

# AMPLIFIER QA12/P.

## OPERATING CONDITIONS

The QA12/P amplifier is capable of an extremely high fidelity of reproduction. If this reproduction is to be realised, then the utmost care must be taken in setting up the equipment.

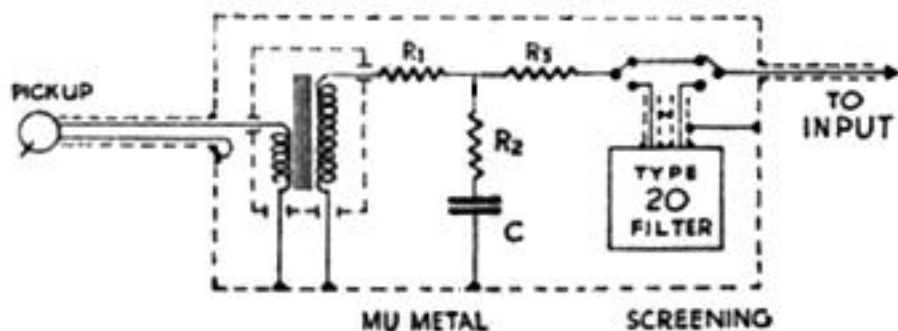
## GRAMOPHONE PICK-UP CONNECTIONS

The input to the amplifier must of course be completely screened. Since screened cable is capacitive, it should only be used for low or medium-low impedance circuits. The first stipulation therefore is that the screened input to the amplifier should **NOT BE FED FROM A SOURCE IMPEDANCE GREATER THAN 25,000 OHMS** at high frequencies. The cable itself should have low capacity and not be more than a few feet in length.

The amplifier has a very high gain for use with low output pick-ups. Since there are two valve stages before the volume control, care must be taken not to overload these. The second stipulation therefore is that the **INPUT VOLTS MUST NOT EXCEED 0.03 v.r.m.s.**

These conditions are easily fulfilled in practice. A lightweight high fidelity pick-up will of course be used and a bass compensation circuit can be incorporated which will provide the characteristics required. By fitting this compensating circuit immediately adjacent to the pick-up transformer there will be no capacitive loading on the transformer secondary such as would be caused by screened cable and which would in turn effect the transformer characteristics.

The following circuit should be used, and the values calculated as shown.



The transformer ratio should be chosen to provide 0.1 to 0.2 v.r.m.s. across the secondary, but the secondary impedance should not exceed 250,000 ohms. Should the pick-up already supply 0.1 v.r.m.s. then the transformer should be omitted.

**RESISTOR R.** The value of this resistor should equal the load recommended by the pick-up manufacturers multiplied by the square of the transformer turns ratio. Its value should not exceed 250,000 ohms.

**RESISTOR R2.**  $R2 = \frac{R1}{10}$  ohms.

**RESISTOR R3**  $R3 = 20,000 - (R2 \times 0.9)$  ohms.

**CONDENSER C.**  $C = \frac{10,000}{R2 \text{ (ohms)}} \times 0.05$  microfarads.

The equaliser, switch, transformer, etc., should all be completely screened in a metal box. In addition, the transformer should be shrouded with mu-metal and the transformer and filter should not be positioned near the field of mains transformers or gramophone motors.

The type 20 filter is a composite filter and must be completely out of circuit when not required. A single pole switch merely shorting out the filter is not suitable.

## RADIO TUNER UNIT

The amplifier has provision for supplying the power requirements for a radio tuner unit or other apparatus. The base of the amplifier should be removed, which will then expose a strip with six terminals. Nos. 1, 2 and 3 are for special purposes only and Nos. 4, 5 and 6 provide radio unit supply as follows:

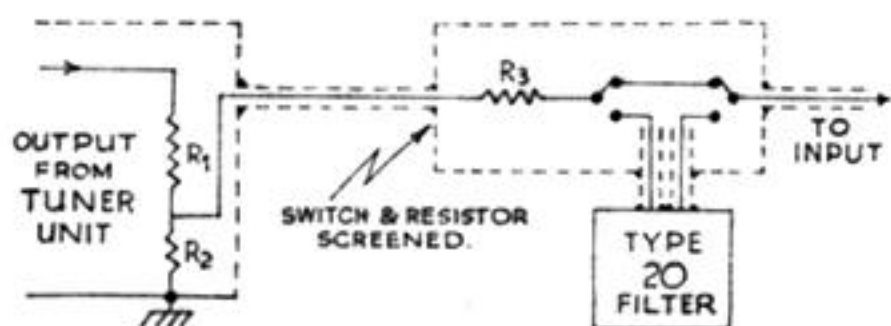
No. 4. H.T. 250 volts up to 10 - 15 ma.

No. 5 & 6. 6.3 volts at 1.5 amps balanced to earth.

The heater circuit in the radio unit should not be connected to any other part of the radio circuit and the H.T. line in the radio unit should be adequately decoupled. The H.T. negative is provided by the screening carrying the audio connections to the QA12/P input socket.

The audio input requires the same conditions as outlined under the heading "Gramophone pick-up connections." These conditions will be satisfied merely by "potting down" the output from the tuner unit one to two hundred times as required. A pre-set volume control may be employed. When the type 20 filter is used, an additional resistance will be required to provide a 20,000 ohm source for the filter.

If a diode detector is employed, the high gain of the amplifier may sometimes be used to eliminate diode distortion due to unequal AC and DC loading. The amplifier input may be connected directly to a tapping on the diode load resistor. Since this tapping will be very near the bottom end, the DC volts from the diode will be insufficient to affect the bias to the first amplifier valve. With this arrangement, the bottom of the diode load must of course be at earth potential.



**RESISTOR R1.** Suitable value as load for tuner unit.

**RESISTOR R2.** About 100 – 200 times smaller than R1. The best value should be selected so that full but undistorted volume is obtained from the QA12/P when set to plus 20 and with amplifier volume control at MAX.

**RESISTOR R3.**  $R3 = 20,000 - R2$  ohms.

When using a radio tuner unit, 0.01 mfd condensers from each mains lead to earth may sometimes be necessary to avoid modulation hum.

## THE LOUDSPEAKER

Provided the greatest care has been taken in selecting and fitting other accessories (radio unit – pick-up etc), the performance will be limited only by the capabilities of the loudspeakers. The loudspeaker should be the best possible, and some care should be taken in positioning it in the room for the best acoustic performance. The amplifier has an output of 7 or 15 ohms and will match any loudspeaker(s) of this impedance.

## RECORDING

The QA12/P is eminently suitable for recording and the high gain enables low level microphones to be used. In order to be completely versatile, gain controls should be fitted between microphones and amplifiers. Any of the conventional mixing arrangements may be used and special matching transformers are available for various cutter heads.

## LABORATORY USE

The source impedance to the amplifier should not exceed 25,000 ohms and the input voltage should not exceed 0.03 v.r.ms.

The amplifier may be used for measuring very small voltages, the limit being set by valve hiss - 6 db down on a one microvolt input signal.

The amplifier may be used in conjunction with distortion measurements on loudspeakers, microphones, etc., and the distortion limits published for the amplifier will not be exceeded with normal fluctuations in valve characteristics. The total harmonic distortion under 10 watt will be less than 0.1% subject to valve variations.

A substantial output can be obtained up to 60 - 70 Kcs., but correction should be applied above 20 Kcs. The output transformer resonance occurs at 70 Kcs. When used for very high frequencies the volume control should be set at maximum.

External supplies may be taken from the terminal strip provided under the chassis as follows:

No. 3. approx. 20 volts + DC. @ 20 ma.

No. 4. approx. 250 volts + DC. @ 10 ma.

No. 5 & 6. 6.3v. AC. 1.5 amps.

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