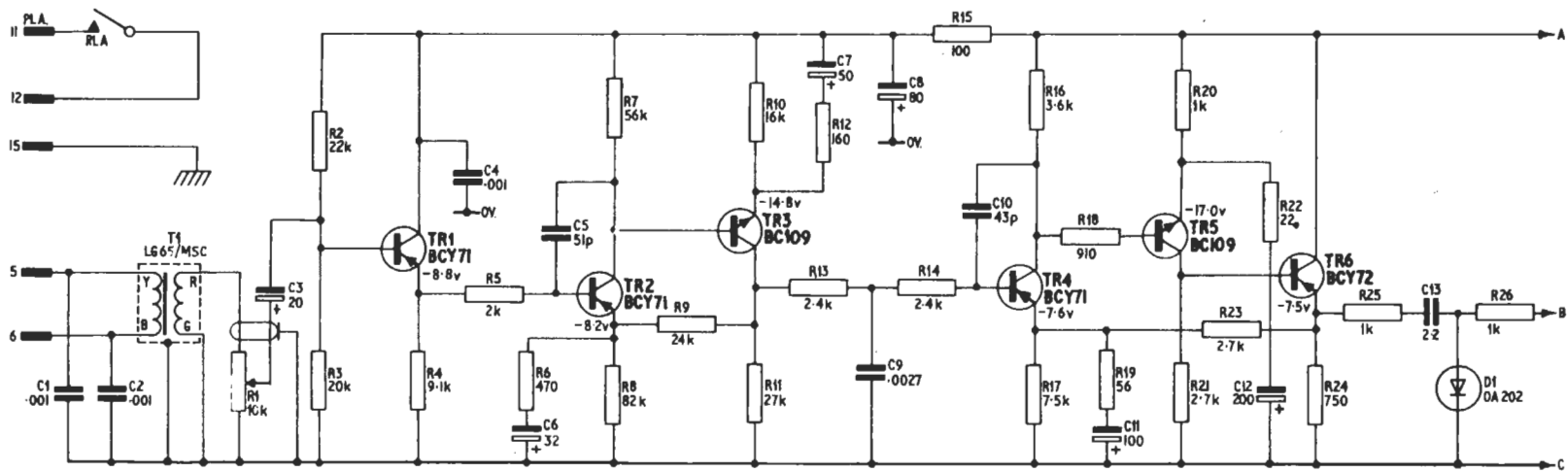


PREHEAR DETECTOR UNIT UN20/22

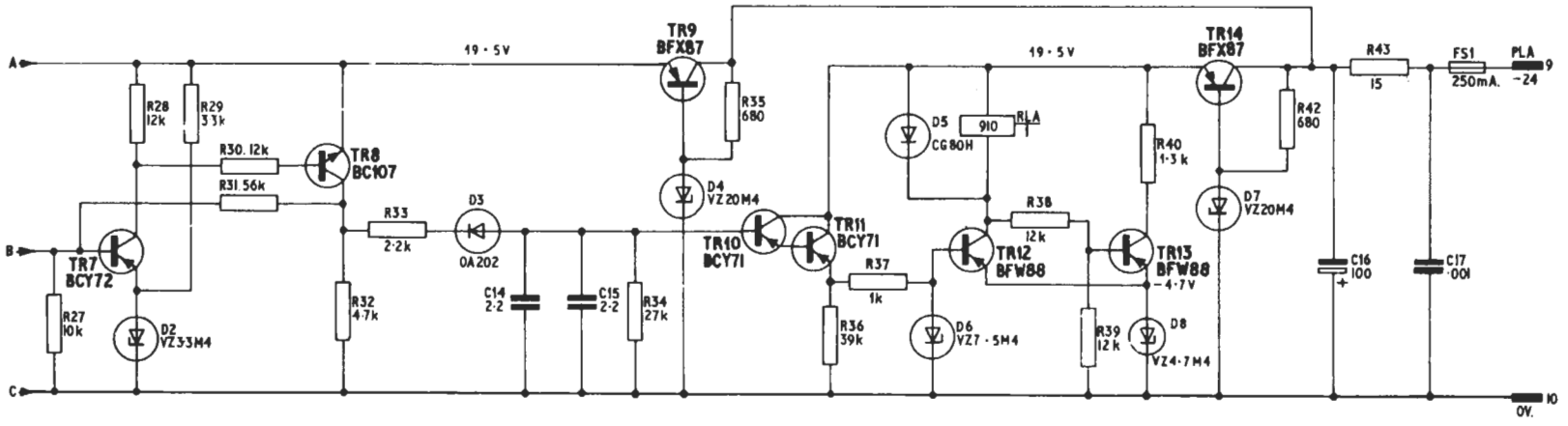


from D29449 A3
parts list D29450 A4

All voltages shown
are for no input

UN20/22/1

Fig. 1. Circuit of the UN20/22



Transistor terminations
view on leads



BCY 71,
BCY 72,
BC 107,
BC 109,
BFX 87.



BFW 88.

General

The prehear detector unit UN20/22 is for use in sound studio desks and other applications which require the generation of a switching function in response to an audio signal exceeding a preset level. It comprises a high-gain amplifier, a threshold switch and a relay drive unit with defined rise and fall characteristics. When the input level to the detector rises above a preset level a reed relay is actuated. In its original application, the detector unit is bridged across the prehear busbar and operates when a channel is selected to the busbar by the operation of a prehear button. The reed relay contacts operate external relays which change the main monitoring loudspeaker from desk output to prehear output.

The unit is constructed on a printed circuit board mounted in a CH1/18C chassis having external dimensions of $5\frac{1}{32}$ by $2\frac{1}{8}$ by $10\frac{3}{4}$ inches (12.8 by 5.4 by 27.3 mm) and uses coding pins 5 and 30. The preset sensitivity control is mounted on the front panel and is fitted with a spindle lock and cap. A 250-mA anti-surge fuse is mounted at the rear of the printed circuit board.

Circuit Description

Amplifier Section

The amplifier section has two stages, a complementary cascade amplifier TR2, TR3 having an a.c. feedback stabilised gain of 34 dB and a feedback triple TR4, TR5, TR6 with an emitter follower output, also with an a.c. gain of 34 dB. Between the two stages is a simple filter to curtail the response of the unit at frequencies above 15 kHz. The sensitivity control R1 is connected across the secondary of the input transformer and feeds an emitter-follower buffer stage TR1 at the input to the amplifier. The amplifier output is taken via a resistor R25 and a capacitor C13 to a clamp diode D1. This arrangement delivers the full peak-to-peak excursion of the amplifier output, free of continuous d.c. offset, as a voltage which swings only one side of chassis potential.

Threshold Detector

The output voltage is fed to the base of TR7, which conducts when this voltage exceeds about 4 volts. The threshold is sharpened by positive feedback from TR8 collector via R31. With sine wave drive the output waveform is a square wave of amplitude just less than the rail voltage, the mark/space ratio being slightly dependent on the level of the drive. When TR8 conducts, C14 and 15 are charged through R33 and D3 and when TR8 is turned off the capacitors discharge through R34, as D3 prevents discharge through R33. The time constants for charge and discharge are 10 ms and 110 ms respectively.

Relay Drive Section

The emitter follower TR10 and TR11 monitors the capacitor voltage, and when this exceeds about 7 volts, TR12 causes the relay RLA to operate. R37 and D6 limit voltage and current swings. TR9 and TR14 are series regulators for the supplies to the amplifier-detector and relay driver respectively.

Test Procedure

Apparatus Required

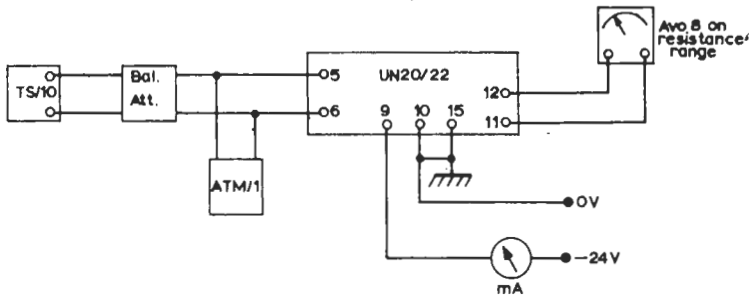
Tone Source TS/10
 Amplifier Test Meter ATM/1
 600-ohm Balanced Load (screened)
 Balanced Attenuator giving a loss of
 0 to 55 dB in 0.5-dB steps
 Double Beam D.C. Oscilloscope (with long
 persistence screen, single shot and
 external trigger facilities)
 24-volt Power Supply
 Avometer Model 8

D.C. Conditions

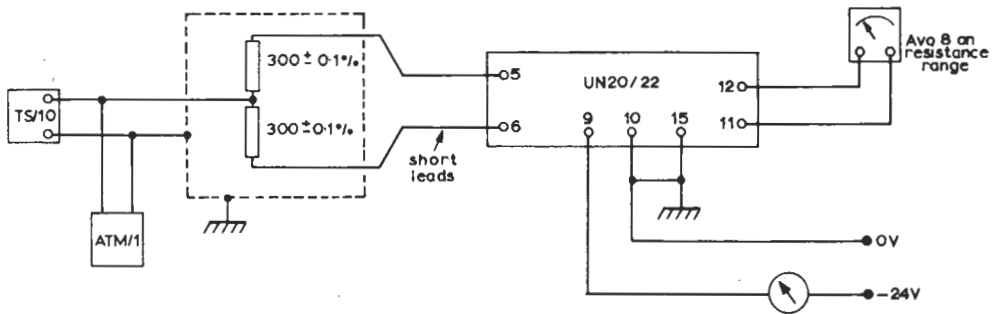
Current consumption 45 ± 5 mA
 (with R1 at minimum)

Emitter voltages TR6 -7.5, TR7 -3.3,
 (tolerances ± 1) TR12 -4.7, TR13 -4.7,
 TR9 -19.5, TR24 -19.5

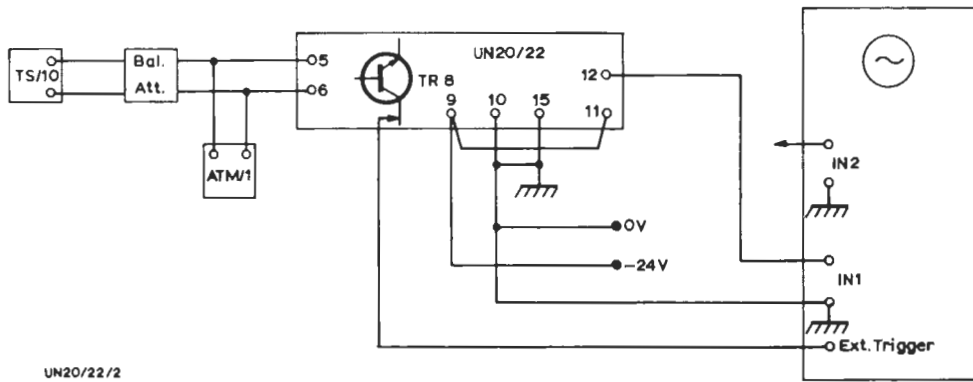
Continued overleaf



TEST CIRCUIT (a)



TEST CIRCUIT (b)



UN20/22/2

TEST CIRCUIT (c)

Fig. 2. UN20/22 Test Circuits

A.C. Tests

1. Connect up the circuit shown in Fig. 2(a). For level measurements use the 600-ohm input of the ATM/1.
2. Turn R1 fully clockwise, and apply 1-kHz tone to pins 5 and 6 at a level of -70 dB. Check that there is no continuity between pins 11 and 12.
3. Slowly increase the tone input level until the Avometer indicates continuity. The threshold level should be -50 ± 2.5 dB.
4. Decrease the input level by 0.5 dB. Continuity should be broken.
5. Measure the threshold level using 100-Hz and 10-kHz tone. The input level should be within ± 1 dB of the 1-kHz level.
6. Set the TS/10 coarse attenuator to -40 dB and the balanced attenuator so that the unit is fed with 1-kHz tone at a level 10 dB above threshold level.
7. Switch the TS/10 coarse attenuator to 0 dB for 10 seconds, and then return it to the -40 dB position. If the continuity at pins 11 and 12 is broken, it should be restored within 1 second.
8. Connect up the test circuit shown in Fig. 2(b). Again measure the threshold level using 10-kHz tone. This level should be 60 dB higher than the 10-kHz threshold level previously measured.
9. Connect up the test circuit shown in Fig. 2(c). Set the TS/10 attenuator to -20 dB and adjust the balanced attenuator so that the unit is fed with 1-kHz tone 10 dB below the threshold level.
10. Set the oscilloscope timebase to single shot and adjust the trigger control so that the timebase does not trigger with the TS/10 attenuator set to -20 dB, but does trigger when it is moved to 0 dB. The waveform should be as in Fig. 3(a).
11. Set the oscilloscope to continuous sweep, disconnect the external trigger wiring and connect the second input of the oscilloscope to TR8 collector. Retain the input on pin 12.
12. Set the TS/10 attenuator to 0 dB and apply 1-kHz tone to the input at a level 10 dB above threshold. Set the oscilloscope to a sweep speed of about 100 ms/cm and, shortly before halfway through the sweep, switch the TS/10 attenuator to -20 dB. The waveforms obtained should be as shown in Fig. 3(b).

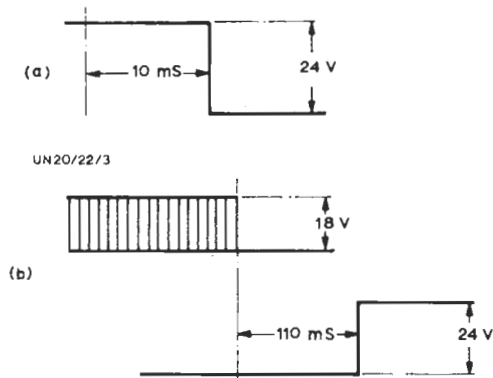


Fig. 3. UN20/22 Test Waveforms

Fault-finding Checks**Gain**

Measure, with a battery-operated a.c. voltmeter (e.g., the Levell TM3B) if available, and a blocking capacitor:

TR1 emitter to 34 dB
TR3 collector

TR4 base to 34 dB
TR6 emitter

Transistor State

With no input to the unit, TR7, TR8 and TR12 should be off.

WWM(X) 5/72