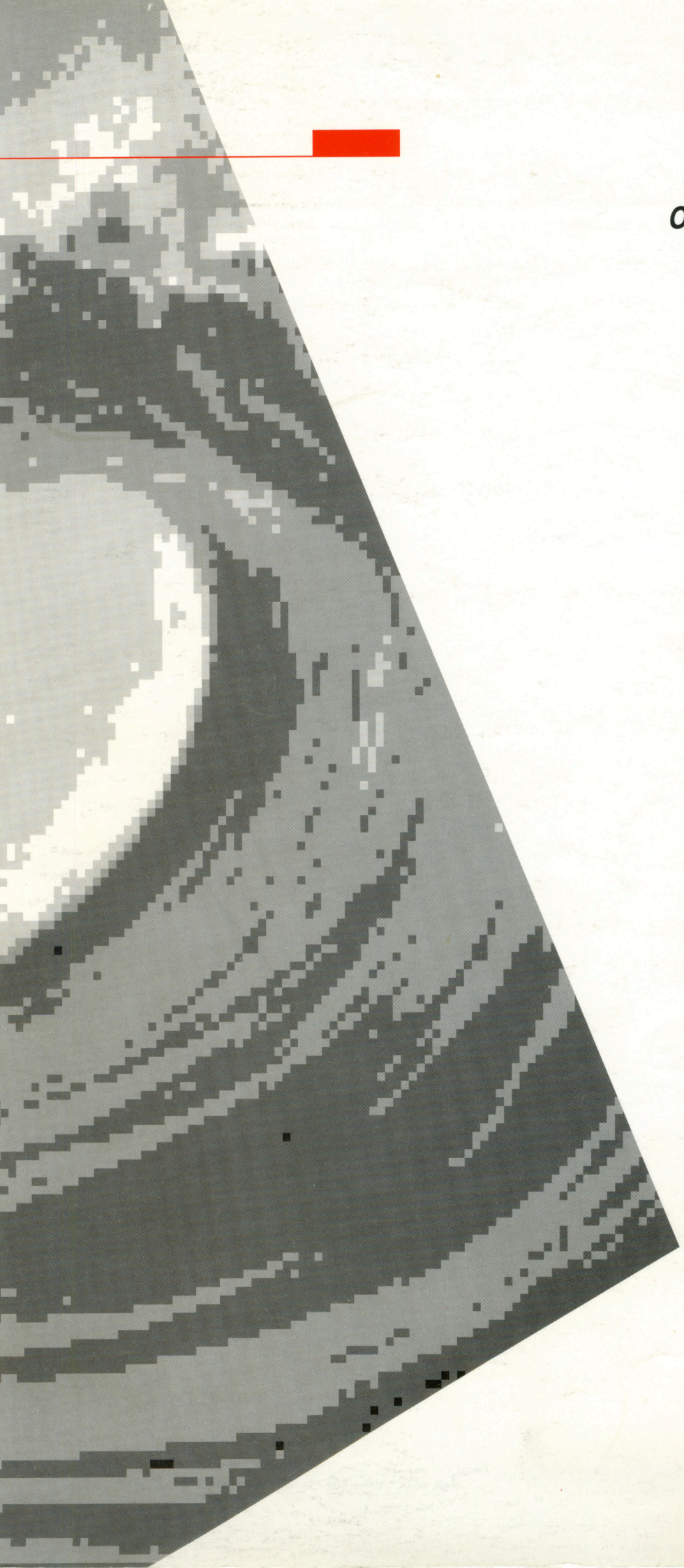

RE 524
FM Stereo Coder
Operating and Service Manual

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1. INTRODUCTION

1.1 Introduction

The purpose of this operating & servicing manual for the RE 524 FM Stereo Coder is to provide the information necessary to:

* understand the principles of operation for the RE 524,
* be able to install and operate the RE 524,
* carry out preventive maintenance and regular adjustments,
* perform troubleshooting to board level.

In order to fulfil these objectives, the manual presents detailed descriptions of electrical and mechanical features of the RE 524 together with detailed instructions on how to install and operate the RE 524.

This manual comprises the following sections:

Section 1 Introduction.

A general introduction to the manual and the RE 524.

Section 2 Installation.

Detailed instructions on how to install the RE 524 in the customers system.

Section 3 Front and Rear Panels.

Description of the various plugs, switches and meters located on the front and rear panels.

Section 4 Manual Operation.

A description of the principles of operation, emphasizing information which is relevant for setting up and operating the RE 524.

Section 5 Dismantling.

General instruction on how to get access to the individual printed circuit boards of the RE 524.

Section 6 Adjustment and Maintenance.

Description on how to perform adjustments and maintenance of the RE 524.

Section 7 Technical Description of Print/Modules.

Each printed circuit board is described in details regarding principle of operation. This is followed by schematic diagrams, component locations and parts lists for the board in question.

Section 8 Equipment and Accessories.

A list of the accessories supplied with the instrument, available options (if any) and optional equipment and accessories.

Section 9 Specifications.

A list of specifications that all RE 524s are able to meet or exceed.

Section 10 Index.

Section 11 Miscellaneous.

This section contains response sheets, blank problem reports and eventual release information together with a data sheet of the RE 524.

1.2 RE 524

The RE 524 is a compact FM stereo coder, providing a time multiplexed, composite signal conforming to the EBU and FCC standards for stereo broadcasting.

Due to RE 524's 1 U high cabinet and low power consumption it is ideally suited to be mounted in tight spaces.

The RE 524 is provided with one set of L and R audio inputs. Furthermore, the RE 524 has got two AUX inputs for RDS/VRF or SCA signals that must be added to the normal stereo signal. For synchronization and monitoring purposes a Pilot and Composite output is supplied.

All settings are stored in EEPROM in order for the coder to be able to start up correctly following a power fail.

A special PTKK function is included whereby the FM station in cases of emergency can broadcast two independant programs one that can only be received by a mono receiver and one that can only be received by a PTKK receiver.

The RE 524 is equipped with a cable equalization network for balancing out the drop in stereo separation at high frequencies introduced if the coder is connected to the exciter via long cables.

The RE 524 has excellent specifications, which makes it well suited for broadcasting of high quality stereo:

L/R separation	> 65 dB (80 Hz to 5 kHz)
Distortion	< -70 dB (-80 dB MONO)
Residuals	< -64 dB (Rel. to +6 dBm)

During installation the following parameters may be modified:

Use of input filters or bypass of the filters.
Input impedances (600 Ω or 47 kΩ)
Preemphasis (25, 50 or 75 μsec)
Mono mode (L only, R only or (L+R)/2)

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2. INSTALLATION

This section contains general instructions on the installation of the RE 524 FM Stereo Coder. This section must be read in order to ensure correct installation and function of the RE 524.

2.1 Unpacking

When unpacking the RE 524, the instrument, the accessories and the packing material should be inspected for any damage. Please refer to section 9, Equipment and Accessories, for a complete list of items. Should any item be damaged, please notify the carrier and your local RE TECHNOLOGY AS representative or the factory directly.

In case of complaint, the packaging material should be retained for inspection by the carrier.

When you have certified that no damage has occurred, you can start installing the instrument. However, before you apply line power to the instrument you should study in detail the following section, Power Requirements, and section 3, Front and Rear Panels.

2.2 Power Requirements

The RE 524 is supplied ready to operate on either 220 V or 110 V AC supplies. The actual power supply installed can be read on the back of the chassis near the main plug. It will read either "220 V, 0,5 A" or "110 V, 1 A".

The following procedure should be used when applying power for the first time:

1. Check that the power outlet is turned off as the RE 524 has no power switch.
2. Remove the plug in the mains adapter and check that a fuse of correct value has been installed. The fuse must always be of the type "slow blow". Then install the plug again.
3. Connect the power cord supplied with the instrument between the power connector and the AC power receptacle.
4. Turn on the AC power.

CAUTION

According to international safety regulations, the RE 524 is grounded via the third wire in the power cord. In case the RE 524 must be operated from AC outlets without a ground connector, the instrument must be grounded by means of the ground plug situated close to the mains adapter.

2.3 Selecting Input Filter

Broadcasters that already have band limited the audio input signal to 15 kHz can decide to bypass the input filters in the RE 524. This is done by means of the solder links SP3/SP25 and SP6/SP26, the test points TP1/TP3 and the jumpers JP1/JP2. The number after the "slash" being the links for the right channel. The testpoints and the jumpers are connected by means of jumpers while the solder links require a soldering iron. The locations are shown on fig. 2.1.

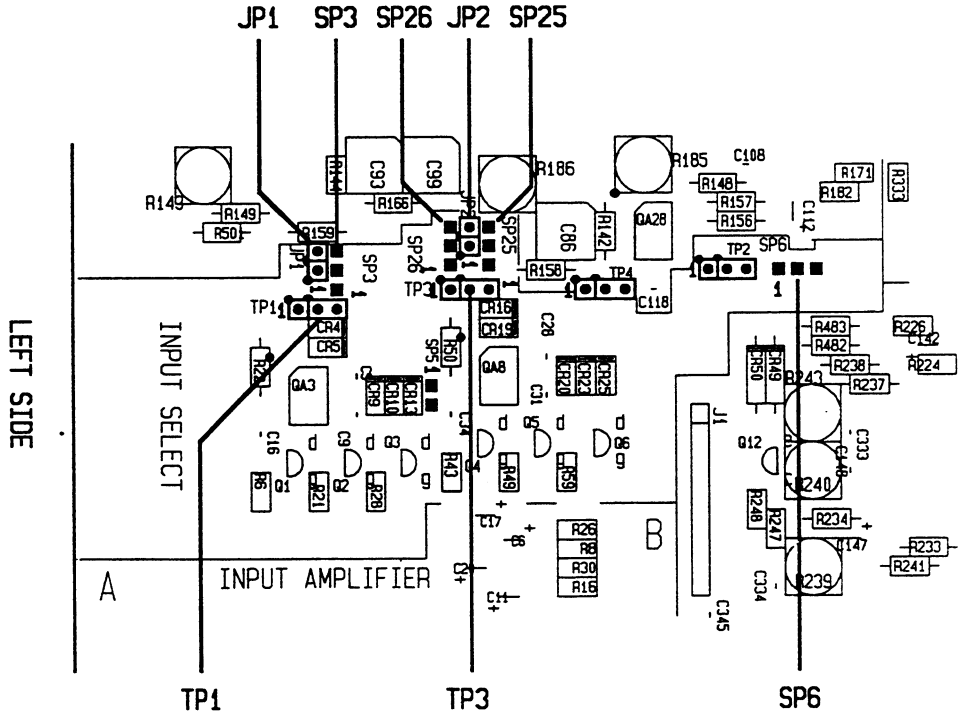

Fig. 2.1 - Selection of Input Filter

The actual solder links and the setting of jumpers for either bypassing or selecting the input filters can be found from table 2.1.

The default setting from the factory is "Input filter selected".

	SP3	SP6	TP1	JP1	SP25	SP26	TP3	JP2
Use filter	■ | ■	■ - ■ ■	Open	Shorted	■ | ■	■ | ■	Open	Shorted

	SP3	SP6	TP1	JP1	SP25	SP26	TP3	JP2
Bypass filter	■ | ■	■ ■ - ■	Shorted	Open	■ | ■	■ | ■	Shorted	Open

Table 2.1 - Selection of Input Filter

2.4 Selecting the Preemphasis

The RE 524 is able to work with the following preemphasis standards: 25 μs, 50 μs and 75 μs, any of which may be selected by means of solder links SP8 to SP11 internal to RE 524 (see fig. 2.2)

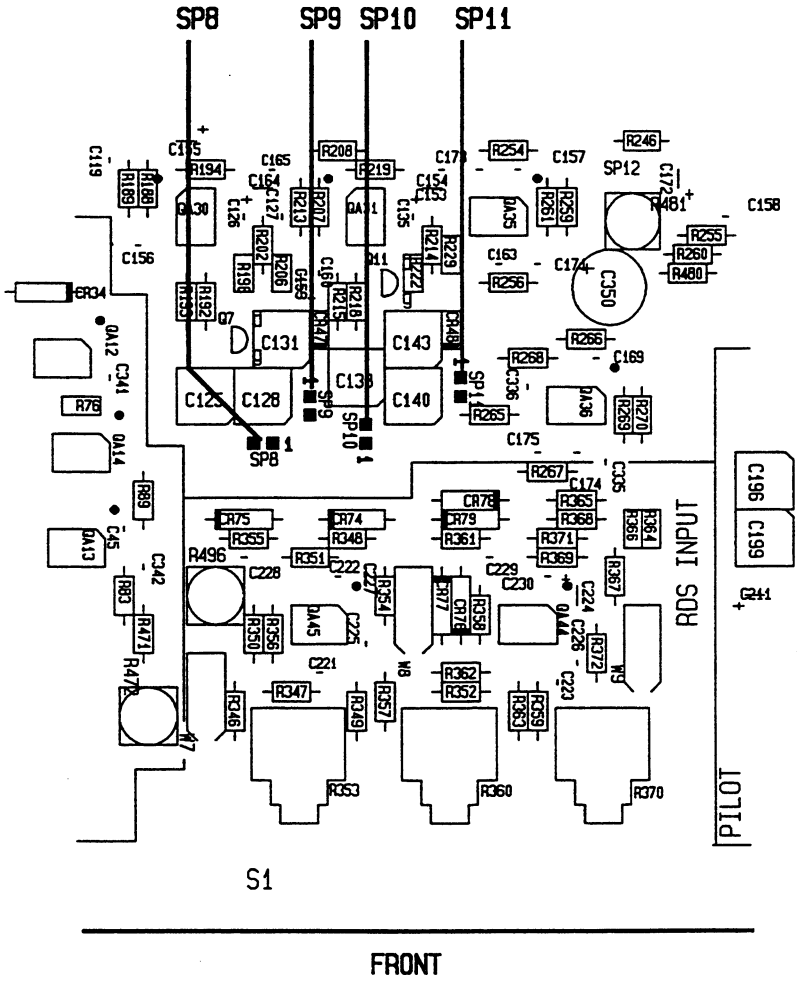

Fig. 2.2 - Selection of Preemphasis

The table on the following page details which solder links to connect in order to select the different preemphasis standards:

Preemphasis Standard	Left	Right
25 μs	SP8, Open SP9, Open	SP10, Open SP11, Open
50 μs	SP8, Short SP9, Open	SP10, Short SP11, Open
75 μs	SP8, Short SP9, Short	SP10, Short SP11, Short

Table 2.2 - Selection of Preemphasis

The default setting from the factory is "50 μs preemphasis selected".

2.5 Selecting the Input Impedance

The RE 524 has been constructed using floating inputs. The inputs may be set to either a low impedance, 600 Ω or a high input impedance, 47 kΩ. The input impedance is set by means of internal solder links, SP1 and SP2.

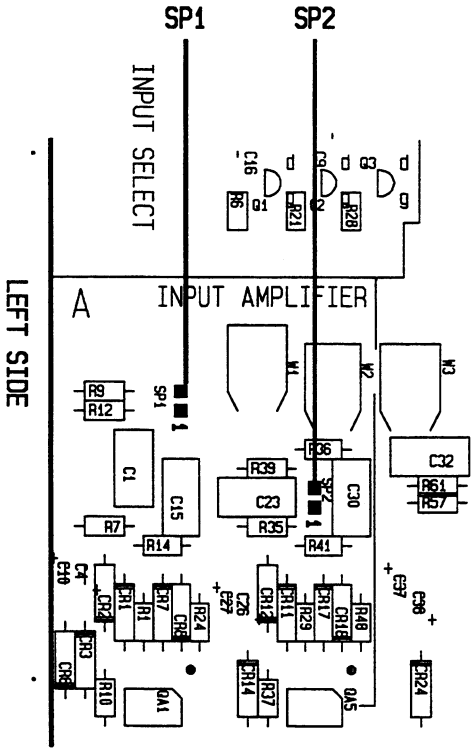

Fig. 2.3 - Selection of Input Impedance

A shorted solder link results in 600 Ω impedance while an open solder link results in 47 kΩ input impedance.

The following table shows the relationship between the solder links and the inputs:

AInput channel	Left	Right
Solder link	SP2	SP1

Table 2.3 - Selection of Input Impedance

The default setting from the factory is "47 kΩ impedance selected".

2.6 Selecting the Mono Source

The RE 524 can output a mono signal instead of the stereo signal when it is switched to mono mode. The mono signal can be generated from three different sources:

Left only
Right only
(L+R)/2

The selection is done by means of solder links SP12 that consists of 4 solder points (see fig. 2.4).

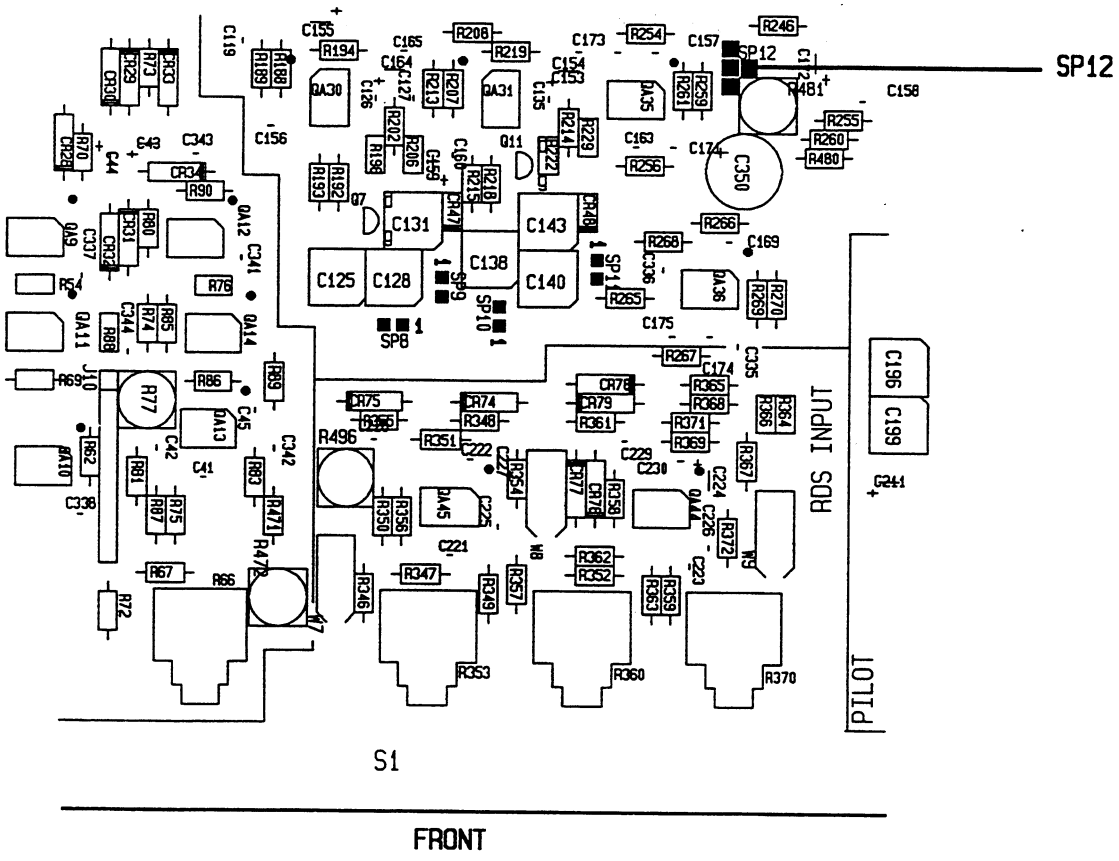

Fig. 2.4 - Selection of Mono Source

The actual relationship between the solder links and the selection is seen from table 2.4:

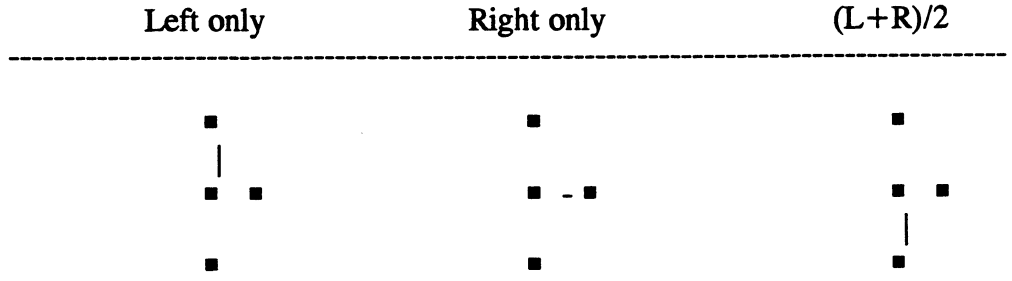

Table 2.4 - Selection of Mono Source

The default setting from the factory is (L+R)/2 only selected".

2.7 Adjusting the Cable Equalizer

The RE 524 is equipped with an equalization circuit that is able to compensate for the loss of stereo separation introduced by connecting the stereo coder to the transmitter via long cables.

The equalization is especially designed for the use of RG-59 cable ranging from 0 to app. 50 m. For convenience, the scale is calibrated in %, as different types of cable require different amounts of compensation. 0% compensation is equal to flat frequency response, while setting the compensation to 100% gives app. 0.25 dB amplification of the MPX signal at high frequencies.

The adjustment of the equalizer is carried out by connecting the cable which is going to be used in the final setup, to the RE 524 and measure the channel separation at the other end of the cable. Please note that the two MPX outputs in RE 524 are equalized seperately. Adjust the compensation through the two holes in the top plate until satisfactory separation is reached throughout the audio range.

2.8 General Environmental Precautions

The RE 524 should be installed in a suitable environment for professional equipment. Due to its 1 U high cabinet it can fit into very tight spaces, only requiring a surrounding temperature of less than 45 °C.

3. FRONT AND REAR PANELS

3.1 Front Panel

This section describes from left to right the controls found on the front of the RE 524 (fig. 3.1 shows the RE 524 Front Panel).

All toggle switches are locked in order to prevent accidental activation. To activate a switch pull the toggle during activation - when released, the toggle locks in place again. All switching takes place under computer control; in order to ensure that the settings are retained following a power fail, the computer stores the switch settings in EEPROM; these settings are then read on power up in order to initialize the coder correctly.

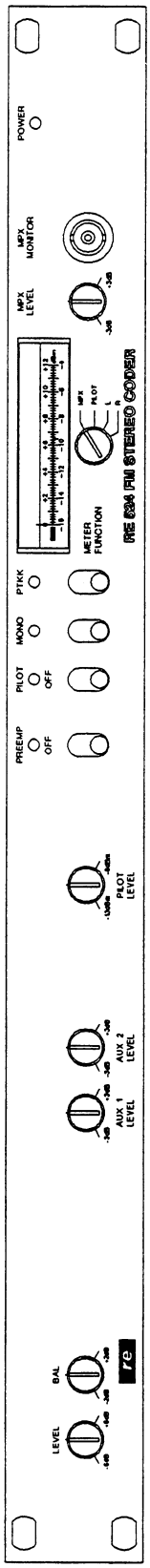

Fig. 3.1 - RE 524 Front Panel

LEVEL

By means of this control the input level may be adjusted ±6 dB.

BAL

By means of this control up to ±2 dB of unbalance at normal level between the L and R input can be corrected.

AUX n LEVEL

By means of these potentiometers the level on the AUX inputs may be adjusted in the range ±3 dB.

PILOT LEVEL

By means of this potentiometer the pilot level may be adjusted between -13 dBu and -6 dBu. The top position gives the standard -9.5 dBu level.

PREEMP OFF

This switch toggles preemphasis on and off. A red LED is used to indicate that preemphasis has been switched off.

PILOT OFF

This switch toggles the Pilot signal on and off. A red LED is used to indicate that the Pilot signal has been switched off.

MONO

This switch is used to switch the RE 524 between Mono and Stereo - a red LED is used to indicate that the RE 524 transmits a mono signal. Switching back to Stereo, the RE 524 will remember the setting of the Pilot on/off switch i.e. reestablishing the correct stereo signal.

PTKK

By means of this switch the radio is put in the special PTKK mode where the mono channel only contains the L/2 signal and the sub channel contains (L-R)/2.

METER FUNCTION

The built-in meter may be used to check four signals:

MPX signal following level adjustment (black scale)
Pilot (red scale)
L input following level adjustment (black scale)
R input following level adjustment (black scale)

MPX LEVEL

By means of this potentiometer the level on the MPX outputs may be adjusted ±3 dB.

MPX MONITOR

The MPX signal may be checked using this BNC output connector.

POWER

A green LED indicating that the RE 524 is powered up.

3.2 Rear Panel

The following connectors are found on the back of RE 524. (the RE 524 Rear Panel is shown in fig. 3.2).

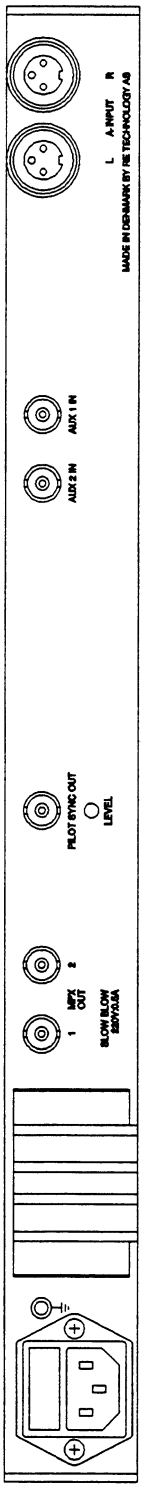

Fig. 3.2 - RE 524 Rear Panel

3.2.1 Inputs

One L/R audio input (A)
Two AUX inputs for RDS/SCA/ARI signals

L/R Input

Connections to the L/R input connectors are shown in fig. 3.3 (seen from rear of instrument)

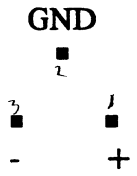

Fig. 3.3 - Connection to L/R Audio Inputs

Nominal input level:	+6 dBu
Input impedance(balanced):	47 kΩ/600 Ω
Connector type:	DIN 41524 female

AUX Inputs

Nominal gain to MPX output:	0 dB
Input impedance:	10 kΩ
Connector type:	BNC female

3.2.2 Outputs

Two MPX outputs
One Pilot Sync output

MPX Outputs

Output limiting level:	> 15 dBu
Output impedance:	< 1 Ω, unbalanced
Connector type:	BNC female
Load	5 nF//75 Ω

PILOT SYNC Output

Output voltage:	0.9 to 1.8 Vpp, square
Connector type:	BNC female

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The modulator is a standard 38 kHz modulator controlled from a 38 kHz square wave signal from the VCXO. This will introduce uneven harmonics of the MPX signal at decreasing levels and the third harmonic is balanced out by means of a 114 kHz modulator whose signal is inverted and added to the MPX-signal.

The MPX signal is fed to a summing point where pilot, SCA/RDS signals and Mono signals can be added or selected, and the combined signal is then passed through a 130 kHz composite filter that removes higher harmonics. Finally the MPX output levels are set and the signal goes through the cable equalizer before it reaches the output connectors MPX1 and MPX2. These two outputs are equipped with high drive capability buffers where the MPX Monitor output has a standard drive capability.

The cable equalizer network is able to compensate limitations in the separation introduced by feeding the exciter through long cables.

The 19 kHz pilot signal is generated by the 4.56 MHz VCXO, and by adding the inverse 3th and 5th harmonic of the pilot we ensure a relatively clean signal. The 7th harmonic is removed by a 133 kHz notch filter and the higher harmonics are removed by the composite filter in the output.

The two AUX signals are passed through individual buffers with level control, then added to the summing point.

All timing signals are generated in the 4.56 MHz VCXO. It generates a 38 kHz normal and inverted signal to the modulator and a 114 kHz normal and inverted signal to the other modulator. Also the pilot frequency and its higher harmonic frequencies are generated in the oscillator. A sync signal is output from the RE 524 for external syncronization.

Finally a built-in meter can be used to monitor the MPX-signal, the pilot signal, or the L or R signal.

4. OPERATION

This section contains a description of the different parts of the RE 524 and how they operate and interact. The description is focused on information which is relevant for setting up and operating the RE 524 and to get a good knowledge of how a stereo coder operates.

4.1 General Description

The RE 524 is constructed on two different printed circuit boards, the main board and the cable equalizer board. The main board by far contains the majority of the electronic circuits. The boards will be discussed in details in section 7, here we do a general description of the principles of operation considering the complete RE 524.

The RE 524 building blocks are shown in the block diagram in fig. 4.1.

The RE 524 is a high performance stereo coder employing several innovative circuits in order to achieve the high specifications. It is controlled by a built-in microcomputer which handles all internal switching based on the inputs from the front panel switches. In order to recover gracefully from power glitches all settings are stored in non volatile memory at the time of power fail.

The analogue input is configured as two identical, balanced inputs protected against over voltages.

After the levels and the balance have been fixed, the signals are passed through a 15 kHz low-pass filter, realized as a 9th order elliptical filter and then through a third order allpass filter for phase equalization ensuring linear phase response to the end of the audio band. If the source signals are band limited already, this filter can be bypassed.

From the LP filter the signals go through the preemphasis circuit, where the time constants can be selected by means of solder links. Preemphasis can be deselected from the front panel.

Before the signals enter the stereo modulator a small amount of reverse crosstalk is added, just enough to cancel the inevitable crosstalk introduced in the composite filter.

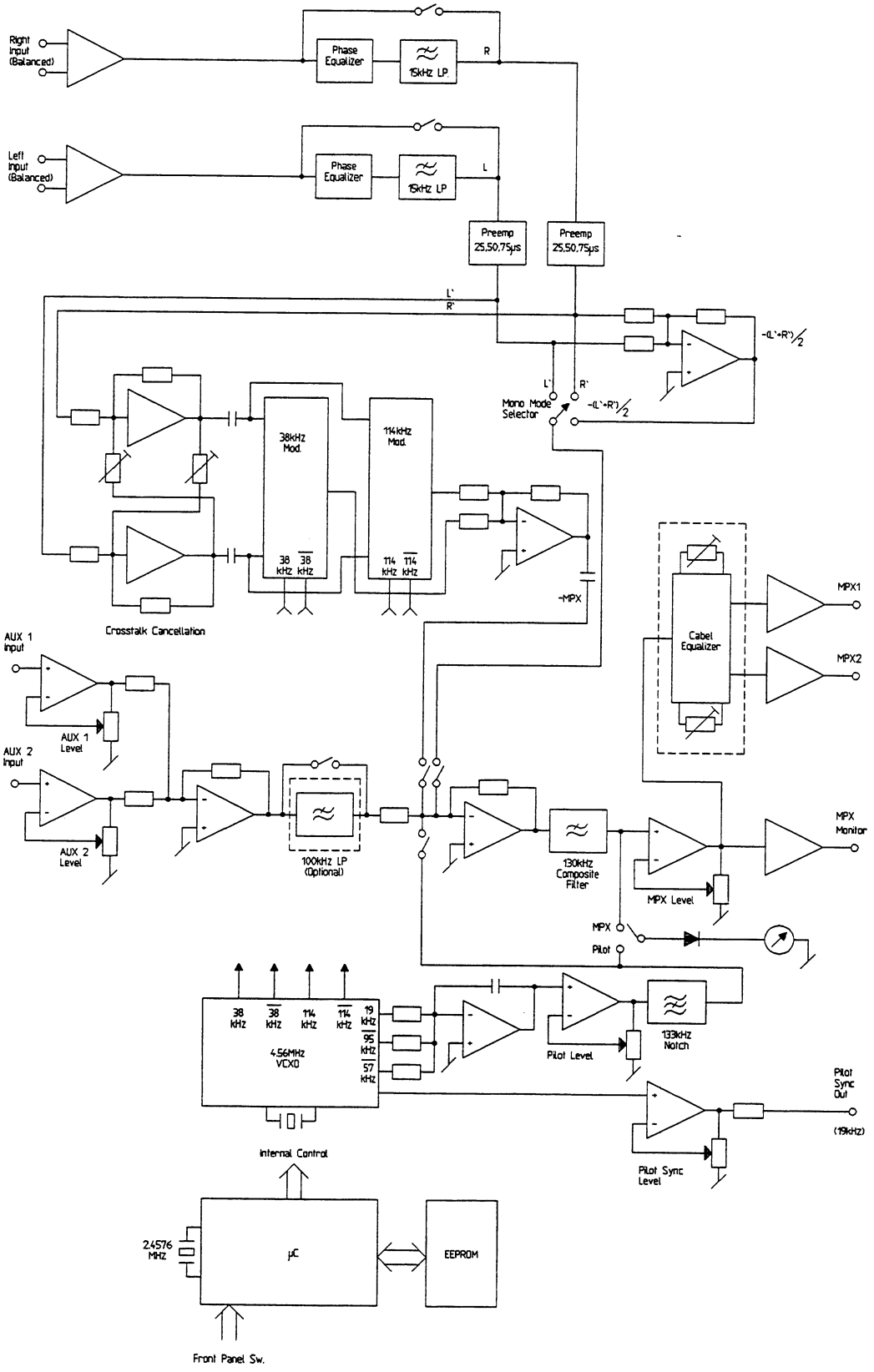

Fig. 4.1 - Block Diagram of RE 524

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5. DISMANTLING

This section describes in details how you gain access to the individual printed circuit boards of the RE 524. Reassembling is not described as it is principally the reverse operation.

CAUTION

Before dismantling the RE 524 it is important that the instrument is disconnected from the AC mains supply. We recommend that you unplug the power cord from the power plug.

The RE 524 is mounted in a chassis frame with a top plate and a bottom plate. Fig 5.1 shows the position of the screws that must be unscrewed in order to remove the top plate.

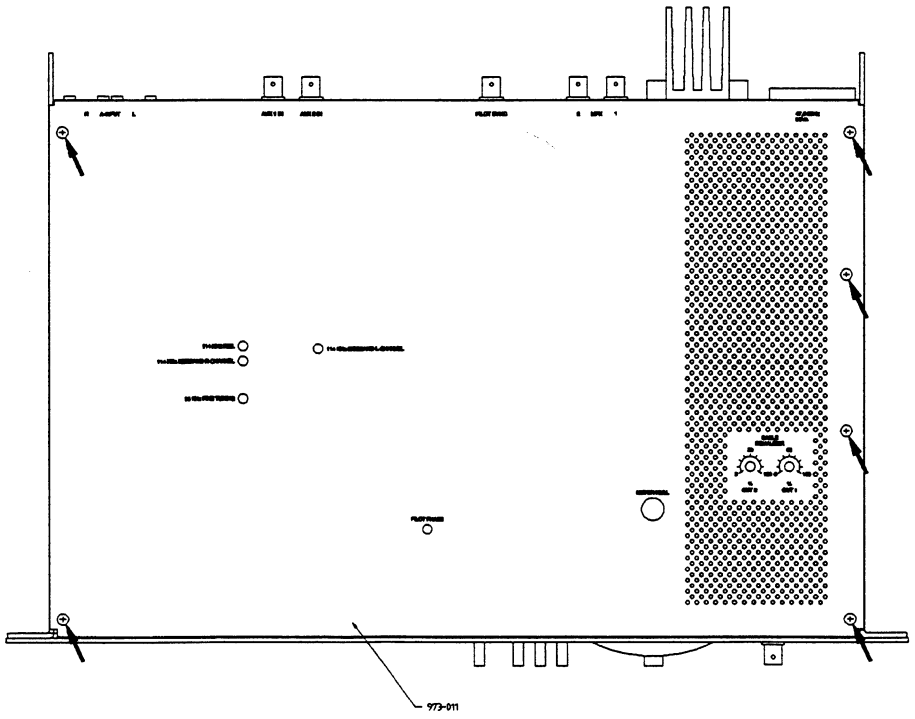

Fig. 5.1 - Position of Screws for Top Plate

From the top it is possible to get access to the main board (902-105) and the cable equalizer board (902-127). Also all adjustment points are accessible from the top.

By removing the bottom plate you get access to the solder side of the main board. Fig. 5.2 shows the position of the screws that must be removed in order to get access.

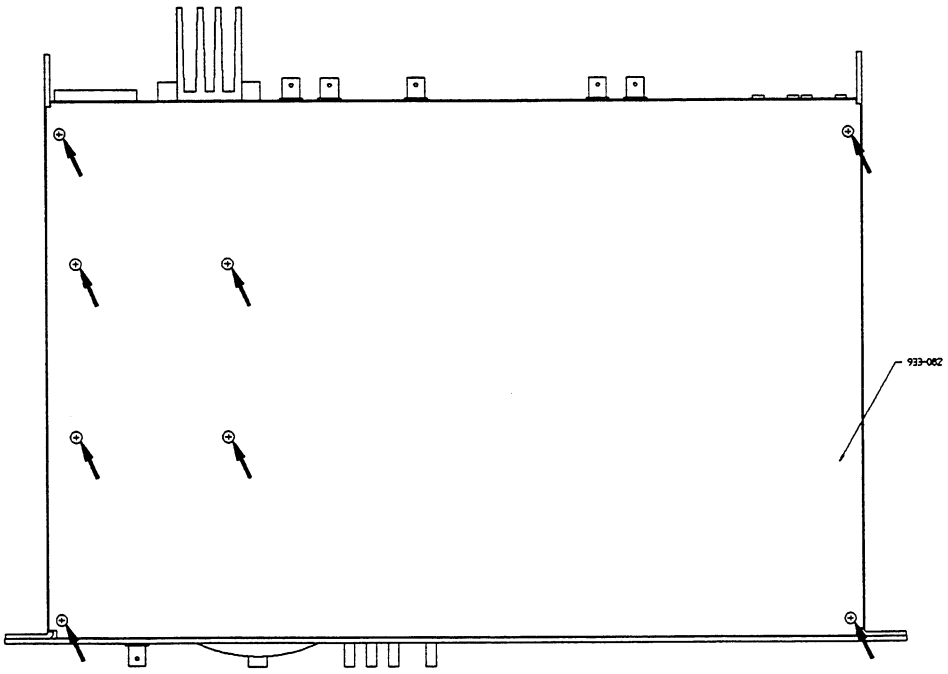

Fig. 5.2 - Position of Screws for Bottom Plate

5.1 Removal of Cable Equalizer Board

The position of the cable equalizer board is shown in fig. 5.3.

You start by removing the screw from the angular holder (933-062). It is then possible to pull the board upwards and free of the RE 524.

When you mount the board again remember to turn the solder side towards the mains transformer.

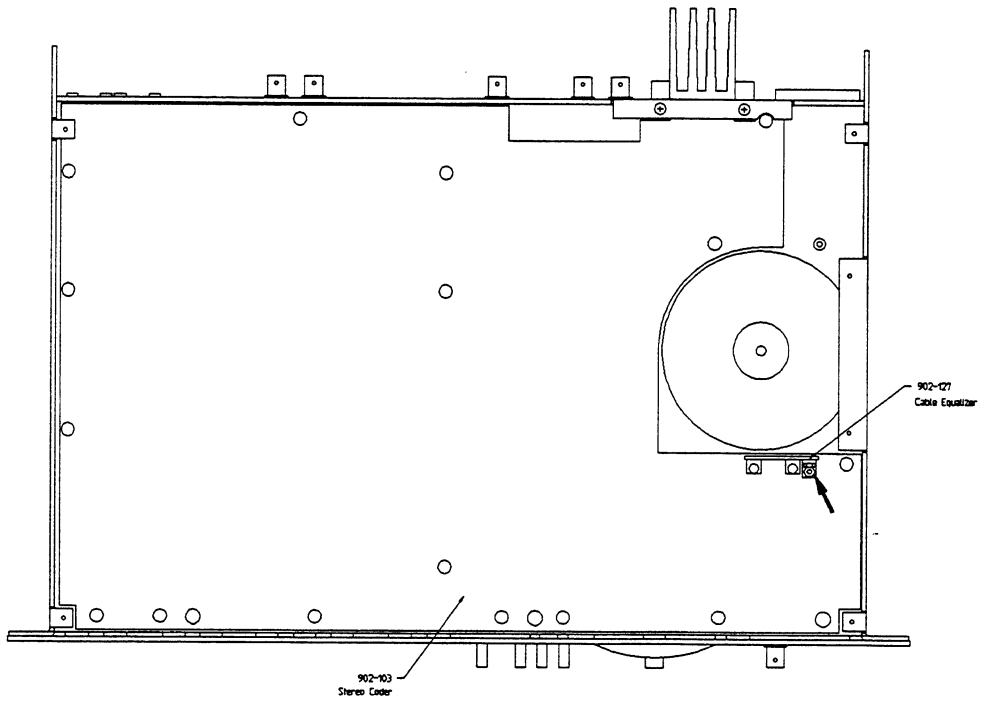

Fig. 5.3 - Location of the Cable Equalizer Board

5.3 Removal of Main Board

We do NOT recommend that you remove the main board from the chassis. All components and solder points are accessible from the top or the bottom so removal should be referred back to the factory.

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6. ADJUSTMENT AND MAINTENANCE

This section describes in details how to adjust and maintain the RE 524. Not all adjustments are advised to be done by the service people in the field.

Before adjustments are initiated the RE 524 must be allowed a warm-up period of at least one hour.

As general test equipment, an oscilloscope, an AF-generator, a precision multimeter and a spectrumanalyzer are needed.

6.1 Test of Power Supply

Before the AC main power is applied please do the following:

Check that all controls on the front panel are in position 0.

Adjust the meter null.

Apply main voltage to the RE 524. The current consumption at 220 V should be app. 140 mA.

Check the following voltages on the main board (Test point TP13 and TP16):

Pin-number	Designation	Measured value
TP13,1	+15 Vout	+15 V ±500 mV
TP13,2	NC	No connection
TP13,3	GND	Ground
TP13,4	-15 Vout	-15 V ±500 mV
Pin-number	**Designation**	**Measured value**
TP16,1	+5 V	+5 V ±200 mV
TP16,2	NC	Ground
TP16,3	GND	Ground
TP16,4	NC	No connection
TP16,5	+15 V	+15 V ±500 mV
TP16,6	-15 V	-15 V ±500 mV

Table 6.1 - Voltages on TP13 and TP16

6.2 Frequency Check

Adjust the VCXO frequency to 4.56000 MHz ±5 Hz on TP17,2 by means of R291. TP17,1 and TP17,3 are grounded.

Check that the frequency on the pilot sync out is 19.000 Hz and check that pilot level can be varied from 0.9 to 1.8 Vpp by means of R293.

6.3 Offset Check

RE 524 is set to the following setting on the front panel:

PREEMP: off
PILOT: off
MONO: off

Keep this setting unless otherwise recommended.

Check that all potentiometers on the front panel are in position 0.

a) Check that the DC voltage on TP18 can be adjusted to <1 mV by means of R426.
b) Check that the DC level on MPX monitor out can be adjusted to <1 mV by means of R437.
c) Check that the DC level on MPX out 1 can be adjusted to <1 mV by means of R408.
d) Check that the DC level on MPX out 2 can be adjusted to <1 mV by means of R424.

6.4 CMRR Check

Connect L and R on the input and apply a 1000 Hz 0 dBu signal.

RE 524 must have the same front panel settings as under point 6.3 with the same shorted inputs and the same 1000 Hz 0 dBu signal applied between the shorted inputs and ground.

Adjust to minimum signal on TP1 (< -60 dBu) by means of R5.

Adjust to minimum signal on TP3 (< -60 dBu) by means of R34.

6.5 Adjustment of 15 kHz Low-Pass Filter

RE 524 must have the same front panel settings as under point 6.3.

Apply the same 20.491 Hz signal to L and R inputs with a level of 0 dBu.

Adjust to minimum signal on TP2 by means of R138.
Adjust to minimum signal on TP4 by means of R186.

Change the frequency to 19.000 Hz at 0 dBu level.

Adjust to minimum signal on TP2 by means of R137.
Adjust to minimum signal on TP4 by means of R185.

6.6 Adjustment of LP Filter Gain

6.6.1 Adjustment of Right Channel Gain

Apply a signal of 1000 Hz 0 dBu to the input. Adjust the level until you measure 0 dBu on TP1 (equal to L=R)

Note down the measured value on TP2.

Apply a signal of 13.000 Hz 0 dB to the input, and adjust the level until you measure 0 dBu on TP1. Adjust the level on TP2 to the earlier noted value by means of R95.

Repeat the last measurement with a signal of 20 Hz. Adjust the level on TP2 to the earlier noted value by means of R98.

6.6.2 Adjustment of Left Channel Gain

Apply a signal of 1000 Hz 0 dBu to the input. Adjust the level until you measure 0 dBu on TP3 (equal to L=R)

Note down the measured value on TP4.

Apply a signal of 13.000 Hz 0 dBu to the input and adjust the level until you measure 0 dBu on TP3. Adjust the level on TP4 to the earlier noted value by means of R143.

Repeat the last measurement with a signal of 20 Hz 0 dBu. Adjust the level on TP4 to the earlier noted value by means of R146.

6.7 Control of 38 kHz Residual

RE 524 must have the same front panel settings as under point 6.3.

Adjust R239 (fine adjustment) and R244 (course adjustment) till minimum 38 kHz spurious (< -58 dBu measured on the MPX output).

6.7.1 Control of 114 kHz Residual

Adjust R243 to minimum 114 kHz spurious (< -54 dBu) on the MPX output.

6.7.2 Control of 133 kHz Residual

Adjust L3 to minimum 133 kHz spurious (< -54 dBu) on the MPX output.

6.7.3 Control of 124 kHz Residual

Apply 10 kHz to L only. Adjust R204 to minimum 124 kHz spurious (< -54 dBu) on the MPX output.

Apply 10 kHz to R only. Adjust R240 to minimum 124 kHz spurious (< -54 dBu) on the MPX output.

6.8 L/R Separation

RE 524 must have the same front panel settings as under point 6.3.

For this measurement an oscilloscope with the capability of 40 dB overdrive without distortion of zero line and a sensitivity of 5 mV/div must be used.

Apply a 1000 Hz signal at 0 dBu to L.

Adjust by means of R209 until maximum channel separation is reached (> 65 dB), i.e. until the "bottom line" of the signal is horizontal - refer to fig. 6.1

Apply a 1000 Hz signal at 0 dBu to R.

Adjust by means of R212 until maximum channel separation is reached (> 65 dB), ie. until the "bottom line" of the signal is horizontal - refer to fig. 6.1

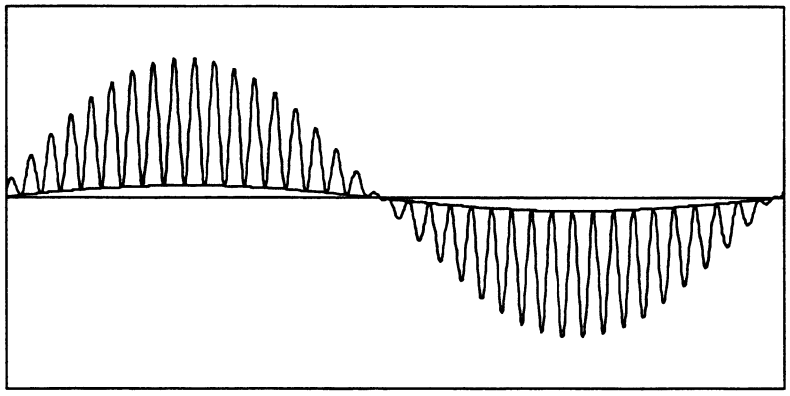


Fig. 6.1 - Adjustment of L/R Separation

6.9 M/S Separation

Apply a 1000 Hz signal at 0 dBu to L and R.

Adjust the sideband at 39 kHz to minimum by means of R470.

Reverse the phase of the signal in R and apply a 3 kHz 0 dBu signal.

Adjust the sideband at 10 kHz to minimum by means of R497.

6.10 MPX Level

RE 524 must have the same front panel settings as under point 6.3.

Apply a 1000 Hz signal at 0 dBu to L and R.

Adjust R500 until MPX1 and MPX2 outputs are at 0 dBu.

Select the following settings on the front panel:

PREEMP: off
PILOT: off
MONO: on

Apply a 1000 Hz signal at 0 dBu to L and R.

Adjust R481 until MPX monitor output is 0 dBu.

6.11 Pilot Level

RE 524 is set to the following settings from the front panel:

PREEMP: off
PILOT: on
MONO: off

Adjust R276 until MPX monitor output is -9.5 dBu (19 kHz).

6.12 Meter Circuit

RE 524 must have the same front panel settings as under point 6.3.

Apply a 1000 Hz signal at 0 dBu to L and R.

Check that MPX monitor output is at 0 dBu level.

Adjust till the meter reads 0 dBu by means of R387.

Increase level to +12 dBu on the MPX monitor output.

Select meter function MPX.

Adjust till the meter reads +12 dBu by means of R393.

6.12.1 Pilot Meter Circuit

Turn "Pilot" on.

Select the meter function "Pilot".

Adjust to -9.5 dBu on the meter by means of R499.

6.13 Distortion

RE 524 must have the same front panel settings as under point 6.3.

Apply a 1000 Hz signal at 6 dBu to L and R.

Check that THD on MPX monitor output is < -70 dB.

6.13.1 Mono

RE 524 is set to the following settings from the front panel:

PREEMP: off
PILOT: off
MONO: on

Apply a 1000 Hz signal at 6 dBu to L and R.

Check that THD on MPX monitor output is < -80 dB.

6.14 Pilot Phase Adjustment

RE 524 is set to the following settings from the front panel:

PREEMP: off
PILOT: on
MONO: off

Apply 400 Hz, 0.4 Vpp to the L and R inputs.

By means of R324 adjust to minimum difference between the waveform above and below the zero line and symmetrical zero crossings on an oscilloscope. See fig. 6.2

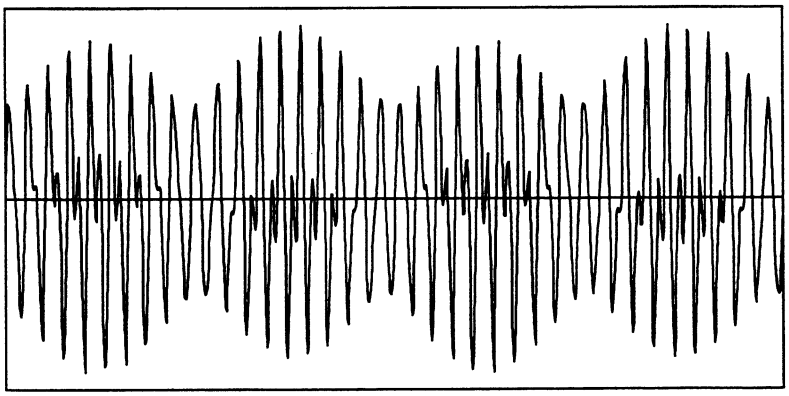


Fig. 6.2 - Pilot Phase Adjustment

7. TECHNICAL DESCRIPTION OF MAIN BOARD

This section contains a technical description of the various circuits that make up the RE 524 FM Stereo Coder Main Board. Each circuit is described separately followed by a circuit diagram and a component location overview. At the end of this section a complete parts list is included.

7.1 Input Amplifiers

The RE 524 is provided with a stereo audio input containing a Left and Right input plug. The following circuit description only covers one of the two identical circuits, (the Right input amplifier) The circuits are shown on the diagram in section 7.1.2.

7.1.1 Circuit Description

The balanced input W1 can have either a 600 Ω input impedance or a 47 kΩ input impedance. This is selected by means of solder link SP1. A closed link will connect resistor R9 (604 Ω) across the input giving the wanted 600 Ω input impedance.

The network R4, R20, C4, C10, CR3 and CR6 established a ±9 V supply from the standard ±15 V supply. Through the diodes CR1, CR2, CR7 and CR8 this supply is used to protect the input amplifier against overvoltages.

A standard instrumentation amplifier is formed by QA1, QA4 and QA2A making the balanced signal into a single ended signal. R5 is used to fine adjust the CMRR and R470 is used to outbalance the small variations between Left and Right channel.

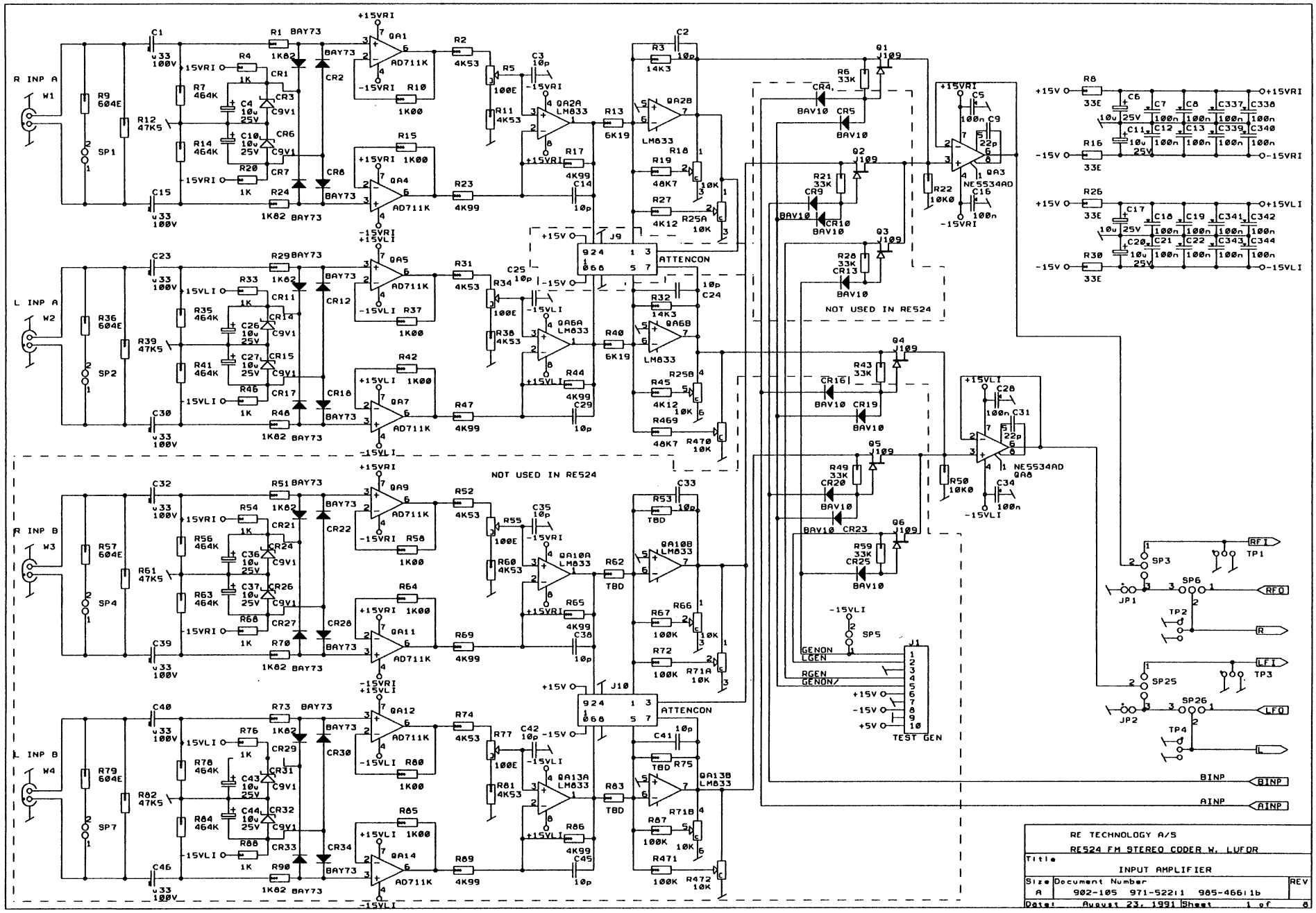
R13 establishes the actual gain of the input amplifier.

R18 is used from the front plate to adjust the balance between L and R and R25 is likewise used to adjust the total level ±6 dB from the front plate.

Finally the signal passes through a buffer made by QA3 to the input filter. The links SP3, SP6, TP1, TP2 and JP1 can be used to bypass this filter (see section 2, Installation).

7.1.2 Schematic Diagrams

The schematic diagram for the input amplifiers is located on the following page. The diagram number is 985-466 Sheet 1.


R INP A
L INP A
R INP B
L INP B
NOT USED IN RE524
NOT USED IN RE524
ATTENCON
ATTENCON
TEST GEN
RE TECHNOLOGY A/S
RE524 FM STEREO CODER W. LUFOR
INPUT AMPLIFIER
902-105 971-52211 985-46611b
August 23, 1991

7.1.3 Component Locations

The component locations on the main board for the input amplifiers are shown on the following page.

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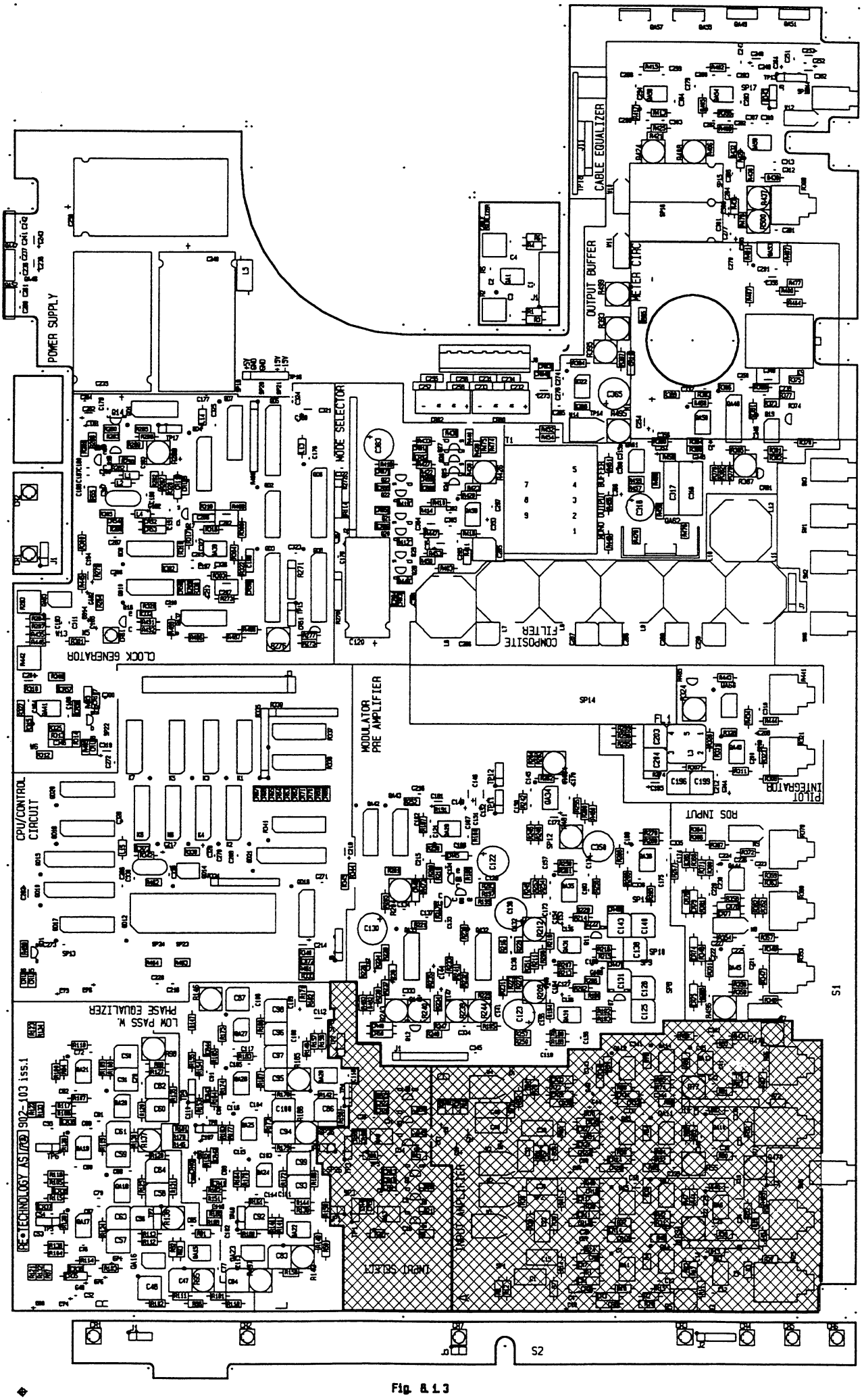
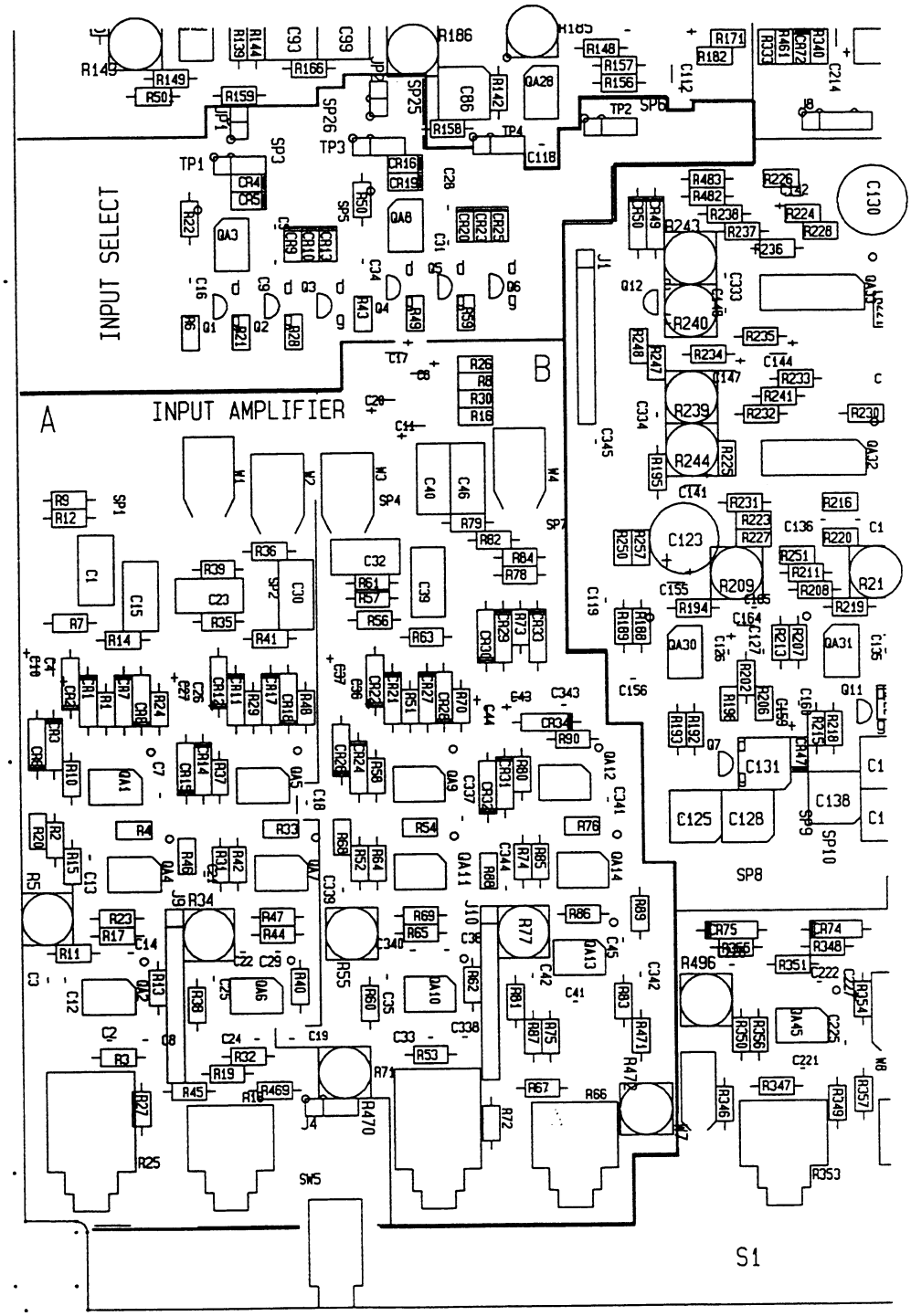

POWER SUPPLY
CABLE EQUALIZER
OUTPUT BUFFER
METER CIRC
MODE SELECTOR
COMPOSITE FILTER
CLOCK GENERATOR
MODULATOR PRE AMPLIFIER
PILOT INTEGRATOR
ROS INPUT
CPU/CONTROL CIRCUIT
LOW PASS & PHASE EQUALIZER
902-103 iss.1
S1
S2

Fig. 8.1.3


INPUT SELECT
A
INPUT AMPLIFIER
B
S1

7.2 15 kHz Low-Pass Filter with Phase Equalization

The purpose of the input filter is to attenuate any signal above 15 kHz. The filter is a 9th order elliptical low-pass filter with a ripple of 0.03 dB which attenuates 60 dB above 19 kHz and 65 dB at 19 kHz. The filter has been implemented using FDNRs (Frequency Dependent Negative Resistances) in order to eliminate problems related to conventional inductors, such as large size, low Q, non-linearity, etc. The diagram shows both left and right channel, but the description will only cover the right channel. The circuits are shown on the diagram in section 7.1.2.

7.2.1 Circuit Description

Before the input filter you will find a 2nd order allpass filter formed by QA15 and QA16. Together with a 1st order allpass filter in the output, formed by QA21 they constitute a 3th order allpass filter used to compensate for the phase variations of the input filter. The left channel has a slight variation of the allpass filter as R497 is used to outbalance small variations in the phase between the two channels.

Gain at low frequencies is adjusted by means of R98 and for the high end by R95. The two zeros nearest to the cut-off frequency (15 kHz) are also corrected by R137 and R138. The gain in the filter should be unity in the frequency band 20 Hz to 15 kHz measured between RFI and RFO.

The actual 9th order elliptical low-pass filter is realized with QA17-QA20 as the active elements.

The diodes CR36-CR39 in conjunction with the zener diode CR35 are included to protect against latch-up during power up.

7.2.2 Schematic Diagrams

The schematic diagram for the low-pass filter is located on the following page. The diagram number is 985-466 Sheet 2.

SECTION 7 _____ TECHNICAL DESCRIPTION OF PRINT/MODULES

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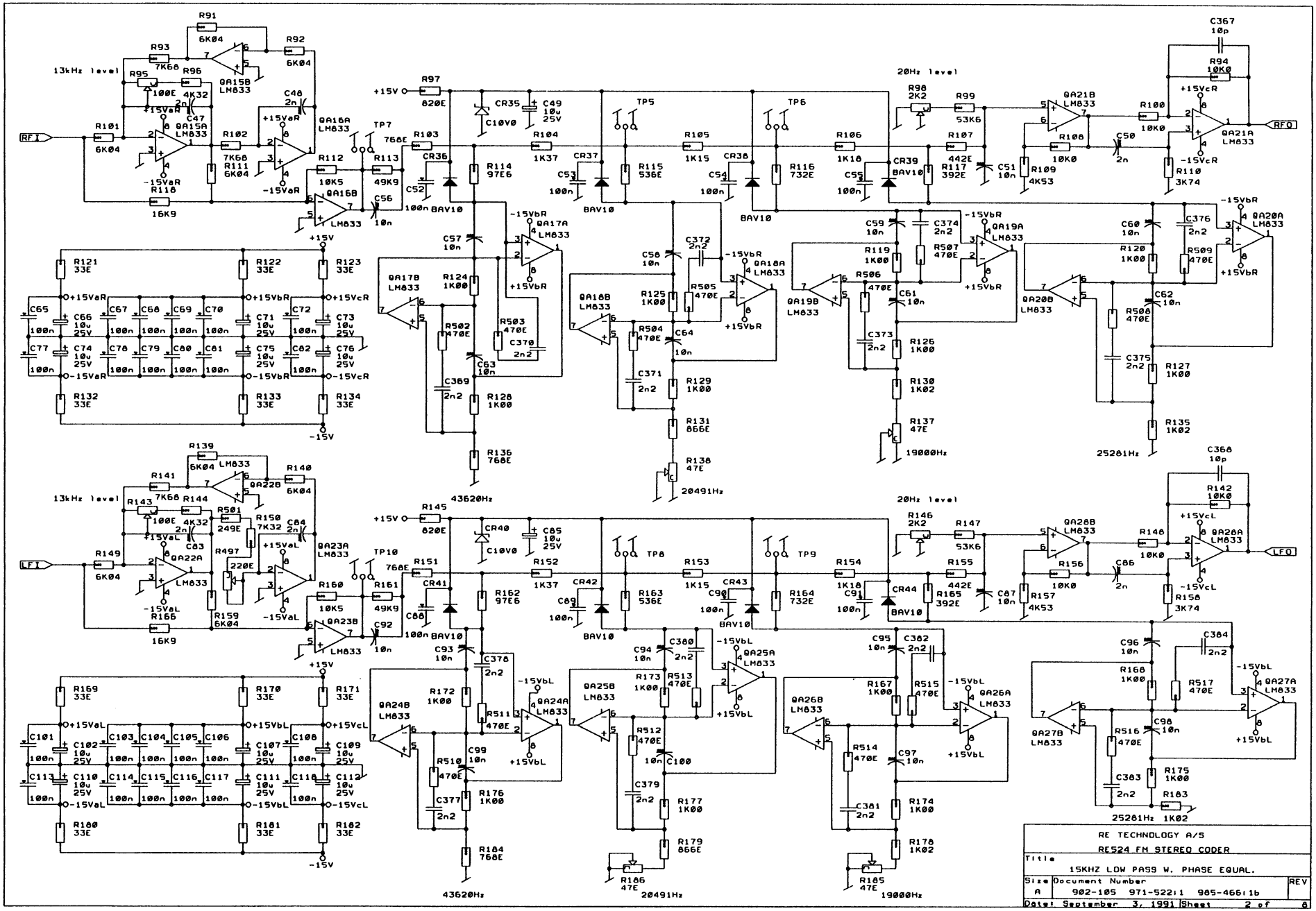
RFI
LFI
RFO
LFO
13kHz level
20Hz level
+15V
-15V
+15VaR
-15VaR
+15VbR
-15VbR
+15VcR
+15VaL
-15VaL
+15VbL
-15VbL
+15VcL
R91 6K04
R92 6K04
R93 7K68
R95 100E
R96 4K32
C47 2n
C48 2n
R101 6K04
R102 7K68
R111 6K04
R110 3K74
R118 16K9
R112 10K5
R113 49K9
C56 10n
R97 820E
C10V0
C49 10u 25V
R104 1K37
R105 1K15
R106 1K18
R98 2K2
R99 53K6
R107 442E
R117 392E
C51 10n
R108 10K0
R109 4K53
C50 2n
R100 10K0
R94 10K0
C367 10p
R114 97E6
R115 536E
R116 732E
C52 100n
C53 100n
C54 100n
C55 100n
BAV10
C57 10n
C58 10n
C59 10n
C60 10n
C61 10n
C62 10n
C63 10n
C64 10n
R119 1K00
R120 1K00
R124 1K00
R125 1K00
R126 1K00
R127 1K00
R128 1K00
R129 1K00
R130 1K02
R131 866E
R135 1K02
R136 768E
R137 47E
R138 47E
C369 2n2
C370 2n2
C371 2n2
C372 2n2
C373 2n2
C374 2n2
C375 2n2
C376 2n2
R502 470E
R503 470E
R504 470E
R505 470E
R506 470E
R507 470E
R508 470E
R509 470E
43620Hz
20491Hz
19000Hz
25281Hz
C121 33E
C122 33E
C123 33E
C132 33E
C133 33E
C134 33E
C65 100n
C66 10u 25V
C67 100n
C68 100n
C69 100n
C70 100n
C71 10u 25V
C72 100n
C73 10u 25V
C74 10u 25V
C75 10u 25V
C76 10u 25V
C77 100n
C78 100n
C79 100n
C80 100n
C81 100n
C82 100n
R139 6K04
R140 6K04
R141 7K68
R143 100E
R144 4K32
C83 2n
C84 2n
R501 249E
R150 7K32
R497 220E
R159 6K04
R160 10K5
R161 49K9
C92 10n
R145 820E
C10V0
C85 10u 25V
R152 1K37
R153 1K15
R154 1K18
R146 2K2
R147 53K6
R155 442E
R165 392E
C87 10n
R156 10K0
R157 4K53
C86 2n
R148 10K0
R142 10K0
C368 10p
R162 97E6
R163 536E
R164 732E
C88 100n
C89 100n
C90 100n
C91 100n
BAV10
C93 10n
C94 10n
C95 10n
C96 10n
C97 10n
C98 10n
C99 10n
C100 10n
R166 1K00
R167 1K00
R168 1K00
R169 1K00
R170 1K02
R171 866E
R172 1K00
R173 1K00
R174 1K00
R175 1K00
R176 1K00
R177 1K00
R178 1K02
R179 866E
R183 1K02
R184 768E
R185 47E
R186 47E
C377 2n2
C378 2n2
C379 2n2
C380 2n2
C381 2n2
C382 2n2
C383 2n2
C384 2n2
R511 470E
R512 470E
R513 470E
R514 470E
R515 470E
R516 470E
R517 470E
R518 470E
C101 100n
C102 10u 25V
C103 100n
C104 100n
C105 100n
C106 100n
C107 10u 25V
C108 100n
C109 10u 25V
C110 10u 25V
C111 10u 25V
C112 10u 25V
C113 100n
C114 100n
C115 100n
C116 100n
C117 100n
C118 100n
R180 33E
R181 33E
R182 33E
TP5
TP6
TP7
TP8
TP9
TP10
RE TECHNOLOGY A/S
RE524 FM STEREO CODER
Title
15KHZ LOW PASS W. PHASE EQUAL.
Size A
Document Number 902-105 971-52211 985-46611b
REV
Date: September 3, 1991
Sheet 2 of 6

7.2.3 Component Locations

The component locations on the main board for the input amplifiers are shown on the following page.

SECTION 7 _____ TECHNICAL DESCRIPTION OF PRINT/MODULES

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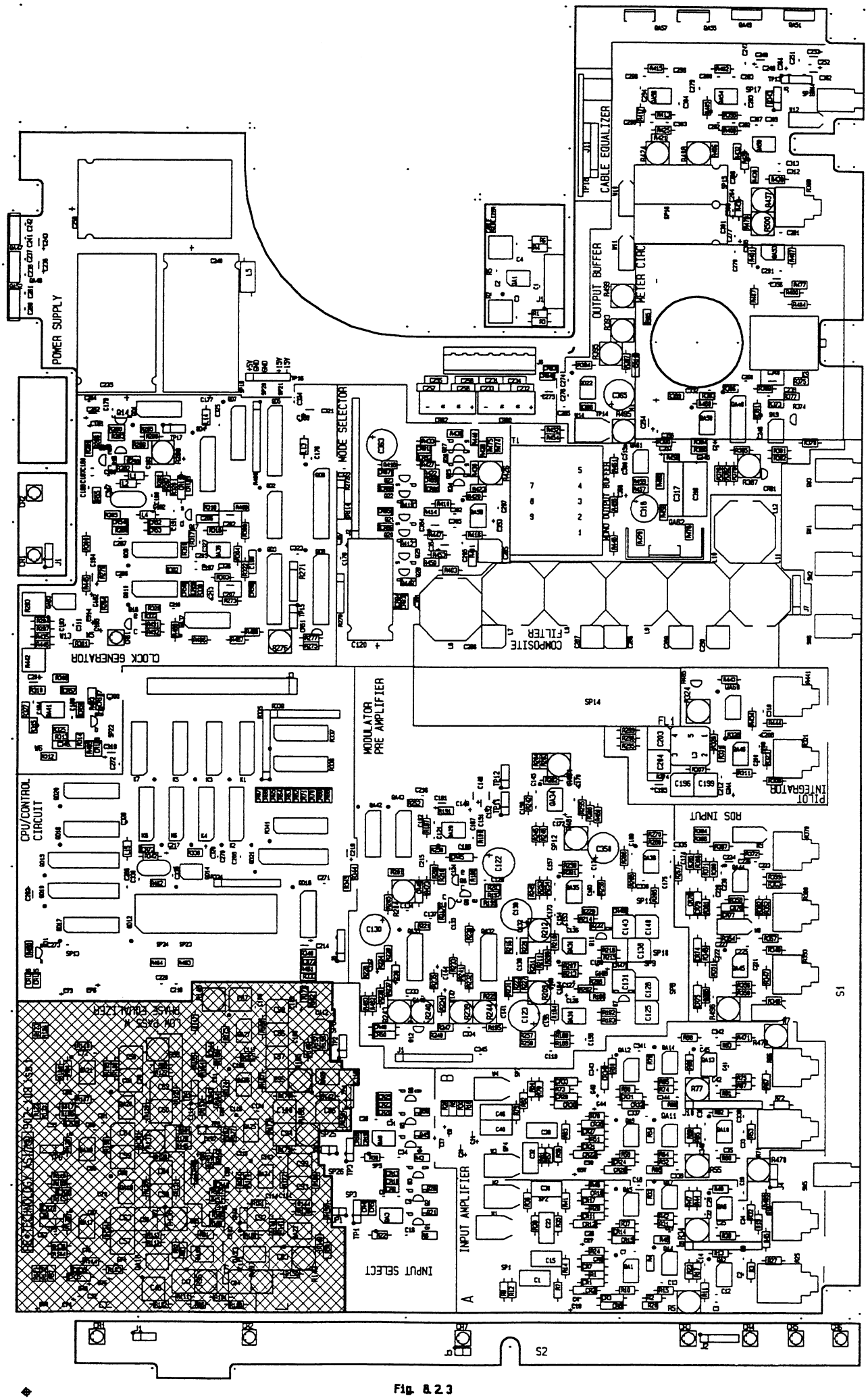

POWER SUPPLY
CABLE EQUALIZER
OUTPUT BUFFER
METER CIRC.
MODE SELECTOR
COMPOSITE FILTER
CLOCK GENERATOR
MODULATOR PRE AMPLIFIER
PILOT INTEGRATOR
RDS INPUT
CPU/CONTROL CIRCUIT
INPUT SELECT
INPUT AMPLIFIER
S1
S2

Fig. 8.2.3

RE°TECHNOLOGY AS RE 902-103 iss.1
LOW PASS W.
PHASE EQUALIZER

7.3 Preemphasis, Modulators and Mono Signals

Following the input filter, the signal passes through a preemphasis circuit that sets the appropriate time constant and then enters into the modulator. The output is the final multiplexed baseband signal but without the pilot tone added. This diagram also shows the circuits that generate the mono signal (L+R)/2 for the mono mode. The detailed circuit description covers both left and right channel. The circuits are shown on the diagram in section 7.3.2.

7.3.1 Circuit Description

QA30A and QA31A form the active elements of the preemphasis circuit and by means of solder links SP8 and SP9 (SP10 and SP11) various time constants can be selected. Through the FET-switches Q7 and Q11 the microcomputer can switch the preemphasis off completely on command from the front panel switch.

Before the signals are fed to the modulator a small amount of reverse crosstalk is introduced to compensate for the crosstalk generated in the composite filter. The circuit is formed around QA30B and QA31B and the resulting crosstalk can be eliminated by adjusting R209 and R212.

The composite signal is generated by an integrated balanced switch modulator, operating at 38 kHz (QA32). The sidebands at the third harmonic of 38 kHz, i.e. 114 kHz, are balanced out by a signal from a 114 kHz modulator (QA33) similar to and synchronized to the 38 kHz modulator. Both modulators consist of two dual-transistors having individual current sources.

The L and R signals are connected to each half of the modulators. The current from each current source will alternately pass through the first and the second half of that dual-transistor to which it is connected, as the bases of the two dual-transistors are fed with complementary square wave voltages with an amplitude of approx. 500 mV.

Due to this, the current through R210 (the output of the 38 kHz modulator QA32) in the first half period of the 38 kHz equals the current of the current generator connected to the L signal while the current in the second half period of the 38 kHz equals the current from the current generator connected to the R signal. As the DC current from the two current generators are equal - adjusted by R233 - the DC current through R210 will be constant, thus providing suppression of the 38 kHz signal from the modulator.

The 114 kHz modulator operates in a similar way.

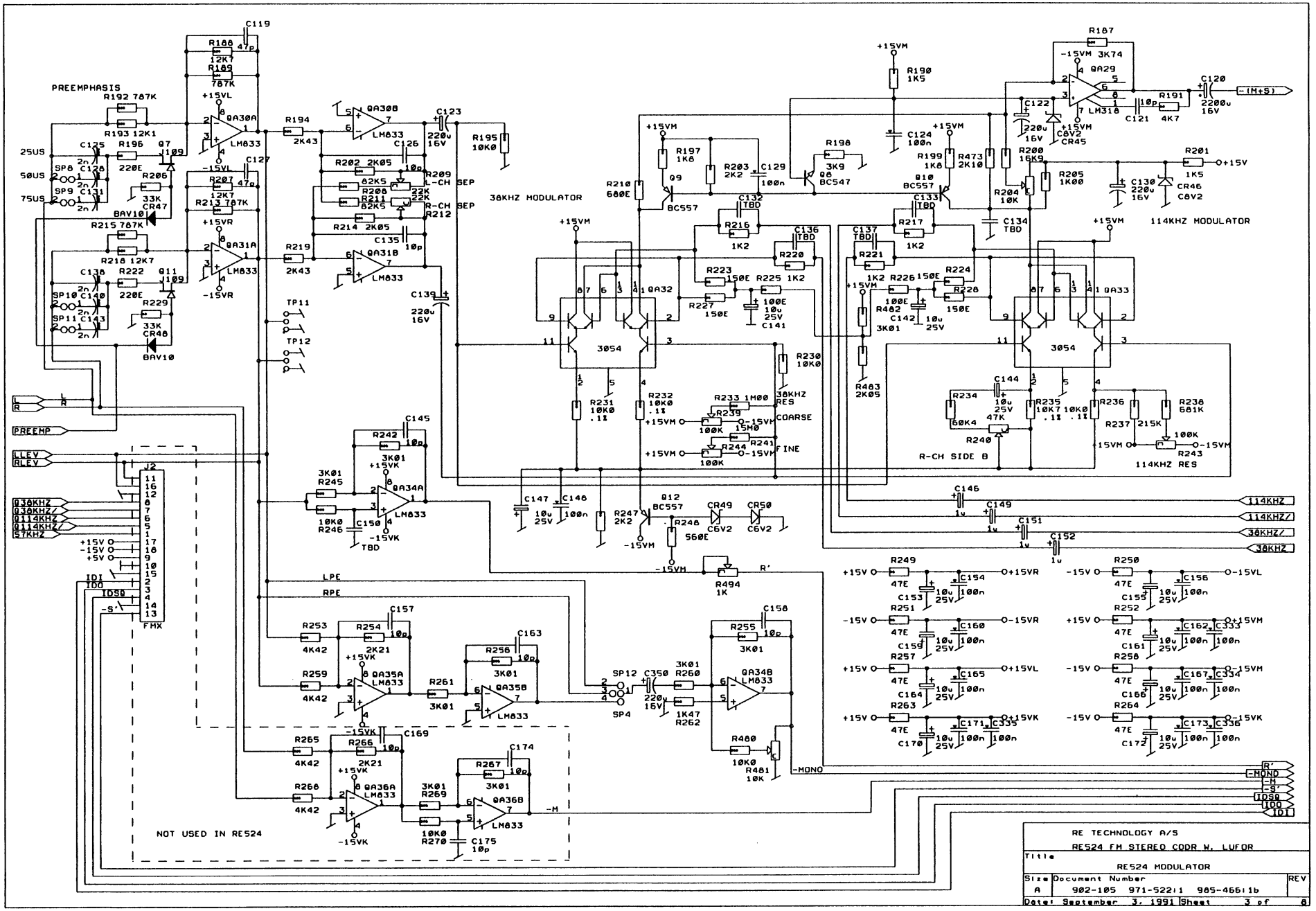
The currents from the two modulators are fed to the summing amplifier QA29. Because the current from the 114 kHz modulator is 3 times less than the current from the 38 kHz modulator, the sidebands in the vicinity of 114 kHz will be compensated.

Adjustment of the L signal current is made by R204, R signal current by R243. C136/C137 provide the correct phasing of the current from the 114 kHz modulator.

The signal for mono mode is generated by adding the two channels before the modulator in order to get the best possible signal to noise ratio. This happens in QA35A and B. The resulting signal, (R+L)/2 is fed to the buffer QA34B through a solder link SP12 where the mono signal can be selected to be either R, L or (R+L)/2.

7.3.2 Schematic Diagrams

The schematic diagram for the modulator is located on the following page. The diagram number is 985-466 Sheet 3.


PREEMPHASIS
25US
50US
75US
30KHZ MODULATOR
114KHZ MODULATOR
R-CH SIDE B
114KHZ RES
NOT USED IN RE524
PREEMP
LLEV
RLEV
LPE
RPE
-MONO
-M
-S'
IDS0
IDO
IDI
114KHZ
114KHZ/
30KHZ/
30KHZ
FMX
RE TECHNOLOGY A/S
RE524 FM STEREO CODR W. LUFOR
RE524 MODULATOR
Size A
Document Number 902-105 971-52211 985-46611b
REV
Date: September 3, 1991 Sheet 3 of 8

7.3.3 Component Locations

The component locations on the main board for the input amplifiers are shown on the following page.

SECTION 7 _____ TECHNICAL DESCRIPTION OF PRINT/MODULES

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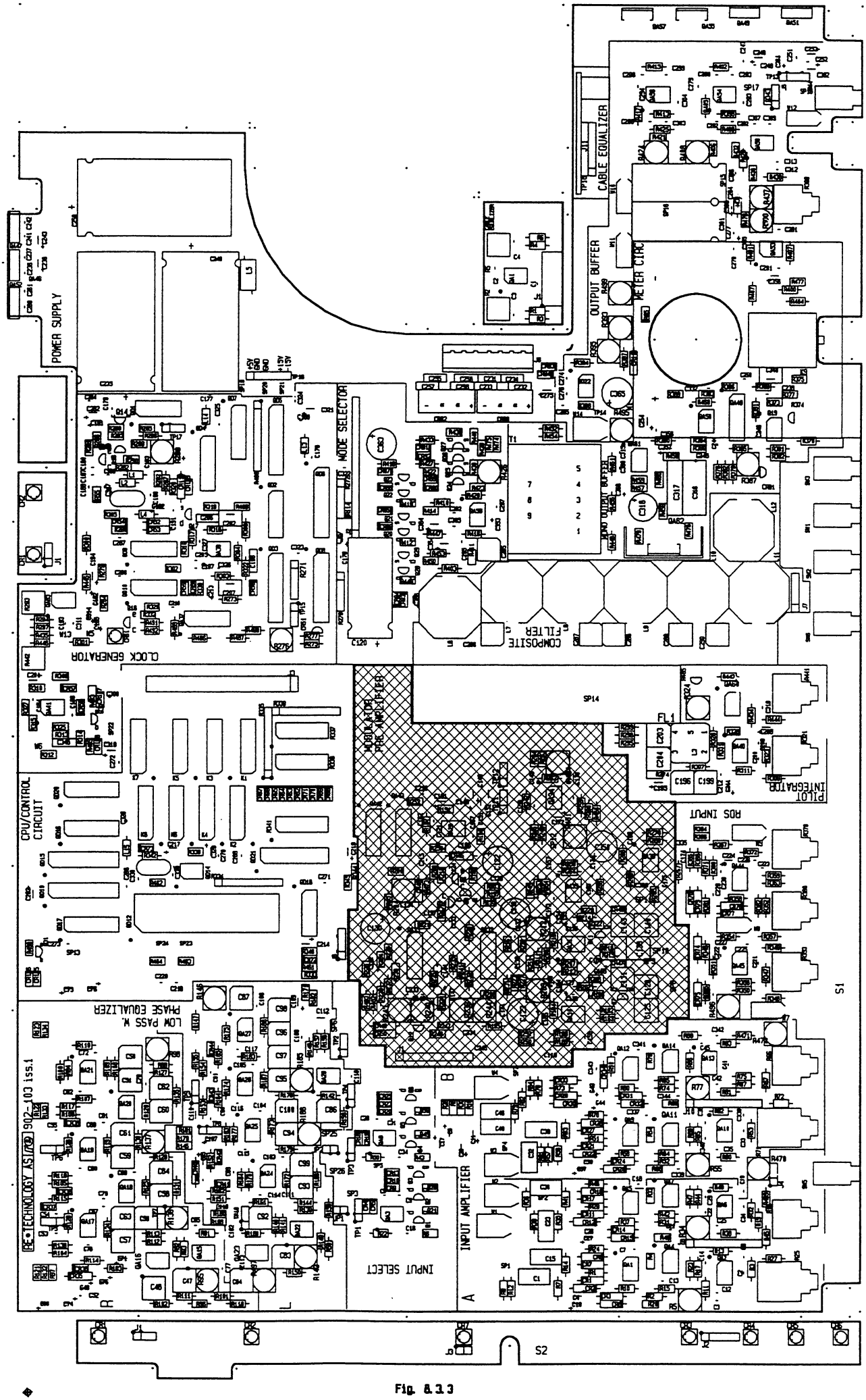
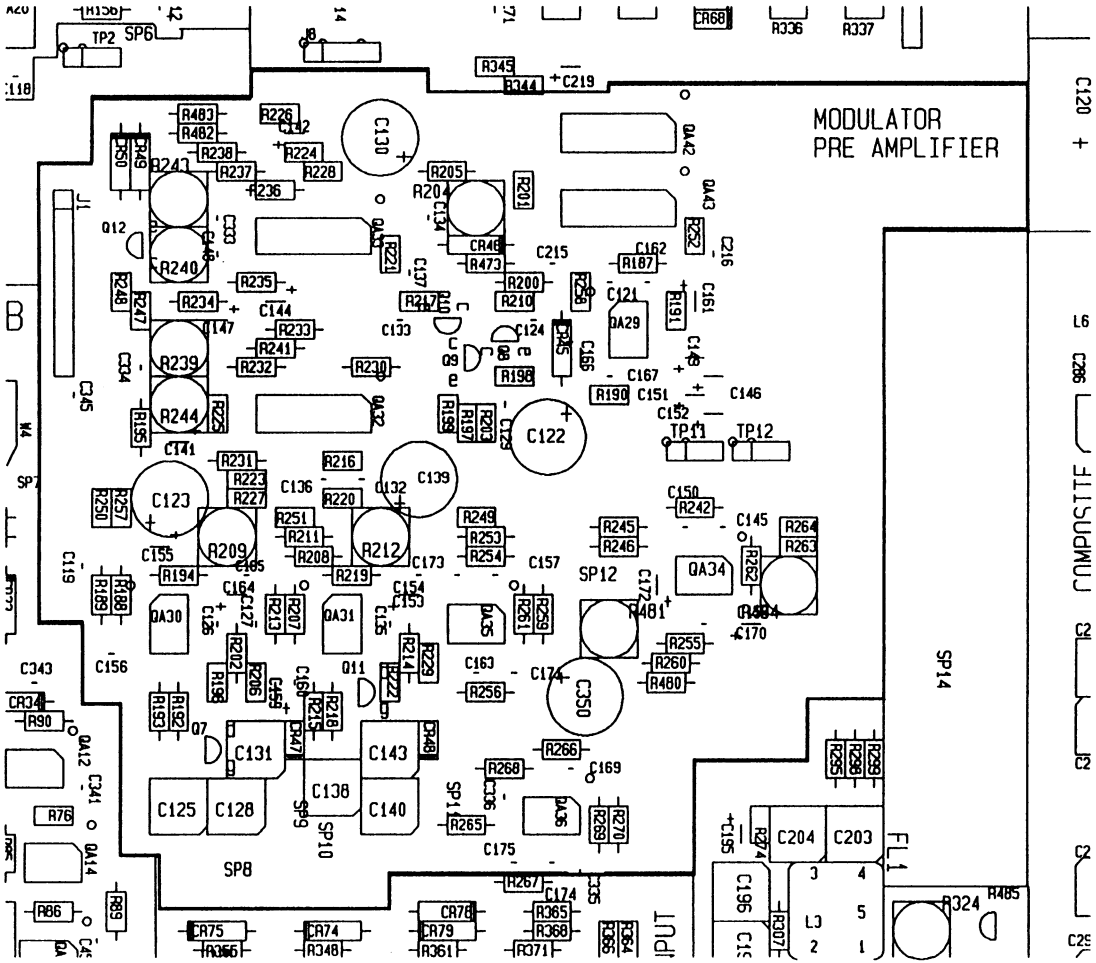

POWER SUPPLY
CABLE EQUALIZER
OUTPUT BUFFER
METER CIRC
MODE SELECTOR
COMPOSITE FILTER
CLOCK GENERATOR
MODULATOR PRE AMPLIFIER
PILOT INTEGRATOR
ROS INPUT
CPU/CONTROL CIRCUIT
LOW PASS & PHASE EQUALIZER
INPUT SELECT
INPUT AMPLIFIER
S1
S2

Fig. 8.3.3


MODULATOR
PRE AMPLIFIER
TP2
SP6
TP11
TP12
SP12
SP14
SP8
SP9
SP10
FL1
J1
C130
C122
C123
C139
C131
C143
C138
C140
C125
C128
C350
C204
C203
C196
R209
R212
R241
R240
R239
R244
R481
QA34
QA29
QA30
QA31
QA36
Q7
Q11
Q12
CR68
R336
R337
R345
R344
C219
C120
C286
C2

7.4 Clock Generator/Sync

In order to generate the internal timing and pilot signals, RE 524 is equipped with a clock generator built around a 4.56 MHz VCXO. This VCXO is used to derive the 19 kHz pilot signal and the frequencies of two higher uneven harmonics of the pilot tone. These frequencies are then used to outbalance the harmonics by adding the inverse signal at a proper lower level. The circuits are shown on the diagram in section 7.4.2.

7.4.1 Circuit Description

The digital circuitry generating the driver signals for the modulators and the pilot generator comprises a X-tal oscillator (VCXO) built around Q15 and Q16. The frequency is determined by a crystal Y1 (4.56 MHz) coupled with a capacitance diode CR55. When the oscillator is free running there is 0 V on the cathode of CR55 and the other end is fed a negative voltage from R291. This trimmer is used to adjust the frequency. The signal, buffered by Q14, is fed to a NAND gate with schmitt-trigger input which in turn feeds the frequency to the 8-bit counters QD4 and QD7. The counters, counting a cycle of 240 (4.56 MHz ÷ 240 = 19 kHz), addresses a PROM (QD5) which outputs the actual timing signals with the correct phase relationship, and finally passed through two latches/buffers (QD3/QD8) that are clocked from the 4.56 MHz clock thereby eliminating variations in the access time of different PROMs.

The outputs of QD8 are used for the pilot signal generation and the pilot sync output. A 19 kHz signal from the clock generator (QD5, pin 9), is fed to the pilot integrator QA40A, together with a 57 kHz (QD5, pin 8) and a 95 kHz (QD5, pin 7). The phase relationship and the current level, set by R295/R298/R299, are such, that the 3rd and 5th harmonics of the 19 kHz square wave are compensated (eliminated). Only harmonics of 7th and 9th order and upwards are present in the output of the pilot integrator. The phase of the pilot signal relative to the 38 kHz subcarrier is adjusted by changing the time constant of the pilot integrator by means of R324 (through a hole in the top plate).

The 7th harmonic, 133 kHz is eliminated by a 133 kHz notch filter which is a parallel resonance circuit (L3/C203/C204). The 7th harmonic is thus attenuated approx. 20 dB. The remaining harmonic components are attenuated by the composite filter. The resulting pilot at the composite output has a THD of approx. 0.1%.

Following the pilot integrator and the 133 kHz trap, the signal is routed to the pilot level adjustment circuit for use in the composite output signal as well as to the meter circuit for level measurement (see sheet 6).

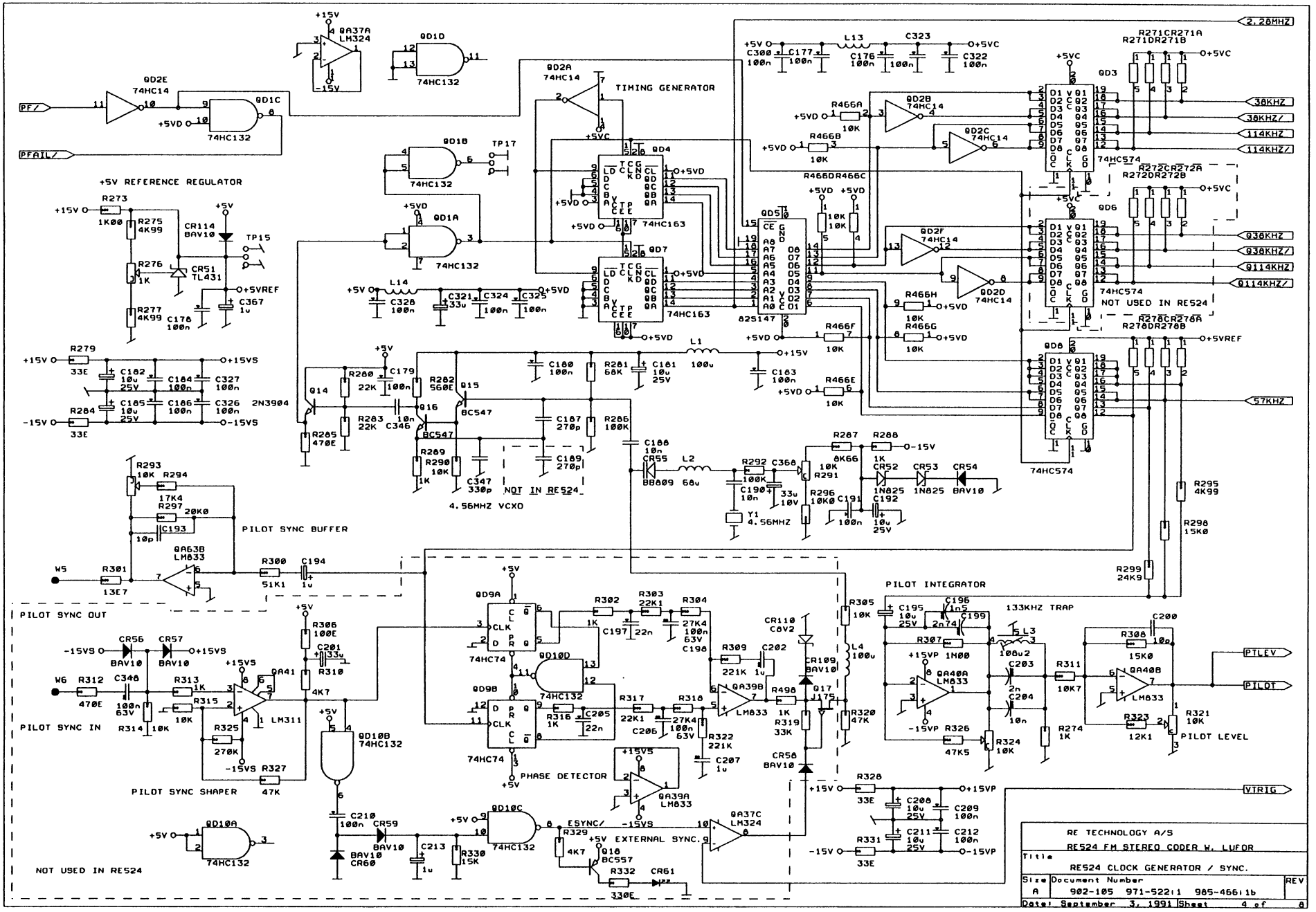
The pilot level is adjustable from -13 to -6 dBu by means of R321 on the front panel.

A separate 19 kHz square wave is fed to the sync output W5 through the buffer and level shifter QA63B.

The pilot level can be varied slightly by changing the supply voltage to QD8. Being CMOS, variations in supply voltage will show as variations in output voltage. The supply voltage can be varied by means of R276.

7.4.2 Schematic Diagrams

The schematic diagram for the clock generator is located on the following page. The diagram number is 985-466 Sheet 4.


TIMING GENERATOR
+5V REFERENCE REGULATOR
PILOT SYNC BUFFER
4.56MHZ VCXO
NOT IN RE524
PILOT SYNC OUT
PILOT SYNC IN
PILOT SYNC SHAPER
PHASE DETECTOR
PILOT INTEGRATOR
133KHZ TRAP
PILOT LEVEL
+5V EXTERNAL SYNC.
NOT USED IN RE524
NOT USED IN RE524
2.28MHZ
38KHZ
38KHZ/
114KHZ
114KHZ/
Q38KHZ
Q38KHZ/
Q114KHZ
Q114KHZ/
57KHZ
PTLEV
PILOT
VTRIG
RE TECHNOLOGY A/S
RE524 FM STEREO CODER W. LUFOR
RE524 CLOCK GENERATOR / SYNC.
Size A
Document Number 902-105 971-52211 985-46611b
REV
Date: September 3, 1991 Sheet 4 of 8

7.4.3 Component Locations

The component locations on the main board for the input amplifiers are shown on the following page.

SECTION 7 _____ TECHNICAL DESCRIPTION OF PRINT/MODULES

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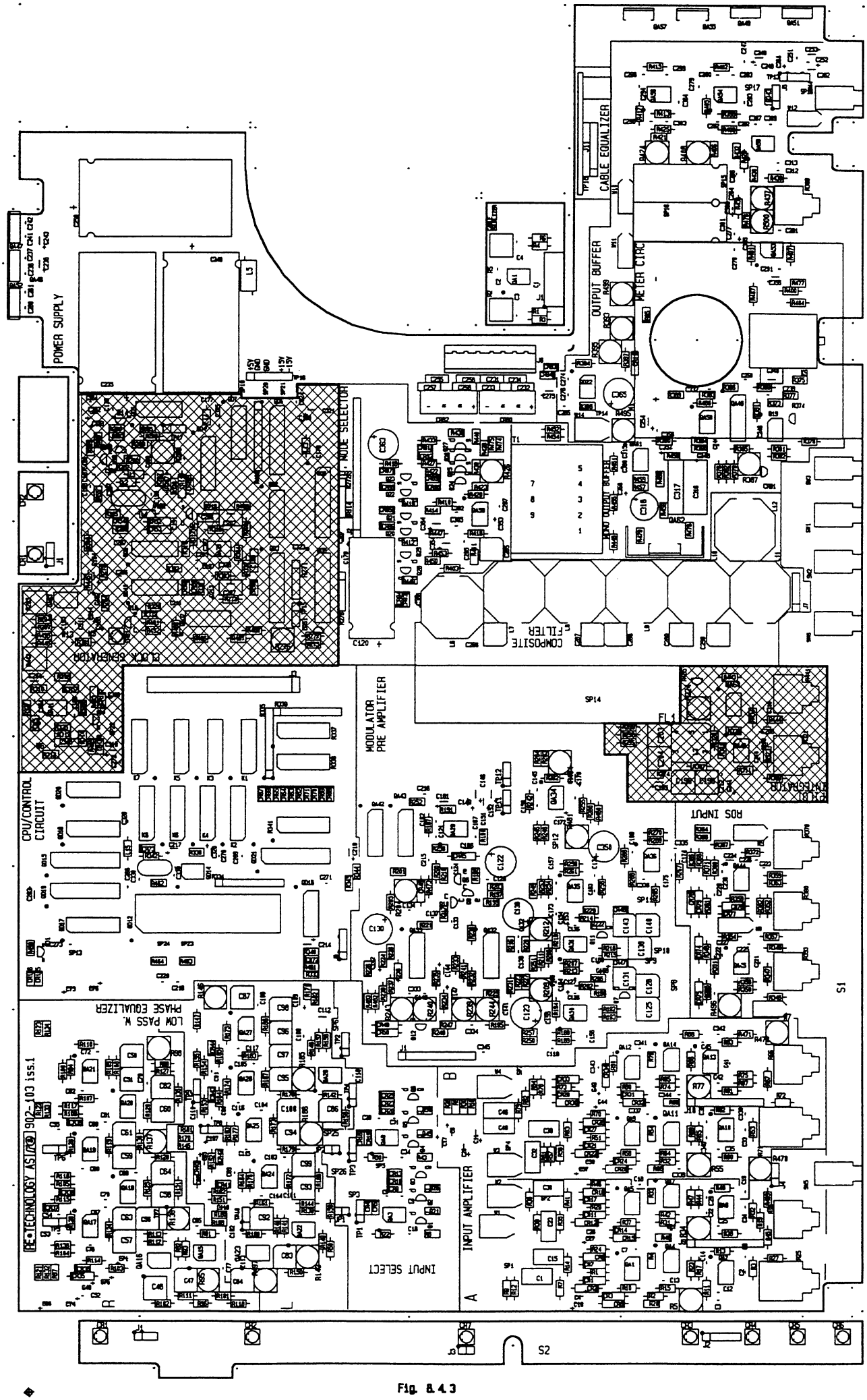
POWER SUPPLY
CABLE EQUALIZER
OUTPUT BUFFER
METER CIRC.
MODE SELECTOR
COMPOSITE FILTER
MODULATOR PRE AMPLIFIER
CPU/CONTROL CIRCUIT
PHASE EQUALIZER
LOW PASS W.
INPUT SELECT
INPUT AMPLIFIER
ROS INPUT
S1
S2
902-103 iss.1

Fig. 8.4.3

PILOT INTEGRATOR
BUS INPUT
COMPOSITE FILTER
MONO OUTPUT BUFFER
MODULATOR PRE AMPLIFIER
MODE SELECTOR
CLOCK GENERATOR
CONTROL UNIT
SW3
SW1
SW2
SW6
J1
J2
J3
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J10
J11
J12
J13
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J1000

7.5 CPU/Control Circuit

The RE 524 is controlled from a microcomputer which takes care of all the internal switching on command from the switches on the front panel. All settings are stored in an EEPROM at power down and is reloaded at power up to ensure the RE 524 continues with the right setting. The circuits are shown on the diagram in section 7.5.2.

7.5.1 Circuit Description

QD12 is a 68HC05 stand alone microcomputer with built-in RAM, ROM and timer. It is clocked at 2.4576 MHz from Y2. The only peripheral chip is QD14, a 64 times 16-bit EEPROM. It has a shadow RAM for quick access to the data and in order to limit the number of writes to the EEPROM. It is used to store all the settings of the RE 524 and at power down the content of the RAM is written into the EEPROM. SW1 to SW6 are the switches on the front panel and the computer controls the indicators on the front panel through the plugs J4, J5 and J7. The control signals are converted to ± 15 V signals that control the FET switches in the RE 524.

7.5.2 Schematic Diagrams

The schematic diagram for the CPU/Control Circuit is located on the following page. The diagram number is 985-466 Sheet 5.

SECTION 7 _____ TECHNICAL DESCRIPTION OF PRINT/MODULES

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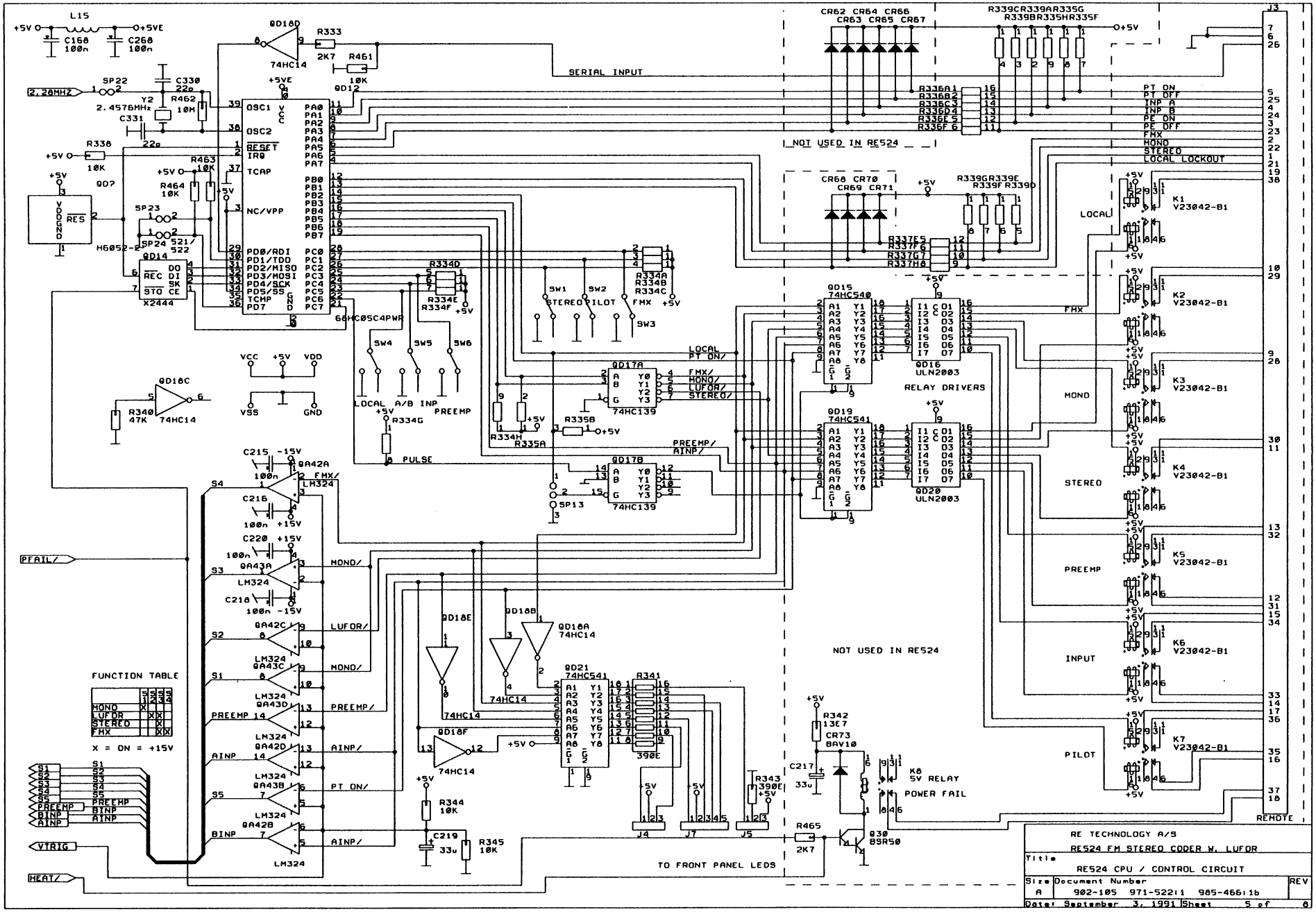
L15
C168 100n
C268 100n
+5V
+5VE
QD18D
74HC14
R333 2K7
R461 10K
SERIAL INPUT
SP22
2.20MHZ
C330 22p
Y2 2.4576MHz
C331 22p
R462 10M
R338 10K
R463 10K
R464 10K
QD7
H6052-2
SP23
SP24 521/522
QD14
X2444
OSC1
OSC2
RESET
IRQ
TCAP
NC/VPP
PD0/RDI
PD1/TDO
PD2/MISO
PD3/MOSI
PD4/SCK
PD5/SS
TCMP
PD7
PA0
PA1
PA2
PA3
PA4
PA5
PA6
PA7
PB0
PB1
PB2
PB3
PB4
PB5
PB6
PB7
PC0
PC1
PC2
PC3
PC4
PC5
PC6
PC7
68HC05C4PWR
QD12
R334D
R334E
R334F
R334A
R334B
R334C
SW1 STEREO
SW2 PILOT
SW3 FMX
SW4
SW5
SW6
LOCAL A/B INP
PREEMP
R334G
PULSE
VCC
VDD
VSS
GND
QD16C
R340 47K
74HC14
R334H
R335A
R335B
QD17A
QD17B
74HC139
SP13
LOCAL PT ON/
FMX/
MONO/
LUFOR/
STEREO/
PREEMP/
AINP/
C215 -15V
C216 100n +15V
C220 +15V
C218 100n -15V
QA42A
QA43A
QA42C
QA43C
QA43D
QA42D
QA43B
QA42B
LM324
S4
S3
S2
S1
PREEMP
AINP
S5
BINP
PFAIL/
VTRIG
HEAT/
FUNCTION TABLE
MONO
LUFOR
STEREO
FMX
X = ON = +15V
QD18E
QD18B
QD18A
QD18F
74HC14
QD21
74HC541
R341
390E
R343 390E
R344 10K
C219 33u
R345 10K
J4
J7
J5
TO FRONT PANEL LEDS
CR62 CR64 CR66
CR63 CR65 CR67
R339C R339A R335G
R339B R335H R335F
R336A1
R336B2
R336C3
R336D4
R336E5
R336F6
NOT USED IN RE524
CR68 CR70
CR69 CR71
R339G R339E
R339F R339D
R337E5
R337F6
R337G7
R337H8
QD15
74HC540
QD16
ULN2003
RELAY DRIVERS
QD19
74HC541
QD20
ULN2003
NOT USED IN RE524
R342 13E7
CR73 BAV10
C217 33u
K8 5V RELAY
POWER FAIL
R465 2K7
Q30 BSR50
J3
PT ON
PT OFF
INP A
INP B
PE ON
PE OFF
FMX
MONO
STEREO
LOCAL LOCKOUT
LOCAL
FMX
MONO
STEREO
PREEMP
INPUT
PILOT
REMOTE
K1 V23042-B1
K2 V23042-B1
K3 V23042-B1
K4 V23042-B1
K5 V23042-B1
K6 V23042-B1
K7 V23042-B1
RE TECHNOLOGY A/S
RE524 FM STEREO CODER W. LUFOR
Title
RE524 CPU / CONTROL CIRCUIT
Size A
Document Number 902-105 971-52211 985-46611b
REV
Date: September 3, 1991 Sheet 5 of 8

7.5.3 Component Locations

The component locations on the main board for the CPU/Control circuit are shown on the following page.

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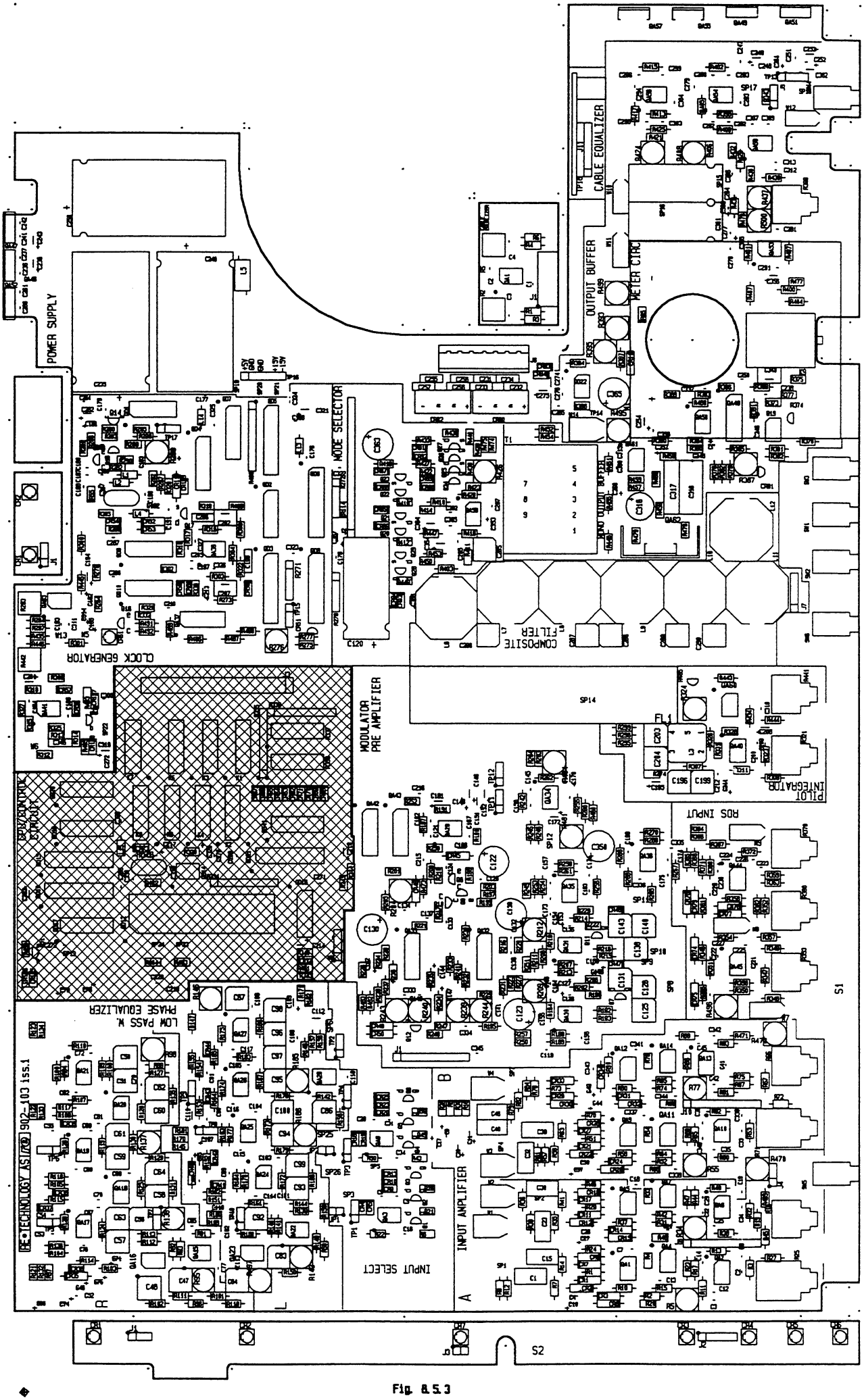
POWER SUPPLY
CABLE EQUALIZER
OUTPUT BUFFER
METER CIRC
MODE SELECTOR
COMPOSITE FILTER
CLOCK GENERATOR
MODULATOR PRE AMPLIFIER
PILOT INTEGRATOR
RDS INPUT
LOW PASS M. PHASE EQUALIZER
INPUT SELECT
INPUT AMPLIFIER
902-103 iss.1
S1
S2

Fig. 8.5.3

CLOCK GENERATOR
MODULATOR
PRE AMPLIFIER
CPU/CONTROL
CIRCUIT
PHASE EQUALIZER
R446
R301
R276
R275
C120
R442
R306
R310
CR57
C300
R327
C186
CR56
R463
CR17
R325
R339
R337
R336
R315
R325
R313
C348
R314
SP22
W6
R312
R465
CR18
C319
C272
K7
K5
K3
K1
CR67
CR66
CR65
CR64
CR63
CR62
CR71
CR70
CR69
CR68
QA42
K8
K6
K4
K2
R341
C328
L15
CR73
C217
R342
R338
C270
C269
C219
C268
C330
R462
R334
C271
R345
R344
C263
R205
C130
R490
C273
SP13
SP24
SP23
C214
R340
CR72
R461
R333
R224
R228
R226
C220
C218
E73
E76
R146
C87
C106
C98
C109
R171
R182
C112
R483
R482
R238
R237
R241

7.6 RDS Inputs/Power Supply

RE 524 is equipped with two auxiliary inputs that can be used to add various SCA signals to the composite signal (typically RDS signals).

This section also covers the power supply and the meter circuit for the RE 524.

The circuits are shown on the diagram in section 7.6.2.

7.6.1 Circuit Description

The two RDS/AUX inputs W7 and W8 are buffered by two identical non inverting buffers with the possibility of adjusting the level of the input. Diodes CR74/CR75 and CR76/CR77 protect the inputs from voltages higher than ± 15 V. The two signals are added in QA45B and then added to the composite signal in QA58 (see sheet 7).

Power from the mains transformer enters the board via J6. There are two conventional ± 15 V supplies, one for the output and meter circuit and one for the rest of RE 524. This distributes the power dissipation over more regulators and reduces the requirements to the heat sink. QD22 is a comparator that as soon as the mains voltage drops inhibits writing to the EEPROM containing the current setting in order to avoid accidental writings to it during power down.

The diagram also contains the meter circuit with the meter switch that selects between MPX, Pilot, R or L. This is followed by a buffer QA48A that amplifies the pilot signal when this signal is selected as its level is lower than the others. QA50 is a comparator coupled as a peak voltage rectifier and the voltage across C254 will represent the peak value of the AC signal measured. QA48B and QA48D is coupled as a logarithmic amplifier with Q19 as the logarithmic element in order to show the measured values in dB. The circuit is temperature compensated by means of R374.

7.6.2 Schematic Diagrams

The schematic diagram for the RDS Inputs/Power Supply is located on the following page. The diagram number is 985-466 Sheet 6.

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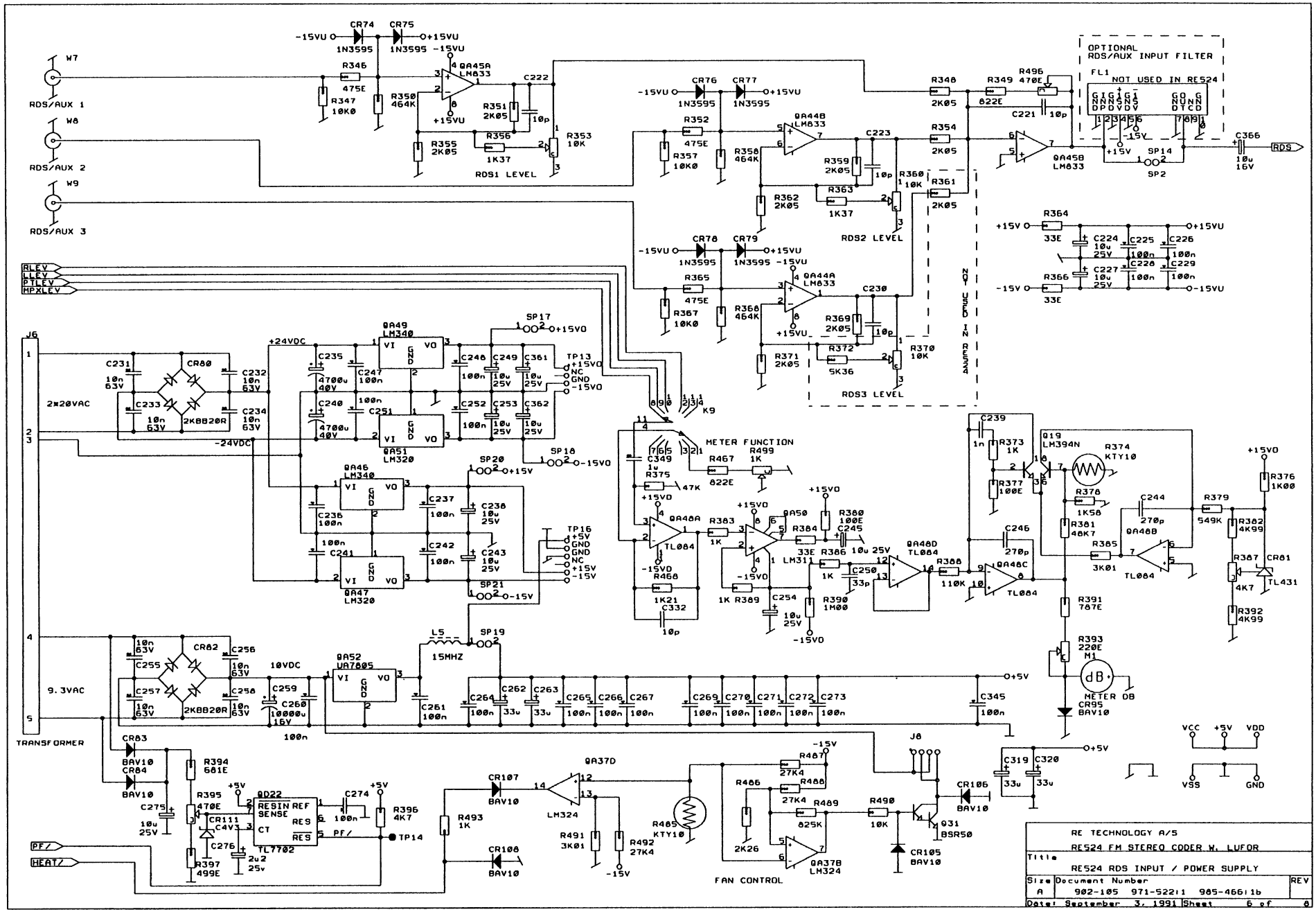
RDS/AUX 1
RDS/AUX 2
RDS/AUX 3
W7
W8
W9
RDS1 LEVEL
RDS2 LEVEL
RDS3 LEVEL
OPTIONAL RDS/AUX INPUT FILTER
NOT USED IN RE524
RDS
ALEV
LLEV
RLEV
MPXLEV
TRANSFORMER
2x20VAC
9.3VAC
+24VDC
-24VDC
10VDC
15MHZ
METER FUNCTION
METER DB
FAN CONTROL
PF/
HEAT/
RE TECHNOLOGY A/S
RE524 FM STEREO CODER W. LUFOR
RE524 RDS INPUT / POWER SUPPLY
Size A
Document Number 902-105 971-52211 985-46611b
REV
Date: September 3, 1991 Sheet 6 of 8

7.6.3 Component Locations

The component locations on the main board for the input amplifiers are shown on the following page.

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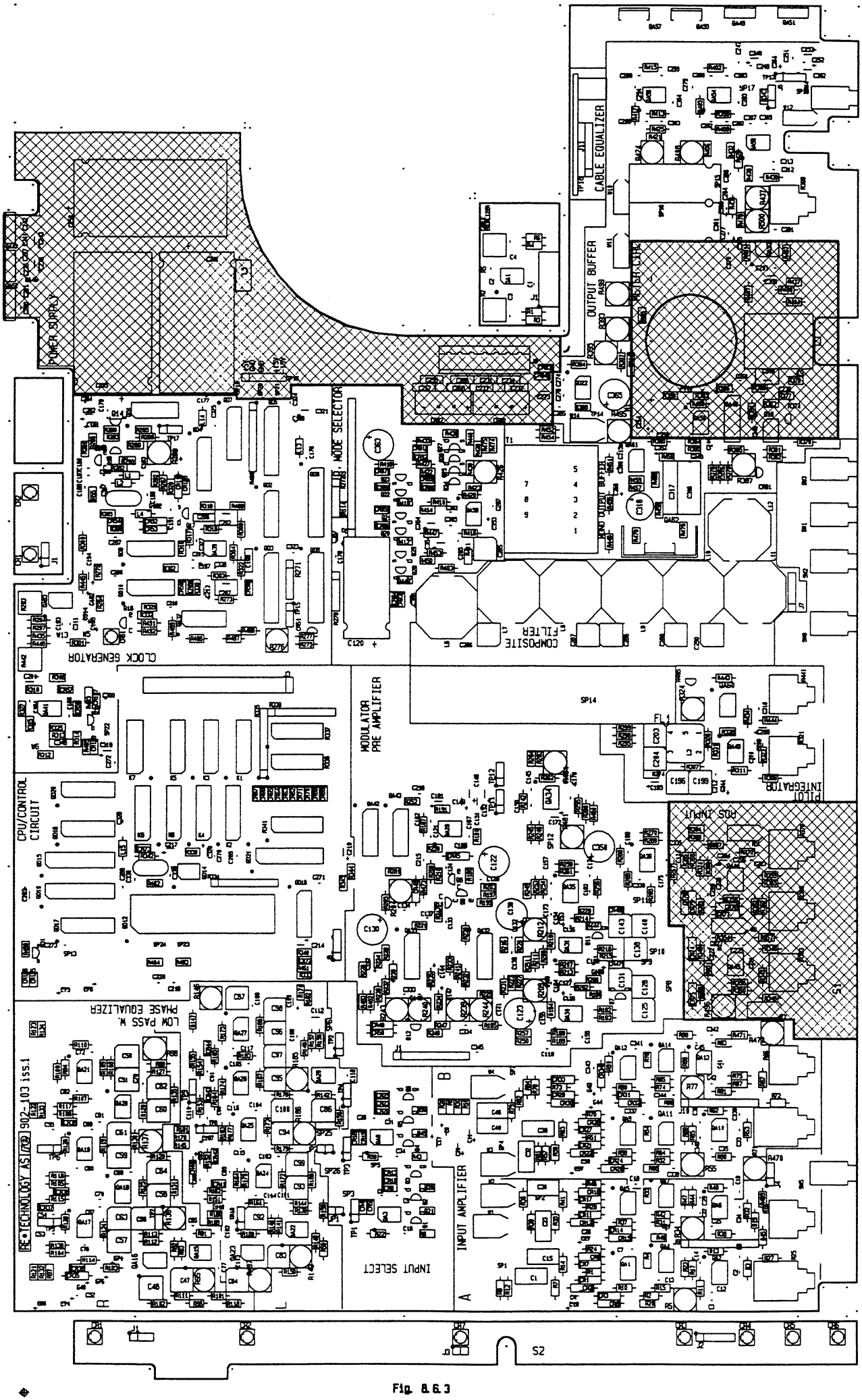
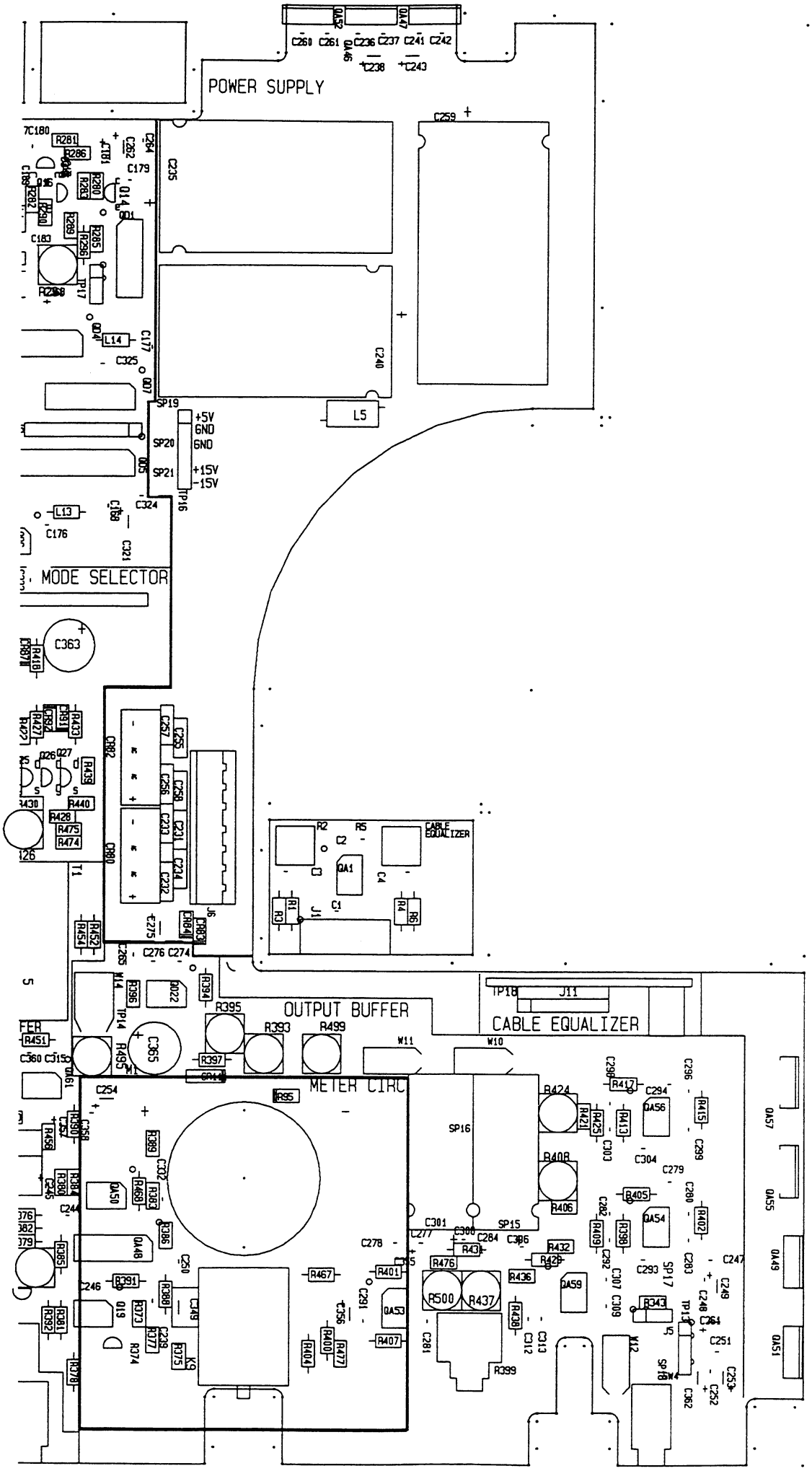

POWER SUPPLY
CABLE EQUALIZER
OUTPUT BUFFER
MODE SELECTOR
COMPOSITE FILTER
CLOCK GENERATOR
MODULATOR PRE AMPLIFIER
CPU/CONTROL CIRCUIT
LOW PASS W. PHASE EQUALIZER
INPUT SELECT
INPUT AMPLIFIER
PILOT INTEGRATOR
RDS INPUT
RE•TECHNOLOGY AS (R) 902-103 iss.1
S2

Fig. 8.6.3

C131
C143
C125
C128
C138
C140
SP9
SP10
SP11
SP8
R266
R268
C169
C136
R265
R269
R270
C175
R267
C135
C174
CR76
CR79
R365
R368
R366
R369
R364
CR75
CR74
R348
R361
R371
R351
C222
C227
C229
C230
C224
R367
R496
R354
CR77
CR78
R358
R356
R350
DA45
C225
R372
C226
R372
C221
W8
R362
R352
R347
R357
R363
R359
R346
R349
R353
R360
R370
S1
RDS INPUT
PILOT
INTEGRATOR
C212
C241
R311
R308
R89
R83
R471
R66
R472
C342
C45
DA13
DA14
R76
C341
DA12
R86


POWER SUPPLY
MODE SELECTOR
OUTPUT BUFFER
METER CIRC
CABLE EQUALIZER
CABLE EQUALIZER
+5V
GND
GND
+15V
-15V
L5
C363
C365
R500
R437
R399
J11
TP18
SP16
SP15
SP17
SP18
J5
J6
J1
T1

7.7 Composite Filter and Outputs

Before the composite signal reaches the output buffers it passes a summing point where pilot signal and mono signals can be added/selected by the computer. The signal goes through a composite filter where the higher harmonics are removed and then it is fed through two buffers with high driving capabilities to the MPX output plugs. The MPX signal is also fed to the plug at the front for monitoring purposes through a standard buffer.

The circuits are shown on the diagram in section 7.7.2.

7.7.1 Circuit Description

Q20 to Q29 are used by the microcomputer to select which signal is passed to the composite filter. The deselected signals are grounded by the second switch in order to eliminate signals leaking through to the summing amplifier. The only signal that always goes through is the AUX-signal, here marked RDS. The selected signal is buffered in QA58 and then fed to the composite filter.

The composite filter is a 6-link low-pass filter with the following characteristics:

* Linear phase characteristic up to 53 kHz.
* Flat amplitude response up to 15 kHz and a max. attenuation of approx. 0.3% at 53 kHz.
* Fine cut-off characteristics.

The filter output is buffered by QA53 where the MPX-level is adjusted by means of R399 (the potentiometer accessible from the front panel). R500 is used to adjust the gain for the whole output section so that the MPX levels are correct with R399 in middle position.

Finally MPX1 output is buffered by QA54/QA55 and MPX2 output by QA56/QA57 after going through the cable equalizer circuit (see section 7.8). QA55 and QA57 has high drive capability into 75 Ω in parallel with 5 nF. The MPX Monitor output is buffered by QA59 with a much lower drive capability. All three buffers have a gain of one ensuring the same level on all three MPX outputs.

7.7.2 Schematic Diagrams

The schematic diagram for the output buffers is located on the following page. The diagram number is 985-466 sheet 7.

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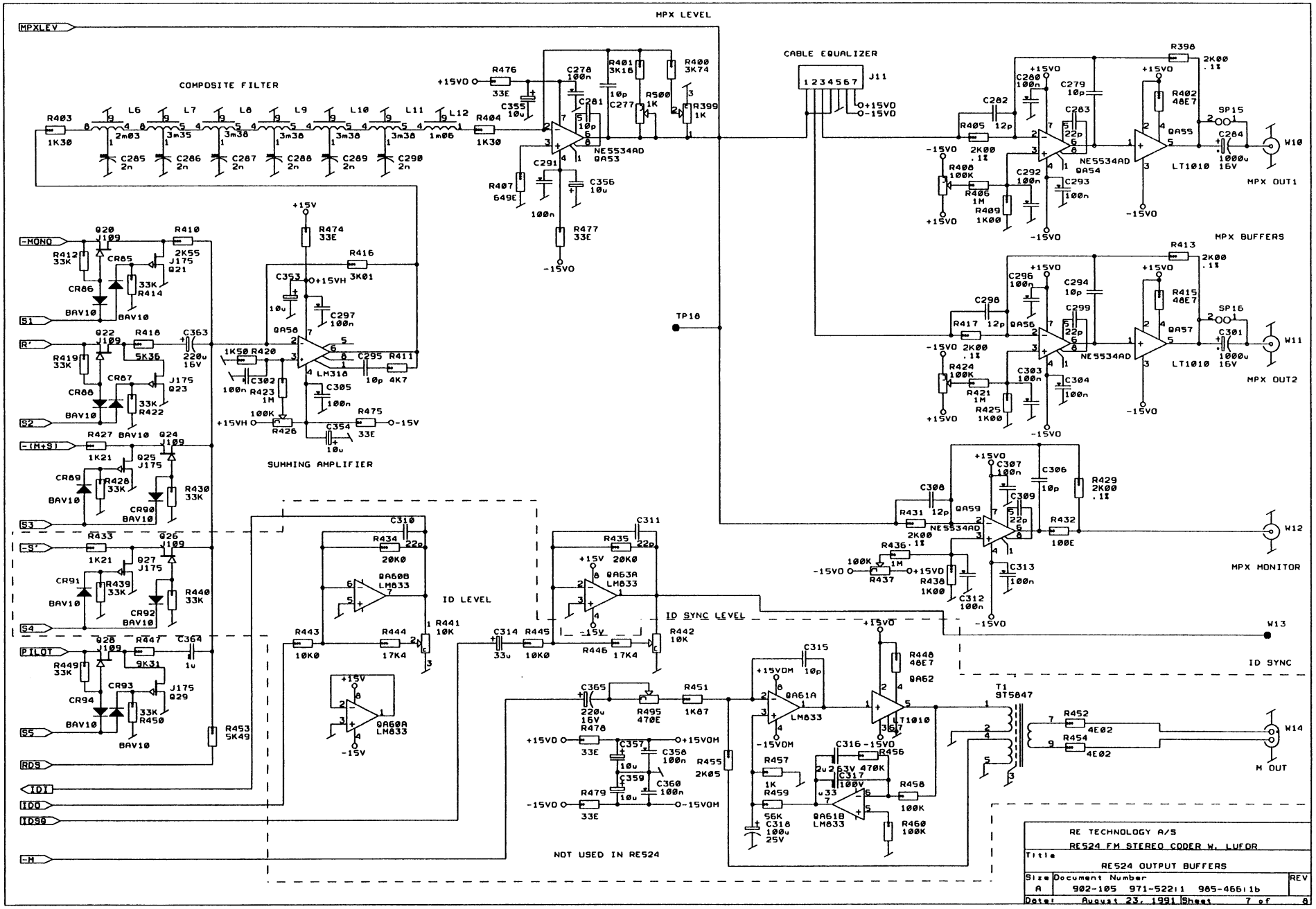
MPX LEVEL
MPXLEV
COMPOSITE FILTER
CABLE EQUALIZER
J11
MPX OUT1
MPX OUT2
MPX BUFFERS
MPX MONITOR
SUMMING AMPLIFIER
ID LEVEL
ID SYNC LEVEL
ID SYNC
TP18
-MONO
S1
R'
S2
-(M+S)
S3
-S'
S4
PILOT
S5
RDS
IDI
IDQ
IDSO
-M
W10
W11
W12
W13
W14
M OUT
NOT USED IN RE524
RE TECHNOLOGY A/S
RE524 FM STEREO CODER W. LUFOR
RE524 OUTPUT BUFFERS
Size A
Document Number 902-105 971-522:1 985-466:1b
REV
Date: August 23, 1991
Sheet 7 of 8

7.7.3 Component Locations

The component locations on the main board for the input amplifiers are shown on the following page.

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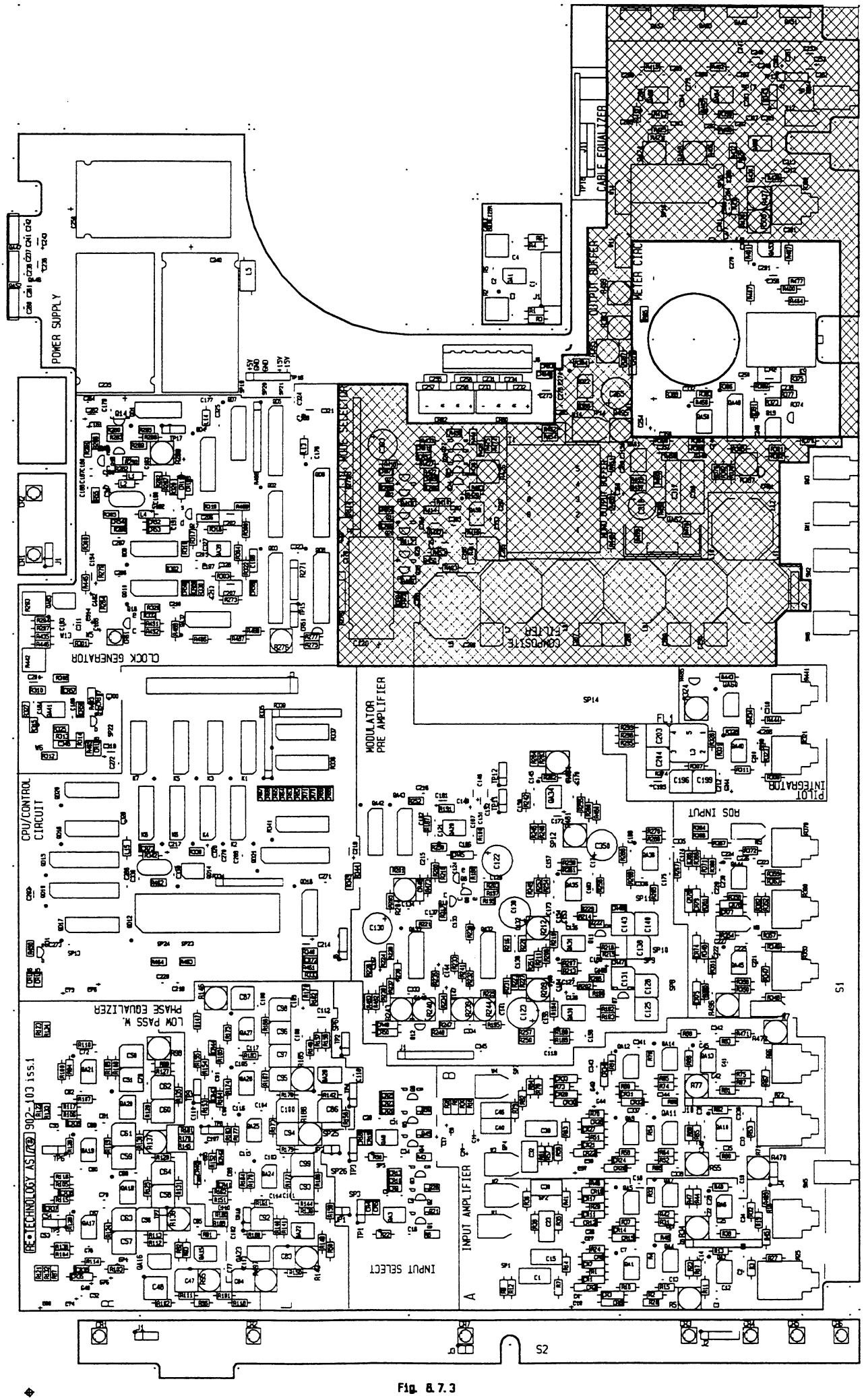
POWER SUPPLY
CABLE EQUALIZER
OUTPUT BUFFER
METER CIRC
CLOCK GENERATOR
COMPOSITE FILTER
MODULATOR PRE AMPLIFIER
PILOT INTEGRATOR
ROS INPUT
CPU/CONTROL CIRCUIT
LOW PASS W. PHASE EQUALIZER
INPUT SELECT
INPUT AMPLIFIER
S1
S2
902-103 155.1
TECHNOLOGY AS

Fig. 8.7.3

COMPOSITE FILTER
MONO OUTPUT BUFFER
OUTPUT BUFFER
METER CIRC
CABLE EQUALIZER
MODE SELECTOR

7.8 Front Panels and Cable Equalizer

The circuits are shown on the diagram in section 7.8.2.

7.8.1 Circuit Description

This diagram shows how the LEDs on the front panel interface to the main board through connectors J1, J2 and J3.

The cable equalizer circuit is mounted on a separate board and its purpose is to compensate for the small loss at high frequencies introduced by long cables that lead to reduced stereo separation. The active element is QA1.C and when R2.C or R5.C are turned to zero QA1.C acts as a buffer with unity gain. The more you turn the trimmers the more you increase the lift at high frequencies. Max. lift is around 0.25 dB at 100 kHz. The cable equalizer has one input, J1.C pin 1 and 4 and two outputs, pin 2 and 3 each feeding a MPX output.

7.8.2 Schematic Diagrams

The schematic diagram for the front panel/cable equalizer is located on the following page. The diagram number is 985-466 Sheet 8.

SECTION 7 _____ TECHNICAL DESCRIPTION OF PRINT/MODULES

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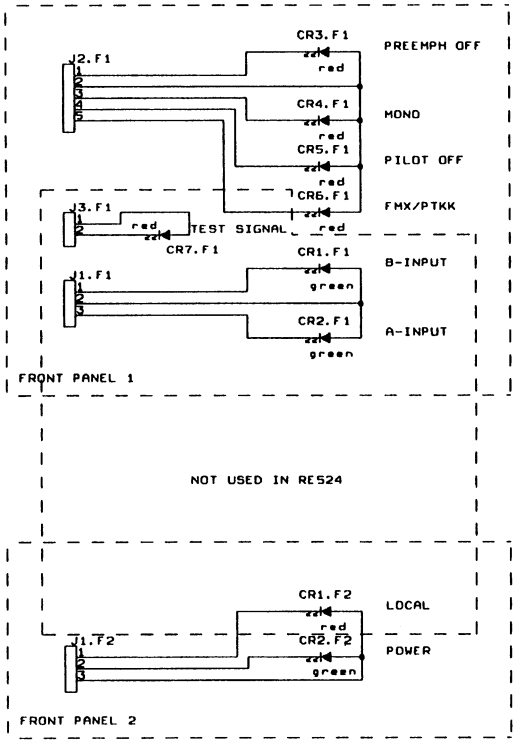

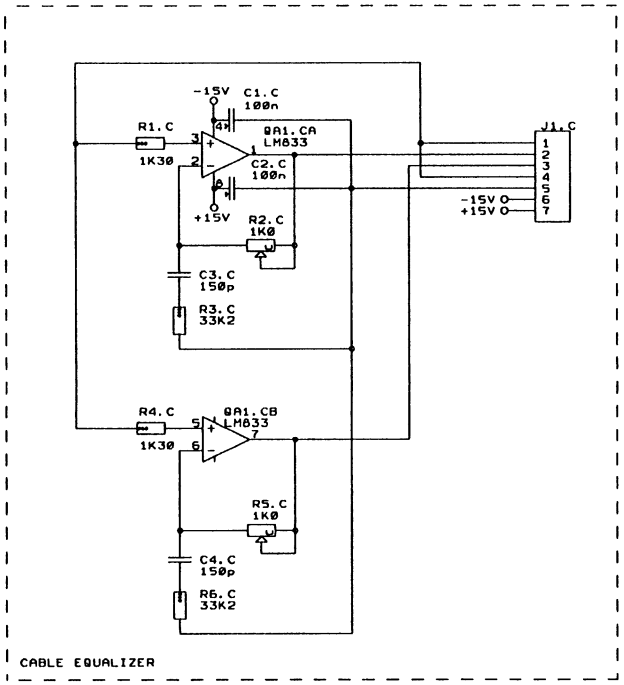

RE TECHNOLOGY A/S		
RE524 FM STEREO CODER W. LUFOR		
Title: RE524 FRONT PANELS & CABLE EQUALIZER		
Size: A	Document Number: 902-103/127 971-522/54411 985-466I1b	REV:
Date: September 3, 1991	Sheet: 0 of 0	

7.8.3 Component Locations

The component locations for the cable equalizer are shown on the following page.

SECTION 7 _____ TECHNICAL DESCRIPTION OF PRINT/MODULES

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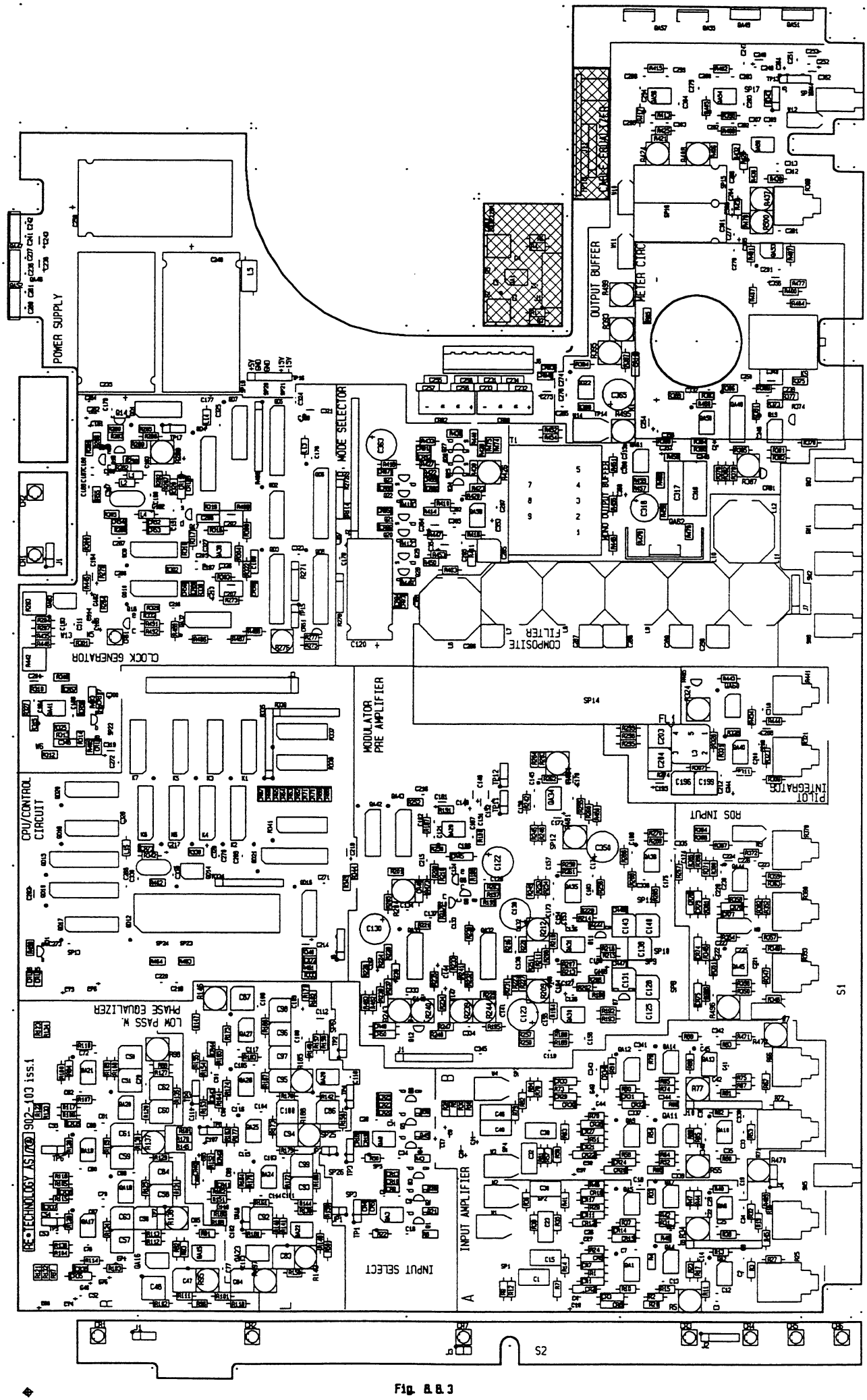
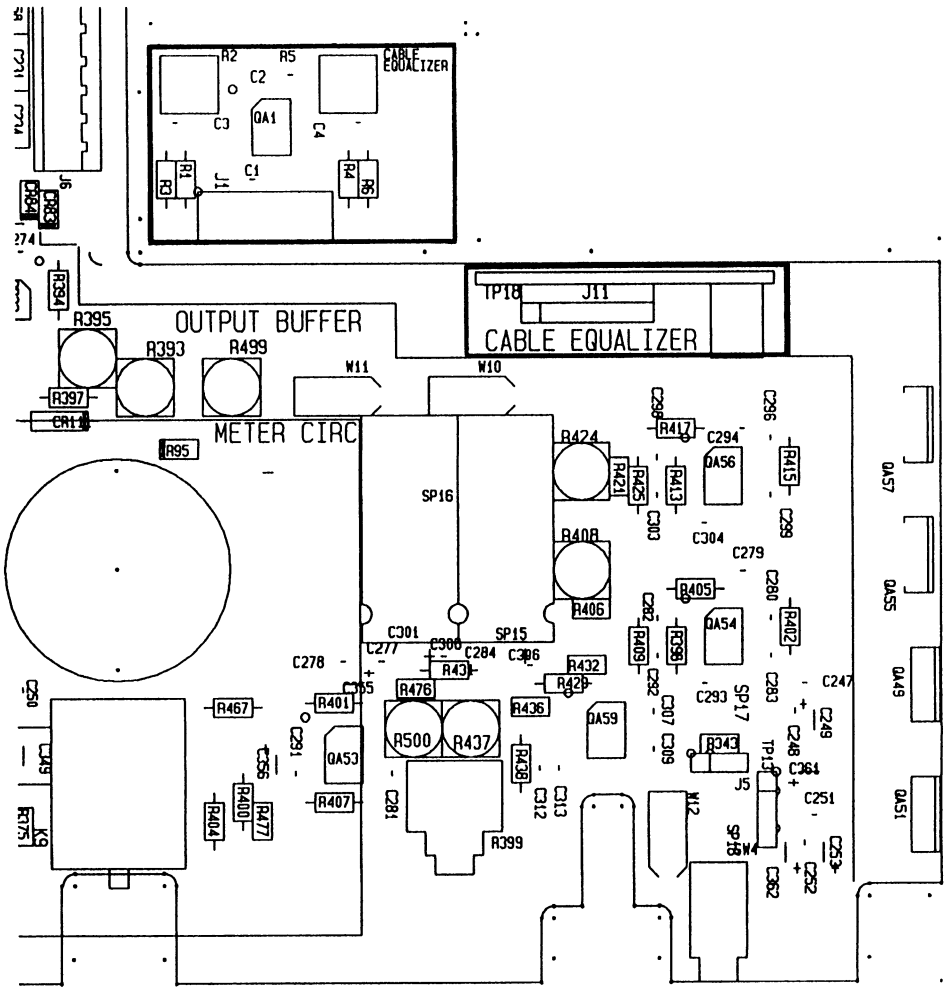

POWER SUPPLY
OUTPUT BUFFER
METER CIRC
MODE SELECTOR
COMPOSITE FILTER
CLOCK GENERATOR
MODULATOR PRE AMPLIFIER
CPU/CONTROL CIRCUIT
PILOT INTEGRATOR
RDS INPUT
LOW PASS & PHASE EQUALIZER
INPUT SELECT
INPUT AMPLIFIER
S1
S2
902-103 iss.1
TECHNOLOGY AS

Fig. 8.8.3


CABLE EQUALIZER
OUTPUT BUFFER
METER CIRC
CABLE EQUALIZER
TP18
J11
R2
R5
C2
C3
C4
C1
QA1
R1
R3
J1
R4
R6
R394
R395
R393
R499
W11
W10
R397
CR1
R95
SP16
R424
R421
R425
R413
R417
C298
C296
C294
QA56
R415
C299
C300
C304
C279
R408
R405
R406
C280
C282
R402
QA54
R409
R398
C301
C300
SP15
C277
C284
C306
C278
R431
R432
R428
R476
R401
R467
R436
QA59
R500
R437
R343
SP17
C247
C249
C248
TP19
C361
J5
C251
C253
C252
C362
W12
SP18
SW4
QA57
QA55
QA49
QA51
C291
QA53
R438
C313
C312
C281
R407
R400
R404
R477
R399
C356
C250
C49
K9
R475

7.9 Parts List for Main Board

The following pages show the parts list for the main board.

SECTION 7 _____ TECHNICAL DESCRIPTION OF PRINT/MODULES

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Main Board (902-105)

CAPACITORS

C 1	MKT, 0.33/100/10, R:5*10.5*10,RM3	241-085
C 2	C Ceramic 10p0 2% 100V NP0	213-205
C 3	C Ceramic 10p0 2% 100V NP0	213-205
C 4	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 5	C Ceramic 100n 20% 50V	213-401
C 6	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 7	C Ceramic 100n 20% 50V	213-401
C 8	C Ceramic 100n 20% 50V	213-401
C 9	C Ceramic 22p0 2% 100V NP0	213-206
C 10	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 11	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 12	C Ceramic 100n 20% 50V	213-401
C 13	C Ceramic 100n 20% 50V	213-401
C 14	C Ceramic 10p0 2% 100V NP0	213-205
C 15	MKT, 0.33/100/10, R:5*10.5*10,RM3	241-085
C 16	C Ceramic 100n 20% 50V	213-401
C 17	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 18	C Ceramic 100n 20% 50V	213-401
C 19	C Ceramic 100n 20% 50V	213-401
C 20	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 21	C Ceramic 100n 20% 50V	213-401
C 22	C Ceramic 100n 20% 50V	213-401
C 23	MKT, 0.33/100/10, R:5*10.5*10,RM3	241-085
C 24	C Ceramic 10p0 2% 100V NP0	213-205
C 25	C Ceramic 10p0 2% 100V NP0	213-205
C 26	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 27	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 28	C Ceramic 100n 20% 50V	213-401
C 29	C Ceramic 10p0 2% 100V NP0	213-205
C 30	MKT, 0.33/100/10, R:5*10.5*10,RM3	241-085
C 31	C Ceramic 22p0 2% 100V NP0	213-206
C 34	C Ceramic 100n 20% 50V	213-401
C 47	C Polyst 2n00 1% 63V	243-305
C 48	C Polyst 2n00 1% 63V	243-305
C 49	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 50	C Polyst 2n00 1% 63V	243-305
C 51	C Ceramic 10n 1% 50V NPO RM2	213-629
C 52	C Ceramic 100n 20% 50V	213-401
C 53	C Ceramic 100n 20% 50V	213-401
C 54	C Ceramic 100n 20% 50V	213-401
C 55	C Ceramic 100n 20% 50V	213-401
C 56	C Ceramic 10n 1% 50V NPO RM2	213-629
C 57	C Ceramic 10n 1% 50V NPO RM2	213-629
C 58	C Ceramic 10n 1% 50V NPO RM2	213-629
C 59	C Ceramic 10n 1% 50V NPO RM2	213-629
C 60	C Ceramic 10n 1% 50V NPO RM2	213-629
C 61	C Ceramic 10n 1% 50V NPO RM2	213-629
C 62	C Ceramic 10n 1% 50V NPO RM2	213-629
C 63	C Ceramic 10n 1% 50V NPO RM2	213-629
C 64	C Ceramic 10n 1% 50V NPO RM2	213-629

C 65	C Ceramic 100n 20% 50V	213-401
C 66	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 67	C Ceramic 100n 20% 50V	213-401
C 68	C Ceramic 100n 20% 50V	213-401
C 69	C Ceramic 100n 20% 50V	213-401
C 70	C Ceramic 100n 20% 50V	213-401
C 71	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 72	C Ceramic 100n 20% 50V	213-401
C 73	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 74	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 75	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 76	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 77	C Ceramic 100n 20% 50V	213-401
C 78	C Ceramic 100n 20% 50V	213-401
C 79	C Ceramic 100n 20% 50V	213-401
C 80	C Ceramic 100n 20% 50V	213-401
C 81	C Ceramic 100n 20% 50V	213-401
C 82	C Ceramic 100n 20% 50V	213-401
C 83	C Polyst 2n00 1% 63V	243-305
C 84	C Polyst 2n00 1% 63V	243-305
C 85	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 86	C Polyst 2n00 1% 63V	243-305
C 87	C Ceramic 10n 1% 50V NPO RM2	213-629
C 88	C Ceramic 100n 20% 50V	213-401
C 89	C Ceramic 100n 20% 50V	213-401
C 90	C Ceramic 100n 20% 50V	213-401
C 91	C Ceramic 100n 20% 50V	213-401
C 92	C Ceramic 10n 1% 50V NPO RM2	213-629
C 93	C Ceramic 10n 1% 50V NPO RM2	213-629
C 94	C Ceramic 10n 1% 50V NPO RM2	213-629
C 95	C Ceramic 10n 1% 50V NPO RM2	213-629
C 96	C Ceramic 10n 1% 50V NPO RM2	213-629
C 97	C Ceramic 10n 1% 50V NPO RM2	213-629
C 98	C Ceramic 10n 1% 50V NPO RM2	213-629
C 99	C Ceramic 10n 1% 50V NPO RM2	213-629
C 100	C Ceramic 10n 1% 50V NPO RM2	213-629
C 101	C Ceramic 100n 20% 50V	213-401
C 102	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 103	C Ceramic 100n 20% 50V	213-401
C 104	C Ceramic 100n 20% 50V	213-401
C 105	C Ceramic 100n 20% 50V	213-401
C 106	C Ceramic 100n 20% 50V	213-401
C 107	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 108	C Ceramic 100n 20% 50V	213-401
C 109	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 110	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 111	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 112	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 113	C Ceramic 100n 20% 50V	213-401
C 114	C Ceramic 100n 20% 50V	213-401
C 115	C Ceramic 100n 20% 50V	213-401
C 116	C Ceramic 100n 20% 50V	213-401
C 117	C Ceramic 100n 20% 50V	213-401
C 118	C Ceramic 100n 20% 50V	213-401

C 119	C Ceramic 47p0 2% 100V NP0	213-209
C 120	Electrolytic 2000/16, 2000h/85°, A:12.5*30, RM14	260-063
C 121	C Ceramic 10p0 2% 100V NP0	213-205
C 122	Electrolytic 220/35, 2000h/105°, R:10*12.5, RM2	261-092
C 123	Electrolytic 220/35, 2000h/105°, R:10*12.5, RM2	261-092
C 124	C Ceramic 100n 20% 50V	213-401
C 125	C Polyst 2n00 1% 63V	243-305
C 126	C Ceramic 10p0 2% 100V NP0	213-205
C 127	C Ceramic 47p0 2% 100V NP0	213-209
C 128	C Polyst 2n00 1% 63V	243-305
C 129	C Ceramic 100n 20% 50V	213-401
C 130	Electrolytic 220/35, 2000h/105°, R:10*12.5, RM2	261-092
C 131	C Polyst 2n00 1% 63V	243-305
C 132	Factory adjusted	213-000
C 133	Factory adjusted	213-000
C 134	Factory adjusted	213-000
C 135	C Ceramic 10p0 2% 100V NP0	213-205
C 136	Factory adjusted	213-000
C 137	Factory adjusted	213-000
C 138	C Polyst 2n00 1% 63V	243-305
C 139	Electrolytic 220/35, 2000h/105°, R:10*12.5, RM2	261-092
C 140	C Polyst 2n00 1% 63V	243-305
C 141	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 142	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 143	C Polyst 2n00 1% 63V	243-305
C 144	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 145	C Ceramic 10p0 2% 100V NP0	213-205
C 146	C Solid Aluminium 1u0 20% 25V Short Type	265-101
C 147	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 148	C Ceramic 100n 20% 50V	213-401
C 149	C Solid Aluminium 1u0 20% 25V Short Type	265-101
C 150	Factory adjusted	213-000
C 151	C Solid Aluminium 1u0 20% 25V Short Type	265-101
C 152	C Solid Aluminium 1u0 20% 25V Short Type	265-101
C 153	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 154	C Ceramic 100n 20% 50V	213-401
C 155	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 156	C Ceramic 100n 20% 50V	213-401
C 157	C Ceramic 10p0 2% 100V NP0	213-205
C 158	C Ceramic 10p0 2% 100V NP0	213-205
C 159	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 160	C Ceramic 100n 20% 50V	213-401
C 161	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 162	C Ceramic 100n 20% 50V	213-401
C 163	C Ceramic 10p0 2% 100V NP0	213-205
C 164	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 165	C Ceramic 100n 20% 50V	213-401
C 166	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 167	C Ceramic 100n 20% 50V	213-401
C 168	C Ceramic 100n 20% 50V	213-401
C 170	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 171	C Ceramic 100n 20% 50V	213-401
C 172	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 173	C Ceramic 100n 20% 50V	213-401

C 176	C Ceramic 100n 20% 50V	213-401
C 177	C Ceramic 100n 20% 50V	213-401
C 178	C Ceramic 100n 20% 50V	213-401
C 179	C Ceramic 100n 20% 50V	213-401
C 180	C Ceramic 100n 20% 50V	213-401
C 181	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 182	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 183	C Ceramic 100n 20% 50V	213-401
C 184	C Ceramic 100n 20% 50V	213-401
C 185	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 186	C Ceramic 100n 20% 50V	213-401
C 187	C Ceramic 270p 2% 100V N750	213-213
C 188	C Ceramic 10n0 -20+80% 63V	213-020
C 190	C Ceramic 10n0 -20+80% 63V	213-020
C 191	C Ceramic 100n 20% 50V	213-401
C 192	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 193	C Ceramic 10p0 2% 100V NP0	213-205
C 194	C Solid Aluminium 1u0 20% 25V Short Type	265-101
C 195	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 196	C Polystyrene 1n5 1% 63V	243-312
C 199	C Polystyrene 2n74 1% 63V	243-318
C 200	C Ceramic 10p0 2% 100V NP0	213-205
C 203	C Polyst 2n00 1% 63V	243-305
C 204	C Polyst 10n0 1% 63V	243-302
C 208	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 209	C Ceramic 100n 20% 50V	213-401
C 211	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 212	C Ceramic 100n 20% 50V	213-401
C 215	C Ceramic 100n 20% 50V	213-401
C 216	C Ceramic 100n 20% 50V	213-401
C 218	C Ceramic 100n 20% 50V	213-401
C 219	C Solid Aluminium 33u 20% 10V Short Type	265-105
C 220	C Ceramic 100n 20% 50V	213-401
C 221	C Ceramic 10p0 2% 100V NP0	213-205
C 222	C Ceramic 10p0 2% 100V NP0	213-205
C 223	C Ceramic 10p0 2% 100V NP0	213-205
C 224	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 225	C Ceramic 100n 20% 50V	213-401
C 226	C Ceramic 100n 20% 50V	213-401
C 227	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 228	C Ceramic 100n 20% 50V	213-401
C 229	C Ceramic 100n 20% 50V	213-401
C 230	C Ceramic 10p0 2% 100V NP0	213-205
C 231	MKT, 0.01/250/10, R:2.5*6.5*7.2, RM2	241-069
C 232	MKT, 0.01/250/10, R:2.5*6.5*7.2, RM2	241-069
C 233	MKT, 0.01/250/10, R:2.5*6.5*7.2, RM2	241-069
C 234	MKT, 0.01/250/10, R:2.5*6.5*7.2, RM2	241-069
C 235	Electrolytic 4700/40, 2000h/85°, A:25*40, RM18	260-070
C 236	C Ceramic 100n 20% 50V	213-401
C 237	C Ceramic 100n 20% 50V	213-401
C 238	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 239	C Ceramic 1n 5% NP0 63V	213-616
C 240	Electrolytic 4700/40, 2000h/85°, A:25*40, RM18	260-070
C 241	C Ceramic 100n 20% 50V	213-401

C 242	C Ceramic 100n 20% 50V	213-401
C 243	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 244	C Ceramic 270p 2% 100V N750	213-213
C 245	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 246	C Ceramic 270p 2% 100V N750	213-213
C 247	C Ceramic 100n 20% 50V	213-401
C 248	C Ceramic 100n 20% 50V	213-401
C 249	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 250	C Ceramic 33p0 2% 100V NP0	213-208
C 251	C Ceramic 100n 20% 50V	213-401
C 252	C Ceramic 100n 20% 50V	213-401
C 253	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 254	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 255	MKT, 0.01/250/10, R:2.5*6.5*7.2, RM2	241-069
C 256	MKT, 0.01/250/10, R:2.5*6.5*7.2, RM2	241-069
C 257	MKT, 0.01/250/10, R:2.5*6.5*7.2, RM2	241-069
C 258	MKT, 0.01/250/10, R:2.5*6.5*7.2, RM2	241-069
C 259	Electrolytic 10000/16, 2000h/85°, A:22*40, RM18	260-064
C 260	C Ceramic 100n 20% 50V	213-401
C 261	C Ceramic 100n 20% 50V	213-401
C 262	C Solid Aluminium 33u 20% 10V Short Type	265-105
C 263	C Solid Aluminium 33u 20% 10V Short Type	265-105
C 264	C Ceramic 100n 20% 50V	213-401
C 265	C Ceramic 100n 20% 50V	213-401
C 266	C Ceramic 100n 20% 50V	213-401
C 267	C Ceramic 100n 20% 50V	213-401
C 268	C Ceramic 100n 20% 50V	213-401
C 269	C Ceramic 100n 20% 50V	213-401
C 270	C Ceramic 100n 20% 50V	213-401
C 271	C Ceramic 100n 20% 50V	213-401
C 272	C Ceramic 100n 20% 50V	213-401
C 273	C Ceramic 100n 20% 50V	213-401
C 274	C Ceramic 100n 20% 50V	213-401
C 275	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 276	C Solid Aluminium 2u2 20% 25V Short Type	265-102
C 277	C Ceramic 10p0 2% 100V NP0	213-205
C 278	C Ceramic 100n 20% 50V	213-401
C 279	C Ceramic 10p0 2% 100V NP0	213-205
C 280	C Ceramic 100n 20% 50V	213-401
C 281	C Ceramic 10p0 2% 100V NP0	213-205
C 282	C Ceramic 12p0 ±0p25 100V NPO	213-227
C 283	C Ceramic 22p0 2% 100V NP0	213-206
C 285	C Polyst 2n00 1% 63V	243-305
C 286	C Polyst 2n00 1% 63V	243-305
C 287	C Polyst 2n00 1% 63V	243-305
C 288	C Polyst 2n00 1% 63V	243-305
C 289	C Polyst 2n00 1% 63V	243-305
C 290	C Polyst 2n00 1% 63V	243-305
C 291	C Ceramic 100n 20% 50V	213-401
C 292	C Ceramic 100n 20% 50V	213-401
C 293	C Ceramic 100n 20% 50V	213-401
C 294	C Ceramic 10p0 2% 100V NP0	213-205
C 295	C Ceramic 10p0 2% 100V NP0	213-205
C 296	C Ceramic 100n 20% 50V	213-401

C 297	C Ceramic 100n 20% 50V	213-401
C 298	C Ceramic 12p0 ±0p25 100V NPO	213-227
C 299	C Ceramic 22p0 2% 100V NP0	213-206
C 300	C Ceramic 100n 20% 50V	213-401
C 302	C Ceramic 100n 20% 50V	213-401
C 303	C Ceramic 100n 20% 50V	213-401
C 304	C Ceramic 100n 20% 50V	213-401
C 305	C Ceramic 100n 20% 50V	213-401
C 306	C Ceramic 10p0 2% 100V NP0	213-205
C 307	C Ceramic 100n 20% 50V	213-401
C 308	C Ceramic 12p0 ±0p25 100V NPO	213-227
C 309	C Ceramic 22p0 2% 100V NP0	213-206
C 311	C Ceramic 22p0 2% 100V NP0	213-206
C 312	C Ceramic 100n 20% 50V	213-401
C 313	C Ceramic 100n 20% 50V	213-401
C 319	C Solid Aluminium 33u 20% 10V Short Type	265-105
C 320	C Solid Aluminium 33u 20% 10V Short Type	265-105
C 321	C Solid Aluminium 33u 20% 10V Short Type	265-105
C 322	C Ceramic 100n 20% 50V	213-401
C 323	C Ceramic 100n 20% 50V	213-401
C 324	C Ceramic 100n 20% 50V	213-401
C 325	C Ceramic 100n 20% 50V	213-401
C 326	C Ceramic 100n 20% 50V	213-401
C 327	C Ceramic 100n 20% 50V	213-401
C 328	C Ceramic 100n 20% 50V	213-401
C 330	C Ceramic 22p0 2% 100V NP0	213-206
C 331	C Ceramic 22p0 2% 100V NP0	213-206
C 332	C Ceramic 10p0 2% 100V NP0	213-205
C 333	C Ceramic 100n 20% 50V	213-401
C 334	C Ceramic 100n 20% 50V	213-401
C 335	C Ceramic 100n 20% 50V	213-401
C 336	C Ceramic 100n 20% 50V	213-401
C 340	C Ceramic 100n 20% 50V	213-401
C 345	C Ceramic 100n 20% 50V	213-401
C 346	C Ceramic 10n0 -20+80% 63V	213-020
C 347	C Ceramic 330p 2% 100V N750	213-214
C 349	MKT, 1/63/10, R:6*11.5*7.2, RM2	241-064
C 350	Electrolytic 220/35, 2000h/105°, R:10*12.5, RM2	261-092
C 353	C Solid Aluminium 10u 20% 16V Short Type	265-108
C 354	C Solid Aluminium 10u 20% 16V Short Type	265-108
C 355	C Solid Aluminium 10u 20% 16V Short Type	265-108
C 356	C Solid Aluminium 10u 20% 16V Short Type	265-108
C 361	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 362	C Solid Aluminium 10u 20% 25V Short Type	265-110
C 363	Electrolytic 220/35, 2000h/105°, R:10*12.5, RM2	261-092
C 364	MKT, 1/63/10, R:6*11.5*7.2, RM2	241-064
C 366	C Solid Aluminium 10u 20% 16V Short Type	265-108
C 367	C Ceramic 10p0 2% 100V NP0	213-205
C 368	C Ceramic 10p0 2% 100V NP0	213-205
C 369	C Ceramic 2n20 -20+80% 63V	213-012
C 370	C Ceramic 2n20 -20+80% 63V	213-012
C 371	C Ceramic 2n20 -20+80% 63V	213-012
C 372	C Ceramic 2n20 -20+80% 63V	213-012
C 373	C Ceramic 2n20 -20+80% 63V	213-012

C 374	C Ceramic 2n20 -20+80% 63V	213-012
C 375	C Ceramic 2n20 -20+80% 63V	213-012
C 376	C Ceramic 2n20 -20+80% 63V	213-012
C 377	C Ceramic 2n20 -20+80% 63V	213-012
C 378	C Ceramic 2n20 -20+80% 63V	213-012
C 379	C Ceramic 2n20 -20+80% 63V	213-012
C 380	C Ceramic 2n20 -20+80% 63V	213-012
C 381	C Ceramic 2n20 -20+80% 63V	213-012
C 382	C Ceramic 2n20 -20+80% 63V	213-012
C 383	C Ceramic 2n20 -20+80% 63V	213-012
C 384	C Ceramic 2n20 -20+80% 63V	213-012
C 385	C Solid Aluminium 33u 20% 10V Short Type	265-105
C 386	C Solid Aluminium 1u0 20% 25V Short Type	265-101
C 387	Electrolytic 220/35, 2000h/105°, R:10*12.5, RM2	261-092

DIODES

CR 1	Diode 1N3595 SI 100V 100mA	350-415
CR 2	Diode 1N3595 SI 100V 100mA	350-415
CR 3	Diode Zener BZX79-C9V1 0.4W	350-606
CR 6	Diode Zener BZX79-C9V1 0.4W	350-606
CR 7	Diode 1N3595 SI 100V 100mA	350-415
CR 8	Diode 1N3595 SI 100V 100mA	350-415
CR 11	Diode 1N3595 SI 100V 100mA	350-415
CR 12	Diode 1N3595 SI 100V 100mA	350-415
CR 14	Diode Zener BZX79-C9V1 0.4W	350-606
CR 15	Diode Zener BZX79-C9V1 0.4W	350-606
CR 17	Diode 1N3595 SI 100V 100mA	350-415
CR 18	Diode 1N3595 SI 100V 100mA	350-415
CR 35	Diode Zener BZX79-C10V 0.4W	350-657
CR 36	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 37	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 38	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 39	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 40	Diode Zener BZX79-C10V 0.4W	350-657
CR 41	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 42	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 43	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 44	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 45	Diode Zener BZX79-C8V2 0.4W	350-607
CR 46	Diode Zener BZX79-C8V2 0.4W	350-607
CR 47	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 48	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 49	Diode Zener BZX79-C6V2 0.4W	350-604
CR 50	Diode Zener BZX79-C6V2 0.4W	350-604
CR 51	IC TL431 ADJ. Precision Shunt Regulators	364-849
CR 52	Diode Zener 1N825 C6V2 0.4W	350-637
CR 53	Diode Zener 1N825 C6V2 0.4W	350-637
CR 54	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 55	Diode cap BB809 Vr-28V Ir-10nA	350-063
CR 74	Diode 1N3595 SI 100V 100mA	350-415
CR 75	Diode 1N3595 SI 100V 100mA	350-415
CR 76	Diode 1N3595 SI 100V 100mA	350-415
CR 77	Diode 1N3595 SI 100V 100mA	350-415

CR 78	Diode 1N3595 SI 100V 100mA	350-415
CR 79	Diode 1N3595 SI 100V 100mA	350-415
CR 80	Bridge Rectifier Vin:140V Io:1.9A	340-208
CR 81	IC TL431 ADJ. Precision Shunt Regulators	364-849
CR 82	Bridge Rectifier Vin:140V Io:1.9A	340-208
CR 83	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 84	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 85	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 86	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 87	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 88	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 89	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 90	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 93	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 94	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 95	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 105	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 106	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 107	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 108	Diode BAV10 Si Vr-60V If-600mA	350-022
CR 111	Diode Zener BZX79-C4V3 0.4W	350-639
CR 114	Diode BAV10 Si Vr-60V If-600mA	350-022

CONNECTORS

J 6	8 Pin AMP mod. I Terminal List, Straight	806-001
J 8	4 Pin Connector Male mod II W. Lock	805-901
J 11	Terminal strip 7-pol Mod.II W.lock	805-897

RELAYS & JUMPERS

JP 1	2-pol amp connector	805-951
JP 2	2-pol amp connector	805-951
K 9	Rotary Switch 2x6 Positions	547-007

CHOKES

L 1	Choke HF Mini 100U/10% 192MA	703-009
L 2	Choke HF Mini 68u 10% 95mA	703-073
L 3	*Potcore Coil	740-016
L 4	Choke HF Mini 100U/10% 192MA	703-009
L 5	RF-choke six-hole core green	731-204
L 6	*Potcore Coil	740-012
L 7	*Potcore Coil	740-013
L 8	*Potcore Coil	740-014
L 9	*Potcore Coil	740-014
L 10	*Potcore Coil	740-014
L 11	*Potcore Coil	740-014
L 12	*Potcore Coil	740-015
L 13	Choke HF Mini 100U/10% 192MA	703-009
L 14	Choke HF Mini 100U/10% 192MA	703-009
L 15	Choke HF Mini 100U/10% 192MA	703-009

METERS

M 1	Panel Meter 2mA	480-297

TRANSISTORS

Q 1	Transistor J109-18 n Fet	360-188
Q 4	Transistor J109-18 n Fet	360-188
Q 7	Transistor J109-18 n Fet	360-188
Q 8	Transistor BC547B npn	360-159
Q 9	Transistor BC557B pnp	360-160
Q 10	Transistor BC557B pnp	360-160
Q 11	Transistor J109-18 n Fet	360-188
Q 12	Transistor BC557B pnp	360-160
Q 14	Transistor 2N3904 pnp	360-064
Q 15	Transistor BC547B npn	360-159
Q 16	Transistor BC547B npn	360-159
Q 19	LM394 Supermatch Pair	360-273
Q 20	Transistor J109-18 n Fet	360-188
Q 21	Transistor J175-18 p jfet	360-252
Q 22	Transistor J109-18 n Fet	360-188
Q 23	Transistor J175-18 p jfet	360-252
Q 24	Transistor J109-18 n Fet	360-188
Q 25	Transistor J175-18 p jfet	360-252
Q 28	Transistor J109-18 n Fet	360-188
Q 29	Transistor J175-18 p jfet	360-252
Q 31	Transistor BSR50 npn	360-201

INTEGRATED ANALOG CIRCUITS

QA 1	IC AD711K OP.AMP	364-792
QA 2	IC LM833N Dual Low Noise OPamp	365-037
QA 3	IC 5534A op amp	364-639
QA 4	IC AD711K OP.AMP	364-792
QA 5	IC AD711K OP.AMP	364-792
QA 6	IC LM833N Dual Low Noise OPamp	365-037
QA 7	IC AD711K OP.AMP	364-792
QA 8	IC 5534A op amp	364-639
QA 15	IC LM833N Dual Low Noise OPamp	365-037
QA 16	IC LM833N Dual Low Noise OPamp	365-037
QA 17	IC LM833N Dual Low Noise OPamp	365-037
QA 18	IC LM833N Dual Low Noise OPamp	365-037
QA 19	IC LM833N Dual Low Noise OPamp	365-037
QA 20	IC LM833N Dual Low Noise OPamp	365-037
QA 21	IC LM833N Dual Low Noise OPamp	365-037
QA 22	IC LM833N Dual Low Noise OPamp	365-037
QA 23	IC LM833N Dual Low Noise OPamp	365-037
QA 24	IC LM833N Dual Low Noise OPamp	365-037
QA 25	IC LM833N Dual Low Noise OPamp	365-037
QA 26	IC LM833N Dual Low Noise OPamp	365-037
QA 27	IC LM833N Dual Low Noise OPamp	365-037
QA 28	IC LM833N Dual Low Noise OPamp	365-037
QA 29	IC LM318N OP-Amp	364-216
QA 30	IC LM833N Dual Low Noise OPamp	365-037

QA 31	IC LM833N Dual Low Noise OPamp	365-037
QA 32	IC 3054 transistor array	364-070
QA 33	IC 3054 transistor array	364-070
QA 34	IC LM833N Dual Low Noise OPamp	365-037
QA 35	IC LM833N Dual Low Noise OPamp	365-037
QA 37	IC LM324N Quad OP-Amp	364-176
QA 40	IC LM833N Dual Low Noise OPamp	365-037
QA 42	IC LM324N Quad OP-Amp	364-176
QA 43	IC LM324N Quad OP-Amp	364-176
QA 44	IC LM833N Dual Low Noise OPamp	365-037
QA 45	IC LM833N Dual Low Noise OPamp	365-037
QA 46	IC LM340T-15 3-terminal positive regulators	364-210
QA 47	IC LM320T-15 3-terminal negative regulators	364-211
QA 48	IC TL084 quad op amp	364-276
QA 49	IC LM340T-15 3-terminal positive regulators	364-210
QA 50	IC LM311N comparator	364-024
QA 51	IC LM320T-15 3-terminal negative regulators	364-211
QA 52	IC 78MO5UC Voltage regulator 5V/1A	364-180
QA 53	IC 5534A op amp	364-639
QA 54	IC 5534A op amp	364-639
QA 55	IC LT1010CT Fast +-150mA Power Buffer	364-813
QA 56	IC 5534A op amp	364-639
QA 57	IC LT1010CT Fast +-150mA Power Buffer	364-813
QA 58	IC LM318N OP-Amp	364-216
QA 59	IC 5534A op amp	364-639
QA 63	IC LM833N Dual Low Noise OPamp	365-037

INTEGRATED DIGITAL CIRCUITS

QD 1	IC 74HC132 Quad 2-InP Nand Schmitt Tigger	364-825
QD 2	IC 74HC14 Hex inv. Schmitt Trig	364-800
QD 3	IC 74HCT574P octal d ff	364-716
QD 4	IC 74HC163P 4-bit binary counter	364-814
QD 5	Prog Prom For RE521/RE524	368-461
QD 7	IC 74HC163P 4-bit binary counter	364-814
QD 8	IC 74HCT574P octal d ff	364-716
QD 12	Prog μProcessor F.RE521/524	368-462
QD 14	IC X2444 Nonvolatile Static Ram 16x16 bit	364-858
QD 17	IC 74HC139 Decoder-Multiplex	364-771
QD 18	IC 74HC14 Hex inv. Schmitt Trig	364-800
QD 21	IC 74HC541 Octal buffer/line driver	364-781
QD 22	IC TL7702A Supply Voltage supervisors	364-820
QD 23	IC H6052-2 Smart Reset Activ Low	365-168

RESISTORS

R 1	R Metal Film 1K82 1% 0.5W TC50	114-182
R 2	R Metal Film 4K53 1% 0.5W TC50	114-453
R 3	R Metal Film 150K 1% 0.5W TC50	116-150
R 4	R Metal Film 1K00 5% 0.2W TC250	107-410
R 5	R Cermet Trimpot 100E 20% 0.5W TC70	182-317
R 6	R Metal Film 33K0 5% 0.2W TC250	107-533
R 7	R Metal Film 464K 1% 0.5W TC50	116-464
R 8	R Metal Film 33E0 5% 0.2W TC250	107-233

R 9	R Metal Film 604E 1% 0.5W TC50	113-604
R 10	R Metal Film 1K00 1% 0.5W TC50	114-100
R 11	R Metal Film 4K53 1% 0.5W TC50	114-453
R 12	R Metal Film 47K5 1% 0.5W TC50	115-475
R 13	R Metal Film 6K19 1% 0.5W TC50	114-619
R 14	R Metal Film 464K 1% 0.5W TC50	116-464
R 15	R Metal Film 1K00 1% 0.5W TC50	114-100
R 16	R Metal Film 33E0 5% 0.2W TC250	107-233
R 17	R Metal Film 4K99 1% 0.5W TC50	114-499
R 18	Potentiometer 10K	180-306
R 19	R Metal Film 4K99 1% 0.5W TC50	114-499
R 20	R Metal Film 1K00 5% 0.2W TC250	107-410
R 22	R Metal Film 10K0 1% 0.5W TC50	115-100
R 23	R Metal Film 4K99 1% 0.5W TC50	114-499
R 24	R Metal Film 1K82 1% 0.5W TC50	114-182
R 25	Potentiometer Tandem 2x10K LOG	180-305
R 26	R Metal Film 33E0 5% 0.2W TC250	107-233
R 27	R Metal Film 3K92 1% 0.5W TC50	114-392
R 29	R Metal Film 1K82 1% 0.5W TC50	114-182
R 30	R Metal Film 33E0 5% 0.2W TC250	107-233
R 31	R Metal Film 4K53 1% 0.5W TC50	114-453
R 32	R Metal Film 150K 1% 0.5W TC50	116-150
R 33	R Metal Film 1K00 5% 0.2W TC250	107-410
R 34	R Cermet Trimpot 100E 20% 0.5W TC70	182-317
R 35	R Metal Film 464K 1% 0.5W TC50	116-464
R 36	R Metal Film 604E 1% 0.5W TC50	113-604
R 37	R Metal Film 1K00 1% 0.5W TC50	114-100
R 38	R Metal Film 4K53 1% 0.5W TC50	114-453
R 39	R Metal Film 47K5 1% 0.5W TC50	115-475
R 40	R Metal Film 6K19 1% 0.5W TC50	114-619
R 41	R Metal Film 464K 1% 0.5W TC50	116-464
R 42	R Metal Film 1K00 1% 0.5W TC50	114-100
R 43	R Metal Film 33K0 5% 0.2W TC250	107-533
R 44	R Metal Film 4K99 1% 0.5W TC50	114-499
R 45	R Metal Film 3K92 1% 0.5W TC50	114-392
R 46	R Metal Film 1K00 5% 0.2W TC250	107-410
R 47	R Metal Film 4K99 1% 0.5W TC50	114-499
R 48	R Metal Film 1K82 1% 0.5W TC50	114-182
R 50	R Metal Film 10K0 1% 0.5W TC50	115-100
R 91	R Metal Film 6K04 1% 0.5W TC50	114-604
R 92	R Metal Film 6K04 1% 0.5W TC50	114-604
R 93	R Metal Film 7K68 1% 0.5W TC50	114-768
R 94	R Metal Film 10K0 1% 0.5W TC50	115-100
R 95	R Cermet Trimpot 200E 20% 0.5W TC70	182-315
R 96	R Metal Film 4K22 1% 0.5W TC50	114-422
R 97	R Metal Film 820E 5% 0.2W TC250	107-382
R 98	R Cermet Trimpot 2K2 20% 0.5W	182-313
R 99	R Metal Film 53K6 1% 0.5W TC50	115-536
R 100	R Metal Film 10K0 1% 0.5W TC50	115-100
R 101	R Metal Film 6K04 1% 0.5W TC50	114-604
R 102	R Metal Film 7K68 1% 0.5W TC50	114-768
R 103	R Metal Film 768E 1% 0.5W TC50	113-768
R 104	R Metal Film 1K37 1% 0.5W TC50	114-137
R 105	R Metal Film 1K15 1% 0.5W TC50	114-115

R 106	R Metal Film 1K18 1% 0.5W TC50	114-118
R 107	R Metal Film 442E 1% 0.5W TC50	113-442
R 108	R Metal Film 10K0 1% 0.5W TC50	115-100
R 109	R Metal Film 4K53 1% 0.5W TC50	114-453
R 110	R Metal Film 3K74 1% 0.5W TC50	114-374
R 111	R Metal Film 6K04 1% 0.5W TC50	114-604
R 112	R Metal Film 10K5 1% 0.5W TC50	115-105
R 113	R Metal Film 49K9 1% 0.5W TC50	115-499
R 114	R Metal Film 97E6 1% 0.5W TC50	112-976
R 115	R Metal Film 536E 1% 0.5W TC50	113-536
R 116	R Metal Film 732E 1% 0.5W TC50	113-732
R 117	R Metal Film 392E 1% 0.4W TC50	113-392
R 118	R Metal Film 16K9 1% 0.5W TC50	115-169
R 119	R Metal Film 1K00 1% 0.5W TC50	114-100
R 120	R Metal Film 1K00 1% 0.5W TC50	114-100
R 121	R Metal Film 33E0 5% 0.2W TC250	107-233
R 122	R Metal Film 33E0 5% 0.2W TC250	107-233
R 123	R Metal Film 33E0 5% 0.2W TC250	107-233
R 124	R Metal Film 1K00 1% 0.5W TC50	114-100
R 125	R Metal Film 1K00 1% 0.5W TC50	114-100
R 126	R Metal Film 1K00 1% 0.5W TC50	114-100
R 127	R Metal Film 1K00 1% 0.5W TC50	114-100
R 128	R Metal Film 1K00 1% 0.5W TC50	114-100
R 129	R Metal Film 1K00 1% 0.5W TC50	114-100
R 130	R Metal Film 1K02 1% 0.5W TC50	114-102
R 131	R Metal Film 866E 1% 0.5W TC50	113-866
R 132	R Metal Film 33E0 5% 0.2W TC250	107-233
R 133	R Metal Film 33E0 5% 0.2W TC250	107-233
R 134	R Metal Film 33E0 5% 0.2W TC250	107-233
R 135	R Metal Film 1K02 1% 0.5W TC50	114-102
R 136	R Metal Film 768E 1% 0.5W TC50	113-768
R 137	R Cermet Trimpot 100E 20% 0.5W TC70	182-317
R 138	R Cermet Trimpot 100E 20% 0.5W TC70	182-317
R 139	R Metal Film 6K04 1% 0.5W TC50	114-604
R 140	R Metal Film 6K04 1% 0.5W TC50	114-604
R 141	R Metal Film 7K68 1% 0.5W TC50	114-768
R 142	R Metal Film 10K0 1% 0.5W TC50	115-100
R 143	R Cermet Trimpot 200E 20% 0.5W TC70	182-315
R 144	R Metal Film 4K22 1% 0.5W TC50	114-422
R 145	R Metal Film 820E 5% 0.2W TC250	107-382
R 146	R Cermet Trimpot 2K2 20% 0.5W	182-313
R 147	R Metal Film 53K6 1% 0.5W TC50	115-536
R 148	R Metal Film 10K0 1% 0.5W TC50	115-100
R 149	R Metal Film 6K04 1% 0.5W TC50	114-604
R 150	R Metal Film 7K32 1% 0.5W TC50	114-732
R 151	R Metal Film 768E 1% 0.5W TC50	113-768
R 152	R Metal Film 1K37 1% 0.5W TC50	114-137
R 153	R Metal Film 1K15 1% 0.5W TC50	114-115
R 154	R Metal Film 1K18 1% 0.5W TC50	114-118
R 155	R Metal Film 442E 1% 0.5W TC50	113-442
R 156	R Metal Film 10K0 1% 0.5W TC50	115-100
R 157	R Metal Film 4K53 1% 0.5W TC50	114-453
R 158	R Metal Film 3K74 1% 0.5W TC50	114-374
R 159	R Metal Film 6K04 1% 0.5W TC50	114-604

R 160	R Metal Film 10K5 1% 0.5W TC50	115-105
R 161	R Metal Film 49K9 1% 0.5W TC50	115-499
R 162	R Metal Film 97E6 1% 0.5W TC50	112-976
R 163	R Metal Film 536E 1% 0.5W TC50	113-536
R 164	R Metal Film 732E 1% 0.5W TC50	113-732
R 165	R Metal Film 392E 1% 0.4W TC50	113-392
R 166	R Metal Film 16K9 1% 0.5W TC50	115-169
R 167	R Metal Film 1K00 1% 0.5W TC50	114-100
R 168	R Metal Film 1K00 1% 0.5W TC50	114-100
R 169	R Metal Film 33E0 5% 0.2W TC250	107-233
R 170	R Metal Film 33E0 5% 0.2W TC250	107-233
R 171	R Metal Film 33E0 5% 0.2W TC250	107-233
R 172	R Metal Film 1K00 1% 0.5W TC50	114-100
R 173	R Metal Film 1K00 1% 0.5W TC50	114-100
R 174	R Metal Film 1K00 1% 0.5W TC50	114-100
R 175	R Metal Film 1K00 1% 0.5W TC50	114-100
R 176	R Metal Film 1K00 1% 0.5W TC50	114-100
R 177	R Metal Film 1K00 1% 0.5W TC50	114-100
R 178	R Metal Film 1K02 1% 0.5W TC50	114-102
R 179	R Metal Film 866E 1% 0.5W TC50	113-866
R 180	R Metal Film 33E0 5% 0.2W TC250	107-233
R 181	R Metal Film 33E0 5% 0.2W TC250	107-233
R 182	R Metal Film 33E0 5% 0.2W TC250	107-233
R 183	R Metal Film 1K02 1% 0.5W TC50	114-102
R 184	R Metal Film 768E 1% 0.5W TC50	113-768
R 185	R Cermet Trimpot 100E 20% 0.5W TC70	182-317
R 186	R Cermet Trimpot 100E 20% 0.5W TC70	182-317
R 187	R Metal Film 3K74 1% 0.5W TC50	114-374
R 188	R Metal Film 12K7 1% 0.5W TC50	115-127
R 189	R Metal Film 787K 1% 0.5W TC50	116-787
R 190	R Metal Film 1K50 5% 0.2W TC250	107-415
R 191	R Metal Film 4K70 5% 0.2W TC250	107-447
R 192	R Metal Film 787K 1% 0.5W TC50	116-787
R 193	R Metal Film 12K7 1% 0.5W TC50	115-127
R 194	R Metal Film 2K43 1% 0.5W TC50	114-243
R 195	R Metal Film 10K0 1% 0.5W TC50	115-100
R 196	R Metal Film 220E 5% 0.2W TC250	107-322
R 197	R Metal Film 1K80 5% 0.2W TC250	107-418
R 198	R Metal Film 3K90 5% 0.2W TC250	107-439
R 199	R Metal Film 1K80 5% 0.2W TC250	107-418
R 200	R Metal Film 16K9 1% 0.5W TC50	115-169
R 201	R Metal Film 1K50 5% 0.2W TC250	107-415
R 202	R Metal Film 2K05 1% 0.4W TC50	114-205
R 203	R Metal Film 2K20 5% 0.2W TC250	107-422
R 204	R Cermet Trimpot 10K 20% 0.5W TC70	182-301
R 205	R Metal Film 1K00 1% 0.5W TC50	114-100
R 206	R Metal Film 33K0 5% 0.2W TC250	107-533
R 207	R Metal Film 12K7 1% 0.5W TC50	115-127
R 208	R Metal Film 82K5 1% 0.5W TC50	115-825
R 209	R Cermet Trimpot 22K 20% 0.3W TC70	182-303
R 210	R Metal Film 680E 5% 0.2W TC250	107-368
R 211	R Metal Film 82K5 1% 0.5W TC50	115-825
R 212	R Cermet Trimpot 22K 20% 0.3W TC70	182-303
R 213	R Metal Film 787K 1% 0.5W TC50	116-787

R 214	R Metal Film 2K05 1% 0.4W TC50	114-205
R 215	R Metal Film 787K 1% 0.5W TC50	116-787
R 216	R Metal Film 1K20 5% 0.2W TC250	107-412
R 217	R Metal Film 1K20 5% 0.2W TC250	107-412
R 218	R Metal Film 12K7 1% 0.5W TC50	115-127
R 219	R Metal Film 2K43 1% 0.5W TC50	114-243
R 220	R Metal Film 1K20 5% 0.2W TC250	107-412
R 221	R Metal Film 1K20 5% 0.2W TC250	107-412
R 222	R Metal Film 220E 5% 0.2W TC250	107-322
R 223	R Metal Film 150E 5% 0.2W TC250	107-315
R 224	R Metal Film 150E 5% 0.2W TC250	107-315
R 225	R Metal Film 100E 5% 0.2W TC250	107-310
R 226	R Metal Film 100E 5% 0.2W TC250	107-310
R 227	R Metal Film 150E 5% 0.2W TC250	107-315
R 228	R Metal Film 150E 5% 0.2W TC250	107-315
R 229	R Metal Film 33K0 5% 0.2W TC250	107-533
R 230	R Metal Film 10K0 1% 0.5W TC50	115-100
R 231	R Metal Film 10K0 0.1% 0.1W TC25	141-010
R 232	R Metal Film 10K0 0.1% 0.1W TC25	141-010
R 233	R Metal Film 1M00 1% 0.5W TC50	117-100
R 234	R Metal Film 60K4 1% 0.5W TC50	115-604
R 235	R Metal Film 10K7 0.5% 0.4W TC50	140-840
R 236	R Metal Film 10K0 0.1% 0.1W TC25	141-010
R 237	R Metal Film 215K 1% 0.5W TC50	116-215
R 238	R Metal Film 681K 1% 0.5W TC50	116-681
R 239	R Cermet Trimpot 100K 20% 0.5W TC70	182-311
R 240	R Cermet Trimpot 47K 20% 0.5W TC70	182-314
R 241	R Carbon Film 15M 10% 1/8W 140PPM	109-016
R 242	R Metal Film 3K01 1% 0.5W TC50	114-301
R 243	R Cermet Trimpot 100K 20% 0.5W TC70	182-311
R 244	R Cermet Trimpot 100K 20% 0.5W TC70	182-311
R 245	R Metal Film 3K01 1% 0.5W TC50	114-301
R 246	R Metal Film 10K0 1% 0.5W TC50	115-100
R 247	R Metal Film 2K20 5% 0.2W TC250	107-422
R 248	R Metal Film 560E 5% 0.2W TC250	107-356
R 249	R Metal Film 47E0 5% 0.2W TC250	107-247
R 250	R Metal Film 47E0 5% 0.2W TC250	107-247
R 251	R Metal Film 47E0 5% 0.2W TC250	107-247
R 252	R Metal Film 47E0 5% 0.2W TC250	107-247
R 253	R Metal Film 4K42 1% 0.5W TC50	114-442
R 254	R Metal Film 2K21 1% 0.5W TC50	114-221
R 255	R Metal Film 3K01 1% 0.5W TC50	114-301
R 256	R Metal Film 3K01 1% 0.5W TC50	114-301
R 257	R Metal Film 47E0 5% 0.2W TC250	107-247
R 258	R Metal Film 47E0 5% 0.2W TC250	107-247
R 259	R Metal Film 4K42 1% 0.5W TC50	114-442
R 260	R Metal Film 3K01 1% 0.5W TC50	114-301
R 261	R Metal Film 3K01 1% 0.5W TC50	114-301
R 262	R Metal Film 1K47 1% 0.5W TC50	114-147
R 263	R Metal Film 47E0 5% 0.2W TC250	107-247
R 264	R Metal Film 47E0 5% 0.2W TC250	107-247
R 271	R Thick Film SIL 4*10K 5% 0.1W	146-017
R 273	R Metal Film 1K00 1% 0.5W TC50	114-100
R 274	R Metal Film 1K00 5% 0.2W TC250	107-410

R 275	R Metal Film 4K99 1% 0.5W TC50	114-499
R 276	R Cermet Trimpot 1K 10% 0.5W TC70	182-310
R 277	R Metal Film 4K99 1% 0.5W TC50	114-499
R 278	R Thick Film SIL 4*10K 5% 0.1W	146-017
R 279	R Metal Film 33E0 5% 0.2W TC250	107-233
R 280	R Metal Film 22K0 5% 0.2W TC250	107-522
R 281	R Metal Film 68K0 5% 0.2W TC250	107-568
R 282	R Metal Film 560E 5% 0.2W TC250	107-356
R 283	R Metal Film 22K0 5% 0.2W TC250	107-522
R 284	R Metal Film 33E0 5% 0.2W TC250	107-233
R 285	R Metal Film 470E 5% 0.2W TC250	107-347
R 286	R Metal Film 100K 5% 0.2W TC250	107-610
R 287	R Metal Film 8K66 1% 0.5W TC50	114-866
R 288	R Metal Film 1K00 5% 0.2W TC250	107-410
R 289	R Metal Film 1K00 5% 0.2W TC250	107-410
R 290	R Metal Film 10K0 5% 0.2W TC250	107-510
R 291	R Cermet Trimpot 10K 20% 0.5W TC70	182-301
R 292	R Metal Film 100K 5% 0.2W TC250	107-610
R 293	R Cermet Trimpot 10K 20% 0.75W TC70	182-320
R 294	R Metal Film 17K4 1% 0.5W TC50	115-174
R 295	R Metal Film 4K99 1% 0.5W TC50	114-499
R 296	R Metal Film 10K0 1% 0.5W TC50	115-100
R 297	R Metal Film 20K0 1% 0.5W TC50	115-200
R 298	R Metal Film 15K0 1% 0.5W TC50	115-150
R 299	R Metal Film 24K9 1% 0.5W TC50	115-249
R 300	R Metal Film 51K1 1% 0.5W TC50	115-511
R 301	R Metal Film 13E7 1% 0.5W TC50	112-137
R 305	R Metal Film 10K0 5% 0.2W TC250	107-510
R 307	R Metal Film 1M00 1% 0.5W TC50	117-100
R 308	R Metal Film 15K0 1% 0.5W TC50	115-150
R 311	R Metal Film 10K7 1% 0.5W TC50	115-107
R 320	R Metal Film 47K0 5% 0.2W TC250	107-547
R 321	Potentiometer 10K	180-306
R 323	R Metal Film 12K1 1% 0.5W TC50	115-121
R 324	R Cermet Trimpot 10K 20% 0.5W TC70	182-301
R 326	R Metal Film 47K5 1% 0.5W TC50	115-475
R 328	R Metal Film 33E0 5% 0.2W TC250	107-233
R 331	R Metal Film 33E0 5% 0.2W TC250	107-233
R 333	R Metal Film 2K70 5% 0.2W TC250	107-427
R 334	R Thick Film SIL 8*18K	146-008
R 335	R Thick Film SIL 8*18K	146-008
R 336	R Thick Film DIL 8*560E 2% 0.2W	146-019
R 337	R Thick Film DIL 8*560E 2% 0.2W	146-019
R 338	R Metal Film 10K0 5% 0.2W TC250	107-510
R 339	R Thick Film SIL 8*18K	146-008
R 341	R Thick Film DIL 8*390E 2% 0.2W	146-020
R 343	R Metal Film 390E 5% 0.2W TC250	107-339
R 344	R Metal Film 10K0 5% 0.2W TC250	107-510
R 345	R Metal Film 10K0 5% 0.2W TC250	107-510
R 346	R Metal Film 475E 1% 0.5W TC50	113-475
R 347	R Metal Film 10K0 1% 0.5W TC50	115-100
R 348	R Metal Film 2K05 1% 0.4W TC50	114-205
R 349	R Carbon Film 820E 5% 0.2W	106-382
R 350	R Metal Film 464K 1% 0.5W TC50	116-464

R 351	R Metal Film 2K05 1% 0.4W TC50	114-205
R 352	R Metal Film 475E 1% 0.5W TC50	113-475
R 353	Potentiometer 10K	180-306
R 354	R Metal Film 2K05 1% 0.4W TC50	114-205
R 355	R Metal Film 2K05 1% 0.4W TC50	114-205
R 356	R Metal Film 1K37 1% 0.5W TC50	114-137
R 357	R Metal Film 10K0 1% 0.5W TC50	115-100
R 358	R Metal Film 464K 1% 0.5W TC50	116-464
R 359	R Metal Film 2K05 1% 0.4W TC50	114-205
R 360	Potentiometer 10K	180-306
R 362	R Metal Film 2K05 1% 0.4W TC50	114-205
R 363	R Metal Film 1K37 1% 0.5W TC50	114-137
R 364	R Metal Film 33E0 5% 0.2W TC250	107-233
R 365	R Metal Film 475E 1% 0.5W TC50	113-475
R 366	R Metal Film 33E0 5% 0.2W TC250	107-233
R 367	R Metal Film 10K0 1% 0.5W TC50	115-100
R 368	R Metal Film 464K 1% 0.5W TC50	116-464
R 369	R Metal Film 2K05 1% 0.4W TC50	114-205
R 371	R Metal Film 2K05 1% 0.4W TC50	114-205
R 373	R Metal Film 1K00 5% 0.2W TC250	107-410
R 374	Sensistor 2K AT 25C PTC KTY 10-7	160-055
R 375	R Metal Film 47K0 5% 0.2W TC250	107-547
R 376	R Metal Film 1K00 1% 0.5W TC50	114-100
R 377	R Metal Film 100E 5% 0.2W TC250	107-310
R 378	R Metal Film 1K58 1% 0.5W TC50	114-158
R 379	R Metal Film 549K 1% 0.5W TC50	116-549
R 380	R Metal Film 100E 5% 0.2W TC250	107-310
R 381	R Metal Film 48K7 1% 0.5W TC50	115-487
R 382	R Metal Film 4K99 1% 0.5W TC50	114-499
R 383	R Metal Film 1K00 5% 0.2W TC250	107-410
R 384	R Metal Film 33E0 5% 0.2W TC250	107-233
R 385	R Metal Film 3K01 1% 0.5W TC50	114-301
R 386	R Metal Film 1K00 5% 0.2W TC250	107-410
R 387	R Cermet Trimpot 4K7 20% 0.5W TC70	182-312
R 388	R Metal Film 110K 1% 0.5W TC50	116-110
R 389	R Metal Film 1K00 5% 0.2W TC250	107-410
R 390	R Metal Film 1M00 1% 0.5W TC50	117-100
R 391	R Metal Film 887E 1% 0.5W TC50	113-887
R 392	R Metal Film 4K99 1% 0.5W TC50	114-499
R 393	R Cermet Trimpot 200E 20% 0.5W TC70	182-315
R 394	R Metal Film 681E 1% 0.5W TC50	113-681
R 395	R Cermet Trimpot 470E 20% 0.5W TC70	182-302
R 396	R Metal Film 4K70 5% 0.2W TC250	107-447
R 397	R Metal Film 499E 1% 0.5W TC50	113-499
R 398	R Metal Film 2K00 1% 0.5W TC50	114-200
R 399	R Potentiometer 1K 20% 1W	180-307
R 400	R Metal Film 3K74 1% 0.5W TC50	114-374
R 401	R Metal Film 3K16 1% 0.5W TC50	114-316
R 402	R Metal Film 48E7 1% 0.5W TC50	112-487
R 403	R Metal Film 1K30 1% 0.5W TC50	114-130
R 404	R Metal Film 1K30 1% 0.5W TC50	114-130
R 405	R Metal Film 2K00 1% 0.5W TC50	114-200
R 406	R Metal Film 1M00 5% 0.2W TC250	107-710
R 407	R Metal Film 649E 1% 0.5W TC50	113-649

R 408	R Cermet Trimpot 100K 20% 0.5W TC70	182-311
R 409	R Metal Film 1K00 1% 0.5W TC50	114-100
R 410	R Metal Film 2K55 1% 0.5W TC50	114-255
R 411	R Metal Film 4K70 5% 0.2W TC250	107-447
R 412	R Metal Film 33K0 5% 0.2W TC250	107-533
R 413	R Metal Film 2K00 1% 0.5W TC50	114-200
R 414	R Metal Film 33K0 5% 0.2W TC250	107-533
R 415	R Metal Film 48E7 1% 0.5W TC50	112-487
R 416	R Metal Film 3K01 1% 0.5W TC50	114-301
R 417	R Metal Film 2K00 1% 0.5W TC50	114-200
R 418	R Metal Film 5K36 1% 0.5W TC50	114-536
R 419	R Metal Film 33K0 5% 0.2W TC250	107-533
R 420	R Metal Film 1K50 1% 0.5W TC50	114-150
R 421	R Metal Film 1M00 5% 0.2W TC250	107-710
R 422	R Metal Film 33K0 5% 0.2W TC250	107-533
R 423	R Metal Film 1M00 5% 0.2W TC250	107-710
R 424	R Cermet Trimpot 100K 20% 0.5W TC70	182-311
R 425	R Metal Film 1K00 1% 0.5W TC50	114-100
R 426	R Cermet Trimpot 100K 20% 0.5W TC70	182-311
R 427	R Metal Film 1K21 1% 0.5W TC50	114-121
R 428	R Metal Film 33K0 5% 0.2W TC250	107-533
R 429	R Metal Film 2K00 1% 0.5W TC50	114-200
R 430	R Metal Film 33K0 5% 0.2W TC250	107-533
R 431	R Metal Film 2K00 1% 0.5W TC50	114-200
R 432	R Metal Film 100E 5% 0.2W TC250	107-310
R 435	R Metal Film 20K0 1% 0.5W TC50	115-200
R 436	R Metal Film 1M00 5% 0.2W TC250	107-710
R 437	R Cermet Trimpot 100K 20% 0.5W TC70	182-311
R 438	R Metal Film 1K00 1% 0.5W TC50	114-100
R 447	R Metal Film 9K31 1% 0.5W TC50	114-931
R 449	R Metal Film 33K0 5% 0.2W TC250	107-533
R 450	R Metal Film 33K0 5% 0.2W TC250	107-533
R 453	R Metal Film 3K01 1% 0.5W TC50	114-301
R 461	R Metal Film 10K0 5% 0.2W TC250	107-510
R 462	R Metal Film 10M 1% TC50 0.6W	118-100
R 463	R Metal Film 10K0 5% 0.2W TC250	107-510
R 464	R Metal Film 10K0 5% 0.2W TC250	107-510
R 466	R Thick Film SIL 8*10K	146-003
R 467	R Metal Film 825E 1% 0.4W TC50	113-825
R 468	R Metal Film 1K21 1% 0.5W TC50	114-121
R 469	R Metal Film 4K99 1% 0.5W TC50	114-499
R 470	R Cermet Trimpot 10K 20% 0.5W TC70	182-301
R 473	R Metal Film 2K10 1% 0.5W TC50	114-210
R 474	R Metal Film 33E0 5% 0.2W TC250	107-233
R 475	R Metal Film 33E0 5% 0.2W TC250	107-233
R 476	R Metal Film 33E0 5% 0.2W TC250	107-233
R 477	R Metal Film 33E0 5% 0.2W TC250	107-233
R 480	R Metal Film 10K0 1% 0.5W TC50	115-100
R 481	R Cermet Trimpot 10K 20% 0.5W TC70	182-301
R 482	R Metal Film 3K01 1% 0.5W TC50	114-301
R 483	R Metal Film 2K05 1% 0.4W TC50	114-205
R 485	Sensistor 2K AT 25C PTC KTY 10-7	160-055
R 486	R Metal Film 464E 1% 0.4W TC50	113-464
R 487	R Metal Film 27K4 1% 0.5W TC50	115-274

R 488	R Metal Film 5K49 1% 0.5W TC50	114-549
R 489	R Metal Film 825K 1% 0.5W TC50	116-825
R 490	R Metal Film 10K0 5% 0.2W TC250	107-510
R 491	R Metal Film 3K01 1% 0.5W TC50	114-301
R 492	R Metal Film 27K4 1% 0.5W TC50	115-274
R 493	R Metal Film 1K00 5% 0.2W TC250	107-410
R 494	R Cermet Trimpot 1K 10% 0.5W TC70	182-310
R 496	R Cermet Trimpot 470E 20% 0.5W TC70	182-302
R 497	R Cermet Trimpot 470E 20% 0.5W TC70	182-302
R 499	R Cermet Trimpot 1K 10% 0.5W TC70	182-310
R 500	R Cermet Trimpot 1K 10% 0.5W TC70	182-310
R 501	R Metal Film 124E 1% 0.4W TC50	113-124
R 502	R Metal Film 470E 5% 0.2W TC250	107-347
R 503	R Metal Film 470E 5% 0.2W TC250	107-347
R 504	R Metal Film 470E 5% 0.2W TC250	107-347
R 505	R Metal Film 470E 5% 0.2W TC250	107-347
R 506	R Metal Film 470E 5% 0.2W TC250	107-347
R 507	R Metal Film 470E 5% 0.2W TC250	107-347
R 508	R Metal Film 470E 5% 0.2W TC250	107-347
R 509	R Metal Film 470E 5% 0.2W TC250	107-347
R 510	R Metal Film 470E 5% 0.2W TC250	107-347
R 511	R Metal Film 470E 5% 0.2W TC250	107-347
R 512	R Metal Film 470E 5% 0.2W TC250	107-347
R 513	R Metal Film 470E 5% 0.2W TC250	107-347
R 514	R Metal Film 470E 5% 0.2W TC250	107-347
R 515	R Metal Film 470E 5% 0.2W TC250	107-347
R 516	R Metal Film 470E 5% 0.2W TC250	107-347
R 517	R Metal Film 470E 5% 0.2W TC250	107-347
R 518	R Metal Film 1E00 1% 0.4W TC50	111-100

TESTPOINTS

TP 1	3 Pin AMP mod II Terminal List, Straight	805-894
TP 2	3 Pin AMP mod II Terminal List, Straight	805-894
TP 3	3 Pin AMP mod II Terminal List, Straight	805-894
TP 4	3 Pin AMP mod II Terminal List, Straight	805-894
TP 5	3 Pin AMP mod II Terminal List, Straight	805-894
TP 6	3 Pin AMP mod II Terminal List, Straight	805-894
TP 7	3 Pin AMP mod II Terminal List, Straight	805-894
TP 8	3 Pin AMP mod II Terminal List, Straight	805-894
TP 9	3 Pin AMP mod II Terminal List, Straight	805-894
TP 10	3 Pin AMP mod II Terminal List, Straight	805-894
TP 11	3 Pin AMP mod II Terminal List, Straight	805-894
TP 12	3 Pin AMP mod II Terminal List, Straight	805-894
TP 13	4 Pin Connector Male mod II W. Lock	805-901
TP 14	Term. strip 50pol mod 2	806-072
TP 15	3 Pin AMP mod II Terminal List, Straight	805-894
TP 16	6 Pin Connector Male mod II W. Lock	805-896
TP 17	3 Pin AMP mod II Terminal List, Straight	805-894
TP 18	Term. strip 50pol mod 2	806-072

CABLES

W 1	Cable For RE521 MPX-OUT	618-073
W 2	Cable For RE521 MPX-OUT	618-073
W 5	Term. strip 50pol mod 2	806-072
W 6	Term. strip 50pol mod 2	806-072
W 13	Term. strip 50pol mod 2	806-072

CRYSTALS

Y 1	Crystal 4.56 MHz	910-105
Y 2	X-Tal 2.4576MHz 50ppm	910-248

MISCELLANEOUS

	Screw Pozidrive panhead M3x6	008-306
	Nut Rectangular M3 for to220	035-909
	Scale For RE521	484-087
	Female Plug	805-718
	Socket DIL 14 pol, h:4.95 300mil	816-131
	Mounting Acc. for TO-220	816-163
	Socket DIL 40 pol, h:4.95 600mil	816-179
	Socket DIL 20 pol, h:4.95 300mil	816-184
	Insulation Bushing F. TO-220	816-214
	Isolating Plate F.Crystal	816-287
	TY-Wrap 150X3.6mm	832-200
	Angle For Potmeter RE521	933-060
	Angle For RE521	933-062
	Angle For 9 Potmeter For RE521	933-066
	PCB For RE521 Mainboart''	971-522
C1.C	C Ceramic 100n 20% 50V	213-401
C2.C	C Ceramic 100n 20% 50V	213-401
C3.C	C Ceramic 150p 2% 100V N750	213-212
C4.C	C Ceramic 150p 2% 100V N750	213-212
CR2.F2	LED 3mm green	350-060
CR3.F1	LED 3mm red	350-043
CR4.F1	LED 3mm red	350-043
CR5.F1	LED 3mm red	350-043
CR6.F1	LED 3mm red	350-043
J1.C	Conn 7 Pol W.Cat Ear Ter	806-151
QA1.C	IC LM833N Dual Low Noise OPamp	365-037
R1.C	R Metal Film 1K30 1% 0.5W TC50	114-130
R2.C	R Cermet Trimpot 1K 20% 0.75W TC70	182-325
R3.C	R Metal Film 33K2 1% 0.5W TC50	115-332
R4.C	R Metal Film 1K30 1% 0.5W TC50	114-130
R5.C	R Cermet Trimpot 1K 20% 0.75W TC70	182-325
R6.C	R Metal Film 33K2 1% 0.5W TC50	115-332
SW 1	Toggle Switch For PCB W/Loch	500-203
SW 2	Toggle Switch For PCB W/Loch	500-203
SW 3	Toggle Switch For PCB W/Loch	500-203
SW 6	Toggle Switch For PCB W/Loch	500-203

8. EQUIPMENT AND ACCESSORIES

This section contains a list of the accessories supplied with the RE 524 FM Stereo Coder and a list of available options.

8.1 Standard Equipment and Accessories

The following equipment and accessories should be found when unpacking the RE 524 FM Stereo Coder:

Code	Type	Description
391-074	RE 524	FM Stereo Coder
615-303	220 V	Line cord, 2.5 m
450-017	0.5 A	Fuse, slow blow
983-416		Operating/Servicing Manual
983-715		Installation Instructions

Table 8.1 - Standard Equipment and Accessories

8.2 Available Options

Presently there are no available options for the RE 524.

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9. SPECIFICATIONS

This section contains a full specification for the instrument. The listed data is guaranteed data unless otherwise indicated.

L and R Inputs

Frequency response	< ±0.1 dB, 20 Hz to 15 kHz < -65 dB, 19 kHz < -60 dB, > 19 kHz
Group delay variation, each channel	< ±1 μsec, 20 Hz to 9 kHz
Group delay difference, between channels	< ±1 μsec, 20 Hz to 9 kHz < ±3 μsec, 9 kHz to 15 kHz
Limiting level	> 15 dBu
Impedance	600 Ω or 47 kΩ, balanced
CMRR	> 60 dB, 20 Hz to 20 kHz > 55 dB, 20 kHz to 75 kHz

RDS/ARI/SCA Inputs

Number of independent inputs	2
Frequency response	< ±0.1 dB, 50 kHz to 75 kHz < ±0.3 dB, 50 kHz to 100 kHz
Impedance	10 kΩ, unbalanced
Nominal gain to MPX output	-6.2 dB

Pre-emphasis

Time constants	0,25,50,75 μsec

Composite Outputs

Impedance	< 1 Ω, unbalanced
Load	> 5 nF//75 Ω
Limiting level	> 15 dBu
DC level	< ±10 mV or AC coupled

Separation

L to R	> 65 dB, 80 Hz to 5 kHz > 60 dB, 40 Hz to 10 kHz > 55 dB, 20 Hz to 15 kHz > 66 dB, L = R > 60 dB, L = -R

Distortion (Stereo)

THD @ +6 dBu	< -70 dB (0.03%)
DIN 45403 intermodulation at +6 dBu,14/15 kHz	< -65 dB, 2nd order < -65 dB, 3rd order

Distortion (Mono)

THD @ +6 dBu	< -80 dB (0.01%)
DIN 45403 intermodulation at +6 dBu,14/15 kHz	< -75 dB, 2nd order < -75 dB, 3rd order

Residuals

38 kHz	< -64 dB rel. to +6 dBu
Spurious above 53 kHz	< -60 dB rel. to +6 dBu

Hum and Noise (Stereo)

Unweighted S/N ratio	DIN BP	> 83 dB rel. to +6 dBu
	CCIR BP	> 80 dB rel. to +6 dBu
Weighted S/N ratio	DIN A	> 83 dB rel. to +6 dBu
	CCIR 468	> 77 dB rel. to +6 dBu

Hum and Noise (Mono)

Unweighted S/N ratio	DIN BP	> 86 dB rel. to +6 dBu
	CCIR BP	> 82 dB rel. to +6 dBu
Weighted S/N ratio	DIN A	> 86 dB rel. to +6 dBu
	CCIR 468	> 80 dB rel. to +6 dBu

Pilot

Frequency	19 kHz ±0.5 Hz
Level	-13 to -6 dBu
Phase deviation	< ±0.3 ° (ref.38 kHz)
Sync Output	0.9 to 1.8 Vpp square wave

Meter

MPX	+6.0 dBu, ±6 dB range
Pilot	-9.5 dBu, ±6 dB range
L,R	+6.0 dBu, ±6 dB range

General

Temperature

Operating	5 to 45 °C (41 to 113 °F)
Storage	-40 to +70 °C (-40 to 158 °F)

Relative humidity	20 to 80%, non condensing
Line	
Voltage	95 V to 130 V AC (Optional) 190 V to 260 V AC
Frequency	47,5 Hz to 63 Hz
Power consumption	< 30 VA
Dimensions and weight	
Height	44 mm (1,7")
Width	440 mm (17,3")
Depth	400 mm (15,8")
Net weight	4 kg (8,8 lbs)
Shipping weight	8 kg (17,6 lbs)

Data subject to change

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11. MISCELLANEOUS

11.1 RE 524 Mechanical Assembly

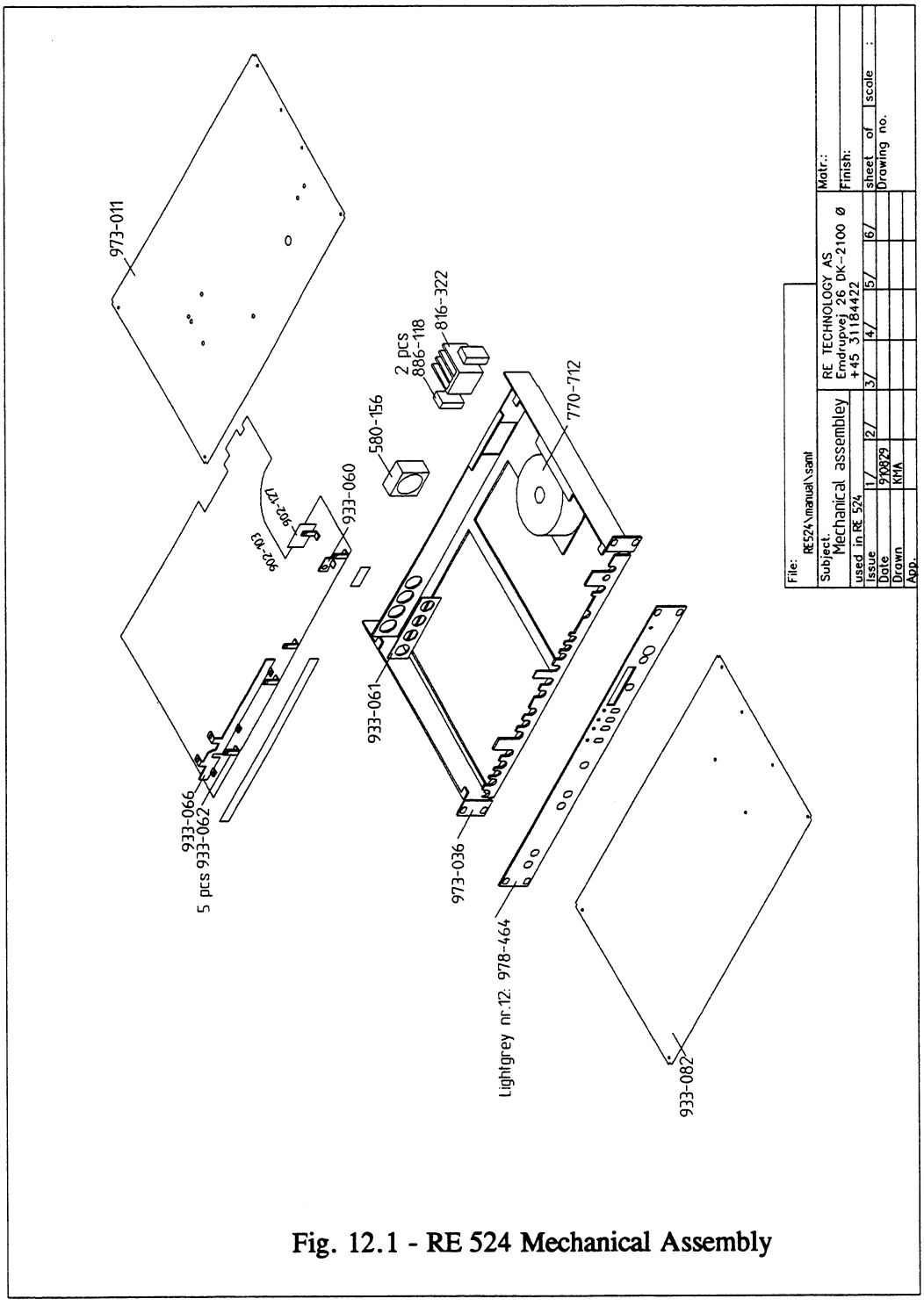

Fig. 12.1 - RE 524 Mechanical Assembly

983-416