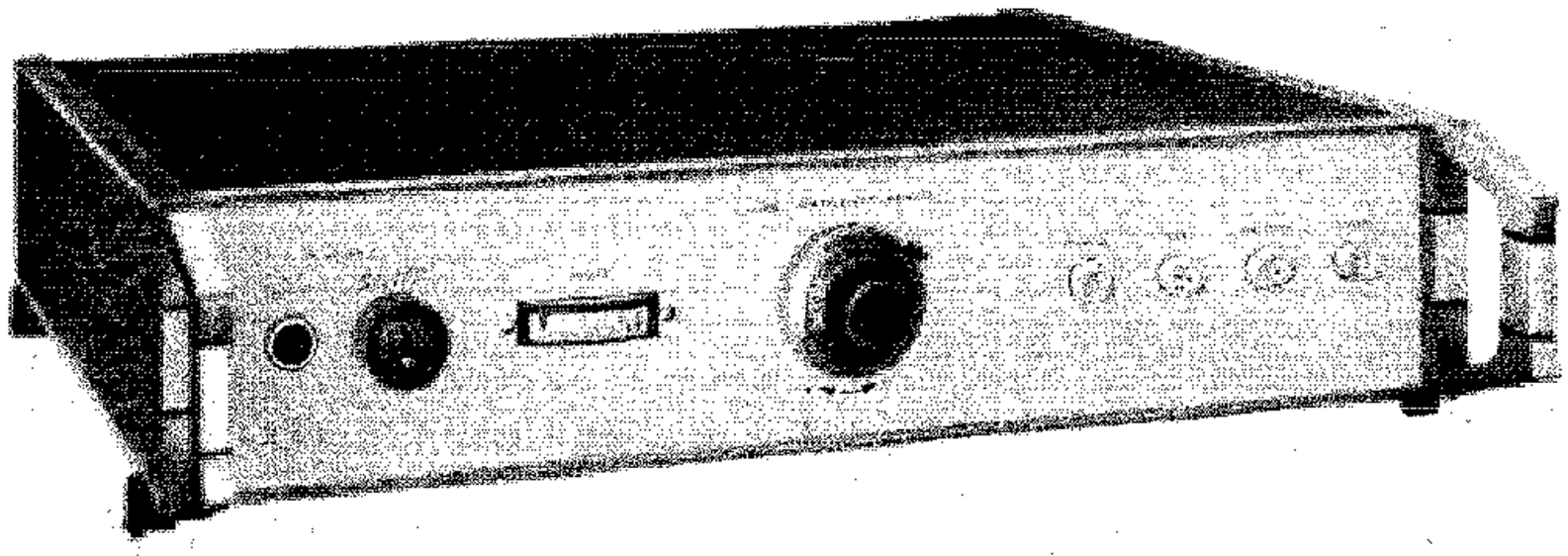
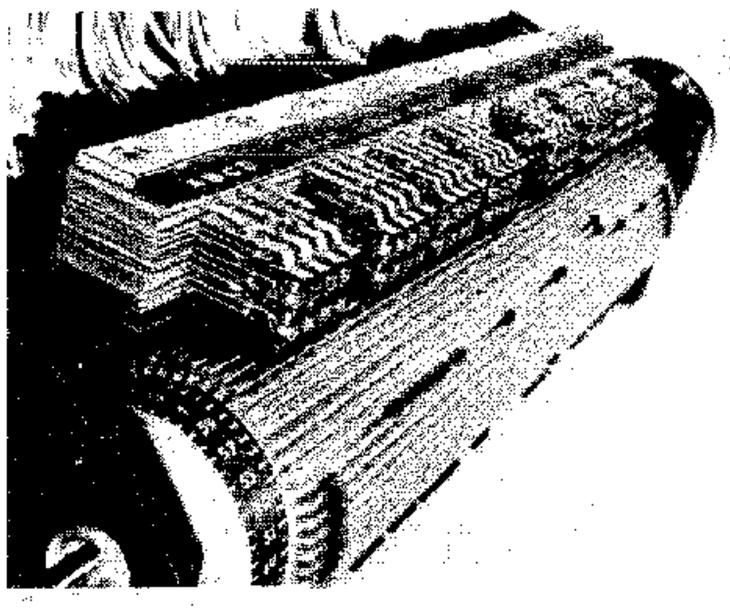


as low as 2 parts in 10^9 per day after 30 days' operation. It incorporates an integral charger and rechargeable battery. Should the mains supply fail the instrument automatically continues to operate at full accuracy on the batteries for up to four hours. When the mains supply is reinstated, the battery is automatically recharged. The FS3 utilizes as its master oscillator an oven-controlled 5MHz crystal. The oven current is monitored for correct operation by a front panel meter. Extensive use of integrated circuits has been made in the design of this instrument. Price £325. Advance Electronics Ltd., Hainault, Essex.

WW 303 for further details

Switching Programmer

A switching programmer measuring 8 × 8cm in cross section and 25.5cm long, including the motor, is designed to replace 32 d.p.d.t. relays and related control devices which may be currently employed in conventional switching systems making it possible to greatly reduce wiring and space requirements. It also permits greater flexibility in



setting up and changing required switching patterns. Now available from Sealectro this model 96D programmer can control 96 s.p.d.t. contacts each of which is electrically isolated to control independent circuits. Contacts are rated to make and break 2A at 230V a.c. or 24V d.c. (resistive load) and the unit's memory drum can be programmed to actuate any number of contacts in groups of three at any of the 60 drum positions. Standard operating voltage is 230-240V a.c. Sealectro Ltd., Walton Road, Farlington, Portsmouth, Hampshire.

WW 310 for further details

New T.T.L. I.Cs

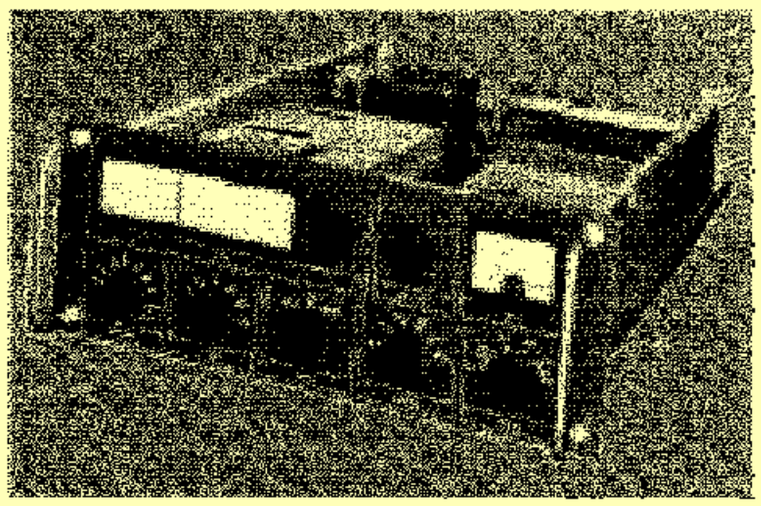
Transitron Electronic, has announced three additions to its Series III range of t.t.l. integrated circuits. They are two 4-bit ripple counters and a 4-bit shift register. Both ripple counters are monolithic and have been designed for high speed, high noise immunity, high output capacitive and current drive capabilities. Both consist of four flip-flops which have been arranged to give a one-way binary ripple counter (TRC 2521-2524) or a binary code decimal ripple counter (TRC 2525-2528). Temperature range of both types is −55 to +125°C and other significant parameters include power consumption of 18mW at 5V; count frequency 25MHz; output current drive 20mA. Other features include low current loading, complete t.t.l. compatibility, and saturated "HLTTL" circuitry. Both counters find application in a wide range of multiplexing, data logging, and flight data recording situations. The new shift register (TSR 2511-2514) is also a monolithic 4-bit device, designed for high speed, high noise immunity, and a high output capacitive and current drive capabilities. Input and output from the four flip-flops are arranged in four different combinations to provide serial in-serial out, serial in-parallel out, parallel in-parallel out, parallel in-serial out operating modes. Enable/disable outputs do the mode selection and no external connections have to be made to switch from one mode to another. The new register can also be converted into left/right shift by simple external connections. Temperature range is −55 to +125°C; power consumption 195mW at 5V; shift frequency 25MHz; output drive 20mA; and power supply, single 5V. All three circuits are available in either 14-lead flat pack, or 14-lead dual-in-line package. Transitron Electronic Ltd., Gardner Road, Maidenhead, Berkshire.

WW 301 for further details

Radio Communications Equipment

The first items in a new range of h.f. equipment introduced by Redifon Communications Division are the G450 1kW h.f. general purpose transmitter; the R499 10-channel m.f./h.f. s.s.b./d.s.b. receiver, and MCU6 aerial distribution amplifier. Particulars have also been given of the TT20 telegraph terminal unit which, although specially designed for the Royal Navy, is now available to other naval, military and commercial users. Type G450 is a self-contained s.s.b./d.s.b./c.w. transmitter without the need for external drive units. It operates on up to ten crystal-controlled channels in the 1.5 to 30Mhz frequency range with provision for an external frequency source such as a frequency synthesizer. The transmitter comprises a driver/p.a. unit, an exciter unit and a power unit, employing transistors in all but the drives and p.a. stages. The exciter unit can be used independently as a drive unit for other linear amplifiers. Type R499 is a fully transistorized receiver which is available in a number of versions to suit individual service and system requirements. Crystal filters are fitted internally according to the modes of signal to be received, and these are available for c.w., s.s.b., d.s.b. and i.s.b. The receiver operates on up to 10 channels in the h.f. band and, with the addition of filters, also on the 255-525 kHz band. Noise factor is generally better than 7dB and front end protection is provided against e.m.fs of up to 30V r.m.s. The a.g.c. system employed ensures that the gain of the i.f. stages is reduced before that of the r.f. stages, and precautions are taken to prevent large signals from introducing intermodulation distortion. Remote control facilities (in conjunction with a remote control unit type RC116) include channel selection, service and on/off switching, fine tuning, a.f. monitoring and channel-in-use indication.

Type MCU6 aerial distribution amplifier has a dynamic range of 135dB extending from below 1μV to 5V total input e.m.f., over a working frequency of 95kHz to 30MHz. Using silicon planar transistors throughout, the circuit comprises a push-pull amplifier with an associated wide-band a.g.c. system controlling a front-end attenuator. The a.g.c. begins to operate at an aerial input e.m.f. of approximately 500mV and limits the output to about 500mV, thus protecting associated receivers and permitting continued reception of a wanted signal in the presence of strong signals which would normally block the system. Two versions of the MCU6 are available: type A accepts a single input and provides ten outputs; type B contains two independent amplifiers each with one input and five outputs. Constructed for standard 19-in. rack mounting with a $3\frac{1}{2}$-in. front panel, the MCU6 normally operates from



100-125V or 200-250V 45-65 Hz, or can be made to special order to operate from 24V or greater d.c. supplies, with positive or negative earth.

Type TT20 telegraph terminal unit comprises twin v.f. receivers for independent simultaneous operation, and common power supply unit. As part of a modern communications system, each receiver forms part of a single teleprinter channel and accepts either a two-tone frequency exchanged keyed, or a frequency shift keyed telegraph signal, which it converts to a 1kHz tone or to a low-level d.c. signal.

WW 316 for further details

I.C. Patchboard

A rapid means of interconnecting integrated circuits and discrete components is provided by a new patchboard system by Circuit Integration Ltd. All types of i.c. configurations are catered for and special carriers are available for mounting other electronic components. In use, the components are mounted on the carriers permitting them to be plugged-in to any one of the patchboard range. Power supply connections are automatically applied to each carrier, and interconnection between devices is carried out by means of plug-in links. Five sizes of patchboard are avail-