U.H.F. CONVERTER CO2M/516

Introduction

The CO2M/516 is a u.h.f. converter designed for use in television rebroadcast receivers[1]. It accepts the u.h.f. signal and an input from a local oscillator[2] and provides an output containing both vision and sound i.f. signals. It consists of a u.h.f. amplifier, a broad-band crystal mixer and pre-i.f. amplifier, each separately screened.

The unit is built on a printed board and mounted in a screened modified chassis type CH1/39A with index pegs 17 and 23.

Signal connections to the converter are made by means of BNC sockets on the front panel.

General Specification

Input Frequency	Preset to any 8MHz channel in bands IV and V.
Output Frequency	
Vision carrier	37·5MHz
Sound carrier	31·5MHz
Local Oscillator Frequency	37·5MHz above vision carrier
Local Oscillator Input Signal Level	1V r.m.s. across 50 ohms
Aerial Input Impedance	50 ohms (nominal)
Input VSWR Over the Channel	Not greater than 1·25
Maximum Input	10mV r.m.s.
Maximum Output across 75 ohms	60mV r.m.s.
Power Gain between Matched Impedances	12dB±2dB
Amplitude/frequency Characteristic over the 8MHz Channel	Flat within 0·5dB
Noise Figure	Less than 12dB
Power Requirements	15mA at 12V negative earth
Weight	3½ lb.

Circuit Description

The circuit diagram is given in Fig. 1. TR1 is a common base amplifier giving a gain of about 10dB at u.h.f. The transistor is a germanium type with its collector earthed at zero frequency. The collector circuit is resonated at u.h.f. by a less than 1/4 wave line tuned by C4. L1 provides feedback and in conjunction with C1, C2 and C3, maintains the input VSWR within specification over a complete channel. The line, L1, C4 and C24 are mounted in the u.h.f. box, but are screened from TR1 by a partition.

L2, L5, C6 and C7 form a bandpass filter which restricts the bandwidth of the amplifier to about 10MHz. The filter has its own screening box attached to the u.h.f. box.

The crystal mixer is a Sage Laboratories balanced mixer, model 2513 R. The mixer circuit is a 3-dB directional coupler type; u.h.f. chokes provide d.c. returns for the diodes and the two capacitors provide u.h.f. decoupling. All these components are built into the diode holders. The poor input impedance of the mixer is held off from the local oscillator output by the pad R13, R14, R15.

The pre-i.f. amplifier consists of TR2 and TR3 in a cascode circuit with a passband from 30MHz to 40MHz. The input network consists of C12, L6, T1, C13 and C15 and is designed to have an 0·1dB Tchebyscheff response[3]. The output network L7, L5, C20, C21 is a heavily-damped T-network equivalent to a transformer where one arm is negligibly small. The gain of the pre-i.f. amplifier between 75-ohm impedances is about 10dB.

Maintenance

Routine maintenance is not required. If faults develop which cannot be cleared on inspection, the unit should be returned to Equipment Department for service.

References

1. Television U.H.F. Receiver RC5M/501
2. Oscillator and Multiplier OS2/511
3. Wireless World, Sept. 1954
4. Designs Department Specification No. 6.111(66)

AIB 10/68

See overleaf for Fig. 1

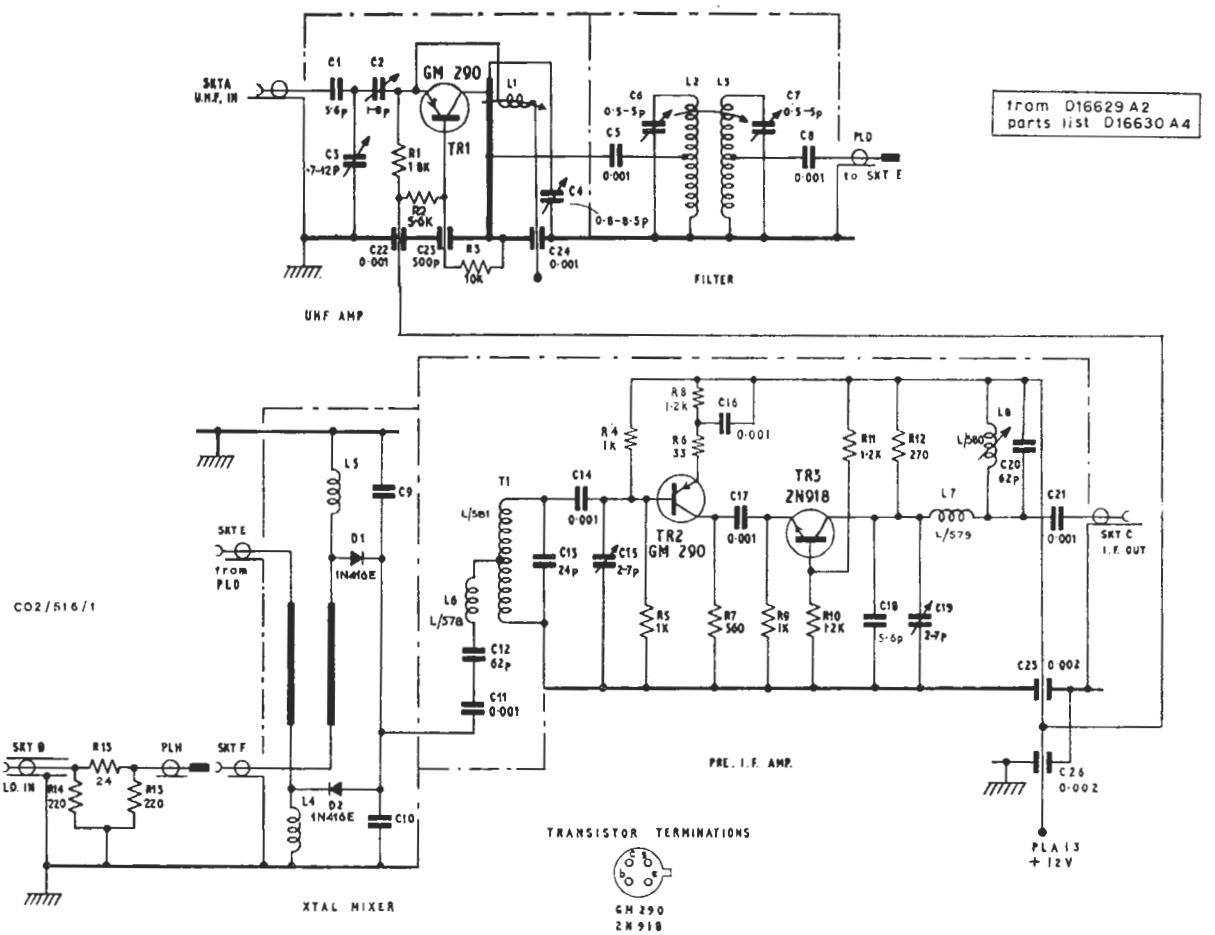

Fig. 1 Circuit of the CO2/516