

stage gain of only slightly more than unity. However, as the frequency increases the emitter resistance is progressively shunted by an impedance, comprising a 560 ohm resistor and 0.15uF capacitor, to a point at about 3KHz where the gain is 20dB, and limited only by the 560 ohm resistor.

As the bypass tapping point is moved down the resistor, when the potentiometer is rotated, the maximum treble gain is reduced to some intermediate value. Thus, the treble boost effect can be varied over a wide range to meet all situational requirements.

In restricting the maximum gain to 20dB at 3KHz, our aim was to prevent any overload and consequent distortion in the guitar amplifier input

PARTS LIST

HARDWARE

- 1 Aluminium box, 4½ x 2-3/8in x 1½in.
- 1 9V battery (216) and conector.
- 1 5-lug length of miniature resistor panel.
- 1 Standard jack socket and plug.
- 1 Knob.

TRANSISTORS

- 1 TT109, BC109, SE4010 or similar.

RESISTORS

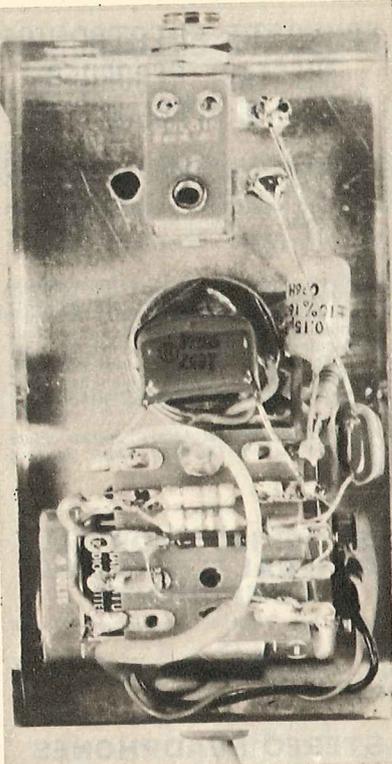
- 1 5K linear potentiometer with switch.
- 1 120K, 1 x 56K, 1 x 6.8K, 1 x 560 ohms. (All ½W 5 pc.)

CAPACITORS

- 1 0.47uF low voltage plastic or ceramic.
- 1 0.22uF low voltage plastic.
- 1 0.15uF low voltage plastic.

stages. However, the chance of overload occurring will depend upon the guitar output and its high frequency harmonic content, and the maximum allowable input to the amplifier.

Depending upon playing technique and position of the guitar pickup heads the output waveform will vary from something essentially sinoidal to one which comprises mainly consonant harmonics. But, the amplitudes of harmonics in the region of 3KHz will be far smaller than the fundamental and



The input jack (from guitar) is at the top of the picture, the boost control pot in the centre (partly obscured) and the terminal board and battery at the bottom.

lower harmonics. Provided that the amplifier has a reasonable overload margin the 560 ohm resistor could be omitted, thus increasing the treble gain by a further 6dB.

Whether to include the resistor or reduce it in value is a matter for individual decision, depending on the particular requirement and equipment used. Conceivably, the 560 ohm resistor could even be increased if less than 20dB treble gain is required.

As presented, the preamplifier operates from a 9-volt supply which, for convenience, can be a small battery with press-fit terminals. The

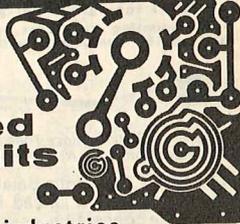
supply is switched via a switch on the treble potentiometer but, if the unit is accidentally left on occasionally, it will have little effect on the battery life as the preamp current drain is very modest.

Construction of the preamplifier is very straightforward and should present little difficulty, being similar in many respects to the preamp for electric guitars described in the October, 1968 issue. We built the prototype in the same style of small aluminium box previously used; it measures 4½ x 2½ x 1½in.

The components were wired on a small section of miniature resistor panel mounted over the battery at one end of the box. A bracket fashioned from a small piece of aluminium serves to retain the battery, and connection is made via a standard press-fit connector.

Output from the preamplifier is taken via a length of shielded microphone cable which should be fitted with a connector to suit the amplifier with which it is to be used. The input connection is made via a standard jack-socket, these being most frequently used in guitar hook-ups. The socket was mounted in the end of the box, opposite the wiring board and battery assembly and the potentiometer was mounted centrally between the two.

The housing was then completed by the addition of the lid, which was secured by two self-tapping screws. A knob fitted to the treble control potentiometer and an indicating arrow inscribed with black drawing ink and laquered completes the unit



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FORUM — continued from page 64

head). This is due to a different amount of refraction with a different "thickness" of air in the visual path.

To provide for this, it is essential to be able to adjust the frequency of the drive oscillator. The facility for adjustment is also handy in adapting to an available reduction ratio for the gearing if the ideal ratio cannot be provided. My own telescope drives slightly fast on 50Hz but, by lowering the frequency slightly, I have been able to get by without having to obtain a different set of gears.

Another good point about variable frequency drive is the ability to track the Moon and the planets, all of which move at different rates relative to the observer.

Instead of a Wien Bridge, try a UJT pulser feeding a J-K flip-flop, the output of which triggers the gates of a pair of SCRs in a class-D (switching)

amplifier. The SCRs could be replaced by an ordinary push-pull amplifier, if that seemed more suitable.

The frequency should be variable between 40 and 60Hz. Two push-buttons, one slow, one fast, together with a helipot, for fine adjustment, complete the set-up.

No amount of frequency adjustment will move the scope fast enough for setting up in the first place, or for corrections during astro-photography. For this, it is necessary to resort to differentials in the gear train, driven by a high-speed reversible motor. A quick tap on the control button centres the guide star fast.

Finally, for those whose interest is simply in the "oohs" and "aahs" of star clusters, etc., a synchronous motor driven from the 50Hz mains is more than accurate enough.

(L.B., Belfield, N.S.W.)

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