**Specification**

- **Output power:** 1W r.m.s. into 4 ohm (9V supply)
- **Frequency response:**
  - 50Hz to 10kHz at -3dB (max. treble)
  - 50Hz to 4kHz at -3dB (min. treble)
- **Sensitivity:** 50mV pk-pk for 1W output (either input)
- **Maximum d.c. level at the input:** 100V (either polarity, either input)
- **Voltage gain:** 150approx.
- **Input impedance:**
  - 1M (high-Z input)
  - 10k (low-Z input)
- **Supply voltage:** 9V
- **Supply current:**
  - 23mA (standby)
  - 270mA (full output)

**COMPONENTS**

- **Resistors**
  - R1 1M
  - R2 2k2
  - R3 10k
  - R4 47
  - R5 56
  - R7 470
  - All 5% W *50/0 carbon film

- **Potentiometers**
  - VR1 5k lin. p.c.b. mounting
  - VR2 10k log. p.c.b. mounting

- **Capacitors**
  - C1, C4
  - C1 1 00n 100V polyester (3 off)
  - C2 10p radial elect. 16V
  - C3 1µ radial polyester 100V
  - C5, C6 100µ radial elect. 16V
  - C9 220µ radial elect. 16V
  - C10 470µ radial elect. 35V
  - C12 1000µ radial elect. 16V

- **Semiconductors**
  - TR1 2N3819
  - IC1 TBA820M
  - D1 red l.e.d. (with mounting bezel)

- **Miscellaneous**
  - S1 SPDT miniature toggle switch
  - S2 DPDT miniature toggle switch
  - LS1 4 or 8 ohm 4” speaker
  - PL1 7-way straight p.c.b. header
  - PL2 6-way straight p.c.b. header
  - SK1 Phono socket (red)
  - SK2 Phono socket (black)
  - ABS enclosure (measuring 220 x 230 x 70mm approx. see text); printed circuit board available from the EE PCB Service order code EE725; plastic p.c.b. fixing pillars with self-tapping No. 6 fixing screws (2 required); snap-fit battery connector; 8-pin low-profile d.i.l. connector; connecting wire; fixings, etc.

**Fig. 1. Block diagram of the Bench Amplifier/Signal Tracer**

**Fig. 2. Complete circuit of the Bench Amplifier/Signal Tracer**

The circuit operates from a single positive supply rail of nominally +9V. This supply may be derived from dry batteries or from a suitable mains adapter (the unit will operate successfully from any regulated d.c. supply capable of delivering an output in the range 6V to 12V).

**CONSTRUCTION**

Construction of the Bench Amplifier/Signal Tracer is very straightforward and the vast majority of the components are assembled on a single-sided printed circuit board measuring approximately 54 x 104mm. The layout of the printed circuit board is shown in Fig. 3.

Components should be assembled on the printed circuit board in the following sequence: p.c.b. headers, d.i.l. socket, resistors, capacitors, and transistor. As with all of our projects, it is important to ensure that all of the components are correctly located. Furthermore, in the case of the polarised components (such as electrolytic capacitors, transistors and i.c.) it is absolutely essential to ensure that each component is correctly orientated.

When construction of the printed circuit board has been completed (and before inserting IC1 into its socket) it is well worth carrying out a careful visual check of both the upper and lower sides of the board. The upper (component) side of the printed circuit board should be examined to ensure that the components have been correctly located whilst the lower (copper track) side of the board should be checked to ensure that there are no dry joints or solder bridges between adjacent tracks. This precaution will only take a few minutes to carry out but can be instrumental in preventing much heartache at a later stage!

When assembly of the printed circuit board has been completed, IC1 should be inserted into its socket (taking care to observe the correct orientation).

**HOUSING**

The bench amplifier/signal tracer should be housed in an ABS enclosure measuring approximately 220 x 230 x 70mm. The precise dimensions of the enclosure are unimportant provided adequate room is made available on the front panel and the unit is large enough to accommodate a 9V battery and loudspeaker of reasonable size.

The front panel should be carefully marked out before drilling and cutting takes place. As usual, there is nothing particularly critical about the layout of the unit and constructors may wish to experiment with the location of the front panel.