

# PERODO PART 3

# POWER SUPPLY & MECHANICAL ASSEMBLY

BY R.A. COLE

THE DISCERNING CONSTRUCTORS CHOICE:

- ★ A Total Quadraphonic System
- ★ An advanced design AM/FM radio
- ★ Complete loudspeaker enclosure design
- ★ Flexible design allows individual modules to be incorporated in existing equipment
- ★ Switching facilities and modules for SQ, QS(RM) and CD4 systems

THE previous articles described the construction of the SQ decoder, the power amplifiers, pre-amplifiers and volume/tonne/balance controls, their circuits and operation.

The present article is devoted to the construction of the power supply and the construction and assembly of the main chassis member.

## POWER SUPPLY

The power requirements for the Rondo are dual rails providing positive and negative supplies with a centre earth for the preamplifiers, tone controls and power amplifiers, and a positive rail and negative earth supply for the tuners, stereo decoder and quadraphonic decoder(s).

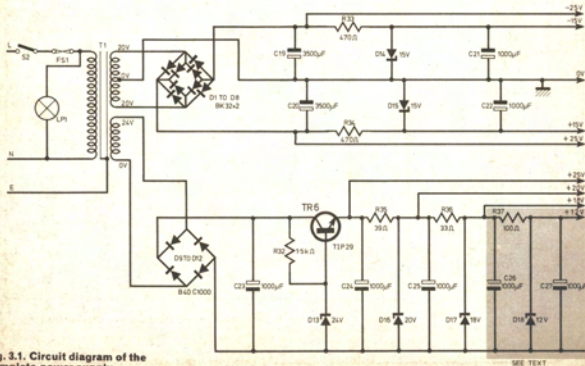


Fig. 3.1. Circuit diagram of the complete power supply

SEE TEXT

# POWER SUPPLY BOARD

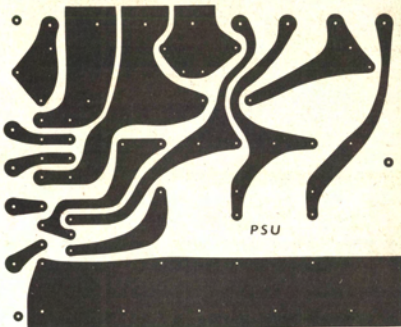


Fig. 3.2. Circuit board master for the Rondo power supply

## COMPONENTS . . .

### POWER SUPPLY

#### Resistors

- R32 1.5k $\Omega$
- R33 470 $\Omega$
- R34 470 $\Omega$
- R35 39 $\Omega$
- R36 33 $\Omega$
- All  $\frac{1}{2}$ W 10%.

#### Capacitors

- C19 3,500 $\mu$ F 40VW
- C20 3,500 $\mu$ F 40VW
- C21 1,000 $\mu$ F 16VW
- C22 1,000 $\mu$ F 16VW
- C23 1,000 $\mu$ F 35VW
- C24 1,000 $\mu$ F 25VW
- C25 1,000 $\mu$ F 25VW
- C26 1,000 $\mu$ F 25VW
- All elect.

#### Semiconductors

- D1 to 8 BK32
- (2 in parallel) Semicon.
- D9 to 12 B40 C1000
- Semicon.
- D13 24V Zener.
- D14 & 15 15V 10% - Zener.
- D16 20V Zener.
- D17 18V Zener.
- All Zeners are 400mW
- TR6 TIP29

#### Transformer

- T1 Primary 240V a.c.
- Secondaries
- 1, 20-0-20V a.c., 4A.
- 2, 24V a.c.  $\frac{1}{2}$ A.

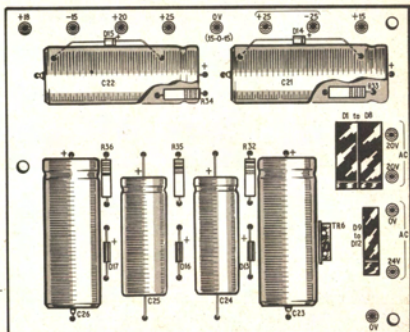


Fig. 3.3. Component layout for the power supply board viewed from the component side

# PE RORDO

## MAIN CHASSIS DETAILS

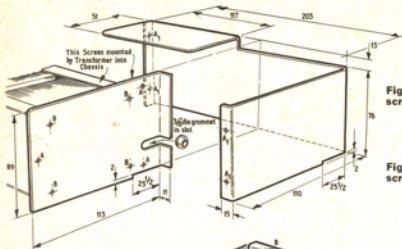


Fig. 3.5. Transformer screen metalwork details

Fig. 3.6. Power supply screen metalwork details

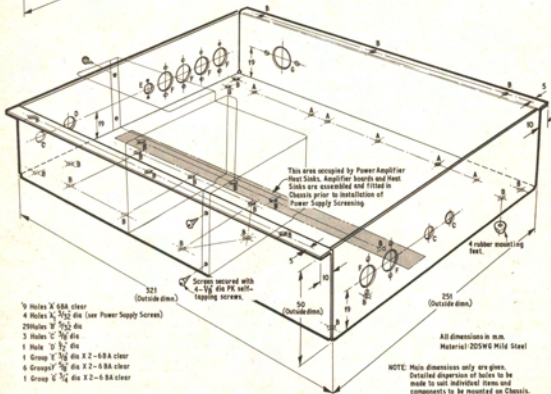


Fig. 3.4. Main supporting chassis metalwork shown in general detail in the fabricated form and with external critical dimensions for simplicity. There should be no reinforcement where the sides meet, as the sides must be able to be pressed inwards when the wooden sleeve is fitted

## POWER AMPLIFIERS SUPPLY

The dual rail supply is, as shown in Fig. 3.1, derived from a 20-0-20V transformer T1 winding with a 4A capacity rectified by two bridge rectifiers D1-D8 in parallel. The expedient of using two smaller (at lower cost) unmatched, bridge rectifiers in parallel is open to criticism because of "current hogging". That is, that the rectifier with the lower impedance will have a higher current flow. The rectifiers have been chosen so that, under all operating conditions, there are no detrimental effects due to this phenomenon.

The transformer centre tap is taken direct to the junction of two 3,500 $\mu$ F main smoothing capacitors C19, C20, joined negative to positive, and the rectified d.c. supply to the free positive and negative terminals of these capacitors respectively. The d.c. voltage, after rectification, is around +25 to -25V. (The centre zero is at earth potential.) The supplies to the main power amplifier output stages are taken direct from the main smoothing capacitors.

## OTHER BOARD SUPPLIES

All the 748's are fed from  $\pm 15$ V d.c. rails obtained by dropping through resistors R33, R34 from the  $\pm 25$ V supplies smoothed by two 1,000 $\mu$ F capacitors C21, C22. As these rails do not have to be at precisely 15V but the i.c.s have to be protected against exceeding a maximum rating of 18V, they are "clamped" to 15V by two Zener diodes (D14 and D15).

The positive rail and negative earth supply is obtained from a separate winding on the transformer T1. This winding is 24V a.c. at 250mA and is rectified by a 1A bridge rectifier, D9 to D12, smoothed and then regulated by a series regulator circuit TR6, R32 and D13 to 24V d.c. and smoothed again.

From this point is taken the supply to the varicap diodes of the f.m. tuner.

A further ladder of droppers, Zeners and smoothing capacitors produces 20V d.c. to the SQ decoder, 18V d.c. to the a.m. tuner, f.m. tuner head transistors, i.f. stages and the stereo multiplex decoder. The values of the ladder are chosen so that either the a.m. or f.m. tuner may be on, or both tuners off, without disturbing the voltages of the other supplies significantly.

The components C26 and C27 and resistor R37, together with D18 are associated with the tuner unit (yet to be described) and in fact appear on that unit's board. They are shown here merely for completeness.

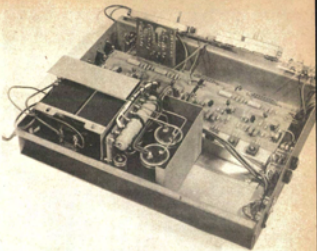
## CONSTRUCTION

The power supply p.c.b. master negative is shown in Fig. 3.2 which indicates the simplicity of the circuit in practice.

The component layout appears in Fig. 3.3 which is self explanatory. Capacitors C19 and C20 are too large for board mounting and are in fact clamped in the main chassis.

## MAIN CHASSIS

The main chassis member is a rectangular box-form which in fact sits on its back in the final assembly. Thus it is used as a trough with components mounted within it rather than in the more conventional manner.



**General view of the "trough" form of the main chassis for the Rondo showing the orientation of the power amplifiers and power supply with some of the general wiring in place. Plug and socket holes are not sized as this will depend on items selected**

The chassis is shown in the bent-up form in Fig. 3.4. The material used for the prototype was 20 s.w.g. mild steel plate but of course this may present some difficulties to constructors since it is not easy to bend. Thus it is possible to use 16 s.w.g. "half-hard" aluminium sheet which is somewhat easier to bend or, indeed, to fabricate the structure from flat sheets cut to size. For this reason only the major dimensions have been given as it is felt that each constructor will probably adopt his own style of construction.

It should be added that the chassis, in the prototype design, contains all the various parts of the system and supports the outer wooden case and fascia which is in the form of a sleeve which slips over the unit and is fastened to the chassis.

## PLUGS AND SOCKETS

As individual constructors may wish to vary the types and sizes of plugs and sockets used the positioning shown is open to variation to suit though of course major shifting of components is not advised as this can create feedback paths for which the equipment is not designed.

## CHASSIS SCREENS

The power supply includes the mains transformer, board and main smoothing capacitors and the whole is placed behind a shield to cut down hum pick-up at the pre-amplifier and elsewhere.

Two screens are used, as illustrated in Fig. 3.5 and 6. The smaller acts as a support for the power supply p.c.b. and is fastened to the transformer using 4BA screws. The p.c.b. is then attached to the screen using 6BA screws and  $\frac{1}{16}$  spacers.

The larger screen is assembled later in the sequence and is held in place using self-tapping screws.

Note that the transistors in the power amplifier last month should be type MJE3055K

**Next month we will finalise the mechanical assembly details and discuss the unit interwiring**