U.H.F. OFF-AIR CUE RECEIVERS UN1/584 AND UN1/584A

Introduction

The UN1/584 and the UN1/584A u.h.f. receiver units provide medium-grade standard-level video and sound signals for comparison purposes. The receivers are continuously tunable and incorporate an a.g.c. system operating from the tips of sync pulses and are suitable for negative modulated signals only. The sound channels employ intercarrier detection and ratio discriminators. The two receivers are identical except that the UN1/584A uses npn transistors in the u.h.f. front end.

The receivers are mounted on CH1/12A chassis and are intended for use with the PS1/15 Loudspeaker and Power Supply Unit in the RC1L/501 receiver.

General Specification

Aerial Input Level	100 μV to 25 mV
Frequency Coverage (Band IV and V)	467 MHz to 860 MHz
Noise Figure	
470 MHz	10 dB max.
800 MHz	11·5 dB max.
V.S.W.R.	1:3
Aerial Input Impedance	75 ohms nominal
Video Output Level (terminated)	1 V p-p
Video Output Impedance	75 ohms
D.C. Level at Video Output (no input)	
With respect to negative supply line	+4 V
With respect to positive supply line	−7 V
Sound Output Level	1 V p-p
Local Oscillator Frequency	Signal frequency +i.f.
Image Rejection	53 dB min.
Vision Carrier i.f.	39·5 MHz
Sound Carrier i.f.	33·5 MHz
Adjacent Sound Rejection	46 dB min.
Sound Rejection	40 dB min.
I.F. Rejection	60 dB min.
Chrominance to Luminance Ratio	unity ±2 dB
Sound i.f.	6 MHz
Sound De-emphasis	50 μs
Automatic Gain Control	±2 dB change of output for 60 dB change of input
Chrominance/luminance Timing	±50 ns
Operating Temperature Range	0° C −50° C
Power Requirements	11 V, 130 mA
Weight	2 lb

Circuit Description

The circuit diagram for the UN1/584 is given in Fig. 1 and for the UN1/584A, in Fig. 2.

The U.H.F. tuner is made by A. B. Metal Products Ltd. and is contained in a fabricated metal box. This box should not be opened as the alignment and performance of the tuner may be impaired.

TR1 is a tuned input tuned output common base r.f. amplifier with a.g.c. applied to the base. The collector circuit has a bandpass characteristic with a bandwidth exceeding 6 MHz. TR2 operates as a self-oscillating mixer.

I.F. Circuits

The i.f. signals developed at the collector of TR2 are coupled to the base of TR3 by the capacitance-coupled bandpass circuit L8, L11A, C25, C27 and C28. Inductors L11A and L11B also form a bifilar

T trap rejecting the adjacent signal and channel 1 signal on 41·5 MHz.

TR3, TR4 and TR5 are neutralised i.f. amplifiers with forward a.g.c. bias used on TR3. The coupling between TR3 and TR4 is series tuned because this minimises change of tuning with change of base current due to a.g.c. A reasonably flat response is presented to the base of TR4. The coupling in the collector circuit of TR4 is tuned on both primary and secondary and presents a flat response to the final i.f. amplifier TR5. TR5 feeds the sound detector diode D2 and the vision i.f. transformer L15. L15 is tuned to 38 MHz and feeds the vision detector D3. A tertiary winding, tuned by C44 and connected in antiphase to the secondary winding, rejects the sound i.f. carrier on 33·5 MHz. Balance between the 33·5 MHz signals in the two windings is obtained by adjustment of R21; L16 bypasses the video signals. The response of the tertiary winding above resonance lifts the response at 34 MHz and the overall response to the vision detector diode is rounded with the vision carrier at −6 dB and the chrominance carrier at −5 dB ±1 dB.

Video Circuits

The vision detector is forward biased, the bias being set by R30. The bifilar T trap, L18/C46, is tuned to 6 MHz to reject the intercarrier signals and L19 attenuates the vision i.f. signals. TR6 and TR7 form a long-tailed pair, the video signal at the collector of TR7 passing to the output via the emitter follower TR8. L21 with C53 and C54 form a phase corrector network improving the video pulse response. The negative feedback from the emitter of TR8 to the base of TR7 is reduced over the chrominance spectrum to correct the overall luminance to chrominance ratio.

A.G.C.

TR11, which is d.c. fed from D3 via TR6, operates as a peak detector on the tips of the positive going sync pulses with a reference d.c. level obtained from the zener diode D4 and the potential divider R47, R49. The a.g.c. signal at the collector of TR11 is directly coupled to TR12 which, from its emitter, controls the forward bias of TR1 and TR3. D1 is biased to delay the a.g.c. feed to TR1 so that approximately 30 dB of i.f. attenuation occurs before the r.f. stage attenuates, thus maintaining a good signal-noise ratio up to high input levels. Integration of the a.g.c. signal is provided by the capacitors C74 and C75 and the maximum receiver sensitivity is set by resistors R48 and R50. The peak-to-peak video output level is set by R49.

The UN1/584A uses npn transistors in the tuner and the polarity of the a.g.c. feed to TR1 must be reversed. It is taken from the junction of R12 and L12 (Fig. 2). The operation is otherwise the same.

Sound

The intercarrier sound detector diode D2 produces the full video signal with the 6 MHz sound signal across R33. The parallel-tuned circuit L22, C56 selects the sound signal and couples it to the first sound i.f. amplifier, TR9. TR9 operates as a neutralised common-emitter amplifier with the collector circuit tuned to 6 MHz and overcoupled to give a bandwidth of 250 kHz at —6 dB. TR10 is a neutralised common-emitter amplifier/limiter feeding the discriminator transformer L24, tuned to 6 MHz on both primary and secondary. The diodes D5 and D6 operate as a ratio discriminator and adjustment of R44 allows maximum a.m. rejection to be obtained. The de-emphasised sound signal is obtained at the junction of R34 and C67.

Tuning

The receiver is tuned first for maximum undistorted sound and then for minimum sound patterning on the video signal commensurate with a good sound signal.

Maintenance

Routine maintenance is not required and the adjustments of the various preset controls should not be disturbed.

The standing d.c. potential at the video output when terminated with 75 ohms, should be approximately −7 volts. This is adjusted by R30.

With an r.f. input of 3 mV ±6 dB, fully modulated with a composite video signal, R49 is adjusted to give a video output of 1 V p-p.

Note that adjustment of R30 affects the setting of R49. R30 primarily sets the linearity on colour signals and it is preferable to make the final adjustment of R30 for minimum differential gain distortion, using a known r.f. signal, modulated with 100% colour bars. The setting of R49 should be checked at the same time.

A circuit diagram is displayed inside the base cover of the receiver.

References

1. Designs Department Specification 8.253(67)
2. Designs Department Technical Memorandum 8.236(67)

AIB 8/68

from D19742 A1 iss.5
Parts List 019743 A4

transistor terminations
view on leads

AF181
AF179

BC109

OC170

OC83

U.H.F. tuner

L1 L2 L3 L4 L5 L6

C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 C15 C16 C17 C18 C19 C20 C21 C22 C23 C24 C25

R1 R2 R3 R4 680 R5 R6 R7 R8

TR1 TR2

01/R34 L9 L10 C27

R5/R8 L9 L/905

−11V

L12 L/905 C30 4·7p R12 390 R13 3·3k C33 10p

L13 L/906 R14 2·2k

TR3 AF181

C27 33p L11A L/904 L11B L/904 C29 100p C28 33p C31 0·01

41·5mHz

R9/L8

R10 470 R11 330 C32 0·01

C34 0·01

L10 L/905

R6/R7

R1

D1 OA91

C36 4·7p L14 L/907 C76 3·3p R17 10k TR4 AF179 C35 18p C37 0·0022

C3 0·1

C38 18p R19 10k TR5 AF179 R15 1·2k R16 220 R18 1·2k

C40 2·2p C39 0·0022 R20 220 C41 1·5p L17 200/150 D2 OA90 C42 1 C43 0·0022

33·5mHz C44 91p D3 OA90 C78 8·2p L15 L/908

6mHz L19 L/911 C46 100p L18 L/910

TR6 OC170 R24 330 R21 1k L16 L/905 C45 10p R22 6·2k R23 10k L25 L/905 C77 0·0047

R27 820 C50 0·1 C51 0·1 TR8 BC109 TR7 OC170 R29 4·7k C49 300p R25 110 R32 75 R31 180 R30 560 D4 BZY88-C5V6

C53 100p L21A L/913 L21B L/913 PLA 6 video output

C47 300p C48 470p R28 1·8k L20 L/912 R26 150 C54 A.O.T. R49 560

0V PLA 3

C52 50 −11V PLA 4

R36 12k C56 4·7p C59 270p C55 22p L22 L/914 C58 270p TR9 OC170 R34 47k R33 15k R35 10k R37 1k C57 0·0047 R38 220 C60 0·01

L23 A L/915 B C61 270p

6mHz

C63 4·7p R42 100 TR10 OC170 C64 0·01 C62 0·01 R39 12k R40 2·7k R41 390

C65 390p L24A L/916 C66 390p L24B L/916 R43 10k C67 0·0047

D5 OA91 C68 100p C69 680p C70 680p D6 OA91 R44 1k R45 390 R46 15k C71 8 C72 0·0022

6mHz

R48 33k TR12 OC83 C75 30 TR11 BC109 C74 30 R52 1k PLA 5 A.G.C.

C73 0·0022 R47 330 R50 150k A.O.T. R51 10k PLA 1 PLA 7 PLA 2 audio frequency output

0V −11V

Fig. 1 Circuit of the UN1/584

(Circuit of the UHF Tuner reproduced by courtesy of A.B. ELECTRONIC COMPONENTS LTD)

L10	58/10/0011/10
L11 A & B	L/904
L12	58/10/0011/10
L13	L/906
L14	L/907
L15	L/908
L16	58/10/0011/10
L17	200150
L18	L910
L19	58/10/0014/10
L20	L/912
L21 A & B	L/913
L22	L/914
L23	L/915
L24 A & B	L/916
L25	58/10/0011/10

transistor terminations view on leads

AF181 AF179 BC109 OC170 OC83

Fig. 2 Circuit of the UN1/584A