The general idea is given in Fig. 14.1. This also shows the basic arrangement of band-changing which, by the turn of a knob on the converter, permits immediate change from one band to another. In practice, the switching is a little more involved since additional contacts are usually employed to "earth" the Band I aerial system on the Band III position so as to reduce break-through of Band I signals. The converter may also have switched provision for more than one Band III station, in which case the band-change switch is ganged to the Band III channel-change switch.

Band III converters are invariably self-powered, containing a small a.c. power unit. To avoid having two mains connexions (one for the receiver and one for the converter), a "mains" socket is often incorporated on the rear of the converter into which the receiver's mains lead can be plugged.

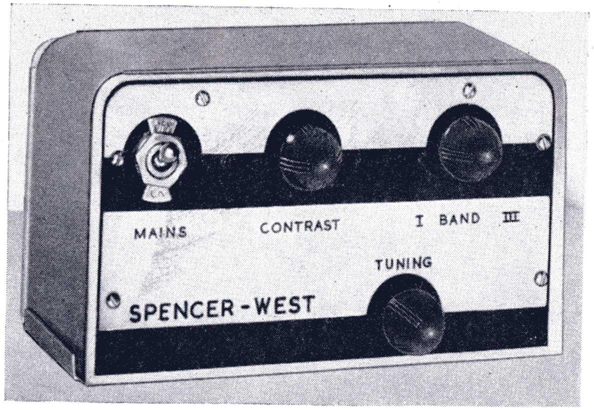


FIG. 14.2. *The Spencer-West Band III converter, type 80. It is designed around a single double-triode valve, as shown in the circuit of Fig. 14.3.*

When this is adopted the converter's on-off switch also controls the receiver, so that the receiver may be pre-adjusted and left in the "on" position and the combination controlled at the converter, which often stands on the top of the receiver cabinet.

A remarkably efficient yet inexpensive Band III converter, known as Type 80 and developed by Spencer-West, Ltd., is illustrated in Fig. 14.2. As may be seen from its circuit in Fig. 14.3, it is evolved around a single double-triode valve. Section V1A serves as a low-noise earthed-grid r.f. amplifier, while section V1B functions as a self-oscillating frequency-changer. The Band III station is pre-tuned by T1, L1 and T2 and selected by the band-change switch, which also controls the converter's power supply. The

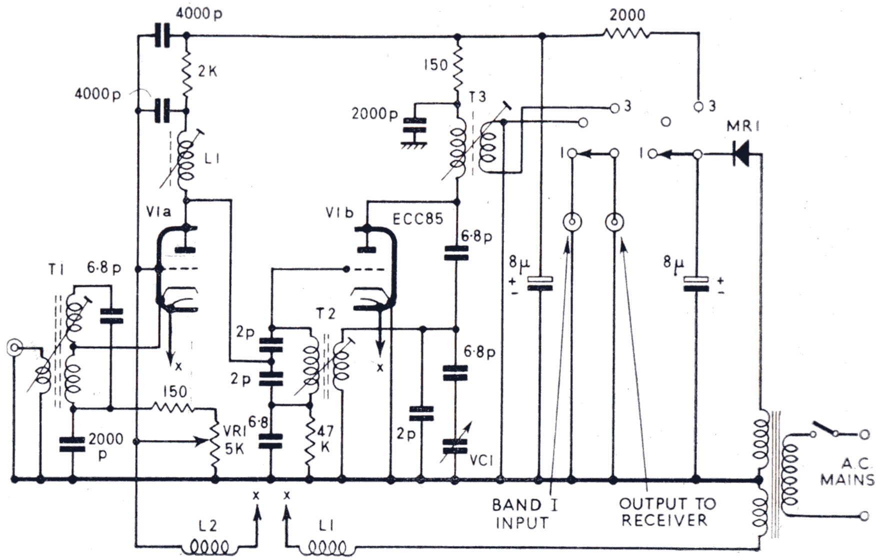


FIG. 14.3. *The circuit diagram of the Spencer-West Band III converter, type 80. This unit has printed circuits.*

variable capacitor VC1 constitutes the fine-tuning control, accessible for adjustment at the front panel.

The advantage of Band III converters of this type lies essentially in the fact that they can be used with almost any Band I receiver, whether t.r.f. or superhet. Installation costs are reduced to nil as no problems are presented to the amateur or experimenter in this respect. A drawback is that in "swamp" areas of a B.B.C. transmitter strong Band I signals are often picked up on the first-stage wiring of the receiver and on the converter-receiver connecting link when the combination is adjusted for reception of the I.T.A. programmes. In severe cases, this results in bad patterns and a ghost B.B.C. picture superimposed on the I.T.A. picture, possibly accompanied by break-through of B.B.C. sound on I.T.A. sound. Methods of combating this interference are described in the section dealing with pattern interference in Chapter 12.

There is also the possibility of the converted Band III signals, which are at high level at the detectors of a t.r.f. receiver, being re-radiated on Band I. This problem also is dealt with in Chapter 12.

BAND III ADAPTORS

The term "adaptor" is often used to describe those units whose signal output is at the receiver's intermediate frequency, and where connexion is

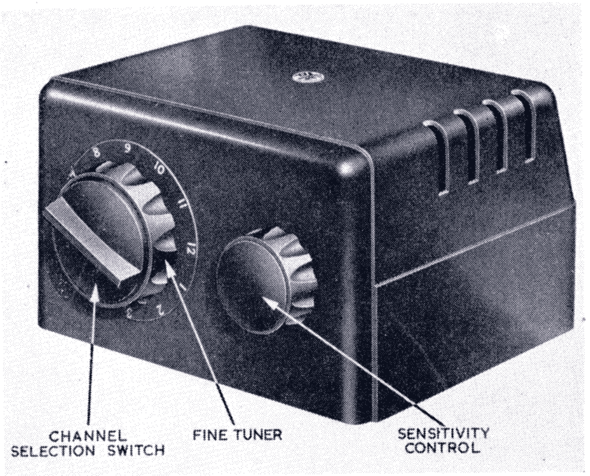


FIG. 14.10. *Pye switch-tuned multi-channel adaptor, types 47 and 124.*

valve V2 is rewired to form an i.f. amplifier. Bias is given by the 180-ohm cathode resistor, which must be decoupled by a capacitor as shown. The screen of V2 is connected direct to the decoupled h.t. point at the junction of R5 and R6. Resistor R7 is changed for one of 100 ohms, across which the tuner signal is applied from points 1 and 2 on the tuner (Fig. 14.6).

The chassis of the tuner, point 6, is connected to the chassis of the receiver, while the h.t., point 3, is usually taken to the anode or screen tag of the vacated r.f. valve holder to supply the tuner with decoupled h.t. The h.t. supply of some 27 mA at 170 V required by the tuner is readily available from the receiver, as its current drain is reduced by the removal of the r.f. valve.

To avoid making soldered connexions between the tuner wiring and receiver circuits, some conversion units have plugs and adaptor plugs which can be plugged into valve holders on the receiver chassis to facilitate power and signal connexion. This method is used by Pye. Here the r.f. valve is removed from the receiver chassis and in its place is inserted the tuner's power-supply plug. A small i.f. unit is also utilized, and this terminates the second of the tuner's connecting cables. The frequency-changer valve is removed from the receiver chassis and inserted into the valve holder on

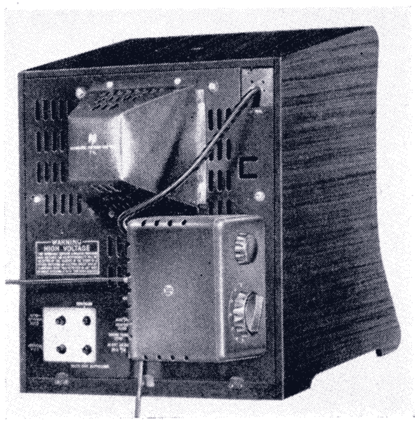
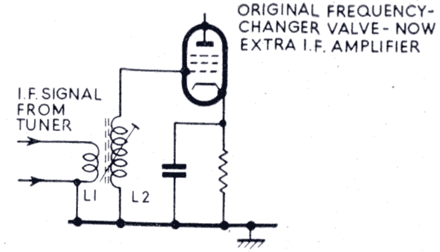


FIG. 14.11. *Pye adaptor, type 47, installed on Pye television receiver, model V4.*

FIG. 14.12. *Additional gain can be secured by injecting the signal by way of a tuned matching transformer.*



the i.f. unit, and the unit is inserted into the frequency-changer valve holder. In this way both power and signal connexions are made without any soldering being necessary.

Fig. 14.9 shows a turret front-end tuner installed in a commercial console receiver, Fig. 14.10 the Pye switch-tuner, and Fig. 14·11 the Pye tuner installed on a Pye Model V4 television receiver. In the last illustration, note the method of fixing at the rear of the cabinet.

Before going too far with an external conversion it is as well to ensure that there is sufficient free space inside the cabinet of the receiver. There is rarely any difficulty with console models, but in smaller table models there is often insufficient room for installation of the tuner.

In receivers which employ a frequency-changer section different from that shown in Fig. 14.3, the same general principle of signal connexion applies. With a double-triode stage, for example, the signal can successfully be injected across the cathode resistor of the mixer section, in a way similar to that shown in Fig. 14.5. In this case, the oscillator triode section can be completely disconnected from the main circuit. Where a separate oscillating valve is used, as in Kolster-Brandes receivers, the oscillator valve can be removed along with the r.f. valve, and the mixer valve rewired to form a low-gain i.f. stage. In this case, the signal can be injected into the control-grid circuit, across a low-value resistor, as shown in Fig. 14.8.

Extra gain can be obtained by connecting the tuner i.f. signal to the control grid of the extra i.f. stage by way of a step-up matching transformer (see Fig. 14.12). On a standard $\frac{1}{4}$-in. former, approximately 50 turns of 36 s.w.g. enamelled covered wire for L2 will tune between 9 and 15 Mc/s, 40 turns will tune between 15 and 20 Mc/s, and 15 turns will tune between 34 and 40 Mc/s by means of a dust-iron core. The coupling coil L1 should consist of two or three turns of larger-diameter wire wound round the "earthy" end of L2.

SIGNAL BALANCE AND NOISE

With older receivers which do not possess vision-channel a.g.c., a means of balancing the Band I and Band III signals is desirable in order to preclude the necessity of contrast adjustment on changing channel. On most tuners and on some converters this is provided for by the inclusion of two