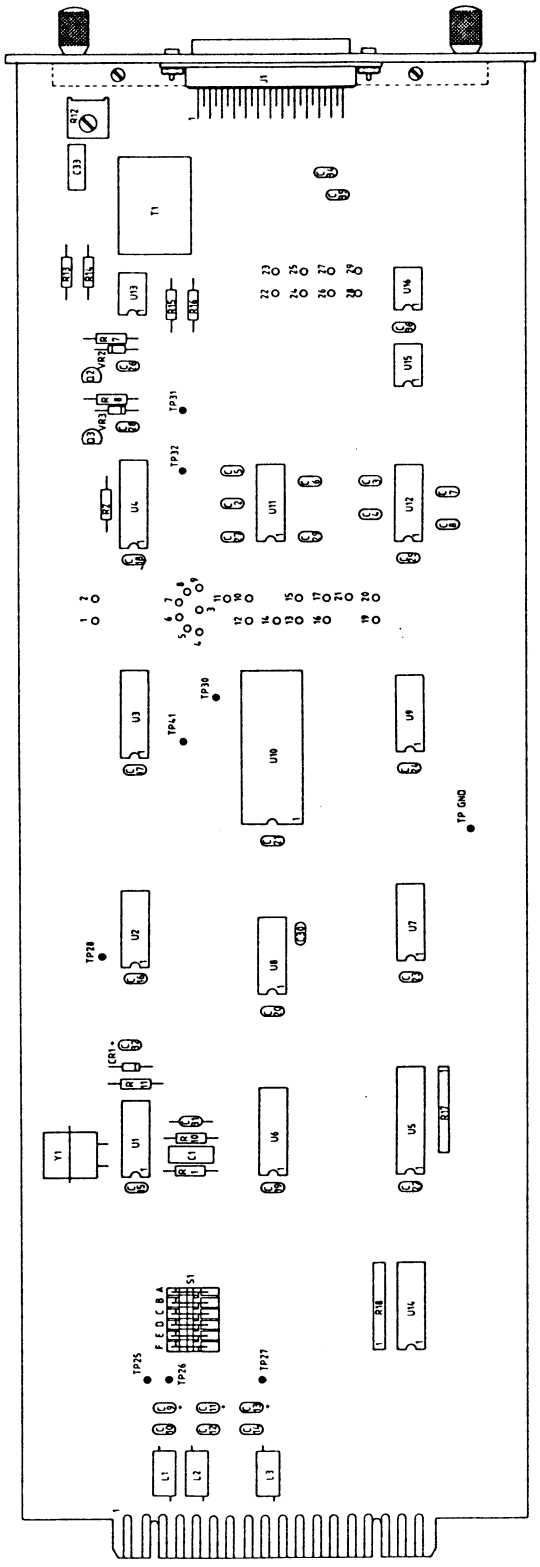


Figure 5.16 Component location

Table 5.11 Baudrate selection

baudrate	straps
75	3-9, 1-2
150	3-8, 1-2
300	3-9
600	3-8
1200	3-7
2400	3-6
4800	3-5
9600	3-4

Table 5.12 Selection of interface type

type	straps
V24/RS232C with control signals	11-12,13-15,19-20
V24/RS232C without control signals	10-11,13-14,19-20
RS422 without control signals	10-11,13-14,19-21,22-23 24-25,26-27,28-29
RS485 without control signals	10-11,13-14,16-17, 19-21,22-23,24-25

Table 5.13 Selection of remote unit address

S1	off switch value	on switch value
a	1	0
b	2	0
c	4	0
d	8	0
e	16	0

Note that switch S1-f must always be in on-position

The remote unit address is the sum of the switches:

E.g.: If an RC/TC4010-RX/SE4010 shall have an address of 21:

Then switch a, c and e must be OFF and
switch b and d must be ON

or another address e.g. 7:

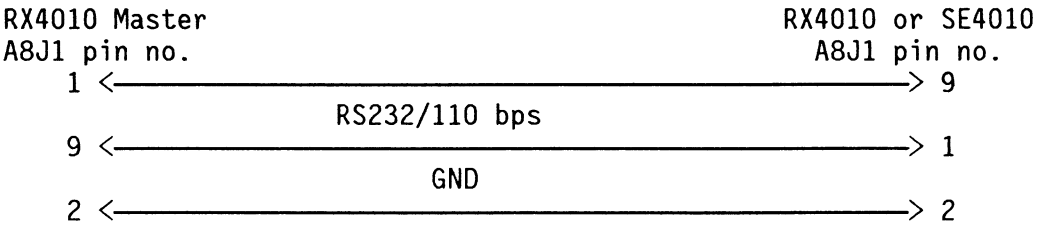
Then switch a, b and c must be OFF and
switch d and e must be ON.

The address must not be set to 0.

5.4 Synchron and Pair mode.

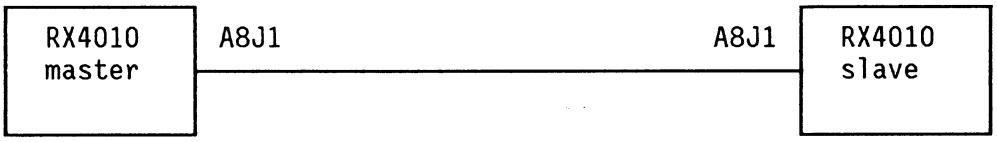
These modes are not applicable to RC4010 and TC4010.

When using synchron or pair mode, the equipments must be connected as shown:



5.4.1 Synchron mode.

In Synchron mode a RX4010 - the master - can control another RX4010 - the slave.



The Synchron mode is selected by using program no. 39 of the master. The master RX4010 will then transmit all keys, rf-gain and tunewheel to the slave RX4010. In scanning modes the slave is synchronized to the master.

The 'ser' led on the master RX4010 indicates that it is controlling another equipment.

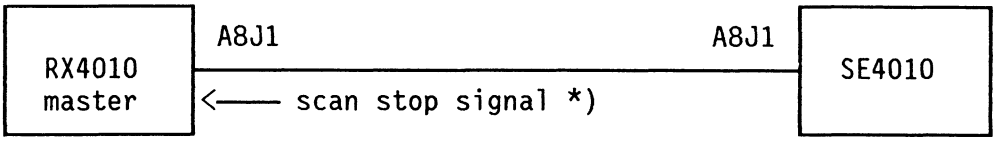
When a slave RX4010 is controlled by a master RX4010, the keyboard on the slave is disabled.

As the Synchron mode has priority over the remote control a RC4010 is not able to control a slave RX4010, but will only show the display of the slave when it is addressed.

Note that in order to get a proper function of the master/slave system it is necessary that the contents of the memories of the equipments are identical. This means that all channels and programmable functions have been made identical. When operating the master in scanning mode the scan time must not be set to less than 1 sec.

5.4.2 Pair mode.

In Pair mode a RX4010 can control the frequency or the channel of a SE4010.



*) See section 2 for pin no..

The Pair mode is selected by using program no. 39 of the RX4010.

When the RX4010 is in scanning mode and receives a scan-stop signal from an external equipment the frequency or the channel no. will be transfered to the SE4010. The frequency is transfered if the RX4010 is in frequency scan or PPC scan mode, and the channel no. is transfered if the RX4010 is in UPC scan mode.
The type of reception is not transfered.

The 'ser' led on the RX4010 indicates that it is controlling another equipment.

When a SE4010 is controlled by a RX4010, the keyboard on the SE4010 is disabled.

A SE4010 which is controlled by a RX4010, can not be controlled by a TC4010 at the same time. If the SE4010 is addressed by the TC4010 the display of the SE4010 will be shown on the TC4010.

5.4.3 Serial errors.

"SEr. OFFLInE" : Indicates that the serial line is off. The master will then go into "off serial" mode.

SECTION 6
REPLACEABLE PARTS

6.1 Introduction

This section contains information for ordering parts. Table 6.1 lists abbreviations used in the parts list, table 6.2 lists all replaceable parts in reference designator order, and table 6.3 contains names that correspond to the manufacturer's code numbers.

6.2 Abbreviations

Table 6.1 lists abbreviations used in the parts list, the schematics, and throughout the manual.

6.3 Replaceable Parts List

Table 6.2 lists replaceable parts and is organized as follows:

a. Electrical assemblies in alphanumerical order by reference designation.

b. Chassis-mounted parts in alphanumerical order by reference designation.

c. Electrical assemblies and their components by alphanumerical order by reference designation.

The information given for each part consists of the following:

a. Complete reference designation

b. Dansk Radio stock number

c. Description of part

d. Typical manufacturer of part in identifying code

e. Total quantity in first higher level

The total quantity in first higher level for each part is given only once - at the first appearance of the part number per lower level.

6.4 Ordering Information

To order a part listed in the replaceable parts table, quote the DRA part number, indicate the quantity required and address the order to Dansk Radio.

To order a part that is not listed in the replaceable parts list, include the receiver model number, receiver serial number, the description and function of the part, and the number of parts required. Address the order to Dansk Radio.

Table 6.1 Reference Designations and Abbreviations

REFERENCE DESIGNATIONS

A . . . . . assembly
AT . . attenuator; isolator; termination
B . . . . . fan; motor
BT . . . . . battery
C . . . . . capacitor
CP . . . . . coupler
CR . . . . . diode; diode thyristor; varactor
DC . . . directional coupler
DL . . . . . delay line
DS . . . . . annunciator; signaling device (audible or visual); lamp; LED
E . . . . . miscellaneous electrical part
F . . . . . fuse
FL . . . . . filter
H . . . . . hardware
HY . . . . . circulator
J . . . electrical connector (stationary portion); jack
K . . . . . relay
L . . . . . coil; inductor
M . . . . . meter
MP . . . . . miscellaneous mechanical part
P . . . electrical connector (movable portion); plug
Q . . . . . transistor; SCR; triode thyristor
R . . . . . resistor
RT . . . . . thermistor
S . . . . . switch
T . . . . . transformer
TB . . . . . terminal board
TC . . . . . thermocouple
TP . . . . . test point
U . . . . . integrated circuit; microcircuit
V . . . . . electron tube
VR . . . . voltage regulator; breakdown diode
W . . . . cable; transmission path; wire
X . . . . . socket
Y . . . . crystal unit (piezoelectric or quartz)
Z . . . . tuned cavity; tuned circuit

ABBREVIATIONS

A . . . . . ampere
ac . . . . alternating current
ACCESS . . . . . accessory
ADJ . . . . . adjustment
A/D . . . . analog-to-digital
AF . . . . . audio frequency
AFC . . . . . automatic frequency control
AGC . . . . . automatic gain control
AL . . . . . aluminum
ALC . . . . . automatic level control
AM . . . amplitude modulation
AMPL . . . . . amplifier
APC . . . . automatic phase control
ASSY . . . . . assembly
AUX . . . . . auxiliary
avg . . . . . average
AWG . . . . American wire gauge
BAL . . . . . balance
BCD . . . . . binary coded decimal
BD . . . . . board
BE CU . . . . . beryllium copper
BFO . . . . . beat frequency oscillator
BH . . . . . binder head
BKDN . . . . . breakdown
BP . . . . . bandpass
BPF . . . . . bandpass filter
BRS . . . . . brass
BWO . . . . . backward-wave oscillator
CAL . . . . . calibrate
ccw . . counter-clockwise
CER . . . . . ceramic
CHAN . . . . . channel
cm . . . . . centimeter
CMO . . cabinet mount only
COAX . . . . . coaxial
COEF . . . . . coefficient
COM . . . . . common
COMP . . . . . composition
COMPL . . . . . complete
CONN . . . . . connector
CP . . . . . cadmium plate
CRT . . . cathode-ray tube
CTL . . . . complementary transistor logic
CW . . . . . continuous wave
cw . . . . . clockwise
cm . . . . . centimeter
D/A . . . . digital-to-analog
dB . . . . . decibel
dBm . . . . decibel referred to 1 mW
dc . . . . . direct current
deg . . degree (temperature interval or difference)
° . . . . . degree (plane angle)
°C . . . . . degree Celsius (centigrade)
°F . . . . degree Fahrenheit
°K . . . . . degree Kelvin
DEPC . . deposited carbon
DET . . . . . detector
diam . . . . . diameter
DIA . . . diameter (used in parts list)
DIFF AMPL . . differential amplifier
div . . . . . division
DPDT . . . . . double-pole, double-throw
DR . . . . . drive
DSB . . . . double sideband
DTL . . . . diode transistor logic
DVM . . . digital voltmeter
ECL . . . . emitter coupled logic
EMF . . electromotive force
EDP . . . . . electronic data processing
ELECT . . . . . electrolytic
ENCAP . . . . encapsulated
EXT . . . . . external
F . . . . . farad
FET . . . . . field-effect transistor
F/F . . . . . flip-flop
FH . . . . . flat head
FIL H . . . . . fillister head
FM . . frequency modulation
FP . . . . . front panel
FREQ . . . . . frequency
FXD . . . . . fixed
g . . . . . gram
GE . . . . . germanium
GHz . . . . . gigahertz
GL . . . . . glass
GRD . . . . . ground(ed)
H . . . . . henry
h . . . . . hour
HET . . . . . heterodyne
HEX . . . . . hexagonal
HD . . . . . head
HDW . . . . . hardware
HF . . . . . high frequency
HG . . . . . mercury
HI . . . . . high
HPF . . . . . high pass filter
HR . . . . . hour (used in parts list)
HV . . . . . high voltage
Hz . . . . . Hertz
IC . . . . integrated circuit
ID . . . . . inside diameter
IF . . . . . intermediate frequency
IMPG . . . . . impregnated
In . . . . . inch
INCD . . . . . incandescent
INCL . . . . . include(s)
INP . . . . . input
INS . . . . . insulation
INT . . . . . internal
kg . . . . . kilogram
kHz . . . . . kilohertz
kΩ . . . . . kilohm
kV . . . . . kilovolt
lb . . . . . pound
LC . . . . . inductance-capacitance
LED . . light-emitting diode
LF . . . . . low frequency
LG . . . . . long
LH . . . . . left hand
LIM . . . . . limit
LIN . . . linear taper (used in parts list)
lin . . . . . linear
LK WASH . . . lock washer
LO . . . low; local oscillator
LOG . . . . logarithmic taper (used in parts list)
log . . . . . logrithm(ic)
LPF . . . . . low pass filter
LV . . . . . low voltage
m . . . . . meter (distance)
mA . . . . . milliampere
MAX . . . . . maximum
MΩ . . . . . megohm
MEG . . . . meg (10^6) (used in parts list)
MET FLM . . . . metal film
MET OX . . metallic oxide
MF . . . medium frequency; microfarad (used in parts list)
MFR . . . . . manufacturer
mg . . . . . milligram
MHz . . . . . megahertz
mH . . . . . millihenry
mho . . . . . mho
MIN . . . . . minimum
min . . . . . minute (time)
. . ' . . . . . minute (plane angle)
MINAT . . . . . miniature
mm . . . . . millimeter
MOD . . . . . modulator
MOM . . . . . momentary
MOS . . . . . metal-oxide semiconductor
ms . . . . . millisecond
MTG . . . . . mounting
MTR . . . meter (indicating device)
mV . . . . . millivolt
mVac . . . . . millivolt, ac
mVdc . . . . . millivolt, dc
mVpk . . . . millivolt, peak

Table 6.1 Reference Designations and Abbreviations (continued)

mVp-p ... millivolt, peak-to-peak
mVrms .... millivolt, rms
mW ..... milliwatt
MUX ..... multiplex
MY ..... mylar
μA ..... microampere
μF ..... microfarad
μH ..... microhenry
μmho ..... micromho
μs ..... microsecond
μV ..... microvolt
μVac ..... microvolt, ac
μVdc ..... microvolt, dc
μVpk ... microvolt, peak
μVp-p ... microvolt, peak-to-peak
μVrms .... microvolt, rms
μW ..... microwatt
nA ..... nanoampere
NC ..... no connection
N/C .... normally closed
NE ..... neon
NEG ..... negative
nF ..... nanofarad
NI PL ..... nickel plate
N/O ..... normally open
NOM ..... nominal
NORM ..... normal
NPN ... negative-positive-negative
NPO .... negative-positive zero (zero temperature coefficient)
NRFR .. not recommended for field replacement
NSR .... not separately replaceable
ns ..... nanosecond
nW ..... nanowatt
OBD ... order by description
OD ..... outside diameter
OH ..... oval head
OP AMPL ... operational amplifier
OPT ..... option
OSC ..... oscillator
OX ..... oxide
oz ..... ounce
Ω ..... ohm
P .... peak (used in parts list)
PAM .... pulse-amplitude modulation
PC ..... printed circuit
PCM .. pulse-code modulation; pulse-count modulation
PDM ..... pulse-duration modulation
pF ..... picofarad
PH BRZ phosphor bronze
PHL ..... Phillips
PIN ... positive-intrinsic-negative
PIV ..... peak inverse voltage
pk ..... peak
PL ..... phase lock
PLO ..... phase lock oscillator
PM .... phase modulation
PNP ... positive-negative-positive
P/O ..... part of
POLY ..... polystyrene
PORC ..... porcelain
POS .. positive; position(s) (used in parts list)
POSN ..... position
POT ..... potentiometer
p-p ..... peak-to-peak
PP ... peak-to-peek (used in parts list)
PPM ..... pulse-position modulation
PREAMPL ... preamplifier
PRF .... pulse-repetition frequency
PRR .... pulse repetition rate
ps ..... picosecond
PT ..... point
PTM ..... pulse-time modulation
PWM ..... pulse-width modulation
PWV ..... peak working voltage
RC ..... resistance-capacitance
RECT ..... rectifier
REF ..... reference
REG ..... regulated
REPL ..... replaceable
RF ..... radio frequency
RFI .... radio frequency interference
RH .... round head; right hand
RLC ..... resistance-inductance-capacitance
RMO ... rack mount only
rms .... root-mean-square
RND ..... round
ROM .. read-only memory
R&P ..... rack and panel
RWV ... reverse working voltage
S ... scattering parameter
s ..... second (time)
..." . second (plane angle)
S-B ..... slow-blow (fuse) (used in parts list)
SCR ... silicon controlled rectifier; screw
SE ..... selenium
SECT ..... sections
SEMICON ..... semiconductor
SHF ..... superhigh frequency
SI ..... silicon
SIL ..... silver
SL ..... slide
SNR .. signal-to-noise ratio
SPDT ..... single-pole, double-throw
SPG ..... spring
SR ..... split ring
SPST ..... single-pole, single-throw
SSB ..... single sideband
SST ..... stainless steel
STL ..... steel
SQ ..... square
SWR .. standing-wave ratio
SYNC ..... synchronize
T .. timed (slow-blow fuse)
TA ..... tantalum
TC ..... temperature compensating
TD ..... time delay
TERM ..... terminal
TFT .. thin-film transistor
TGL ..... toggle
THD ..... thread
THRU ..... through
TI ..... titanium
TOL ..... tolerance
TRIM ..... trimmer
TSTR ..... transistor
TTL .. transistor-transistor logic
TV ..... television
TVI television interference
TWT .. traveling wave tube
U ..... micro (10^{-6}) (used in parts list)
UF ... microfarad (used in parts list)
UHF .. ultrahigh frequency
UNREG .... unregulated
V ..... volt
VA ..... voltampere
Vac ..... volts, ac
VAR ..... variable
VCO ... voltage-controlled oscillator
Vdc ..... volts, dc
VDCW .. volts, dc, working (used in parts list)
V(F) ..... volts, filtered
VFO .. variable-frequency oscillator
VHF ..... very-high frequency
Vpk ..... volts, peak
Vp-p .. volts, peak-to-peak
Vrms ..... volts, rms
VSWR ... voltage standing wave ratio
VTO ..... voltage-tuned oscillator
VTVM .... vacuum-tube voltmeter
V(X) ..... volts, switched
W ..... watt
W/ ..... with
WIV .... working inverse voltage
WW ..... wirewound
W/O ..... without
YIG .. yttrium-iron-garnet
Z_o ..... characteristic impedance

MULTIPLIERS

Abbreviation	Prefix	Multiple
T	tera	10^{12}
G	giga	10^{9}
M	mega	10^{6}
k	kilo	10^{3}
da	deka	10
d	deci	10^{-1}
c	centi	10^{-2}
m	milli	10^{-3}
μ	micro	10^{-6}
n	nano	10^{-9}
p	pico	10^{-12}
f	femto	10^{-15}
a	atto	10^{-18}

PARTS LIST

PRINTET..... 89/12/05

FIND NO.	QTY RQD	U M	ITEM OR DOCUMENT NUMBER	NOMENCLATURE	I T	PREP NO.	BIN	REFERENCE DESIGNATION	LINE REV
1	0,000	ST	60 BR471941	8-LINE MONITOR A5	1			A5	A1
2	1,000	ST	60 BR487740	MICROCOMPUTER ASSY A8 RTC	1			A8	A1
3	0,000	ST	60 BR471666	MODEM ANALOG ASSY A9	1			A9	A1
3	0,000	ST	60 BR490598	INTERF. RS232 422/485 A9	1			A9	A1
4	1,000	ST	61 BR476803	POWER SUPPLY ASSY A10	1			A10	A1
5	1,000	ST	60 BR495131	FRONT PANEL RC4010 A11	1			A11	A1
6	1,000	ST	41 BR476056	CHASSIS ASSY A12 RC40..	1			A12	A1
7	4,000	ST	51 BR327301	SCREW M 5 X20 CHM CU SN	4			H1	A1
8	4,000	ST	51 BR327263	SCREW M 4 X20 CHM CU SN	4			H2	A1
9	40,000	ST	51 BR450561	SCREW SELFTAP.4X1/2 PH-PL	4			H3	A1
10	4,000	ST	53 BR336777	WASHER,FLAT Ø 4MM CU SN M	4			H4	A1
11	4,000	ST	53 BR321966	WASHER,FLAT Ø 5MM CU SN M	4			H5	A1
12	6,000	ST	41 BR445991	REAR PLATE DUMMY 1M	1			MP1	A1
13	1,000	ST	41 BR475149	REAR PLATE DUMMY 1,5M	1			MP2	A1
14	2,000	ST	24 207443-005	MICROCKT M 27128	4				A2
**********				********** BILL OF DOCUMENTATION	**********				
			BR495123 EB	INTERCONN DIAG RC4010					
			BR495123 PD	PANEL RC4010 RX REMOTE					
			BR498823 SP	SOFTWARE BESKRIVELSE					
			BRQA4110 TP	FOR RC4010					
			BRQA6110 TP	RC4010 OG RX4010					

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TITLE: PANEL RC4010 RX REMOTE

DOCUMENT NO.: 41 - BR495123 (495123)

REV: A2

SHEET NO.: 1 OF 1

A4 Form 200473 FB Rev A

PARTS LIST

PRINTET..... 89/12/07
PARTS LIST PER.. 89/12/06

FIND NO.	QTY RQD	U M	ITEM OR DOCUMENT NUMBER	NOMENCLATURE	I T	PREP NO.	BIN	REFERENCE DESIGNATION	LINE REV
1	1,000	ST	37 BR471933	PWB 8-LINE MO.	3				
2	11,000	ST	22 BR450510	CAP. CER. 100N 63 S	4			C1, C2, C3, C4, C13, C14, C15, C16, C17, C52, C53	
3	6,000	ST	22 BR450529	CAP. ELEC 6U8 25 M	4			C5, C6, C7, C19, C54, C55	
4	1,000	ST	22 BR446254	CAP. PLST 5N6 160 F	4			C8	
5	1,000	ST	22 BR462993	CAP. PLST 33N 63 F	4			C9	
6	1,000	ST	22 BR466980	CAP. PLST 120P 630 H	4			C10	
7	1,000	ST	22 BR448893	CAP. PLST 5N1 160 H	4			C11	
8	1,000	ST	22 BR448826	CAP. PLST 820P 630 H	4			C12	
9	1,000	ST	22 BR357502	CAP. CER. 33P 100 G N150	4			C18	
10	16,000	ST	22 BR202991	CAP. PLST 220N 100 K	4			C20, C23, C24, C27, C28, C31, C32, C35, C36, C39, C40, C43, C44, C47, C48, C51	
11	16,000	ST	22 BR450863	CAP. PLST 10N 400 J	4			C21, C22, C25, C26, C29, C30, C33, C34, C37, C38, C41, C42, C45, C46, C49, C50	
12	32,000	ST	23 BR228087	DIO SIGN. 1N4148 SI 150MA	4			CR1, CR2, CR3, CR4, CR5, CR6, CR7, CR8, CR9, CR10, CR11, CR12, CR13, CR14, CR15, CR16, CR17, CR18, CR19, CR20, CR21, CR22, CR23, CR24, CR25, CR26, CR27, CR28, CR29, CR30, CR31, CR32	
13	5,000	ST	51 BR458694	SCREW M 2,5X 5 CHM CU SN	4			H1	A1
14	1,000	ST	31 BR390895	CONN D PWB ANG 25P FEMALE	4			J1	
15	1,000	ST	31 BR368016	CONN D PWB ANG 15P FEMALE	4			J2	
16	3,000	ST	25 BR363944	COIL, CHOKE HF WIDE BAND	4			L1, L2, L3	
17	1,000	ST	41 BR476072	REAR PLATE A 5 RC4000	1			MP1	
18	1,000	ST	45 BR448095	RETAINER, PC 5X5X109 MM	2			MP2	
19	2,000	ST	51 BR260819	THUMBSCREW, KNURLED M3	3			MP3	
20	8,000	ST	26 BR359157	TRANS. LOPOW BC 251 SI-P T	4			Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8	
21	3,000	ST	21 BR240486	RES CARB. 3K3 1/4J SFR25	4			R1, R55, R59	
22	1,000	ST	21 BR457647	RES NETW 9X10K 1/5G	4			R2	
23	2,000	ST	21 BR457671	RES NETW 8X15K 1/4G	4			R3, R4	
24	1,000	ST	21 BR372188	RES NETW 9X47K 1/8M	4			R5	
25	1,000	ST	21 BR240184	RES CARB. 47R 1/4J SFR25	4			R6	

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TITLE: 8-LINE MONITOR A5

DOCUMENT NO.: 60 - BR471941 (471941)

REV: A1

SHEET NO.: 1 OF 2

A4 Form 200473 FB Rev A

PARTS LIST

PRINTET..... 89/12/07
PARTS LIST PER.. 89/12/06

FIND NO.	QTY RQD	U M	ITEM OR DOCUMENT NUMBER	NOMENCLATURE	I T	PREP NO.	BIN	REFERENCE DESIGNATION	LINE REV
26	3,000	ST	21 BR462063	RES FILM 24K3 0,6F MRS25	4			R7, R8, R9	
27	4,000	ST	21 BR240567	RES CARB. 10K 1/4J SFR25	4			R10, R11, R56, R57	
28	1,000	ST	21 BR240370	RES CARB. 620R 1/4J SFR25	4			R12	
29	2,000	ST	21 BR240680	RES CARB. 47K 1/4J SFR25	4			R13, R14	
30	16,000	ST	21 BR240400	RES CARB. 1K0 1/4J SFR25	4			R15, R17, R20, R22, R25, R27, R30, R32, R35, R37, R40, R42,	
31	16,000	ST	21 BR240494	RES CARB. 3K9 1/4J SFR25	4			R45, R47, R50, R52 R16, R18, R21, R23, R26, R28, R31, R33, R36, R38, R41, R43,	
32	8,000	ST	21 BR238864	RES CARB. 620R 1K	4			R46, R48, R51, R53 R19, R24, R29, R34, R39, R44, R49, R54	
33	1,000	ST	21 BR361534	RES CARB. 16K 1/4J SFR25	4			R58	
34	2,000	ST	21 BR240745	RES CARB. 100K 1/4J SFR25	4			R60, R61	
35	1,875	ST	33 BR471798	SW,PCP DIP-FIX 8X ON/OFF	4			S1, S2, S3, S4, S5, S6, S7, S8, S9, S10	
36	1,000	ST	25 BR373206	TRAFO,LINE 600:600R	4			T1	
37	1,000	ST	24 BR404586	IC DGTL 74 45N BCD-DECIMA	4			U1	
38	1,000	ST	24 BR433683	IC DGTL 74LS138 3-8 DECOD	4			U2	
39	1,000	ST	24 BR451029	IC DGTL 74LS377N 8X D-FF	4			U3	
40	1,000	ST	24 BR462292	IC LIN TL 084 4X OP.AMP.	4			U4	
41	1,000	ST	24 BR362131	IC DGTL 74 06N 6X INV-BUF	4			U5	
42	5,000	ST	24 BR354821	IC DGTL 4066B 4X ANA.SW.	4			U6, U7, U8, U9, U10	
43	2,000	ST	31 BR495905	CONN D ACCESS. JACK SOCKT	4				A1
**********			**********	********** BILL OF DOCUMENTATION	**********			**********	**********
			BR471941 EB	8-LINE MONITOR A5					
			BR471941 EC	8-LINE MONITOR A5					
			BR471941 PD	8-LINE MONITOR A5					
			BRQA4450 TP	8-LINE MON.A5 RC40XX					
**********			**********	********** NEXT ASSY **********	**********			**********	**********
	0,000	ST	BR495123	PANEL RC4010 RX REMOTE	1				

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TITLE: 8-LINE MONITOR A5

DOCUMENT NO.: 60 - BR471941 (471941)

REV: A1

SHEET NO.: 2 OF 2

A4 Form 200473 FB Rev A

PARTS LIST

PRINTET..... 89/12/07
PARTS LIST PER.. 89/12/06

FIND NO.	QTY RQD	U M	ITEM OR DOCUMENT NUMBER	NOMENCLATURE	I T	PREP NO.	BIN	REFERENCE DESIGNATION	LINE REV
1	1,000	ST	37 BR487848	PWB,MICROCOMP.RTC A8	3				
2	1,000	ST	20 BR391921	BATTERY 3V LITHIUM	4			BT1	
3	2,000	ST	22 BR459410	CAP. ELEC 10U 10 M	4			C1,C47	
4	1,000	ST	22 BR451339	CAP. ELEC 15U 10 M	4			C2	
5	1,000	ST	22 BR357650	CAP. CER. 22N 63 A HI-K	4			C3	
6	1,000	ST	22 BR437395	CAP. CER. 220P 100 G N750	4			C4	
7	4,000	ST	22 BR450510	CAP. CER. 100N 63 S	4			C5,C6,C7,C54	C
8	3,000	ST	22 BR357642	CAP. CER. 10N 100 S HI-K	4			C9,C11,C15	
9	1,000	ST	22 BR492795	CAP. PLST 33N 63 K	4			C10	
10	1,000	ST	22 BR349070	CAP. PLST 680N 100 K	4			C12	
11	1,000	ST	22 BR202991	CAP. PLST 220N 100 K	4			C13	
12	1,000	ST	22 BR454117	CAP. PLST 68N 250 K	4			C14	
13	3,000	ST	22 BR450529	CAP. ELEC 6U8 25 M	4			C16,C17,C18	
14	1,000	ST	22 BR357634	CAP. CER. 2N2 100 K HI-K	4			C42	
15	3,000	ST	23 BR228001	DIO SCHOT BAT 85 SI 200MA	4			CR1,CR11,CR19	
16	9,000	ST	23 BR228087	DIO SIGN. 1N4148 SI 150MA	4			CR4,CR5,CR6,CR7,CR8,CR9, CR10,CR12,CR14	
18	1,000	ST	23 BR328324	DIO SIGN. AAZ 15 GE 140MA	4			CR23	
19	5,000	ST	51 BR458694	SCREW M 2,5X 5 CHM CU SN	4			H1	
20	1,000	ST	31 BR495905	CONN D ACCESS. JACK SOCKT	4			H2	
21	8,000	ST	26 BR392707	TRANS.ACCESS PAD TO-18	4			H3	
22	0,010	M	46 BR260843	PAD,RUBBER ADHESIV 3,2X19	4			H4	
23	1,000	ST	45 BR371157	STRAP,CABLE L 92XB2,6	4			H6	
24	1,000	ST	31 BR368016	CONN D PWB ANG 15P FEMALE	4			J1	
25	3,000	ST	25 BR363944	COIL,CHOKE HF WIDE BAND	4			L1,L2,L3	
26	1,000	ST	41 BR489808	REAR PLATE A 8 MICROC.RTC	1			MP1	
27	1,000	ST	45 BR448095	RETAINER,PC 5X5X109 MM	2			MP2	
28	2,000	ST	51 BR260819	THUMBSCREW,KNURLED M3	3			MP3	
29	3,000	ST	26 BR392820	TRANS.LOPOW 2N2222A SI-N	4			Q1,Q2,Q3	
30	1,000	ST	26 BR273899	TRANS.LOPOW BC 547B SI-N	4			Q8	
31	1,000	ST	26 BR273910	TRANS.LOPOW BC 177 SI-P T	4			Q9	
32	1,000	ST	26 BR392839	TRANS.LOPOW 2N2907A SI-P	4			Q11	
33	1,000	ST	21 BR240451	RES CARB. 2K2 1/4J SFR25	4			R1	
34	3,000	ST	21 BR240745	RES CARB. 100K 1/4J SFR25	4			R2,R3,R78	
35	1,000	ST	21 BR357693	RES CARB. 150K 1/4J SFR25	4			R4	
36	28,000	ST	21 BR240400	RES CARB. 1K0 1/4J SFR25	4			R5,R7,R10,R11,R12,R13,R19,	

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TITLE: MICROCOMPUTER ASSY A8 RTC

DOCUMENT NO.: 60 - BR487740 (487740)

REV: C

SHEET NO.: 1 OF 4

A4 Form 200473 FB Rev A

PARTS LIST

PRINTET..... 89/12/07
PARTS LIST PER.. 89/12/06

FIND NO.	QTY RQD	U M	ITEM OR DOCUMENT NUMBER	NOMENCLATURE	I T	PREP NO.	BIN	REFERENCE DESIGNATION	LINE REV
								R21, R25, R27, R33, R34, R35, R36, R39, R40, R41, R42, R47, R48, R49, R51, R82, R88, R89, R97, R98, R99	
37	3,000	ST	21 BR372137	RES CARB. 20K 1/4J SFR25	4			R6, R59, R62	
38	2,000	ST	21 BR240699	RES CARB. 51K 1/4J SFR25	4			R8, R9	
39	3,000	ST	21 BR240516	RES CARB. 4K7 1/4J SFR25	4			R14, R15, R102	B
40	7,000	ST	21 BR241458	RES CARB. 1KO 1/2JSFR25H	4			R16, R17, R22, R23, R28, R29, R103	B
41	3,000	ST	21 BR240257	RES CARB. 180R 1/4J SFR25	4			R18, R24, R30	
42	3,000	ST	21 BR240494	RES CARB. 3K9 1/4J SFR25	4			R20, R26, R32	
44	2,000	ST	21 BR324205	RES CARB. 5K1 1/4J SFR25	4			R64, R66	
45	7,000	ST	21 BR240567	RES CARB. 10K 1/4J SFR25	4			R65, R77, R79, R81, R83, R85, R96	
46	1,000	ST	21 BR391093	RES SEMIV 20K 1/2K CERM	4			R67	
47	7,000	ST	21 BR240702	RES CARB. 56K 1/4J SFR25	4			R68, R72, R73, R84, R86, R87, R93	
48	1,000	ST	21 BR240869	RES CARB. 1MO 1/4J SFR25	4			R69	
49	1,000	ST	21 BR240583	RES CARB. 12K 1/4J SFR25	4			R70	
50	1,000	ST	21 BR240532	RES CARB. 6K2 1/4J SFR25	4			R71	
51	2,000	ST	21 BR240338	RES CARB. 390R 1/4J SFR25	4			R75, R95	
52	1,000	ST	21 BR240605	RES CARB. 15K 1/4J SFR25	4			R80	
53	1,000	ST	21 BR240443	RES CARB. 2KO 1/4J SFR25	4			R90	
54	1,000	ST	21 BR380393	RES CARB. 270K 1/4J SFR25	4			R100	
55	1,000	ST	21 BR240508	RES CARB. 4K3 1/4J SFR25	4			R101	
56	2,000	ST	31 BR458562	CONN AMP MODU2 18P MALE	4			TP	
57	1,000	ST	24 BR433799	IC DGTL 8085 MICROPROC.	4			U1	
58	1,000	ST	24 BR488119	IC DGTL 74HCT123 2XMONOST	4			U2	
59	3,000	ST	24 BR488038	IC DGTL 74HCT 04 6XINVERT	4			U3, U5, U10	
60	1,000	ST	24 BR488062	IC DGTL 74HCT 14 6XINV.ST	4			U4	
61	4,000	ST	24 BR362131	IC DGTL 74 06N 6X INV-BUF	4			U6, U37, U47, U56	B
62	1,000	ST	24 BR488046	IC DGTL 74HCT 08 4X2IN AN	4			U7	
63	2,000	ST	24 BR488003	IC DGTL 74HCT 00 4X2IN NA	4			U8, U15	
64	4,000	ST	24 BR488682	IC DGTL 74HCT161 BIN COUN	4			U9, U38, U39, U40	
65	2,000	ST	24 BR488070	IC DGTL 74HCT 32 4X2IN OR	4			U11, U20	
66	1,000	ST	24 BR451614	IC DGTL 74LS373N 8X D LAT	4			U12	

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TITLE: MICROCOMPUTER ASSY A8 RTC

DOCUMENT NO.: 60 - BR487740 (487740)

REV: C

SHEET NO.: 2 OF 4

A4 Form 200473 FB Rev A

PARTS LIST

PRINTET..... 89/12/07
PARTS LIST PER.. 89/12/06

FIND NO.	QTY RQD	U M	ITEM OR DOCUMENT NUMBER	NOMENCLATURE	I T	PREP NO.	BIN	REFERENCE DESIGNATION	LINE REV
67	1,000	ST	24 BR451169	IC DGTL 74LS365N 6X BUSDR	4			U13	
68	2,000	ST	24 BR488089	IC DGTL 74HCT 74 2X D-FF	4			U14,U28	
69	2,000	ST	24 BR451592	IC DGTL 74LS240N 8X BUF.I	4			U16,U41	
70	2,000	ST	24 BR451606	IC DGTL 74LS245N 8 BIT TR	4			U17,U27	
71	1,000	ST	24 BR488054	IC DGTL 74HCT 11 3X3IN AN	4			U18	
72	2,000	ST	24 BR488127	IC DGTL 74HCT138 3-8 DECO	4			U19,U21	
73	2,000	ST	24 BR488674	IC DGTL 74HCT 21 4X2IN AN	4			U22,U48	
74	1,000	ST	24 BR487503	IC DGTL 62421B RT CLOCK	4			U26	
75	3,000	ST	24 BR404381	IC 7438	4			U29,U30,U31	B
76	1,000	ST	24 BR390909	IC DGTL 1488L 4XLINEDRIV	4			U32	
77	1,000	ST	24 BR390917	IC DGTL 1489A 4XLIN RCVR	4			U33	
78	3,000	ST	24 BR433632	IC LIN MCA 255 OPTO ISOL	4			U34,U35,U36	
79	1,000	ST	24 BR488739	IC DGTL 74HCT259 8X LATCH	4			U42	
80	1,000	ST	24 BR488216	IC DGTL 74HCT374 8X D-FF	4			U43	B
81	1,000	ST	24 BR451568	IC DGTL 74LS145N BCD-DEC	4			U44	
82	1,000	ST	24 BR487511	IC DGTL 6264 8KX8 SRAM	4			U45	
83	1,000	ST	24 BR355003	IC DGTL 4049B 6X INV-BUF	4			U49	
84	1,000	ST	24 BR354899	IC DGTL 4027A 2X JK FF	4			U50	
85	1,000	ST	24 BR355046	IC DGTL 4071B 4X2 INP OR	4			U51	
86	1,000	ST	24 BR451029	IC DGTL 74LS377N 8X D-FF	4			U52	
87	1,000	ST	24 BR451215	IC LIN DAC-08EN D/A CONV.	4			U53	
88	2,000	ST	24 BR450294	IC LIN TL 082CP OP.AMP.	4			U54,U55	
89	2,000	ST	24 BR354821	IC DGTL 4066B 4X ANA.SW.	4			U57,U58	
90	1,000	ST	24 BR455474	IC LIN LM 3302N VOLT COMP	4			U59	
91	2,000	ST	23 BR363324	DIO ZEN ZPD 5.1 5.1V 0.5W	4			VR1,VR2	
92	1,000	ST	23 BR228834	DIO ZEN ZPD 4.7 4.7V 0.5W	4			VR3	
93	0,020	KG	32 BR394297	COIL-WIRE,COP 0,50MM	4			W1	
94	1,000	ST	24 BR451452	IC ACCESS 40 PIN SOCKET	4			XU1	
95	5,000	ST	24 BR435120	IC ACCESS 28 PIN SOCKET	4			XU23,XU24,XU25,XU45,XU46	
96	1,000	ST	24 BR380008	IC ACCESS 18 PIN SOCKET	4			XU26	
97	2,000	ST	24 BR362832	IC ACCESS 14 PIN SOCKET	4			XU32,XU33	
98	1,000	ST	20 BR433853	CRYSTAL 6,14400MHZ HC18-U	4			Y1	
99	1,000	ST	31 BR498173	JUMPER 0,1 " 2 PIN	4			S7	B
100	1,000	ST	31 BR477079	CONN MOLEX 3P MALE	4			S8	B
101	2,000	ST	21 BR451398	RES NETW 9X4K7 1/5G	4			R104,R105	B
102	31,000	ST	22 BR459534	CAP. PLST 100N 63 M	4			C19,C20,C21,C22,C23,C24,	C

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TITLE: MICROCOMPUTER ASSY A8 RTC

DOCUMENT NO.: 60 - BR487740 (487740)

REV: C

SHEET NO.: 3 OF 4

A4 Form 200473 FB Rev A

PARTS LIST

PRINTET..... 89/12/07
PARTS LIST PER.. 89/12/06

FIND NO.	QTY RQD	U M	ITEM OR DOCUMENT NUMBER	NOMENCLATURE	I T	PREP NO.	BIN	REFERENCE DESIGNATION	LINE REV
								C25, C26, C27, C28, C29, C30, C31, C32, C33, C34, C35, C36, C37, C38, C39, C40, C48, C49, C50, C51, C52, C53, C57, C58, C59	
103	1,000	ST	21 BR457639	RES NETW 7X4K7 1/5G	4			R106	B
104	1,000	ST	31 BR446068	CONN D PWB ANG 9P FEMALE	4			J2	B
105	1,000	ST	31 BR493910	JUMPER 0,1" 2P FEMALE	4			VED J	B
**********			**********	*** BILL OF DOCUMENTATION	**********			**********	**********
			BR487740 EB	MICROCOMPUTER ASSY A8					
			BR487740 EC	MICROCOMPUTER ASSY A8 -RT					
			BR487740 PD	MICROCOMPUTER ASSY A8 -RT					
**********			**********	********** NEXT ASSY **********	**********			**********	**********
	1,000	ST	BR488100	PANEL SE4010 SYNTHEX	1				
	1,000	ST	BR490008	RX 4010 SSB/ISB	1				
	1,000	ST	BR491500	PANEL TC4010 TX REMOTE	1				
	1,000	ST	BR495123	PANEL RC4010 RX REMOTE	1				

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TITLE: MICROCOMPUTER ASSY A8 RTC

DOCUMENT NO.: 60 - BR487740 (487740)

REV: C

SHEET NO.: 4 OF 4

PARTS LIST

PRINTET..... 89/12/07
PARTS LIST PER.. 89/12/06

FIND NO.	QTY RQD	U M	ITEM OR DOCUMENT NUMBER	NOMENCLATURE	I T	PREP NO.	BIN	REFERENCE DESIGNATION	LINE REV
1	1,000	ST	37 BR471658	PWB MODEM ANA.	3				
2	1,000	ST	60 BR471631	MODEM DGTL ASSY A9A1	1			A1	
3	5,000	ST	31 BR451479	CONN AMP MODU2 10P FEMALE	4			AXP1, AXP2, AXP3, AXP4, AXP5	
4	5,000	ST	22 BR487449	CAP. TAN. 3U3 25 M	4			C1, C28, C38, C93, C94	
5	7,000	ST	22 BR209783	CAP. TAN. 1U 35 S	4			C3, C13, C56, C58, C59, C91, C128	
6	5,000	ST	22 BR448923	CAP. PLST 15N 63 F	4			C4, C21, C57, C76, C82	
7	23,000	ST	22 BR459534	CAP. PLST 100N 63 M	4			C6, C7, C60, C61, C62, C87, C98, C99, C100, C113, C114, C117, C119, C120, C121, C122, C123, C124, C125, C126, C127, C129, C130	
8	1,000	ST	22 BR373176	CAP. PLST 5N1 160 F	4			C8	
9	21,000	ST	22 BR209643	CAP. PLST 820P 400 F	4			C9, C14, C17, C18, C23, C24, C30, C31, C36, C37, C43, C44, C47, C51, C52, C55, C74, C78, C79, C84, C85	
10	1,000	ST	22 BR462993	CAP. PLST 33N 63 F	4			C10	
11	3,000	ST	22 BR446254	CAP. PLST 5N6 160 F	4			C11, C20, C92	
12	1,000	ST	22 BR466980	CAP. PLST 120P 630 H	4			C12	
13	2,000	ST	22 BR448893	CAP. PLST 5N1 160 H	4			C15, C40	
14	15,000	ST	22 BR357502	CAP. CER. 33P 100 G N150	4			C16, C19, C22, C25, C29, C32, C35, C41, C42, C45, C50, C53, C75, C77, C83	
15	1,000	ST	22 BR359661	CAP. PLST 680P 400 F	4			C26	
16	3,000	ST	22 BR367869	CAP. PLST 7N5 63 F	4			C27, C33, C39	
17	1,000	ST	22 BR396052	CAP. PLST 1N0 400 F	4			C34	
18	2,000	ST	22 BR203513	CAP. PLST 1N8 250 F	4			C46, C48	
19	1,000	ST	22 BR448907	CAP. PLST 10N 160 F	4			C49	
20	3,000	ST	22 BR209600	CAP. PLST 470P 400 F	4			C54, C73, C81	
21	4,000	ST	22 BR450863	CAP. PLST 10N 400 J	4			C63, C64, C67, C68	
22	6,000	ST	22 BR437395	CAP. CER. 220P 100 G N750	4			C65, C66, C69, C107, C108, C109	
23	6,000	ST	22 BR393959	CAP. CER. 100N 50 M	4			C70, C71, C72, C95, C96, C97	
24	1,000	ST	22 BR359688	CAP. PLST 270P 400 F	4			C80	
25	1,000	ST	22 BR362867	CAP. PLST 15N 250 K	4			C86	

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TITLE: MODEM ANALOG ASSY A9

DOCUMENT NO.: 60 - BR471666 (471666)

REV: B

SHEET NO.: 1 OF 5

A4 Form 200473 FB Rev A

PARTS LIST

PRINTET..... 89/12/07
PARTS LIST PER.. 89/12/06

FIND NO.	QTY RQD	U M	ITEM OR DOCUMENT NUMBER	NOMENCLATURE	I T	PREP NO.	BIN	REFERENCE DESIGNATION	LINE REV
26	1,000	ST	22 BR475386	CAP. PLST 3N0 250 F	4			C88	
27	1,000	ST	22 BR384895	CAP. PLST 22N 63 F	4			C89	
28	1,000	ST	22 BR358940	CAP. PLST 2N2 250 F	4			C90	
29	17,000	ST	23 BR228087	DIO SIGN. 1N4148 SI 150MA	4			CR1,CR2,CR3,CR4,CR5,CR6, CR7,CR8,CR9,CR10,CR11, CR12,CR13,CR14,CR15,CR23,	
30	6,000	ST	23 BR492566	DIO LED HLMPK150 RED Ø3	4			CR24 CR16,CR17,CR18,CR19,CR20, CR21	
31	1,000	ST	23 BR363324	DIO ZEN ZPD 5.1 5.1V 0.5W	4			CR22	
32	11,000	ST	22 BR450510	CAP. CER. 100N 63 S	4			C101,C103,C106,C133,C134, C135,C136,C137,C138,C139, C140	
33	3,000	ST	22 BR450359	CAP. ELEC 1U 25 M	4			C5,C102,C111	B
34	1,000	ST	22 BR396621	CAP. PLST 22N 400 M	4			C104	
35	1,000	ST	22 BR390291	CAP. PLST 47N 63 F	4			C105	
36	1,000	ST	22 BR450529	CAP. ELEC 6U8 25 M	4			C110	
37	1,000	ST	22 BR396389	CAP. CER. 680P 40 M	4			C112	
38	5,000	ST	22 BR209805	CAP. TAN. 6U8 35 S	4			C115,C116,C118,C131,C132	
39	4,000	ST	51 BR458694	SCREW M 2,5X 5 CHM CU SN	4			H1	
40	8,000	ST	51 BR276790	SCREW M 3 X 5 CHM CU SN	4			H2	
41	2,000	ST	31 BR495905	CONN D ACCESS. JACK SOCKT	4			H3	
42	4,000	ST	31 BR392715	GLASPERLER 2.5/1MMX2M	4			H4	
43	1,000	ST	31 BR368016	CONN D PWB ANG 15P FEMALE	4			J6	
44	1,000	ST	31 BR390895	CONN D PWB ANG 25P FEMALE	4			J7	
45	3,000	ST	25 BR363944	COIL,CHOKE HF WIDE BAND	4			L1,L2,L3	
46	1,000	ST	41 BR476099	REAR PLATE A 9 R 4000	1			MP1	
47	2,000	ST	51 BR260819	THUMBSCREW,KNURLED M3	3			MP2	
48	1,000	ST	45 BR448095	RETAINER,PC 5X5X109 MM	2			MP3	
49	4,000	ST	52 BR453137	STAY NUT M3 X12 N5	3			MP4	
50	9,000	ST	26 BR273899	TRANS.LOPOW BC 547B SI-N	4			Q1,Q3,Q4,Q7,Q10,Q11,Q12, Q13,Q14	
51	5,000	ST	26 BR359157	TRANS.LOPOW BC 251 SI-P T	4			Q2,Q5,Q6,Q8,Q9	
52	27,000	ST	21 BR240567	RES CARB. 10K 174J SFR25	4			R1,R4,R5,R10,R28,R29,R57, R62,R63,R71,R74,R81,R83, R87,R90,R91,R92,R93,R94,	

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TITLE: MODEM ANALOG ASSY A9

DOCUMENT NO.: 60 - BR471666 (471666)

REV: B

SHEET NO.: 2 OF 5

PARTS LIST

PRINTET..... 89/12/07
PARTS LIST PER.. 89/12/06

FIND NO.	QTY RQD	U M	ITEM OR DOCUMENT NUMBER	NOMENCLATURE	I T	PREP NO.	BIN	REFERENCE DESIGNATION	LINE REV
								R99, R109, R110, R124, R125, R126, R143, R192	
53	11,000	ST	21 BR240516	RES CARB. 4K7 1/4J SFR25	4			R2, R21, R64, R70, R97, R102, R111, R134, R135, R189, R191	
54	2,000	ST	21 BR240400	RES CARB. 1KO 1/4J SFR25	4			R3, R16	
55	5,000	ST	21 BR240680	RES CARB. 47K 1/4J SFR25	4			R6, R8, R13, R141, R154	
56	3,000	ST	21 BR240664	RES CARB. 39K 1/4J SFR25	4			R7, R85, R155	
57	5,000	ST	21 BR240605	RES CARB. 15K 1/4J SFR25	4			R9, R12, R84, R139, R168	
58	4,000	ST	21 BR240648	RES CARB. 27K 1/4J SFR25	4			R11, R72, R73, R169	
59	4,000	ST	21 BR324205	RES CARB. 5K1 1/4J SFR25	4			R14, R15, R65, R66	
60	6,000	ST	21 BR450316	RES FILM 47K5 0,6F MRS25	4			R17, R158, R159, R161, R162, R165	
61	1,000	ST	21 BR359351	RES FILM 36K5 0,6F MRS25	4			R18	
62	1,000	ST	21 BR432881	RES FILM 30K1 0,6F MRS25	4			R19	
63	2,000	ST	21 BR240265	RES CARB. 200R 1/4J SFR25	4			R20, R69	
64	16,000	ST	21 BR240745	RES CARB. 100K 1/4J SFR25	4			R22, R23, R24, R80, R131, R136, R146, R147, R148, R150, R152, R171, R181, R182, R183, R184	
65	3,000	ST	21 BR462063	RES FILM 24K3 0,6F MRS25	4			R25, R26, R27	
66	26,000	ST	21 BR349623	RES FILM 10KO 0,6F MRS25	4			R30, R31, R32, R36, R37, R38, R39, R40, R41, R45, R46, R47, R48, R49, R50, R54, R55, R56, R114, R115, R116, R117, R118, R119, R120, R123	
67	3,000	ST	21 BR328634	RES CARB. 4M7 1/4K SFR25	4			R33, R42, R51	
68	1,000	ST	21 BR368563	RES FILM 133R 0,6F MRS25	4			R34	
69	1,000	ST	21 BR371432	RES FILM 9K09 0,6F MRS25	4			R35	
70	1,000	ST	21 BR349607	RES FILM 18K2 0,6F MRS25	4			R43	
71	1,000	ST	21 BR376388	RES FILM 681R 0,6F MRS25	4			R44	
72	1,000	ST	21 BR368539	RES FILM 7K50 0,6F MRS25	4			R52	
73	1,000	ST	21 BR349542	RES FILM 22K1 0,6F MRS25	4			R53	
74	4,000	ST	21 BR390267	RES FILM 11KO 0,6F MRS25	4			R58, R61, R105, R108	
75	2,000	ST	21 BR376418	RES FILM 82K5 0,6F MRS25	4			R59, R106	
76	2,000	ST	21 BR467146	RES FILM 511K 0,6F MRS25	4			R60, R107	
77	1,000	ST	21 BR373486	RES FILM 3K32 0,6F MRS25	4			R67	
78	1,000	ST	21 BR454354	RES FILM 20K5 0,6F MRS25	4			R68	

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TITLE: MODEM ANALOG ASSY A9

DOCUMENT NO.: 60 - BR471666 (471666)

REV: B

SHEET NO.: 3 OF 5

A4 Form 200473 FB Rev A

PARTS LIST

PRINTET..... 89/12/07
PARTS LIST PER.. 89/12/06

FIND NO.	QTY RQD	U M	ITEM OR DOCUMENT NUMBER	NOMENCLATURE	I T	PREP NO.	BIN	REFERENCE DESIGNATION	LINE REV
79	3,000	ST	21 BR240486	RES CARB. 3K3 1/4J SFR25	4			R75, R104, R140	
80	1,000	ST	21 BR380393	RES CARB. 270K 1/4J SFR25	4			R76	
81	2,000	ST	21 BR240559	RES CARB. 8K2 1/4J SFR25	4			R77, R142	
82	6,000	ST	21 BR328626	RES CARB. 220K 1/4J SFR25	4			R78, R79, R137, R138, R144, R164	
83	1,000	ST	21 BR240702	RES CARB. 56K 1/4J SFR25	4			R82	
84	1,000	ST	21 BR240451	RES CARB. 2K2 1/4J SFR25	4			R86	
85	1,000	ST	21 BR240109	RES CARB. 10R 1/4J SFR25	4			R88	
86	2,000	ST	21 BR240370	RES CARB. 620R 1/4J SFR25	4			R89, R98	
87	2,000	ST	21 BR450979	RES CARB. 360R 1/4J SFR25	4			R95, R100	
88	2,000	ST	21 BR240419	RES CARB. 1K2 1/4J SFR25	4			R96, R101	
89	1,000	ST	21 BR361534	RES CARB. 16K 1/4J SFR25	4			R103	
90	2,000	ST	21 BR240826	RES CARB. 330K 1/4J SFR25	4			R112, R121	
91	3,000	ST	21 BR357693	RES CARB. 150K 1/4J SFR25	4			R113, R122, R153	
92	2,000	ST	21 BR240842	RES CARB. 510K 1/4J SFR25	4			R129, R130	
93	1,000	ST	21 BR371963	RES CARB. 62K 1/4J SFR25	4			R132	
94	2,000	ST	21 BR359165	RES SEMIV 10K 1/2K CERM	4			R133, R202	
95	1,000	ST	21 BR240478	RES CARB. 2K7 1/4J SFR25	4			R145	
96	8,000	ST	21 BR240621	RES CARB. 22K 1/4J SFR25	4			R149, R151, R157, R160, R173, R174, R175, R212	
97	1,000	ST	21 BR240524	RES CARB. 5K6 1/4J SFR25	4			R156	
98	1,000	ST	21 BR467081	RES FILM 2K15 0,6F MRS25	4			R163	
99	1,000	ST	21 BR367826	RES FILM 2K49 0,6F MRS25	4			R166	
100	2,000	ST	21 BR240494	RES CARB. 3K9 1/4J SFR25	4			R167, R170	
101	1,000	ST	21 BR240532	RES CARB. 6K2 1/4J SFR25	4			R172	
102	4,000	ST	21 BR240427	RES CARB. 1K5 1/4J SFR25	4			R176, R177, R178, R179	
103	1,000	ST	21 BR241334	RES CARB. 330R 1/2JSFR25H	4			R180	
104	1,000	ST	21 BR451363	RES NETW 5X2K2 1/5G	4			R185	
105	1,000	ST	21 BR457655	RES NETW 4X3K3 1/5G	4			R186	
106	1,000	ST	21 BR372196	RES NETW 5X47K 1/8M	4			R187	
107	1,000	ST	21 BR372188	RES NETW 9X47K 1/8M	4			R188	
108	1,000	ST	21 BR240540	RES CARB. 6K8 1/4J SFR25	4			R190	
109	1,000	ST	21 BR368636	RES SEMIV 2K 1/2K CERM	4			R201	
110	4,000	ST	21 BR365963	RES SEMIV 5K 1/2K CERM	4			R203, R204, R206, R207	
111	1,000	ST	21 BR361550	RES SEMIV 100K 1/2K CERM	4			R205	
112	1,000	ST	21 BR372072	RES SEMIV 100K 1/2K CERM	4			R208	

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TITLE: MODEM ANALOG ASSY A9

DOCUMENT NO.: 60 - BR471666 (471666)

REV: B

SHEET NO.: 4 OF 5

PARTS LIST

PRINTET..... 89/12/07
PARTS LIST PER.. 89/12/06

FIND NO.	QTY RQD	U M	ITEM OR DOCUMENT NUMBER	NOMENCLATURE	I T	PREP NO.	BIN	REFERENCE DESIGNATION	LINE REV
113	2,000	ST	21 BR391980	RES SEMIV 2K 1/2K CERM	4			R209,R210	
114	1,000	ST	21 BR357715	RES SEMIV 1K 1/2K CERM	4			R211	
115	1,750	ST	33 BR471771	SW,PWB DIP-FIX 4X CHANGE	4			S1,S3,S2A,S2B,S13A,S13B,	
116	2,250	ST	33 BR471798	SW,PCP DIP-FIX 8X ON/OFF	4			S14C S15,S16,S17,S18,S20,S21, S5A,S5B,S7A,S7B,S7C,S10A,	
117	2,000	ST	25 BR373206	TRAFO,LINE 600:600R	4			S10B,S10C,S22A,S22B,S22C, S22D T1,T2	
118	9,000	ST	31 BR231304	TERMINAL STUD 2,5X7 Ø1,3	4			TP	
119	10,000	ST	24 BR462292	IC LIN TL 084 4X OP.AMP.	4			U1,U2,U3,U4,U5,U8,U9,U10, U11,U13	
120	1,000	ST	24 BR392561	IC LIN NE 567N PLL DECOD	4			U6	
121	1,000	ST	24 BR462950	IC LIN XR 2211C TONE DECO	4			U7	
122	1,000	ST	24 BR354821	IC DGTL 4066B 4X ANA.SW.	4			U12	
123	2,000	ST	24 BR475122	IC LIN XR 2206 FUNC.GEN.	4			U14,U15	
124	1,000	ST	24 BR357707	IC LIN MC 1458P OP.AMPL.	4			U16	
125	1,000	ST	24 BR475130	IC DGTL 26LS 29 LINEDRIVE	4			U17	
**********				********** BILL OF DOCUMENTATION	**********				
			BR471666 EB	MODEM ANALOG ASSY A9					
			BR471666 EC	MODEM ANALOG ASSY A9					
			BR471666 PD	MODEM ANALOG ASSY A9					
			BRQA4490 TP	MODEM, ANALOG RX4000 A9					
**********				********** NEXT ASSY **********					
	0,000	ST	BR488100	PANEL SE4010 SYNTHEX	1				
	0,000	ST	BR490008	RX 4010 SSB/ISB	1				
	0,000	ST	BR491500	PANEL TC4010 TX REMOTE	1				
	0,000	ST	BR495123	PANEL RC4010 RX REMOTE	1				

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TITLE: MODEM ANALOG ASSY A9

DOCUMENT NO.: 60 - BR471666 (471666)

REV: B

SHEET NO.: 5 OF 5

A4 Form 200473 FB Rev A

PARTS LIST

PRINTET..... 89/12/07
PARTS LIST PER.. 89/12/06

FIND NO.	QTY RQD	U M	ITEM OR DOCUMENT NUMBER	NOMENCLATURE	I T	PREP NO.	BIN	REFERENCE DESIGNATION	LINE REV
1	1,000	ST	37 BR471623	PWB MODEM DIG.	3				
2	1,000	ST	22 BR450529	CAP. ELEC 6U8 25 M	4			C1	
3	21,000	ST	22 BR393959	CAP. CER. 100N 50 M	4			C2,C3,C4,C5,C6,C7,C8,C9,	
								C10,C11,C12,C13,C14,C15, C16,C17,C18,C19,C20,C21, C22	
4	1,000	ST	22 BR437395	CAP. CER. 220P 100 G N750	4			C23	
5	1,000	ST	23 BR228087	DIO SIGN. 1N4148 SI 150MA	4			CR1	
6	5,000	ST	31 BR451487	CONN AMP MODU2 10P MALE	4			P1,P2,P3,P4,P5	
7	1,000	ST	21 BR240451	RES CARB. 2K2 1/4J SFR25	4			R1	
8	2,000	ST	21 BR240435	RES CARB. 1K8 1/4J SFR25	4			R2,R3	
9	1,000	ST	21 BR357693	RES CARB. 150K 1/4J SFR25	4			R4	
10	3,000	ST	21 BR240516	RES CARB. 4K7 1/4J SFR25	4			R5,R7,R8	
11	1,000	ST	21 BR457647	RES NETW 9X10K 1/5G	4			R6	
12	2,000	ST	33 BR476587	SW,DIP 8PST 16PIN DIP	4			S1,S2	
13	18,000	ST	31 BR457698	WRAP-PIN 0.64X0.64X	4			TP	
14	2,000	ST	24 BR488062	IC DGTL 74HCT 14 6XINV.ST	4			U1,U22	
15	1,000	ST	24 BR488682	IC DGTL 74HCT161 BIN COUN	4			U2	
16	1,000	ST	24 BR488763	IC DGTL 74HCT393 2XBIN.CO	4			U3	
17	1,000	ST	24 BR488186	IC DGTL 74HCT245 8BIT TRC	4			U4	
18	2,000	ST	24 BR488070	IC DGTL 74HCT 32 4X2IN OR	4			U5,U17	
19	2,000	ST	24 BR488208	IC DGTL 74HCT373 8XD-LATC	4			U6,U12	
20	1,000	ST	24 BR462489	IC DGTL 8251A USART	4			U7	
21	1,000	ST	24 BR488178	IC DGTL 74HCT240 8XBUF.IN	4			U8	
22	1,000	ST	24 BR488054	IC DGTL 74HCT 11 3X3IN AN	4			U9	
23	2,000	ST	24 BR393622	IC DGTL 74 07N 6X BUF.OC.	4			U10,U23	
24	1,000	ST	24 BR488127	IC DGTL 74HCT138 3-8 DECO	4			U11	
25	1,000	ST	24 BR492396	IC DGTL 74HCT157 4X2 IN M	4			U13	
26	1,000	ST	24 BR488747	IC DGTL 74HCT273 8X D-FF	4			U14	
27	2,000	ST	24 BR476579	IC DGTL 2068B 4XDARLINGT	4			U15,U16	
28	2,000	ST	24 BR390917	IC DGTL 1489A 4XLIN RCVR	4			U18,U19	
29	2,000	ST	24 BR488038	IC DGTL 74HCT 04 6XINVERT	4			U20,U24	
30	1,000	ST	24 BR488046	IC DGTL 74HCT 08 4X2IN AN	4			U21	
31	1,000	ST	20 BR433853	CRYSTAL 6,14400MHZ HC18-U	4			Y1	
**********			**********	********** BILL OF DOCUMENTATION	**********			**********	

Dansk Radio AS

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TITLE: MODEM DGTL ASSY A9A1

DOCUMENT NO.: 60 - BR471631 (471631)

REV: A

SHEET NO.: 1 OF 2

PARTS LIST

PRINTET..... 89/12/07
PARTS LIST PER.. 89/12/06

FIND NO.	QTY RQD	U M	ITEM OR DOCUMENT NUMBER	NOMENCLATURE	I T	PREP NO.	BIN	REFERENCE DESIGNATION	LINE REV
			BR471631 EC BR471631 PD	MODEM DGTL ASSY A9A1 MODEM DGTL ASSY A9A1					
**********	**********	**********	**********	********** NEXT ASSY **********	**********	**********	**********	**********	**********
	1,000	ST	BR471666	MODEM ANALOG ASSY A9	1				

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TITLE: MODEM DGTL ASSY A9A1

DOCUMENT NO.: 60 - BR471631 (471631)

REV: A

SHEET NO.: 2 OF 2

A4 Form 200473 FB Rev A

PARTS LIST

PRINTET..... 89/12/07
PARTS LIST PER.. 89/12/06

FIND NO.	QTY RQD	U M	ITEM OR DOCUMENT NUMBER	NOMENCLATURE	I T	PREP NO.	BIN	REFERENCE DESIGNATION	LINE REV
34	1,000	ST	24 BR488186	IC DGTL 74HCT245 8BIT TRC	4			U5	
35	1,000	ST	24 BR488127	IC DGTL 74HCT138 3-8 DECO	4			U6	
36	1,000	ST	24 BR488038	IC DGTL 74HCT 04 6XINVERT	4			U7	
37	1,000	ST	24 BR488070	IC DGTL 74HCT 32 4X2IN OR	4			U8	
38	1,000	ST	24 BR362131	IC DGTL 74 06N 6X INV-BUF	4			U9	
39	1,000	ST	24 BR462489	IC DGTL 8251A USART	4			U10	
40	1,000	ST	24 BR390909	IC DGTL 1488L 4XLINEDRIV	4			U11	
41	1,000	ST	24 BR390917	IC DGTL 1489A 4XLIN RCVR	4			U12	
42	1,000	ST	24 BR357707	IC LIN MC 1458P OP.AMPL.	4			U13	
43	1,000	ST	24 BR488755	IC DGTL 74HCT365 6XBUSDRI	4			U14	
44	2,000	ST	24 BR491837	IC DGTL 75176 BUS TRCV.	4			U15,U16	
45	2,000	ST	23 BR362727	DIO ZEN ZPD13 13V 0.5W	4			VR2,VR3	
46	1,000	ST	20 BR433853	CRYSTAL 6,14400MHZ HC18-U	4			Y1	
**********	**********	**	**********	********** BILL OF DOCUMENTATION	**	**********	**********	**********	**********
			BR490598 EB	INTERFACE RS232 422/485					
			BR490598 EC	INTERFACE RS232 422/485					
			BR490598 PD	INTERFACE RS232 422/485					
			BRQA4492 TP	DIGITAL PART RX4000 A9					
**********	**********	**	**********	********** NEXT ASSY **********	**	**********	**********	**********	**********
	0,000	ST	BR488100	PANEL SE4010 SYNTHEX	1				
	0,000	ST	BR490008	RX 4010 SSB/ISB	1				
	0,000	ST	BR491500	PANEL TC4010 TX REMOTE	1				
	0,000	ST	BR495123	PANEL RC4010 RX REMOTE	1				

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TITLE: INTERF. RS232 422/485 A9

DOCUMENT NO.: 60 - BR490598 (490598)

REV: A

SHEET NO.: 2 OF 2

A4 Form 200473 FB Rev A

PARTS LIST

PRINTET..... 89/12/07
PARTS LIST PER.. 89/12/06

FIND NO.	QTY RQD	U M	ITEM OR DOCUMENT NUMBER	NOMENCLATURE	I T	PREP NO.	BIN	REFERENCE DESIGNATION	LINE REV
1	1,000	ST	37 BR490563	PWB,INTERFACE RS232 422/4	3				
2	2,000	ST	22 BR454117	CAP. PLST 68N 250 K	4			C1,C33	
3	7,000	ST	22 BR477176	CAP. CER. 330P 100 K	4			C2,C3,C4,C5,C6,C7,C8	
4	3,000	ST	22 BR450529	CAP. ELEC 6U8 25 M	4			C9,C11,C13	
5	19,000	ST	22 BR450510	CAP. CER. 100N 63 S	4			C10,C12,C14,C15,C16,C17, C18,C19,C20,C21,C22,C23, C24,C25,C26,C27,C28,C29, C36	
6	1,000	ST	22 BR437395	CAP. CER. 220P 100 G N750	4			C30	
7	3,000	ST	22 BR357529	CAP. CER. 47P 100 C N150	4			C31,C34,C35	
8	1,000	ST	22 BR451053	CAP. ELEC 68U 6,3 M	4			C32	
9	1,000	ST	23 BR228087	DIO SIGN. 1N4148 SI 150MA	4			CR1	
10	4,000	ST	51 BR458694	SCREW M 2,5X 5 CHM CU SN	4			H1	
11	1,000	ST	31 BR495905	CONN D ACCESS. JACK SOCKT	4			H2	
12	9,000	ST	31 BR231304	TERMINAL STUD 2,5X7 Ø1,3	4			H3	
13	1,000	ST	31 BR390895	CONN D PWB ANG 25P FEMALE	4			J1	
14	3,000	ST	25 BR363944	COIL,CHOKE HF WIDE BAND	4			L1,L2,L3	
15	1,000	ST	41 BR491829	REAR PLATE A 9 INTERFACE	1			MP1	
16	1,000	ST	45 BR448095	RETAINER,PC 5X5X109 MM	2			MP2	
17	2,000	ST	51 BR260819	THUMBSCREW,KNURLED M3	3			MP3	
18	1,000	ST	26 BR274097	TRANS.LOPOW BC 547C SI-N	4			Q2	
19	1,000	ST	26 BR359157	TRANS.LOPOW BC 251 SI-P T	4			Q3	
20	2,000	ST	21 BR240354	RES CARB. 510R 1/4J SFR25	4			R1,R10	
21	1,000	ST	21 BR240400	RES CARB. 1KO 1/4J SFR25	4			R2	
22	2,000	ST	21 BR240397	RES CARB. 820R 1/4J SFR25	4			R7,R8	
23	1,000	ST	21 BR240648	RES CARB. 27K 1/4J SFR25	4			R11	
24	1,000	ST	21 BR359165	RES SEMIV 10K 1/2K CERM	4			R12	
25	1,000	ST	21 BR240419	RES CARB. 1K2 1/4J SFR25	4			R13	
26	1,000	ST	21 BR240621	RES CARB. 22K 1/4J SFR25	4			R14	
27	2,000	ST	21 BR240125	RES CARB. 22R 1/4J SFR25	4			R15,R16	
28	2,000	ST	21 BR478741	RES NETW 7X10K	4			R17,R18	
29	1,000	ST	33 BR471798	SW,PCP DIP-FIX 8X ON/OFF	4			S1	
30	1,000	ST	25 BR362859	TRAFO,LINE 600:600R	4			T1	
31	1,000	ST	24 BR433535	IC DGTL 74LS04 6XINVERTER	4			U1	
32	1,000	ST	24 BR404780	IC DGTL 74LS90N DEC.COUNT	4			U2	
33	2,000	ST	24 BR488682	IC DGTL 74HCT161 BIN COUN	4			U3,U4	

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TITLE:
INTERF. RS232 422/485 A9

DOCUMENT NO.:
60 - BR490598
(490598)

REV:
A

SHEET NO.:
1 OF 2

PARTS LIST

PRINTET..... 89/12/07
PARTS LIST PER.. 89/12/06

FIND NO.	QTY RQD	U M	ITEM OR DOCUMENT NUMBER	NOMENCLATURE	I T	PREP NO.	BIN	REFERENCE DESIGNATION	LINE REV
1	1,000	ST	61 BR471534	REGULATOR-AF,ASSY A10A1	1			A1	
2	1,000	ST	25 BR488321	TRAFO ASSY A10A2	1			A2	
3	1,000	ST	56 BR476048	HEAT SINK ASSY A10A3	1			A3	
4	4,000	ST	51 BR458694	SCREW M 2,5X 5 CHM CU SN	4			H1	
5	2,000	ST	51 BR276790	SCREW M 3 X 5 CHM CU SN	4			H2	
6	4,000	ST	51 BR275638	SCREW M 4 X 8 CHJ GULCR	4			H3	
7	1,000	ST	31 BR495905	CONN D ACCESS. JACK SOCKT	4			H4	
8	2,000	ST	51 BR260819	THUMBSCREW,KNURLED M3	3			MP1	
**********			**********	********** BILL OF DOCUMENTATION	**********			**********	**********
			BR471720 PD	POWER SUPPLY ASSY A10 220					
**********			**********	********** NEXT ASSY **********	**********			**********	**********
	1,000	ST	BR495123	PANEL RC4010 RX REMOTE	1				

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TITLE: POWER SUPPLY ASSY A10

DOCUMENT NO.: 61 - BR476803 (476803)

REV: A

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PARTS LIST

PRINTET..... 89/12/07
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FIND NO.	QTY RQD	U M	ITEM OR DOCUMENT NUMBER	NOMENCLATURE	I T	PREP NO.	BIN	REFERENCE DESIGNATION	LINE REV
1	1,000	ST	37 BR471526	PWB,REGULATOR & AF A10A1	3				
2	4,000	ST	22 BR454265	CAP. ELEC 100U 25 T	4			C1,C17,C21,C40	
3	5,000	ST	22 BR202967	CAP. PLST 100N 100 K	4			C2,C22,C45,C46,C47	
4	12,000	ST	22 BR450510	CAP. CER. 100N 63 S	4			C3,C4,C6,C10,C13,C16,C18, C23,C42,C53,C55,C56	
5	9,000	ST	22 BR450529	CAP. ELEC 6U8 25 M	4			C5,C30,C34,C35,C38,C41, C43,C44,C50	
6	2,000	ST	22 BR451053	CAP. ELEC 68U 6,3 M	4			C7,C36	
7	2,000	ST	22 BR357634	CAP. CER. 2N2 100 K HI-K	4			C8,C14	
8	7,000	ST	22 BR357642	CAP. CER. 10N 100 S HI-K	4			C9,C15,C20,C24,C25,C26, C32	
9	1,000	ST	22 BR357499	CAP. CER. 27P 100 G N150	4			C11	
10	2,000	ST	22 BR454273	CAP. ELEC 220U 25 T	4			C12,C52	
11	2,000	ST	22 BR385123	CAP. CER. 4N7 100 K HI-K	4			C19,C48	
12	1,000	ST	22 BR450812	CAP. PLST 1N 160 J	4			C27	
13	2,000	ST	22 BR448907	CAP. PLST 10N 160 F	4			C28,C29	
14	1,000	ST	22 BR203246	CAP. PLST 10N 400 K	4			C31	
15	3,000	ST	22 BR476315	CAP. PLST 680N 50 J	4			C33,C39,C57	B
16	1,000	ST	22 BR454281	CAP. ELEC 1M 25 T	4			C37	
17	1,000	ST	22 BR344273	CAP. PLST 22N 250 K	4			C49	
18	1,000	ST	22 BR454117	CAP. PLST 68N 250 K	4			C51	
19	1,000	ST	22 BR209376	CAP. ELEC 470U 16 T LL	4			C54	
20	9,000	ST	23 BR228087	DIO SIGN. 1N4148 SI 150MA	4			CR1,CR2,CR3,CR4,CR5,CR6, CR7,CR8,CR9	
21	6,000	ST	51 BR458694	SCREW M 2,5X 5 CHM CU SN	4			H1	
22	5,000	ST	51 BR276790	SCREW M 3 X 5 CHM CU SN	4			H2	
23	1,000	ST	51 BR276804	SCREW M 3 X 8 CHM CU SN	4			H3	
24	6,000	ST	52 BR327514	NUT M 3 CONTRA M CU SN	4			H4	
25	1,000	ST	24 BR362069	IC ACCESS HEATSINK	4			H5	
26	1,000	ST	26 BR391387	TRANS.ACCESS ISOLAT.PLD	4			H6	
27	32,000	ST	56 BR386677	BEAD,STEATITE 3.18X3.18	4			H7,H10	
28	4,000	ST	31 BR442399	TERMINAL STUD 140-1785-2	4			H8	
29	1,000	ST	45 BR354554	STRAP,CABLE L191XB3,6	4			H9	
30	1,000	ST	31 BR458481	CONN MOLEX 11P MALE	4			J2	
31	1,000	ST	31 BR368016	CONN D PWB ANG 15P FEMALE	4			J3	
32	1,000	ST	31 BR454168	CONN MOLEX 2P MALE	4			J4	

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TITLE:
REGULATOR-AF,ASSY A10A1

DOCUMENT NO.:
61 - BR471534
(471534)

REV: B

SHEET NO.: 1 OF 4

PARTS LIST

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FIND NO.	QTY RQD	U M	ITEM OR DOCUMENT NUMBER	NOMENCLATURE	I T	PREP NO.	BIN	REFERENCE DESIGNATION	LINE REV
33	1,000	ST	41 BR458384	SCREEN SHIELD CAN A10A1	1			MP1	
34	1,000	ST	45 BR448095	RETAINER,PC 5X5X109 MM	2			MP2	
35	2,000	ST	52 BR455571	STAY NUT M2,5X15 Ø4,0-2,9	3			MP3	
36	5,000	ST	26 BR359157	TRANS.LOPOW BC 251 SI-P T	4			Q1,Q3,Q8,Q9,Q18	B
37	8,000	ST	26 BR273899	TRANS.LOPOW BC 547B SI-N	4			Q4,Q6,Q11,Q12,Q14,Q15,Q16, Q17	
38	3,000	ST	26 BR454206	TRANS.SCR 2N6402 200V16A	4			Q5,Q7,Q10	
39	1,000	ST	26 BR454605	TRANS.JFETN 2N3955 DUAL T	4			Q12	
40	1,000	ST	21 BR240583	RES CARB. 12K 1/4J SFR25	4			R1	
41	1,000	ST	21 BR324221	RES CARB. 2K4 1/4J SFR25	4			R3	
42	11,000	ST	21 BR240567	RES CARB. 10K 1/4J SFR25	4			R4,R14,R15,R17,R81,R102, R103,R105,R113,R117,R119	
43	2,000	ST	21 BR240621	RES CARB. 22K 1/4J SFR25	4			R5,R16	
44	1,000	ST	21 BR432881	RES FILM 30K1 0,6F MRS25	4			R6	
45	1,000	ST	21 BR349496	RES FILM 100K 0,6F MRS25	4			R7	
46	3,000	ST	21 BR240427	RES CARB. 1K5 1/4J SFR25	4			R8,R124,R125	
47	1,000	ST	21 BR240516	RES CARB. 4K7 1/4J SFR25	4			R10	
48	1,000	ST	21 BR240478	RES CARB. 2K7 1/4J SFR25	4			R11	
49	4,000	ST	21 BR240222	RES CARB. 100R 1/4J SFR25	4			R12,R41,R49,R61	
50	14,000	ST	21 BR240400	RES CARB. 1K0 1/4J SFR25	4			R18,R20,R24,R28,R29,R35, R37,R43,R51,R52,R53,R133, R134,R135	
51	2,000	ST	21 BR240494	RES CARB. 3K9 1/4J SFR25	4			R19,R36	
52	6,000	ST	21 BR240524	RES CARB. 5K6 1/4J SFR25	4			R21,R22,R38,R39,R54,R55	
53	2,000	ST	21 BR240192	RES CARB. 51R 1/4J SFR25	4			R23,R40	
54	2,000	ST	21 BR371963	RES CARB. 62K 1/4J SFR25	4			R24,R59	
55	1,000	ST	21 BR240648	RES CARB. 27K 1/4J SFR25	4			R25	
56	5,000	ST	21 BR454184	RES WIREW 0R1 4J	4			R26,R27,R44,R57,R58	
57	3,000	ST	21 BR369578	RES FILM 5K11 0,6F MRS25	4			R30,R31,R32	
58	5,000	ST	21 BR240311	RES CARB. 330R 1/4J SFR25	4			R33,R34,R62,R123,R126	
59	2,000	ST	21 BR240249	RES CARB. 150R 1/4J SFR25	4			R45,R132	
60	1,000	ST	21 BR324183	RES CARB. 30K 1/4J SFR25	4			R46	
61	1,000	ST	21 BR372129	RES FILM 178K 0,6F MRS25	4			R47	
62	1,000	ST	21 BR376434	RES FILM 59K0 0,6F MRS25	4			R48	
63	1,000	ST	21 BR328545	RES CARB. 220R 1/4J SFR25	4			R50	
64	1,000	ST	21 BR240265	RES CARB. 200R 1/4J SFR25	4			R56	

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TITLE:
REGULATOR-AF,ASSY A10A1

DOCUMENT NO.:
61 - BR471534
(471534)

REV: B

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PARTS LIST

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PARTS LIST PER.. 89/12/06

FIND NO.	QTY RQD	U M	ITEM OR DOCUMENT NUMBER	NOMENCLATURE	I T	PREP NO.	BIN	REFERENCE DESIGNATION	LINE REV
65	2,000	ST	21 BR240540	RES CARB. 6K8 1/4J SFR25	4			R60, R115	
66	1,000	ST	21 BR454192	RES WIREW 0R22 4J	4			R63	
67	1,000	ST	21 BR240338	RES CARB. 390R 1/4J SFR25	4			R64	
68	2,000	ST	21 BR240370	RES CARB. 620R 1/4J SFR25	4			R65, R87	
69	2,000	ST	21 BR240664	RES CARB. 39K 1/4J SFR25	4			R66, R94	
70	1,000	ST	21 BR240605	RES CARB. 15K 1/4J SFR25	4			R67	
71	2,000	ST	21 BR240273	RES CARB. 240R 1/4J SFR25	4			R68, R69	
72	1,000	ST	21 BR240214	RES CARB. 82R 1/4J SFR25	4			R70	
73	1,000	ST	21 BR489387	RES CARB. 36R 0,4J SFR25	4			R71	
74	4,000	ST	21 BR349623	RES FILM 10K0 0,6F MRS25	4			R72, R85, R86, R95	
75	1,000	ST	21 BR405604	RES FILM 16K2 0,6F MRS25	4			R73	
76	1,000	ST	21 BR376566	RES FILM 8K25 0,6F MRS25	4			R74	
77	3,000	ST	21 BR240702	RES CARB. 56K 1/4J SFR25	4			R75, R76, R98	
78	6,000	ST	21 BR328626	RES CARB. 220K 1/4J SFR25	4			R77, R78, R79, R80, R91, R97	
79	2,000	ST	21 BR240486	RES CARB. 3K3 1/4J SFR25	4			R82, R84	
80	3,000	ST	21 BR359165	RES SEMIV 10K 1/2K CERM	4			R83, R90, R118	
81	1,000	ST	21 BR324175	RES CARB. 36K 1/4J SFR25	4			R88	
82	1,000	ST	21 BR450251	RES NTC 15K K M822	4			R89	
83	2,000	ST	21 BR240745	RES CARB. 100K 1/4J SFR25	4			R92, R116	
84	2,000	ST	21 BR240680	RES CARB. 47K 1/4J SFR25	4			R93, R114	
85	1,000	ST	21 BR454354	RES FILM 20K5 0,6F MRS25	4			R96	
86	4,000	ST	21 BR240451	RES CARB. 2K2 1/4J SFR25	4			R99, R109, R110, R111	
87	2,000	ST	21 BR240397	RES CARB. 820R 1/4J SFR25	4			R100, R101	
88	1,000	ST	21 BR240559	RES CARB. 8K2 1/4J SFR25	4			R104	
89	3,000	ST	21 BR240419	RES CARB. 1K2 1/4J SFR25	4			R106, R108, R112	
90	1,000	ST	21 BR240346	RES CARB. 470R 1/4J SFR25	4			R107	
91	1,000	ST	21 BR240729	RES CARB. 75K 1/4J SFR25	4			R120	
92	2,000	ST	21 BR240257	RES CARB. 180R 1/4J SFR25	4			R121, R128	
93	1,000	ST	21 BR240125	RES CARB. 22R 1/4J SFR25	4			R122	
94	1,000	ST	21 BR240176	RES CARB. 43R 1/4J SFR25	4			R127	
95	1,000	ST	21 BR364029	RES CARB. 2R2 1/4J SFR25	4			R129	
96	1,000	ST	21 BR462004	RES WIREW 1R0 5J	4			R130	
97	1,000	ST	21 BR458686	RES WIREW 4R7 4J	4			R131	
98	0,500	ST	33 BR471798	SW,PCP DIP-FIX 8X ON/OFF	4			S1	
99	2,000	ST	25 BR362859	TRAFO,LINE 600:600R	4			T1, T2	
100	13,000	ST	31 BR231304	TERMINAL STUD 2,5X7 Ø1,3	4			TP	

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TITLE:
REGULATOR-AF,ASSY A10A1

DOCUMENT NO.:
61 - BR471534
(471534)

REV: B

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PARTS LIST

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FIND NO.	QTY RQD	U M	ITEM OR DOCUMENT NUMBER	NOMENCLATURE	I T	PREP NO.	BIN	REFERENCE DESIGNATION	LINE REV
101	1,000	ST	24 BR454370	IC LIN 79MGU1 VOLT REGL.	4			U1	
102	1,000	ST	24 BR451231	IC LIN LM 723C VOLT REGL.	4			U2	
103	1,000	ST	24 BR451282	IC LIN LF 356N OP.AMP.	4			U3	
104	1,000	ST	24 BR451266	IC LIN LM 301A OP.AMP.	4			U4	
105	1,000	ST	24 BR454222	IC LIN LM 324N 4X OP.AMP.	4			U5	
106	2,000	ST	24 BR462292	IC LIN TL 084 4X OP.AMP.	4			U6,U7	
107	1,000	ST	24 BR454230	IC LIN LM 3054N TRANS.ARR	4			U8	
108	1,000	ST	24 BR443964	IC LIN TDA2002 POW. AMPL	4			U9	
109	3,000	ST	23 BR228842	DIO ZEN ZPD 5.6 5.6V 0.5W	4			VR1,VR4,VR5	
110	2,000	ST	23 BR454389	DIO ZEN ZPD16 16V 0.5W	4			VR2,VR3	
111	1,000	ST	23 BR228869	DIO ZEN ZPD 7.5 7.5V 0.5W	4			VR6	
112	2,000	ST	23 BR228818	DIO ZEN ZPD 2.7 2.7V 0.5W	4			VR7,VR8	
113	1,000	ST	23 BR228788	DIO ZEN ZPD10 10V 0.5W	4			VR9	
114	1,000	ST	26 BR386758	TRANS.LOPOW BC 327A SI-P	4			Q2	B
115	1,000	ST	21 BR362913	RES CARB. 15R 1/4J SFR25	4			R136	B
**********			**********	********** BILL OF DOCUMENTATION	**********			**********	**********
			BR471534 EC	REGULATOR-AF,ASSY A10A1					
			BR471534 PD	REGULATOR-AF,ASSY A10A1					
			BRQA4402 TP	AF ASSY RX4000 A10 PS,					
**********			**********	********** NEXT ASSY **********	**********			**********	**********
	1,000	ST	BR471720	POWER SUPPLY ASSY A10 220	1				
	1,000	ST	BR476803	POWER SUPPLY ASSY A10	1				

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TITLE: REGULATOR-AF,ASSY A10A1

DOCUMENT NO.: 61 - BR471534 (471534)

REV: B

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PARTS LIST

PRINTET..... 89/12/07
PARTS LIST PER.. 89/12/06

FIND NO.	QTY RQD	U M	ITEM OR DOCUMENT NUMBER	NOMENCLATURE	I T	PREP NO.	BIN	REFERENCE DESIGNATION	LINE REV
1	1,000	ST	37 BR471542	PWB,TRANSFORMER AS. A10A2	3				
2	1,000	ST	31 BR476552	TERMINAL ASSY A10A2A1	1			A1	
3	3,000	ST	22 BR385190	CAP. CER. 4N7 5KV M HI-K	4			C1,C2,C3	
4	1,000	ST	22 BR458511	CAP. PLST 100N 630 K	4			C4	
5	3,000	ST	22 BR202967	CAP. PLST 100N 100 K	4			C5,C6,C7	
6	1,000	ST	22 BR450510	CAP. CER. 100N 63 S	4			C8	
7	1,000	ST	22 BR450529	CAP. ELEC 6U8 25 M	4			C9	
8	5,000	ST	22 BR366471	CAP. ELEC 1M 40 T T	4			C10,C11,C12,C13,C14	
9	5,000	ST	22 BR373516	CAP. ELEC 2M2 25 T LL	4			C15,C16,C17,C18,C19	
10	5,000	ST	23 BR373524	DIO POW. MR 501 SI100V 3A	4			CR1,CR2,CR3,CR4,CR5	
11	3,000	ST	33 BR394629	FUSE 20X5MM 6,3A T	4			F1,F2,F3	
12	3,000	ST	51 BR458694	SCREW M 2,5X 5 CHM CU SN	4			H1	
13	6,000	ST	51 BR327239	SCREW M 4 X10 CHM CU SN	4			H2	
14	1,000	ST	51 BR446793	SCREW M 3 X10 CHN NYLON	4			H3	
15	1,000	ST	51 BR458295	SCREW M 5 X50 CHM CU SN	4			H4	
16	1,000	ST	52 BR327549	NUT M 5 M CU SN	4			H5	
17	1,000	ST	26 BR391387	TRANS.ACCESS ISOLAT.PLD	4			H6	
18	18,000	ST	31 BR442399	TERMINAL STUD 140-1785-2	4			H7	
19	1,000	ST	26 BR458546	TRANS.ACCESS ISOLATIONS	4			H8	
20	5,000	ST	45 BR475343	STRAP,CABLE L292XB4,8	4			H9	
21	2,000	ST	25 BR454125	COIL,CHOKE 25U 1,5A INS	4			L1,L2	
22	1,000	ST	45 BR448095	RETAINER,PC 5X5X109 MM	2			MP1	
23	2,000	ST	52 BR458120	STAY NUT M4 X62 N7	3			MP2	
24	2,000	ST	52 BR458139	STAY NUT M4 X64 N7	3			MP3	
25	1,000	ST	56 BR458430	HEAT SINK A10A2 M 3000	1			MP4	
26	1,000	ST	21 BR240494	RES CARB. 3K9 1/4J SFR25	4			R1	
27	1,000	ST	21 BR240540	RES CARB. 6K8 1/4J SFR25	4			R2	
28	1,000	ST	25 BR471976	TRAFO,MAINS 125/125 9,7/2	4			T1	
29	1,000	ST	24 BR454362	IC LIN 78MGU1 VOLT REGL.	4			U1	
30	1,000	ST	37 BR464902	FLATCABL.ASSY W1 A10	4			W1	
31	6,000	ST	33 BR216070	FUSE ACCESS CLIPS	4			XF1,XF2,XF3	
**********				********** BILL OF DOCUMENTATION	**********				
			BR471550 EC	TRAFO ASSY A10A2					
			BR488321 EC	TRAFO ASSY					

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TITLE: TRAFO ASSY A10A2

DOCUMENT NO.: 25 - BR488321 (488321)

REV: A

SHEET NO.: 1 OF 2

A4 Form 200473 FB Rev A

PARTS LIST

PRINTET..... 89/12/07
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FIND NO.	QTY RQD	U M	ITEM OR DOCUMENT NUMBER	NOMENCLATURE	I T	PREP NO.	BIN	REFERENCE DESIGNATION	LINE REV
			BR471550 PD BR488321 PD	TRAFO ASSY A10A2 TRAFO ASSY					
**********				********** NEXT ASSY **********					**********
	1,000	ST	BR476803	POWER SUPPLY ASSY A10	1				

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TITLE: TRAFO ASSY A10A2

DOCUMENT NO.: 25 - BR488321 (488321)

REV: A

SHEET NO.: 2 OF 2

A4 Form 200473 FB Rev A

PARTS LIST

PRINTET..... 89/12/07
PARTS LIST PER.. 89/12/06

FIND NO.	QTY RQD	U M	ITEM OR DOCUMENT NUMBER	NOMENCLATURE	I T	PREP NO.	BIN	REFERENCE DESIGNATION	LINE REV
1	3,000	ST	26 BR458546	TRANS.ACCESS ISOLATIONS	4			H1	
2	3,000	ST	26 BR391387	TRANS.ACCESS ISOLAT.PLD	4			H2	
3	4,000	ST	51 BR327220	SCREW M 4 X 8 CHM CU SN	4			H3	
4	6,000	ST	51 BR276790	SCREW M 3 X 5 CHM CU SN	4			H4	
5	7,000	ST	53 BR380105	WASHER,FLAT Ø 3MM CU SN M	4			H5	
6	7,000	ST	54 BR436518	RIVET,TUBULAR 3.3/4.8	4			H6	
7	5,000	ST	56 BR458465	CLAMP,CABLE CV3 3MMX7	4			H7	
8	5,000	ST	56 BR458473	CLAMP,CABLE CV6 6MMX7	4			H8	
9	0,100	M	32 BR220108	FLEX SILICONE 1,6 WHT	4			H9	
10	0,150	M	32 BR345555	FLEX CRIMP 6,0MM/BLCK	4			H10	
11	1,000	ST	41 BR476005	BACK-SPACE RC4000	1			MP1	
12	1,000	ST	56 BR476013	HEAT SINK RC4000	3			MP2	
13	11,000	ST	31 BR454567	CONN MOLEX 1P FEMALE	4			P1	
14	1,000	ST	31 BR458503	CONN MOLEX 11P FEMALE	4			P1	
15	2,000	ST	26 BR454400	TRANS.DARLN BDX 54A SI-P	4			Q1,Q3	
16	1,000	ST	26 BR454397	TRANS.DARLN BDX 53C SI-N	4			Q2	
17	1,000	ST	37 BR476021	CABLE ASSY A10A3W1 RC	1			W1	
**********	**********		**********	********** BILL OF DOCUMENTATION	**********			**********	**********
			BR476048 PD	HEAT SINK ASSY A10A3					
**********	**********		**********	********** NEXT ASSY **********	**********			**********	**********
	1,000	ST	BR476803	POWER SUPPLY ASSY A10	1				

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TITLE: HEAT SINK ASSY A10A3

DOCUMENT NO.: 56 - BR476048 (476048)

REV: A

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FIND NO.	QTY RQD	U M	ITEM OR DOCUMENT NUMBER	NOMENCLATURE	I T	PREP NO.	BIN	REFERENCE DESIGNATION	LINE REV
1	1,000	ST	60 BR495166	FR PAN CKT A11A1 RC4010	1			A1	
2	4,000	ST	51 BR458694	SCREW M 2,5X 5 CHM CU SN	4			H1	
3	10,000	ST	51 BR276790	SCREW M 3 X 5 CHM CU SN	4			H2	
4	4,000	ST	51 BR450545	SCREW M 5 X12 UHR	4			H3	
5	8,000	ST	51 BR475785	SCREW SELFTAP.2X1/8 PHPX-	4			H4	
6	8,000	ST	53 BR245674	WASHER,NYLON Ø10MM	4			H6	
7	2,000	ST	51 BR403342	SCREW PINOL M 3 X 6 R UNB	4			H7	
8	1,000	ST	43 BR454443	KNOB Ø10MM BLCK	4			H8	
9	1,000	ST	43 BR454435	KNOB,CAB 3,3X Ø7,2	4			H9	
10	1,000	ST	43 BR452971	KNAP SOØ44.5 ØB.2	4			H10	
11	3,000	ST	43 BR454478	KNOB 17X Ø14,5	4			H12	
12	3,000	ST	43 BR454451	KNOB,CAB 4,8X Ø11	4			H13	
13	1,000	ST	53 BR230278	WASHER,LOCK Ø 5MM XO,7MM	4			H14	
14	6,000	ST	52 BR327506	NUT M 3 M CU SN	4			H15	
15	6,000	ST	53 BR380105	WASHER,FLAT Ø 3MM CU SN M	4			H16	
16	6,000	ST	51 BR465046	SCREW M 3 X 5 UHJ CU SN	4			H17	
17	2,000	ST	51 BR333255	SCREW M 3 X 6 UHJ GULCR	4			H18	
18	2,000	ST	51 BR403377	SCREW SELFT.4X5/16UHPX-AB	4			H19	
19	2,000	ST	54 BR436518	RIVET,TUBULAR 3.3/4.8	4			H20	
20	1,000	ST	52 BR321486	NUT M10F 10X14X3MM	4			H21	
21	0,360	D2	20 BR475289	CLOTH,LOUDSPEAK BLK 60X60	4			H22	A1
22	1,000	ST	53 BR402923	WASHER,FLAT Ø10MM GULCR J	4			H23	
23	1,000	ST	31 BR454575	CONN JACK CHAS 2P FEMALE	4			J1	
24	1,000	ST	20 BR474924	LOUDSPEAKER 8R 10W 60X60	4			LS1	
25	2,000	ST	43 BR216674	HANDLE F.5 1/4" 111MM	3			MP1	
26	4,000	ST	51 BR260827	THUMBSCREW,KNURLED M6	3			MP2	
27	4,000	ST	46 BR268682	GUIDE F/THUMBSCREW 260827	2			MP3	
28	1,000	ST	41 BR495158	FRONT PLATE RC4010	1			MP4	
29	1,000	ST	46 BR471453	GUIDE SHEET A11	1			MP5	
30	2,000	ST	46 BR445827	BRACKET,FRONTPLATE A11	1			MP6	
31	1,000	ST	57 BR458015	BUSHING,PILOT A11	3			MP7	
32	1,000	ST	42 BR457728	CODE WHEEL A11	1			MP9	
33	1,000	ST	42 BR458023	FLY WHEEL A11	3			MP10	
34	1,000	ST	42 BR458007	SHAFT F/CODE WHEEL A11	3			MP11	
35	1,000	ST	41 BR457957	SCREEN A11	1			MP12	
36	4,000	ST	53 BR267015	WASHER,NYLON Ø12MM X15MM	3			MP13	

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TITLE:
FRONT PANEL RC4010 A11

DOCUMENT NO.:
60 - BR495131
(495131)

REV: A1

SHEET NO.: 1 OF 2

PARTS LIST

PRINTET..... 89/12/07
PARTS LIST PER.. 89/12/06

FIND NO.	QTY RQD	U M	ITEM OR DOCUMENT NUMBER	NOMENCLATURE	I T	PREP NO.	BIN	REFERENCE DESIGNATION	LINE REV
37	1,000	ST	48 BR490377	WINDOW,DSPL RX4010	3			MP14	
38	1,000	ST	41 BR471690	MOUNTING F/LOUDSP. A11A1	1			MP16	
39	2,000	ST	52 BR377104	STAY NUT M3 X 5,5 N5	3			MP17	
40	6,000	ST	52 BR482978	STAY NUT M3 X 6 W/TAB 5MM	3			MP18	
41	1,000	ST	21 BR454516	RES VAR. 10K CERM LIN	4			R1	
42	2,000	ST	21 BR454508	RES VAR. 1KO CERM LIN	4			R2,R3	
43	1,000	ST	21 BR459313	RES VAR. 4K7 A11R4	1			R4	
44	1,000	ST	21 BR377538	RES CARB. 30R 1/4J SFR25	4			R5	
45	1,000	ST	37 BR458937	CABLE ASSY W1 A11	1			W1	
46	1,000	ST	37 BR458945	CABLE ASSY W2 A11	1			W2	
47	1,000	ST	37 BR458953	CABLE ASSY W3 A11	1			W3	
**********			**********	********** BILL OF DOCUMENTATION	**********				
			BR495131 PD	FRONT PANEL RC4010 A11					
**********			**********	********** NEXT ASSY **********	**********				
	1,000	ST	BR495123	PANEL RC4010 RX REMOTE	1				

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TITLE: FRONT PANEL RC4010 A11

DOCUMENT NO.: 60 - BR495131 (495131)

REV: A1

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A4 Form 200473 FB Rev A

PARTS LIST

PRINTET..... 89/12/07
PARTS LIST PER.. 89/12/06

FIND NO.	QTY RQD	U M	ITEM OR DOCUMENT NUMBER	NOMENCLATURE	I T	PREP NO.	BIN	REFERENCE DESIGNATION	LINE REV
1	1,000	ST	37 BR471437	PWB,FRONT PANEL CIR A11A1	3				
2	1,000	ST	60 BR489883	DSPL BD A11A1A1 RX/RC4010	1			A1	
3	4,000	ST	22 BR209805	CAP. TAN. 6U8 35 S	4			C1,C3,C5,C15	
4	5,000	ST	22 BR393959	CAP. CER. 100N 50 M	4			C2,C4,C6,C8,C11	
5	4,000	ST	22 BR450510	CAP. CER. 100N 63 S	4			C7,C9,C10,C19	
6	1,000	ST	22 BR451053	CAP. ELEC 68U 6,3 M	4			C12	
7	1,000	ST	22 BR203378	CAP. TAN. 10U 16 S	4			C13	
8	1,000	ST	22 BR357642	CAP. CER. 10N 100 S HI-K	4			C14	
9	1,000	ST	22 BR450529	CAP. ELEC 6U8 25 M	4			C16	
10	2,000	ST	22 BR357650	CAP. CER. 22N 63 A HI-K	4			C17,C18	
11	12,000	ST	23 BR450480	DIO LED HLMP1000 RED Ø3	4			CR1,CR2,CR3,CR4,CR5,CR6, CR7,CR8,CR9,CR10,CR11, CR12	
12	2,000	ST	23 BR228087	DIO SIGN. 1N4148 SI 150MA	4			CR16,CR17	
13	20,000	ST	51 BR276790	SCREW M 3 X 5 CHM CU SN	4			H2	
14	1,000	ST	51 BR276804	SCREW M 3 X 8 CHM CU SN	4			H3	
15	1,000	ST	52 BR327506	NUT M 3 M CU SN	4			H6	
16	12,000	ST	26 BR218952	TRANS.ACCESS PAD TO-18	4			H8	
17	16,000	ST	53 BR380105	WASHER,FLAT Ø 3MM CU SN M	4			H9	
18	1,000	ST	26 BR452688	TRANS.ACCESS TALLFJEDER	4			H10	
19	0,480	M	32 BR220140	FLEX SILICONE 0,5/1 TRAN	4			H11	
20	16,000	ST	51 BR494380	SCREW M 3 X 4 CHM CU SN	4			H12	
21	3,000	ST	25 BR363944	COIL,CHOKE HF WIDE BAND	4			L1,L2,L3	
22	1,000	ST	43 BR458961	KNOB,BLK,WHT.TEXT "SLOW"	3			MP1	
23	1,000	ST	43 BR458988	KNOB,BLK,WHT.TEXT "INTER"	3			MP2	
24	1,000	ST	43 BR458996	KNOB,BLACK,WHT.TEXT "AM"	3			MP3	
25	1,000	ST	43 BR459003	KNOB,BLACK,WHT.TEXT "BFO"	3			MP4	
26	1,000	ST	43 BR459011	KNOB,WHITE,BLK.TEXT "9"	3			MP5	
27	1,000	ST	43 BR459038	KNOB,WHITE,BLK.TEXT "6"	3			MP6	
28	1,000	ST	43 BR459046	KNOB,WHITE,BLK.TEXT "3"	3			MP7	
29	1,000	ST	43 BR474959	KNOB,WHITE,BLK.TEXT "C"	3			MP8	
30	1,000	ST	43 BR459062	KNOB,BLACK,WHT.TEXT "ATT"	3			MP9	
31	1,000	ST	43 BR459070	KNOB,BLK,WHT.TEXT "VNAR"	3			MP10	
32	1,000	ST	43 BR459089	KNOB,BLACK,WHT.TEXT "CW"	3			MP11	
33	1,000	ST	43 BR459097	KNOB,BLK,WHT.TEXT "SCAN"	3			MP12	
34	1,000	ST	43 BR459100	KNOB,WHITE,BLK.TEXT "7"	3			MP13	

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TITLE:
FR PAN CKT A11A1 RC4010

DOCUMENT NO.:
60 - BR495166
(495166)

REV: A

SHEET NO.: 1 OF 4

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PARTS LIST

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FIND NO.	QTY RQD	U M	ITEM OR DOCUMENT NUMBER	NOMENCLATURE	I T	PREP NO.	BIN	REFERENCE DESIGNATION	LINE REV
35	1,000	ST	43 BR459119	KNOB,WHITE,BLK.TEXT "4"	3			MP14	
36	1,000	ST	43 BR459127	KNOB,WHITE,BLK.TEXT "1"	3			MP15	
37	1,000	ST	43 BR459135	KNOB,WHITE,BLK.TEXT "0"	3			MP16	
38	1,000	ST	43 BR459143	KNOB,BLACK.WHT.TEXT "OFF"	3			MP17	
39	1,000	ST	43 BR459151	KNOB,BLK,WHT.TEXT "WIDE"	3			MP18	
40	1,000	ST	43 BR459178	KNOB,BLACK,WHT.TEXT "SSB"	3			MP19	
41	1,000	ST	43 BR459186	KNOB,BLACK,WHT.TEXT "RCL"	3			MP20	
42	1,000	ST	43 BR459194	KNOB,BLACK,WHT.TEXT "STO"	3			MP21	
43	1,000	ST	43 BR471429	KNOB,BLK,WHT.TEXT "ADDR"	3			MP22	
44	1,000	ST	43 BR490385	KNOB,BLACK,WHT.TEXT "MON"	3			MP23	
45	1,000	ST	43 BR459224	KNOB,BLK,WHT.TEXT "FAST"	3			MP24	
46	1,000	ST	43 BR459232	KNOB,BLK,WHT.TEXT "NARR"	3			MP25	
47	1,000	ST	43 BR459240	KNOB,BLK,WHT.TEXT "RTTY"	3			MP26	
48	1,000	ST	43 BR459259	KNOB,BLK,WHT.TEXT "TUNE"	3			MP27	
49	1,000	ST	43 BR459267	KNOB,WHITE,BLK.TEXT "8"	3			MP28	
50	1,000	ST	43 BR459275	KNOB,WHITE,BLK.TEXT "5"	3			MP29	
51	1,000	ST	43 BR459283	KNOB,WHITE,BLK.TEXT "2"	3			MP30	
52	1,000	ST	43 BR459291	KNOB,WHITE,BLK.TEXT "."	3			MP31	
53	1,000	ST	46 BR448117	GUIDE SHEET 1 A11	1			MP32	
54	1,000	ST	46 BR471461	GUIDE SHEET 2 A11	1			MP33	
55	8,000	ST	52 BR453129	STAY NUT M3 X 7 N5	3			MP34	
56	6,000	ST	52 BR490431	STAY NUT M3 X14 N5	3			MP36	
57	8,000	ST	52 BR460338	STAY NUT M3 X13,3 N5	3			MP37	
58	1,000	ST	43 BR471402	KNOB,BLK,WHT.TEXT "PROGR"	3			MP38	
59	11,000	ST	26 BR392839	TRANS.LOPOW 2N2907A SI-P	4			Q1,Q2,Q3,Q4,Q5,Q6,Q7,Q8, Q10,Q16,Q17	
60	1,000	ST	26 BR362980	TRANS.HIPOW MJE3055 SI-N	4			Q9	
61	3,000	ST	26 BR369454	TRANS.DARLN MPSA13 SI-N T	4			Q11,Q12,Q13	
62	1,000	ST	26 BR399914	TRANS.JFETN J 309 TO-92	4			Q14	
63	1,000	ST	26 BR392820	TRANS.LOPOW 2N2222A SI-N	4			Q15	
64	2,000	ST	26 BR273899	TRANS.LOPOW BC 547B SI-N	4			Q18,Q19	
65	6,000	ST	21 BR240400	RES CARB. 1K0 1/4J SFR25	4			R1,R42,R45,R46,R49,R52	
66	1,000	ST	21 BR457663	RES NETW 8X1K5 1/4G	4			R2	
67	1,000	ST	21 BR457647	RES NETW 9X10K 1/5G	4			R3	
68	8,000	ST	21 BR241040	RES CARB. 15R 1/2JSFR25H	4			R4,R5,R6,R7,R8,R9,R10,R11	
69	1,000	ST	21 BR240419	RES CARB. 1K2 1/4J SFR25	4			R12	

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TITLE:
FR PAN CKT A11A1 RC4010

DOCUMENT NO.:
60 - BR495166
(495166)

REV: A

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PARTS LIST

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FIND NO.	QTY RQD	U M	ITEM OR DOCUMENT NUMBER	NOMENCLATURE	I T	PREP NO.	BIN	REFERENCE DESIGNATION	LINE REV
70	1,000	ST	21 BR240613	RES CARB. 18K 1/4J SFR25	4			R13	
71	3,000	ST	21 BR324221	RES CARB. 2K4 1/4J SFR25	4			R14, R47, R50	
72	1,000	ST	21 BR240702	RES CARB. 56K 1/4J SFR25	4			R15	
73	3,000	ST	21 BR240516	RES CARB. 4K7 1/4J SFR25	4			R16, R17, R19	
74	1,000	ST	21 BR457639	RES NETW 7X4K7 1/5G	4			R18	
75	3,000	ST	21 BR240486	RES CARB. 3K3 1/4J SFR25	4			R20, R21, R22	
76	1,000	ST	21 BR451355	RES NETW 5X1K0 1/5G	4			R23	
77	1,000	ST	21 BR433470	RES NETW 9X1K0 1/5G	4			R24	
78	1,000	ST	21 BR457671	RES NETW 8X15K 1/4G	4			R25	
79	1,000	ST	21 BR349674	RES FILM 15K0 0,6F MRS25	4			R26	
80	8,000	ST	21 BR368539	RES FILM 7K50 0,6F MRS25	4			R27, R28, R29, R30, R31, R32, R33, R34	
81	1,000	ST	21 BR240745	RES CARB. 100K 1/4J SFR25	4			R35	
82	1,000	ST	21 BR240605	RES CARB. 15K 1/4J SFR25	4			R36	
83	1,000	ST	21 BR240338	RES CARB. 390R 1/4J SFR25	4			R37	
84	5,000	ST	21 BR240567	RES CARB. 10K 1/4J SFR25	4			R38, R43, R44, R53, R54	
85	1,000	ST	21 BR324205	RES CARB. 5K1 1/4J SFR25	4			R39	
86	2,000	ST	21 BR240621	RES CARB. 22K 1/4J SFR25	4			R48, R51	
87	32,000	ST	33 BR450421	SW,PUSH BU.SPST NO	4			S1, S2, S3, S4, S5, S6, S7, S8, S9, S10, S11, S12, S13, S14, S15, S16, S17, S18, S19, S20, S21, S22, S23, S24, S25, S26, S27, S28, S29, S30, S31, S32	
88	1,000	ST	33 BR471992	SW,SLIDE SPDT F/PWB	4			S33	
89	1,000	ST	24 BR488127	IC DGTL 74HCT138 3-8 DECO	4			U1	
90	1,000	ST	24 BR488011	IC DGTL 74HCT 02 4X2IN NO	4			U2	
91	3,000	ST	24 BR362131	IC DGTL 74 06N 6X INV-BUF	4			U3, U10, U12	
92	1,000	ST	24 BR488062	IC DGTL 74HCT 14 6XINV.ST	4			U4	
93	1,000	ST	24 BR488208	IC DGTL 74HCT373 8XD-LATC	4			U5	
94	1,000	ST	24 BR450294	IC LIN TL 082CP OP.AMP.	4			U6	
95	2,000	ST	24 BR488151	IC DGTL 74HCT164 SHIFT RE	4			U7, U8	
96	1,000	ST	24 BR488178	IC DGTL 74HCT240 8XBUF.IN	4			U9	
97	1,000	ST	24 BR365874	IC DGTL 74LS 74N 2X D FF	4			U11	
98	1,000	ST	24 BR473928	IC HYBRID OPB822SD OPTO S	4			U13	
99	1,000	ST	37 BR459550	FLATCABL.ASSY W1 A11	3			W1	
100	3,000	ST	31 BR451479	CONN AMP MODU2 10P FEMALE	4			XP1, XP2, XP3	

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TITLE:
FR PAN CKT A11A1 RC4010

DOCUMENT NO.:
60 - BR495166
(495166)

REV: A

SHEET NO.: 3 OF 4

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PARTS LIST

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FIND NO.	QTY RQD	U M	ITEM OR DOCUMENT NUMBER	NOMENCLATURE	I T	PREP NO.	BIN	REFERENCE DESIGNATION	LINE REV
**********	**********	**	**********	**** BILL OF DOCUMENTATION	**	**********	**********	**********	******
			BR495166 PD	FRONT PANEL CKT A11A1					
**********	**********	**	**********	********** NEXT ASSY **********	**	**********	**********	**********	******
	1,000	ST	BR495131	FRONT PANEL RC4010 A11	1				

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TITLE: FR PAN CKT A11A1 RC4010

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(495166)

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FIND NO.	QTY RQD	U M	ITEM OR DOCUMENT NUMBER	NOMENCLATURE	I T	PREP NO.	BIN	REFERENCE DESIGNATION	LINE REV
1	1,000	ST	37 BR489840	PWB,DSPL BD A11A1A1	3				
2	2,000	ST	23 BR228087	DIO SIGN. 1N4148 SI 150MA	4			CR1,CR2	
3	1,000	ST	23 BR497029	DIO LED HLMPQ101 RED MINI	4			CR3	
4	3,000	ST	31 BR490458	CONN AMP MODU2 10P MALE	4			P1,P2,P3	
5	11,000	ST	26 BR369454	TRANS.DARLN MPSA13 SI-N T	4			Q1,Q2,Q3,Q4,Q5,Q6,Q7,Q8, Q9,Q10,Q11	
6	11,000	ST	21 BR489956	RES FILM 3K30 0,5JSFR16T	4			R1,R2,R11,R12,R13,R14,R15, R16,R17,R18,R19	
7	1,000	ST	21 BR489964	RES FILM 1K00 0,5JSFR16T	4			R3	
8	1,000	ST	21 BR489972	RES FILM 2K40 0,5JSFR16T	4			R4	
9	2,000	ST	21 BR489980	RES FILM 3K00 0,5JSFR16T	4			R5,R6	
10	1,000	ST	21 BR489999	RES FILM 24K0 0,5JSFR16T	4			R7	
11	1,000	ST	21 BR490016	RES FILM 10K0 0,5JSFR16T	4			R8	
12	2,000	ST	21 BR490024	RES FILM 470R 0,5JSFR16T	4			R9,R10	
13	1,000	ST	21 BR490628	RES FILM 220R 0,5JSFR16T	4			R20	
14	10,000	ST	24 BR489859	IC DSPL HD1077R 7 SEGM.RE	4			U1,U2,U3,U4,U5,U6,U7,U8, U9,U10	
15	13,000	ST	24 BR471380	IC DSPL HLMP2300 LGHT BAR	4			U11,U12,U13,U14,U15,U16, U17,U21,U22,U23,U24,U25, U26	
16	1,000	ST	24 BR446327	IC LIN UAA 170 LED DRIVER	4			U18	
17	2,000	ST	24 BR474916	IC DSPL HDSP4820 LGHT BAR	4			U19,U20	
**********				********** BILL OF DOCUMENTATION	**********				**********
			BR489883 EC	DSPL BD ASSY A11A1A1					
			BR489883 PD	DSPL BD ASSY A11A1A1					
**********				********** NEXT ASSY	**********				**********
	1,000	ST	BR489891	FR PAN CKT A11A1 RX4010	1				
	1,000	ST	BR495166	FR PAN CKT A11A1 RC4010	1				

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TITLE: DSPL BD A11A1A1 RX/RC4010

DOCUMENT NO.: 60 - BR489883 (489883)

REV: A

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A4 Form 200473 FB Rev A

PARTS LIST

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FIND NO.	QTY RQD	U M	ITEM OR DOCUMENT NUMBER	NOMENCLATURE	I T	PREP NO.	BIN	REFERENCE DESIGNATION	LINE REV
1	1,000	ST	60 BR471925	MOTHERB ASSY A12A1 RC40..	1			A1	
2	16,000	ST	52 BR450588	NUT M 3 SQUARE 3X7X2,2MM	4			H2	
3	12,000	ST	51 BR276723	SCREW M 3 X 8 UHM CU SN	4			H3	
4	4,000	ST	51 BR436909	SCREW UNBRAK M 3X 8 UHR	4			H4	
5	40,000	ST	51 BR450561	SCREW SELFTAP.4X1/2 PH-PL	4			H5	
6	20,000	ST	51 BR276790	SCREW M 3 X 5 CHM CU SN	4			H6	
7	12,000	ST	51 BR495239	SCREW M 4 X 4 CHJ Z	4			H7	
8	1,000	ST	41 BR474991	PLATE,JUNCTION A12	1			MP1	
9	8,000	ST	41 BR445886	PROFILE,PC 1M	3			MP2	
10	2,000	ST	41 BR445894	PROFILE,PC 1M DRILL	3			MP3	
11	1,000	ST	41 BR445908	PROFILE,PC 1,5M	3			MP4	
12	2,000	ST	41 BR445940	PROFILE,SIDE DRILL.	3			MP5	
13	2,000	ST	41 BR458600	RAIL SECTION A12	1			MP6	
14	6,000	ST	41 BR495026	SPLICE-PIECE A12	1			MP7	
15	10,000	ST	52 BR387681	STAY NUT M3 X10 N5	3			MP8	
16	18,000	ST	51 BR333417	SCREW M 4 X10 UHJ GULCR	4			H8	B
17	8,000	ST	46 BR497266	BRACKET FOR 1M PROFILE	2			MP9	B
18	1,000	ST	46 BR497274	BRACKET FOR 1,5M PROFILE	2			MP10	B
19	9,000	ST	46 BR497282	FISHPLATE A12	2			MP11	B
20	12,000	ST	53 221387-135	WASHER LOCK 2.8X 5.3X0.6M	4				B1
**********	**********	**	**********	**** BILL OF DOCUMENTATION	**	**********	**********	**********	******
			BR476056 PD	CHASSIS ASSY A12					
**********	**********	**	**********	********** NEXT ASSY **********	**********	**********	**********	**********	******
	1,000	ST	BR495123	PANEL RC4010 RX REMOTE	1				

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TITLE: CHASSIS ASSY A12 RC40..

DOCUMENT NO.: 41 - BR476056 (476056)

REV: B1

SHEET NO.: 1 OF 1

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PARTS LIST

PRINTET..... 89/12/07
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FIND NO.	QTY RQD	U M	ITEM OR DOCUMENT NUMBER	NOMENCLATURE	I T	PREP NO.	BIN	REFERENCE DESIGNATION	LINE REV
1	1,000	ST	37 BR471917	PWB MOTHERBRD.	3				
2	2,000	ST	22 BR393959	CAP. CER. 100N 50 M	4			C1, C2	
3	16,000	ST	31 BR454419	CONN PWB ACCES CODE PIN	4			H1	
4	1,000	ST	21 BR240451	RES CARB. 2K2 1/4J SFR25	4			R6	
5	5,000	ST	21 BR240400	RES CARB. 1KO 1/4J SFR25	4			R7, R8, R9, R12, R13	
6	1,000	ST	21 BR451371	RES NETW 9X2K2 1/5G	4			R10	
7	1,000	ST	21 BR451363	RES NETW 5X2K2 1/5G	4			R11	
8	2,000	ST	24 BR451606	IC DGTL 74LS245N 8 BIT TR	4			U1, U2	
9	1,000	ST	24 BR404551	IC DGTL 74 37N 4X2IN NAND	4			U3	
10	8,000	ST	31 BR451509	CONN PWB EDGE 36P FEMALE	4			X51, X52, X53, X54, X61, X81, X91, X101	
**********	**********		**********	********** BILL OF DOCUMENTATION	**********	**********	**********	**********	**********
			BR471925 EC	MOTHERBD ASSY A12A1					
			BR471925 PD	MOTHERBD ASSY A12A1					
**********	**********		**********	********** NEXT ASSY **********	**********	**********	**********	**********	**********
	1,000	ST	BR476056	CHASSIS ASSY A12 RC40..	1				

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TITLE: MOTHERB ASSY A12A1 RC40..

DOCUMENT NO.: 60 - BR471925 (471925)

REV: A

SHEET NO.: 1 OF 1

A4 Form 200473 FB Rev A

SECTION 7
MANUAL CHANGES

This section contains information for correcting manual errors and for adapting the manual to equipment containing improvements made after the printing of the manual or to equipment containing options.

SECTION 8
SERVICE

8.1 Introduction

This section provides information for servicing the RC4010.

8.2 Theory of Operation

The overall theory of operation is explained beginning with paragraph 8.11. Each paragraph explains with the aid of block diagrams the operation of functional assemblies.

Detailed theory of operation is located opposite the schematics.

8.3 trouble shooting

WARNING

Read the Safety Summary at the front of this manual before trouble shooting the RC4010.

By the use of front-panel controls, note as many symptoms of the malfunction as possible. From these symptoms it can usually be determined which assembly is malfunctioning. The Self-Test Program and the Fault Analysis Table (table 8.3) can be used as a guide.

When a problem has been isolated to a particular assembly or circuit, the faulty component(s) may be located using the detailed theory of operation shown on the page opposing the appropriate schematic.

8.4 Self-Test Program

Self test is activated by selecting program 49. The built-in test program goes through the following sequence:

a) The remote address will be shown 2.5 sec. and then the software version number.
Press enter to continue.

b) Software Option displayed. "0000000" indicate no option.
Press enter to continue.

c) Key test. Pressing any key but enter results in the hexadecimal value of the key being shown, see table 8.2.
Press enter to continue.

d) Display and led test. All led's and segment's are lit.
Press enter to continue.

e) Real time clock test. The µp tests the real time clock, and displays "Err. A8 cloc." if an error has been recognized.
Press enter to continue.

f) Assembly test. The µp addresses the modules to see whether they are present. If any module does not acknowledge the call,. the µp displays e.g. "no A9" and then continues the test (A5.1 -A5.4 indicate A5 module no. 1-4).
Press enter to end test.

8.5 Preventive Maintenance

Painted surfaces can be cleaned with a commercial, spray-type window cleaner or with a mild soap and water solution.

CAUTION

Avoid the use of chemical cleaning agents that might damage the plastics used in this RC 4010.

The pushbutton switches in this RC4010 were designed for long, troublefree service. If one of these switches should become defective, replacement rather than repair is recommended.

8.6 Front Panel Assembly Removal

To remove the front panel assembly proceed as follows:

a) remove the four screws holding the front panel. The four screws are located at the exterior side of the RC4010 side profiles.
b) carefully withdraw the front panelassembly and disconnect the ribbon cable connector from the mother-board.
c) to reinstall the front panel assembly, reserve removal procedure.

8.7 PC-Board Assembly Removal.

To remove a PC-board assembly, proceed as follows:

a) Disconnect the regulation transistor cable from A10J2 and remove the power supply heat sink panel by removing the four screws holding the panel. The four screws are located on the exterior side of the RC4010 side profiles.

b) Disconnect all cables running to the concerned assembly.

c) Remove the six (eight) screws positioned at the edge of the concerned assembly rear panel and withdraw the assembly. If the assembly is stuck in the chassis frame, it may be necessary carefully to release the assembly by keying a screwdriver in between the rear panel and the main frame.

d) To reinstall the assembly, reverse removal procedure.

Due to the use of self tapping screws holding the assembly rear panel to the chassis frame, carefully reinsert the screws in the threads when reversing step d above.

8.8 Servicing PC-Boards

All the PC-boards have plated-through component holes. This allows components to be removed or replaced by unsoldering or soldering from either side of the board. When removing large components,rotate the soldering iron tip from lead to lead while applying pressure to the part to lift it from the board.

8.9 MOS Handling Precautions

All MOS devices are subject to damage from static charge build-up. The generation of static charges is not a problem, but the accumulation of static charges is. In general, any device not connected directly to ground can accumulate static charges. Electrical discharge can occur to ground or to any object or person having a lower potential. Therefore, handling precautions are recommended for all personnel coming into contact with MOS devices.

When handling or testing MOS devices, observe the following precautions.

a) Ground test equipment and tools used in testing or handling MOS devices.

b) Apply no power to board assembly while MOS device is being installed. This permits accumulated static charges on MOS device safely to be removed before power is applied.

c) When not in use, short all MOS leads.
This prevents voltage differences from occurring on leads

WARNING

When accomplishing step d, never expose personnel directly to hard electrical ground. For safety reasons, resistance of at least 100 Kohms should be placed between using personnel and hard electrical ground.

d) Do not handle MOS devices by their leads. Before handling any MOS device, personnel should touch electrical ground to discharge accumulate static charges.

e) Avoid use of plastics, rubber, and silk in MOS areas. Do not use any material susceptible to static charge accumulation.

f) Handle circuit boards and modules containing MOS devices in the same manner as individual MOS devices. Regardless of configuration, whenever leads of MOS devices are exposed, damage due to static-charge build-up can occur.

g) Use conductive, grounded table tops in MOS work area.

h) Humidity in work area should be maintained above 50%. Static charge generation increases exponentially as relative humidity decreases.

8.10 Logic Devices

This RC4010 uses two different families of logic circuits: MOS, and TTL. Most of the logic devices used in this RC4010 are TTL and are represented by unmarked logic symbols on the schematics. Logic elements, not belonging to the TTL Logic family, are so indicated on the schematics.
Table 8.1 below lists typical voltage levels associated with each family used in this RC4010.

Table 8.1 Typical Logic Levels

Logic Family	High Level	Low Level
TTL	3 - 5V	0.2V
MOS	5 - 15V	0V

8.11 Basic Principles of Operation

The following paragraphs contain funcional descriptions keyed to the block diagrams. The block diagrams are drawn for function and do not show circuit details. Schematic and detailed descriptions of each circuit are located on subsequent service sheets.

8.12 Overall Operation

The overall functional block diagram of the RC4010 is shown in Figure 8.1.

The microcomputer assembly A8 performs the overall control of the Receiver controller.

Typical tasks handled by the assembly:

- Control of the individual assemblies.
- Keyboard reading.
- Display refreshing.
- Programmable memory set-ups.
- Remote control.
- Diagnostic routines.

Communication between the microcomputer assembly and the remaining assemblies is conducted over an internal bus running on the mother PC-board and the front panel ribbon cable.
The remote assembly A9 performs the remote control communication under control from the microcomputer.
The audio signals is selected by the audio A5 modul.

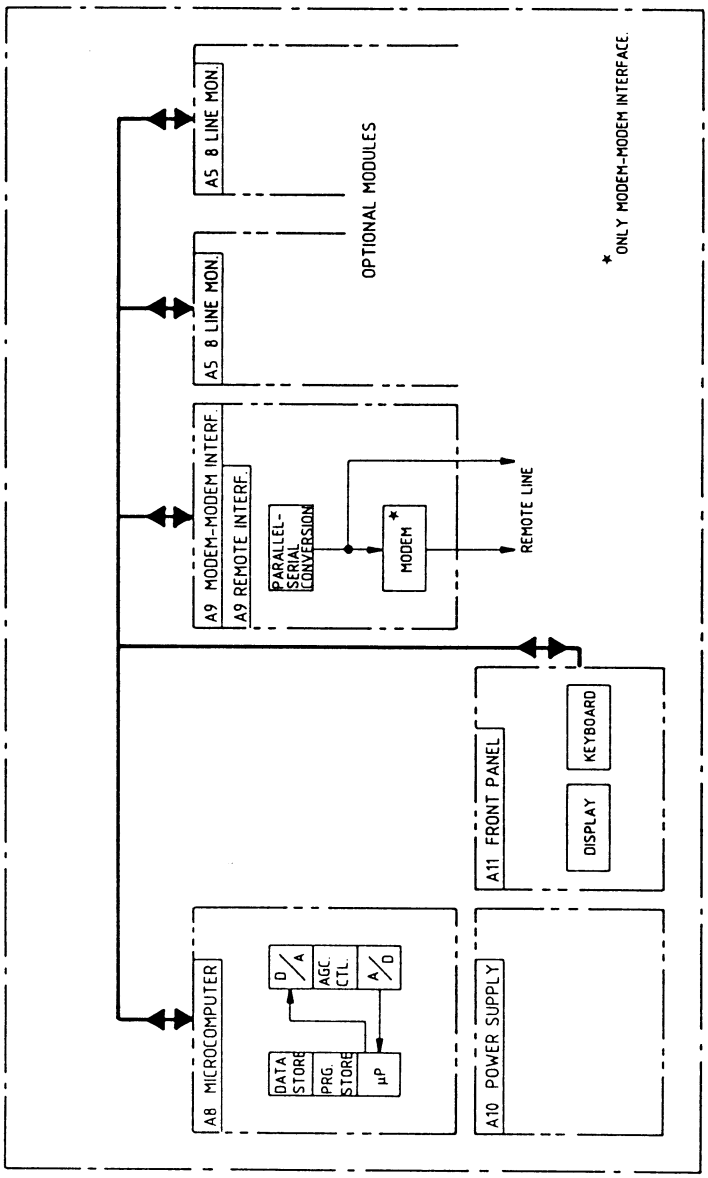


figure 8.1 Overall Functional Block Diagram.

8.13 8-line monitor assembly

The functional block diagram of the 8-line monitor Assembly is shown in Figure 8.2.

1. Inputs and outputs.
   Spikes and overvoltage protection of inputs and outputs.

2. Line switches
   Line switching according to address decoded line number.

3. Level conversion
   Q1 true Q7 performs logical inverting and level converting.

4. Address decoding
   U2 detects and decodes addresses for 8-line monitor service, and if correct address is recognized, acknowledge is signalled on the output of the U6 open collector buffers. The selected line address is further latched by U3, and the binary value converted to decimal by U1.

5. Muting.
   If zero address according to no active RX4010, is detected, the AF line is muted by U10.

6. Lowpass filter.

7. Highpass filter.

8. AF amplifier.
   AF amplifier with gain select (S1).

9. Balun.
   Transformation from balanced telephone line to unbalanced amplifier input.

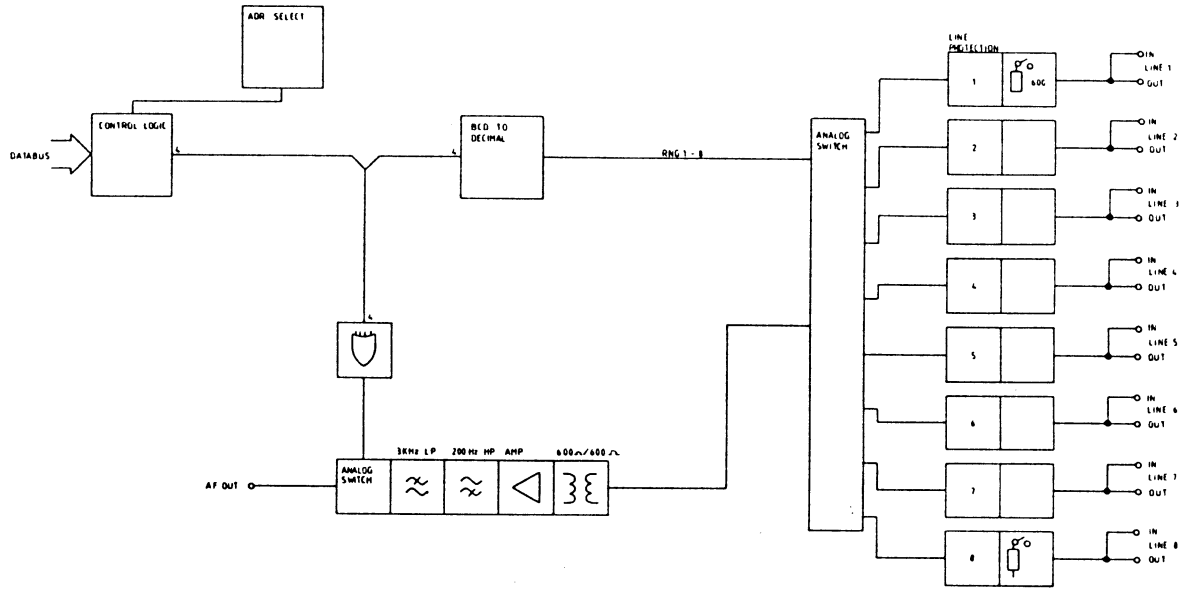


Fig 8.2 8-line monitor assembly

8.14 Microcomputer Assembly A8

The functional block diagram of the Microcomputer Assembly is shown in Figure 8.3.

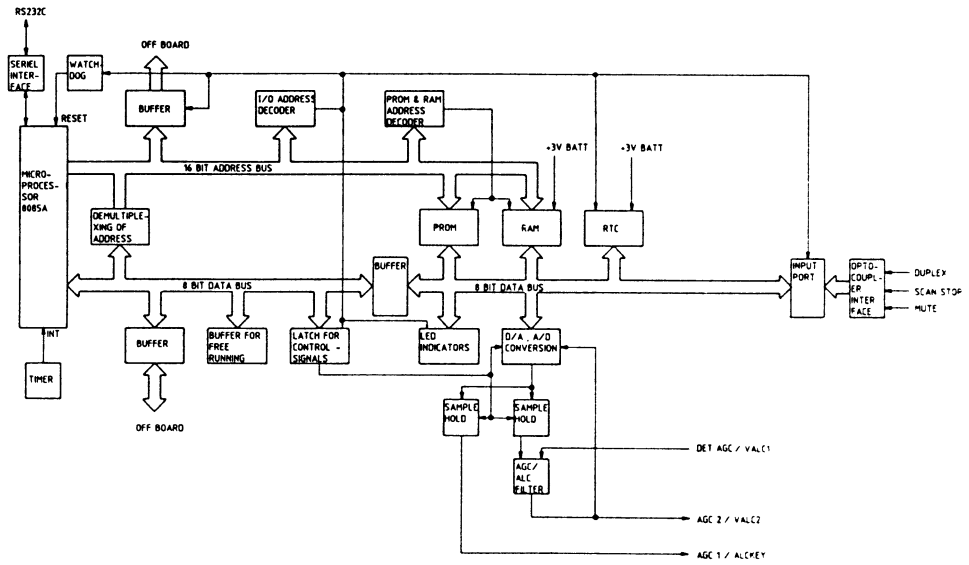


Figure 8.3 Microcomputer Assembly

The assembly consists of a 8085 microprocessor largescale integrated circuit that controls all basic functions within the RC4010.

The operating system software for the microcomputer is stored in three programmable read-only memories (PROM's). Each PROM is capable of storing 16K x 8-bit words.

A random access memory chip (RAM), capable of storing 8k x 8-bit words, is required for the temporary storage and manipulation of input and output data. During power failure and standby, the RAM is powered from a 3V battery backup preventing interruptions from disturbing the stored data.

Various buffers and decoders assure proper drive levels and timing to and from various circuits and input/output ports.

A battery back-uped real time clock integrated circuit is mounted to ensure correct time keeping even during power failure .

Timing of the assembly is via a 6.144 MHz crystal oscillator contained in the CPU.

8.15 Power Supply Assembly A10

The functional block diagram of the Power Supply Assembly is shown in Figure 8.4 for the AC only version and in Figure 8.5 for the AC/DC version.

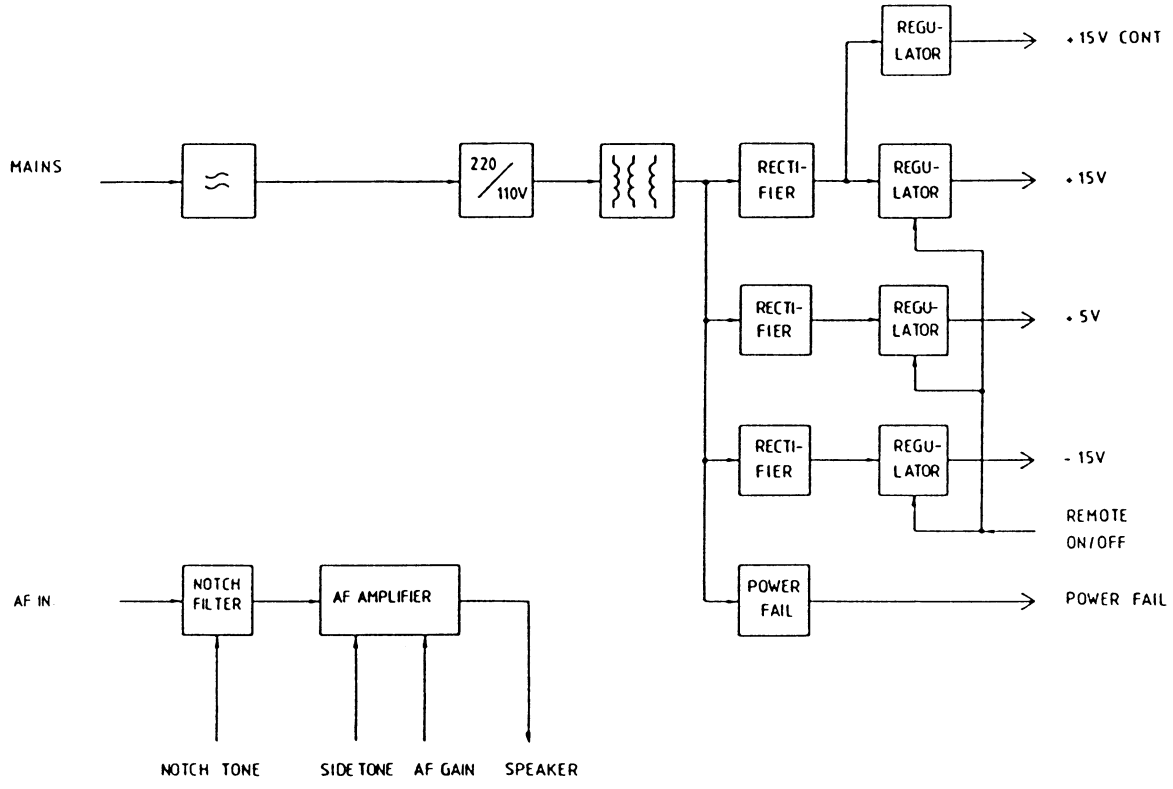


Figure 8.4 Power Supply Assembly. AC only version.

Part of the AF circuits, the notch filter and the AF power amplifier, are included in the assembly.

The AC mains is transformer-coupled to bridge rectifiers, followed by current limited voltage regulators (fold-back limited) delivering +5V, -15V and +15V.

The AC/DC version (Figure 8.5) incorporates a floating inverter enabling the receiver to be driven by a 24Vdc source. The DC supply is converted to 80 Hz ac and applied to a tertiary winding on the mains transformer.

The changeover between the mains supply and the DC supply is performed by a relay, controlled by an optocoupler sensing mains drop-out. The DC to AC converter is released to operate in the same instance the relay is open.

The regulated output voltages are controlled by the front panel ON/OFF switch.

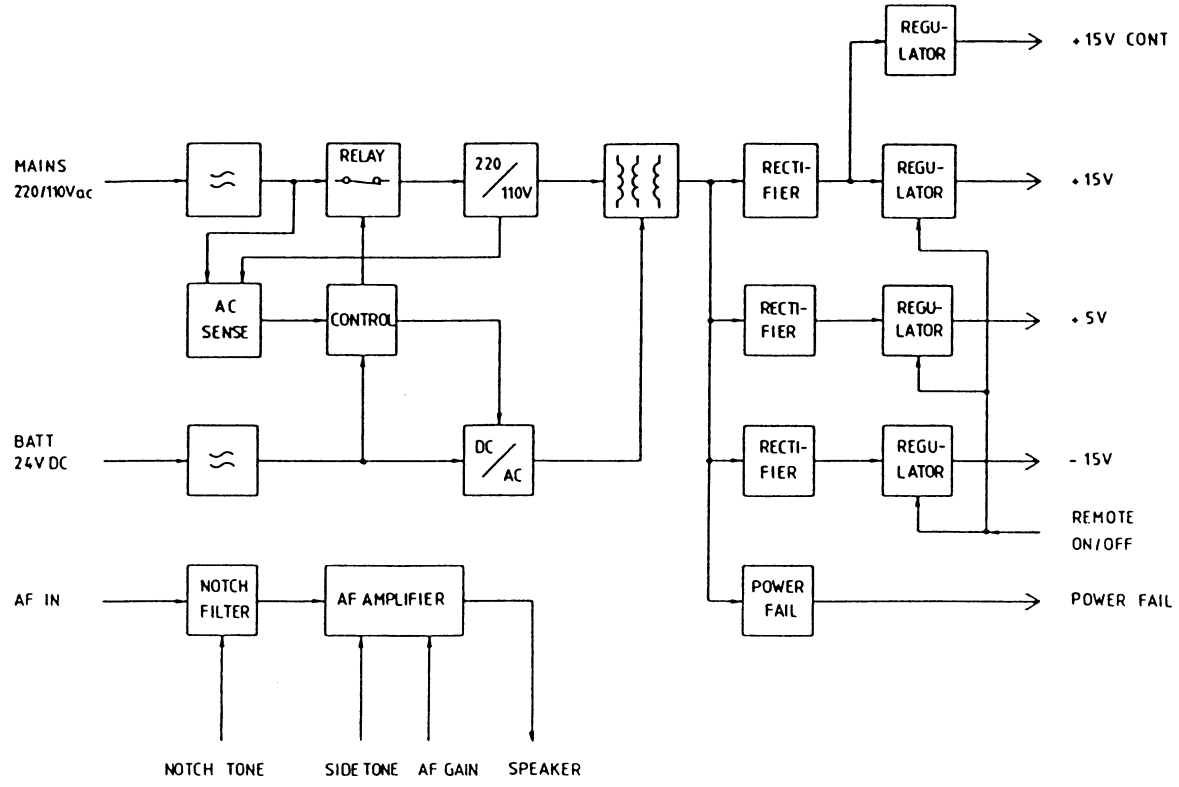


Figure 8.5 Power Supply Assembly. AC/DC version.

When the switch is turned off, the reference voltage for the regulators is grounded, causing the output voltages to be removed, while the remaining part of the assembly will continue to energize.

By means of an on/off switch positioned on the assembly rear panel the RC4010 may be de-energized. To avoid information loss during supply drop-out, a power failure circuit sensing the mains transformer secondary voltage, generates a look-ahead warning for the Microcomputer Assembly.

The AF part of the assembly contains a voltage controlled notch filter covering the range 300 to 3400 Hz, a voltage controlled gain variable preamplifier and a 4W/4 ohm loudspeaker amplifier. A sidetone input, used during CW/SIMPLEX operation is mixed to the preamplifier AF signal.

8.16 Front Panel Assembly A11A1

The Front Panel Assembly mounts and interconnects most of the front panel controls, including power ON/OFF dimmer control, RF gain, AF gain, notch tune, mode select, bandwidth select, and receiver frequency/BFO tune. The LEDs, meter read-out, and phone connector are also mounted on this assembly.

All digital controlled pushbuttons, the tuning knob information and the digitized RF-gain setting are scanned by the Microcomputer Assembly. Synchronous the LED read-outs and the front panel meter are updated. The assembly incorporates A/D-D/A converters for converting the analogue RF-gain and meter information.

The only analogue signals routed to and from the assembly are the DC-voltages controlling the notch tune and gain setting of the AF circuits, and the phone signal for the front panel mounted phone jack.

A single ribbon cable interconnects the asembly to the RC4010 mother board.

8.17 Mother Board A12A1

The RC4010 mother board ties all parts of the RC4010 together. It routes the front panel controls, the microcomputer controls and the stabilized voltage to the remaining assemblies.

Table 8.2 Key Values During Self-Test

KEY DEPRESSED	VALUE DISPLAYED
SSB	11
AM	10
RTTY	12
CW	13
wide	18
inter	19
narr	1A
vnar	1B
off	20
slow	21
fast	22
att	24
scan	36
bfo	35
tune	34
C	37
.	8A
0	80
1	81
2	82
3	83
4	84
5	85
6	86
7	87
8	88
9	89
rcl	31
sto	30
addr	32
mon	33
progr	38

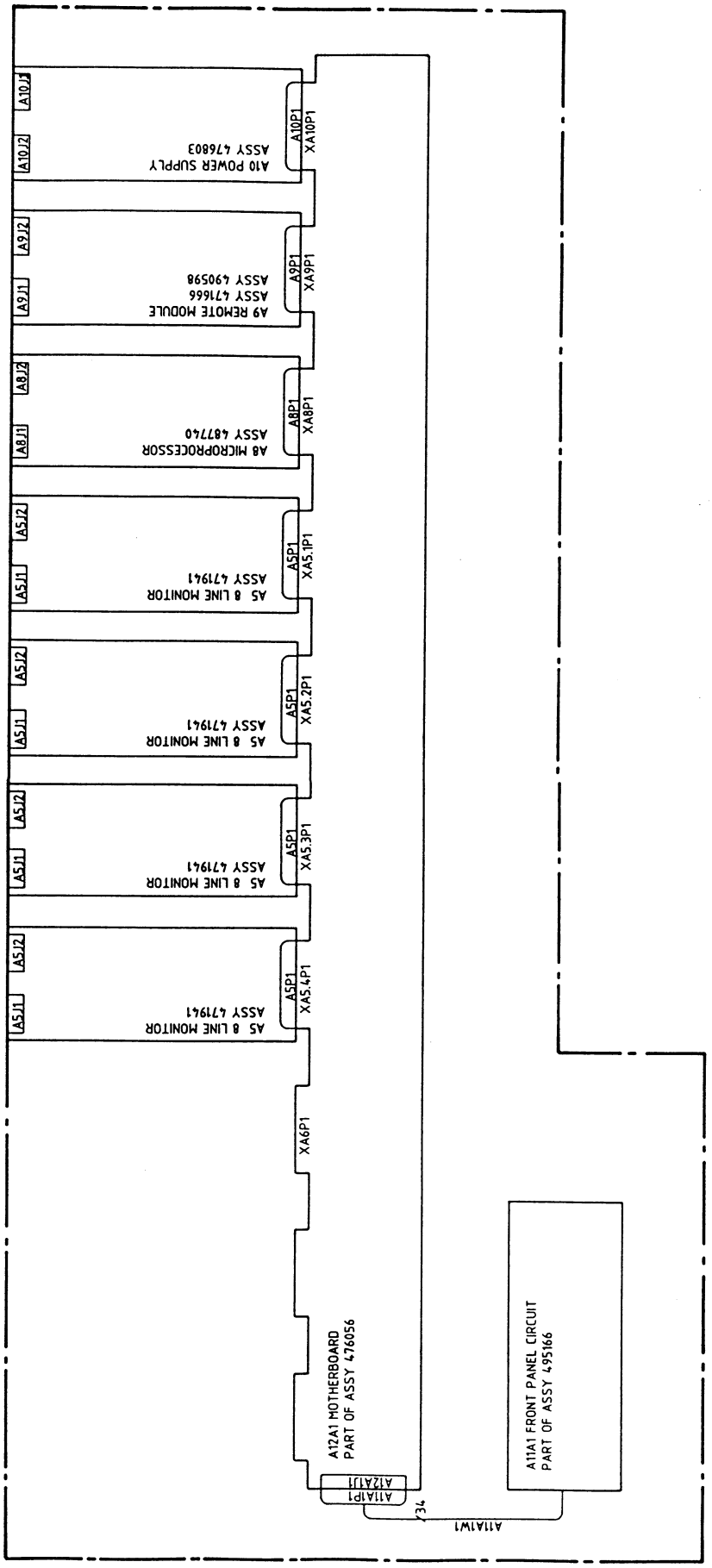
Table 8.3 Fault Analysis Procedures

Find the symptoms below that match the fault condition and follow the hints.

SYMPTOM	POSSIBLE CAUSE
1. RC4010 dead. Mains OK Fuse not blown. No LEDs lit.	A10 Power Supply. A11 Front Panel. on/off switch.
2. RC4010 dead. Mains OK. Fuse blown and new fuse also blows	A10 Power Supply Diodes, seriestransistors, 75V Z-diodes
3. Front Panel dead. Noise is heard in the loudspeaker during power-up.	A8 Microcomputer A10 Power Supply 5V missing
4. Front Panel dead.	A11 Front Panel
5. Display very Weak. RC4010 else OK	A11 Front Panel Dimmer Circuit A10 Power Supply 8V missing
6. Part of Display lights extremely bright while the rest do not lit. RC4010 stops operation.	A8 Microcomputer 8085
7. The same display segment is missing in all figures.	A11 Front Panel Driver transistor Interconnection cable to motherboard
8. Display shows "bAt.FAIL" steadyly or periodically.	A10 Power Supply VBB, VEE or VFF drifting or incorrectly adjusted
9. The Display shows "Axx FAIL" during power-up.	Microcomputer inter face on Ax is faulty
10. "no Axx" during test program	Microcomputer interface on Axx faulty
11. RC4010 acts strange when pressing certain keys	A8 Microcomputer 8085 or EPROMs
12. RC4010 looses data in memory.	A8 Microcomputer Battery run out CMOS RAM faulty
13. "bAt.FAIL" during power-up	As 12.

Table 8.4 Remote transmission error codes.

Display	Error type	Explanation
r.Fr.	Received frames	Number is counting up for every 256 received frames.
r.bt.	Received bytes	Number is counting up for every 256 received bytes.
Syn.	Synchronousing retransmissions	The data is retransmitted 3 times, if there is no answer this error is counting up.
Hd.E.	Header error	a) More than 32 byte is received in a frame. b) There is not the correct number of data in the datatype. c) Datatype don't exist.
to.E.	Timeout error	The time between two frames is out of limit.
Fr.E.	Framing error	No stop bit is detected.
or.E.	Overrun error	The received byte is not read before a newone is received. Data lost.
Pt.E.	Parity error	The parity bit is not correct on the received byte
to.S.	Timeout on S110 line	No acknowledge received on



INTERCONNECTION DIAGRAM RC 4010

DWG.NO. 49 51 23

ASSY 471941, 8-LINE MONITOR

Service sheet A5

Assy 471941, 8-line monitor **Schematic 1**

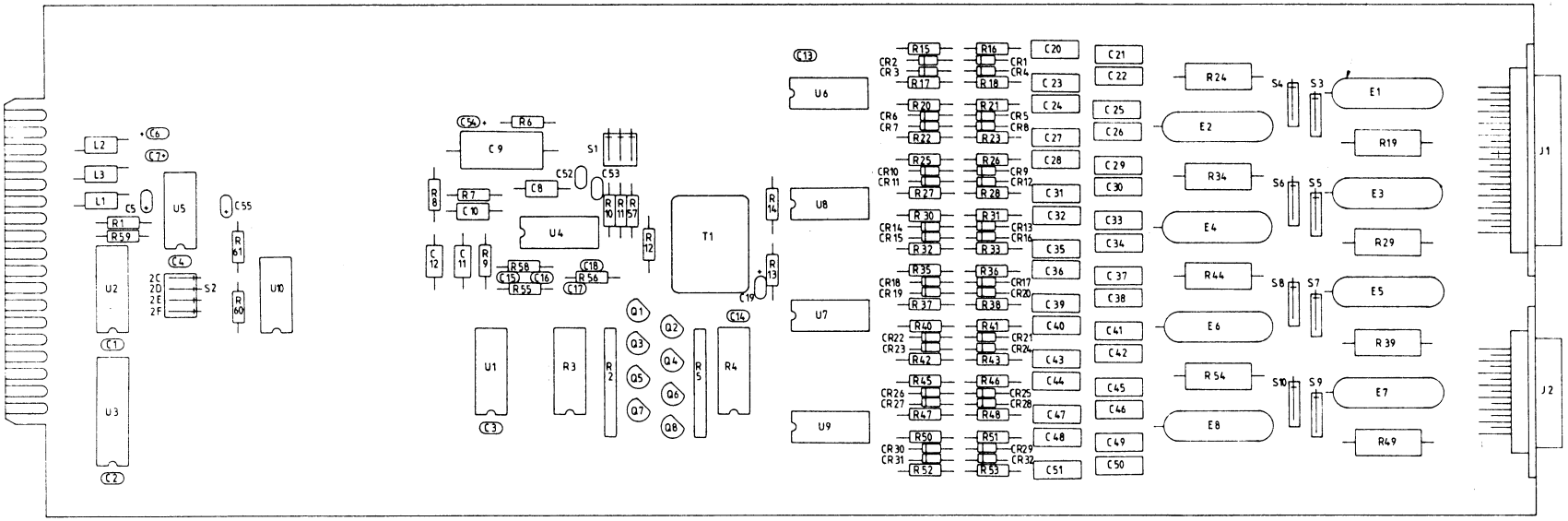
1. Input circuits.
Spike and overvoltage protection of the inputs. With S3 to S10 the impedance of the line inputs can be selected to 600Ω.

2. Line switches.
Line switching according to address decoded line number.

3. Level conversion.
Q1 thru Q7 performs logical inverting and level converting.

1 E1 - E8 OPTIONAL

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVAL
	A			



47 1909	RC 4000	MATERIAL	
NEXT ASSY	USED ON		
APPLICATION			

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETRES AND TOLERANCES ARE IN ACCORDANCE WITH DS 2775

ANGLES

LIN DIM

DR	VH	23 10 1984
CH		
AP		
AP		

FIRST ANGLE PROJECTION

Dansk Radio AS

TITLE: 8 - LINE MONITOR

SIZE	CODE IDENT	DRAWING NO
A1		47 1941
SCALE		SHEET 1 OF 1

4. Address decoding.
U2 detects and decodes addresses for 8-line monitor service. When correct address is recognized, an acknowledge is signalled on the data bus thrugh U5 open collector buffers. The selected line address is further latched by U3, and the binary value converted to decimal value by U1.

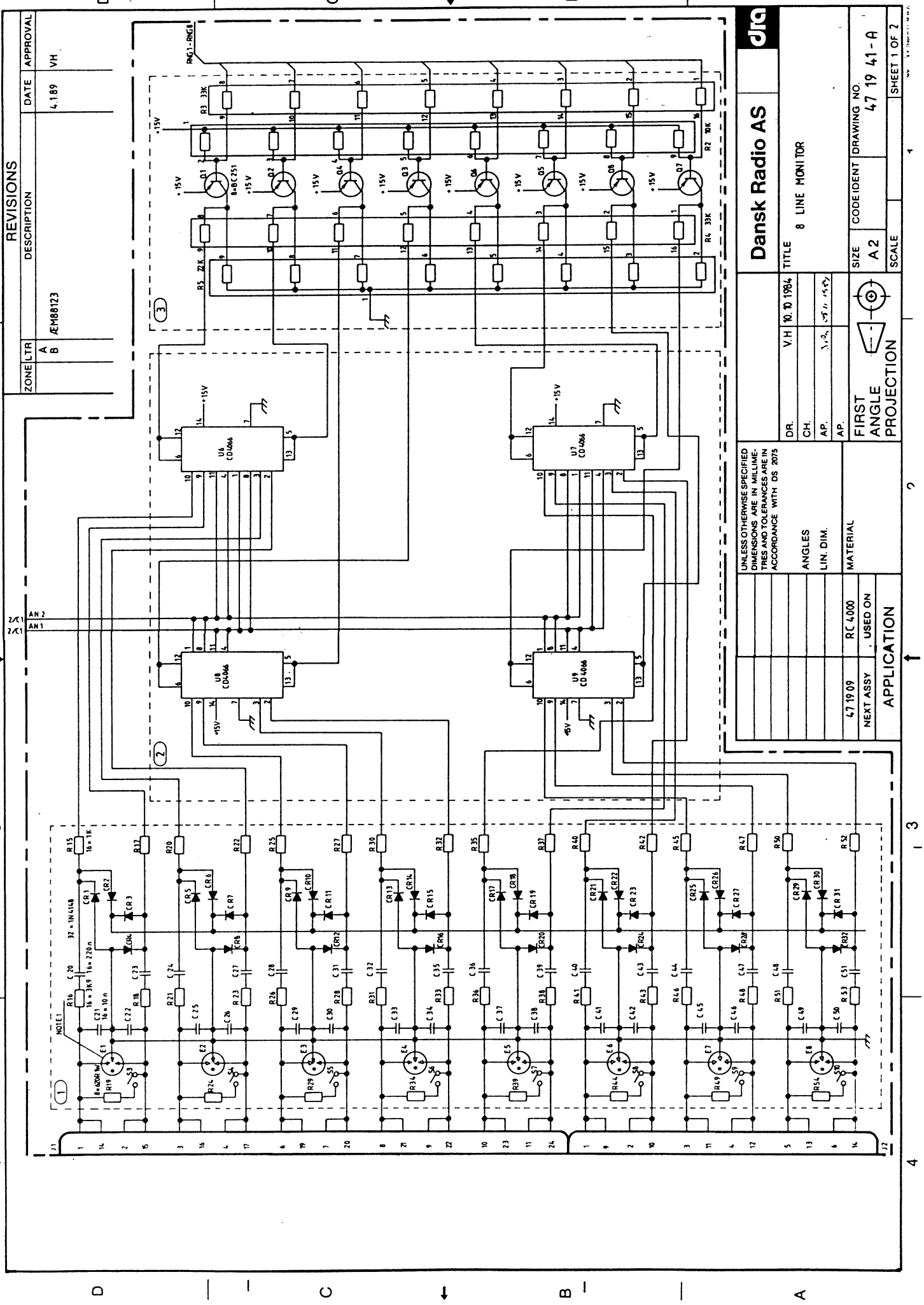
5. Muting.
If a zero address, corresponding to a non active RX4010, is detected, the AF line is muted by U10.

6. Lowpass filter.

7. Highpass filter.

8. AF amplifier.
AF amplifier with selectable gain by means of S1.

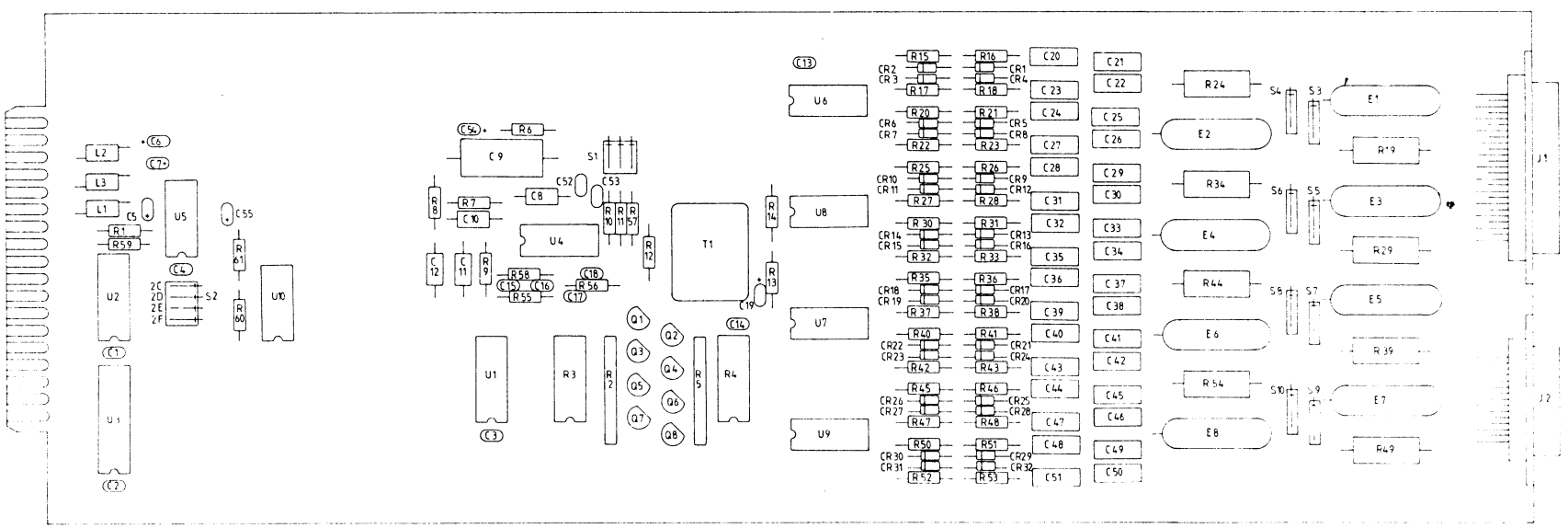
9. Balun.
Transformation from balanced telephone line to unbalanced amplifier input.



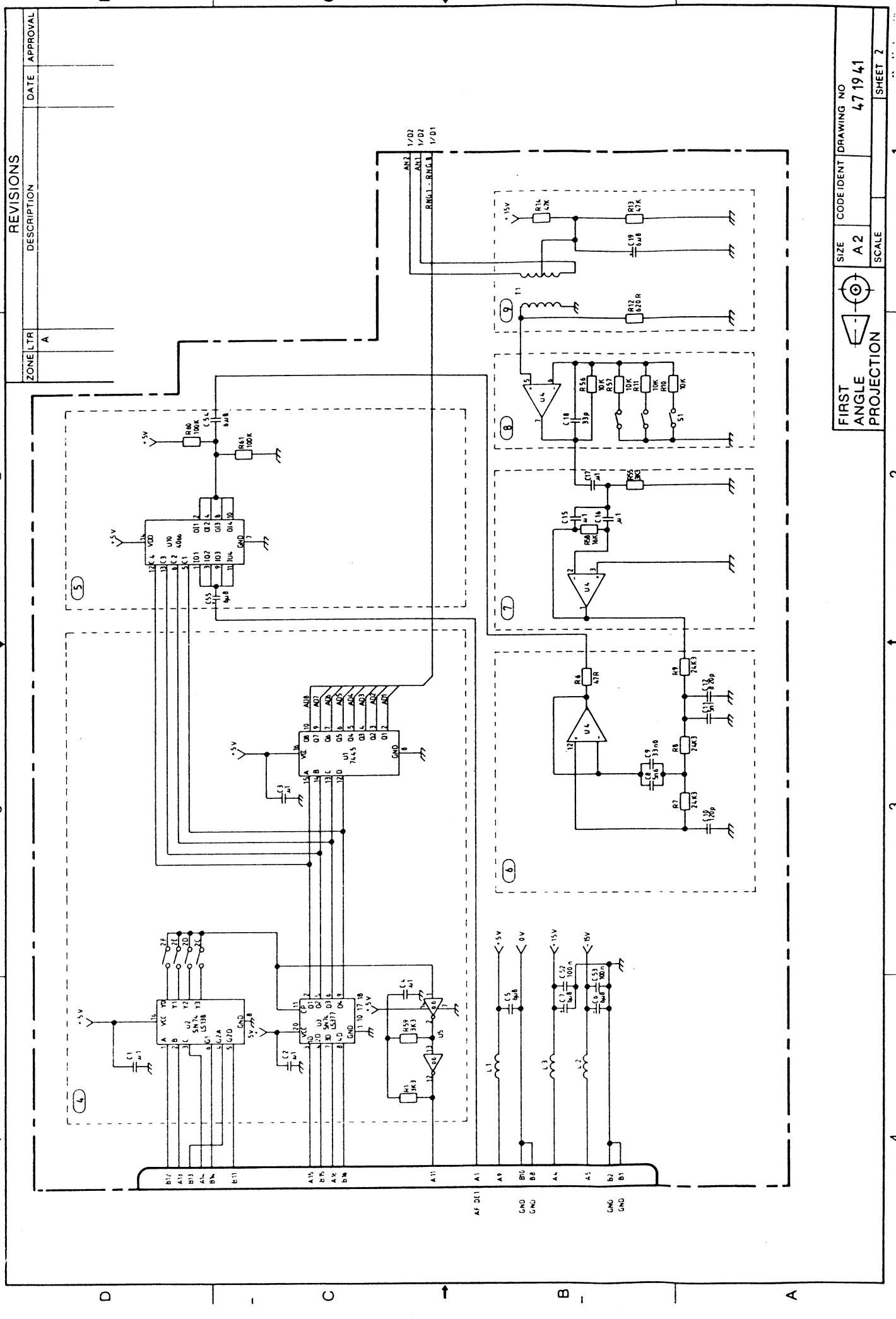
Service Sheet A5

1 E1 - E8 OPTIONAL

REVISIONS			
ZONE LTR	DESCRIPTION	DATE	APPROVAL
A			



47 1909	RC 4000	ANGLES		Dansk Radio AS
NEXT ASSY	USED ON	LIN DIM	DR V.H. 23.10.1984	TITLE 8 - LINE MONITOR
APPLICATION		MATERIAL	CH AP AP	
			FIRST ANGLE PROJECTION	SIZE A1 / DRAWING NO. 47 1941
				SCALE / SHEET 1 OF 1



Service Sheet A5

ASSY 487740, MICROCOMPUTER ASSEMBLY

Service Sheet A8

1. Microprocessor Circuit

This circuit contains an 8085 microprocessor with associated 6.144MHz crystal for internal clock-stabilisation. U12 is an eight bit latch for multi-plexing address line **DB0** to **DB7**. U13 is a buffer for command signals etc.

2. Watch-dog

Watch-dog for surveillance of correct start-up and system software operation.

At system start-up R4 and C1 ensures that a reset pulse of approx. 10msec is generated. This pulse is routed to the microprocessor through U2.

U2 is a retrigger astable multivibrator with a period of 1sec. Under normal operation, the software ensure that U2 is retriggered at appropriate intervals so that the reset signal to the microprocessor is disabled. Appearance of software error causes the retrigger to cease and the reset pulse generation will start-up.

3. 15msec No-Acknowledge Timer

This timer starts counting when **$\overline{\text{OFF BD REQ}}$** goes low. If the timer counts out, no acknowledge-signal has been received within the last 15 msec, and a trap-interrupt is generated to the microprocessor. In normal operation, acknowledge-signals should be received within 15 msec.

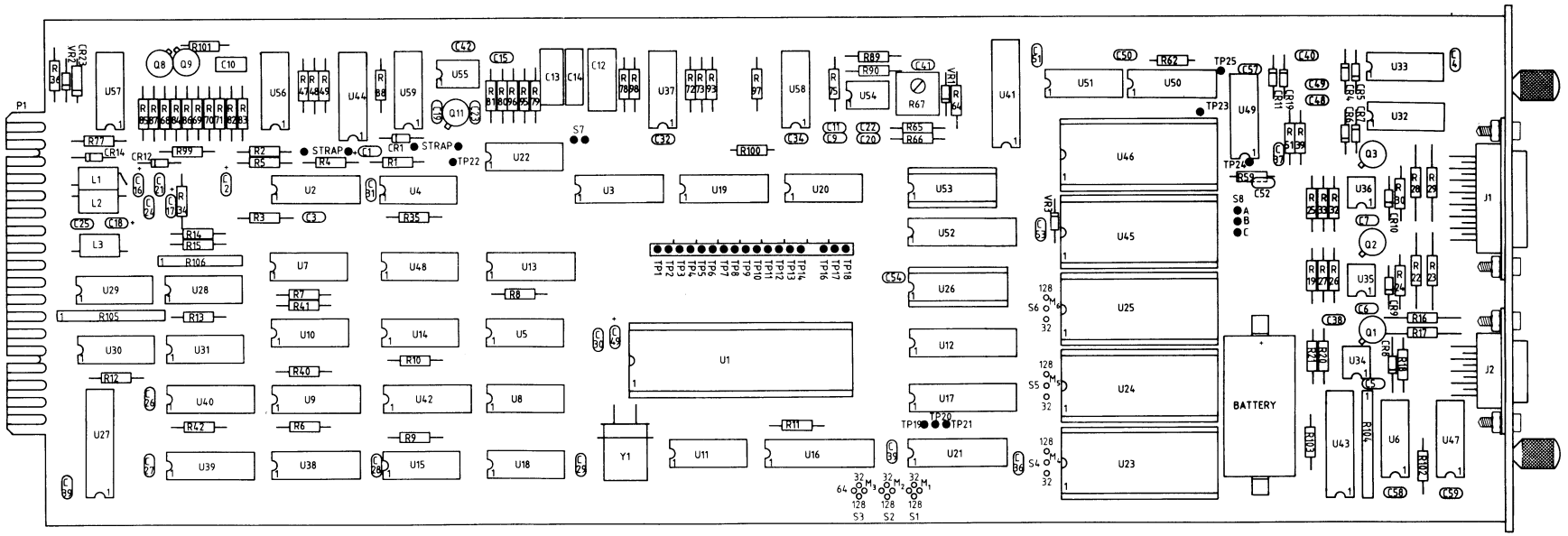
4. Acknowledge Network

The circuit converts the different acknowledge-signals to a ready-signal to the microprocessor.

5. OFF Board Request

The J/K flip-flop U14 delays the start of the **WR**-signal one half of a clock period which ensures that **BUFEN**-signal delays the enable of buffer U17 in accordance with the timing. **$\overline{\text{OFF BD REQ}}$** and **$\overline{\text{OFF BD WR}}$** are only generated if no acknowledge-signal on board has been received before start of **BUFEN**.

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVAL
3C		Added CR1	2.12.87	VH
		ÆM88040	23.8.88	VH
		ÆM88041	24.8.88	VH
		REVISED	1.9.88	VH
		ÆM88110	18.11.88	VH
		ÆM89032	18.5.89	VH



PROM	S1	S2	S3	S4	S5	S6
2732	M_1-32	M_2-32	M_3-32	M_4-32	M_5-32	M_6-32
2764	M_1-64	M_2-64	M_3-64	-	-	-
27128	M_1-128	M_2-128	M_3-128	M_4-128	M_5-128	M_6-128

S7 ONLY ON WHEN USED IN SE4010
S8 M-RAM U45 USED AS RAM
M-ROM U45 USED AS ROM

471909	RC4000
471712	RX4000
488240	RX4009
488100	SE4010
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETRES AND TOLERANCES ARE IN ACCORDANCE WITH DS 2075

ANGLES
LIN DIM
MATERIAL

DR	VH	3.9.1987
CH	NOF	1.9.1987
AP		
AP		

FIRST ANGLE PROJECTION

Dansk Radio AS

TITLE
COMPONENT LOCATION
MPU BOARD A8

SIZE	CODE IDENT	DRAWING NO
A1		48 77 40-B

SCALE 2:1 SHEET 1 OF 1

6. Test Buffer
U16 is an 8 bit buffer which is enabled during "free-running", i.e. when $\overline{\text{TEST}}$ is low. When "free-running" is selected, U16 forces the microprocessor to read NOP-instructions, regardless of the microprocessor addressing.

7. Data Buffer
U17 is an 8 bit bidirectional data buffer which is enabled during on board operations.

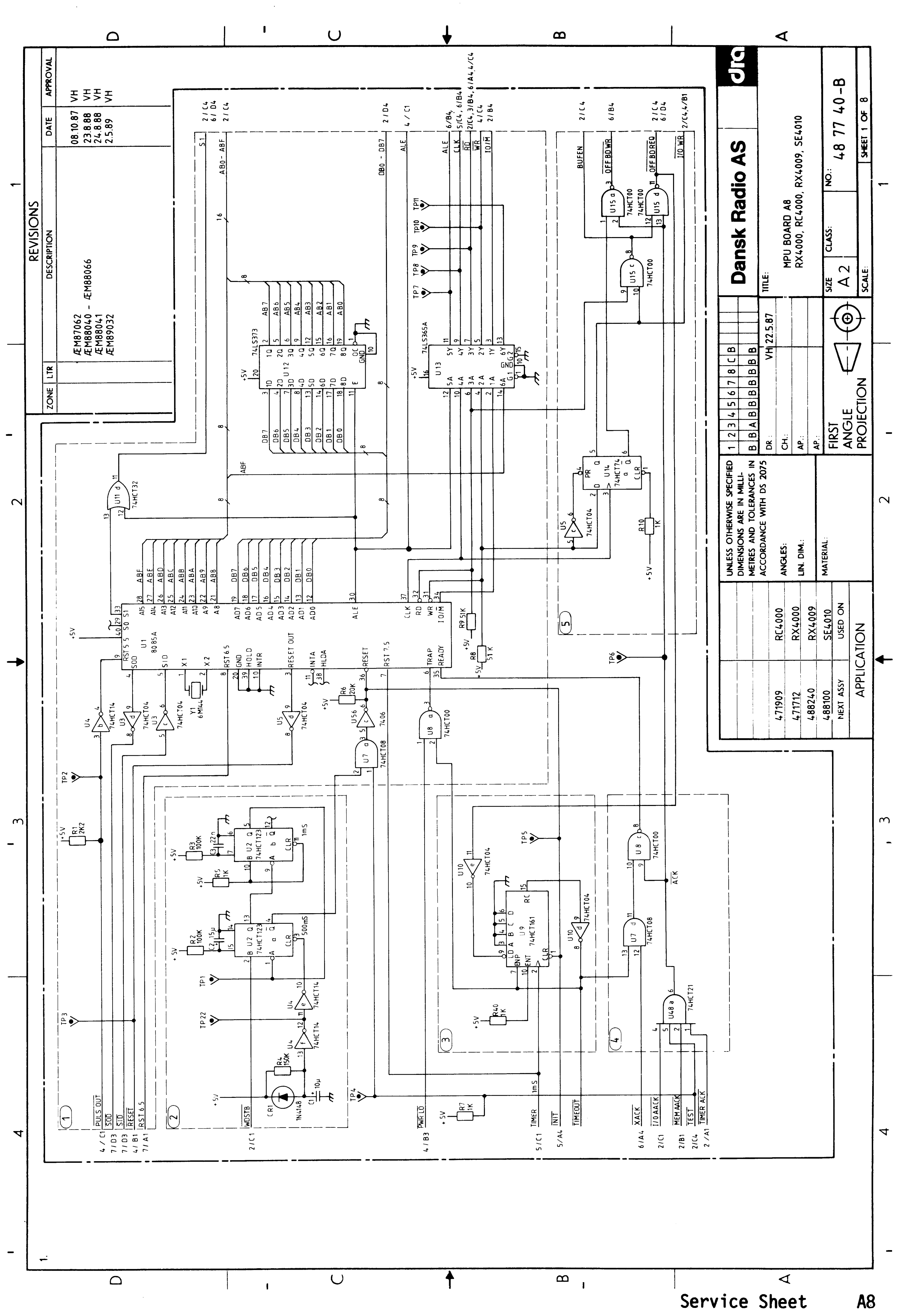
8. Internal Address Decoding
Address decoding for generating on-board chip selects for I/O operations. An acknowledge-signal $\overline{\text{I/O AACK}}$ is generated for every I/O-address, as handshaking signal to the microprocessor.

9. Address Decoding for Memory
Address decoding for generating on-board chip selects for memory operations. An acknowledge-signal $\overline{\text{MEM-AACK}}$ is generated for every memory address, as handshaking signal to the microprocessor.

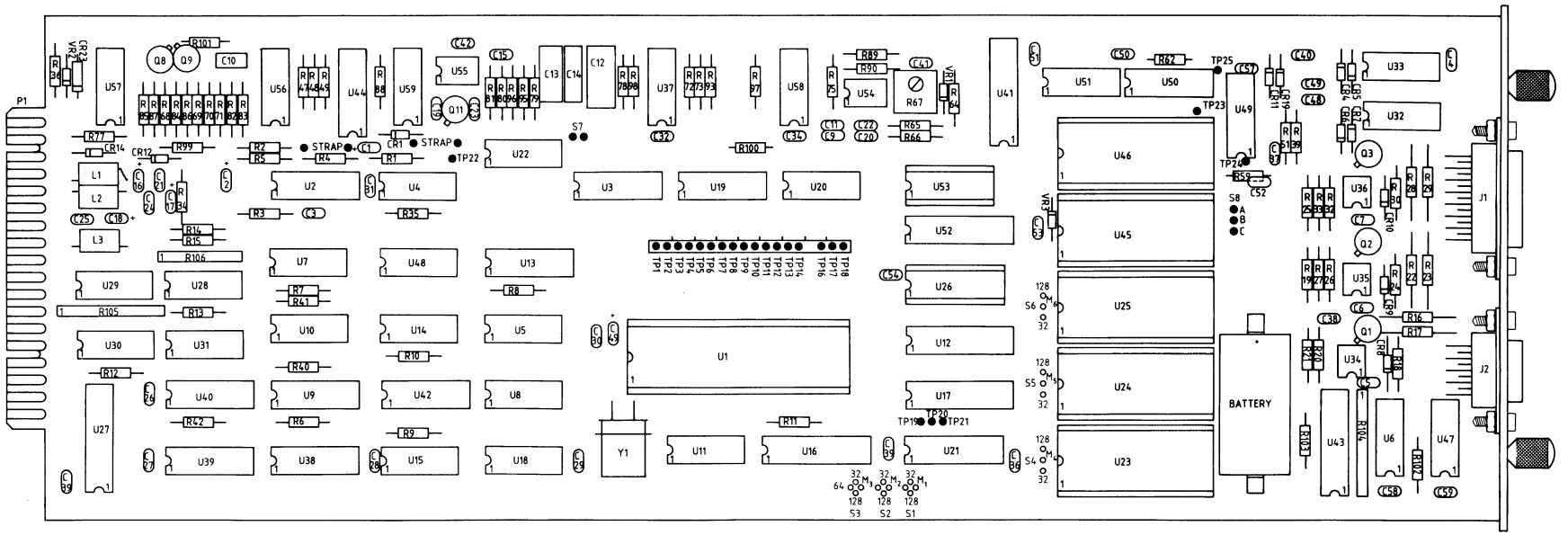
The S1, S2 and S3 strap fields determine the address range of CS1, CS2 and CS3

S1,S2,S3	32	64	128
CS1	0-0FFFH	0-1FFFH	0-3FFFH
CS2	1000-1FFFH	2000-3FFFH	4000-7FFFH
CS3	2000-2FFFH	3000-4FFFH	8000-BFFFH

The address range from C000H to FFFFH is reserved for RAM memory.


REVISIONS
ZONE LTR DESCRIPTION DATE APPROVAL
ÆM87062 08.10.87 VH
ÆM88040 - ÆM88066 23.8.88 VH
ÆM88041 24.8.88 VH
ÆM89032 2.5.89 VH
Dansk Radio AS
TITLE: MPU BOARD A8
RC4000, RC4000, RX4009, SE4010
SIZE A2
NO.: 48 77 40-B
SHEET 1 OF 8
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETRES AND TOLERANCES IN ACCORDANCE WITH DS 2075
FIRST ANGLE PROJECTION
APPLICATION
NEXT ASSY USED ON
471909 RC4000
471712 RX4000
488240 RX4009
488100 SE4010
DR.: VH 22.5.87

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVAL
3C		Added CR1	2.12.87	VH
		ÆM88040	23.8.88	VH
		ÆM88041	24.8.88	VH
		REVISED	1.9.88	VH
		ÆM88110	18.11.88	VH
		ÆM89032	8.5.89	VH



PROM	S1	S2	S3	S4	S5	S6
2732	M_1-32	M_2-32	M_3-32	M_4-32	M_5-32	M_6-32
2764	M_1-64	M_2-64	M_3-64	-	-	-
27128	M_1-128	M_2-128	M_3-128	M_4-128	M_5-128	M_6-128

S7 ONLY ON WHEN USED IN SE4010
S8 M-RAM : U45 USED AS RAM
M-ROM : U45 USED AS ROM

471909	RC4000
471712	RX4000
488240	RX4009
488100	SE4010
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETRES AND TOLERANCES ARE IN ACCORDANCE WITH DS 2075

ANGLES
LIN. DIM
MATERIAL

DR	VH	3.9.1987
CH	MoF	7.9.1987
AP		
AP		

FIRST ANGLE PROJECTION

Dansk Radio AS

TITLE
COMPONENT LOCATION
MPU BOARD A8

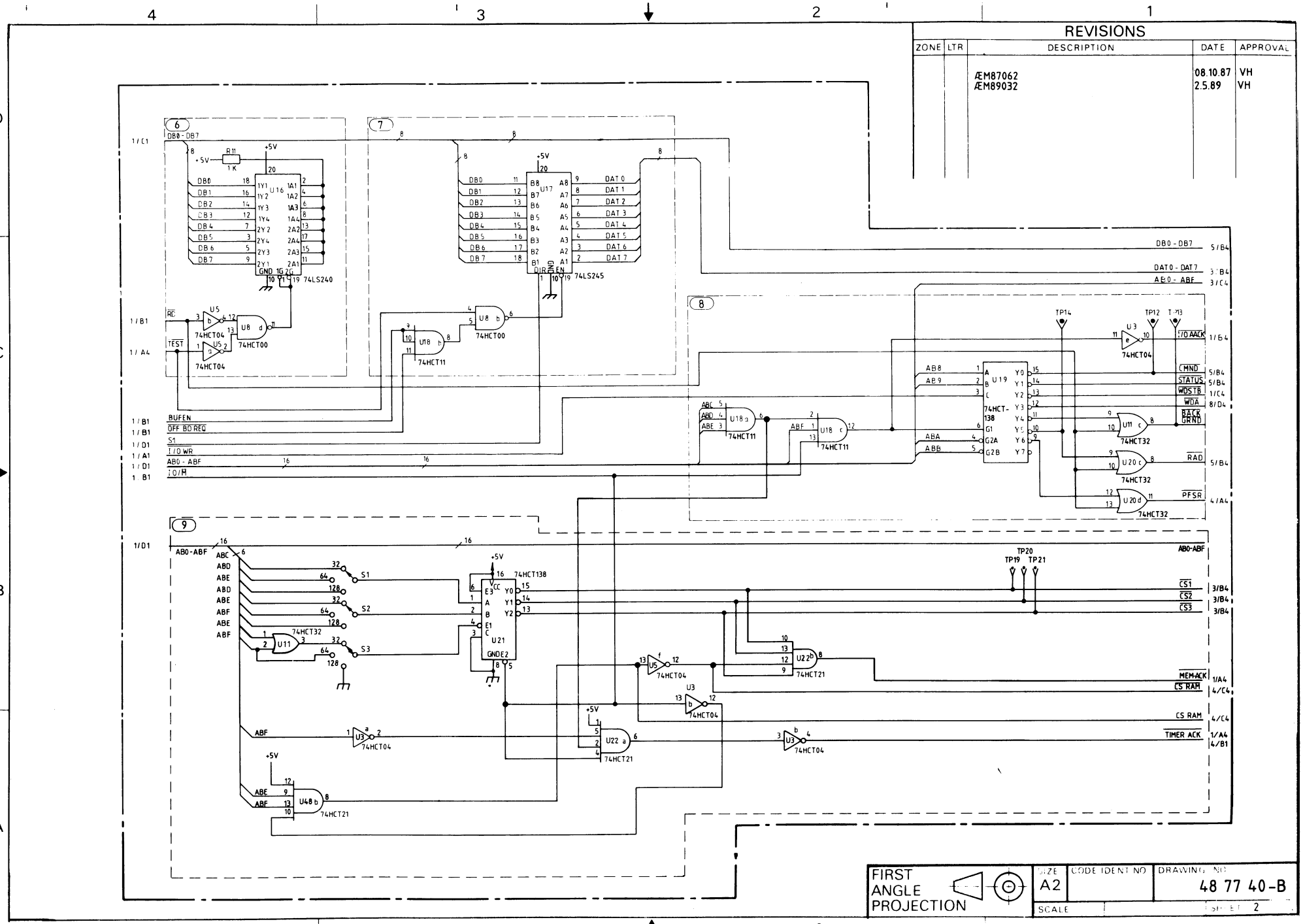
SIZE	CODE IDENT	DRAWING NO.
A1		48 77 40-B
SCALE 2:1		SHEET 1 OF 1

10. EPROM Area

The content of 2732 is 4K x 8 bit.
The content of 2764 is 8K x 8 bit.
The content of 27128 is 16K x 8 bit.

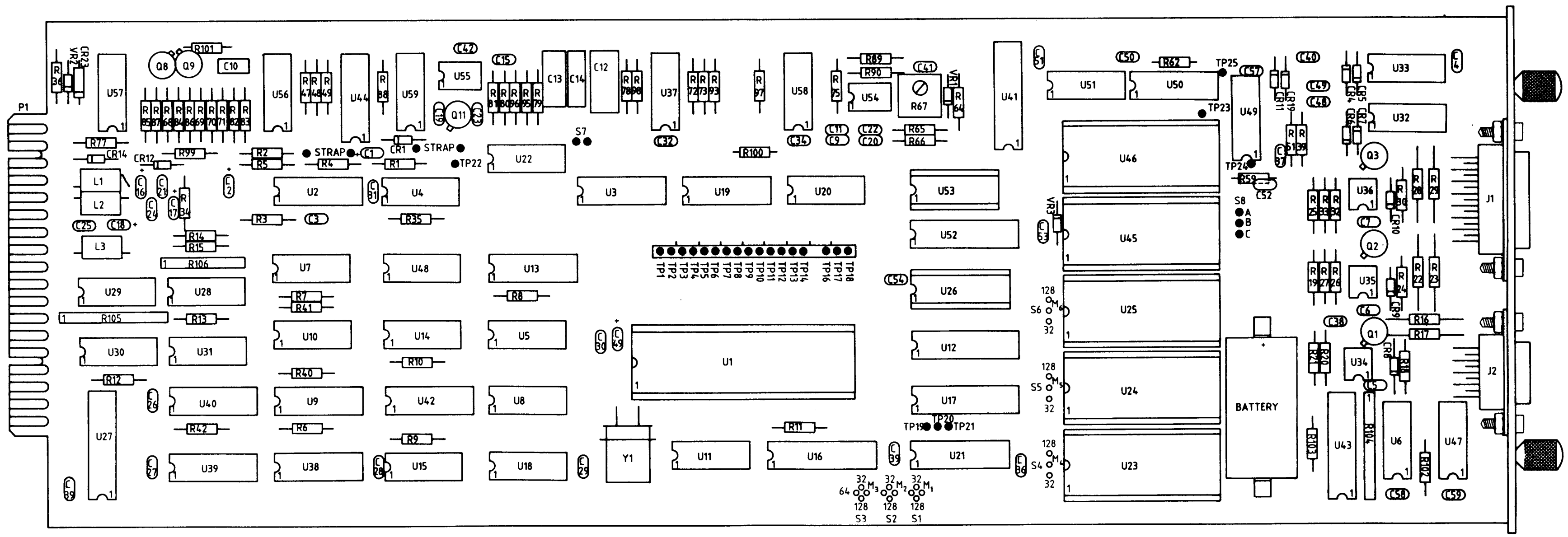
S1,S2,S3	S4	S5	S6	U23	U24	U25
32	32	32	32	2732	2732	2732
64	-	32	-	2764	2732	N.U.
64	-	-	32	2764	2764	2732
64	-	-	-	2764	2764	2764
128	128	32	-	27128	2732	N.U.
128	128	64	-	27128	2764	N.U.
128	128	128	-	27128	27128	2764
128	128	128	128	28128	28128	27128

(N.U. = not used).


REVISIONS
ZONE LTR DESCRIPTION DATE APPROVAL
ÆM87062 08.10.87 VH
ÆM89032 2.5.89 VH
6
7
8
9
DB0 - DB7
DAT0 - DAT7
ABO - ABF
74LS240
74LS245
74HCT04
74HCT00
74HCT11
74HCT32
74HCT138
74HCT21
74HCT-138
BUFEN
OFF BD REQ
S1
I/O WR
I/O M
CMND
STATUS
WDSTB
WDA
BACK GRND
RAD
PFSR
I/O AACK
CS1
CS2
CS3
MEM-ACK
CS RAM
TIMER ACK
TP12
TP13
TP14
TP19
TP20
TP21
FIRST ANGLE PROJECTION
SIZE A2
CODE IDENT NO
DRAWING NO 48 77 40-B
SCALE
SHEET 2
Service Sheet A8

REVISIONS

ZONE	LTR	DESCRIPTION	DATE	APPROVAL
3C		Added CR1	2.12.87	VH
		ÆM88040	23.8.88	VH
		ÆM88041	24.8.88	VH
		REVISED	1.9.88	VH
		ÆM88110	18.11.88	VH
		ÆM89032	8.5.89	VH



PROM	S1	S2	S3	S4	S5	S6
2732	M_1-32	M_2-32	M_3-32	M_4-32	M_5-32	M_6-32
2764	M_1-64	M_2-64	M_3-64	-	-	-
27128	M_1-128	M_2-128	M_3-128	M_4-128	M_5-128	M_6-128

S7 : ONLY ON WHEN USED IN SE4010
S8 : M-RAM : U45 USED AS RAM
M-ROM : U45 USED AS ROM

471909	RC4000
471712	RX4000
488240	RX4009
488100	SE4010
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETRES AND TOLERANCES ARE IN ACCORDANCE WITH DS 2075

ANGLES

LIN. DIM.

MATERIAL

DR. VH 3.9 1987

CH. NoF 1.9.1988

AP.

AP.

FIRST ANGLE PROJECTION

Dansk Radio AS dra

TITLE
COMPONENT LOCATION
MPU BOARD A8

SIZE A1 | CODE IDENT | DRAWING NO. 48 77 40-B

SCALE 2:1 | SHEET 1 OF 1

11. Back-up Circuit

Circuit which ensures power to CMOS-gates U49-U51, CMOS-RAM U45 and U46 (if large RAM area is required) and RTC (U26) during power off.

BT1 is a lithium battery and R51 protects the battery against serious damage if a short circuit appears.

12. RAM area

The RAM area consist of one 8K x 8 bit. The RAM-area can be extended to 16K x 8 bit by placing an additional 8K x 8 bit RAM circuit in socket U46.
When U45 is used as RAM memory, the strap S8 must be strapped between a and b.
When large PROM memory is required, the strap S8 must be strapped between b and c. In this case, the U45 must be a PROM memory and U46 must be a RAM memory.

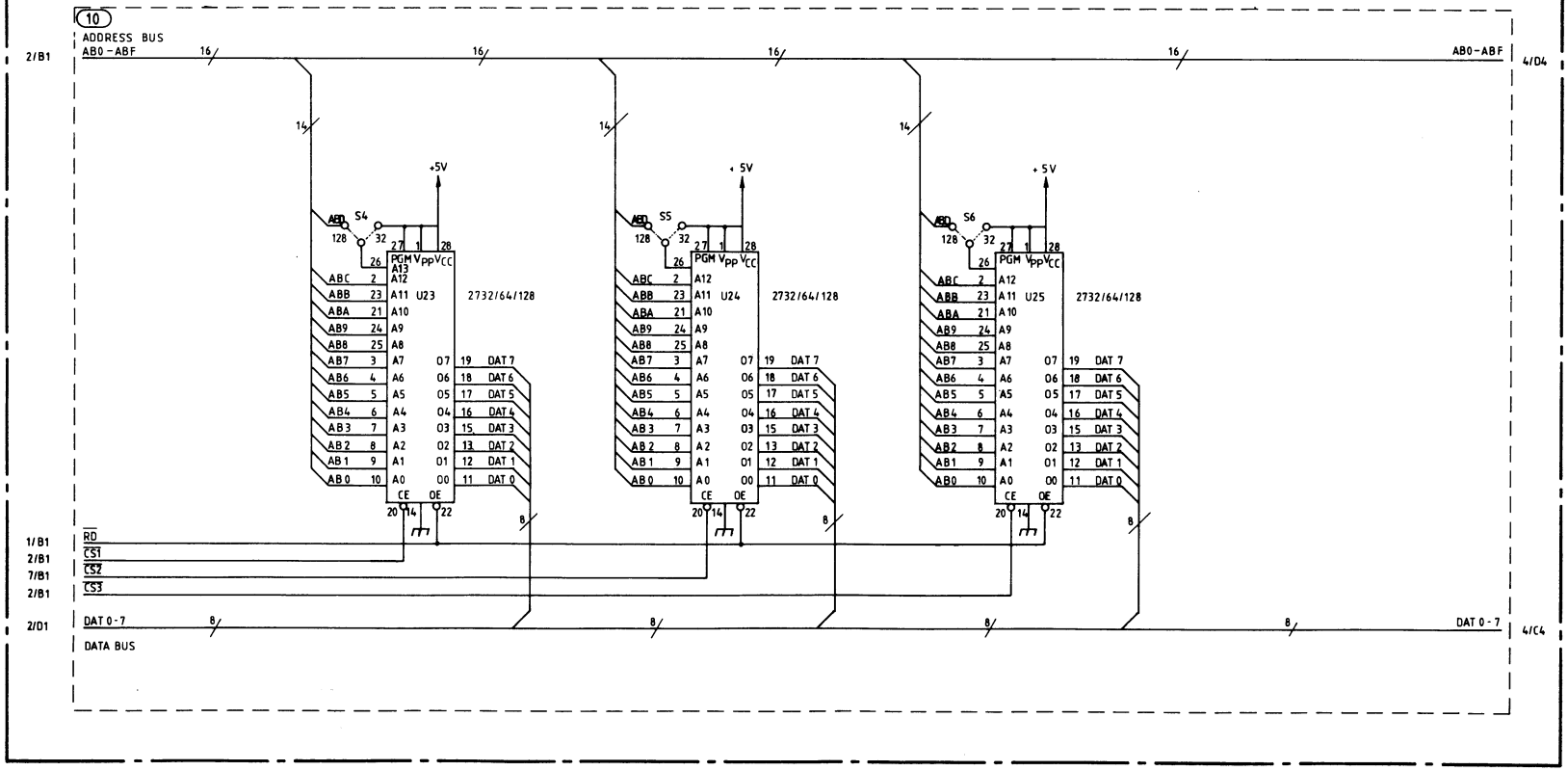
13. RAM Protection

When power is removed intentionally by PWR OFF on the front panel, U50a is set. The **PWR LO** will interrupt the microprocessor. This will read the status of U50a and store relevant information in the CMOS RAM (U45 and U46) and hereafter protect the CMOS RAM against writing by setting U50b. During start-up U50a will be cleared by **RESET** and the CMOS RAM will be enabled by clearing U50b.

33. Real Time Clock

The real time clock consist of a battery back-uped integrated circuit U26. If the integrated circuit has a built-in oscillator crystal, the external components C35, C36 and Y2 are not mounted.

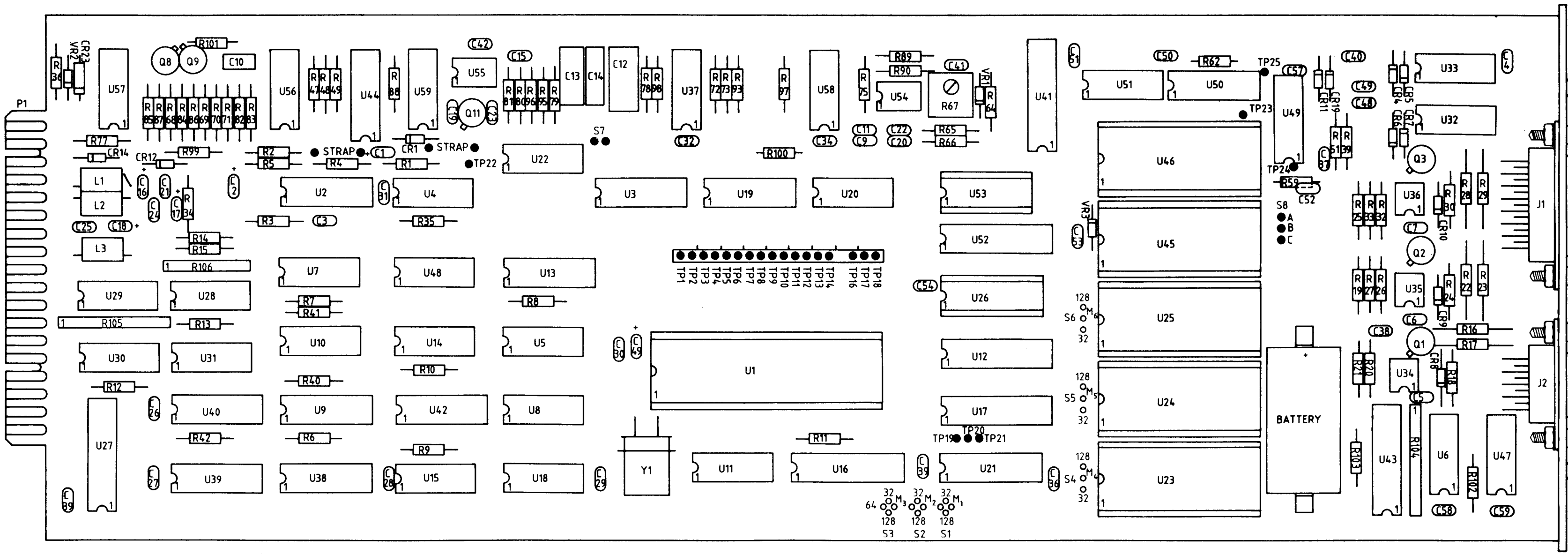
REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVAL



FIRST ANGLE PROJECTION	SIZE	CODE IDENT	DRAWING NO.
	A2		48 77 40
	SCALE		SHEET 3

Service Sheet A8

ZONE	LTR	DESCRIPTION	DATE	APPROVAL
3C		Added CR1	2.12.87	VH
		ÆM88040	23.8.88	VH
		ÆM88041	24.8.88	VH
		REVISED	1.9.88	VH
		ÆM88110	18.11.88	VH
		ÆM89032	8.5.89	VH



PROM	S1	S2	S3	S4	S5	S6
2732	M_1-32	M_2-32	M_3-32	M_4-32	M_5-32	M_6-32
2764	M_1-64	M_2-64	M_3-64	-	-	-
27128	M_1-128	M_2-128	M_3-128	M_4-128	M_5-128	M_6-128

S7 ONLY ON WHEN USED IN SE4010
S8 : M-RAM : U45 USED AS RAM
M-ROM : U45 USED AS ROM

NEXT ASSY	USED ON
471909	RC4000
471712	RX4000
488240	RX4009
488100	SE4010

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETRES AND TOLERANCES ARE IN ACCORDANCE WITH DS 2075

ANGLES
LIN DIM
MATERIAL

DR VH 3.9.1987
CH NoF 1.9.1988
AP
AP

FIRST ANGLE PROJECTION

Dansk Radio AS

TITLE: COMPONENT LOCATION MPU BOARD A8

SIZE A1 | CODE IDENT | DRAWING NO. 48 77 40-B

SCALE 2:1 | SHEET 1 OF 1

14. 1msec Timer

This timer counts on the CLK-signal from the microprocessor. The output gives a RST 7.5 interrupt to the microprocessor for every 1ms, and a clock pulse to 3.

15. Input Buffer for internal Signals

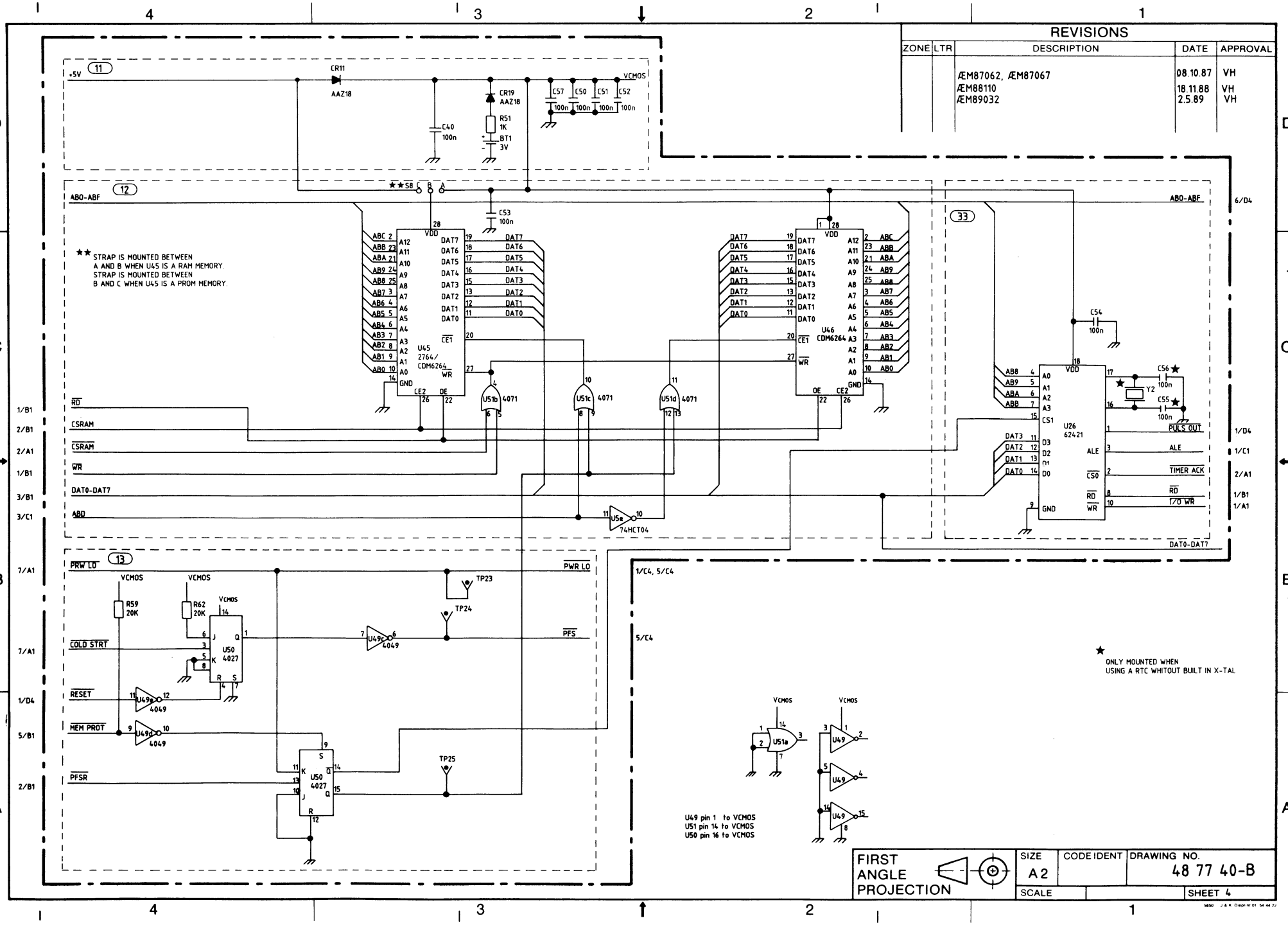
8 bit input port.

16. Control Latch

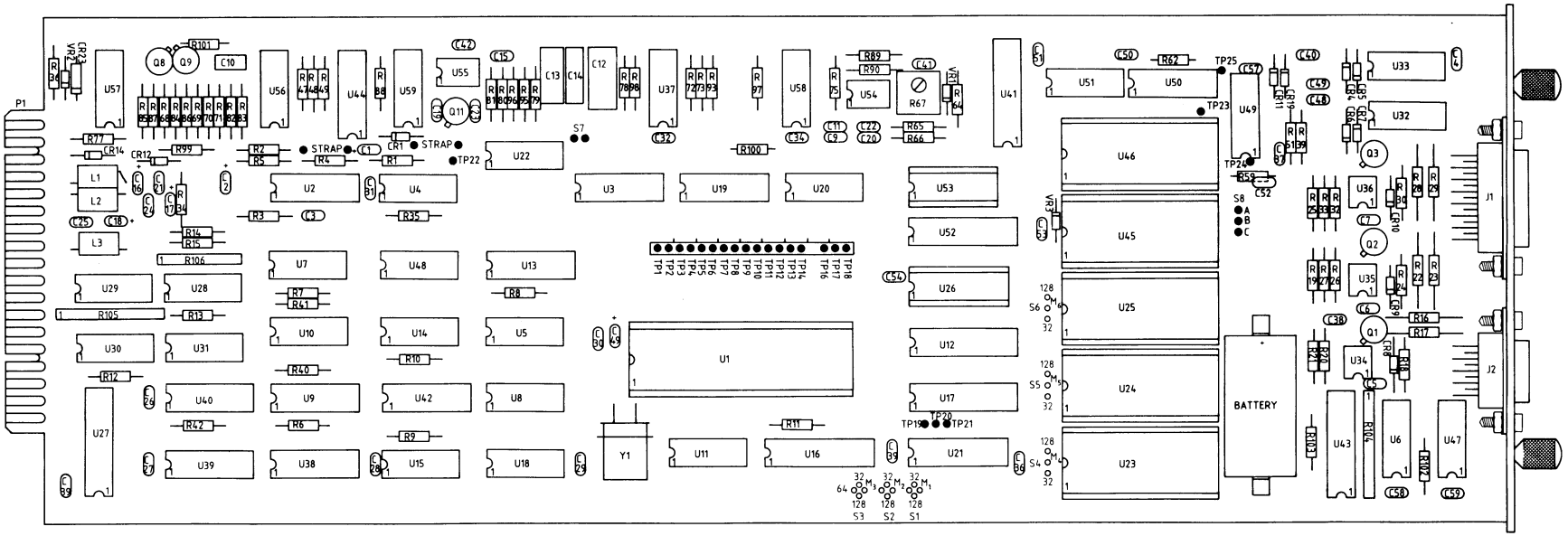
U42 is an 8 bit addressable latch used for control signals. U44 is a one out-of-four decoder with associated pull-up resistors. used for control signals

17. 8 bit Open collector Output Circuit

Each output consists of an no protected open collector inverter capable to sink max. 24 mA. The open collector voltage must not exceed 30 Volt. The 8 bit output are avaible via the connector J2 on the rear plate.


REVISIONS
ZONE LTR DESCRIPTION DATE APPROVAL
ÆM87062, ÆM87067 08.10.87 VH
ÆM88110 18.11.88 VH
ÆM89032 2.5.89 VH
+5V
CR11 AAZ18
CR19 AAZ18
R51 1K
BT1 3V
C40 100n
C57 C50 C51 C52 100n
VCMOS
C53 100n
ABO-ABF
★★S8 C B A
★★ STRAP IS MOUNTED BETWEEN A AND B WHEN U45 IS A RAM MEMORY. STRAP IS MOUNTED BETWEEN B AND C WHEN U45 IS A PROM MEMORY.
U45 2764/ CDM6264
U46 CDM6264
U51b 4071
U51c 4071
U51d 4071
U5a 74HCT04
RD
CSRAM
CSRAM
WR
DAT0-DAT7
ABD
33
C54 100n
C56 100n
C55 100n
Y2
U26 62421
PULS OUT
ALE
TIMER ACK
RD
I/O WR
PRW LO
PWR LO
R59 20K
R62 20K
U50 4027
U49c 4049
TP23
TP24
TP25
COLD STRT
RESET
MEM PROT
PFSR
PFS
1/C4, 5/C4
5/C4
★ ONLY MOUNTED WHEN USING A RTC WHITOUT BUILT IN X-TAL
U49 pin 1 to VCMOS
U51 pin 14 to VCMOS
U50 pin 16 to VCMOS
FIRST ANGLE PROJECTION
SIZE A2
CODE IDENT
DRAWING NO. 48 77 40-B
SCALE
SHEET 4
Service Sheet A8

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVAL
3C		Added CR1	2.12.87	VH
		ÆM88040	23.8.88	VH
		ÆM88041	24.8.88	VH
		REVISED	1.9.88	VH
		ÆM88110	18.11.88	VH
		ÆM89032	8.5.89	VH



PROM	S1	S2	S3	S4	S5	S6
2732	M_1-32	M_2-32	M_3-32	M_4-32	M_5-32	M_6-32
2764	M_1-64	M_2-64	M_3-64	-	-	-
27128	M_1-128	M_2-128	M_3-128	M_4-128	M_5-128	M_6-128

S7 ONLY ON WHEN USED IN SE4010
S8 M-RAM : U45 USED AS RAM
M-ROM : U45 USED AS ROM

471909	RC4000
471712	RX4000
488240	RX4009
488100	SE4010
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETRES AND TOLERANCES ARE IN ACCORDANCE WITH DS 2075

ANGLES
LIN. DIM
MATERIAL

DR	VH	3.9.1987
CH	NOF	1.9.1987
AP		
AP		

FIRST ANGLE PROJECTION

Dansk Radio AS

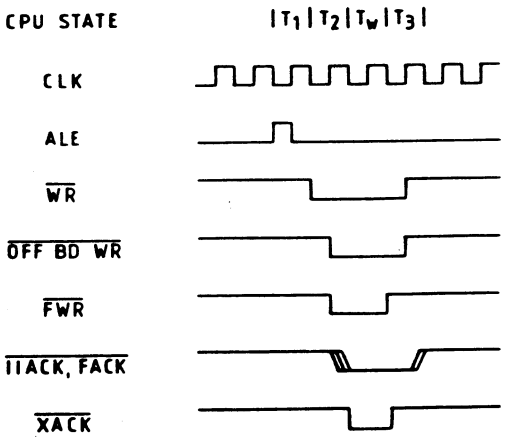
TITLE
COMPONENT LOCATION
MPU BOARD A8

SIZE	CODE IDENT	DRAWING NO
A1		48 77 40-B
SCALE 2:1		SHEET 1 OF 1

18. Supply Filters

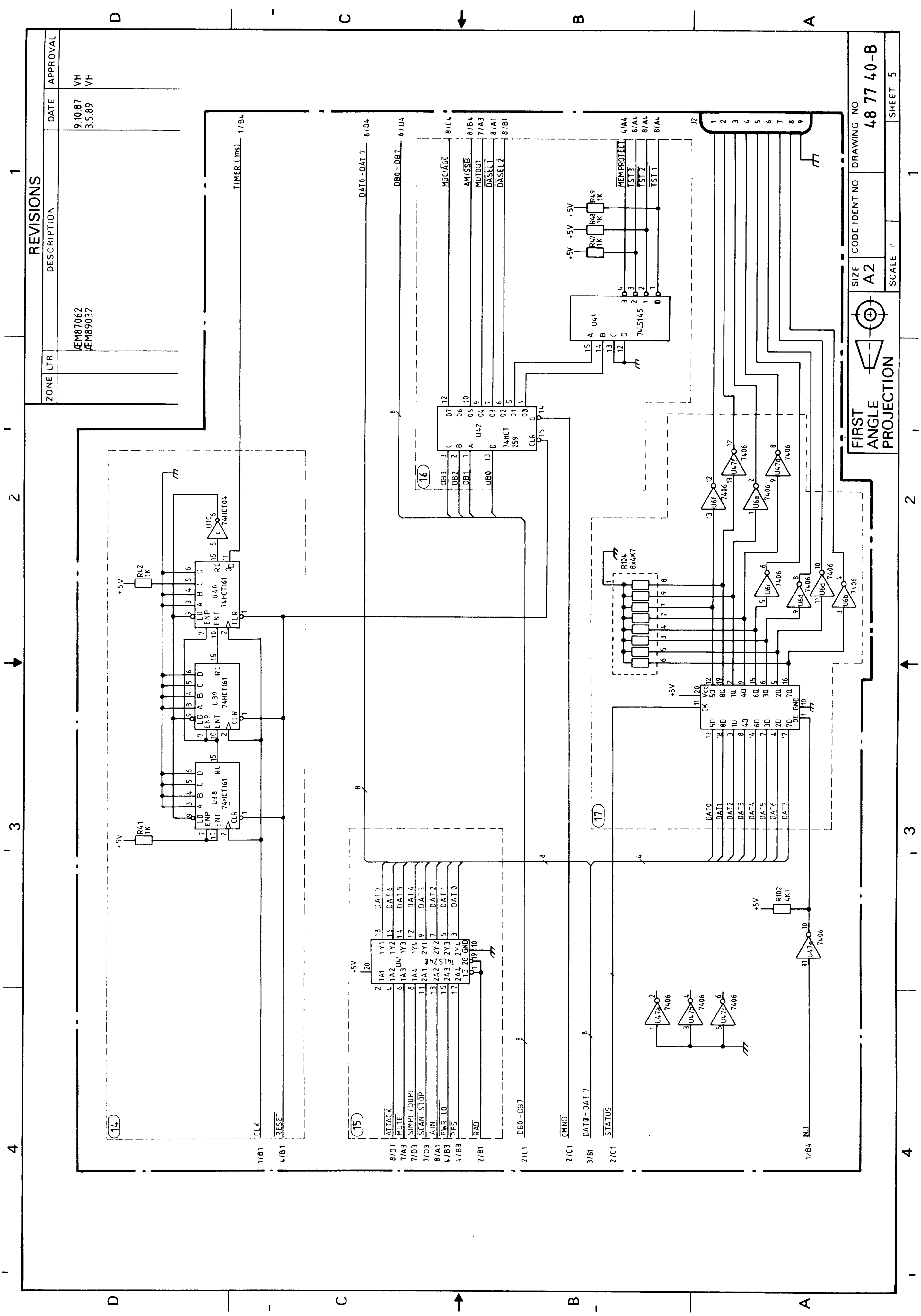
19. Off-Board Data Latch
U27 is an 8 bit bidirectional data bus buffer, which is enabled during off-board operations.

20. Off-Board Acknowledge
Circuit to provide at least 1 wait-state in the micro-processor timing, during off board write operations. This ensures that data is valid on the rising edge of $\overline{FWR}$.

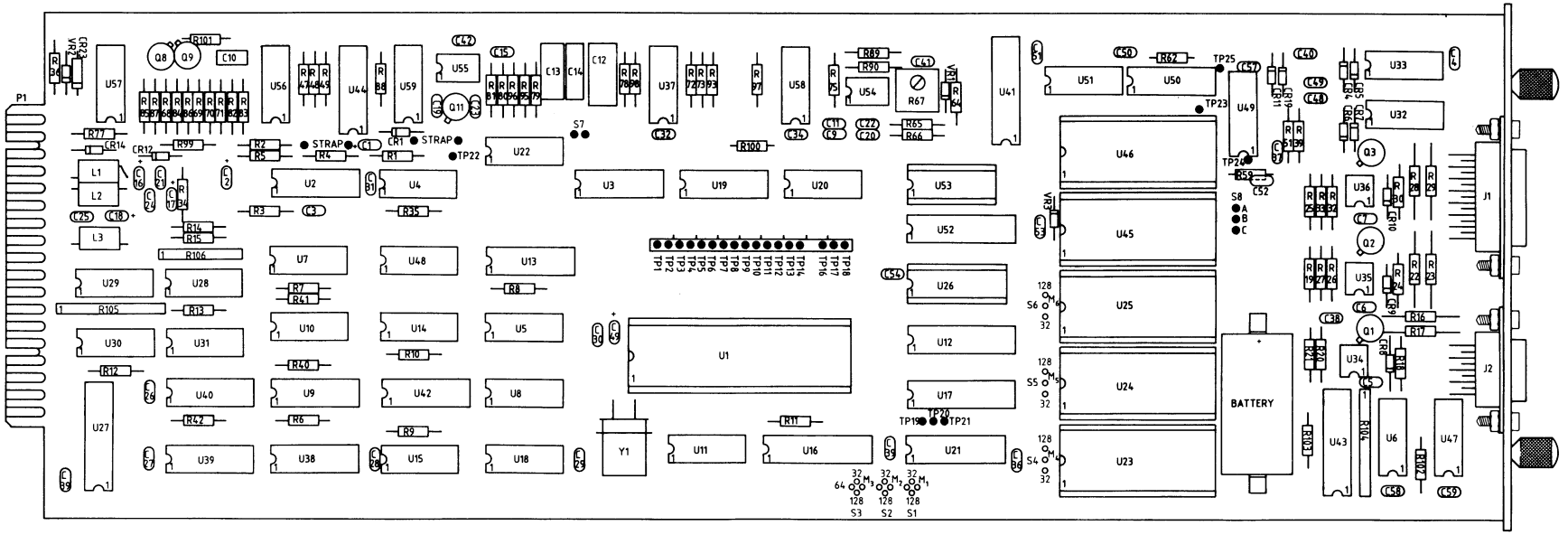


Timing diagram for generating of 1 wait-state.

21. Off-Board Address Buffer
Buffers for Off-board address- and command-signals.


REVISIONS
ZONE
LTR
DESCRIPTION
DATE
APPROVAL
ÆM87062
ÆM89032
9.10.87
3.5.89
VH
VH
FIRST ANGLE PROJECTION
SIZE
A2
CODE IDENT NO
DRAWING NO
48 77 40-B
SCALE
SHEET 5

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVAL
3C		Added CR1	2.12.87	VH
		ÆM88040	23.8.88	VH
		ÆM88041	24.8.88	VH
		REVISED	1.9.88	VH
		ÆM88110	18.11.88	VH
		ÆM89032	8.5.89	VH



PROM	S1	S2	S3	S4	S5	S6
2732	M_1-32	M_2-32	M_3-32	M_4-32	M_5-32	M_6-32
2764	M_1-64	M_2-64	M_3-64	-	-	-
27128	M_1-128	M_2-128	M_3-128	M_4-128	M_5-128	M_6-128

S7 : ONLY ON WHEN USED IN SE4010
S8 : M-RAM : U45 USED AS RAM
M-ROM : U45 USED AS ROM

471909	RC4000
471712	RX4000
488240	RX4009
488100	SE4010
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETRES AND TOLERANCES ARE IN ACCORDANCE WITH DS 2075

ANGLES
LIN. DIM
MATERIAL

DR	VH	3.9.1987
CH	NOF	1.9.1987
AP		
AP		

FIRST ANGLE PROJECTION

Dansk Radio AS

TITLE
COMPONENT LOCATION
MPU BOARD A8

SIZE	CODE IDENT	DRAWING NO.
A1		48 77 40-B

SCALE 2:1 SHEET 1 OF1

22. RS232 Interface (Optional)
RS232 interface for serial communication.

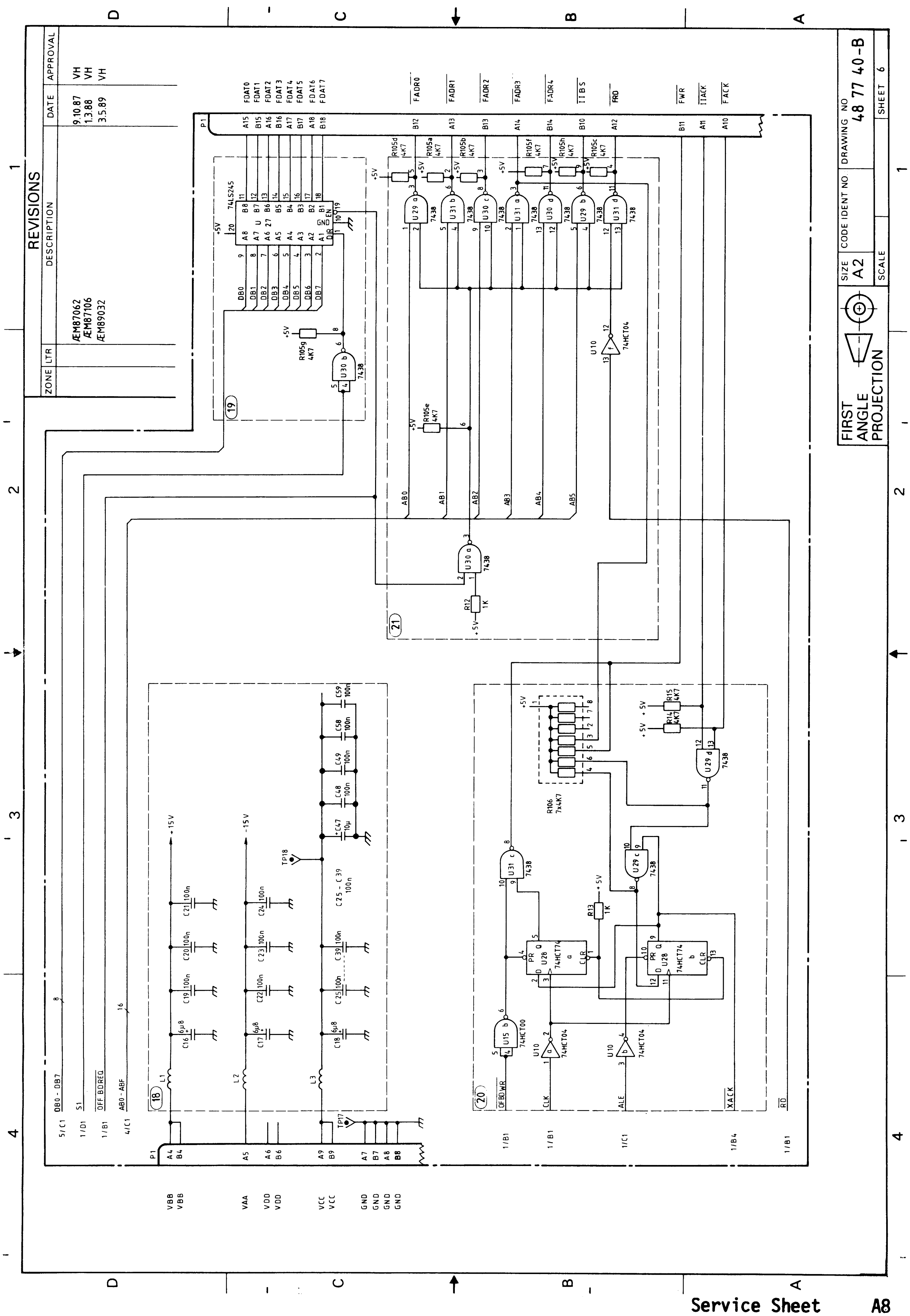
23. Opto-coupler Interface
Octo-coupler interface to ensure electrical separation between incoming signals and on-board signals.

External signal generators shall be 24V, 10mA to provide a proper TTL-signal on Q1's, Q2's or Q3's collector.

The duplex input is used only in RX4010.

24. Power Control Inputs
Diode network CR13 and CR14 are protection diodes. R34 and CR12 ensures current through the connector when **PWRON** is low.

If power is removed by turning "PWR OFF" on the front panel, **PWRON** goes high, and provides U50a in 13 to be cleared, by means of **COLD STRT**.


REVISIONS
ZONE
LTR
DESCRIPTION
DATE
APPROVAL
ÆM87062
ÆM87106
ÆM89032
9.10.87
1.3.88
3.5.89
VH
VH
VH
FIRST ANGLE PROJECTION
SIZE
A2
CODE IDENT NO.
DRAWING NO
48 77 40-B
SCALE
SHEET 6

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVAL
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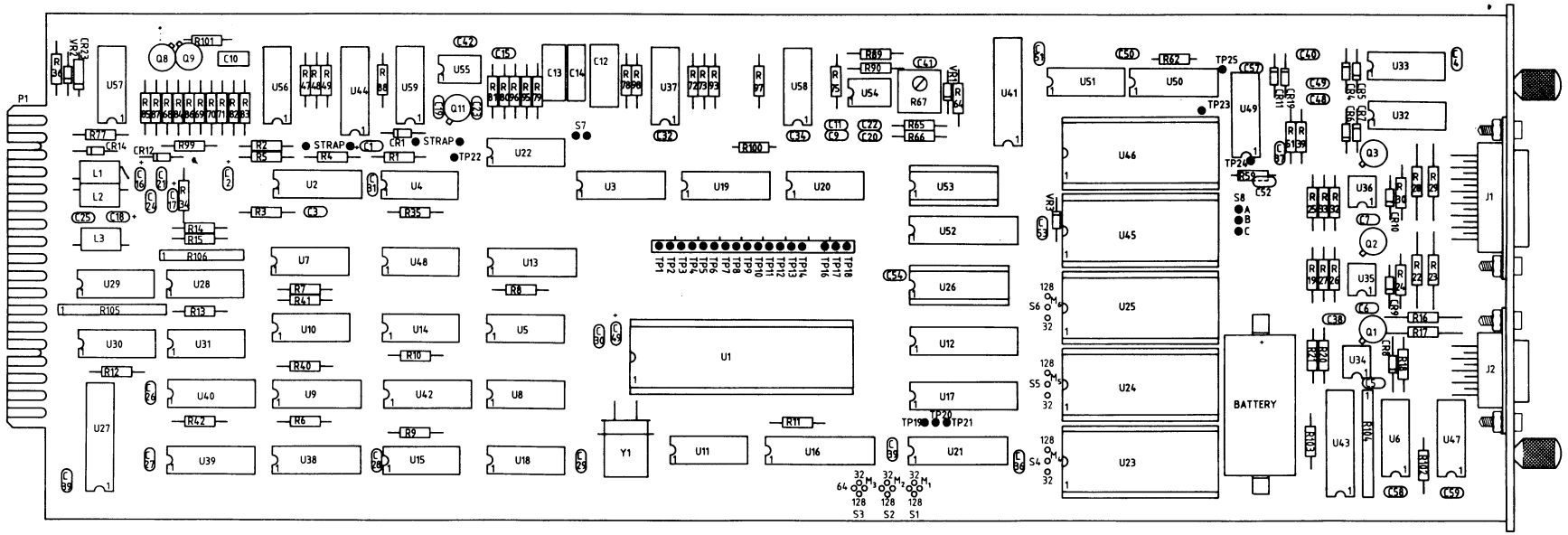
		ÆM88040	23.8.88	VH
		ÆM88041	24.8.88	VH
		REVISED	1.9.88	VH
		ÆM88110	18.11.88	VH
		ÆM89032	8.5.89	VH



PROM	S1	S2	S3	S4	S5	S6
2732	M_1-32	M_2-32	M_3-32	M_4-32	M_5-32	M_6-32
2764	M_1-64	M_2-64	M_3-64	-	-	-
27128	M_1-128	M_2-128	M_3-128	M_4-128	M_5-128	M_6-128

S7 : ONLY ON WHEN USED IN SE4010
S8 : M-RAM : U45 USED AS RAM
M-ROM : U45 USED AS ROM

471909	RC4000
471712	RX4000
488240	RX4009
488100	SE4010
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETRES AND TOLERANCES ARE IN ACCORDANCE WITH DS 2075

ANGLES

LIN. DIM.

MATERIAL

DR	VH	3.9.1987
CH	NOF	14.9.1987
AP		
AP		

FIRST ANGLE PROJECTION

Dansk Radio AS

TITLE
COMPONENT LOCATION
MPU BOARD A8

SIZE	CODE IDENT	DRAWING NO
A1		48 77 40-B

SCALE 2:1 SHEET 1 OF 1

25. D/A Converter
U52 is an 8 bit latch. U53 is an bit digital to analogue converter with associated resistor network. U54 is an operational amplifier with an output to be range set by R67. The maximum output may be adjusted to 10V.

26. ATTACK Detector
Circuit to provide an **ATTACK** as long as Q9 is open. To avoid spikes to cause an **ATTACK**, R91, C10 determines the minimum time Q9 has to be open. R70, R71 and C10 holds the **ATTACK** to ensure the microprocessor to read the **ATTACK**.

27. MUTE Buffer
A MUTE - Signal will force the AGC2/VALC2 and the AGC1/ALCKEY to +15 VDC. (optionally).

28. Analogue Switch
U57 is an analogue switch. When the microprocessor assembly is used in SE4010 this switch will always be closed. CR23 protects U57 against negative levels.

29. Gain Control Filter/Strap
Only when the microcomputer assembly is used in SE4010, the strap S7 must be strappet between a and b. This will minimize the effect of the filter and cause the transfer function to equals 1 approximately.
Otherwise the strap S7 must be strapped between b and c.

If **VALC1/AGCDET** exceeds **Vhold** + Vbe (Q8) (**Vhold** is the voltage on the output of U54b) an **ATTACK** is fed to the microcomputer causing **Vhold** to increase.

When used in SE4010 **Vhold** decreases slowly when no **ATTACK** is present provided that **AGC1/ALCKEY** is on logical "1".

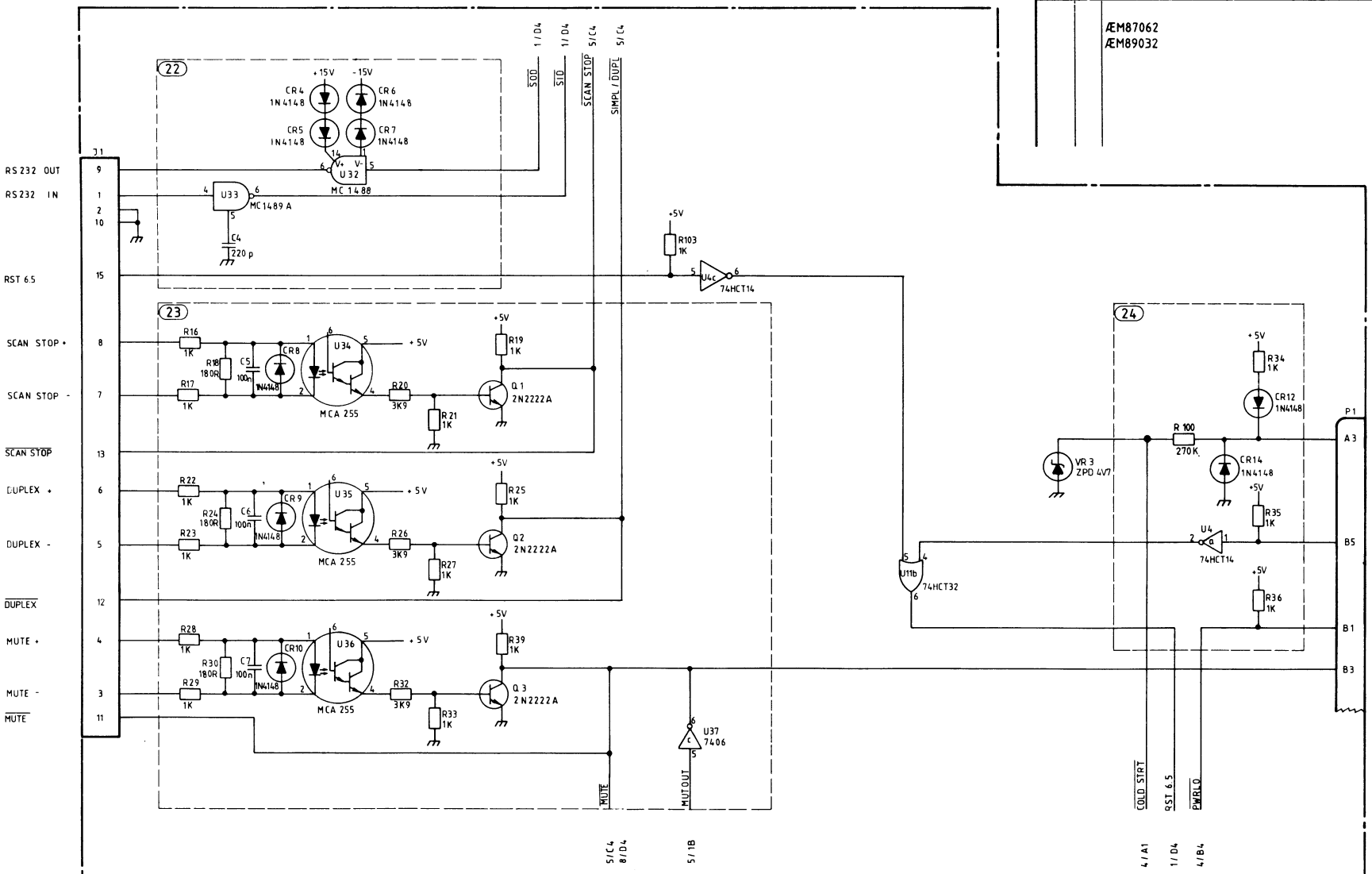
When used in a receiver **Vhold** decreases according to the AGC time constants.

30. Sample and Hold Circuit for Vhold
Sample and hold circuit supplying **Vhold**.

31. Test Circuit
By means of the comparator U59 and the D/A-converter in (25), an A/D-conversion of either **AGC1/ALCKEY**, **AGC2/VALC2** or a test level can be performed.

32. Sample and Hold Circuit for AGC1
When used in receivers the circuit supplies AGC-voltage to **AGC1**.

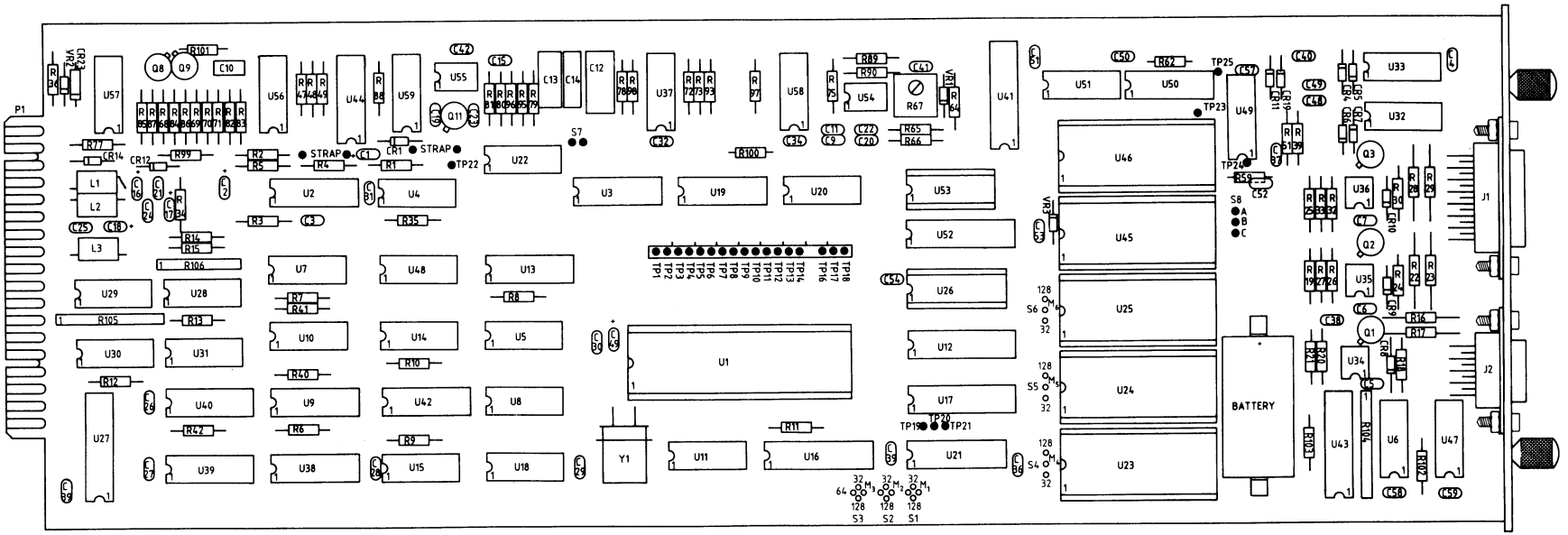
REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVAL
		ÆM87062	9.10.87	VH
		ÆM89032	3.5.89	VH



FIRST ANGLE PROJECTION	SIZE	CLASS:	NO.:
	A 2		48 77 40-B
	SCALE:		SHEET 7

Service Sheet A8

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVAL
3C		Added CR1	2.12.87	VH
		ÆM88040	23.8.88	VH
		ÆM88041	24.8.88	VH
		REVISED	1.9.88	VH
		ÆM88110	18.11.88	VH
		ÆM89032	8.5.89	VH



PROM	S1	S2	S3	S4	S5	S6
2732	M_1-32	M_2-32	M_3-32	M_4-32	M_5-32	M_6-32
2764	M_1-64	M_2-64	M_3-64	-	-	-
27128	M_1-128	M_2-128	M_3-128	M_4-128	M_5-128	M_6-128

S7 : ONLY ON WHEN USED IN SE4010
S8 : M-RAM : U45 USED AS RAM
M-ROM : U45 USED AS ROM

471909	RC4000
471712	RX4000
488240	RX4009
488100	SE4010
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETRES AND TOLERANCES ARE IN ACCORDANCE WITH DS 2075

ANGLES
LIN. DIM

MATERIAL

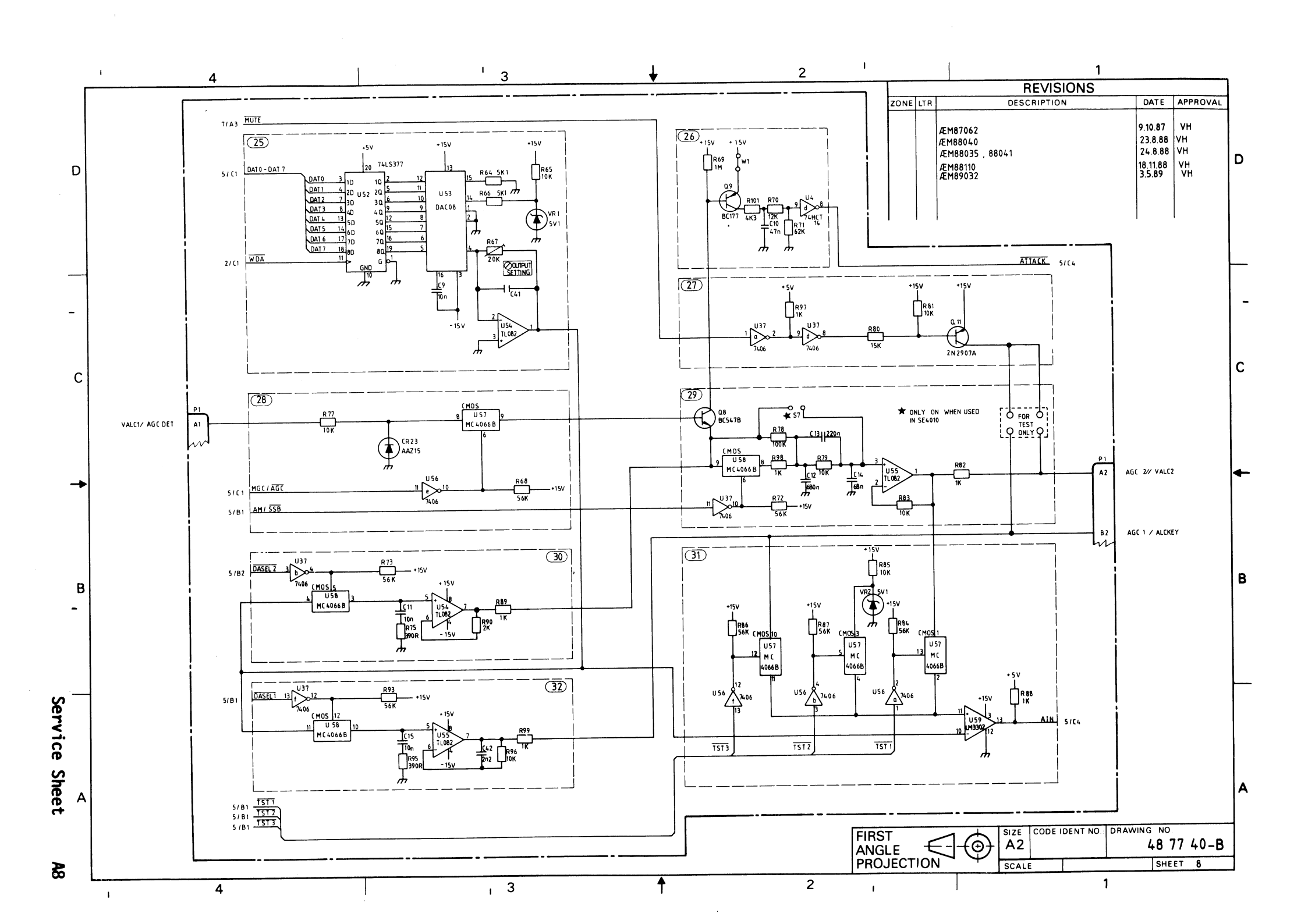
FIRST ANGLE PROJECTION

DR	VH	3.9.1987
CH	MoF	1.9.1987
AP		
AP		

Dansk Radio AS

TITLE
COMPONENT LOCATION
MPU BOARD A8

SIZE	CODE IDENT	DRAWING NO
A1		48 77 40-B
SCALE 2:1		SHEET 1 OF 1


REVISIONS
ZONE | LTR | DESCRIPTION | DATE | APPROVAL
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ÆM88040 | 23.8.88 | VH
ÆM88035 , 88041 | 24.8.88 | VH
ÆM88110 | 18.11.88 | VH
ÆM89032 | 3.5.89 | VH
MUTE
DAT0 - DAT 7
WDA
74LS377
U52
U53
DAC08
OUTPUT SETTING
ATTACK
VALC1/ AGC DET
MGC / AGC
AM / SSB
DASEL 2
DASEL 1
TST 1
TST 2
TST 3
ONLY ON WHEN USED IN SE4010
FOR TEST ONLY
AGC 2// VALC2
AGC 1 / ALCKEY
AIN
FIRST ANGLE PROJECTION
SIZE A2
CODE IDENT NO
DRAWING NO 48 77 40-B
SCALE
SHEET 8
Service Sheet A8

ASSY 471666, MODEM/MODEM INTERFACE ASSEMBLY

Service Sheet A9

a

Assy 471666, Modem/Modem interface Assembly Schematic 1
Analog Part

1. Supply Filtering
The +15V, -15V and +5V supplies are filtered to reduce noise by distributed capacitances around the board.

2. Line Input - Output A
The line I/O provides a balanced impedance for bidirectional data and audio, bidirectional data or only transmitted data.

3. Line A Buffer
The buffer, U1, is protected against high levels by D3-D6 and provides a low impedance output to the attenuator. Data to be transmitted is applied to the line primary via R89.

4. Line A Attenuator
The attenuator is used to set the line sensitivity. Attenuation of 10 dB, 20 dB or 30 dB is obtained with S7 c,b and a respectively.

5. Buffer
The buffer is used to provide a low impedance source for the filter inputs and prevents loading of the attenuator.

6. Line Input B
The line input can act as data receiver, audio receiver or both data and audio receiver. R98 defines the line impedance.

7. Line B Attenuator
The attenuator is used to set the line sensitivity. Attenuation of 10 dB, 20 dB or 30 dB is obtained with S10 c,b and a respectively.

8. Line B Buffer
The buffer U1 is protected against high levels by D7 and D23 and provides a low impedance source to the filters.

9. Notch Filter
As a 2990 Hz tone is used to provide a mute contact for the receiver it is desirable to filter this out of the audio and data line. This filter provides > 20 dB attenuation with a bandwidth of 300 Hz. The center frequency of the notch is adjustable with R208.

10. 200 Hz HPF
The low end frequency response as used by the FSK demodulator is defined by this third order filter.

11. FSK Demodulator
This is a PLL type demodulator and can be set to receive either 600 baud, 1300 Hz mark and 1700 Hz space or 1200 baud, 1300 Hz mark and 2100 Hz space by setting S18 either on or off. The received data and carrier detect signals are sent to the digital board via AXP5.

REVISIONS				
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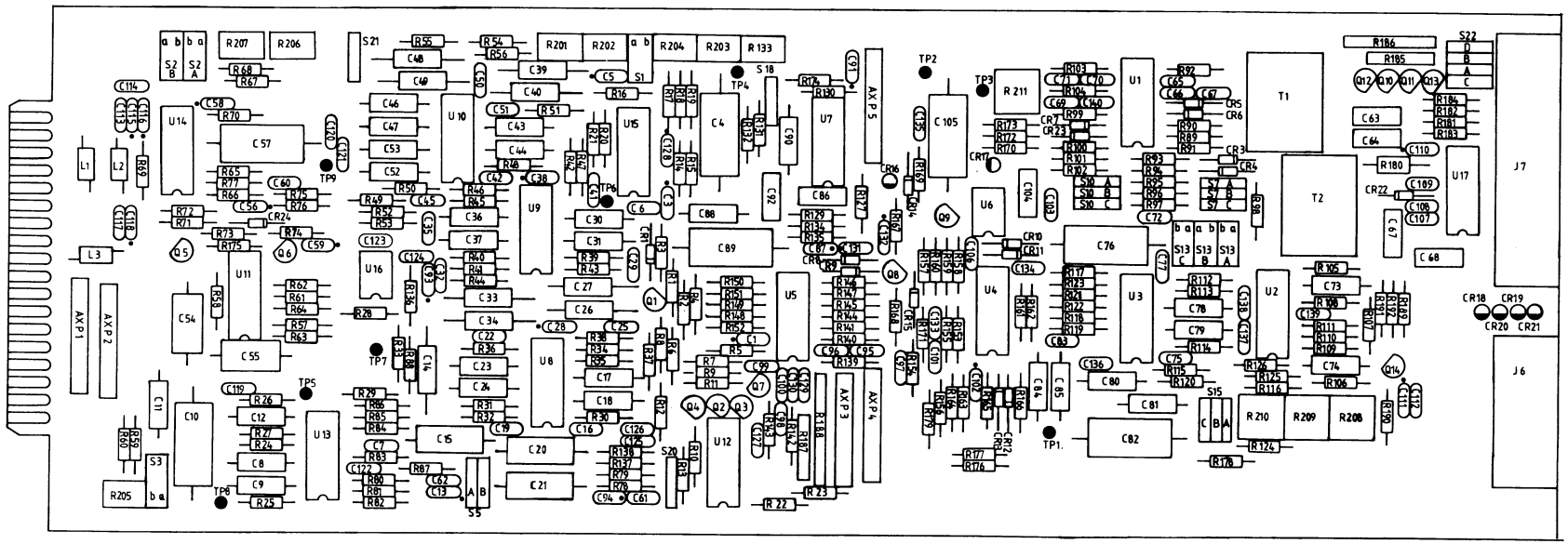
	A			
	B	ÆM87079	21.12.87	VH



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETRES AND TOLERANCES ARE IN ACCORDANCE WITH DS 2075

ANGLES

LIN. DIM.

MATERIAL

NEXT ASSY | USED ON

APPLICATION

DR. GERT JENSEN 830505

CH.

AP.

AP.

FIRST ANGLE PROJECTION

Dansk Radio AS

TITLE: MODEM

SIZE A1 | CODE IDENT | DRAWING NO. 47 16 66

SCALE | SHEET 1 OF 1

12. Bandpass Filter
This filter is tuned to a center frequency of 2990 Hz with R209 and R210. U3 is used as a "gyrator" to simulate inductance. The bandwidth of the filter is 100 Hz with S15 a,b,c open and 200 Hz with S15 a,b,c closed.

13. Amplifier
A +3 dB amplifier acts also as a buffer following the filter and operates in the non-inverting mode.

14. Level Detector
The level detector is preceded by a limiting stage U4a, D12-D13. The output of this also goes to the frequency detector. The limited signal is then rectified with U4, D10, D11 and and filtered by U4 and C101. The resulting signal will then be used to indicate the presence of a 2990 Hz tone above a required level.

15. Frequency Detector
The limited signal from **14)** is applied to the input of U6, a PLL tone decoder. The free running frequency is adjusted to 2990 Hz with R211. If the loop locks on to a signal of 2990 Hz then the output will go low, lighting CR17.
This is also "anded" with the output from the level detector, so when both level and frequency criteria are filled, then CR16 lights. At the RX4000 this is used to determine if a mute tone is present.

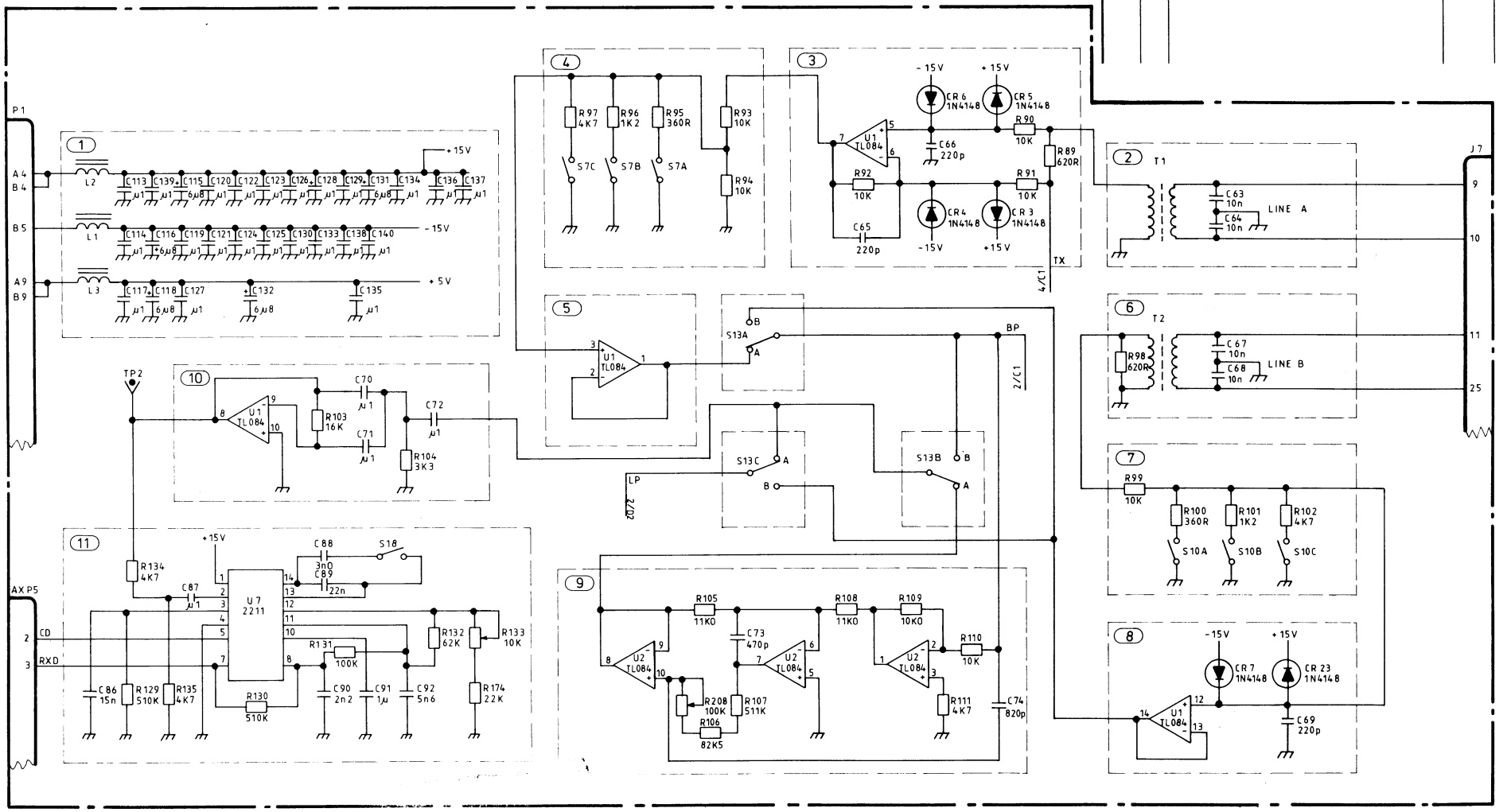
16. 200 Hz HPF
This 3rd order filter is used to define the low end audio response before further amplification in the RC4000.

17. Audio Switch
The analogue switch, biased for linear operation, is used to cut the audio at the RC4000 when a mute tone or data is sent. It can be bypassed with S20 which would allow a continuous monitoring of the line.

18. Unity Gain Buffer
The buffer is used for the audio signal before it passes to the power amplifiers at the RC4000.

19. Log AF Detector
The detector gives an output proportional to the log of audio level. The detector and buffer are made up of U5, D8, D9 and the feedback is applied to the transistor Q7 which reduces the input signal level.

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVAL



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			DR. G. Jensen/EVB 840627	TITLE	
		ANGLES	CH.	MODEM	
		LIN. DIM.	AP. CS 9/1-1985	ANALOG PART	
			AP.		
471909	RC 4000	MATERIAL			
471712	RX 4000		FIRST ANGLE PROJECTION	SIZE A2 / CODE IDENT / DRAWING NO. 47 16 66-A	
NEXT ASSY	USED ON			SCALE / SHEET 1 OF 5	
APPLICATION					

Service Sheet A9

REVISIONS				
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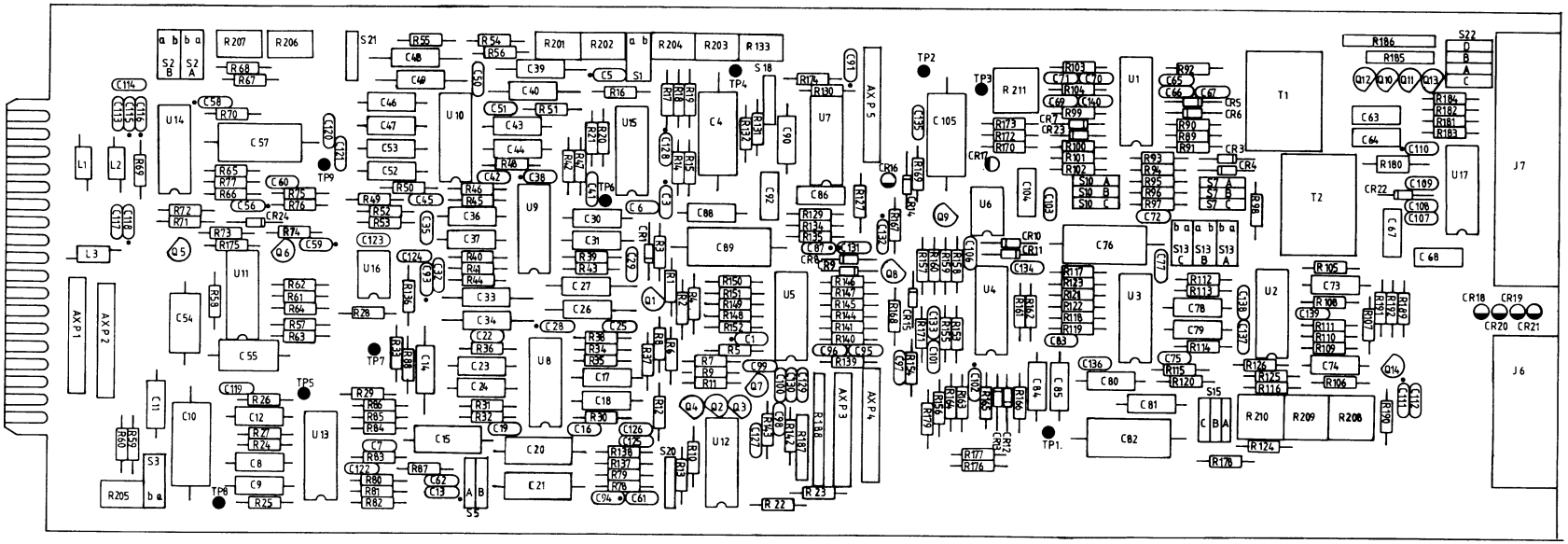


UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETRES AND TOLERANCES ARE IN ACCORDANCE WITH DS 2075		Dansk Radio AS	dra
ANGLES	DR GERT JENSEN 830505	TITLE: MODEM	
LIN. DIM.	CH		
MATERIAL	AP		
NEXT ASSY / USED ON	AP	SIZE: A1 / CODE IDENT / DRAWING NO: 47 16 66	
APPLICATION	FIRST ANGLE PROJECTION	SCALE / SHEET 1 OF 1	

20. 60 msec. Delay

A delay of 60mS is produced between RTS going low and CTS going low due to R3,R4 and C1. The switching speed of the network is increased with Q2 so that a sharp falling edge is produced. Q4 is used as an inverter to drive the analogue switch 22 .

21. FSK Generator

The serial data to be transmitted is used to control two tones. A mark tone of 1300 Hz is adjusted by R202. The space frequency can be either 1700 Hz or 2100 Hz as selected by S1.
K203 adjusts the 2100 +/-5 Hz tone and R204 adjusts the 1700 +/-5 Hz tone. R201 adjusts the output level at TP6 to be 77mVrms.

22. Analogue Switch

The switch, biased for linear operation by R22 and R23, selects either audio from the receiver's detector or the tones from the FSK generator. It is controlled by the 60mS delay **20)** so that only one source is selected at a time.

23. Buffer

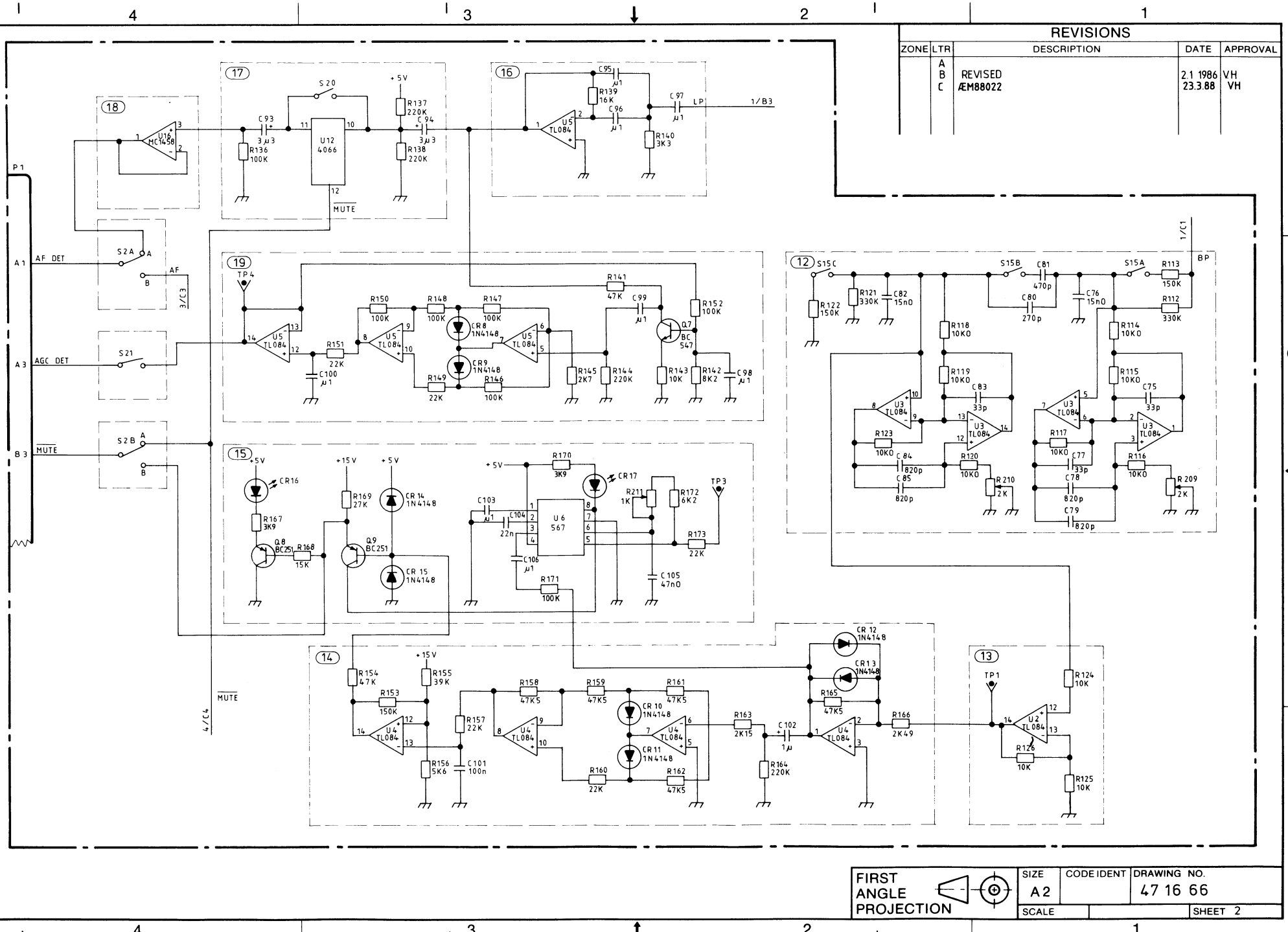
A buffer is provided so that the following filter sees a low source impedance.

24. 3 kHz Lowpass Filter

This 3rd order LPF is used to provide a band limited signal for the line transmitter.

25. 2700 Hz Lowpass Filter

This filter, of an elliptic configuration, provides very high attenuation of frequencies above 2.7 kHz, typically 45 dB at 2870 Hz. It is formed with floating gyrators providing the inductance. R33, 42 and 51 are only to provide a ground reference point. This high order of attenuation is used to prevent the audio tones from activating the mute. The three stages are coupled by C28 and C38.


REVISIONS
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A
B REVISED 2.1 1986 VH
C ÆM88022 23.3.88 VH
FIRST ANGLE PROJECTION
SIZE A2
CODE IDENT
DRAWING NO. 47 16 66
SCALE
SHEET 2
Service Sheet A9

REVISIONS				
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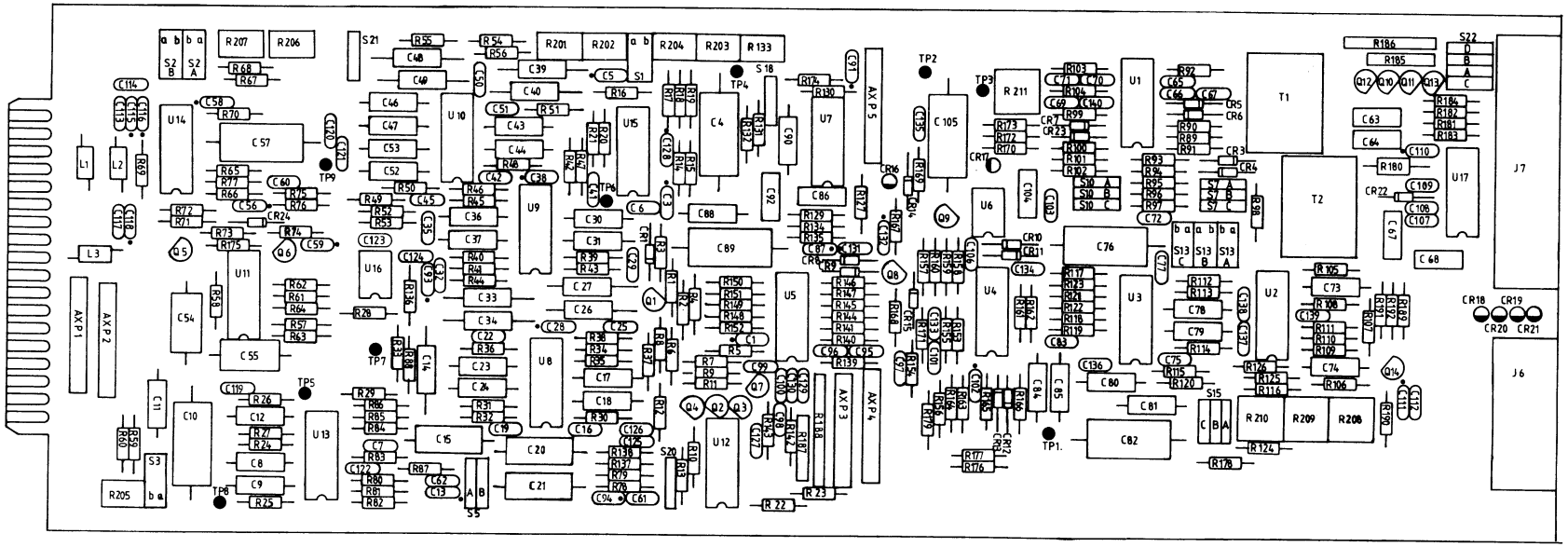
	B	ÆM87079	21.12.87	VH



NEXT ASSY	USED ON		
APPLICATION			

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETRES AND TOLERANCES ARE IN ACCORDANCE WITH DS 2075

ANGLES

LIN. DIM

MATERIAL

DR GERT JENSEN	880505	
CH		
AP		
AP		

FIRST ANGLE PROJECTION

Dansk Radio AS

TITLE: MODEM

SIZE	CODE IDENT	DRAWING NO
A1		47 16 66

SCALE

SHEET 1 OF 7

26. Buffer
The buffer is used to provide isolation between filters (25) and (27)

27. Notch Filter
This provides further attenuation of any further 2990 Hz frequencies. During alignment it is normally neccessary to connect TP7 and TP5, so that R205 can be adjusted for a minimum. Typically > 20 dB of attenuation is provided with a 3 dB bandwidth of < 300 Hz.

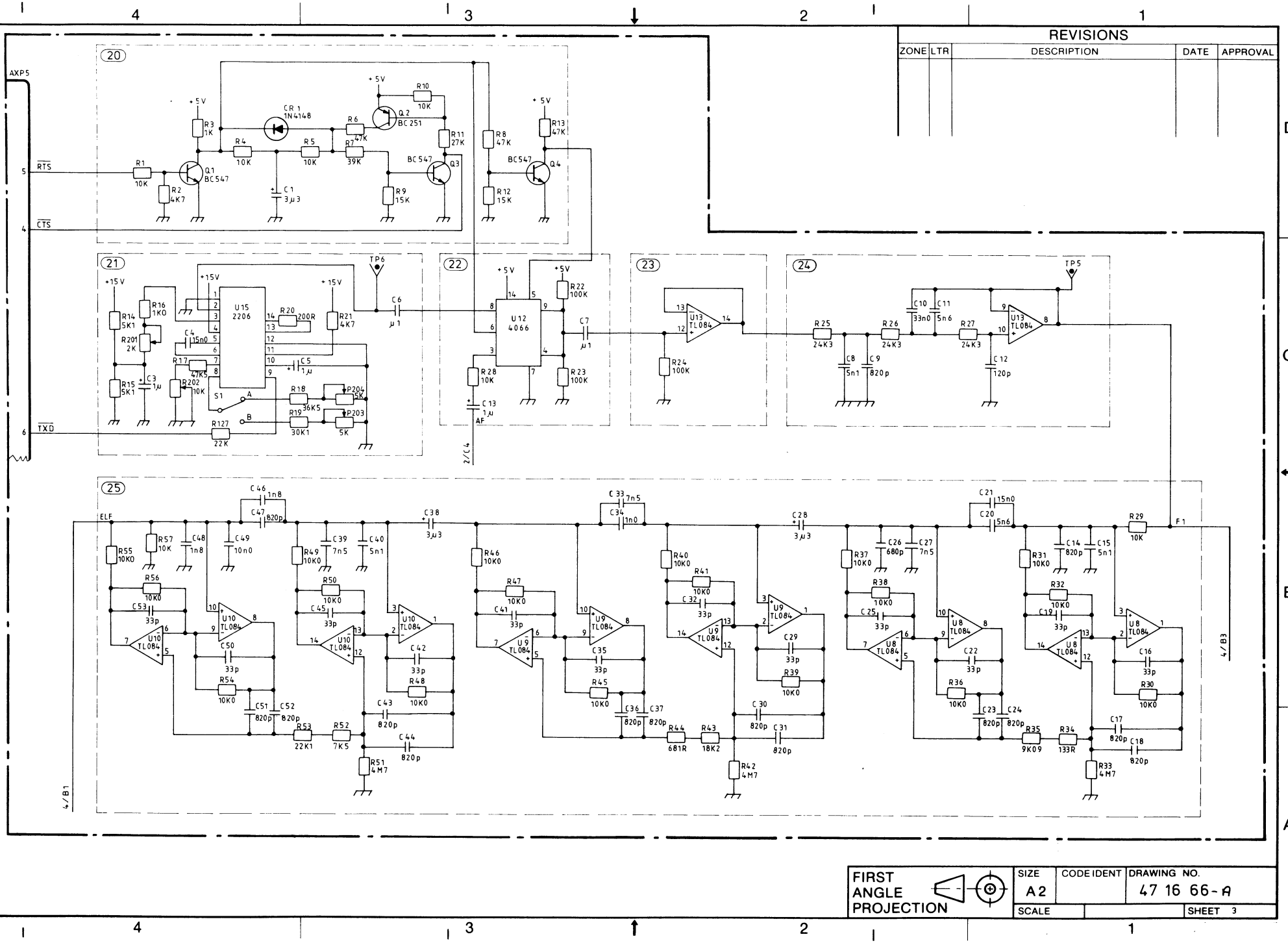
28. Tone Generator
The mute tone of 2990 +/- 5 Hz is generated by U14 with the frequency of the tone adjusted by R207. The output level at TP9 is normally 206 mVrms and is set by R206.

29. +10 dB Switch
When the controller requires the receiver to be muted, the mute line goes low. This turns on Q5 and turns off Q6, leaving the mute tone only attenuated by R76. After a time delay set by C54, R76 Q6 again turns on and the mute tone is attenuated by R75 in parallel to R76, reducing the level by 10 dB.

30. Switch
The analogue switch is controlled by the inverted MUTE and isolates the tone from the combiner if no mute is selected.

31. Combiner
U13 is used to combine the audio or FSK and mute tones when present.

32. Output Amplifier
The line A output amplifier has three possible gain reductions, six dB with S5a closed and ten dB with S5b closed or sixteen dB with S5a and S5b both closed.



Service Sheet A9

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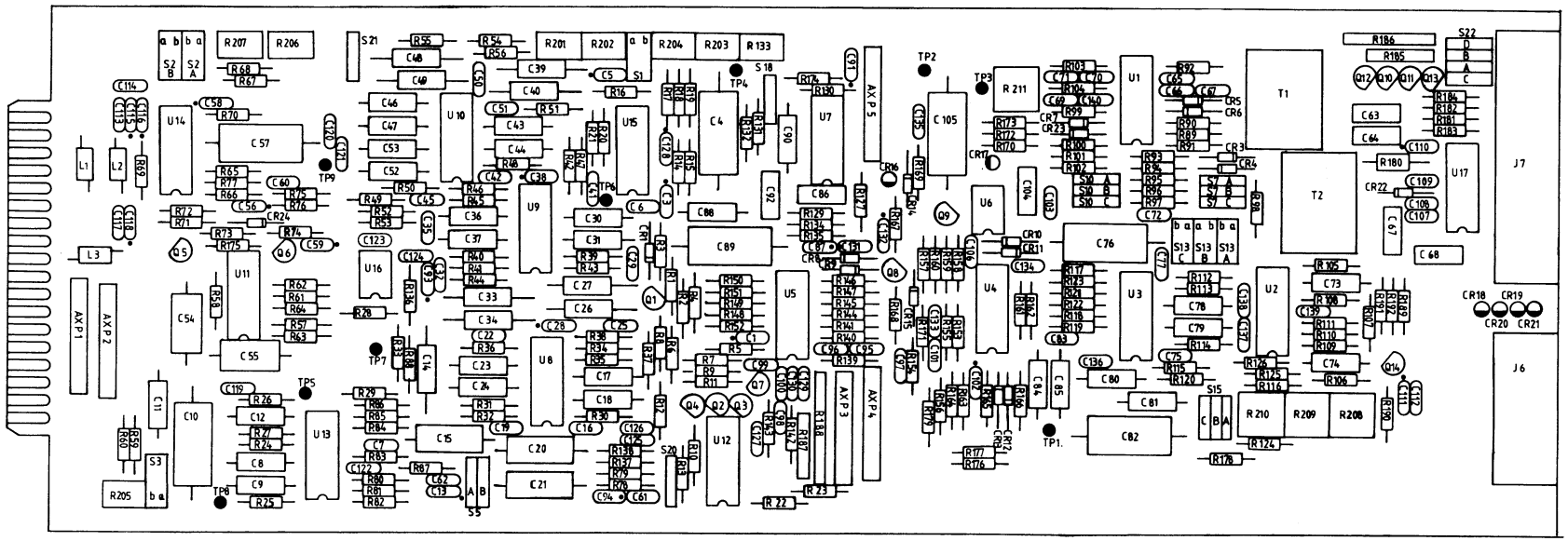

NEXT ASSY	USED ON	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETRES AND TOLERANCES ARE IN ACCORDANCE WITH DS 2075	
APPLICATION		ANGLES	
		LIN. DIM.	
		MATERIAL	

		Dansk Radio AS
DR GERT JENSEN	880505	TITLE: MODEM
CH.		
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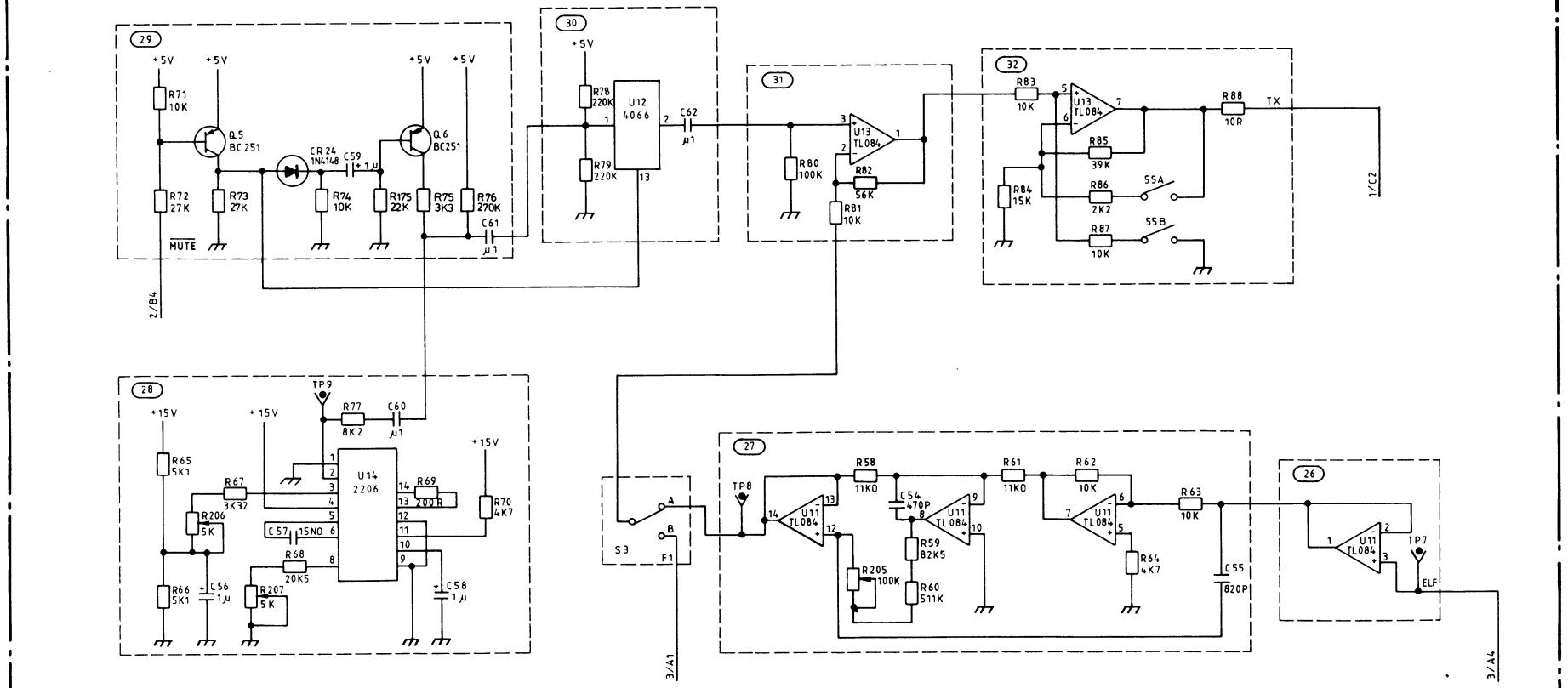
AP.		
FIRST ANGLE PROJECTION		SIZE: A1 / CODE IDENT / DRAWING NO. 47 16 66
		SCALE / SHEET 1 OF 1

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVAL



FIRST ANGLE PROJECTION	SIZE	CODE IDENT	DRAWING NO.
	A2		47 16 66-A
	SCALE		SHEET 4

Service Sheet A9

REVISIONS				
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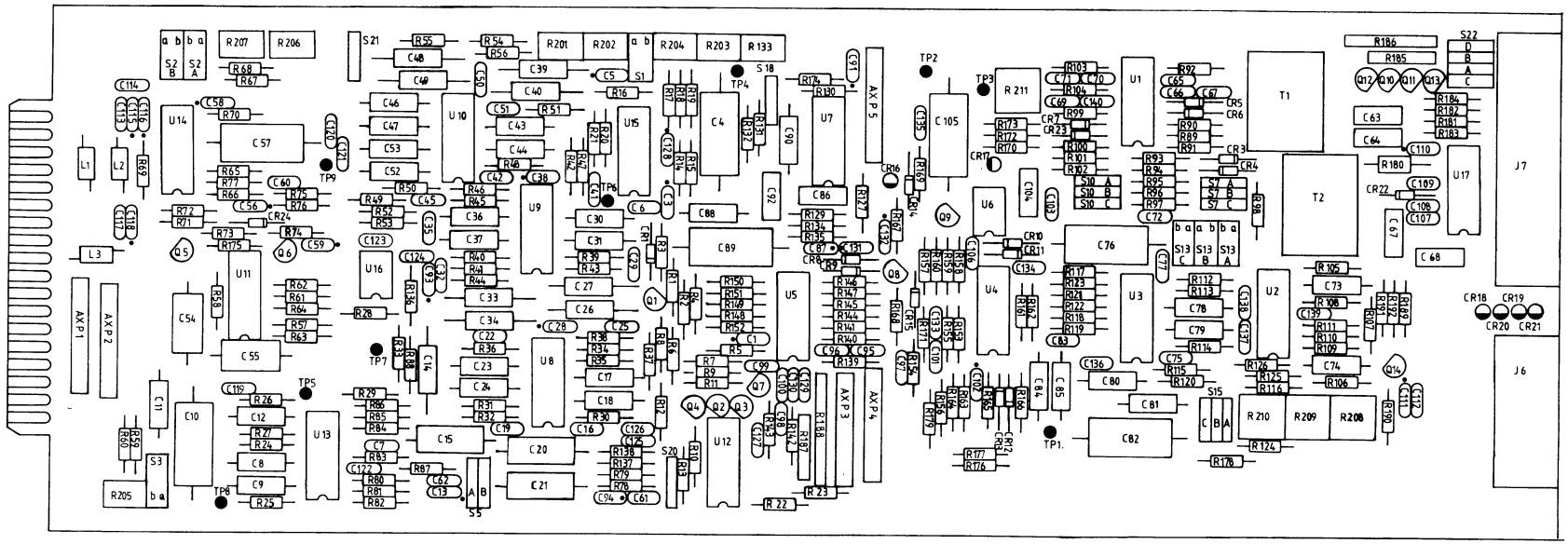
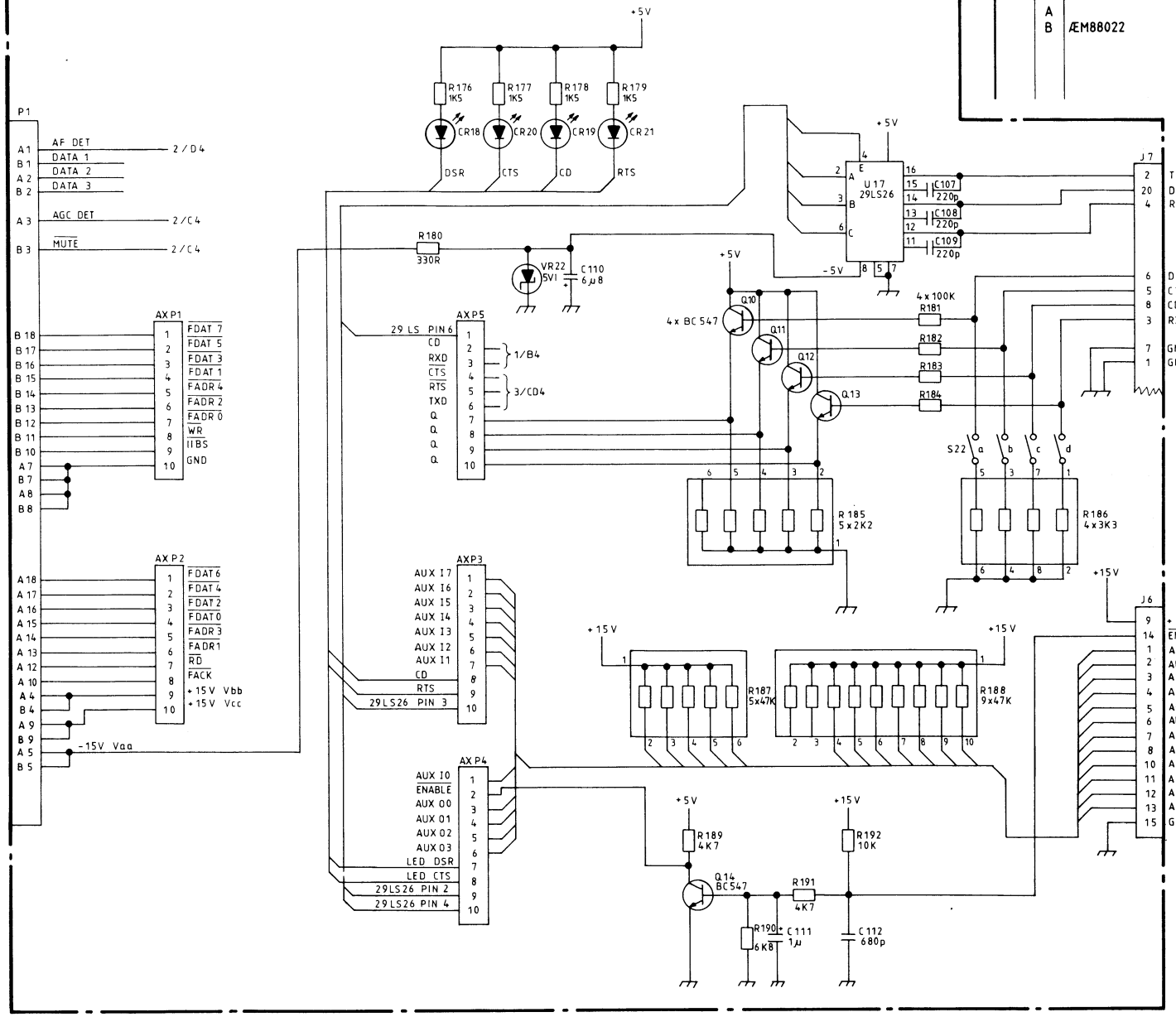
	B	ÆM87079	21.12.87	VH



		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETRES AND TOLERANCES ARE IN ACCORDANCE WITH DS 2075		Dansk Radio AS
		ANGLES	DR GERT JENSEN 880505	TITLE MODEM
		LIN DIM	CH	
			AP	
		MATERIAL	AP	
NEXT ASSY	USED ON		FIRST ANGLE PROJECTION	SIZE A1 / CODE IDENT / DRAWING NO 47 16 66
APPLICATION				SCALE / SHEET 1 OF 1

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVAL
	A			
	B	ÆM88022	23.3.88	VH



FIRST ANGLE PROJECTION	SIZE	CODE IDENT	DRAWING NO.
	A2		47 16 66
	SCALE		SHEET 5

Service Sheet A9

ASSY 471631, MODEM/MODEM INTERFACE ASSEMBLY
Digital Part
Service Sheet A9A1

a

Assy 471631, Modem/Modem Interface Assembly Schematic 1
Digital part

1. Control/Data Interface

This circuit controls the data transmission between the CPU card (A8) and the modem card (A9).
The modem is controlled through 6 ports, each having an address decoded by U11.

Addr.	Function
02H	UART command port
03H	UART data port
04H	AUX out port(from card)
06H	AUX in port (to card)
0AH	STATUS in port
0CH	STRAP in port

A handshake signal is generated to A8, when a port is addressed.

2. Strap Field

Switch S2 and U8 form a strap circuit.

Switch	remote address
a	0
b	1
c	2
d	3
e	4
f	5

Switch a through f select the address of the actual remote unit (binary form).

Switch g selects either external or internal modem.

Switch h selects whether data and AF are transmitted on the same modem line or not.

3. AUX Circuit

This circuit is used to control the data transfer between the I/O ports and the data bus.

The AUX-port has 8 inputs and 8 outputs which are split up in 4 separate input lines and 4 separate output lines, and 4 common I/O lines. The common lines can only be used as either input or output at a time.

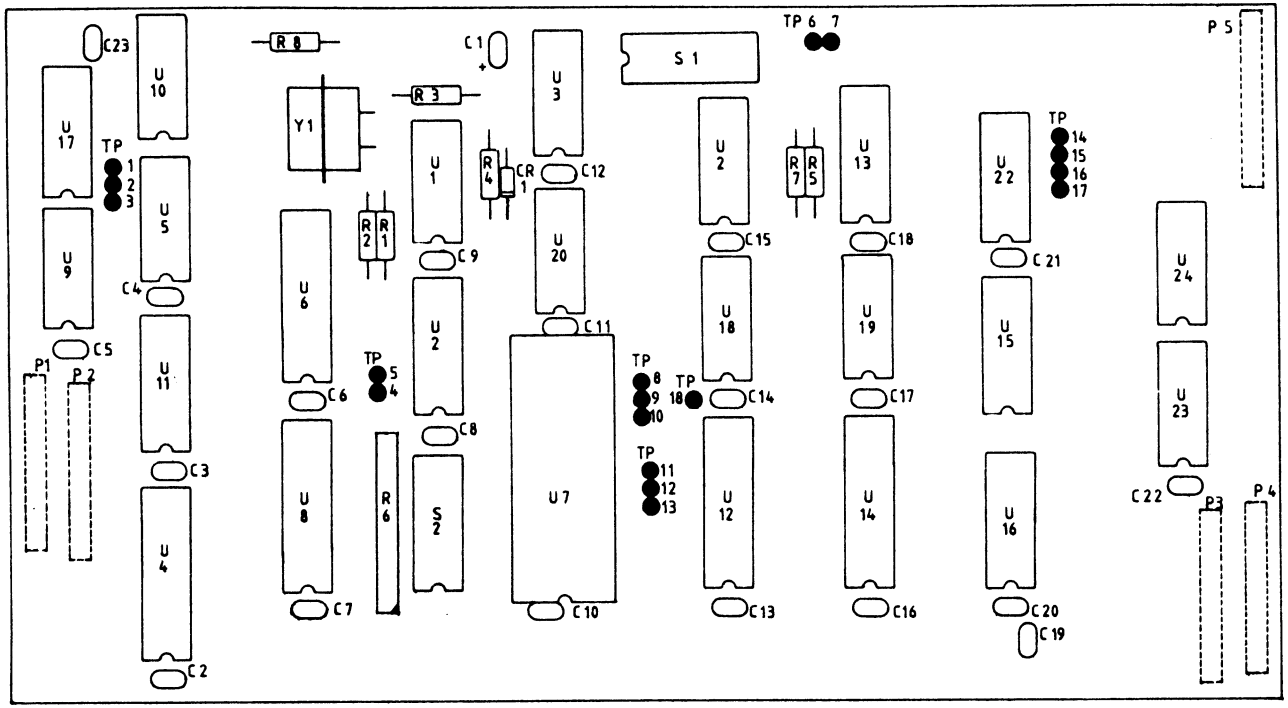
The signal on the input lines is latched by putting 'Enable' to OV. Input level is RS232 compatible. Output level is open collector circuit max. 15V and max.source current is 100mA per line.

4. Status Port

U6 is used as status port of the modem.

1.

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVAL



		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETRES AND TOLERANCES ARE IN ACCORDANCE WITH DS 2075			**Dansk Radio AS** dra
		ANGLES	DR. MIJ	06.06.84	TITLE MODEM DIGITAL PART
		LIN. DIM.	CH.		
471666	RC 4000		AP. B.S.	850128	
471656	RX 4000	MATERIAL	AP.		
NEXT ASSY	USED ON		FIRST ANGLE PROJECTION		SIZE A2 / CODE IDENT / DRAWING NO. 471631
APPLICATION					SCALE / SHEET 1 OF 2

5. Modem Controller

U7 is a USART and the heart of the modem. It controls the serial data transmission and sets associated control signals.

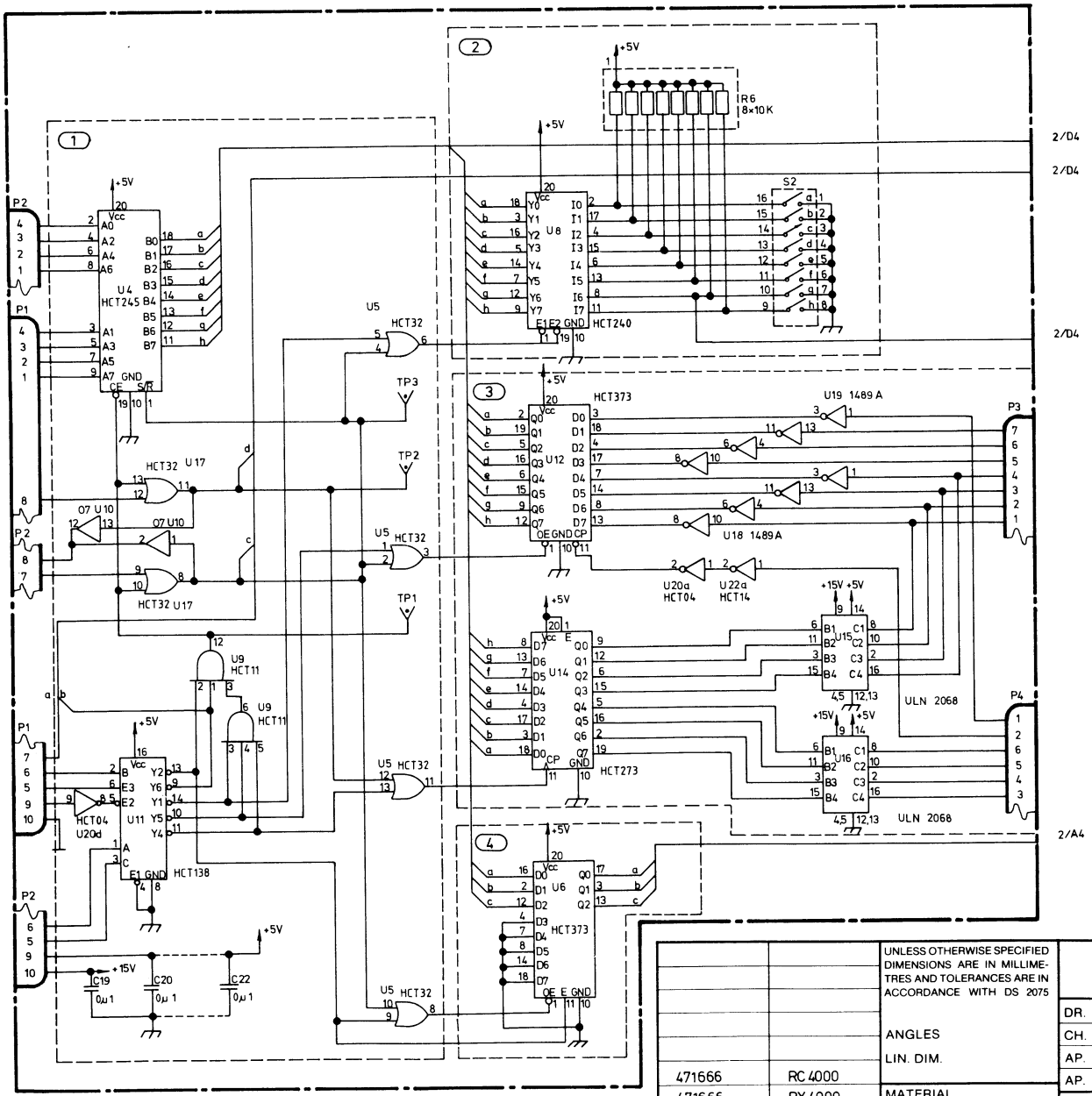
6. Clock Circuit

U1 e,d,f and crystal Y1 form a clock generator running at 6.4122 MHz. U2 divides this by 5 to obtain a 1.2824 MHz clock to the UART. This clock is further divided by U3 to get the receive/transmit clock rate at 16 times the baud rate.
The baud rate is selected at switch S1. b selects 600 baud transmission. c selects 1200 baud rate.

U1c together with R4 and C1 generate a power on reset pulse to the USART.

7. Modem Control Logic

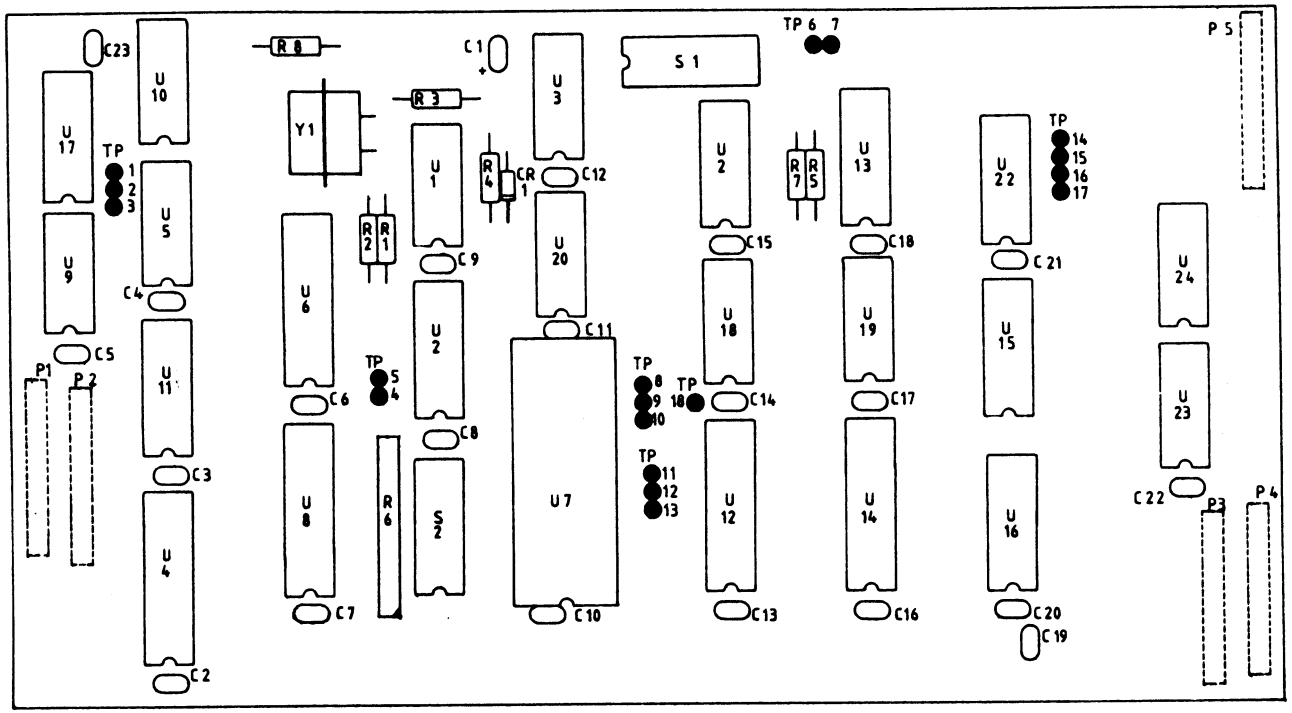
U21 and U13 control the data transfer between the ext./int. modem and the USART.



Service Sheet A9A1

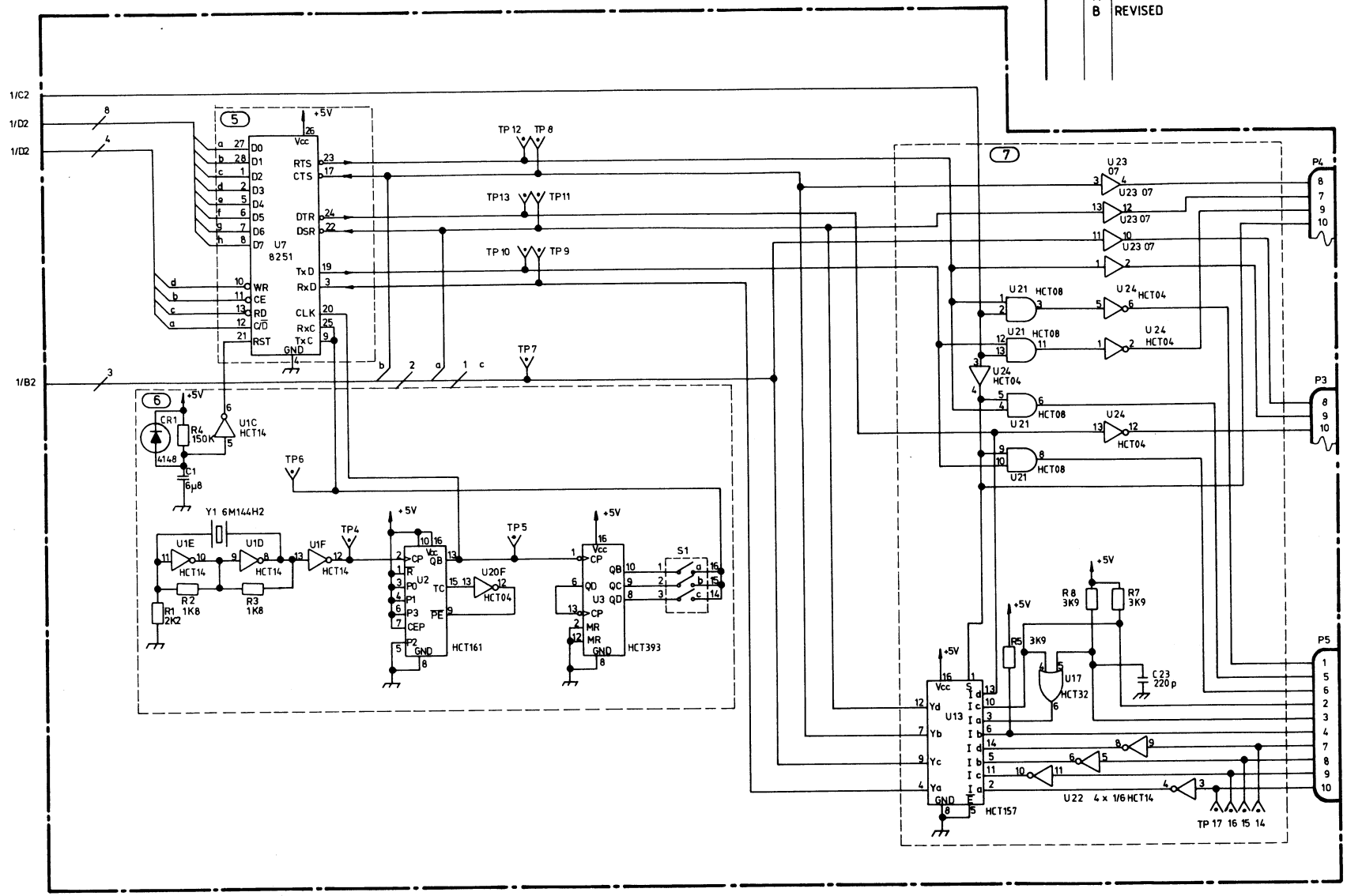
1.

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVAL



		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETRES AND TOLERANCES ARE IN ACCORDANCE WITH DS 2075				
					Dansk Radio AS	dra
			DR. MIJ	06.06.84	TITLE	
		ANGLES	CH		MODEM	
		LIN. DIM.	AP. B.S.	850128	DIGITAL PART	
471666	RC 4000		AP.			
471666	RX 4000	MATERIAL	FIRST ANGLE PROJECTION		SIZE A2 / CODE IDENT / DRAWING NO. 471631	
NEXT ASSY	USED ON				SCALE	SHEET 1 OF 2
APPLICATION						

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVAL
	A			
	B	REVISED	12.2.88	VH



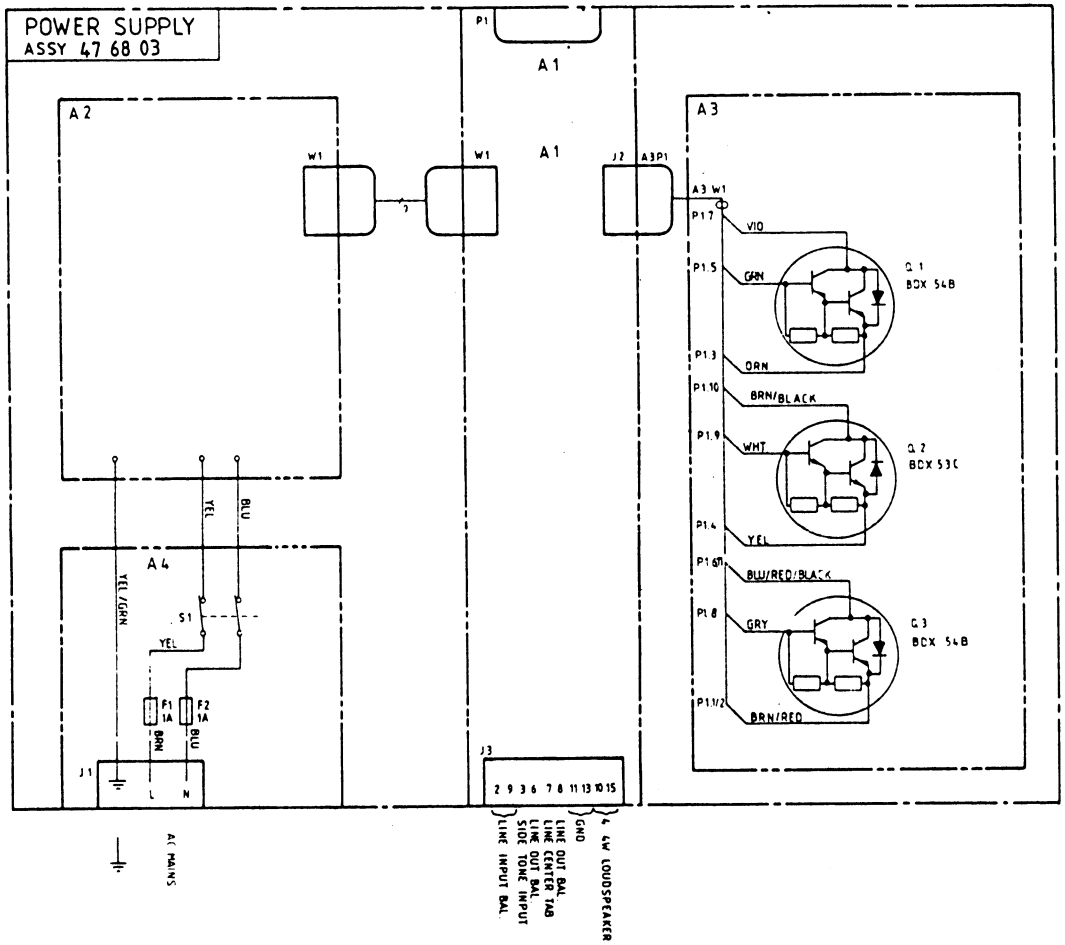
FIRST ANGLE PROJECTION	SIZE	CODE IDENT	DRAWING NO.
	A2		471631
	SCALE		SHEET 2

Service Sheet A9A1

ASSY 476803, 471534, 488321, POWER SUPPLY ASSEMBLY

Service Sheet A10A1 and A10A2

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVAL



49 51 23	RC4010
47 19 09	RC4000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETRES AND TOLERANCES ARE IN ACCORDANCE WITH DS 2075

ANGLES

LIN. DIM.

MATERIAL

DR.	VH	23.11 1989
CH.	RC	22.11.1989
AP.		
AP.		

FIRST ANGLE PROJECTION

Dansk Radio AS

TITLE: POWER SUPPLY A10

SIZE	CODE IDENT	DRAWING NO.
A2		47 68 03

SCALE | SHEET 1 OF 1

Service Sheet A10

1. VEE Supply Filter

2. -15V Reference Voltage Regulator
The reference voltage is adjusted to -15, 3V at 25°C by means of R2.

3. Standby/ON Switch Circuit
When P1-A3 is grounded, Q1 is switched on supplying +15V to 4.

4. U2
Forms part of the PWRLO detector. R6 and R7 generate a reference ripple from the unregulated 8V.
The reference ripple is compared with a threshold level (R8, R9), holding Q2 in the off-state when the reference ripple exceeds the threshold level. Q3 and Q4 ensure a PWRLO signal during start-up until VBB reaches VEE.

5. VBB Regulator (+15V)
U4 compares VBB/3 with the 5V reference voltage and supplies the regulating current for the driving transistor Q6.

U3 forms the current limiting circuit. When the R26-27 voltage drop exceeds the R132 voltage drop, U3 shunts the regulating current for Q6 tracking a fold-back characteristic.
Q5, VR2 and R33 form a crow-bar protection on the regulator output voltage. The trigger point for Q5 is approx. +17V.

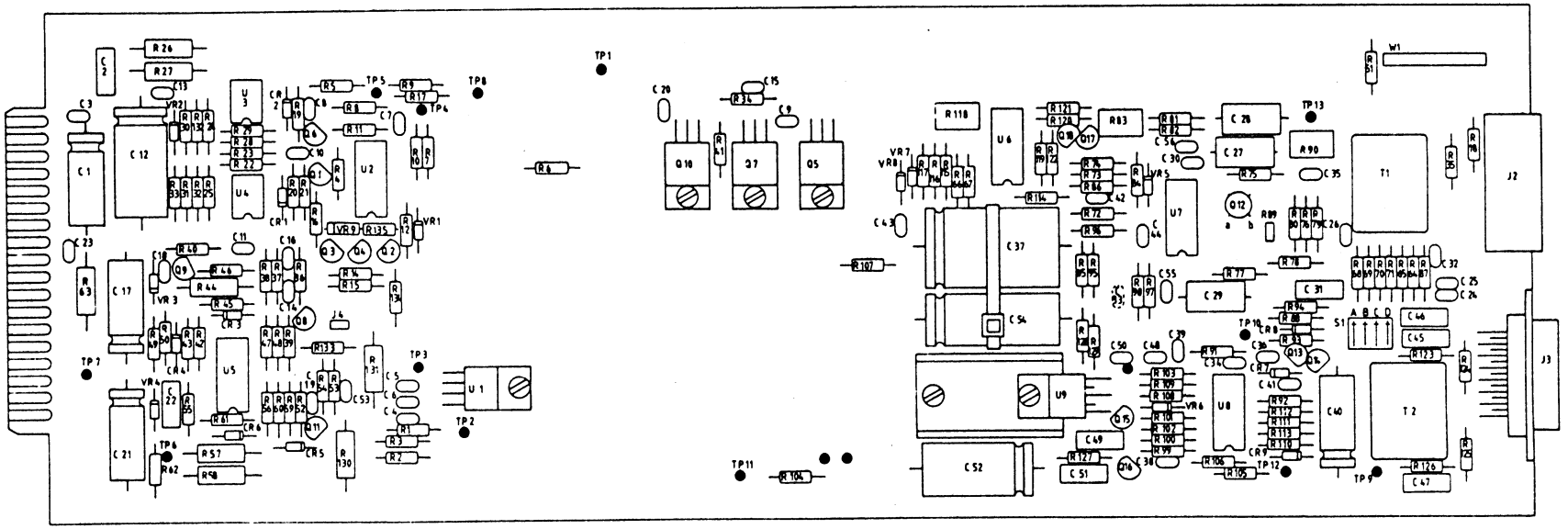
6. VAA Regulator (-15V)
U5B compares VAA with three times the 5V reference voltage and supplies the regulating current for the driving transistor Q8.

U4B forms the current limiting circuit similar in operation to 5. Q7, VR3, R49, R50 and Q9 form a crow-bar protection on the regulator output voltage. The trigger point for Q7 is approx.-17V.

7. VCC/VDD Regulator (+5V)
U5d compares VDD from a motherboard sense point (P1-B6) or through R61, with the 5V reference voltage and supplies the regulating current for the driving transistor Q11.

U5a forms the current limiting circuit similar in operation to 5. Q10, VR4 and R62 form a crow-bar protection on the regulated output voltage. The trigger point for Q10 is approx. +6.2V.

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVAL



		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETRES AND TOLERANCES ARE IN ACCORDANCE WITH DS 2075		Dansk Radio AS
		ANGLES	DR	TITLE
		LIN DIM	CH	Regulator and AF assy
			AP	
471909	RC 4000	MATERIAL	AP	
471712	RX 4000		FIRST ANGLE PROJECTION	SIZE A1 / CODE IDENT / DRAWING NO 4715 34
NEXT ASSY	USED ON			SCALE / SHEET 1 OF 1
APPLICATION				

8. AFDET and Line Input

The appropriate input is selected with S1. U6d makes it possible to drive the AFDET line with the 600 ohm line input.

9. Notch Filter

U7a, U7b and U7c form an inverting voltage controlled bandpass filter with unity gain. The notch characteristic is obtained by adding the non-inverted input signal to the inverted output signal. Q12 acts as voltage controlled resistor in the filter. The filter is adjusted by means of R83 to 1 kHz notch tune when TP9 is set to -11.5V.

10. Notch Control

R88, R89 and C35 filter and temperature stabilize the filter control voltage.

By means of Q13 and Q14 the notch filter may be bypassed. When TP9 reaches -15V, Q13 is switched on whereby the bandpass filter output is grounded.

U7d forms a summing amplifier for AFDET, bandpass filter output and "Side-Tone" input.

11. AF-Gain Control

The AF signal from (9) is routed to U8-11. The control voltage between U8-6 and U8-9 adjusts the AF signal level at R106 by means of the emitter coupled amplifier within U8. The control voltage is derived from the AF gain control adjustment. The overall gain of the stage may be controlled from -60 dB to approx. 0 dB.

12. Line Output Amplifier

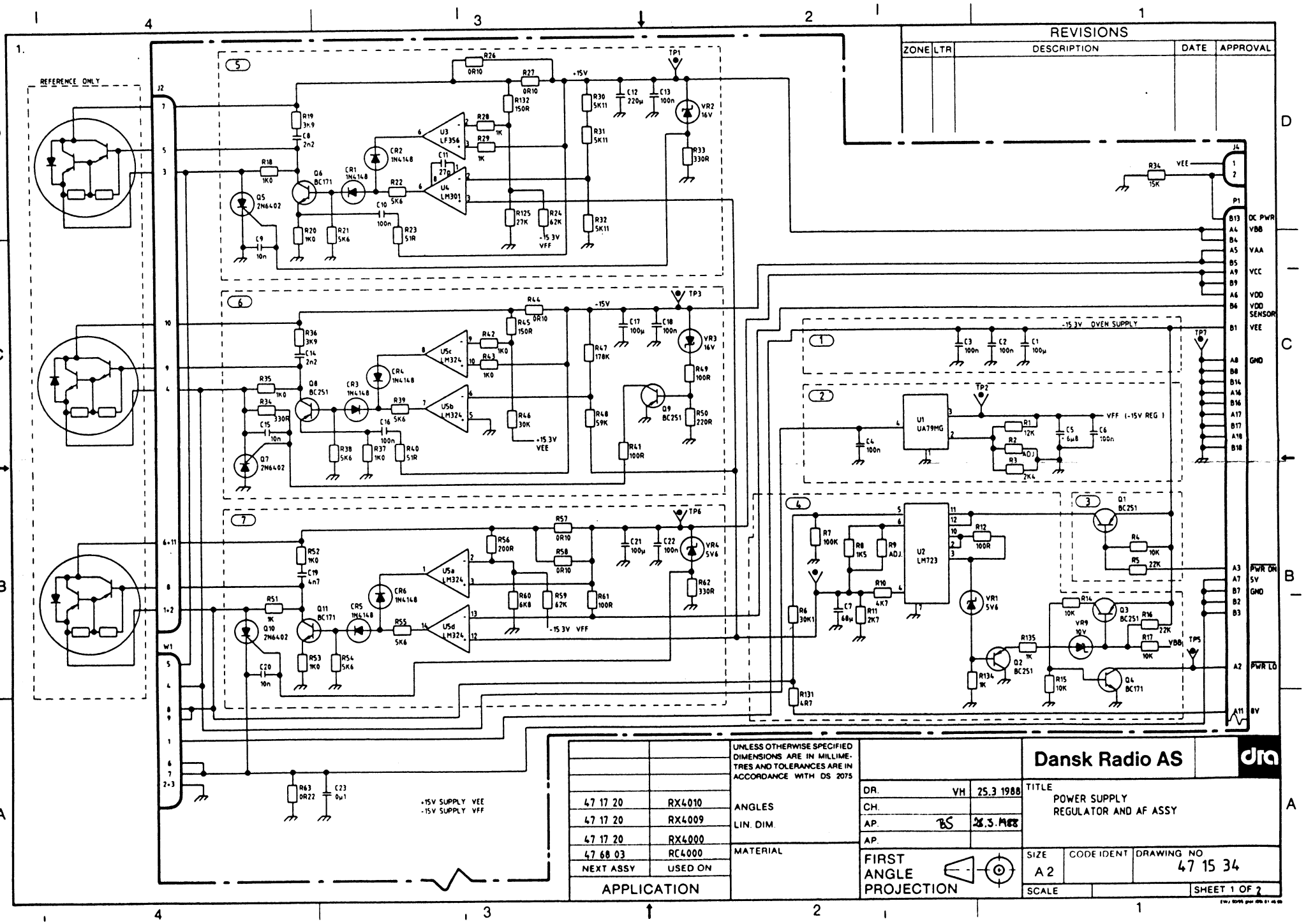
U6c, VR7 and VR8 form an amplifier with the output limited to +/- 3.5V peak.

U6b, Q17 and Q18 drive the transformer T2 and the feedback loop includes the transformer.

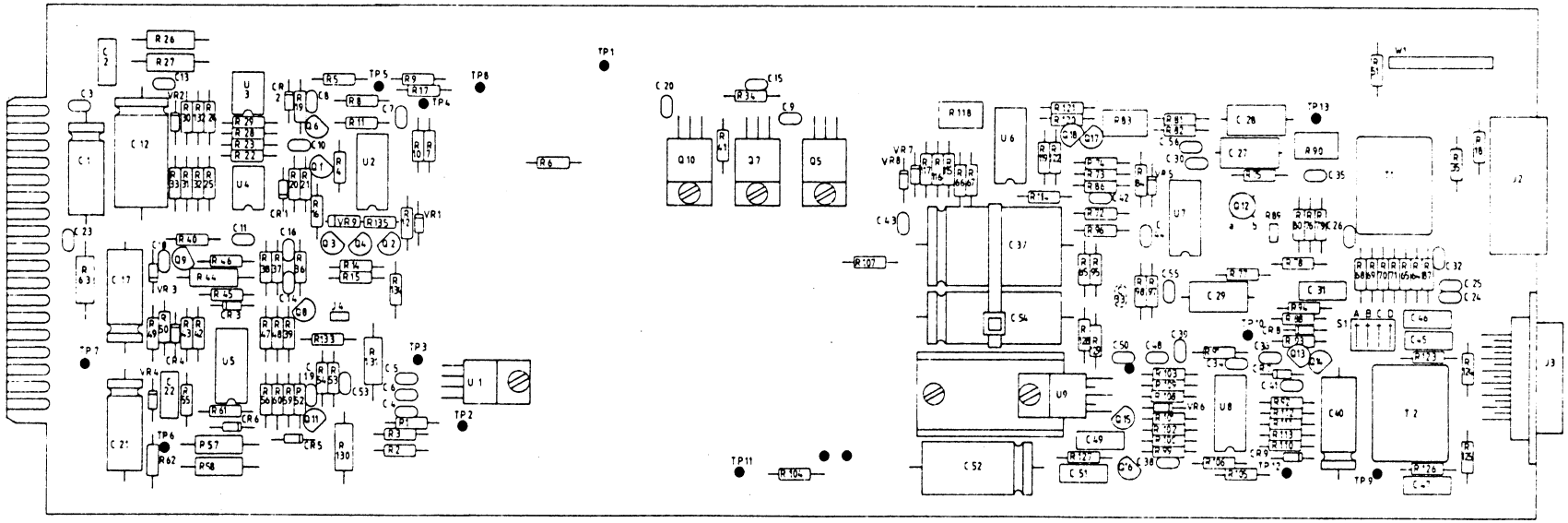
R123 and R126 give the 600 ohm output impedance independent of the transformer.

13. AF Output Amplifier

U9 forms the AF output amplifier. The stage has a voltage gain of approx. 38 dB and is capable of delivering up to 4W in a 4 ohm load.


REVISIONS
ZONE LTR DESCRIPTION DATE APPROVAL
REFERENCE ONLY
-15V OVEN SUPPLY
+15V SUPPLY VEE
-15V SUPPLY VFF
Dansk Radio AS
TITLE
POWER SUPPLY
REGULATOR AND AF ASSY
DR. VH 25.3 1988
CH.
AP. BS 28.3.1988
AP.
FIRST ANGLE PROJECTION
SIZE A2
CODE IDENT
DRAWING NO 47 15 34
SCALE
SHEET 1 OF 2
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETRES AND TOLERANCES ARE IN ACCORDANCE WITH DS 2075
ANGLES
LIN. DIM.
MATERIAL
47 17 20 RX4010
47 17 20 RX4009
47 17 20 RX4000
47 68 03 RC4000
NEXT ASSY USED ON
APPLICATION
Service Sheet A10A1

REVISIONS			
ZONE LTR	DESCRIPTION	DATE	APPROVAL



471909	RC 4000	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIM TREAT TOLERANCES ARE IN ACCORDANCE WITH DS 30	Dansk Radio AS
471712	RX 4000	ANGLES	TITLE: Regulator and AF assy
NEXT ASSY	USED ON	LIN DIM	DR
APPLICATION		MATERIAL	CH, AP, AP
		FIRST ANGLE PROJECTION	SIZE: A1 — DRAWING NO: 471534
			SCALE — SHEET 1 OF 1

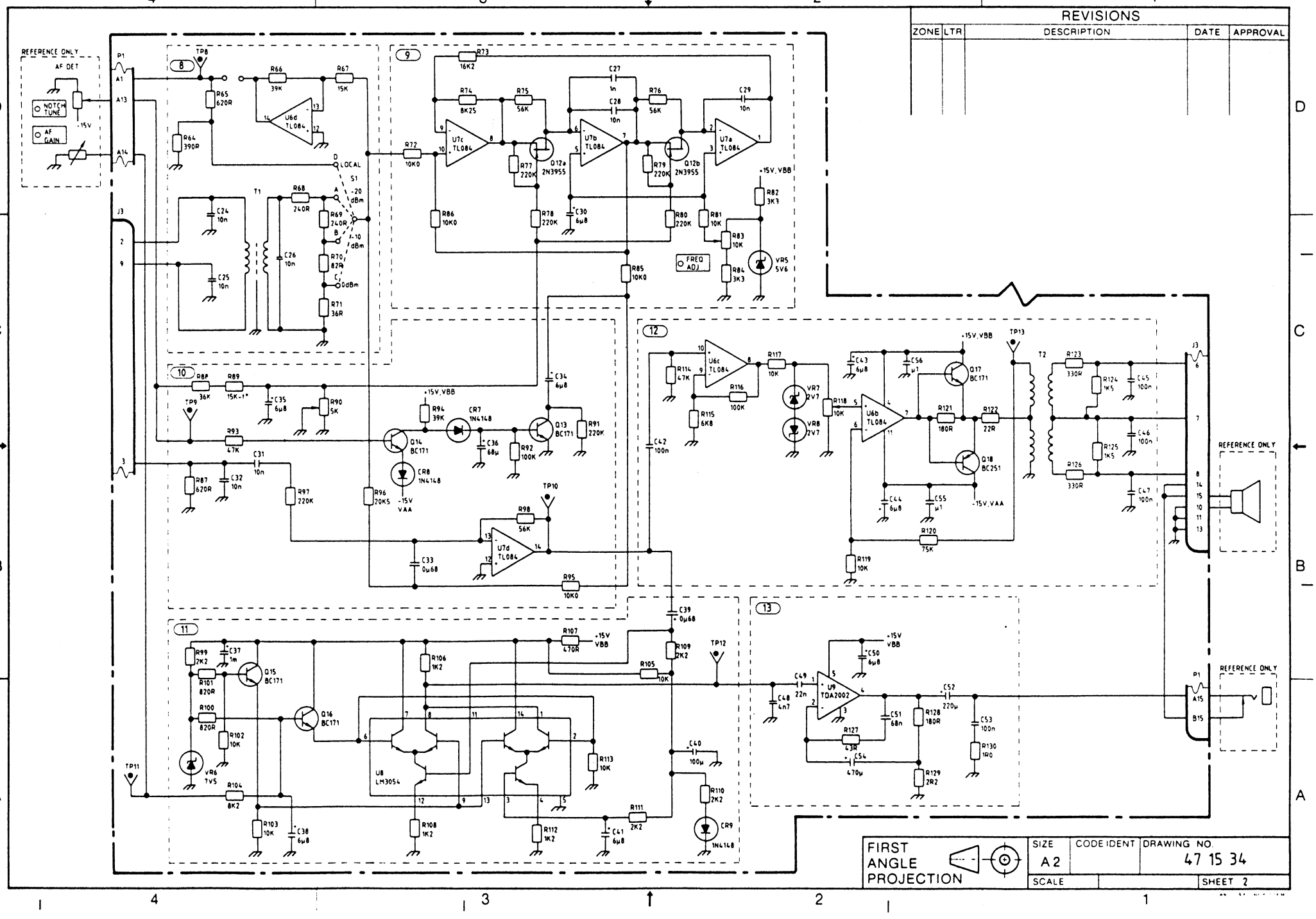
Assy 488321, Power Supply Assembly (A10A2) **Schematic 1**

1. EMI Filter for AC Mains Supply

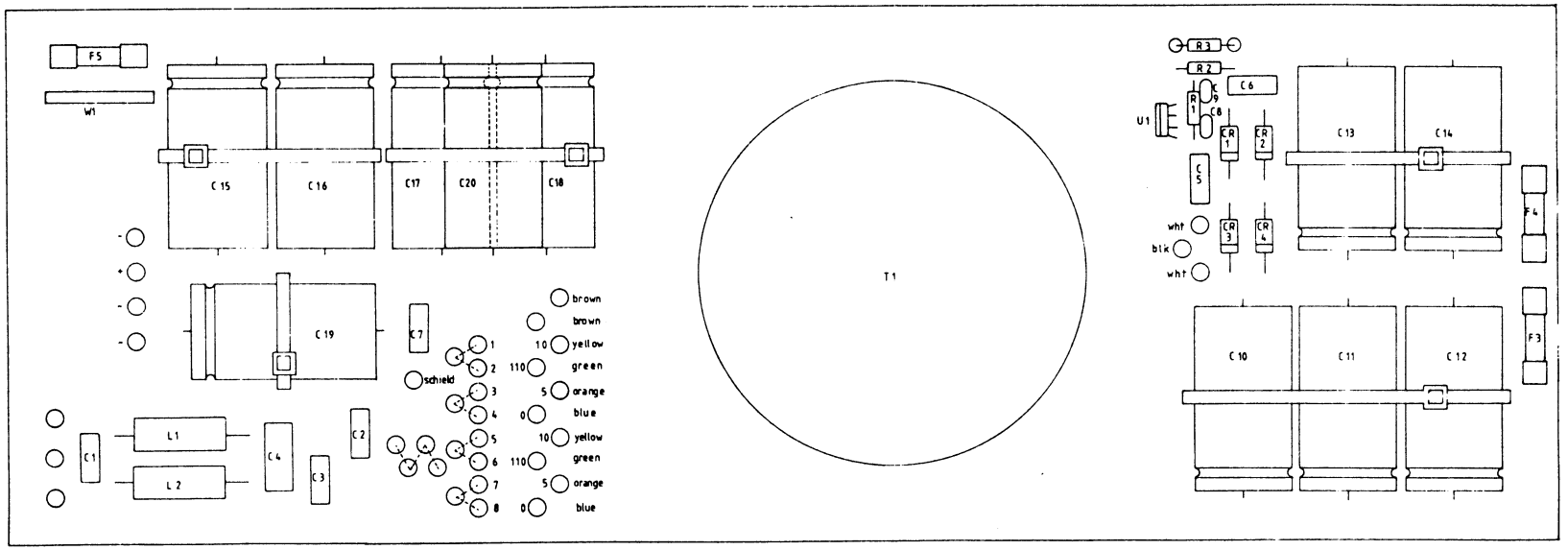
2. Mains Transformer
with 110V to 125V and 220V to 250V in 5V steps.

3. Rectifiers and Filters

4. +15V Regulator for Standby Supply
By means of R3 the voltage is adjusted to +15.3V at 25°C.


REVISIONS
ZONE | LTR | DESCRIPTION | DATE | APPROVAL
REFERENCE ONLY
AF DET
NOTCH TUNE
AF GAIN
-15V
P1
A1
A13
A14
8
TP8
R65 620R
R66 39K
R67 15K
U6d TL084
R64 390R
LOCAL
S1
-20 dBm
-10 dBm
0dBm
T1
R68 240R
R69 240R
R70 82R
R71 36R
C24 10n
C25 10n
C26 10n
J3
9
R72 10K0
R73 16K2
C27 1n
C28 10n
R74 8K25
R75 56K
R76 56K
C29 10n
U7c TL084
U7b TL084
U7a TL084
Q12a 2N3955
Q12b 2N3955
R77 220K
R78 220K
R79 220K
R80 220K
C30 6µ8
R81 10K
R82 3K3
R83 10K
R84 3K3
R85 10K0
R86 10K0
+15V,VBB
FREQ ADJ
VR5 5V6
10
R88 36K
R89 15K-1%
C35 6µ8
R90 5K
TP9
R93 47K
C31 10n
R87 620R
C32 10n
R97 220K
R96 20K5
-15V VAA
CR7 1N4148
CR8 1N4148
R94 39K
Q14 BC171
Q13 BC171
C34 6µ8
C36 68µ
R92 100K
R91 220K
TP10
R98 56K
U7d TL084
C33 0µ68
R95 10K0
12
U6c TL084
R114 47K
R117 10K
R116 100K
R115 6K8
VR7 2V7
VR8 2V7
R118 10K
C43 6µ8
C56 µ1
Q17 BC171
TP13
T2
R123 330R
R124 1K5
C45 100n
C46 100n
R125 1K5
R126 330R
C47 100n
U6b TL084
R121 180R
R122 22R
Q18 BC251
C44 6µ8
C55 µ1
-15V,VAA
R120 75K
R119 10K
C42 100n
J3
REFERENCE ONLY
11
R99 2K2
C37 1n
Q15 BC171
R101 820R
R100 820R
Q16 BC171
R102 10K
VR6 7V5
TP11
R104 8K2
R103 10K
C38 6µ8
R106 1K2
R107 470R
+15V VBB
R105 10K
C39 0µ68
R109 2K2
TP12
U8 LM3054
R113 10K
C40 100µ
R110 2K2
CR9 1N4148
R108 1K2
R112 1K2
C41 6µ8
R111 2K2
13
C49 22n
C48 4n7
U9 TDA2002
C50 6µ8
C51 68n
C52 220µ
C53 100n
R128 180R
R130 1R0
R127 4R3
C54 470µ
R129 2R2
P1
A15
B15
REFERENCE ONLY
FIRST ANGLE PROJECTION
SIZE A2
CODE IDENT
DRAWING NO. 47 15 34
SCALE
SHEET 2
Service Sheet A10A1

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVAL



----- strap

47 68 03	RC4000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETRES AND TOLERANCES ARE IN ACCORDANCE WITH DS 2075

ANGLES

LIN. DIM

MATERIAL

DR	VH	22.3. 1988
CH		
AP		
AP		

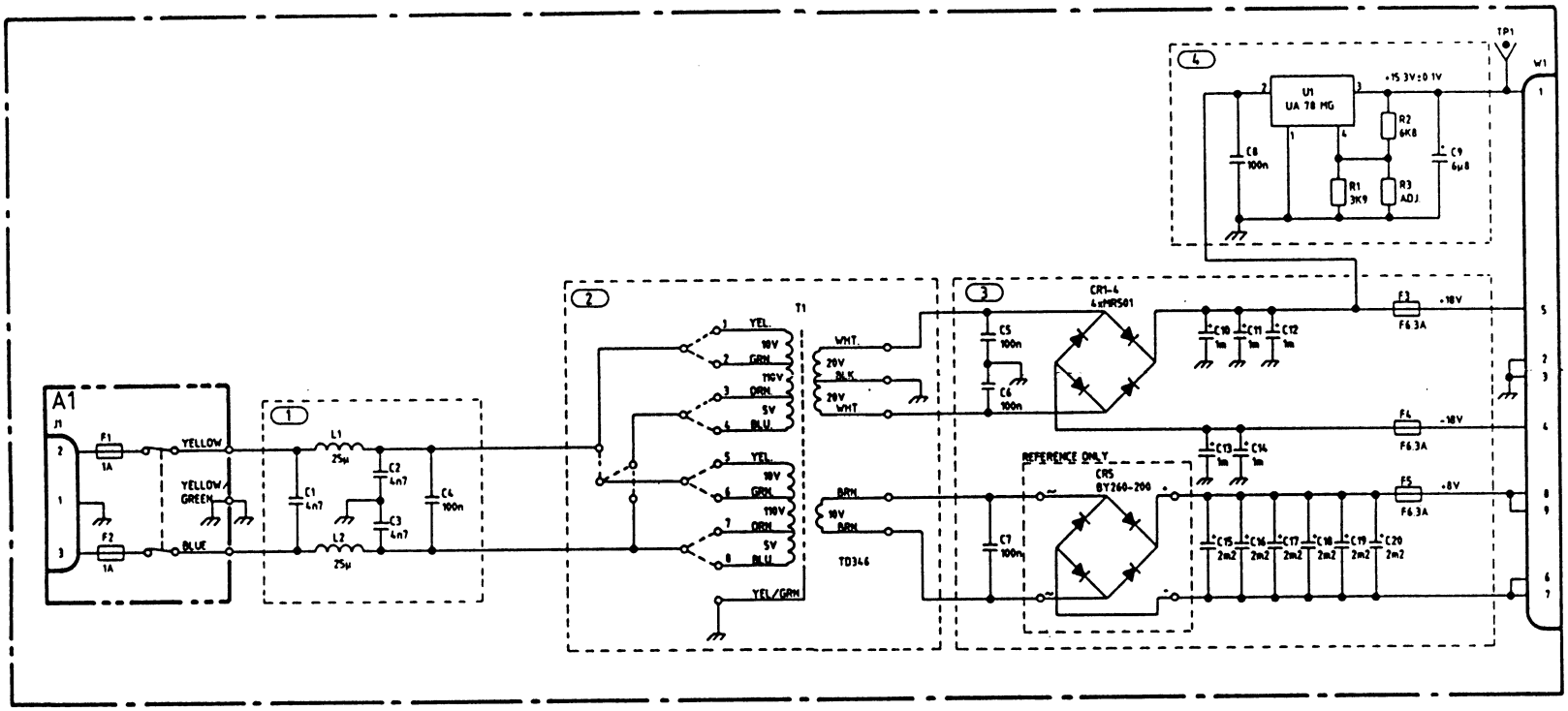
FIRST ANGLE PROJECTION

Dansk Radio AS

TITLE
COMPONENT LOCATION
POWER SUPPLY , 220V
TRAFO ASSY

SIZE	CODE IDENT	DRAWING NO
A1		48 83 21-A
SCALE 2:1		SHEET 1 OF 1

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVAL



		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETRES AND TOLERANCES ARE IN ACCORDANCE WITH DS 2075		Dansk Radio AS	dra
		ANGLES	DR. VH 21.3 1988	TITLE POWER SUPPLY , 220V TRAFO ASSY	
		LIN. DIM.	CH.		
			AP. 21.3.88		
			AP.		
47 68 03	RC4000	MATERIAL	FIRST ANGLE PROJECTION	SIZE A2	CODE IDENT	DRAWING NO. 48 83 21-A
NEXT ASSY	USED ON			SCALE		SHEET 1 OF 1
APPLICATION						

Service Sheet A10A2

ASSY 495166, FRONT PANEL CIRCUIT
ASSY 489883, DISPLAY BOARD ASSEMBLY

Service Sheet A11A1 and A11A1A1

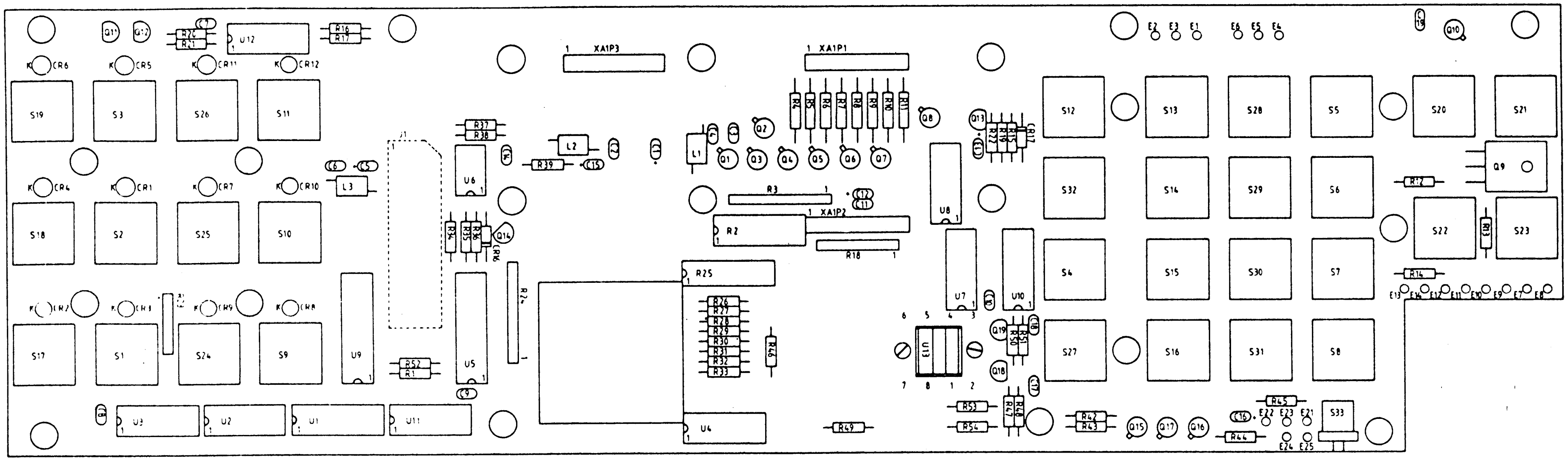
Assy 495166, Front Panel Circuit **Schematic 1**

1. Address Decoding
with associated gates for generation of acknowledge FACK, as handshaking signal for the microcomputer

2. Supply Filters

REVISIONS

ZONE LTR	DESCRIPTION	DATE	APPROVAL



489905	RX4010	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETRES AND TOLERANCES ARE IN ACCORDANCE WITH	Dansk Radio AS
NEXT ASSY	USED ON	ANGLES	TITLE COMPONENT LOCATION FRONT PANEL CIRCUIT
APPLICATION		LIN DIM	
		MATERIAL	FIRST ANGLE PROJECTION
			SIZE A1 — DRAWING NO 49 51 66
			SCALE 2:1 — SHEET 1 OF 1

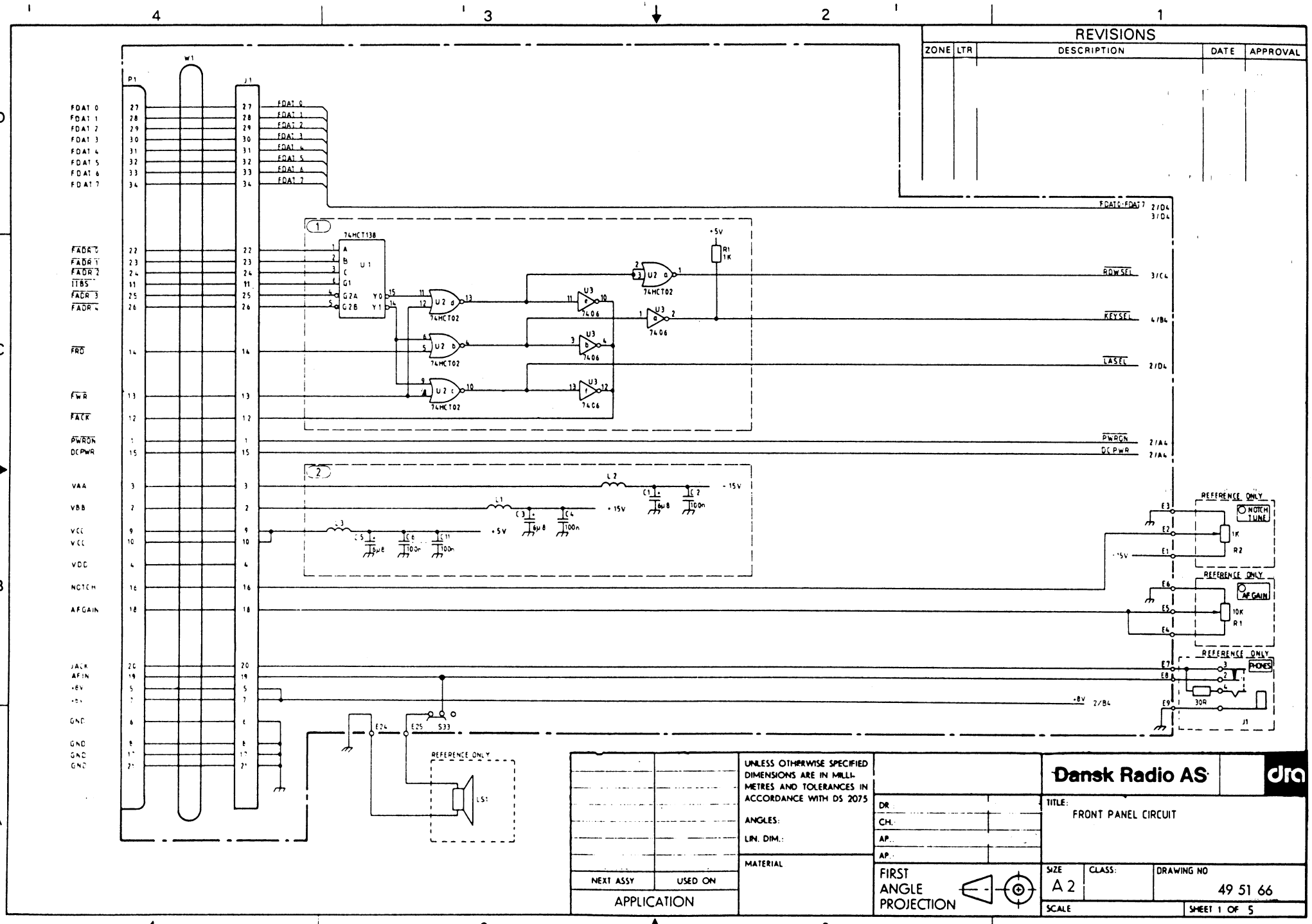
3. Eight-bit Latch
used for segment information to displays and LEDs, and data to D/A-converter (11).

4. Q1-Q8
Drivers for Segment Information. R4-R11: Current limiting resistors.

5. LED Indicators

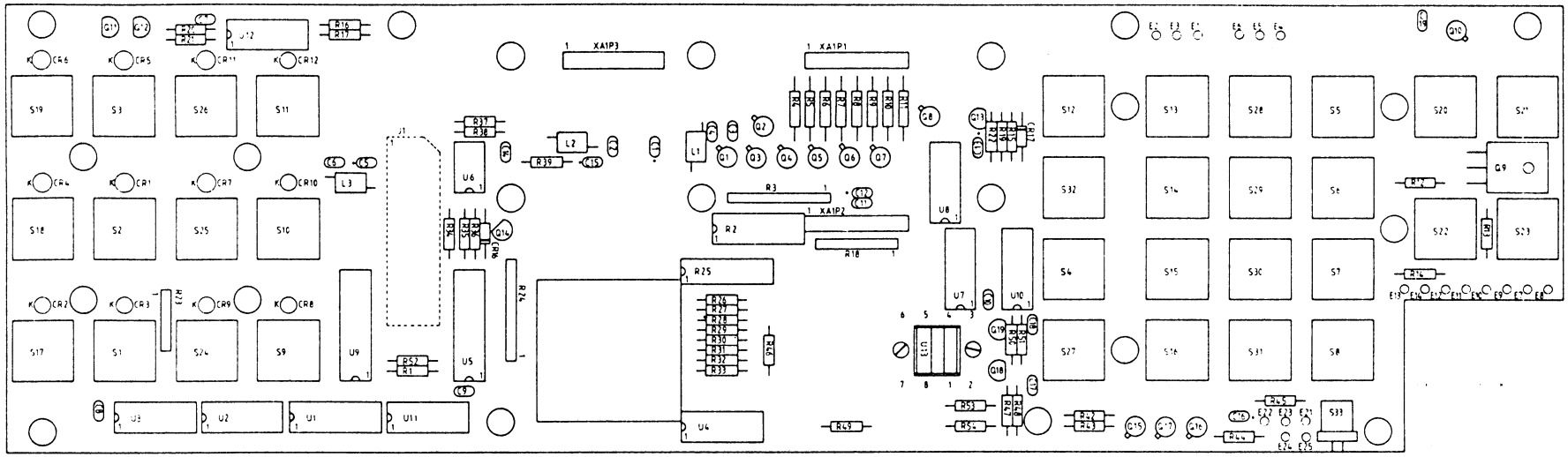
Cr.no.	Corresponding Switch
1	inter
2	off
3	slow
4	WIDE
5	AM
6	SSB
7	narr
8	att
9	fast
10	vnar
11	RTTY
12	CW
13	tune
14	bfo
15	scan

6. Dimmer Circuit
controls the light in displays, LEDs and S-meter.



Service Sheet A11A1

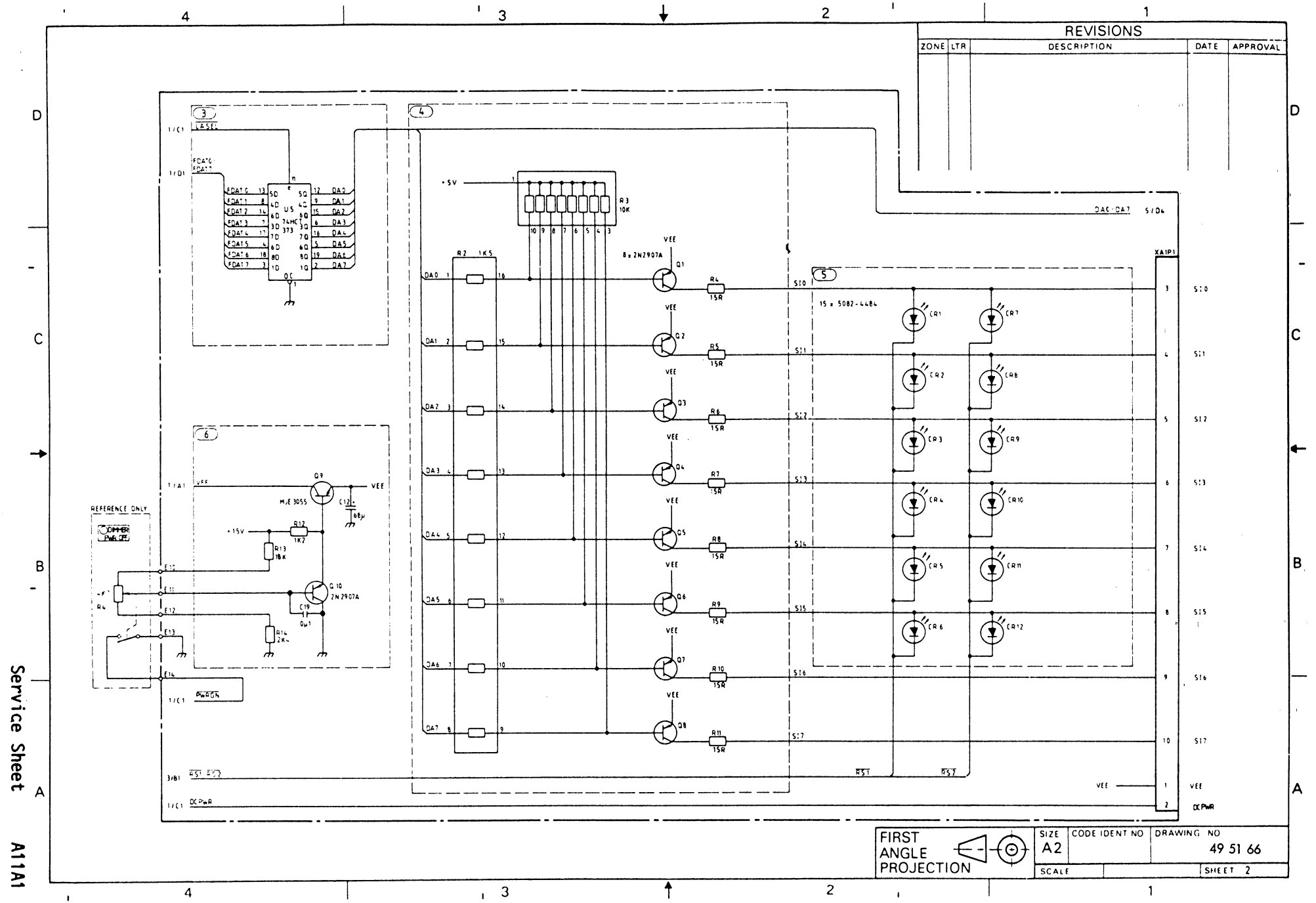
REVISIONS



			Dansk Radio AS
	ANGLES LIN DIM		COMPONENT LOCATION FRONT PANEL CIRCUIT
NEXT ASSY | USED ON APPLICATION	MATERIAL	FIRST ANGLE PROJECTION	SIZE A1 | DRAWING NO 49 51 66 SCALE 2:1 | SHEET 1 OF 1

7. U7, U8
Shift registers with associated pull-up network, used for multiplexing displays LEDs and switches. It also selects the sample hold circuit (13),and clears tune F/F(12). R15, C13 clear U7-U8 during start-up.

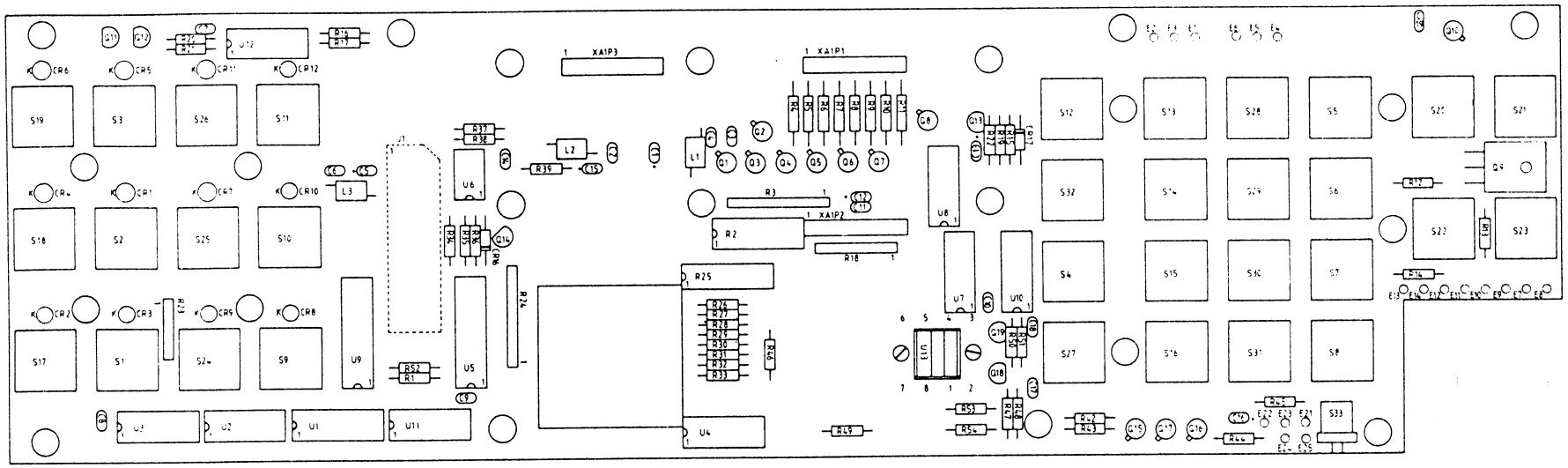
8. Drivers
for Multiplexing of LEDs



Service Sheet A11A1

FIRST ANGLE PROJECTION	SIZE A2	CODE IDENT NO	DRAWING NO 49 51 66
	SCALE		SHEET 2

REVISIONS

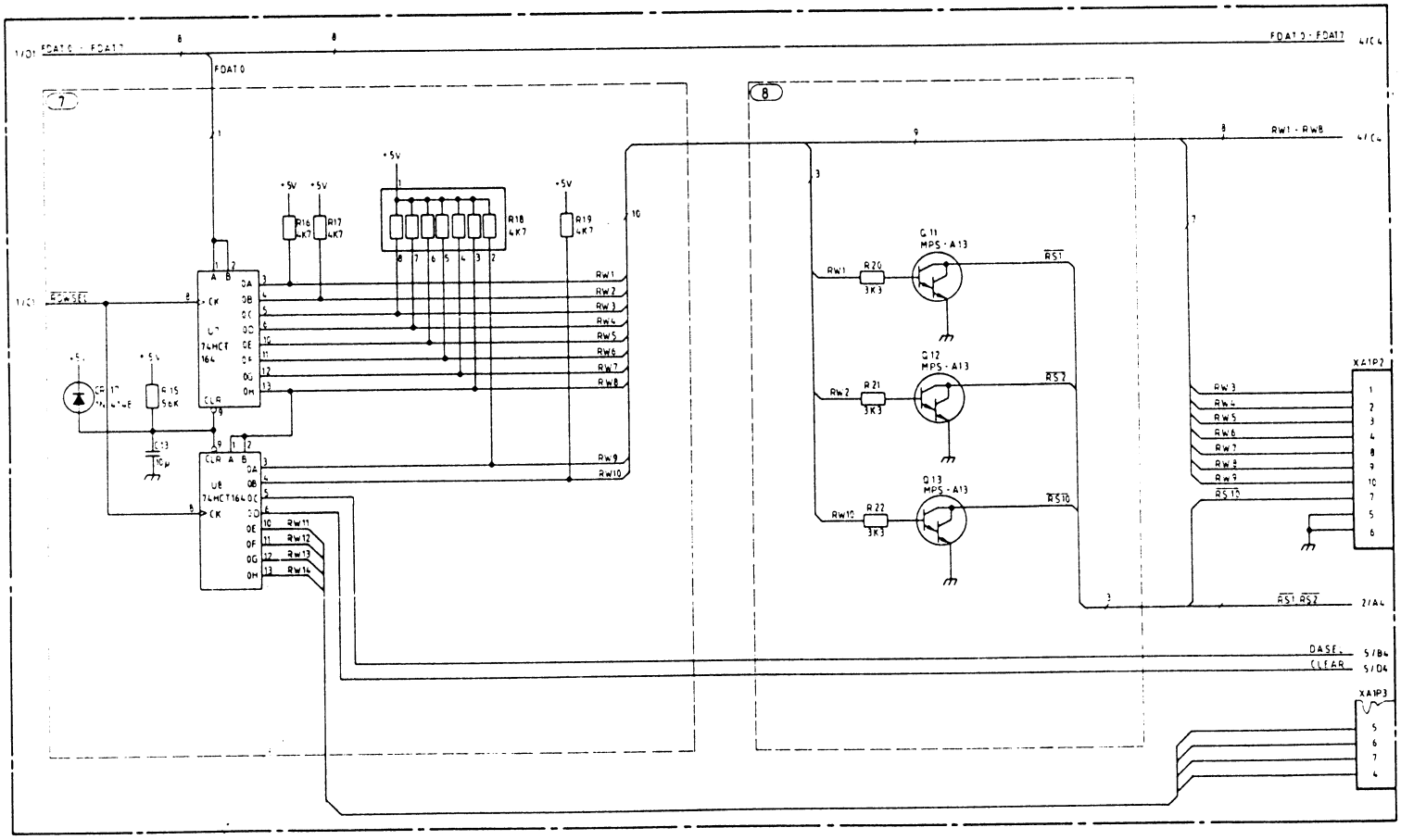


			Dansk Radio AS
			COMPONENT LOCATION FRONT PANEL CIRCUIT
489905	RX4010	MATERIAL	SIZE A1 — DRAWING NO. 49 51 66
NEXT ASSY	USED ON		
APPLICATION		FIRST ANGLE PROJECTION	SCALE 2:1 — SHEET 1 OF 1

9. Eight-bit Output Buffer
read by the microcomputer

10. S1-S31, Switches SPSTNO
(Single pole single throw normally open) with associated pull-up network and open-collector buffers.

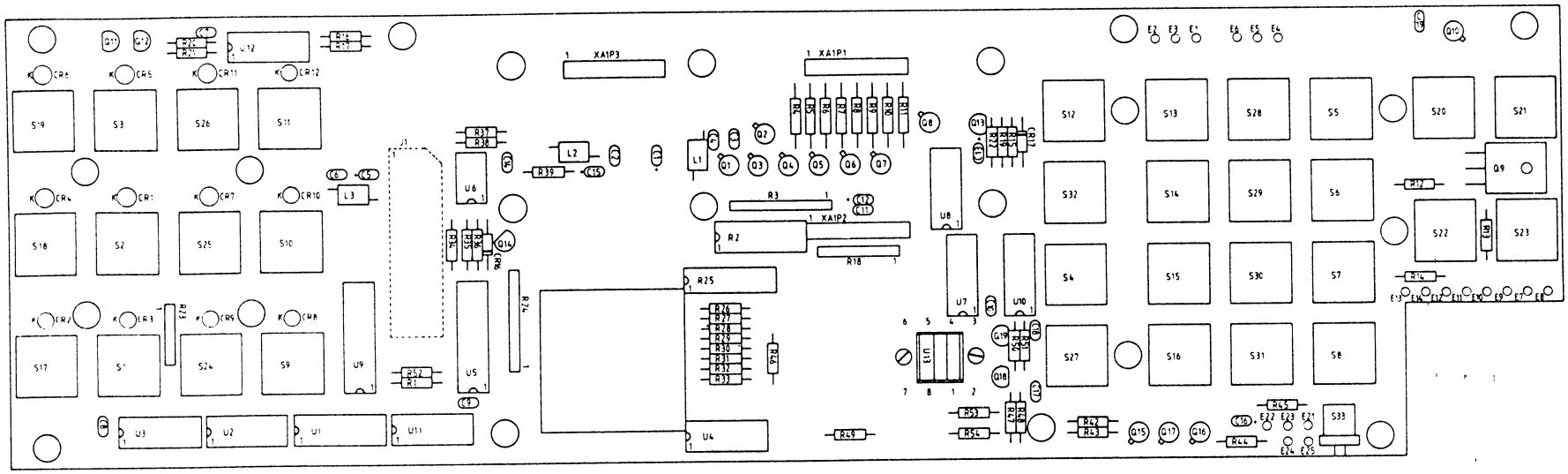
REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVAL



FIRST ANGLE PROJECTION	SIZE A2	CODE IDENT NO	DRAWING NO 49 51 66
	SCALE		SHEET 3

Service Sheet A11A1

REVISIONS			
ZONE	DESCRIPTION	DATE	APPROVAL



489905	RX4010		Dansk Radio AS
NEXT ASSY	USED ON		
APPLICATION		ANGLES LIN DIM	COMPONENT LOCATION FRONT PANEL CIRCUIT
		MATERIAL	DRAWING NO 49 51 66
		FIRST ANGLE PROJECTION	SIZE A1
			SCALE 2:1
			SHEET 1 OF 1

11. Eight-bit Digital to Analogue Converter
R24 : Pull-up network
R25-R33: R-2R network
U6b : Operational amplifier with an output range from 5V to 10V.

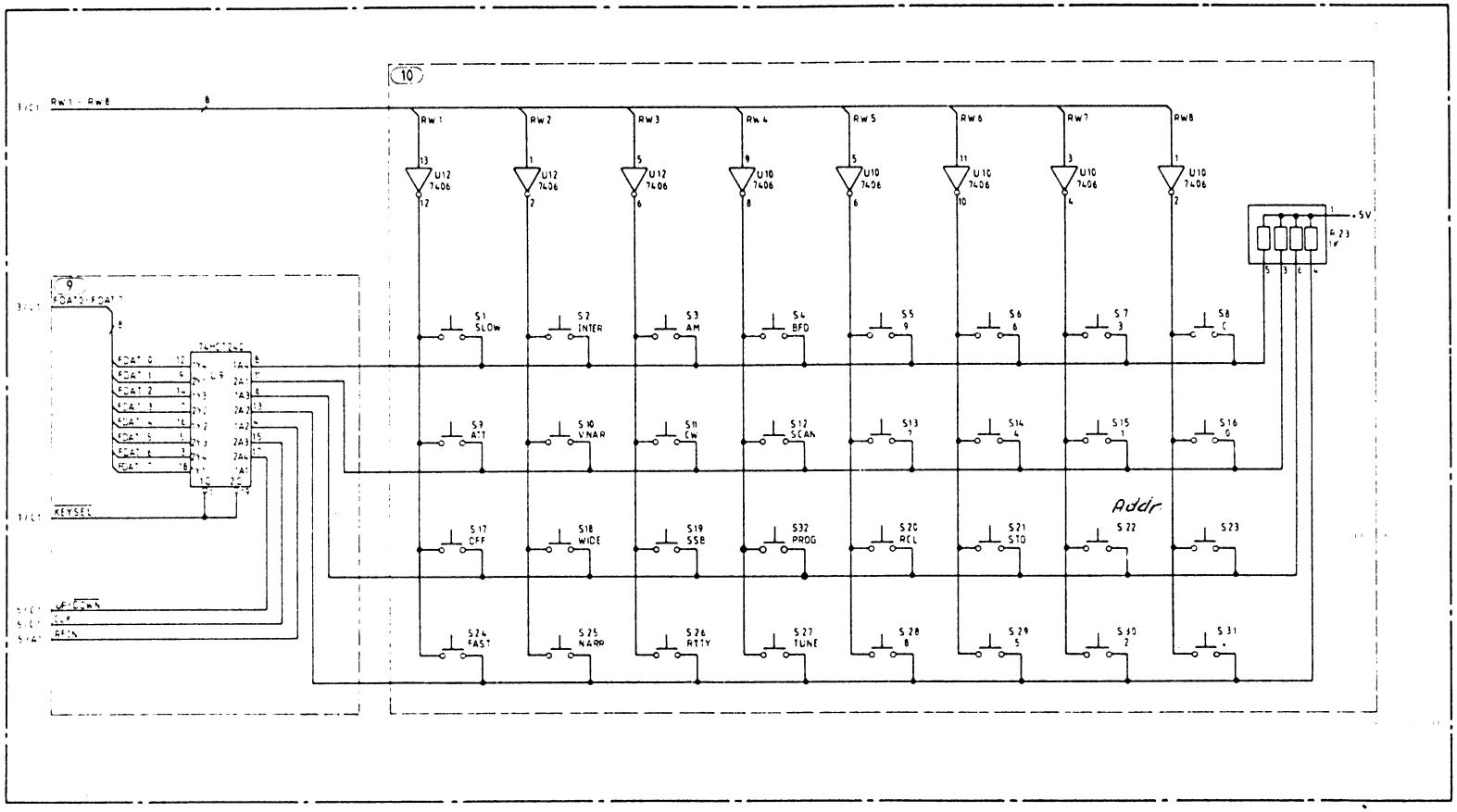
12. Circuit for reading of Tune Control
U11a: is set when tuning.
U11b: is set when tuning up.
When U11 has been read by the microcomputer, the program will clear U11a.

13. Sample and Hold Circuit
used as a source generator to the S-meter and for A/D-conversion (15).

14. Low Pass Filter
for meter voltage.

15. Voltage Comparator
By means of the D/A-converter (11) and the comparator circuit an A/D-conversion of the RF-level is performed.

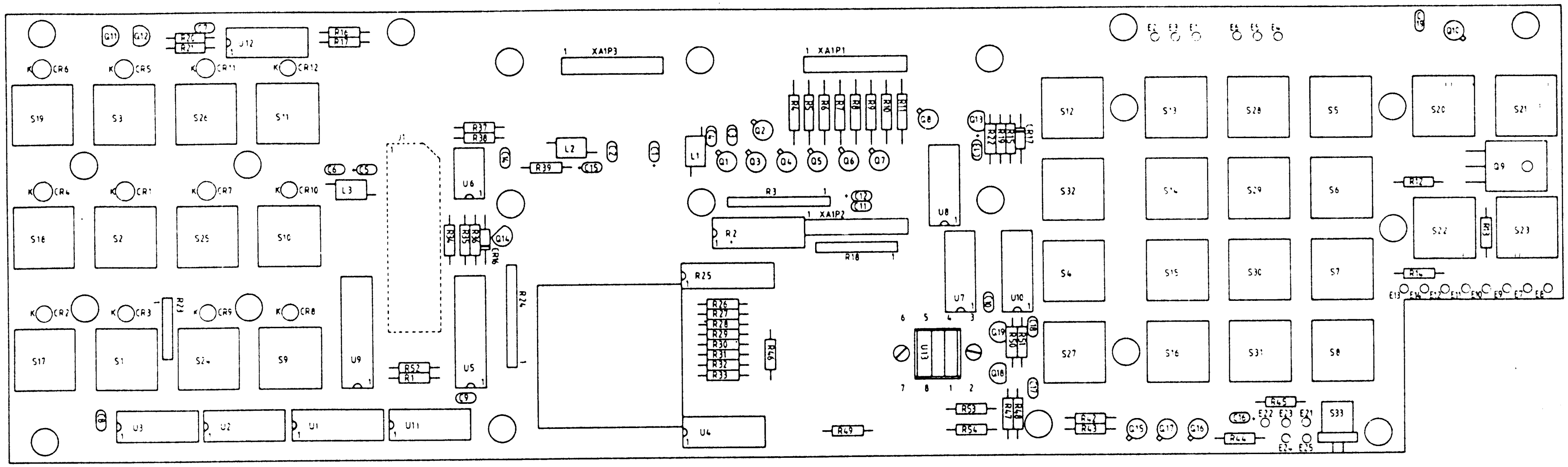
REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVAL



FIRST ANGLE PROJECTION

SIZE	CODE IDENT NO	DRAWING NO
A2		49 51 66
SCALE		SHEET 4

Service Sheet A11A1



REVISIONS

ZONE	LTR	DESCRIPTION	DATE	APPROVAL
	A			
	B	ÆM87077	17.12.87	VH

Dansk Radio AS

TITLE: COMPONENT LOCATION FRONT PANEL CIRCUIT

FIRST ANGLE PROJECTION

SIZE: A1

DRAWING NO: 49 51 66

SCALE 2:1

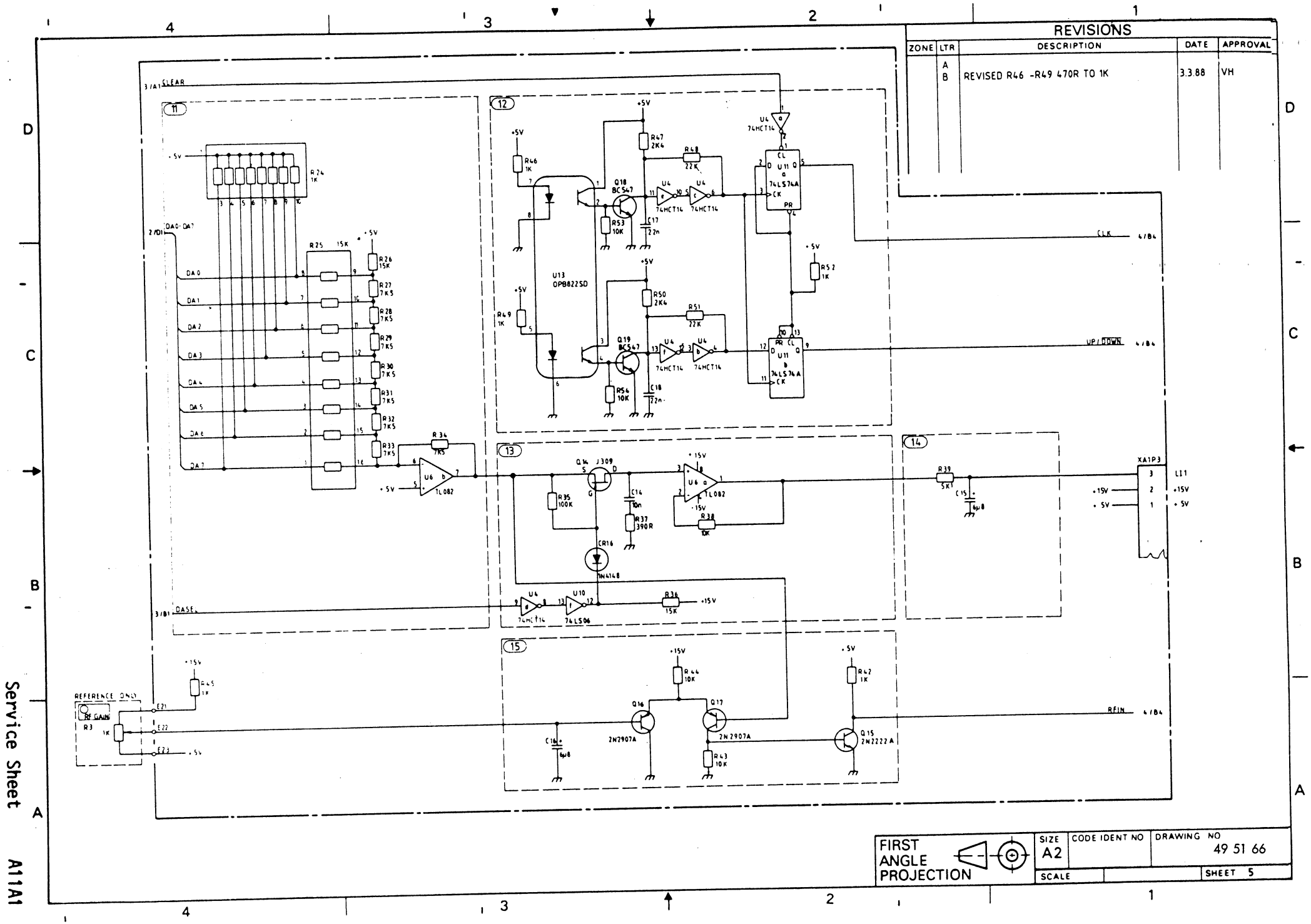
SHEET 1 OF 1

NEXT ASSY | USED ON

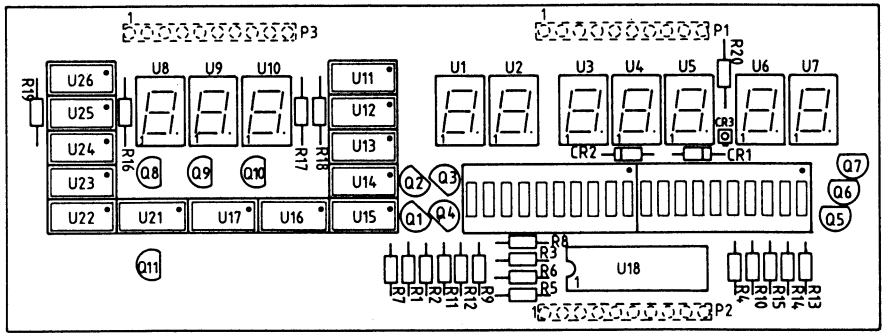
APPLICATION

Assy 489883, Display Board Assembly **Schematic 1**

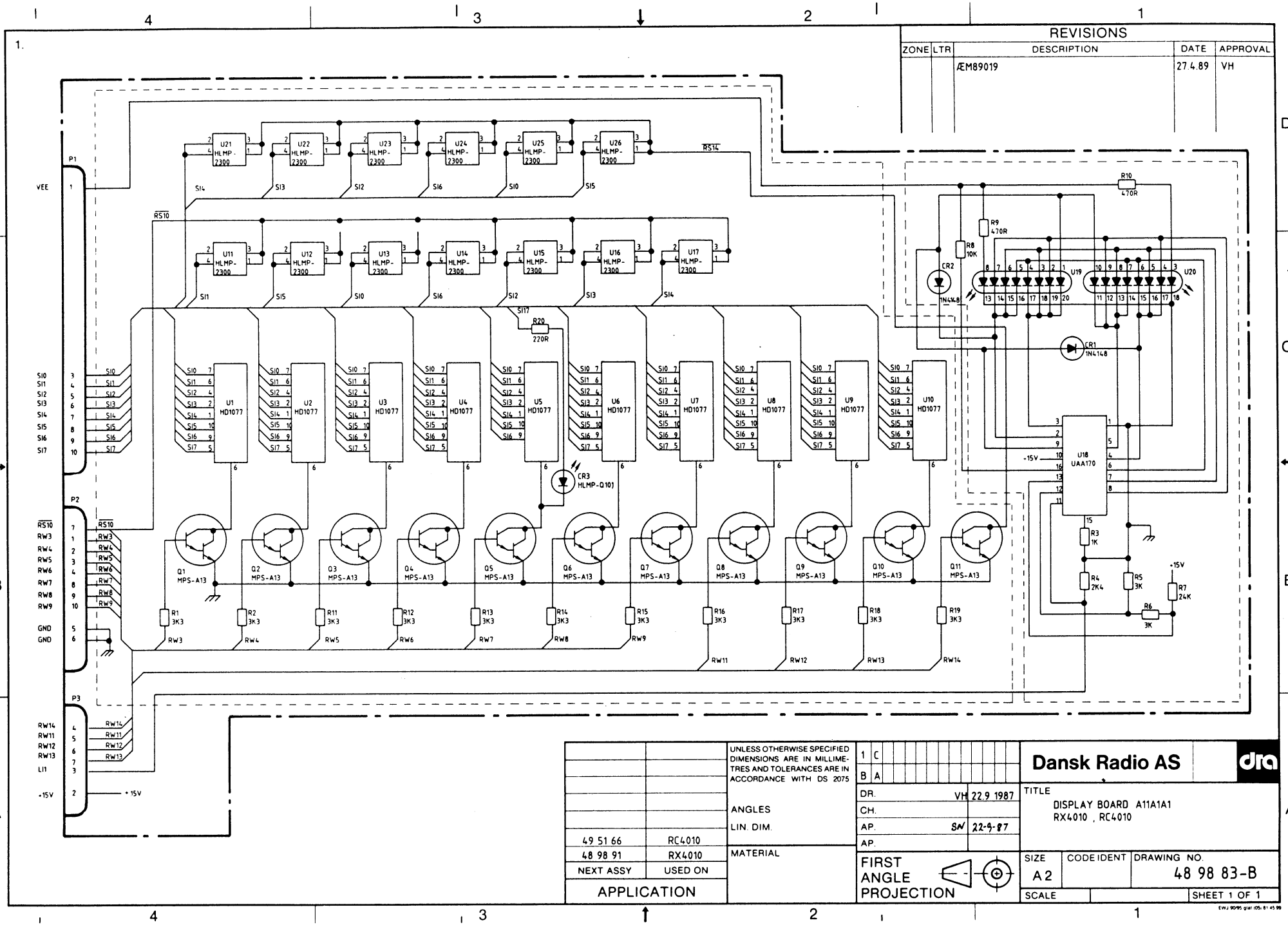
U1-U10	7-segment display
U11-U17	Annunciators
U21-U26	Annunciators
Q1-Q11	Drivers for multiplexing
U18	Driver for light bars for meter
U19-U20	Light bars for meter


REVISIONS
ZONE | LTR | DESCRIPTION | DATE | APPROVAL
A
B | REVISED R46 -R49 470R TO 1K | 3.3.88 | VH
Service Sheet A11A1
FIRST ANGLE PROJECTION
SIZE A2
CODE IDENT NO
DRAWING NO 49 51 66
SCALE
SHEET 5
U13 OPB822SD
74HCT14
74LS74A
TL082
74LS06
2N2907A
2N2222A
J309
BC547
1N4148
REFERENCE ONLY
RF GAIN R3 1K
CLEAR
DA0-DA7
CLK
UP/DOWN
RFIN
XA1P3
LI1
+15V
+5V
-15V

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVAL
	A			
	B	REVISED	22.3.88	VH



		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETRES AND TOLERANCES ARE IN ACCORDANCE WITH DS 2075		**Dansk Radio AS**	dra
		ANGLES	DR. VH 22.9 1987	TITLE COMPONENT LOCATION DISPLAY BOARD RX4010	
		LIN. DIM.	CH.		
			AP. SN 22-9-87		
489891	RX4010	MATERIAL	AP.	SIZE A2	CODE IDENT — DRAWING NO. 48 98 83
NEXT ASSY	USED ON		FIRST ANGLE PROJECTION	SCALE 2:1	SHEET 1 OF 1
APPLICATION					



Service Sheet A11A1A1

49 51 66	RC4010
48 98 91	RX4010
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETRES AND TOLERANCES ARE IN ACCORDANCE WITH DS 2075

ANGLES

LIN. DIM.

MATERIAL

DR.	VH	22.9 1987
CH.		
AP.	SN	22-9-87
AP.		

FIRST ANGLE PROJECTION

Dansk Radio AS

TITLE
DISPLAY BOARD A11A1A1
RX4010 , RC4010

SIZE	CODE IDENT	DRAWING NO.
A2		48 98 83-B
SCALE		SHEET 1 OF 1

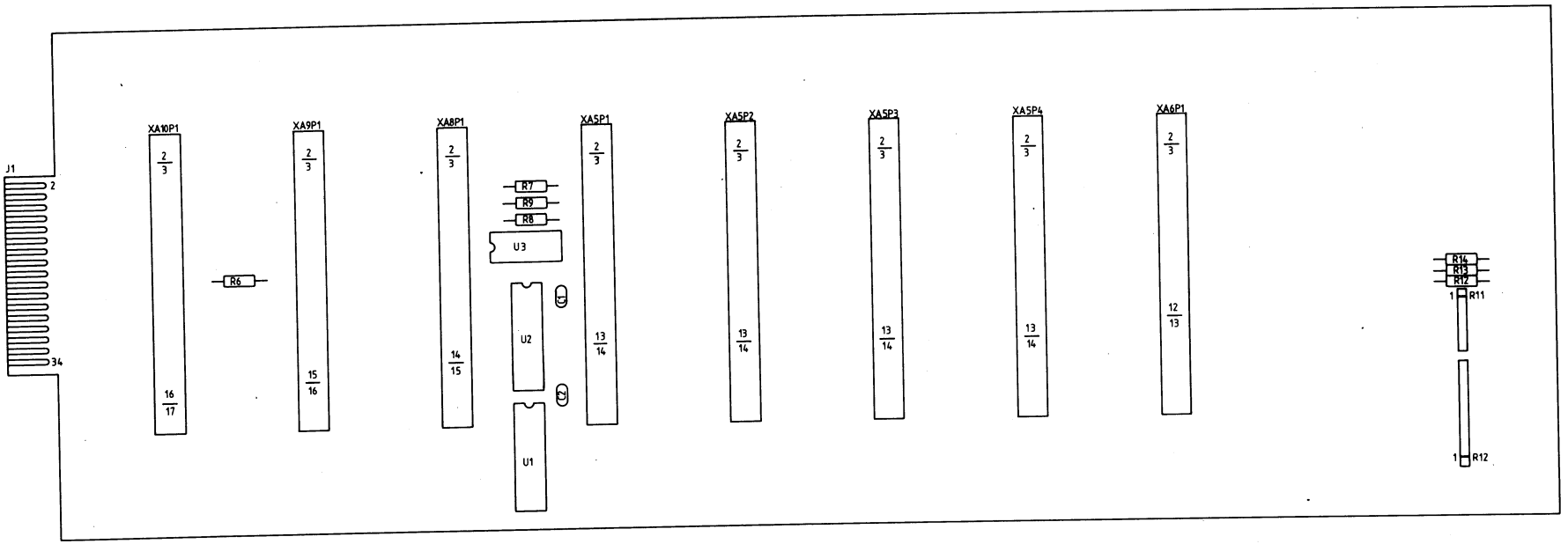
ASSY 471925, MOTHERBOARD ASSEMBLY

Service Sheet A12A1

Assy 471925, Motherboard Assembly

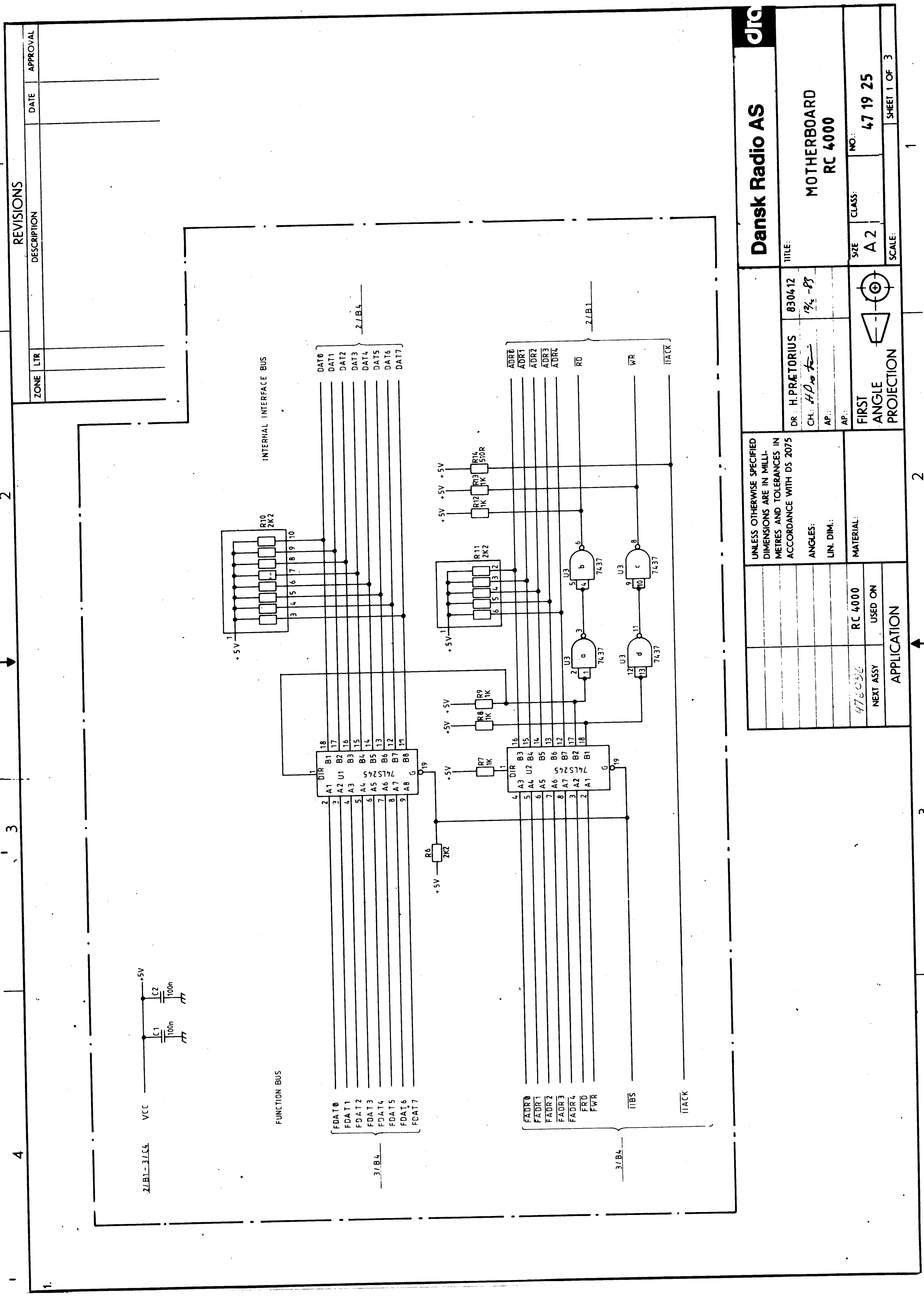
To avoid noise in the more sensitive parts of the receiver controller, two buffers U1 and U2 separate the internal interface bus from the function bus. The internal interface bus is only activated when necessary.

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVAL

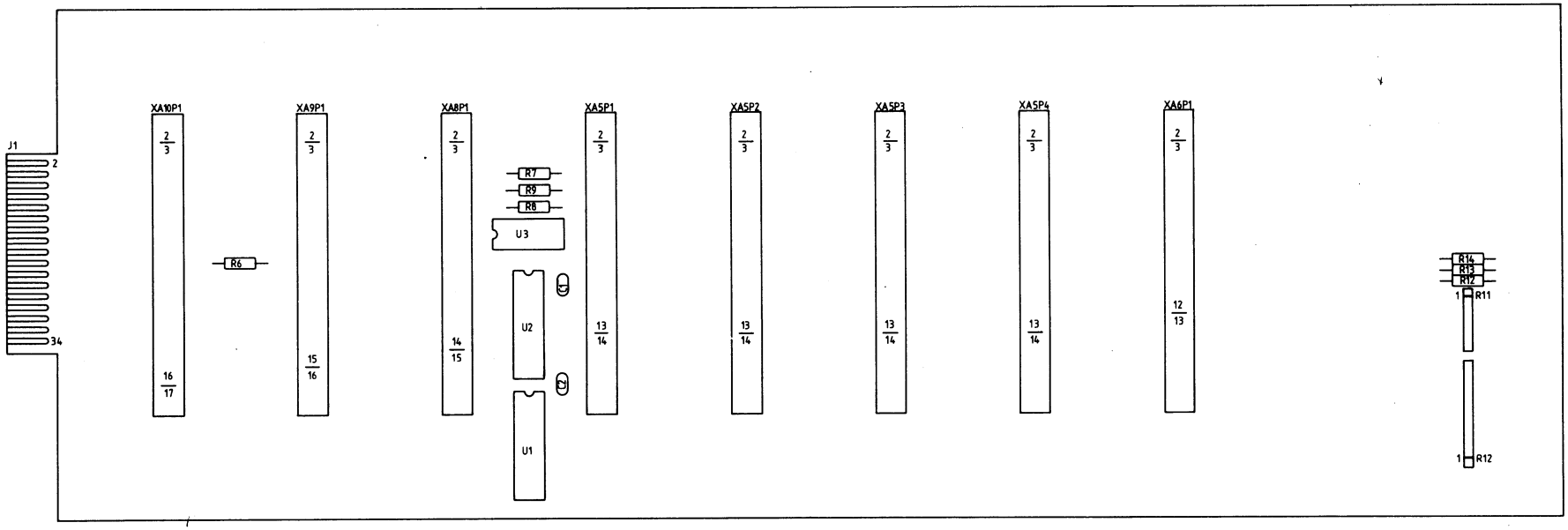


— Codepin

		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETRES AND TOLERANCES ARE IN ACCORDANCE WITH DS 2075		Dansk Radio AS	dra
			DR. FP 14-7-83	TITLE	
		ANGLES	CH.	MOTHERBOARD	
		LIN. DIM.	AP.		
			AP.		
476056	RC 4000	MATERIAL	FIRST ANGLE PROJECTION	SIZE A1	CODE IDENT / DRAWING NO. 471925
NEXT ASSY	USED ON			SCALE	SHEET 1 OF
APPLICATION					


REVISIONS
ZONE
LTR
DESCRIPTION
DATE
APPROVAL
Dansk Radio AS
TITLE:
MOTHERBOARD
RC 4000
NO.:
47 19 25
SHEET 1 OF 3
SIZE
A 2
CLASS:
SCALE:
DR: H. PRÆTORIUS
830412
CH.:
AP.:
AP.:
FIRST ANGLE PROJECTION
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETRES AND TOLERANCES IN ACCORDANCE WITH DS 2075
ANGLES:
LIN. DIM.:
MATERIAL:
RC 4000
NEXT ASSY
USED ON
APPLICATION
INTERNAL INTERFACE BUS
FUNCTION BUS
74LS245
7437
VCC

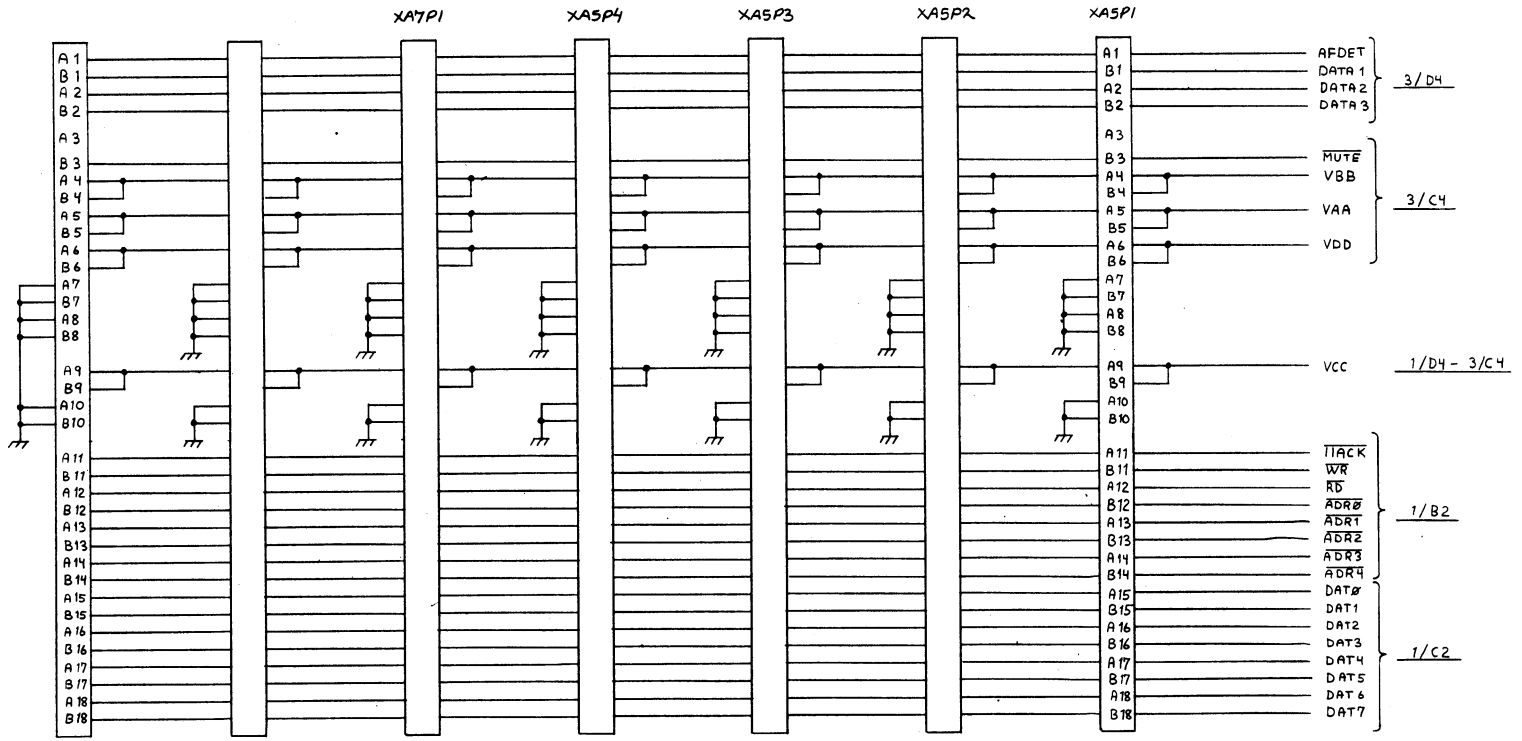
REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVAL



— Codepin

		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETRES AND TOLERANCES ARE IN ACCORDANCE WITH DS 2075		Dansk Radio AS	dra
			DR. FP 14-7-83	TITLE	
		ANGLES	CH.	MOTHERBOARD	
		LIN. DIM.	AP.		
			AP.		
476056	RC 4000	MATERIAL	FIRST ANGLE PROJECTION	SIZE A1	CODE IDENT	DRAWING NO. 471925
NEXT ASSY	USED ON			SCALE		SHEET 1 OF
APPLICATION						

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVAL

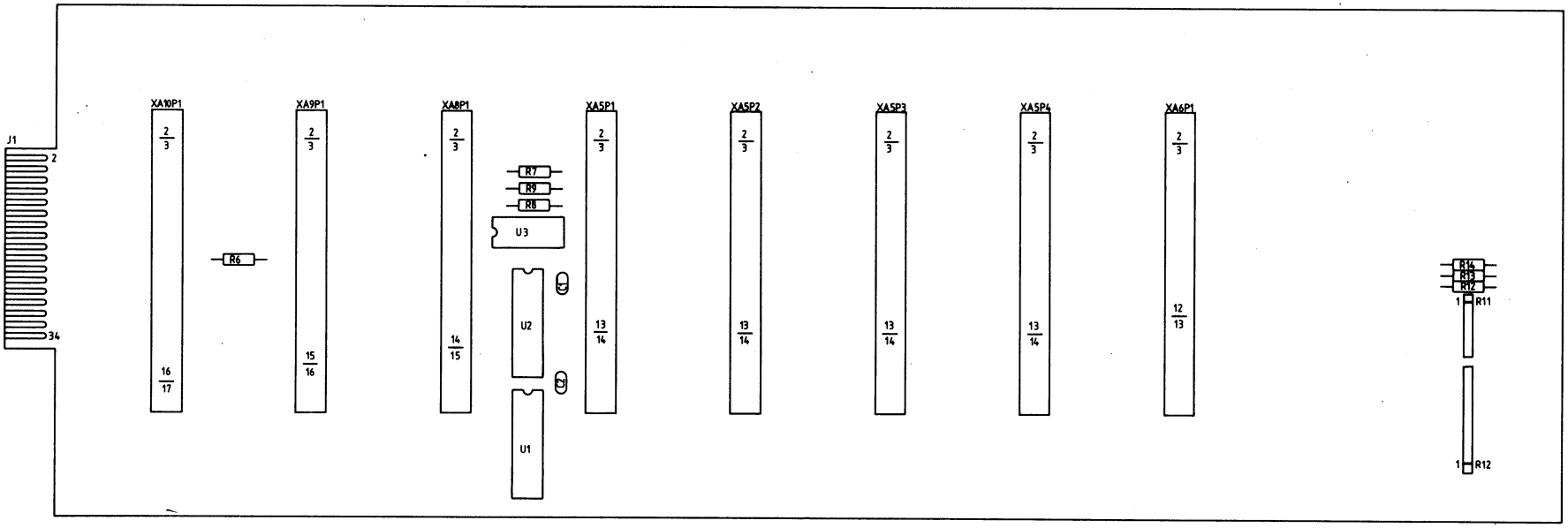


FIRST ANGLE PROJECTION	SIZE	CODE IDENT	DRAWING NO.
	A2		471925
	SCALE		SHEET 2

3650 J & K Diaprint 01-54 44 22

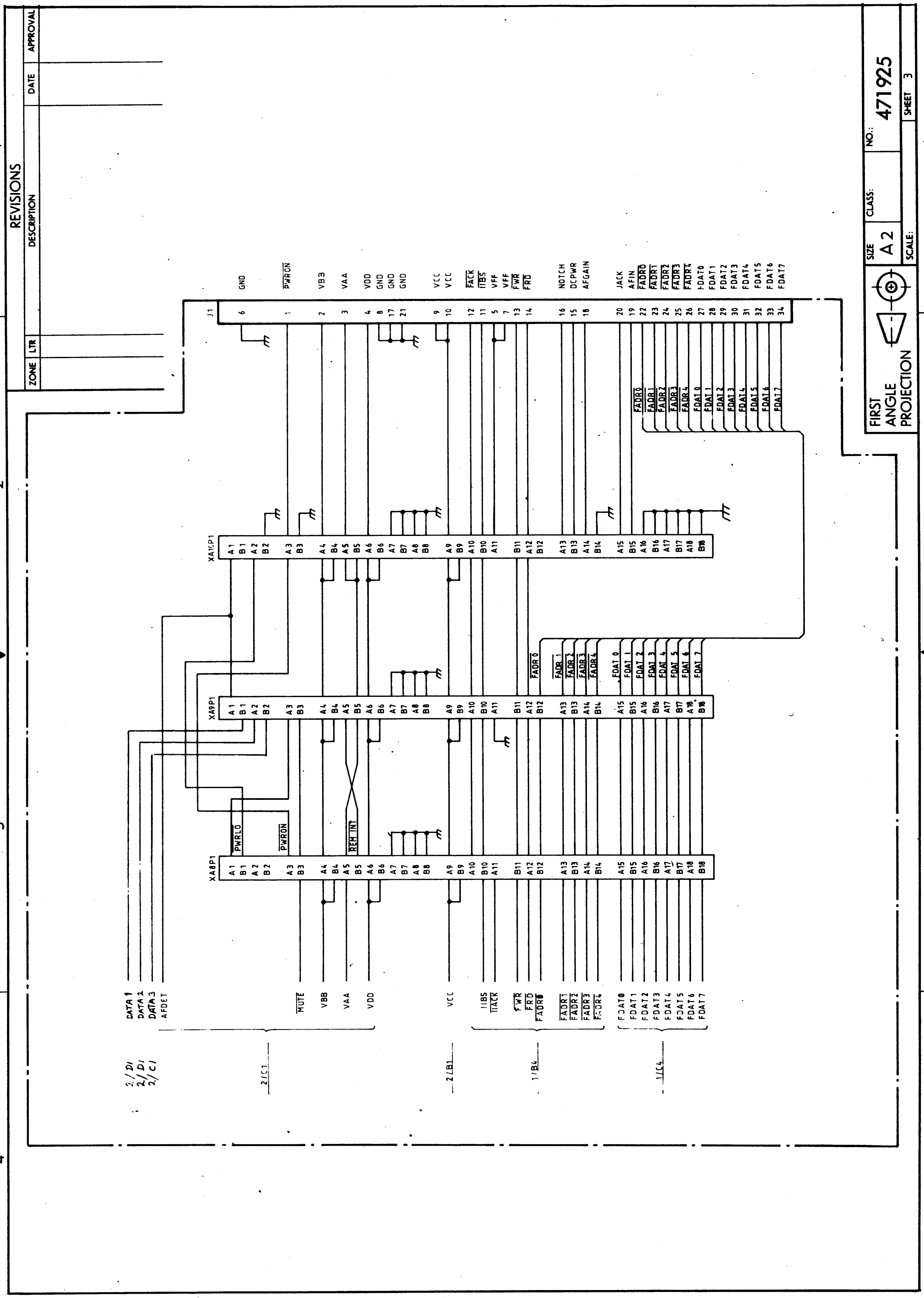
Service Sheet A12 (RC)

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVAL



— Codepin

		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETRES AND TOLERANCES ARE IN ACCORDANCE WITH DS 2075		Dansk Radio AS
			DR. FP 14-7-83	TITLE
		ANGLES	CH.	MOTHERBOARD
		LIN. DIM.	AP.	
476056	RC 4000	MATERIAL	AP.	
NEXT ASSY	USED ON		FIRST ANGLE PROJECTION	SIZE A1 / CODE IDENT / DRAWING NO. 471925
APPLICATION				SCALE / SHEET 1 OF


REVISIONS
ZONE
LTR
DESCRIPTION
DATE
APPROVAL
FIRST ANGLE PROJECTION
SIZE
A2
CLASS:
NO.:
471925
SCALE:
SHEET 3
J1
XA10P1
XA9P1
XA8P1
GND
PWRON
VB3
VAA
VDD
VCC
FACK
IIBS
VFF
FWR
FRD
NOTCH
DCPWR
AFGAIN
JACK
AFIN
FADR0
FADR1
FADR2
FADR3
FADR4
FDAT0
FDAT1
FDAT2
FDAT3
FDAT4
FDAT5
FDAT6
FDAT7
PWRLO
REM INT
DATA 1
DATA 2
DATA 3
AFDET
MUTE
VBB
IIACK
2/C1
2/B1
1/B4
1/C4