TMC SPECIFICATION

NO. S 986

REV: 0			
COMPILED: LB	CHECKED:	APPD: [illegible] 7/8/65	SHEET COVER OF 12

TITLE:

typed by vab 6/12/65

ENVIRONMENTAL TEST PROCEDURE

KEYER MONITOR CONTROL UNIT

TMC SPECIFICATION

REV: 0	NO. S 986
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APPD:	SHEET 1 OF 12

TITLE: ENVIRONMENTAL TEST PROCEDURE - KEYER MONITOR CONTROL UNIT

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I. Environmental Tests to be performed.

II. Electrical Test to be performed.

III. Test Equipment (for elect test specifications)

IV. Block Diagram of KMCU

V. Operational Theory

VI. Electrical Test Detail

ENVIROMENTAL TESTS - TO BE PERFORMED FOR CLASS 4 EQUIPMENT AS PER MIL-E-16400*:

a.	Surface examination	4.5.1*
b.	Supply line voltage and frequency	4.5.4
c.	Heat Test.	4.5.6
d.	Temperature Test	4.5.8 **
e.	Humidity Test	4.5.9
f.	Power #	4.5.10

** NOTE: The non-operating conditions of MIL-E-16400, 4.5.8.1(a) shall apply except the hold time shall be 8 hours.

Primary Power - The equipment shall provide for 115/230 Volts AC ±10%, 48 to 63 CPS with an estimated load maximum of 50 Watts.

4.5.8.2.4 CLASS 4. - Class 4 equipment shall be capable of normal operation (without alignment or adjustment, other than the accessible controls employed for operation of the equipment) through out the following temperature cycle; tolerances in operating characteristics shall be as specified in the individual equipment specification:

(a) Hold room temperature at 0° ± 2°C. for at least 24 hours.

(b) Increase room temperature in the steps of 10 degrees each, at 30 minutes per step, until +50° ± 2°C. is reached and hold at that temperature for at least 4 hours.

(c) Reduce room temperature in steps of 10° each, at 30 minutes per step until +25°C, ± 2°C. is reached and hold at that temperature for at least 4 hours.

1. Range of Keying sensitivity of R9.

2. Delay of K2 versus K1 with adjustment of R21.

3. Delay of K2 (if any) on "MAKE" versus K1.

A. KEYING INPUTS - (SPEED: Up to 50 words per minute)

a.	DC	50 or 100 Volts ± 10%
b.	DC	20 or 60 ma ± 10%
c.	Audio	
1.	Input range	-17 DBM to +10 DBM
2.	Frequency range	400-7000 CPS
3.	Impedance	10,000 OHMS (Tone Bridge)
		600 OHMS (Tone)

5. Monitor Inputs:

A. R. F.

1.	Impedance	600 OHMS
2.	Level	-17 DBM to +10 DBM
3.	Range	300 to 6000 CPS

TEST EQUIPMENT REQUIRED:

1. Square Wave Generator (50V and 100V Keying)
2. Current Power Supply (20ma and 60ma Keying)
3. Audio Generator (600 Balanced)

   Frequency Range 300 CPS to 7000 CPS.

   Voltage - 17 DBM. (.1094) to +10DBM. (2.449) 600 OHM ref.
4. Radio Frequency Generator

   Frequency Range 2- 28MC

   Voltage Range 0- 1VRF
5. Audio Voltmeter
6. RF Voltmeter
7. Continuity Checker
8. Oscilliscope
9. 2 - 1.5 V d-c batteries.
10. 2 - 100 ohm resistors.

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TMC SPECIFICATION NO. S 986

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TITLE: BLOCK DIAGRAM OF KMCU

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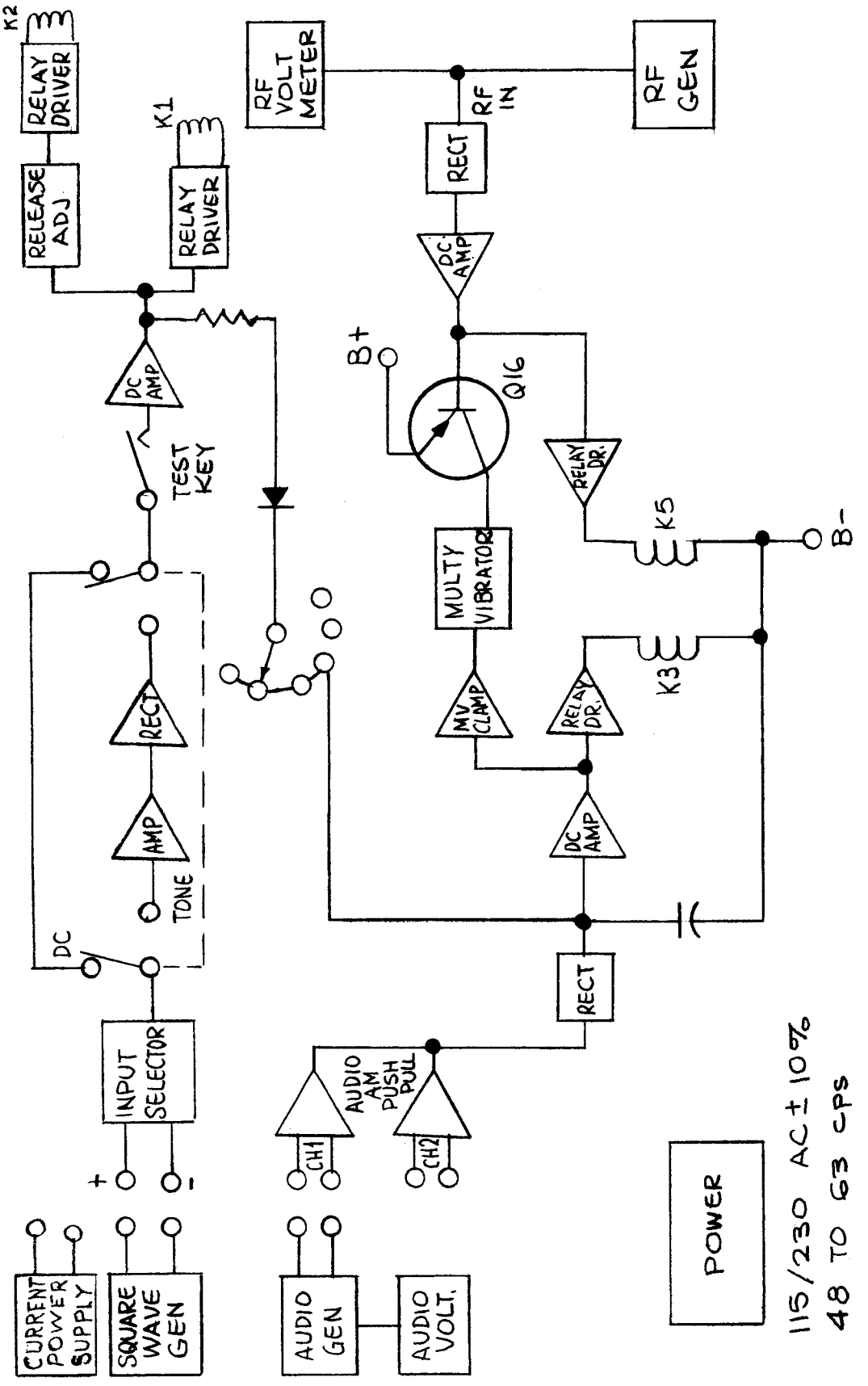

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A. OPERATIONAL THEORY

The KMCU consists of two separate sections: a Keyer-Control circuit and a monitor circuit. The Keyer is designed to sequntially control the various sections of a high power transmitter; the monitor section provides for remote observation of transmitter operation, announcing failure of R. F. or Audio with a red light and switch closures which can be used for an external alarm. The two sections are linked together during DC Keying to prevent a false alarm since there is no audio under these conditions.

B. THE KEYER

Input from the key line enters the unit through TB101, and is filtered by chokes L1, L2 and capacitors C1 through C4. Keying selector switch, S4, permits the operator to adjust the unit for operation with the Input in use, Threshold control R9 permits adjustment for various lengths of line. Transistor Q2 is used as a tone amplifier when tone Keying is to be used. Output of this stage is rectified by a voltage doubler consisting of CR4, CR5, C7 and C8. DC amplifier Q1 provides enough voltage to operate the driver for relays. The input to the delayed relay K2, is isolated by resistor R17 and diode CR6. The parall 1 circuit consisting of capacitor C9 and resistors R21 and R22 stores the voltage from Q1 when it conducts; R21 is adjustable to provide for adjustment of hold in time.

C. THE MONITOR

The monitor consists of two basic sections: (packaged on separate

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circuit cards) the amplifier and the alarm. The amplifier is simply two push-pull stage to provide isolation from and gain to the two audio channels. The outputs of the two amplifiers are rectified by a full wave bridge and applied to a common filter capacitor C12.

DC amplifier Q11 operates relay driver Q12 and multivibrator clamp Q14. Since Q11 conductors whenever traffic is present on either channel, the base of Q12 is driven negative through R48 and Q 12 conducts closing relay K3 to indicate the presence of traffic.

Q14 is a clamp on the multivibrator whenever traffic is present since its, too, is coupled to the collector circuit of Q11. When audio traffic fails, Q14 unclamps, permitting the multivibrator consisting of Q13 and Q15 to oscillate provided transistor Q16 is conducting enough to put collector voltage on the multivibrator. The relay in the multivibrator circuit K4 operates whenever the multivibrator is oscillating, to flash the red failure light.

R. F. enters the unit through J101 and is rectified by CR13 to operate Q18. Whenever Q18 conducts, the base of Q17 is driven negative and Q17 conducts closing relay K5. Q16 is also driven to conduction through collector circuit of Q18.

A external voltage source of 24VDC is required to light the front panel status lamps and the remote status lamps. The relays are wired to light the lamps in the following sequence: The amb r

CONT.

READY light is lit as soon as 230VAC is applied to J102 pins A and B to energise Relay K6 (Plate on Indicator). Whenever traffic is present and the transmitter is operating correctly, K3 and K5 are closed and the green ON AIR lamp is lit (The contacts extinguish the amber READY lamp). Failure of RF causes K5 to open, lighting the red failure lamp and extinguishing the green ON AIR lamp. Failure of traffic and the presence of RF causes K4 to flash the red failure lamp at approximately a one second rate after approximately 8 (eight) seconds delay. There are delays built into the circuit to provide the following:

Application of Plate Voltage	No Delay
Application of Traffic	Approximately 1/4 SEC.
Failure of Traffic	Approximately 1 SEC. to extinguish green approximalely 8 seconds before flashing red.
Application of RF	No Delay
Failure of RF	Approximately 1-1/2 second before extinguishing green approximately 1-1/2 second before lighting red.

D. CONTROLS

POWER:
This switch controls the line voltage to the unit.

KEYING SELECTOR:
This switch selects the voltage which will operate the Keyer.

THRESHOLD:
This control adjust the KMCU input to operate with the lines and installation is use.

CONT.

HOLD IN ADJUST:
This control permits the operator to adjust the time K2 will stay actuated after K1 opens.

KEYING CONTROL:

Permits operator to remove external Keying lines.

ELECTRICAL TEST SET UP

NOTE: With the AC Power switch OFF the KMCU is in its keyed condition.

1. Using the external connections, TB101, TB102, J102 and J101, connect as shown.

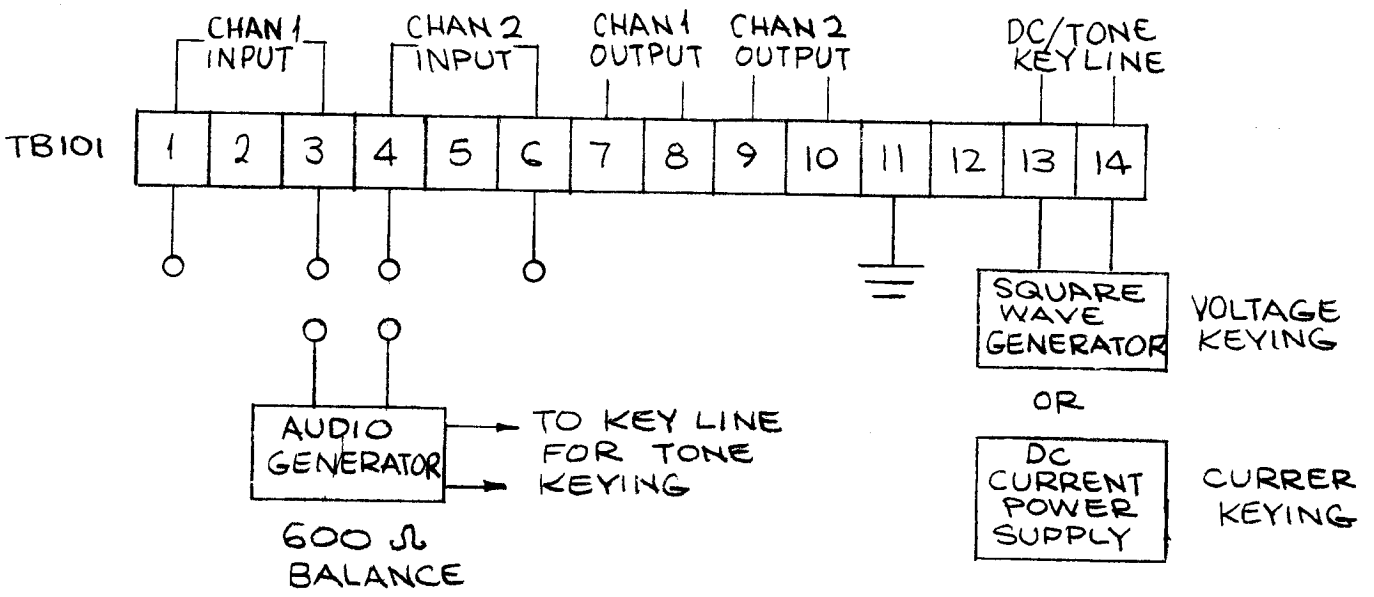

FIGURE 1

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TITLE: ELECTRICAL TEST SET UP

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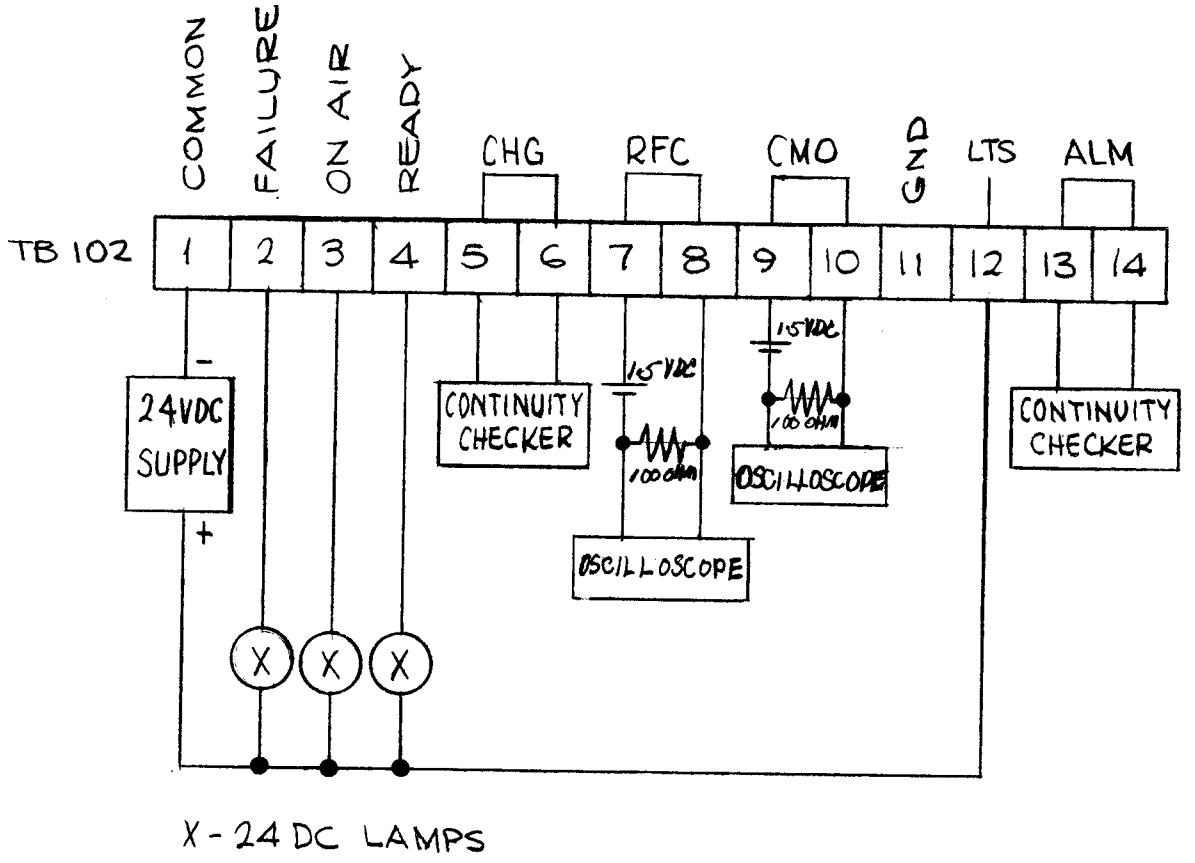
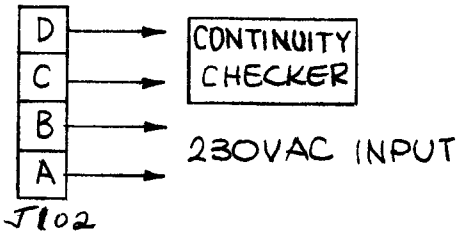


X - 24 DC LAMPS



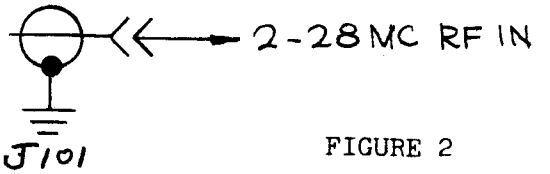


FIGURE 2

2. Connect Power input to a 115 VAC Source (Power Switch OFF)

3. Place operating controls in following positions:

Test Key	Neutral
Keying Control	Remote
Keying Selector	50 V

4. Check the following continuity:

TB102, Terminal 5 and 6	Shorted
TB102, Terminal 7 and 8	Shorted
TB102, Terminal 9 and 10	Shorted
TB102, Terminal 13 and 14	Open
J102, Pins C and D	Open

5. A. Place main power switch ON;

B. Check the following continuity:

TB102, Terminal 5 and 6	Open
TB102, Terminal 7 and 8	Open
TB102, Terminal 9 and 10	Open
TB102, Terminal 13 and 14	Open
J102, Terminal C and D	Open

C. Apply 230 VAC to pins A8 B of J102, K6 relay will engerize and light the internal and external ready light.

CONT.

d. Audio Keying - Remove existing power supply from key line and connect audio generator. By placing the keying selector in the tone terminal or tone bridge, the KMCU-1 will key with a voltage level of -17 dbm to +10 dbm from 300 to 6000 cps.

6. Audio Keying:

Place keying control from LOCAL to REMOTE. By observing oscilloscope and continuity checker, there will be a delay of 0 to approximately 7 seconds release time of K_2 vs. K_1 with the ADJUST of R21. Hold in ADJUST.

There is no delay of K_2 on make versus K_1.

7. Status Lamp Check: (Set up KMCU-1 as per Steps 3 and 4)

a. Remove audio RF and external keying. The amber READY lamp will light.

b. Re-connect RF. The red failure lamp will blink.

c. Remove the RF, and re-connect the keying. The red failure lamp will light.

REVISION SHEET

THE TECHNICAL MATERIEL CORP.
MAMARONECK NEW YORK

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LIST NO.

DATE	REV.	SHEET	EMN #	DESCRIPTION	APP.
7/8/65		1 of	12	O=ORIGINAL RELEASE FOR PRODUCTION.	