Issue 1
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CHANGES

RC3/10 M.F./L.F. MONITORING RECEIVER

INTRODUCTION

The RC3/10 is a crystal controlled, pre-tuned receiver intended for monitoring amplitude modulated signals in the long and medium wave broadcast bands. It has the following outputs:-

(a) An audio frequency monitoring output.
(b) An output of unmodulated carrier at the frequency of the received signal.
(c) A power supply of 10 mA d.c. for an aerial pre-amplifier.
(d) A 'carrier drop' output.
(e) A 'carrier fail' output.

The 'carrier drop' output is a transistor switch which ceases to conduct if the mean amplitude of the received carrier falls below an internally preset threshold. An indicator lamp on the front panel is lit whenever carrier level exceeds threshold.

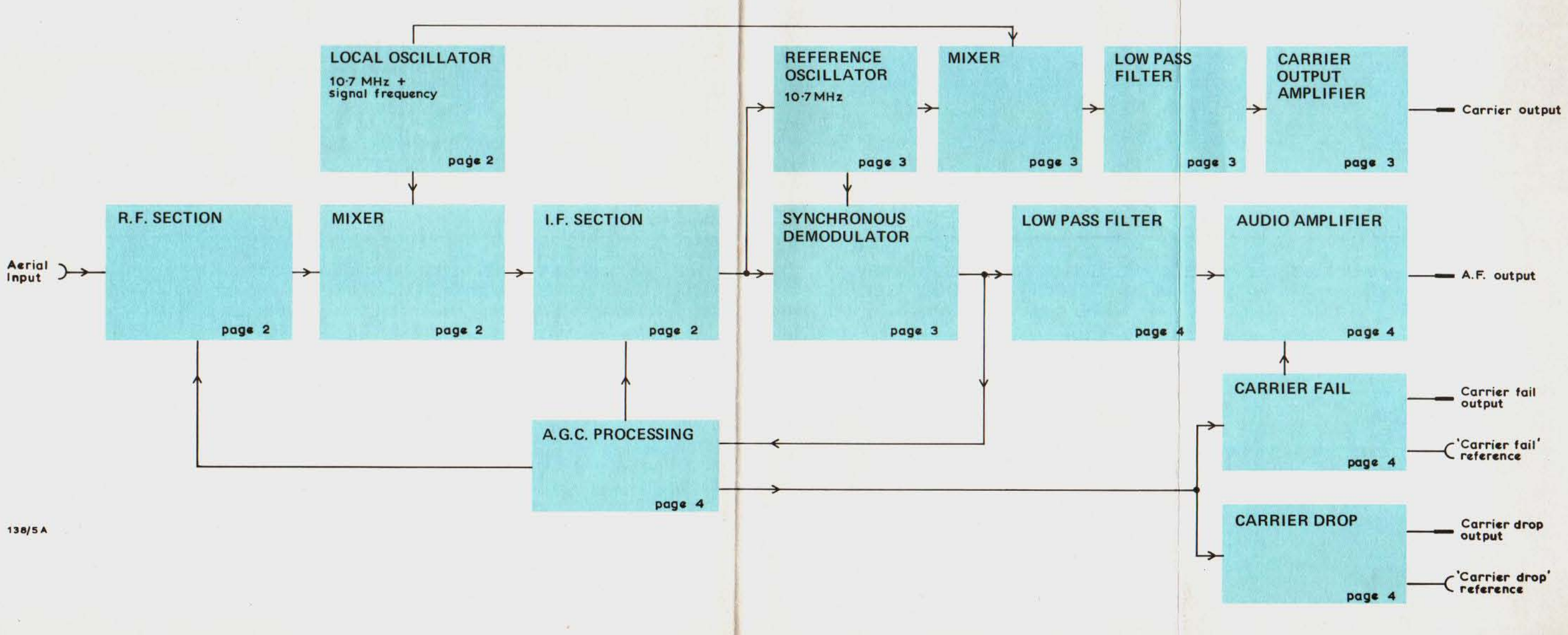
The 'carrier fail' output is a transistor switch, exactly like the 'carrier drop' output, with a similar lamp indication and a separately preset threshold. When the carrier level falls below the 'carrier fail' threshold the audio output is automatically muted. Front panel sockets enable measurement of the 'carrier drop' and 'carrier fail' reference voltages.

The receiver uses a superheterodyne circuit with an I.F. of 10·7 MHz and a crystal I.F. filter. It is built on a CH1/12A chassis with a BNC coaxial socket on the front panel for the aerial input. All other connections are made via a 15 pole in-line plug at the rear.

Frequency coverage	150 kHz to 1·6 MHz
A.F. output level	+12 ±1 dB into 150 ohms for 100% modulation
A.F. response	±1 dB 10 Hz to 5 kHz
	−50 dB at 6 kHz
	−60 dB at 8 kHz
A.F. output impedance	50 ohms balanced
I.F. and image signal rejection	80 dB
A.F. distortion	1% typical at 90% modulation
Signal-to-noise ratio at 1 mV	53 dB typical (measured peaking to PPM4)

SPECIFICATION

Input levels:	
A.G.C. range	4 μV to 400 mV
Carrier drop/fail ranges	10 μV to 400 mV (preset) If the input falls by 3 dB from the preset value the carrier drop/fail circuits operate.
Carrier drop/fail switch rating	50 V 200 mA max.
Aerial Impedance	50 ohms
Aerial pre-amplifier supply	10 mA ±2 mA at 11 V (nominal)
Mains input	240 V 50 Hz 10 W



CIRCUIT DIAGRAM (Part 1)

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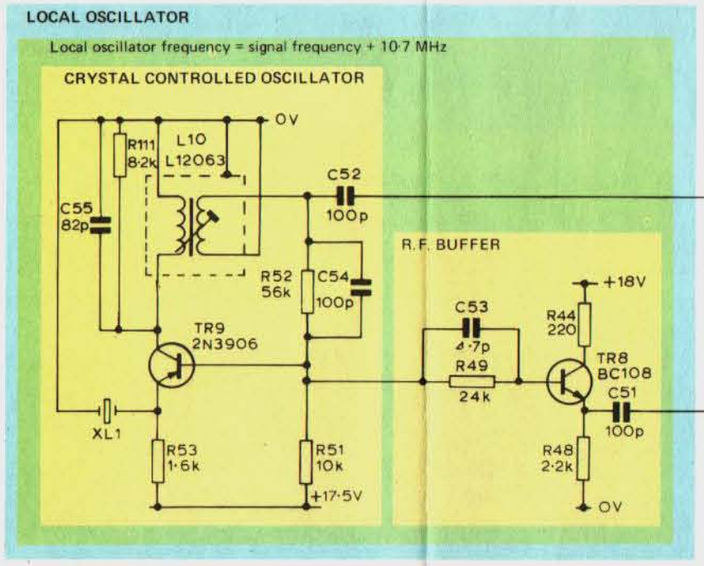
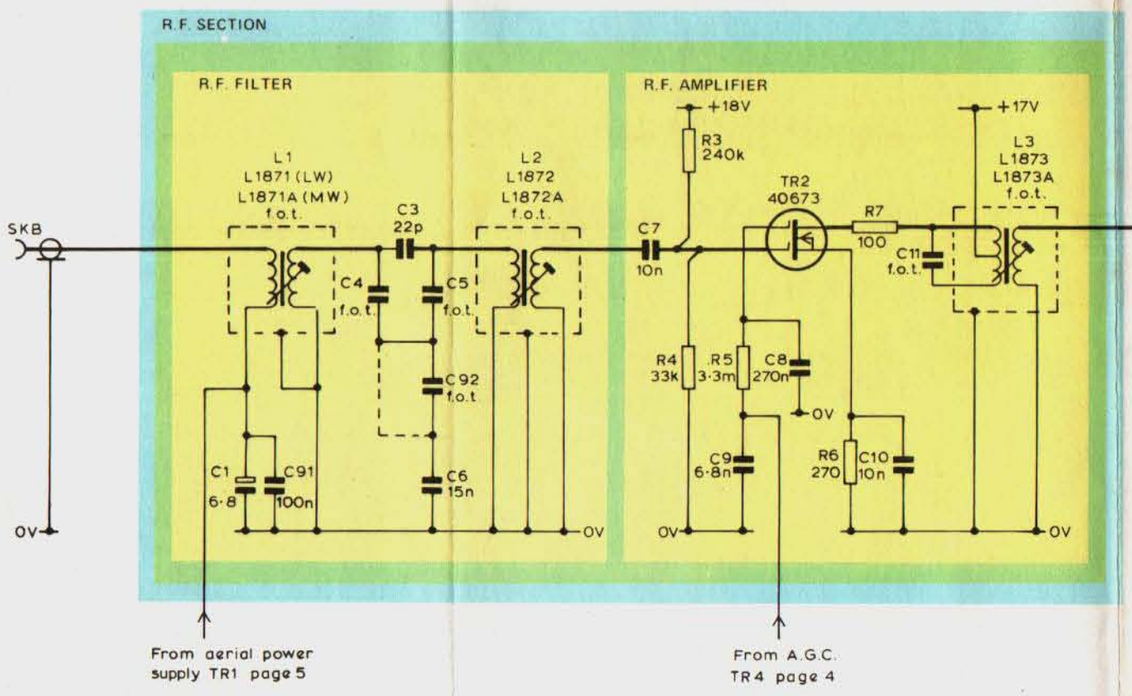
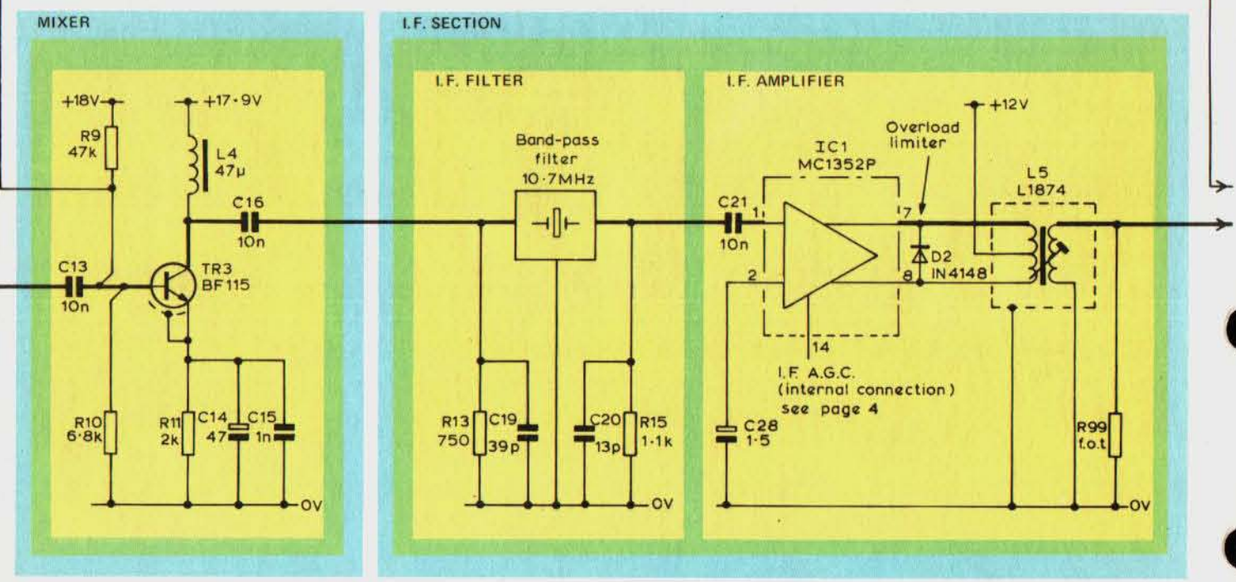
IC1 details		Top view
Type	MC1352P	14
OV	pins 3, 4	
+12V	pin 11	1

Transistor	2	3	8	9
Type	40673	BF115	BC108	2N3906
View on leads	g2 c g1 eb	e b c s	b e c	c b e







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CIRCUIT DIAGRAM (Part 2)

REFERENCE OSCILLATOR SECTION

90° PHASE SHIFT
0V
L6 L12061
C40 4·7p
R34 4·7k

D.C. REFERENCE
C38 10n
0V
part of IC2 MC1351P
13
3
11

PHASE DETECTOR
ERROR AMPLIFIER

LIMITING AMPLIFIER
C31 1n
C37 10n
0V
4
5

6
R26 2k
C32 10n
D.C. REFERENCE
0V

1
LOW PASS FILTER
R27 1k
C34 220p
C33 6·8
0V

CRYSTAL CONTROLLED OSCILLATOR WITH A.F.C.
+4V
R38 62k
TR5 BC109
XL2
R37 47k
R36 1k
R30 11k
D4 BA102A
R31 30k
C42 100p
C41 20p
L7 L12062
0V

AMPLIFIER
R33 100k
C44 2·2p
9
10
C65 30p
R32 47k
part of IC2 MC1351P
R35 1k
0V

TR	Type	View on leads
5 6	BC109 BCY70	b c e
7	40673	g2 c g1 eb

	IC2 & 3
Type	MC1351P
0V	pin 7
+12V	pin 14
Top view	14 … 1

CARRIER OUTPUT SECTION

D.C. RESTORER
IC3 MC1351P
9
0V

MIXER
+18V
R42 1k
TR7 40673
R58 3·9k
R47 2·7k
R45 330k
C50 100n
R46 240
0V

LOW PASS FILTER
L9 47µ
L8 47µ
C49 100p
C48 100p
0V

CARRIER OUTPUT AMPLIFIER
0V
R82 1k
TR6 BCY70
PLA 11
C93 10n
R41 300
0V
+18V

FROM LOCAL OSCILLATOR (page 2)

FROM I.F. SECTION (page 2)

SYNCHRONOUS DEMODULATOR

part of IC3 MC1351P

AMPLIFIER
R57 13k
C64 220p
4
5
C62 10n
0V

D.C. REFERENCE
R56 62
6
C59 10n
0V

Internal connection

MIXER
C60 1n
13
MIXER

AMPLIFIER
2

To low pass filter and A.G.C. section page 4

D.C. REFERENCE
R54 2k
3
11
C61 10n
0V

C63 100p
FILTER

CIRCUIT DIAGRAM (Part 3)

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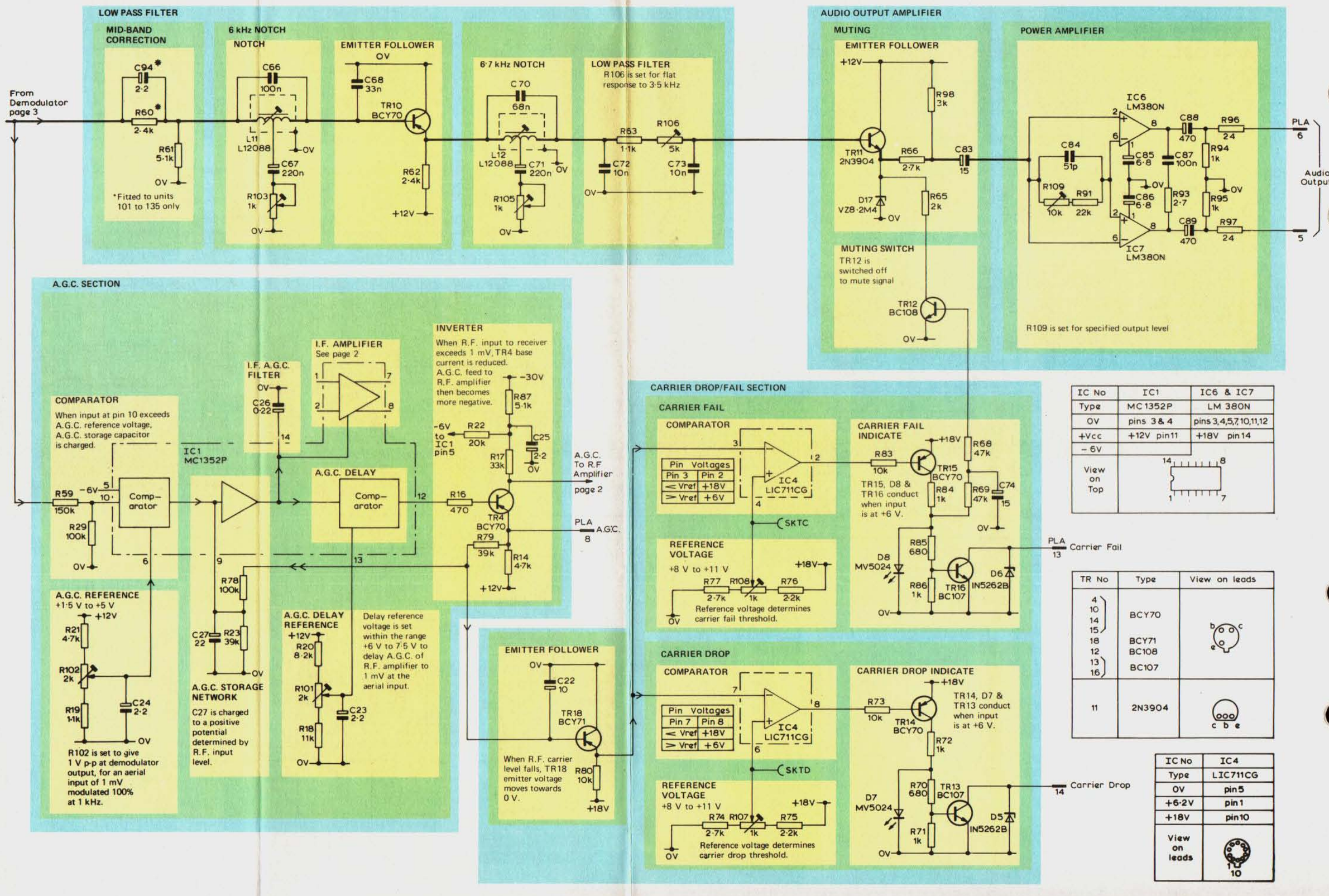

IC No	IC1	IC6 & IC7
Type	MC1352P	LM 380N
0V	pins 3 & 4	pins 3,4,5,7,10,11,12
+Vcc	+12V pin11	+18V pin14
- 6V		
View on Top		14 8 / 1 7

TR No	Type	View on leads
4, 10, 14, 15	BCY70	b c e
18	BCY71	
12	BC108	
13, 16	BC107	
11	2N3904	c b e

IC No	IC4
Type	LIC711CG
0V	pin5
+6·2V	pin1
+18V	pin10
View on leads	1 10

RECTIFICATION

PLA
L 1
240V a.c.
N 2
E 3

FS1 150mA
T7 M303B
R
BN
G
G
BK

C76 4·7n
C77 4·7n

D12 D10
4X IN4006
D11 D9

C78 47
D13 IN4006
D14 IN4006
C79 47

+30V
0V
−30V

To A.G.C. inverter page 4

REGULATION

MJE521 TR17
R88 2·7

IC5 LIC 723CG
Vc Vo Ilim Isens
Vcc+ Vref Non-inv Vcc− freq comp Inv

R89 5·1k
C82 470
C81 470p
R90 3·3k

0V

UNREGULATED SUPPLY

R92 10
D15 VZ12M1
+18V
C90 470
0V

To audio output amplifiers IC6, IC7 pin 14 page 4

DISTRIBUTION AND DECOUPLING

LINK

+18V
+6V
D16 VZ6·2M4
0V
pin 10
pin 1
To IC4 page 4

+18V
To carrier drop indicate TR14 page 4

+18V
To carrier fail indicate TR15 page 4

+18V
To TR18 page 4

LINK

+18V
To carrier fail reference R76 page 4

+18V
To carrier drop reference R75 page 4

LINK

R43 10
C47 100n
+18V
To carrier output stage TR6 & TR7 page 3

R67 1k
C75 15
+12V
To audio stages TR10 & TR11 page 4

R39 11k
C39 1n
C45 10n
+4V
To reference oscillator TR5 page 3

R28 240
C35 6·8
+12V
To IC2 pin 14 page 3

R55 270
C58 15
+12V
To IC3 pin 14 page 3

LINK

R24 1k
C29 10n
+12V
L5
To IC1 pin 7
See page 2
To IC1 pin 8

R25 150
C30 15
C36 100n
D3 VZ12M4
+12V
To: AGC REFERENCE AGC DELAY REFERENCE and IC1 pin 11 page 4

C18 1·5
R12 100
C17 10n
+18V
+17·9V
To mixer stage TR3 page 2

R50 300
C56 10
C57 10n
+17·5V
To local oscillator TR9 page 2

LINK

R8 100
C12 100n
+18V
+17V
To R.F. amplifier TR2 page 2

+18V To R.F. amplifier TR8 page 2

AERIAL POWER SUPPLY

10 mA is supplied to the aerial preamplifier via the aerial socket.

R2 470
R1 1k
TR1 2N3906
D1 VZ12M4
15
C2 1·5
C1 6·8
C91 100n
L1 See page 2
SKB
0V

IC5	
Type	view on leads
LIC 723CG	1 10

TR1	
Type	view on leads
2N3906	c b e

TR17	
Type	Top View
MJE 521	heatsink under e c b