PAL VECTOR DEMODULATOR DM1/502

Introduction

The DM1/502 accepts a chrominance signal, a subcarrier reference signal and a 7·8-kHz switching signal[1,2,3] and provides colour difference signals which are suitable for display on an oscilloscope.

The chrominance signal is demodulated by two synchronous detectors working in quadrature. The reference feed of subcarrier passes through a goniometer before being applied to the demodulator circuits; this permits the displayed signals to be rotated through 370 degrees.

The unit is constructed on a CH1/12A plug-in chassis with index peg positions 5 and 41. *Quadrature*, *Phase* and *X Gain* controls are mounted on the front panel of the unit. Power supplies at +6 volts and −6 volts are required[4].

General Specification

Chrominance Input Level	1·4 V p-p (nominal)
Subcarrier Input Level	1 V p-p ± 3 dB
Subcarrier Frequency	4·43361875 MHz
7·8-kHz Input Level	1 V p-p
X and Y Video Outputs	4 volts p-p
Output Bandwidth (including UN9/542)	Response −6 dB at 700 kHz ± 200 kHz
Residual Subcarrier Output	less than 10 mV
Switching Axis	X (R−Y)
Time-advance Sense	anti-clockwise
Current Consumption	170 mA
Weight	1·5 lb.

Circuit Description

The circuit diagram is shown in Fig. 1.

The chrominance input signal is applied, simultaneously, to transistors TR1 and TR6. Transistor TR1 drives a synchronous demodulator circuit comprising L1, diodes D1 to D4 and L2 (see Instruction L.1). The reference feed of subcarrier is applied via TR2 to the primary winding of L2. The demodulated colour-difference signal, which appears between points A and A1, is direct-coupled to the amplifier-and-output stage TR11-TR12. Inductor L7 and capacitors C40 and C41 form a sub-carrier rejection filter. The preset resistor R44 is used to vary the emitter-base bias of TR11 so that the zero of the output signal is at chassis potential. The signal developed at the emitter of TR12 constitutes the Y output of the unit.

The chrominance signal from emitter-follower TR6 is fed to the centre-tap on the primary winding of L4. Diodes D10 and D11 are alternately driven into conduction by the operation of the bistable multivibrator TR9-TR10 and so the upper and lower ends of the primary of L4 are alternately decoupled to earth. Thus the signal induced into the secondary of L4 alternates in phase at the frequency (7.8 kHz) of the signal applied to the bistable multivibrator and is switched through 180 degrees during alternate line-periods. Reverse bias for the diode that, at any given time, is not conducting is provided by the potential divider R24-R25. The preset resistor R39 is adjusted to balance the switching action of the diodes.

The phase-switched chrominance signal developed across the secondary of L4 is applied, via amplifier stage TR7, to the demodulator comprising L5, diodes D6 to D9 and L6. A reference feed of subcarrier is applied to the demodulator via L6. The demodulated colour-difference signal appearing between points B and B1 is direct-coupled to the amplifier-and-output stage TR13-TR14. The preset resistor R51 is used to adjust the emitter-base bias of TR13 so that the zero of the output signal is at chassis potential. A subcarrier rejection filter is formed by inductor L8 and capacitors C44 and C45. The signal developed at the emitter of TR14 is fed to the X output of the unit via the *X Gain* control R57.

The sub-carrier input to the unit is fed, via TR5, to a goniometer. This device consists of two fixed windings, which are set at right-angles to each other, and a rotatable secondary winding which is located within the primary windings and separated from them by an electrostatic screen. The two signals induced into the secondary winding, form a resultant signal in which the phase depends on the angle between the primary and secondary windings; the phase of this signal can be varied by rotating the secondary winding by means of the *Phase* control located on the front panel of the unit. From the secondary of the goniometer the signal is applied, via emitter-follower TR4, to the sub-carrier amplifier TR3. The network D5, C13 and R10 constitutes an a.g.c. system which (via TR4) varies the bias on transistor TR3 and so maintains

the output of the amplifier at a constant level for a ±3 dB variation in input level.

From TR3 the sub-carrier signal is applied to the two demodulator circuits via a low-pass filter and transistor TR2. The relative phase of the two signals is adjusted to 90 degrees by means of the *Quadrature* control R12.

References to Typical Associated Equipment

1. Vector Detector Unit UN20L/508.
2. Vector Display Unit UN12/502.
3. Vector Waveform Monitor MN6M/504.
4. Sync Separator Unit UN1/540.

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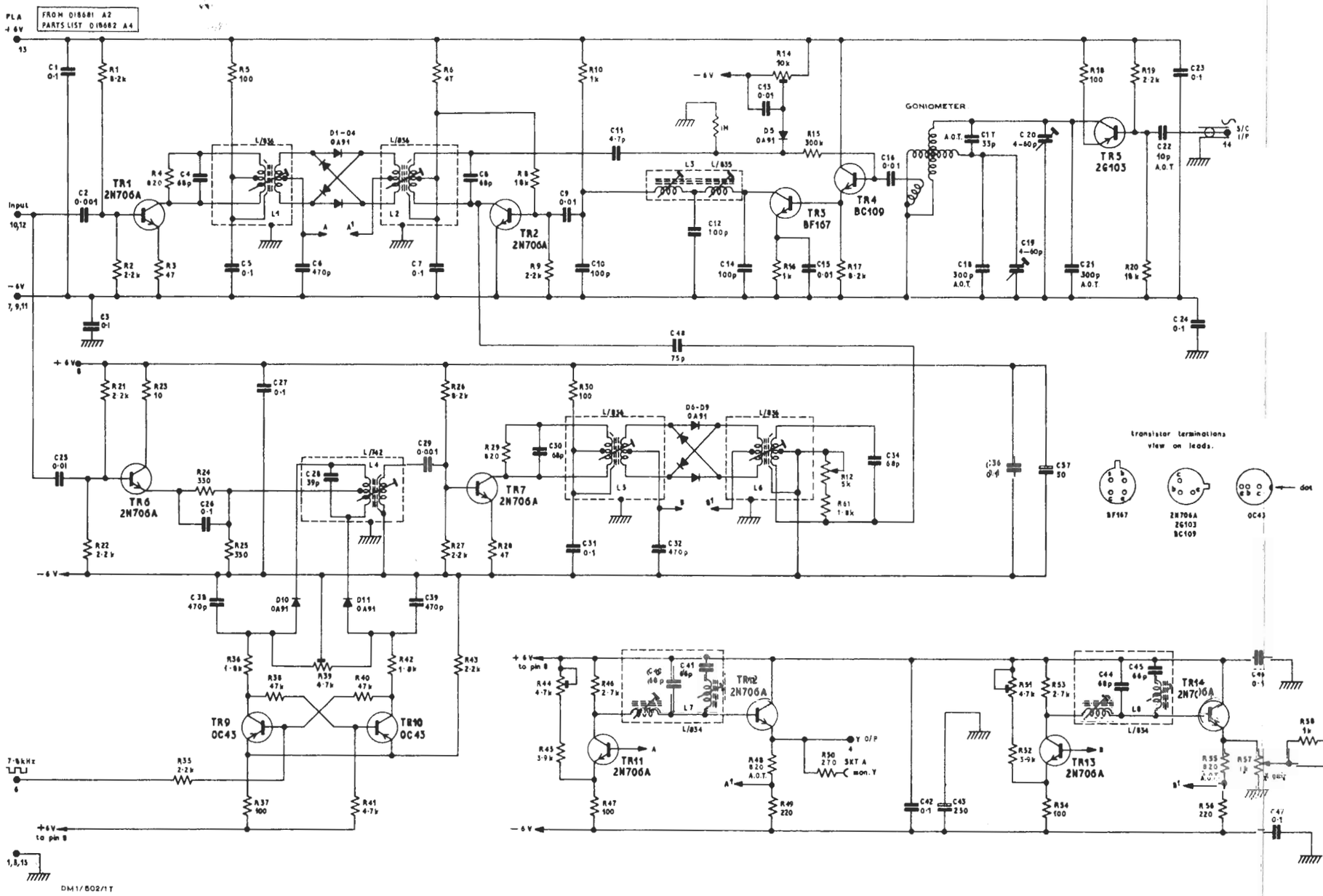

Fig. 1 Circuit of the DMi/502