TM 11-6625-213-35

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

FIELD AND DEPOT MAINTENANCE MANUAL

TEST SETS TS-538/U, TS-538A/U, TS-538B/U, AND TS-538C/U

This copy is a reprint which includes current pages from Changes 1

HEADQUARTERS, DEPARTMENT OF THE ARMY
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Technical Manual
No. 11-6625-213-35

HEADQUARTERS,
DEPARTMENT OF THE ARMY
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TEST SETS TS-538/U, TS-538A/U, TS-538B/U AND TS-538C/U

* This manual, together with TM 11-6625-213-12, 2 October 1963, supersedes TM 11-5014, dated 3 May 1957, including C1, 16 September 1957, C2, 9 April 1959, and C4, 22 March 1962, and replaces Signal Corps Repaired Equipment Standard No. 828, Issue No. 2, dated 17 April 1961.

CHAPTER 1

FUNCTIONING OF TS-538( )/U

Section I. GENERAL

1. Scope

a. This manual covers field and depot maintenance for Test Sets TS-538/U, TS-538A/U, TS-538B/U, and TS-538C/U. It includes instructions appropriate to third, fourth, and fifth echelons for troubleshooting, testing, calibrating, repairing the equipment, replacing maintenance parts, and repairing specified maintenance parts. It also lists tools, materials, and test equipment for third, fourth, and fifth echelon maintenance. Detailed functions of the test set are covered in the equipment functioning section.

b. The purpose, operation, and interoperation of the various circuits (electrical, electronic, mechanical, and electromechanical) in this e quip me nt are explained in this chapter. Familiarity with the equipment, how it works, and why it works that way are valuable tools in troubleshooting the equipment rapidly and effectively.

c. The complete technical manual for this equipment includes TM 11-6625-213-12, TM 11-6625-213-20P, and TM 11-6625-213-35P.

d. The direct reporting, by the individual user, of errors, omissions, and recommendations for improving this equipment manual is authorized and encouraged. DA Form 2028 will be used for reporting these improvements. This form may be completed using pencil, pen, or typewriter. DA Form 2028 will be completed in triplicate and forwarded by the individual using the manual. The original and one copy will be forwarded direct to: Commanding Officer, U. S. Army Electronics Materiel Support Agency, ATTN: SELMS-MP, Fort Monmouth, New Jersey 07703. One information copy will be furnished to the individual's immediate supervisor (officer, noncommissioned o f f i c e r, supervisor, etc).

Note: For other applicable forms and records, see paragraph 2, TM 11-6625-213-12.

2. Index of Publications

Refer to the latest issue of DA Pamphlet 310-4 to determine whether there are new editions, changes, or additional publications pertaining to this equipment. Department of the Army Pamphlet No. 310-4 is a current index of technical manuals, technical bulletins, supply manuals, (types 4, 6, 7, 8, and 9), supply bulletins, lubrication orders, and modification work orders that are available through publications supply channels. The index lists the invididual parts (-10, -20, -35P, etc) and the latest changes to and revisions of each equipment publication.

3. Internal Differences in Models

a. The oscillator tuning cavity in the TS-538C/U differs from that in the earlier models, and the oscillator wrench that fits this cavity also differs from the wrench designed for the earlier models (fig. 16 and 17).

b. Internal differences are listed in the chart below. For external differences and other internal differences, see TM 11-6625-213-12.

Item	Basic model	A model	B model	C model
Coil L3	Used	Used	Used	Not used
Coil L4	Used	Used	Used	Not used
Coil L5	Used	Used	Used	Designated as L3
Coil L6	Used	Used	Used	Not used

4. Signal Paths
(fig. 1)

a. When the test set is used for measuring the frequency of a radar transmitter, the transmitted signal is picked up by the antenna and then applied to the frequency meter, and to the crystal and meter circuits ,

b. When the test set is used for checking the output power of a radar transmitter, the transmitted signal is picked up by the antenna and then applied to the crystal and meter circuit.

c. When the test set is used as a signal s o u r c e for checking radar receivers, blocking oscillator V1 is used to generate a series of pulses, These pulses are fed to multivibrator V2 which changes these pulses to rectangular pulses with negative-going spikes. These negative spikes are chopped off by limiter CR1. Cathode follower V3 couples the rectangular pulses to radio frequency (rf) oscillator V4. RF oscillator V4 generates a continuous rf wave which is interrupted (modulated) by the pulses from cathode follower V3. The rf modulated wave can then be fed directly to the antenna, or it can be sent through the output power attenuator to output power jack J1. The rf oscillator frequency output can also be monitored by the frequency meter, and by the crystal and meter circuits .

Section II. UNIT FUNCTIONING

5. Block Diagram
(fig. 1)

a. Blocking Oscillator V1. The blocking oscillator produces positive pulses which are used to trigger multivibrator V2 (A, fig. 2). The pulse repetition rate of the oscillator can be varied from 5 to 200 pulses per second by the REPETITION RATE control. The blocking oscillator is turn e d ON and OFF by MODULATION switch S1.

b. Multivibrator V2. The multivibrator is a flip-flop circuit having one stable and one unstable condition of conductivity. The multivibrator remains in the stable condition until a trigger pulse from the blocking oscillator switches it to the unstable condition. The multivibrator recovers its stable condition after several microsecends (normally adjusted to 45 microseconds), This action produces an output pulse which is rectangular shaped with a negative-going spike (B, fig. 2).

c. Limiter CR1. The limiter removes the negative-going spike from the multivibrator pulse and establishes a 0-volt direct-current (dc) reference level (C, fig. 2).

d. Cathode Follower V3. The cathode follower acts as an impedance matching device which matches the high impedance of the limiter output, with very little loss of multivibrator pulse voltage, to the impedance of the rf oscillator input, which is a relatively low impedance load (D, fig. 2).

e. Rf Oscillator V4. The rf oscillator is a pencil-type triode connected in a coaxial-line cavity which produces rf oscillations, The oscillator is tunable through the range of 1,630 megacycles (mc) to 1,730 mc (1,615 mc to 1,715 mc in the TS-538C/U), The rf output may be either continuous wave (CW) (F, fig. 2) or interrupted continuous wave (icw) (E, fig. 2), depending on the position of MODULATION switch S1. When the output is icw, the duration of the interruption is adjusted to 45 microseconds *(b* above) and the repetition rate is adjustable from 5 to 200 pulses per second *(a* above).

f. Output Power Attenuator. The output power attenuator is an adjustable waveguive-type assembly which controls the amount of rf power available at output jack J1.

g. Frequency Meter. The frequency meter is a coaxial cavity, the resonant frequency of which is adjustable, Resonance is indicated by a dip on meter Ml.

h. Crystal CR2 and Meter M1. T h e crystal rectifies the rf current from the