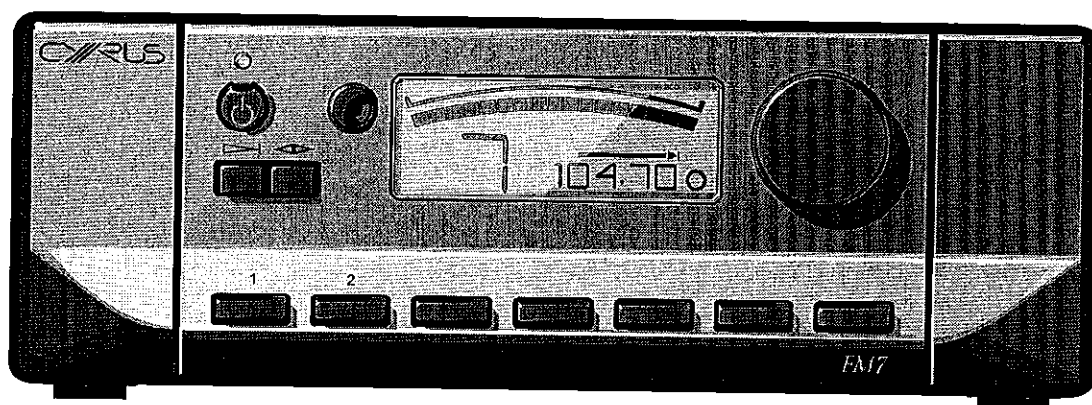


CYRUS FM7 STEREO FM TUNER

SERVICE MANUAL

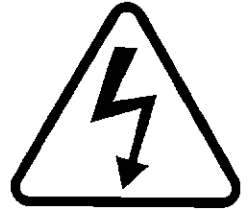


SPECIFICATIONS

50dB S/N Ratio:	12dBuV (Mono) 30dBuV (Stereo)
Ultimate S/N Ratio:	83dB (Mono) 76dB (Stereo)
T.H.D:	0.2% @ 75kHz deviation (Mono) 0.25% @ 75kHz deviation (Stereo)
Channel separation	>50dB
Pilot tone suppression	68dB
Output level	775mV @ 95% modulation
Dimensions (H x W x D)	73 x 215 x 360 (mm), 2.8 x 8.4 x 14.1 (inches)
Weight	2.7kg
Finish	Black

CYRUS

CYRUS FM7 SERVICE MANUAL CAUTIONS



These two symbols shown are displayed prominently on the Cyrus FM7 base cover label. They indicate that the following cautions must be observed by all personnel-

***CAUTION: TO REDUCE THE RISK OF ELECTRICAL SHOCK, DO NOT REMOVE COVER OR BACK.
THERE ARE NO USER SERVICEABLE PARTS INSIDE THE PRODUCT.
ALWAYS REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.***

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.....

CYRUS FM7 TYPE IDENTIFICATION

Rating label

The Cyrus FM7 is manufactured to meet the power requirements of different world markets. Each FM7 carries a rating label on the rear panel which includes details of the following:

Nominal power voltage

This will be either 230V For use on nominal 220V - 240V AC mains supply.
 115V For use on nominal 110V - 120V AC mains supply

If it becomes necessary to adjust the nominal voltage for use in another zone, the power transformer and the power fuse must *both* be replaced with original parts from Cyrus to be the correct type for the new zone

AC fuse rating

The AC fuse rating is also shown on the label. If replacing the AC fuse it is essential that the replacement fuse is exactly the same specification as the original fuse, supplied by Cyrus. All mains fuses have a 'Timelag' blow characteristic.

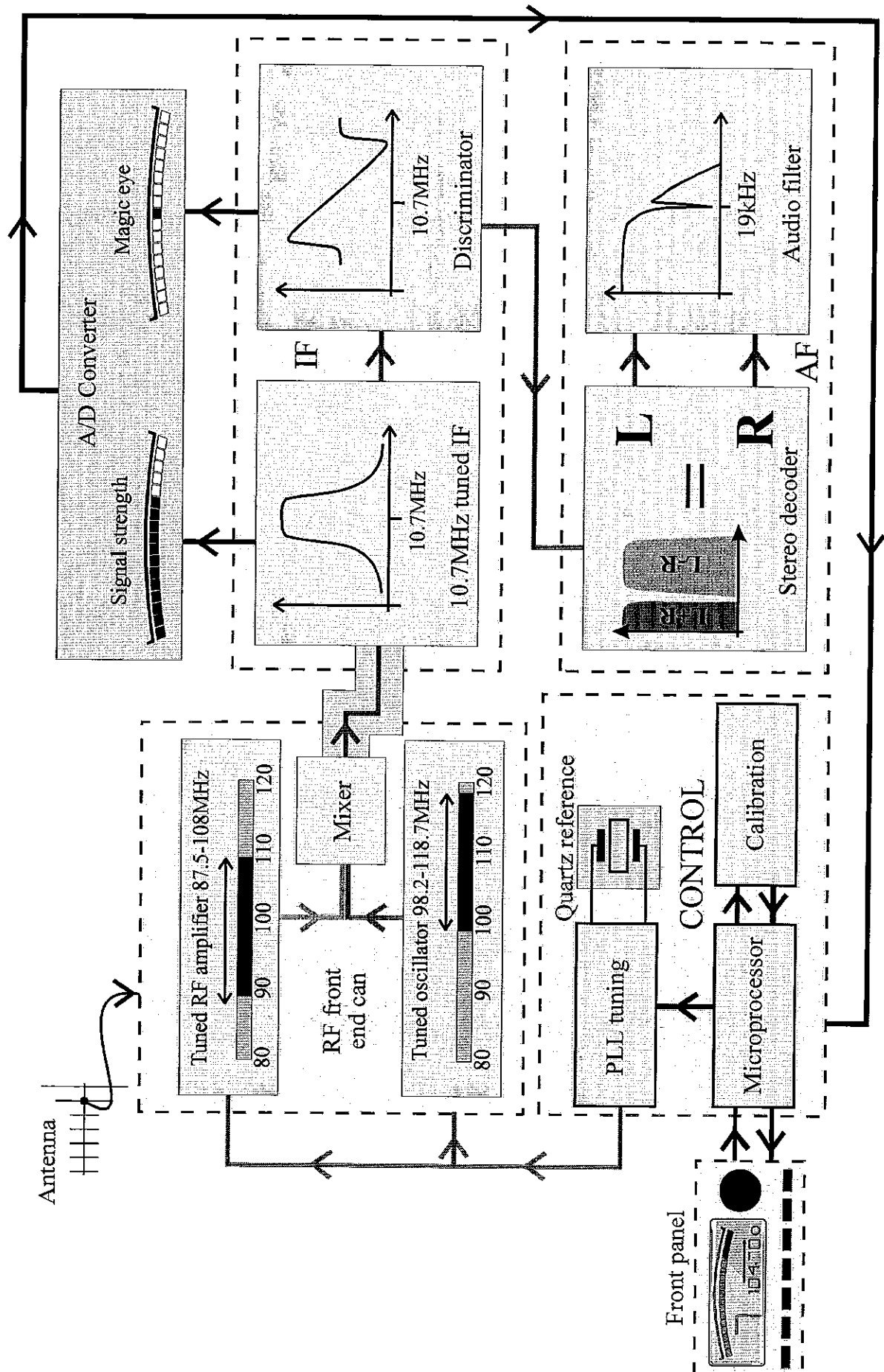
Serial number

Each Cyrus FM7 carries a serial number code which identifies the following-

- Type of product
- Market destination
- Build number

The serial number is visible through a window in the baseplate caution label. It is therefore important to ensure that a baseplate removed from a product is re-fitted to the same product. In any communications with Cyrus Service or Quality departments it is essential that the full serial number is quoted so that original specification parts and service information may be supplied.

CYRUS FM7 BLOCK DIAGRAM



Main board

The main board contains the power supply circuit, RF front end module, IF filter strip, FM demodulator, FM decoder, pilot filter and microcontroller with interface connections to the front panel/display board.

Analogue power supplies

These are derived from the high voltage AC windings of the transformer. This AC supply is rectified by D210 and D211 and smoothed by C217 to produce a high voltage DC supply (about +15V). This is then regulated down to +12V via VR203 and VR204.

The RF section (sheet 1, RF Front end, IF filter and demodulator) is supplied by a switched +12V DC supply, called RFB. This is supplied from VR203 and switched via the microcontroller by T206. VCCR is also derived from VR203, but is non switched and supplies only the PLL.

The audio section (sheet 2, FM decoder and pilot filter) is supplied by a +12V DC supply from VR204, VCCA.

Digital power supplies

These are derived from the low voltage AC windings of the transformer. This AC supply is rectified by D208 and D209 and smoothed by C216 to produce a DC supply of +8.6V. This is then regulated down to +5V by VR201 and VR202.

The microcontroller IC202 is supplied by VDD1 from VR201 (+5V).

The front panel is also supplied by VDD1, but the backlight for the display is supplied solely by VR202 which is switched by T205 from the microcontroller.

RF front end

The RF signal from an external antenna is connected to the unit via the aerial socket. This is connected directly to the front end module FE101. The front end module is tuned by the microcontroller via the PLL (Phase locked loop) IC, IC101. When a new tuning frequency is selected, the microcontroller sends the tuning frequency information to the PLL through the data lines SDA and SCLK. The PLL IC will then set the correct tuning voltage for the front end - VT. Through the Fosc input, the PLL IC can monitor the local oscillator frequency from the front end, comparing this to the tuning reference oscillator X101, ensuring constant accurate tuning.

The incoming signal (from the antenna) is amplified inside the front end. The amplified signal is then mixed together with the modules local oscillator, which runs at 10.7MHz above the tuned frequency. This mixer stage will output an image of the RF input signal but set at a constant 10.7MHz, regardless of tuned frequency for next stage amplification. This signal is called the IF (intermediate frequency) signal and is output from the Front End pin 7.

IF strip

The IF output from the module then goes into the IF strip, which is a set of bandpass filters (FIL101, 102 & 103) set at 10.7MHz. Amplifiers IC102 and IC103 restore the amplitude due to filter insertion losses. The filtered signal then feeds into the FM demodulator.

FM demodulator

The audio content of the signal is now derived via the FM demodulator (IC104). This uses a double coil FM discriminator (TC101 and TC102) to detect the audio. The audio output is present on pin 6 of IC104, and is called the MPX signal. The double coil discriminator requires critical alignment to

CYRUS FM7 TECHNICAL DESCRIPTION

achieve the required audio performance - see the 'Alignment' section of this manual for the required procedure.

The FM demodulator also sends a signal level indicator (SIGMET), station found signal (STOP) and fine tuning signals (EYEREF & EYEVAR) to the microcontroller IC202. RV101 is used to set the minimum sensitivity for when a station is found (30 dBuV).

Stereo decoder

The level of the MPX signal is then set by level pre-set RV103, which is adjusted to set the audio output to 775mV for a 75kHz modulated signal at 1 kHz.

The signal is then fed to IC105, the stereo decoder, which outputs a decoded stereo signal (if the signal is strong enough) via PIN 5 and 8. If stereo is detected then a signal is sent to the microcontroller via the /STEREO line.

The microcontroller can also set the decoder for mono reception via the /MONO line and mute the decoder output via the MUTE line.

Pilot filter/output drive

The stereo output has a significant 19KHz content (pilot) and excess high frequency noise, which are by-products of the stereo decoding action. These unwanted signals are filtered out by IC106/IC107 and their associated components. IC106/107 (part A) form an active 19KHz notch filter which is followed by a passive 27kHz notch. These add together to give a low pass response up to 15kHz. Subsequent frequencies are heavily filtered.

The output signal is then buffered by IC106/107 (part B) and outputted via the phono socket SK102.

Control circuits

The microcontroller IC (IC202) controls all functions of the tuner, writing to the display and reading the front panel commands via the interface cable CON201. The microcontroller includes a main microprocessor unit with additional internal ROM to define the operation of the product.

The microcontroller communicates to the PLL IC (IC101, to set tuning frequency), the NVRAM IC (IC201, storage of settings) and the display module via a common serial bus, the SDA and SCLK lines. A system of unique addresses for these ICs enables each IC to read/write the correct data.

Storage of settings and calibration data is achieved through the use of IC201, a non-volatile memory which electrically retains the data without the requirement for battery backup.

The analogue signal level and station tuning voltages from the FM demodulator are read by the microcontroller via an ADC (analogue to digital converter) with three selectable inputs (IC203/T202/T203/T204 etc). The output from the ADC is a variable length pulse signal where the pulse length is proportional to the input voltage. The ADC is implemented by using a ramp generator (IC203 - part A), which is reset by the microcontroller via RSRAMP (pin 16). A voltage comparator compares the level of the ramp to the selected input voltage and changes state when the ramp and input voltages are equal. The microcontroller selects which of the analogue input signals (EYEREF, EYEVAR & SIGMET) it requires to monitor via switches T202, T203 & T204 and the converted digital signal from the ADC is inputted to the microcontroller via /IRQ (Pin 39). The data collected by the microcontroller from the ADC is used to update the signal strength and fine tuning displays.

The alignment section of this manual describes in detail the storage of calibration settings in the NVRAM.

Front panel board

The tuning control, selector keys, remote signal sensor and display are all mounted on the front panel board. Operational commands are received at this board and communicated to the microcontroller via the interface cable CON201. Display information from the microcontroller is addressed through this cable to the display and written to the LCD module via a shift register/decoder.

CYRUS FM7 FAULT FINDING

The recommended procedure for finding signal faults which occur in the FM7 tuner is as follows-

- Check internal power supplies.
- Check tuning voltage.
- Trace audio signal.

POWER SUPPLY VOLTAGE TESTS

Each of the power supplies should be checked in sequence. Connect the mains power to the unit. Switch on the power at the front panel, then make tests for the voltages listed between the chassis ground and the following test-points with a DVM.

TEST POINT	VOLTAGE	NOTES
VR201 output	+5V	
VR202 output	+5V	
VR203 output	+12V	
VR204 output	+12V	
T205 collector	+5V	0V when display is switched off
T206 collector	+12V	0V when set to Standby

Refer to the Power Supply schematic diagram when making these tests. If any of the above voltages are incorrect, the problem should be found before proceeding with further tests.

NO STATIONS- TUNING VOLTAGE TESTS

Connect a DVM between R111 (end closest to the edge of the PCB) and the chassis. Set the tuner to scan. As the tuner is scanning upwards in frequency, the voltage will decrease in the range from about 1.5V (87.5MHz) to 8V (108MHz). If the tuning voltage is not changing correctly, then the problem may be caused by the PLL IC (IC101) and associated components or the FM front end module. The power supplies to this part of the circuit should also be checked.

RF SIGNAL FAULTS

RF signal faults will generally relate to poor sensitivity. In this case the following checks are recommended-

- Check the power supplies to the RF/IF section (RFB on the schematic).
- Check the condition of the antenna, antenna cable and connections.
- Check the IF ceramic filters- FIL101, FIL102, FIL103.
- Check also that the fixing screw for the aerial connector SK101 is fully tightened.

If these checks are all OK, then other components from the IF strip (IC102, IC103 etc) may be suspect and should be checked by substitution.

AUDIO SIGNAL TRACING

If the fault symptom is 'no audio', signal tracing will be necessary. In order to trace an audio signal through the FM7, a standard test signal should be supplied from an FM generator. At least a mono RF generator will be required which covers the FM band (87.5MHz to 108MHz).

Before commencing the tests, set the FM generator to:

- RF input level to 60dBuV.
- RF frequency to 98MHz.
- audio frequency to 1kHz.
- FM deviation to 75kHz.

CYRUS FM7 FAULT FINDING

Tune the FM7 to 98MHz and check that the signal strength meter reads good signal strength. Check if the test signal is visible at the 'MPX' test point. If the signal is present, then it may be traced further through the audio part of the circuit with the aid of the schematic diagrams.

Loss of audio signal may also be due to problems with the mute circuit.

NOTE:- C141 modification

If the audio signal is intermittent then this may be due to C141 becoming leaky. In some samples of the FM7 this capacitor becomes leaky which can disturb the DC operating conditions of the stereo decoder IC, muting the audio. It is therefore advisable to replace this capacitor in all FM7 units returned for service. The replacement capacitor should be a 10uF 50V Bi-polar type to prevent premature failure.

FAULTS WITH THE SIGNAL AND TUNING METERS

If the audio signal quality is good but the signal or tuning meters are not responding correctly then the A/D circuit may be defective. Check IC204 and associated components which is the A/D converter.

OPERATIONAL FAULTS

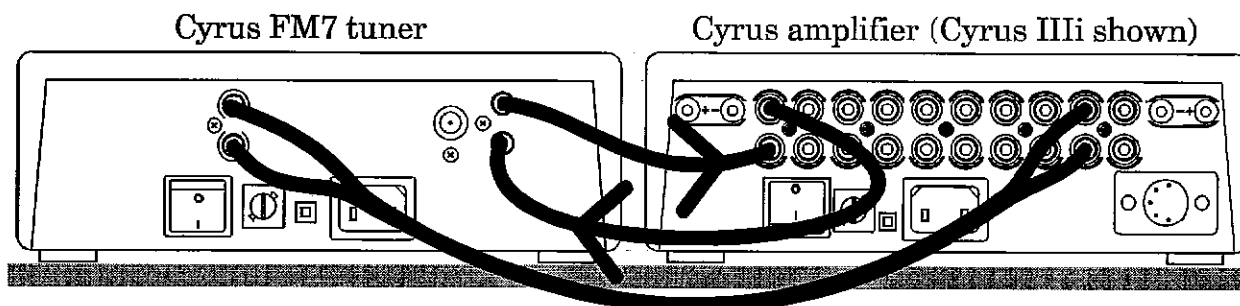
Tuner scans but will not lock to a station

If this problem occurs, the following procedure is recommended-

- Check the alignment of the tuner.
- Check the STOP signal from IC104 (STOP test point on schematic). If this line is not changing when the FM7 is tuned to a strong station, check the adjustment of RV101 (see alignment section of the manual).

MC-Bus System Operation

MC-Bus is a system which provides communication between the control systems of a number of Cyrus products. The communication takes the form of a serial data stream which is sent from a 'master' product and received and repeated by 'slave' products. The data is thus passed from one product to another around a loop. The master product will then receive the message back which confirms that loop connections have been correctly made. Cyrus amplifiers are 'master' products and send commands following certain key sequences. Products such as the FM7 and CD players are 'slaves' and only listen to MC-Bus for commands which may be appropriate.



NOTE: Audio signal cables must be connected

MC-Bus system test

If a fault is suspected with the MC-Bus system of the FM7, this should be tested by connection in a system with a known working Cyrus Integrated Amplifier or Pre-amplifier. Check the system connections carefully. Note that MC-Bus must be connected as a closed loop as shown in the

CYRUS FM7 FAULT FINDING

diagram. It is also important to connect the audio signal cables between components to provide an adequate ground return path for the MC-Bus signals. Switch on the power to the system and set all components to Standby. Selecting the TUNER input on the Cyrus amplifier will now activate both the Cyrus amplifier and the FM7. When the Cyrus amplifier is set to Standby, all other components connected to the MC-Bus loop will also set to Standby.

When is re-alignment necessary

All FM7 tuners are factory aligned and calibrated for best performance. In normal use re-alignment of the FM7 will not be necessary unless alignment critical parts have been replaced.

If repairs have been made to an FM7, refer to the following list to determine which circuit sections (if any) will require re-alignment or re-calibration (NOTE- re-calibration cannot be performed in field service and must take place at the Cyrus factory)-

Coils TC101 or TC102 replaced

Distortion alignment, output level alignment.

Ceramic filters replaced in IF-strip, FIL101, FIL102 & FIL103

Distortion alignment, output level alignment, stop level alignment.

IC105 (stereo decoder) replaced

Output level alignment, stereo separation alignment.

Any component directly connected to IC105 is replaced

Output level alignment, stereo separation alignment.

RV103 replaced.

Output level alignment.

No auto lock

Stop level alignment.

Refer to the alignment section for alignment procedures for the FM7.

When is re-calibration necessary

The FM7 circuit includes a memory which contains information about certain circuit characteristics of the product. Specialist equipment at the Cyrus factory stores the calibration information in the memory when the FM7 is manufactured. Repairs to some sections of the circuit will require a re-calibration of the memory. This procedure can only be carried out at the Cyrus factory. In the following cases which require re-calibration, remove the main PCB from the chassis and return it to the Cyrus factory for calibration.

IC104 (FM demodulator) replaced

Distortion alignment, stop level alignment, output level alignment, re-calibration.

C212 or C218 replaced (or other related ADC components)

Re-calibration only.

IC201 (NVRAM) replaced

Re-calibration only.

Alignment procedures

The procedures for circuit re-alignment are listed to follow-

Equipment required

FM generator (87.5MHz) to 108MHz).

Stereo modulator (if FM generator is Mono).

Distortion and level analyser with high/low pass filters and bandpass measurement.

Multimeter (3½ digit).

Oscilloscope.

Initial equipment settings

Set the FM generator to:

- RF input level to 60dBuV (unless otherwise stated).
- RF frequency to 98MHz (unless otherwise stated).
- audio frequency to 1kHz.
- FM deviation to 75kHz.
- stereo modulator pilot level to 5%.
- stereo modulator audio frequency to 1kHz.
- output amplitude to give full modulation on FM generator.
- stereo modulator pre-emphasis to 50uS.

Unless stated otherwise the Cyrus FM7 tuner should be set to 98MHz.

Distortion alignment procedure

1. Set the FM generator to mono.
2. Monitor audio output via the distortion analyser and oscilloscope.
3. Monitor the DC voltage at TP201 with the DVM.
4. Set TC101 & 102 as follows:
 - adjust TC101 core (white coil) near to the top of the coil.
 - adjust TC101 for minimum distortion.
 - adjust TC102 (blue coil) for 0VDC ($\pm 10\text{mV}$).
 - repeat TC101 and TC102 adjustments for both minimum distortion and 0VDC.

When correctly aligned, the distortion should be less than 0.2%.

Stereo separation alignment procedure

1. Set the FM generator to stereo - both channels.
2. Read the output voltage from the right channel for reference.
3. Set the FM generator to stereo - left channel only.
4. Monitor the audio output of the right channel via the level analyser.
5. Set the level analyser to bandpass mode (if available).
6. Adjust RV102 for a minimum reading (At least 53dB less than the reference measured in 2).

Output level alignment procedure

1. Set FM generator to mono.
2. Monitor audio output via level analyser.
3. Adjust RV103 for 775mV.

CYRUS FM7 ALIGNMENT

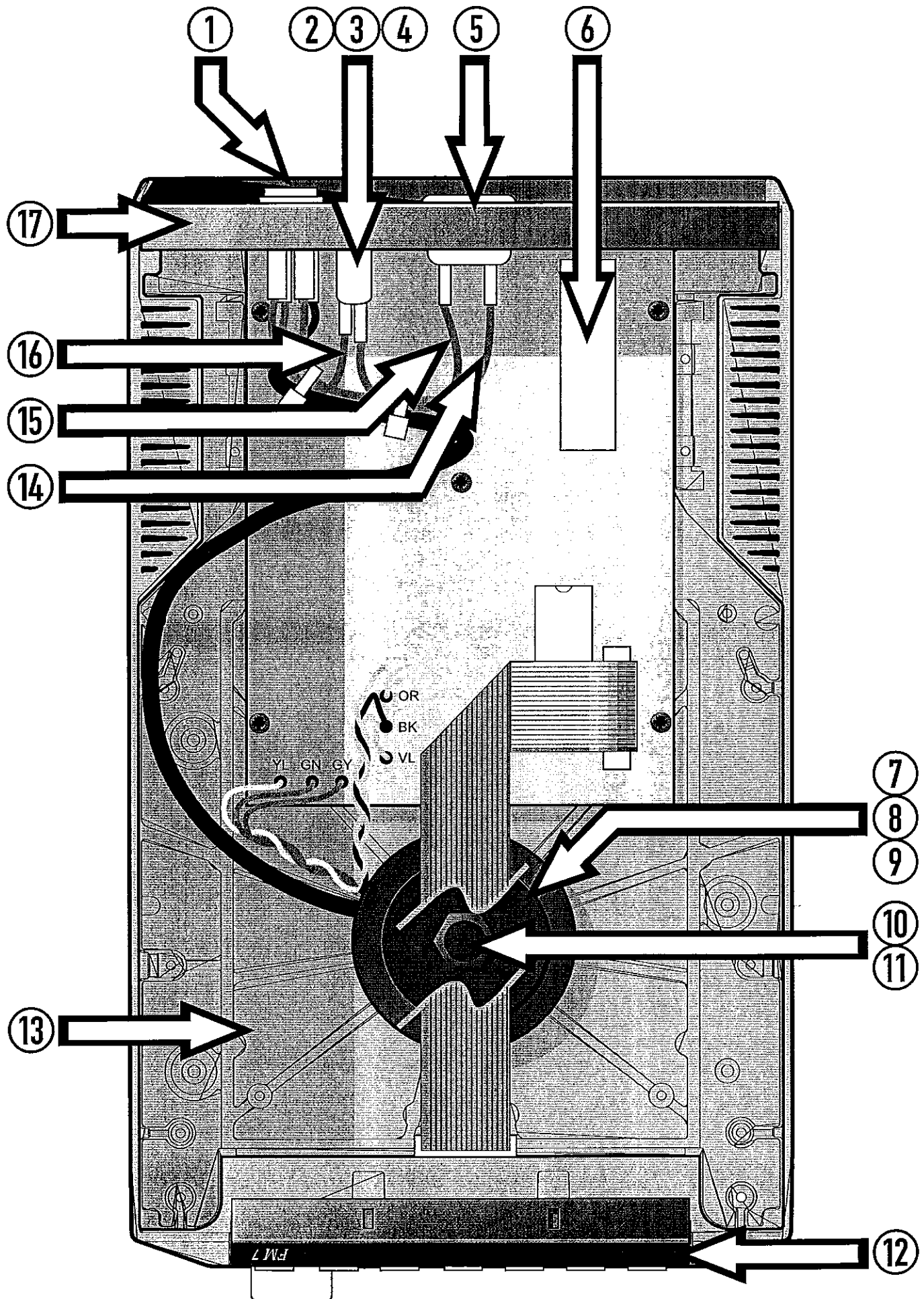
Stop level alignment procedure

1. Set FM generator to mono and 30dBuV RF output..
2. Adjust RV101 so that the lock indicator on the Cyrus FM7 just goes out.
3. Adjust RV101 so that the lock indicator just comes on.
4. Set the Cyrus FM7 to 108MHz and use the remote control to set the tuner to scan down.
5. Check that the Cyrus FM7 locks to 98MHz.
6. Set the FM generator to 108MHz.
7. Use the remote control to set the tuner to scan up.
8. Check that the Cyrus FM7 locks to 108MHz.
9. Set the FM generator to 87.7MHz.
10. Use the remote control to set the tuner to scan down.
11. Check that the Cyrus FM7 locks to 87.5MHz.

Re - calibration

This procedure requires specialist test equipment and can only be carried out at the Cyrus factory. Remove the main PCB from the chassis and return it to the Cyrus factory for calibration.

CYRUS FM7 CHASSIS PARTS



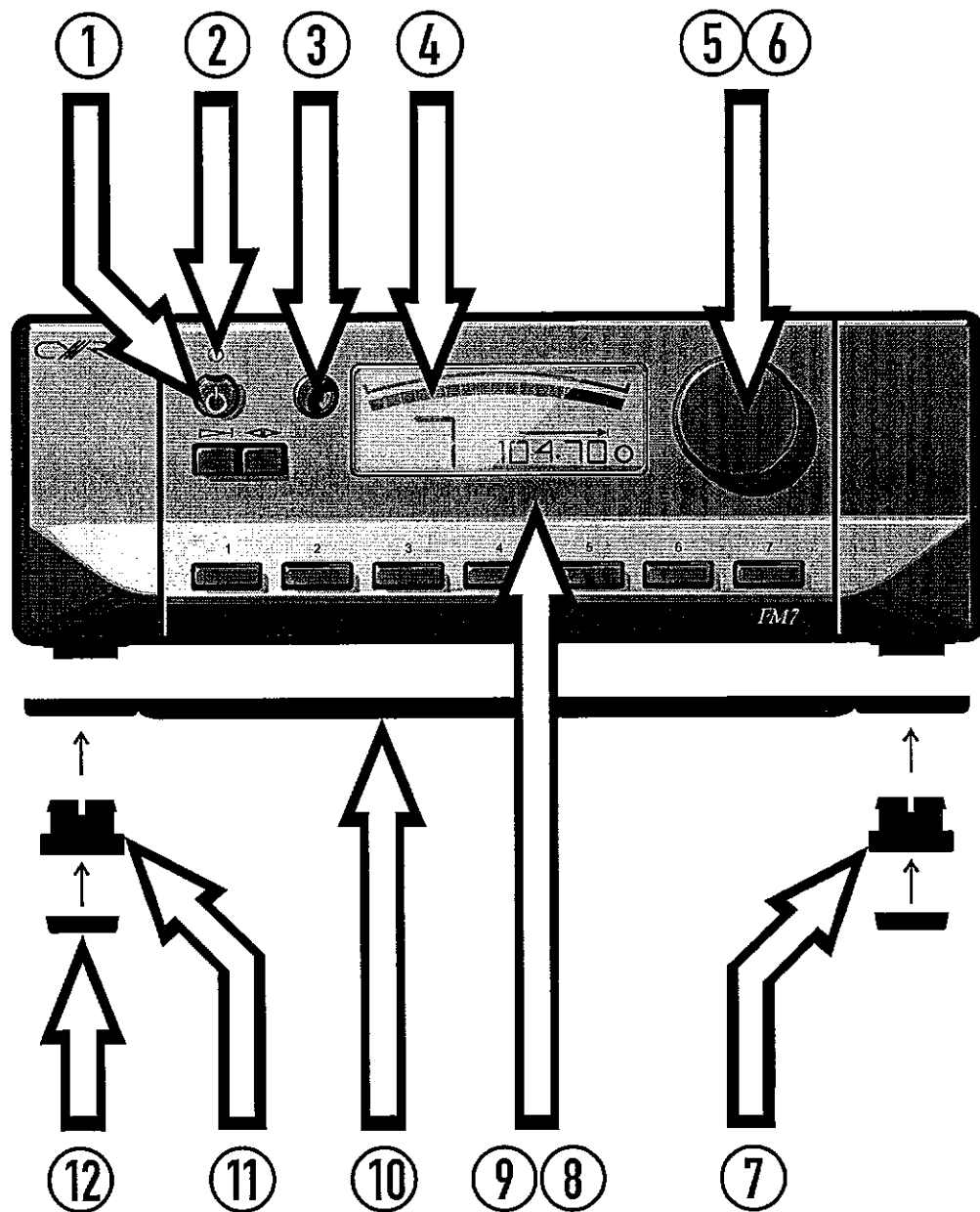
CYRUS FM7 CHASSIS PARTS LIST

Main chassis

Ref	Part number	Description
1	AM-POWSW	Power switch
2	TU-T0.1A	T0.1A Timelag Power fuse for 230 volts only #
2	C5-T0.2A	T0.2A Timelag Power fuse for 115 volts only #
3	AM-MFUSE	Fuseholder #
4	AM-FCOVE	Fuse cover #
5	AM-MTERM	AC power inlet #
6	TU-FE415	Tuner front end
7	AM-TXPLT55	Transformer plate
8	AM-TXWAS70	Neoprene washer
9	TU-TX230SEM	Transformer for 230 volts only
9	TU-TX115CSA	Transformer for 115 volts only
10	TU-M1230B	Transformer bolt
11	AM-M12WAB	Transformer washer
12	See following pages	Front panel complete
13	AM-COVER/B	Chassis
14	AM-CBPOW/106	Power cable (blue) #
15	AM-CBPOW/75S	Power cable (brown) #
16	AM-CBPOW/76L	Power cable (brown) #
17	TU-BACKP	Back plate

NOTE- Parts marked # are safety critical and must be replaced only with identical types supplied by Cyrus.

CYRUS FM7 FRONT PANEL PARTS DRAWING



CYRUS FM7 FRONT PANEL PARTS LIST

Front panel

Ref	Part number	Description
1	AM-POWCP	Standby knob trim
2	AM-PLENS/02	Standby lens
3	AM-LENSM02	Remote lens
4	TU-DISPW02	Window lens
5	AM-CKNOB	Knob cap
6	AM-RKNOBB	Knob insert
7	AM-FTINS/LH	Left hand foot insert
8	AM-FRONT02	Technical moulding
9	TU-FACIA02	Front facia
10	AM-BPPLT/B	Base plate
11	AM-FTINS/RH	Right hand foot insert
12	AM-BFOOT	Rubber foot

Packing list

Part number	Description
D3-PLEAD/Y	Phono lead
AM-MLEUR	Mains lead
TUMANUL	Instruction manual

CYRUS FM7 PCB PARTS LIST

Location of parts in the amplifier

The parts list that follows includes details of the components of the circuit boards used in the Cyrus FM7. The component number can be used to identify which part of the circuit board each component relates to. The locations of the main circuit sections are listed to follow with component references-

Circuit section	Location	Component number
RF/IF/audio	Main board	101~200 eg. R101
Power supply/control	Main board	201~300 eg. R201

Ordering parts from the parts list

When ordering PCB parts from the parts list, always quote the following information to ensure that the correct parts are supplied-

- Model number
- Serial number
- Component PCB reference
- Value
- Full description

For example-

- Cyrus FM7
- HCE00001
- R118
- 330R
- Resistor, 1% MRS25

Understanding the parts list

The parts list which follows covers the Cyrus FM7 PCB assembly.

- Column 1 of the parts list shows the reference number that will be found on the PCB and the schematic diagram.
- Column 2 of the parts list shows brief details of the component package.
- Column 3 of the parts list shows the component value or type number.
- Column 4 of the parts list shows the tolerance and type of the component.
- Column 5 of the parts list is for notes concerning changes made to parts specifications.

CYRUS FM7 PCB PARTS LIST

RESISTORS

R101	MRS25	1M	MF 1/4W 1%	
R102	MRS25	120k	MF 1/4W 1%	
R103	MRS25	120k	MF 1/4W 1%	
R104	MRS25	100R	MF 1/4W 1%	
R105	MRS25	10k	MF 1/4W 1%	
R106	MRS25	120k	MF 1/4W 1%	
R107	MRS25	10k	MF 1/4W 1%	
R108	MRS25	10k	MF 1/4W 1%	
R109	MRS25	1k	MF 1/4W 1%	
R110	MRS25	300R	MF 1/4W 1%	
R111	MRS25	560R	MF 1/4W 1%	
R112	MRS25	150R	MF 1/4W 1%	
R113	MRS25	18k	MF 1/4W 1%	
R114	MRS25	100R	MF 1/4W 1%	
R115	MRS25	330R	MF 1/4W 1%	
R116	MRS25	2.2k	MF 1/4W 1%	
R117	MRS25	390R	MF 1/4W 1%	
R118	MRS25	330R	MF 1/4W 1%	
R119	MRS25	2.2k	MF 1/4W 1%	
R120	MRS25	390R	MF 1/4W 1%	
R121	NFR25	4.7R	MF 1/4W 5%	
R122	NFR25	4.7R	MF 1/4W 5%	
R123	MRS25	330R	MF 1/4W 1%	
R124	MRS25	33k	MF 1/4W 1%	
R125	MRS25	18k	MF 1/4W 1%	
R126	MRS25	62k	MF 1/4W 1%	
R127	MRS25	62k	MF 1/4W 1%	
R128	MRS25	10k	MF 1/4W 1%	
R129	MRS25	4.3k	MF 1/4W 1%	
R130	MRS25	4.3k	MF 1/4W 1%	
R131	MRS25	10k	MF 1/4W 1%	
R132	MRS25	47k	MF 1/4W 1%	
R133	MRS25	4.3k	MF 1/4W 1%	
R134	NFR25	4.7R	MF 1/4W 5%	
R135	MRS25	10k	MF 1/4W 1%	
R136	MRS25	10k	MF 1/4W 1%	
R137	MRS25	10k	MF 1/4W 1%	
R138	MRS25	3.3k	MF 1/4W 1%	
R139	NFR25	4.7R	MF 1/4W 5%	
R140	MRS25	3.3k	MF 1/4W 1%	
R141	MRS25	180k	MF 1/4W 1%	
R142	MRS25	147k	MF 1/4W 1%	
R143	MRS25	147k	MF 1/4W 1%	
R144	MRS25	180k	MF 1/4W 1%	
R145	MRS25	180k	MF 1/4W 1%	
R146	MRS25	10k	MF 1/4W 1%	
R147	MRS25	2.2k	MF 1/4W 1%	
R148	MRS25	2.7k	MF 1/4W 1%	
R149	MRS25	2.7k	MF 1/4W 1%	

CYRUS FM7 PCB PARTS LIST

R150	MRS25	2.7k	MF 1/4W 1%	
R151	MRS25	2.7k	MF 1/4W 1%	
R152	MRS25	2.7k	MF 1/4W 1%	
R153	MRS25	2.7k	MF 1/4W 1%	
R154	MRS25	2.7k	MF 1/4W 1%	
R155	MRS25	2.7k	MF 1/4W 1%	
R156	MRS25	47k	MF 1/4W 1%	
R157	MRS25	47k	MF 1/4W 1%	
R158	MRS25	560R	MF 1/4W 1%	
R159	MRS25	560R	MF 1/4W 1%	
R160	NFR25	4.7R	MF 1/4W 5%	
R161	MRS25	2.2k	MF 1/4W 1%	
R201	MRS25	3.3k	MF 1/4W 1%	
R202	MRS25	3.3k	MF 1/4W 1%	
R203	MRS25	47k	MF 1/4W 1%	
R204	MRS25	47k	MF 1/4W 1%	
R205	MRS25	3.3k	MF 1/4W 1%	
R206	MRS25	47k	MF 1/4W 1%	
R207	MRS25	47k	MF 1/4W 1%	
R208	MRS25	33k	MF 1/4W 1%	
R209	MRS25	1M	MF 1/4W 1%	
R210	MRS25	1M	MF 1/4W 1%	
R211	MRS25	120k	MF 1/4W 1%	
R212	MRS25	1M	MF 1/4W 1%	
R213	MRS25	1M	MF 1/4W 1%	
R214	MRS25	10k	MF 1/4W 1%	
R215	MRS25	10k	MF 1/4W 1%	
R216	MRS25	47k	MF 1/4W 1%	
R217	MRS25	10k	MF 1/4W 1%	
R218	MRS25	1k	MF 1/4W 1%	
R219	MRS25	3.3k	MF 1/4W 1%	
R220	MRS25	10k	MF 1/4W 1%	
R221	MRS25	10k	MF 1/4W 1%	
R222	MRS25	10k	MF 1/4W 1%	
R223	MRS25	1k	MF 1/4W 1%	
R224	MRS25	120k	MF 1/4W 1%	
R225	NFR25	4.7R	MF 1/4W 5%	
R226	MRS25	10k	MF 1/4W 1%	
R227	MRS25	560R	MF 1/4W 1%	
R228	MRS25	1k	MF 1/4W 1%	
R229	MRS25	1k	MF 1/4W 1%	
R230	MRS25	120k	MF 1/4W 1%	
R231	MRS25	1k	MF 1/4W 1%	
R232	MRS25	47k	MF 1/4W 1%	
R233	MRS25	47k	MF 1/4W 1%	
R234	MRS25	10k	MF 1/4W 1%	
R235	MRS25	560R	MF 1/4W 1%	
R236	MRS25	3.3k	MF 1/4W 1%	
R237	NFR25	1R	MF 1/4W 5%	

Key:

NFR25 = non flammable resistor. MRS25 = axial metal film resistor

CYRUS FM7 PCB PARTS LIST

CAPACITORS

C101	Z5U	22nF	MC 63V 20%	
C102	Z5U	22nF	MC 63V 20%	
C103	Z5U	22nF	MC 63V 20%	
C104	Z5U	1nF	MC 63V 20%	
C105	X7R	100pF	MC 63V 20%	
C106	Z5U	1nF	MC 63V 20%	
C107	Z5U	10nF	MC 63V 20%	
C108	X7R	27pF	MC 63V 20%	
C109	MKS2	220nF	PE 63V 10%	
C110	FKP2	1nF	PP 100V 2.5%	
C111	TAP	10uF	TB 16V 20%	
C112	TAP	10uF	TB 16V 20%	
C113	RE2	1uF	EL 50V 20%	
C114	Z5U	22nF	MC 63V 20%	
C115	Z5U	22nF	MC 63V 20%	
C116	Z5U	22nF	MC 63V 20%	
C117	Z5U	22nF	MC 63V 20%	
C118	Z5U	22nF	MC 63V 20%	
C119	Z5U	22nF	MC 63V 20%	
C120	Z5U	22nF	MC 63V 20%	
C121	Z5U	47nF	MC 63V 20%	
C122	Z5U	47nF	MC 63V 20%	
C123	Z5U	47nF	MC 63V 20%	
C124	Z5U	47nF	MC 63V 20%	
C125	FKP2	100pF	PP 100V 5%	
C126	Z5U	47nF	MC 63V 20%	
C127	Z5U	47nF	MC 63V 20%	
C128	RE2	1uF	EL 50V 20%	
C129	RE2	1uF	EL 50V 20%	
C130	RE2	1uF	EL 50V 20%	
C131	RE2	1uF	EL 50V 20%	
C132	RE2	220uF	EL 16V 20%	
C133	RE2	1uF	EL 50V 20%	
C134	RE2	1uF	EL 50V 20%	
C135	RE2	47uF	EL 50V 20%	
C136	MKS2	220nF	PE 63V 10%	
C137	Z5U	47nF	MC 63V 20%	
C138	X7R	390pF	MC 63V 10%	
C139	Z5U	47nF	MC 63V 20%	
C140	MKS2	220nF	PE 63V 10%	
C141	TAP	2.2uF	TB 16V 20%	Early production- always replace with 10uF 50V bipolar.
	TAP	10uF	TB 16V 20%	Later production- always replace with 10uF 50V bipolar.
C142	FKP2	1nF	PP 100V 2.5%	
C143	FKP2	1nF	PP 100V 2.5%	
C144	FKP2	510pF	PP 63V 2.5%	
C145	FKP2	510pF	PP 63V 2.5%	
C146	RE2	47uF	EL 50V 20%	

CYRUS FM7 PCB PARTS LIST

C147	RE2	47uF	EL 50V 20%	
C148	FKP2	3.9nF	PP 63V 2.5%	
C149	FKP2	3.9nF	PP 63V 2.5%	
C150	FKP2	2.2nF	PP 63V 2.5%	
C151	FKP2	2.2nF	PP 63V 2.5%	
C152	FKP2	4.7nF	PP 63V 2.5%	
C153	FKP2	4.7nF	PP 63V 2.5%	
C154	FKP2	4.7nF	PP 63V 2.5%	
C155	FKP2	4.7nF	PP 63V 2.5%	
C156	FKP2	1nF	PP 100V 2.5%	
C157	FKP2	1nF	PP 100V 2.5%	
C158	FKP2	100pF	PP 100V 5%	
C159	FKP2	100pF	PP 100V 5%	
C160	TAP	10uF	TB 16V 20%	
C161	TAP	10uF	TB 16V 20%	
C162	TAP	10uF	TB 16V 20%	
C163	TAP	10uF	TB 16V 20%	
C164	RE2	47uF	EL 50V 20%	
C165	RE2	47uF	EL 50V 20%	
C201	Z5U	47nF	MC 63V 20%	
C202	X7R	27pF	MC 63V 20%	
C203	X7R	27pF	MC 63V 20%	
C204	Z5U	47nF	MC 63V 20%	
C205	X7R	100pF	MC 63V 20%	
C206	Z5U	47nF	MC 63V 20%	
C207	Z5U	47nF	MC 63V 20%	
C208	Z5U	47nF	MC 63V 20%	
C209	Z5U	47nF	MC 63V 20%	
C210	Z5U	47nF	MC 63V 20%	
C211	Z5U	47nF	MC 63V 20%	
C212	RE2	47uF	EL 50V 20%	
C213	RE2	1uF	EL 50V 20%	
C214	Z5U	47nF	MC 63V 20%	
C215	TAP	10uF	TB 16V 20%	
C216	RC	2200uF	EL 25V 20%	
C217	RC	2200uF	EL 25V 20%	
C218	Z5U	47nF	MC 63V 20%	
C219	Z5U	47nF	MC 63V 20%	
C220	TAP	10uF	TB 16V 20%	
C221	Z5U	47nF	MC 63V 20%	
C222	Z5U	47nF	MC 63V 20%	
C223	RE2	1uF	EL 50V 20%	

Key:

TB = tantalum bead. EL = electrolytic. PE = polyester. PP = polypropylene. MC = ceramic

PRESETS

RV101	CP10H	10k	CERMET	
RV102	CP10H	220k	CERMET	
RV103	CP10H	10k	CERMET	

CYRUS FM7 PCB PARTS LIST

DIODES

D101	AXIAL	1N4148	400mA signal diode	
D102	AXIAL	1N4148	400mA signal diode	
D201	AXIAL	1N4148	400mA signal diode	
D202	AXIAL	1N4148	400mA signal diode	
D203	AXIAL	1N4148	400mA signal diode	
D204	AXIAL	1N4148	400mA signal diode	
D205	AXIAL	1N4148	400mA signal diode	
D206	AXIAL	1N4148	400mA signal diode	
D207	AXIAL	1N4148	400mA signal diode	
D208	AXIAL	1N4002	1A signal diode	
D209	AXIAL	1N4002	1A signal diode	
D210	AXIAL	1N4002	1A signal diode	
D211	AXIAL	1N4002	1A signal diode	
D212	AXIAL	1N4148	400mA signal diode	
D213	AXIAL	1N4148	400mA signal diode	

TRANSISTORS

T101	TO92	BC546	NPN signal transistor	
T102	TO92	BF199	NPN R.F. transistor	
T103	TO92	BC546	NPN signal transistor	
T104	TO92	BC556	PNP signal transistor	
T105	TO92	BC556	PNP signal transistor	
T106	TO92	BC546	NPN signal transistor	
T107	TO92	BC546	NPN signal transistor	
T201	TO92	BC546	NPN signal transistor	
T202	TO92	BC546	NPN signal transistor	
T203	TO92	BC546	NPN signal transistor	
T204	TO92	BC546	NPN signal transistor	
T205	TO92	BC327	PNP signal transistor	
T206	TO92	BC556	PNP signal transistor	
T207	TO92	BC546	NPN signal transistor	
T208	TO92	BC546	NPN signal transistor	
T209	TO92	BC556	PNP signal transistor	

INTEGRATED CIRCUITS

IC101	DIL	TSA6057	Phase lock loop	
IC102	DIL	TA7060AP	FM IF amplifier	
IC103	DIL	TA7060AP	FM IF amplifier	
IC104	DIL	LA1235	FM IF IC	
IC105	DIL	LA3401N	Stereo decoder	
IC106	DIL	NE5532	Dual low noise op-amp	
IC107	DIL	NE5532	Dual low noise op-amp	
IC201	DIL	X24C02A	NVRAM	
IC202	DIL	86C21		
IC203	DIL	LM324	Quad Op-amp	
IC204	DIL	74HC04	Hex inverter	

CYRUS FM7 PCB PARTS LIST

VOLTAGE REGULATORS

VR201	TO220	MC7805	1A +5V voltage regulator	
VR202	TO220	MC7805	1A +5V voltage regulator	
VR203	TO220	MC7812	1A +12V voltage regulator	
VR204	TO220	MC7812	1A +12V voltage regulator	

FILTERS, INDUCTORS AND CRYSTALS

CR101	RADIAL	CSB456F11	Ceramic resonator	
FIL101	RADIAL	SK107M1-AE-10G	Ceramic filter	
FIL102	RADIAL	SK107M1-AE-10G	Ceramic filter	
FIL103	RADIAL	SK107M1-AE-10G	Ceramic filter	
L101	7BS	2.2 uH	PART No.283AS-2R2K,M	
L102	7BS	2.2 uH	PART No.283AS-2R2K,M	
L103	7BS	2.2 uH	PART No.283AS-2R2K,M	
L104	8RB	18mH	PART No.187LY-183J	
L105	8RB	18mH	PART No.187LY-183J	
L106	8RB	33mH	PART No.187LY-333J	
L107	8RB	33mH	PART No.187LY-333J	
TC101	Met Can	292MEA-2198X	FM quad detector 1	
TC102	Met Can	M292MEA-2399FKG	FM quad detector 2	
TC103	Met Can	KM10DFE01	Filter	
X101	AXIAL	HC49/4H-4.000MHz	20ppm crystal	
X201	AXIAL	HC49/4H-8.000MHz	20ppm crystal	

SOCKETS

SK101	VERT	MC91-26-8 (T5944)	75 Ohm acrial socket	
SK102	Socket	RJ-1020-020	Double vertical phono (gold)	
SK201	Socket	RJ-1020-020	Double vertical phono (gold)	
CON201	DIL	HA7C-2-4D	26 pin transition header	
SK202	DIL	IS50140	40-Pin socket for microcontroller	

OTHERS

FE101	Met. Can	FE415-G11	RF front end	
IF		Test points	LOUPOTS	
LV		Test points	LOUPOTS	
HV		Test points	LOUPOTS	
TP201		0.1" 2 Pin Header		

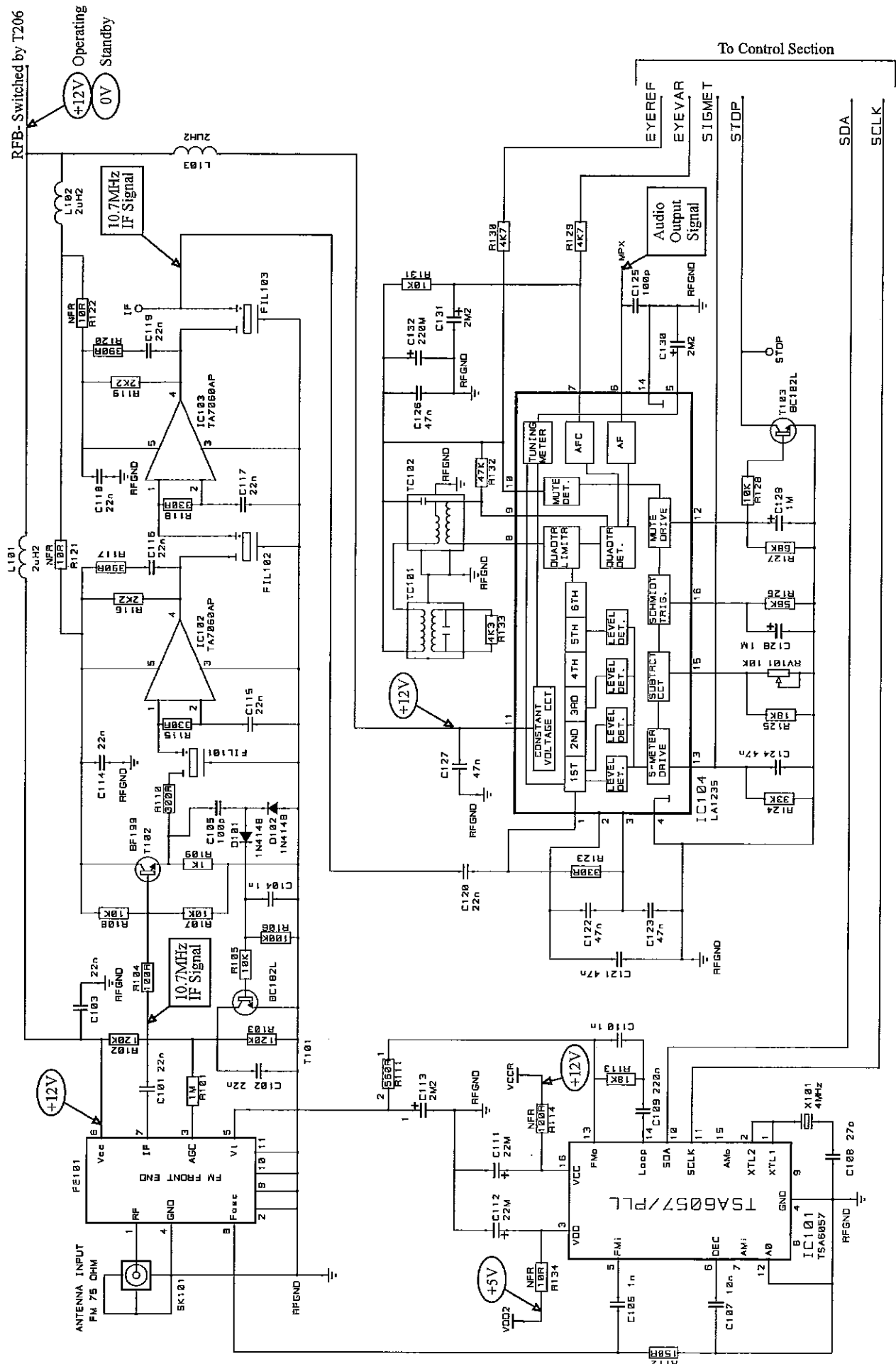
CYRUS FM7 SCHEMATIC DIAGRAMS

Schematic diagram index

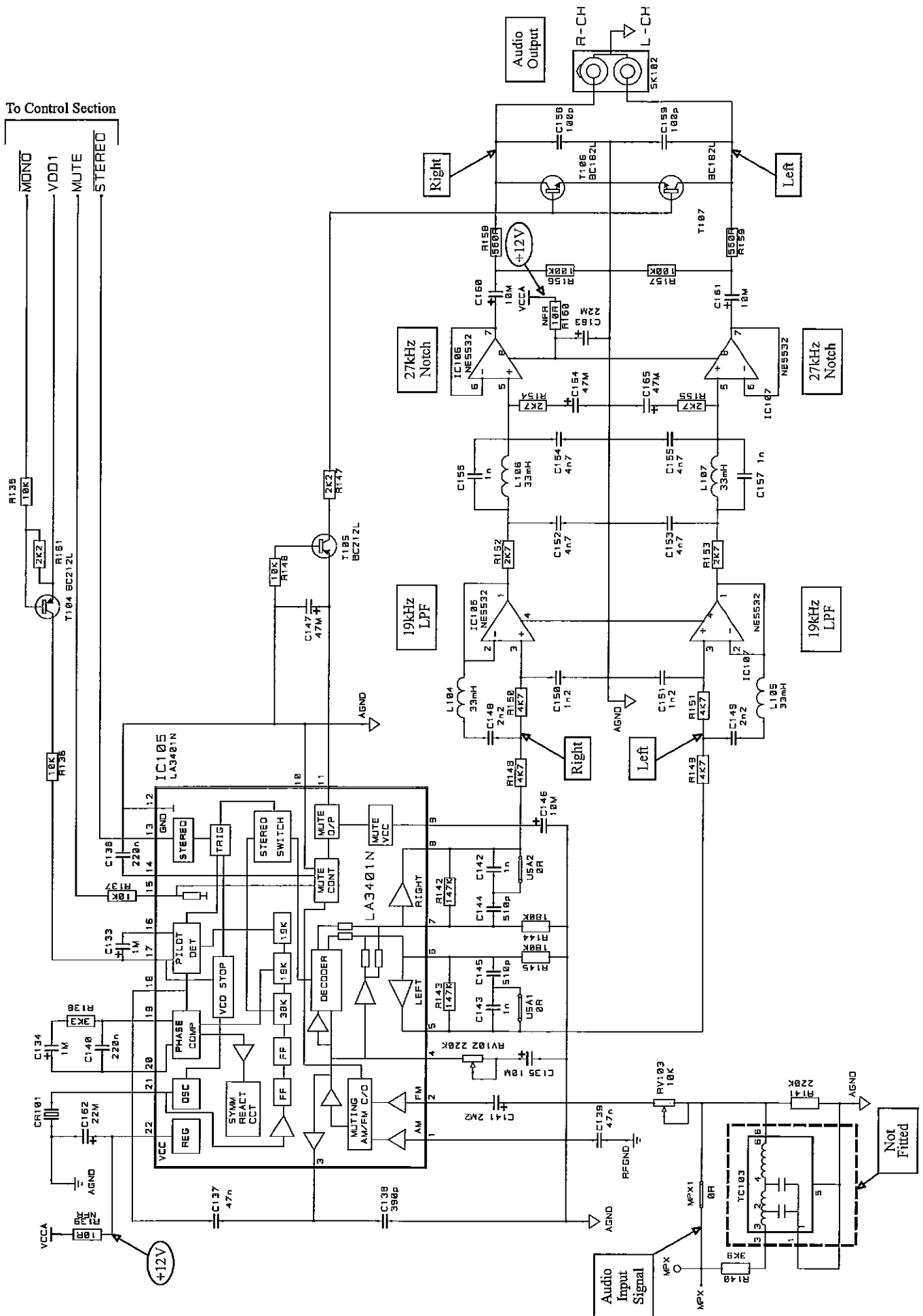
The Cyrus FM7 schematic diagrams are listed below.

SHEET 1	RF/IF circuit
SHEET 2	Audio circuit
SHEET 3	Control circuit
SHEET 4	Front panel circuit

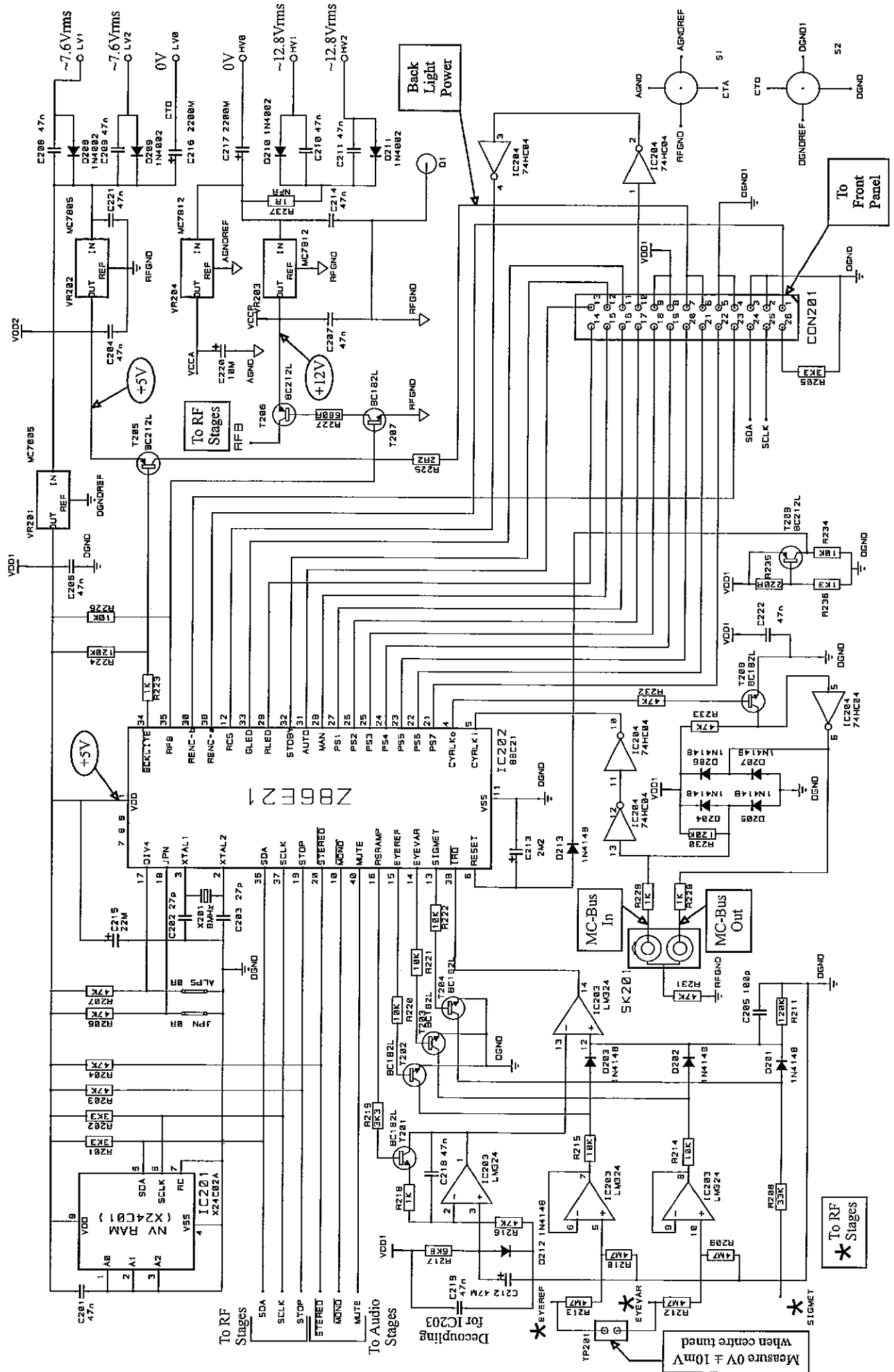
FM7 RF stages Schematic diagram

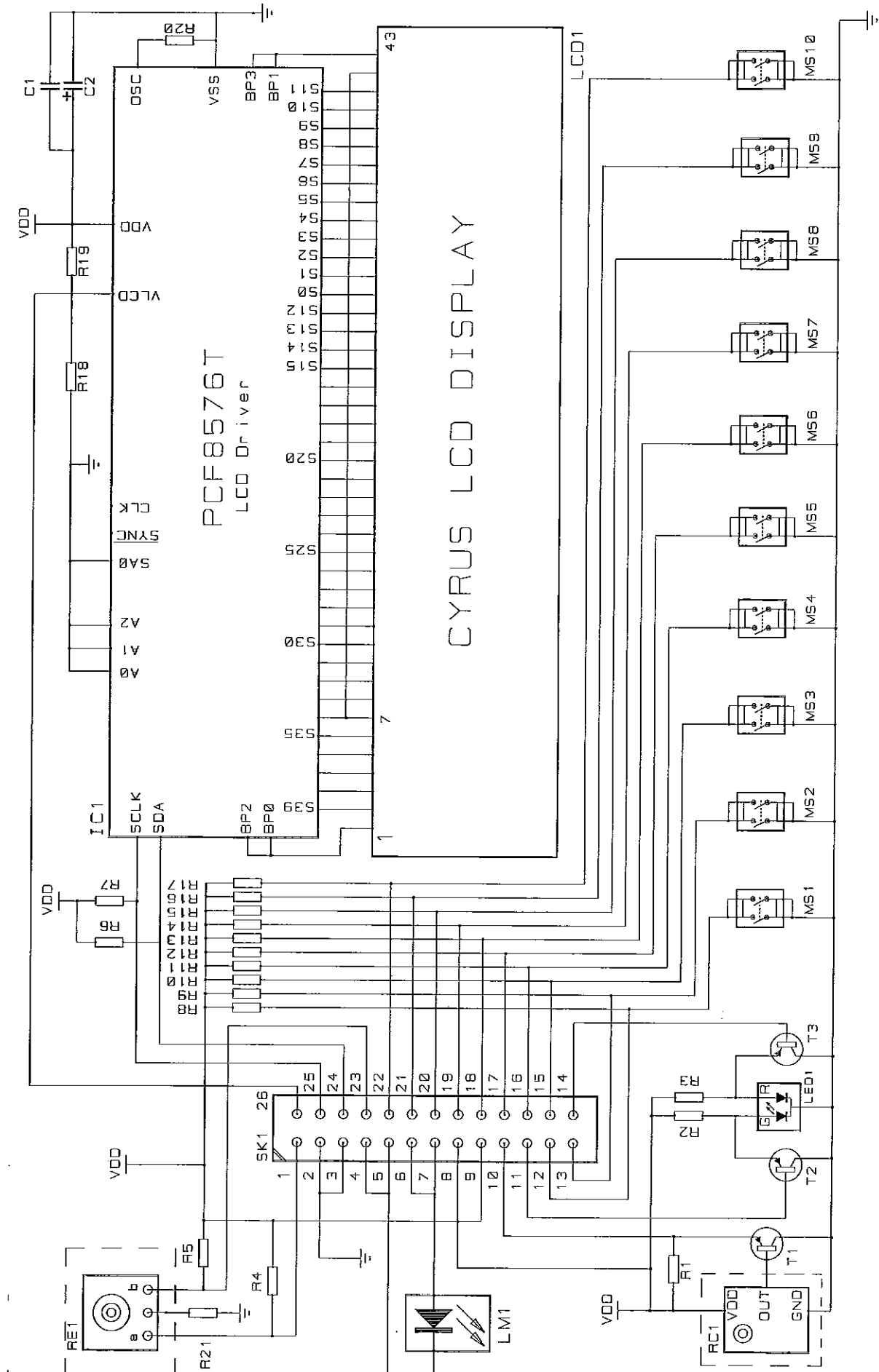


To Control Section

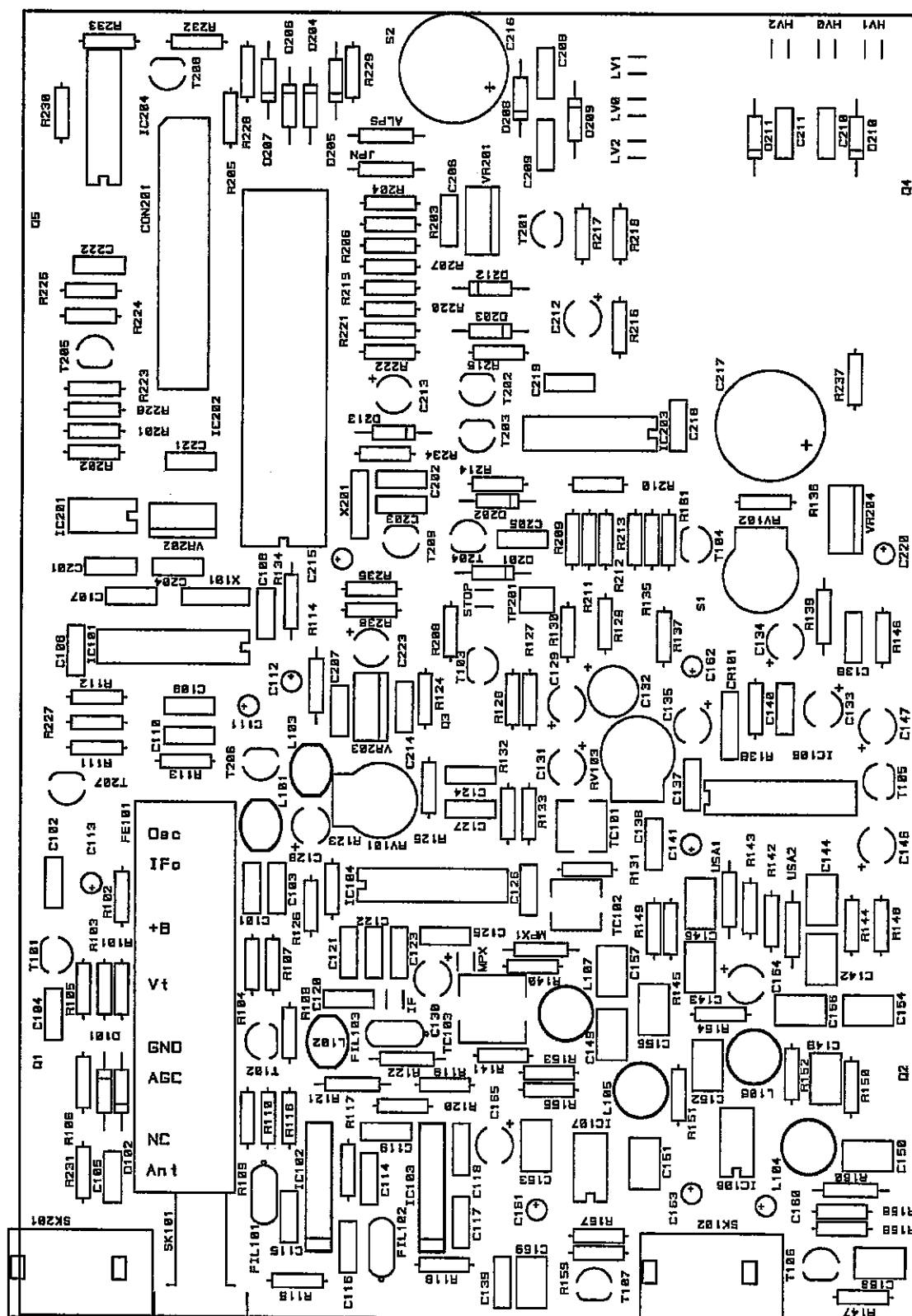


FM7 Control circuit Schematic diagram





SERVICE MANUAL



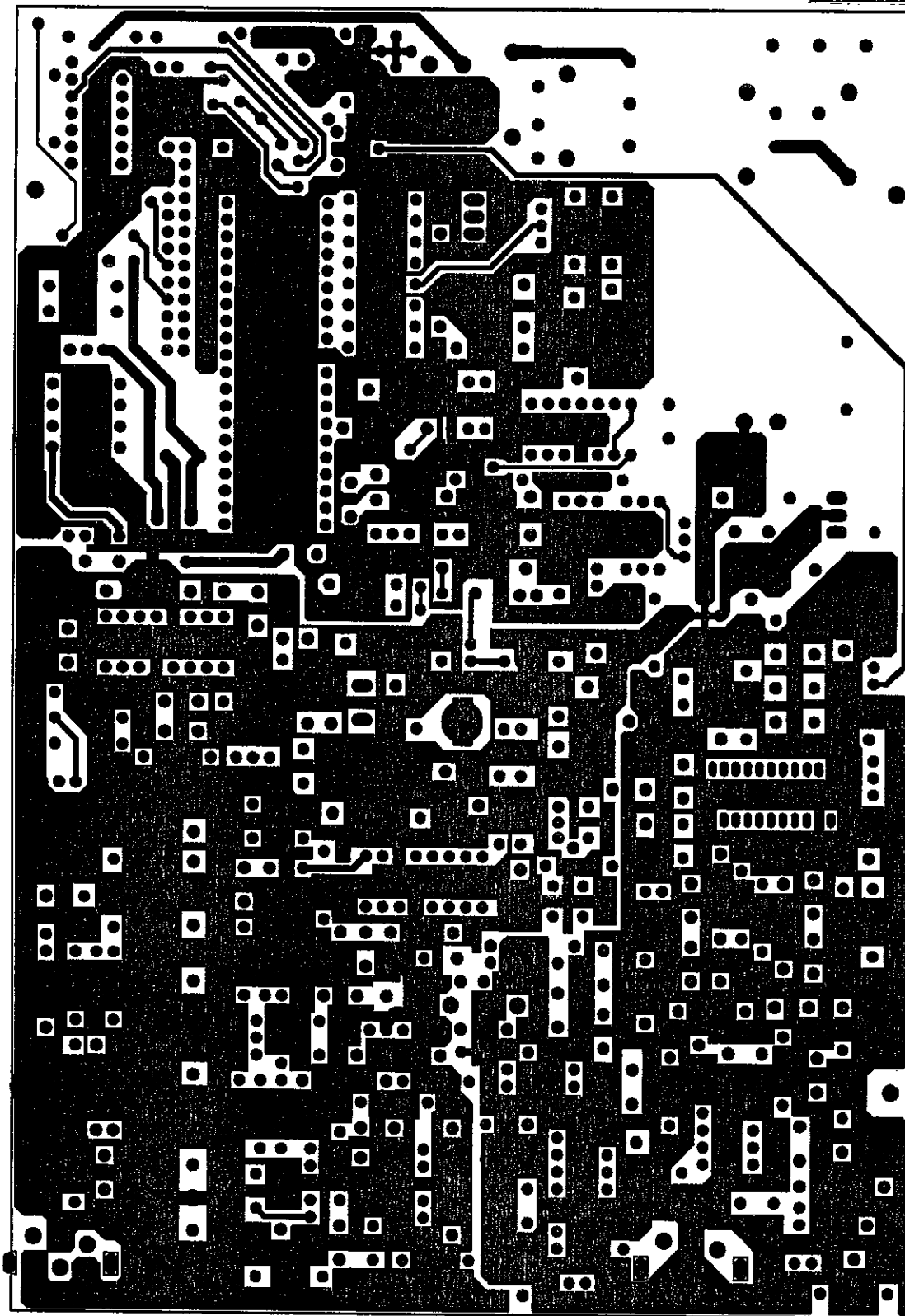
CYRUS FM7

PCB ARTWORK PLOT

COMPONENT SIDE TRACK
(COMPONENT SIDE VIEW)

SHEET 2 OF 3

SERVICE MANUAL



CYRUS FM7

PCB ARTWORK PLOT

SOLDER SIDE TRACK
(COMPONENT SIDE VIEW)

SHEET 3 OF 3

SERVICE MANUAL

