TECHNICAL MANUAL

OPERATION AND MAINTENANCE INSTRUCTIONS WITH ILLUSTRATED PARTS BREAKDOWN

TESTER, OXYGEN MASK, HEADSET, MICROPHONE AND FLASH GOGGLES

TYPE MQ.1A, PN 1854
NSN 6695-01-097-0441

THIS TECHNICAL MANUAL IS A REPRINT OF AIR FORCE T.O. 33D2-10-10-41, 1 NOVEMBER 1980, INCLUDING CHANGES 1 THROUGH 4.

DEPARTMENT OF THE ARMY

27 AUGUST 1986

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REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: Commander, US Army Aviation Systems Command, ATTN: AMSAV-MPSD, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798. A reply will be furnished directly to you.

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SECTION I

INTRODUCTION AND GENERAL INFORMATION

1-1. INTRODUCTION. This technical manual contains operating and maintenance instructions and an illustrated parts breakdown for the Oxygen Mask, Headset, Microphone and Flash Goggles Tester, Type MQ-1A, National Stock Number 6695-01-0970441. The MQ-1A Tester is manufactured by Winding Specialists Co., Inc., Wichita, KS under part number 1854.

1-2. PURPOSE. The MQ-1A Tester (hereinafter referred to as tester) is a preflight tester for the MS22001 oxygen mask and similar oxygen masks and the P series helmet to discover evidence of leakage or other malfunctions. It duplicates the oxygen, flash goggles and communications system installed on aircraft, except that this unit can be made available in personnel areas. The tester performs "talk out" checks of headsets and mask microphones, and of headset microphones used with the AN A1C-10 Intercommunication Set or similar systems. The tester also provides regulated power for the EEU-2P flash protection goggles.

1-3. DESCRIPTION. (See figure 1-1.) The tester is - contained in a portable case that requires only two external connections: 1) connection to a supply of breathing oxygen adjusted to 450 psi and 2) connection of the power cord to 115 volt, 60 Hz electrical power. All operating controls and instrumentation are located on the control panel and are accessible with the cover opened. Sufficient space Is provided between the closed cover and the control panel to permit storage of connecting cables, power cord and oxygen hose when not in use. Additional physical characteristics and specifications are provided in subsequent paragraphs and Table 1-1.

Table 1-1. Leading Particulars.

Input voltage	115 VAC, 60 HZ
Oxygen supply	450 PSI
Dimensions	14 in. long x 8 3/4 In. wide x 10 in. high
Weight	15 pounds

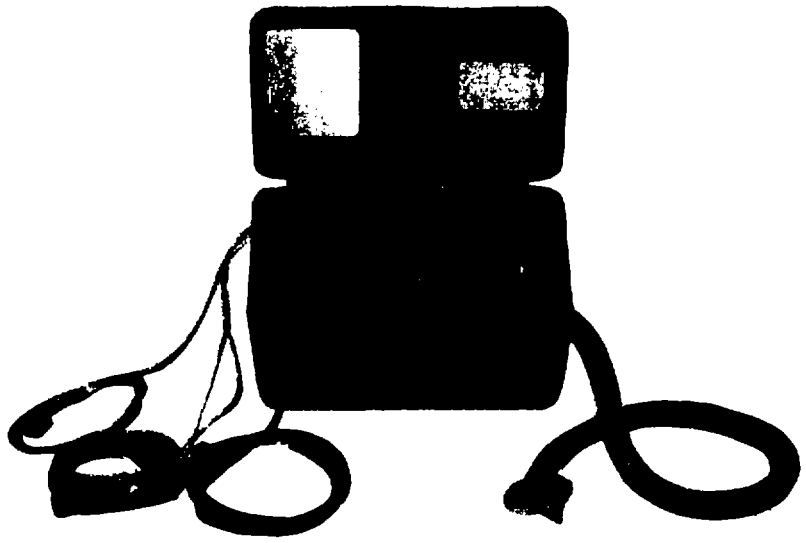


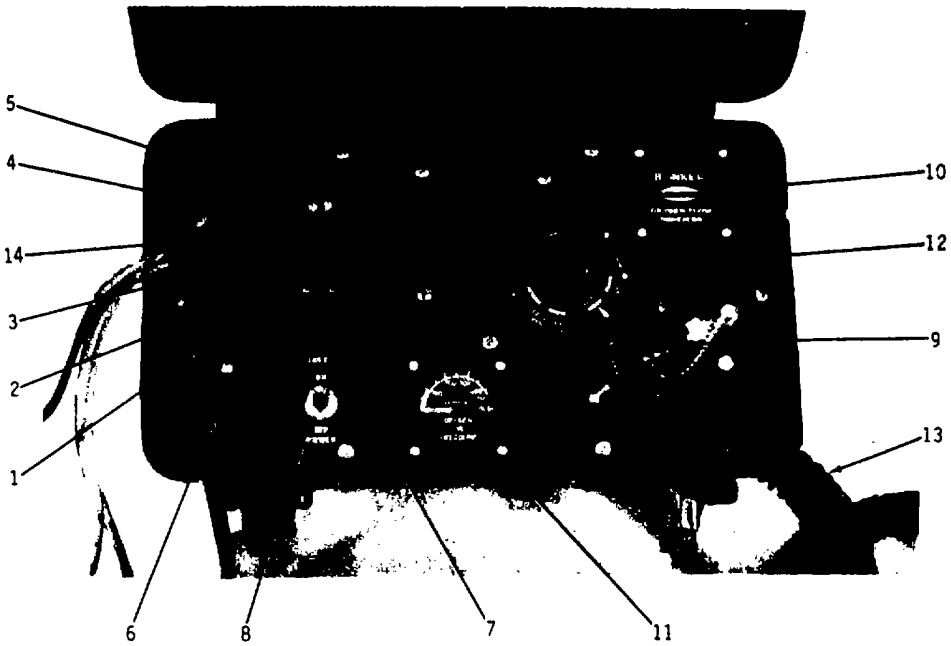
Figure 1-1. Oxygen Mask, Headset, Microphone and Flash Goggles Tester MQ-1A

a. Case Assembly. The case assembly consists of an aluminum cover and base joined by two hinges and two latches. Split hinges permit the cover to be completely separated from, the base if desired. The case assembly also includes four rubber feet and a carrying handle. The latches provide sufficient seal pressure to result in a weather resistant. rain proof case. The case assembly is finished in a weather resistant black epoxy paint. Testers can be stacked during storage.

b. Oxygen Supply and Control Equipment. A tee fitting (9) provides two inlet connections between the oxygen supply cylinder and the tester. Oxygen inlets are protected by caps. Oxygen pressure gauge (11) measures oxygen cylinder pressure from0 to 500 psi. Visual indication of oxygen flow is provided by a blinker type oxygen flow regulator (10). A type A-14 diluter demand, pressure breathing type of oxygen regulator (12) regulates the flow of oxygen and mixes oxygen with ambient air to a specified ratio. The operating pressure range of the oxygen regulator is from 50 to 500 psi.

Hose assembly (13) connects the MS22001 mask, similar oxygen masks and the P-series helmet to the tester.

c. Communication Equipment. A power supply changes 115 volt 60 Hz alternating current into 28 volt direct current. The power supply consists of an ON-OFF toggle switch (8). a 1 amp cartridge type replaceable fuse (6). a power indicator light (7) that illuminates when there is power in the test set. a power cable assembly (1). power transformer assembly . and filters for the direct current to prevent noticeable alternating current ripple from being heard in the communication equipment. An audio frequency amplifier amplifies microphone signals for the "talk out" check of the headset and microphone. Suitable connecting cables allow Headset-Microphone H-78/ AIC, Headset HS-33-A, Microphone M-15/UR or similar communication equipment to be connected to the tester. EEU-2P Flash Protection Goggles are provided regulated 28 vdc electrical power through suitable connection cables.



LEGEND

1. POWER CABLE
2. MICROPHONE INDICATOR LIGHT
3. CABLE ASSY, U92A/U
4. CABLE ASSY, U61/U
5. CONNECTOR, JJ-033
6. FUSE
7. POWER INDICATOR LIGHT - RED
8. ON-OFF SWITCH
9. TEE INLET FITTING
10. OXYGEN FLOW INDICATOR
11. OXYGEN PRESSURE GAUGE
12. OXYGEN REGULATOR
13. HOSE ASSY
14. CABLE ASSY, S-830

Figure 1-2. Control Panel Assembly

SECTION II

SPECIAL TOOLS AND TEST EQUIPMENT

Not applicable.

SECTION III

PREPARATION FOR USE AND SHIPMENT

3-1. PREPARATION FOR USE. Prepare the tester for use as follows:

a. Carefully remove the tester from shipping container(s) as required and remove any extraneous cushioning material used to protect the control panel during shipment.

b. Inspect the case assembly for evidence of damage or breakage and make sure the cover closes and latches securely.

c. Check instruments and controls to assure all attaching parts are tight.

d. Operate controls and switches to determine positive action.

e. Inspect cables and jacks for evidence of damage.

f. Inspect oxygen hose assembly for kinks, abrasion or other damage.

g. Check condition of fuse and name and data plates.

WARNING

Do not use oil or grease on oxygen equipment. Oil, even in minute quantities, coming In con tact with oxygen, may cause an explosion. Dust, lint or fine metal particles (also filing) are also dangerous.

h. Inspect tester for cleanliness; tester must be free of oil and dirt.

i. Following satisfactory visual inspection, prepare tester for operation In accordance with subsequent steps.

k. Connect external oxygen supply to one inlet of tester inlet fitting and securely cap the other inlet to withstand pressure of 450 psi.

l. Set A-14 regulator to NORMAL and open oxygen supply shutoff valve; allow oxygen pressure to build up to 450 psi.

m. Connect power cable to 115 volt, 60 Hz power source. Tester is now ready for operation.

3-2. PREPARATION FOR SHIPMENT. (See figure 1-1.) Prepare tester for shipment as follows:

a. Accomplish steps b thru h of paragraph 3-1 to assure that tester is in good condition at time of shipment.

b. Wrap oxygen hose assembly (13) and cables (1, 3, 4, 14) with suitable material to prevent damage to inside of cover or to panel surface during shipment and stow cables and hose between cover and panel. Latch cover securely.

c. Pack tester in accordance with packing method 4Q.

(1) Enclose tester in weather resistant box of paperboard per PPP-B-636, Type CF, with suitable dunnage such as microfoam per MIL-P-11 6 if loose fit. Include dessicant per MIL-D-3464, Type 1, 2 or 3, and indicator card. Seal box with shipping tape.

(2) Enclose box within aluminized vapor barrier bag per MIL-P-131B, evacuate air from bag and heat seal bag.

(3) Enclose package In a second weather resisbox and seal box with non-asphaltic reinforced shipping tape.

SECTION IV

OPERATION INSTRUCTIONS

4-1. THEORY OF OPERATION. (See figure 1-1.) Three separate personnel equipment items are tested by separate systems within the tester.

a. Oxygen System. The oxygen system contains or simulates an aircraft personnel oxygen system. The system supplies breathing oxygen to the mask under test through oxygen hose assembly (13). Oxygen flow indicator (10) indicates flow to the mask by closing; blinker opens to show flow interruption.

b. Headset and Microphone System. This system amplifies electrical impulses from a microphone under test and supplies the amplified signal to a headset under test to test operation of both units.

c. Flash Goggle System. This system supplies 28 vdc electrical power to EEU-2P Flash Protection Goggles through cable connector (14) to check that the goggle lens become transparent with power applied.

4-2. OPERATION INSTRUCTIONS. (See figure 1-1.) Operation of the separate systems within the tester are described separately after startup.

a. Tester Startup. Set ON-OFF switch (8) to ON; red POWER indicator (7) should come on.

b. Oxygen System. Operate the oxygen system to test MS22001 or similar oxygen mask as follows:

(1) Set regulator (12) to NORMAL position.

(2) Connect oxygen mask hose to oxygen hose assembly (13).

(3) Rotate regulator control to 43M position.

(4) Don headgear and mask to simulate flight conditions.

(5) Exhale slowly; observe oxygen flow indicator 10).

(a) If blinker opens no leak.

(b) If blinker remains closed mask leaks and needs adjustment or repair in accordance with applicable technical order.

(6) Rotate regulator control (12) to 45M position.

(7) Exhale slowly; inhalation valve is operating satisfactorily if no resistance to exhalation is encountered. Troubleshoot and repair mask in accordance with applicable technical order if resistance to exhalation is evident.

c. Headset and Microphone System. Operate tester to test headset-microphone combinations as indicated by equipment noted in step 1, 2 or 3. Step 4 is applicable to all combinations.

(1) Connect Headset HS-33A and Microphone M-33/ AIC to cable connector U61/U (4).

(2) Connect Headset-Microphone H-78B/AIC to cable connector U92A/U (3).

(3) Connect microphone M-15/R to panel mounted connector JJ-033 (5). Disconnect microphone to U92A /U when connection is made to JJ-033.

(4) Depress handle switch if using hand-held microphone; microphone control indicator light should illuminate if microphone switch is functioning properly. Speak into microphone; voice will be heard in headset if headset and microphone are operating properly.

d. Flash Goggle System. Connect power cable from EEU-2P Flash Protection Goggles to cable connector S-830 (14); goggles (opaque without electrical power) shall become transparent when power is applied.

e. Tester Shutdown. At completion of testing accomplish steps of shutdown procedure that are applicable to system used.

(1) Disconnect headset, microphone and goggles from applicable connectors.

(2) Rotate regulator control (12) to NORMAL position and disconnect oxygen system hose (13) from mask hose.

(3) Set ON-OFF switch (8) to OFF and disconnect power cable from power source.

(4) Shut off external oxygen supply and disconnect supply from inlet fitting (9).

(5) Cap inlet fitting to prevent entry of foreign material.

(6) Coil cables (3, 4 and 14), power cable (1) and oxygen system hose (13) and store all under cover on face of tester.

SECTION V

MAINTENANCE INSTRUCTIONS

5-1. OPERATIONAL CHECKOUT. Accomplish operational checkout of tester in accordance with inspection procedure that follows. Refer to paragraph 4 -2 and perform all steps that are applicable to system affected by repair. Troubleshoot and repair testers shown defective by operational check.

5-2. INSPECTION AND PREVENTIVE MAINTE NANCE. Visually inspect tester prior to and after each use as follows:

a. Make sure that oxygen tee inlet fitting is capped all times external oxygen supply is not connected to tester to avoid contamination.

b. Inspect tester for cleanliness, completeness and general appearance. Clean dirt, oil and grease from tester with clean soft cloth moistened with water and castile soap.

c. Check oxygen hose assembly and electrical cables for fraying, abrasion and other damage,

Accomplish operational checkout of tester as functional test any time operation of tester is suspect and subsequent to a repair that could affect the function of a system. Periodic lubrication of tester components are not required.

5-3. TROUBLESHOOTING. Troubleshoot tester in accordance with instructions provided in Table 5-1. The table indicates possible troubles, probable causes and recommended remedial action.

Table 5-1. Troubleshooting Guide.

TROUBLE	PROBABLE CAUSE	REMEDY
a. Power indicator does not light.	Defective OFF-ON switch, fuse or lamp.	Replace switch, fuse and/or lamp.
b. TALK-OUT checks cannot be performed or goggles remain opaque.	Audio frequencies amplifier not functioning properly.	Replace or repair amplifier.
	Power supply not functioning properly.	Check power supply. Replace or repair if defective.
c. Signal distortion or noise in headset.	Defective audio frequency amplifier.	Check amplifier. Repair or replace.
	Ripple in DC line.	Check and repair or replace power supply.
d. Pressure gauge does not register.	No oxygen from supply source.	Provide oxygen from source.
	Defective pressure gauge.	Replace pressure gauge.
e. Oxygen flow indicator does not operate.	Regulator control improperly positioned.	Position regulator control properly.
	Defective regulator.	Replace regulator.

5-4. REPAIR. Subsequent paragraphs provide maintenance guidance for tester disassembly, replacement of parts, requirements for testing after repair, repair of finish and assembly instructions.

a. Disassembly. Disassemble tester only to extent required to accomplish required maintenance. Refer to Illustrated Parts Breakdown, Section VII; determine order of disassembly by inspection of illustrations and parts list.

b. Replacement of Parts. Defective oxygen regulators, flow indicators, pressure gauges or tubing shall be replaced by an oxygen equipment specialist. Defective electrical components shall be repaired or replaced by a qualified electrician.

WARNING

- **Zinc Chromate primer is toxic to skin, eyes and respiratory tract. Us In a well ventilated area. Avoid prolonged breathing of vapors. Avoid eye and repeated skin contact. Keep away from sparks and flames.**

- **Paints, primers, lacquers and varnishes must be handled carefully and used only in a well ventilated approved area. Avoid prolonged breathing of vapors. Avoid eye and repeated skin contact. Keep away from spark and flames.**

c. Repair of Finish. Touch up finish as required with zinc chromate primer, MIL-P-6889, and black semi-gloss enamel, MIL-E-7729.

d. Assembly. Assemble tester in reverse of disassembly order as determined by inspection of Illustrated Parts Breakdown illustration and parts list.

5-5. LEAKAGE TEST. Leakage test shall be made at atmospheric pressure of 28 to 32 inches of mercury at temperature of 77 degrees F, plus or minus 18 degrees F, and at a relative humidity of 80 percent or less. Tests performed with atmospheric pressure or temperature substantially different from these values shall have the proper allowance made for the change In instrument readings. Oxygen used for test purposes should be commercial grade breathing oxygen or per Federal Specification BB-O-925, Type 1, Grade A. Perform leakage test as follows:

a. Accomplish operational checkout for oxygen system to assure tester is functional.

b. Assemble test setup consisting of an external oxygen supply, an oxygen shut-off valve, an oxygen supply pressure regulator set to deliver 450 psi, an oxygen pressure regulator gauge, a line shut-off valve, a line pressure gauge calibrated to read in 1 pound divisions and a suitable line to connect to the tester.

c. Accomplish a leakage test of the assembled test equipment. The leakage rate of the test equipment must be subtracted from the leakage rate experienced after the tester is included in the test setup.

d. Include tester In test setup by attaching the supply connection line to one inlet of the tester tee inlet fitting. Make sure the other inlet Is securely capped.

e. Open line shut-off valve and then the oxygen supply shut-off valve.

f. Adjust the oxygen supply pressure regulator until line pressure gauge indicates 450 psi.

g. Close line shut-off valve and note the time. At the end of 7 minutes the line pressure gauge shall indicate 400 psi minimum. If the reading is less than 400 psi, leakage within the oxygen system of the tester is indicated. Use Leak Tec, manufactured by American Gas & Chemical Co., (MIL-L-25567), NSN 6850-00-621-1850, or soap and water solution around each connection to determine the location of leak.

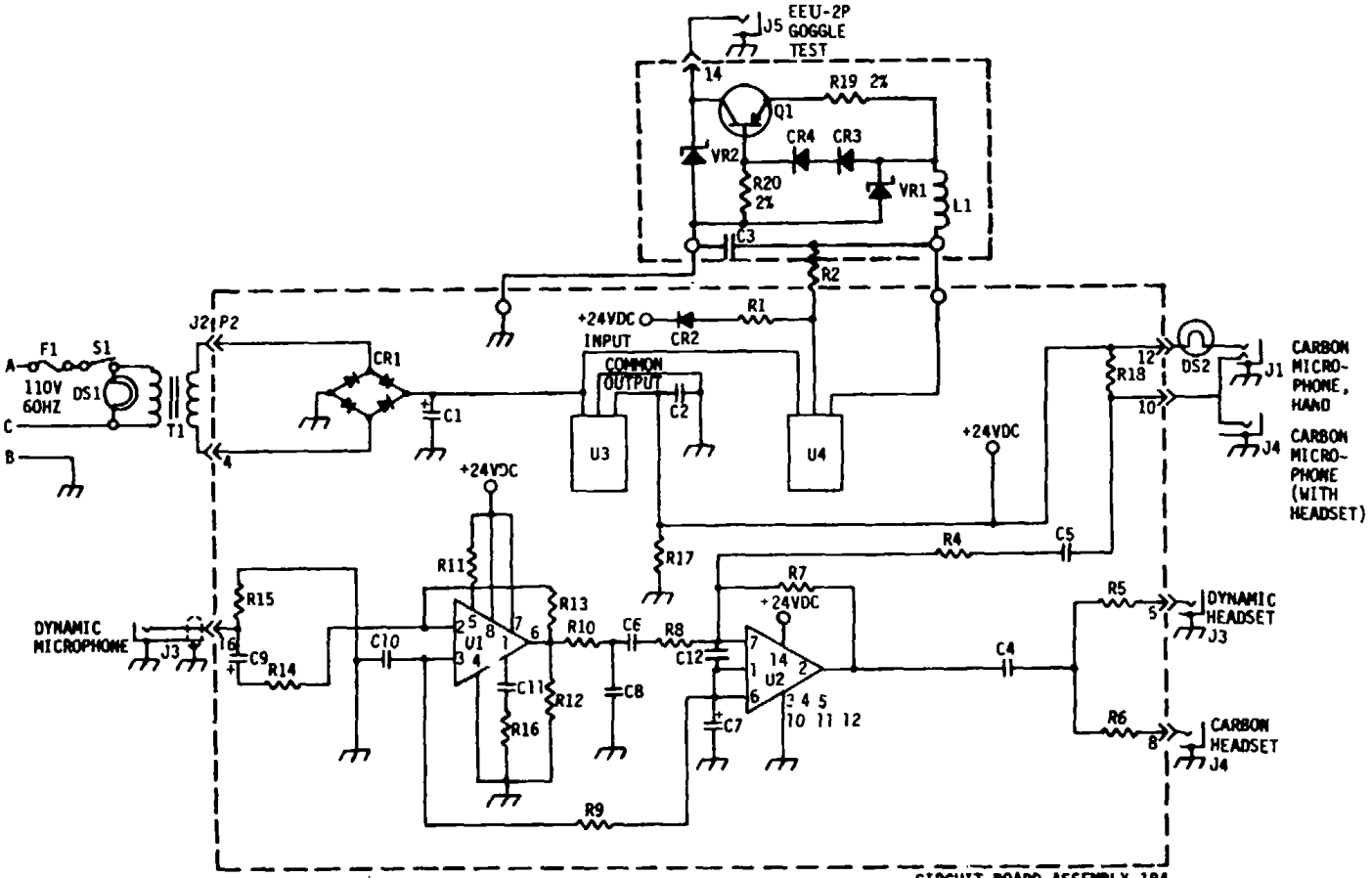
5-6. CALIBRATION. The tester does not require calibration; however, some components of the tester may require calibration. The oxygen cylinder pressure gauge and oxygen regulator may be calibrated as follows:

a. Oxygen Cylinder Pressure Gauge. Compare pressure reading of suspect gauge with those of a known accurate gauge, with both connected to same oxygen supply. If the pointer of oxygen pressure gauge under test is within 10 percent of full scale with pressure applied, and the pressure gauge indicates zero pressure when the oxygen pressure is removed, the gauge may be regarded as calibrated.

b. Oxygen Regulator. Type A14 oxygen regulators may be calibrated by those activities which possess the required equipment to meet the limits specified in TO. 15X6-3-2-23, paragraphs 3.8a, 3.8b (10,000 ft only), and 4.28b. If the oxygen regulator fails to meet these requirements, it should be replaced by qualified personnel. The leakage test outlined in paragraph 5-5 shall be performed on the tester oxygen system after any repair or replacement of parts within that system is completed.

SECTION VI

SCHEMATIC DIAGRAMS



CIRCUIT BOARD ASSEMBLY 184

R1	240	R8	43K	R15	300	C1	250	C8	0.005	U1	CA3094AT
R2	120	R9	1.5M	R16	1.0K	C2	0.1	C9	1.0	U2	LM377
R3	NOT USED	R10	1.5K	R17	820, 1W	C3	0.1	C10	0.1	U3	UA7824UC
R4	1.5K	R11	470K	R18	5.1K	C4	50	C11	75 pf	U4	LM317T
R5	7.5	R12	5.6K	R19	6.8, 1/2W	C5	0.1	C12	50	CR1	MDA942A-1
R6	7.5	R13	2.2M	R20	10K, 1/2W	C6	0.1	Q1	2N6211	CR2	1N914
R7	56K	R14	820	L1	820 uH	C7	6.8	VR1	1N5656A	CR3	1N4150
								VR2	1N3032B	CR4	1N4150

NOTE: ALL RESISTORS 1/4 WATT, 5% UNLESS OTHERWISE NOTED.
ALL CAPACITORS MICROFARADS 50 WVDC UNLESS OTHERWISE NOTED.

P2	00-7023-017-000-001
J2	00-7038-017-217-001

Figure 6-1. Schematic Diagram of Oxygen Mask, Headset, Microphone and Flash Goggles Tester, Type MQ-1A

SECTION VII

ILLUSTRATED PARTS BREAKDOWN

7-1. G ENERAL. This section illustrates and lists assemblies and parts of the tester in disassembly sequence insofar as drawing order permits. The Illustrated Parts Breakdown (IPB) consists only of a Maintenance parts List (MPL) since a Numerical Index and Reference Designation Index are not required for the number of parts listed in this publication. Reference designations are provided within parentheses with applicable indexes on illustrations of the IPB or directly upon components of printed circuit board assemblies.

7-2. MAINTENANCE PARTS LIST. The MPL contains a breakdown of the tester into assemblies and parts that have maintenance significance.

a. Figure and Index Number Column. Index numbers are assigned to a multiple number of parts. One index number identifies each grouping.

b. Part Number Column. The contractor, vendor or Government standard part number is listed in this column. Equivalent commercial parts may be used.

c. Federal Supply Code for Manufacturers (FSCM). This column provides the FSCM for the manufacturer of the part identified by the part number on the same line. Commercial parts identified by NONE may be procured from any source. A list of manufacturers identified by FSCM listed in this MPL follow. 'Codes, names and addresses are in accordance with Cataloging Handbooks H4-1 and H4-2.

d. Description Column. Part descriptions are indented to illustrate the relationship within the overall equipment of one part or assembly to another part or assembly. Attaching parts are identified in this column by the symbol (AP).

e. Qty Per Assy Column. Quantities listed in this column are in the case of assemblies the total quantity per equipment at the location indicated; however, the component parts indented under the assemblies are the quantity per one assembly.

f. Usable On Code Column. This column contains no entries in this publication since no part variations exist within the tester.

g. Source, Maintenance and Recoverability (SMR) Code Column. SMR codes have not been furnished at the date of publication. Should SMR codes be provided at a later date, they will be added at the next change or revision.

MANUFACTURER LIST BY FSCM

FSCM	NAME AND ADDRESS
04713	Motorola Inc Semiconductors Phoenix, AZ
05820	Wakefield Engineering Inc Wakefield, MA
06540	Amaton Electronic Hdwe Div of Mite Corp New Haven, CT
07263	Fairchild Semiconductor Div Mountain View, CA
07497	Stancor Corp Essex International Chicago, IL
12040	National Semiconductor Corp Danbury, CT
13103	Thermalloy Co Dallas, TX
16428	Belden Corp Richmond, IN
17357	Elco Webster Corp Boston, MA
30150	Winding Specialists Co Inc 1225 Wellington Place Wichita, KS 67201

MANUFACTURER LIST BY FSCM

FSCM	NAME AND ADDRESS
58873	Sylvania, GTE Inc New York, NY
71400	Bussmann Mfg Co St Louis, MO
71590	Centralab Electronics Milwaukee, WI
72853	G. C. Electronics Co. 400 S Wyman St Rockford, IL 61101
80183	Sprague Products Co North Adams, MA
82389	Switchcraft Inc Chicago, IL
83330	Herman H. Smith Inc 812 Snediker Ave Brooklyn, NY 11207
86684	RCA Corp Harrison, NJ
90201	Mallory Indianapolis, IN
91802	Industrial Devices Edgewater, NJ
92194	Alpha Wire Corp Elizabeth, NJ

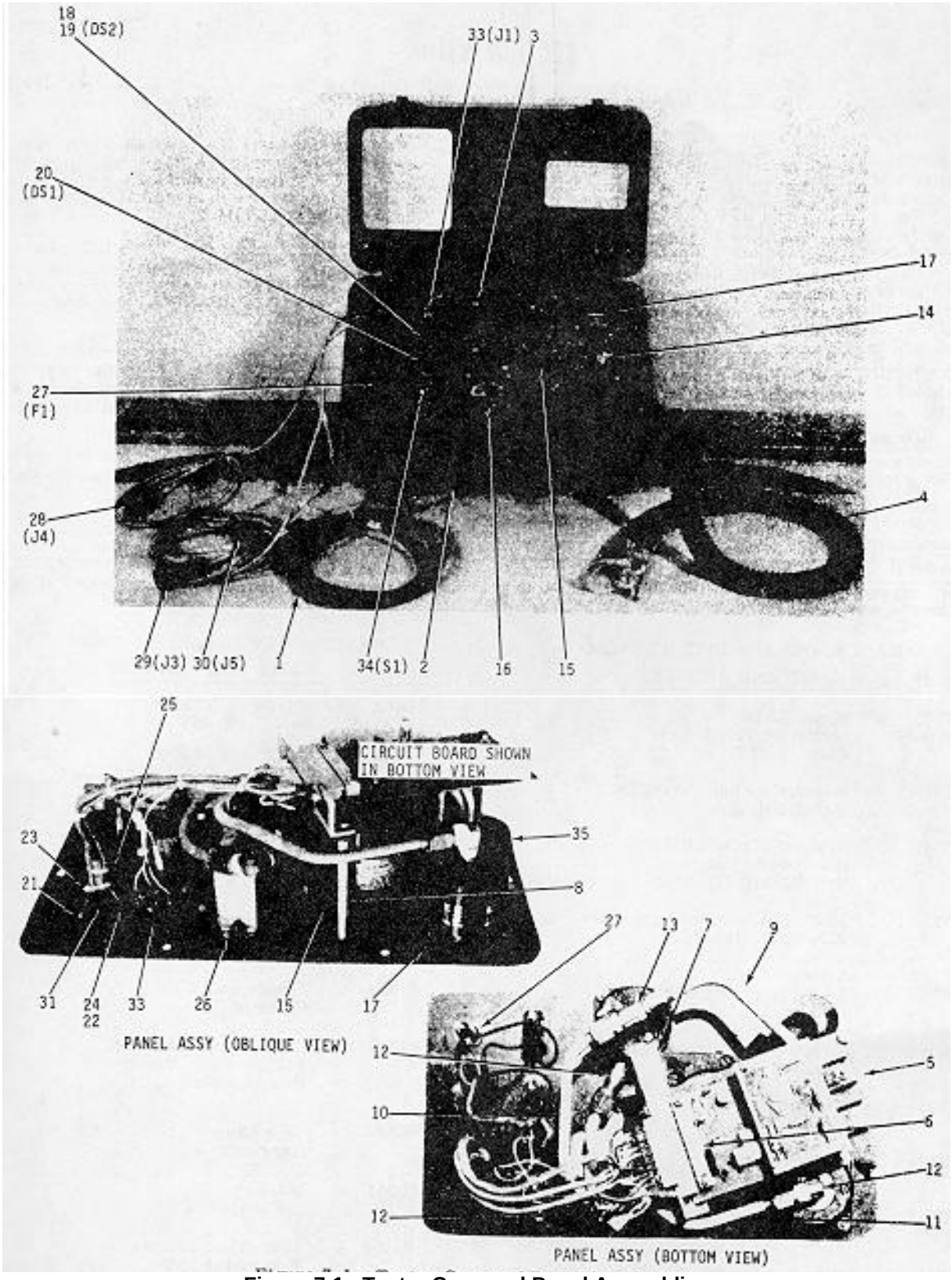
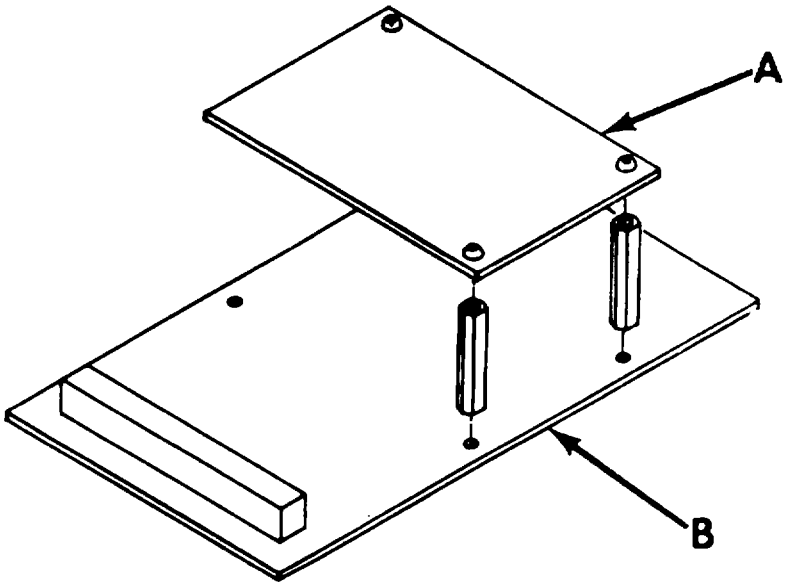


Figure 7-1. Tester Case and Panel Assemblies

FIGURE AND INDEX NO.	PART NO.	FSCM	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE	SMR
7-1	1854	30150	TESTER, Oxygen mask, headset, microphone and flash goggles, type MQ-1A	1		
- 1	17238	16428	. CABLE, Power, electrical	1		
	1854-100	30150	. CASE AND MARKING AS SY	1		
- 2	1854-10	30150	. . CASE ASSY	1		
	1854-11	30150	. . DECAL, Instruction	1		
	1854-12	30150	. . DECAL, Instruction	1		
	1854-13	30150	. . DECAL, Identification	1		
	1854-14	30150	. PANEL ASSY	1		
- 3	MS35207-263	96906	. SCREW (AP)	6		
- 4	MS22055A36	96906	. . HOSE, Oxygen mask to regulator	1		
- 5	184	30150	. . CIRCUIT BOARD ASSY (see fig. 7-2)	1		
	MS35207-263	96906	. . SCREW (AP)	1		
- 6	00-7038-017-217-001	17357	. . CONNECTOR	1		
	MS35207-215	96906	. . SCREW (AP)	2		
	MS35649-242	96906	. . NUT (A P)	2		
	MS35338-40	96906	. . WASHER (A P)	2		
- 7	1854-2	30150	. . BRACKET, Connector	1		
- 8	8242-A-1032-16	60540	. . STAND OFF, PC board	1		
	MS35207-263	96906	. . SCREW (AP)	1		
- 9	1854-300	30150	. . TUBE ASSY, Supply to gauge	1		
- 10	1854-310	30150	. . TUBE ASSY, Gauge to regulator	1		
- 11	1854-320	30150	. . TUBE ASSY, Regulator to blinker	1		
- 12	AN822-5D	88044	. . ELBOW, 90 degree	1		
- 13	AN825-5D	88044	. . TEE	1		
- 14	AN804D5	88044	. . TEE, Inlet fitting	1		
	AN924-5D	88044	. . NUT (AP)	1		
	1854-200	30150	. . CAP AND CHAIN ASSY	1		
	MS24629-12	96906	. . SCREW (AP)	1		
- 15	TYPE A-14	96906	. . REGULATOR, Oxygen (MIL-R-6371)	1		
	8239-A-1032-16	06540	. . SPACER	3		
	MS35207-263	96906	. . SCREW (AP)	6		
- 16	AN6021-1B	88044	. . GAUGE, Oxygen, low pressure	1		
	MS35216-29	96906	. . SCREW (AP)	4		
- 17	AN6029-1	88044	. . INDICATOR, Flow	1		
	MS35216-29	96906	. . SCREW (AP)	4		
- 18	28V-PSB	58873	. . BULB, Microphone	1		
- 19	2800A5	58873	. . LAMP, Microphone	1		
- 20	1050-C1	91802	. . LAMP, Power on	1		
- 21	COML	NONE	. . GROMMET, 1/2 in. dia	2		
- 22	COML	NONE	. . GROMMET, 3/8 in. dia	1		
- 23	COML	NONE	. . GROMMET, 3/8 in. dia	1		
- 24	COML	NONE	. . GROMMET, 5/16 in. dia	1		
- 25	R-6	90201	. . BUSHING, Strain relief	1		
- 26	P6469	07497	. . TRANSFORMER	1		
	MS35207-263	96906	. . SCREW (AP)	2		
	MS35337-81	96906	. . WASHER (AP)	2		
	MS35650-302	96906	. . NUT (AP)	2		
- 27	HJM	71400	. . FUSEHOLDER	1		
	AGX-2	71400	. . FUSE, Cartridge, lamp, 250v	1		
	3221	92194	. . CABLE, 2 Cond (on J5)	8 FT		
	1174	92194	. . CABLE, 4 Cond (on J4)	8 FT		
	1243/4	92194	. . CABLE, 4 Cond, shld pr (on J3)	8 FT		
- 28	U-61/U	81349	. . CONNECTOR, Plug	1		
- 29	U-92A/U	81349	. . CONNECTOR, Plug	1		
- 30	S-830	82389	. . CONNECTOR, Plug	1		
- 31	8228-A-103-16	06540	. . STANDOFF	1		
	MS35207-263	96906	. . SCREW (AP)	1		
- 32	MS35207-263	96906	. . SCREW, Grounding	1		
	MS35337-81	9G906	. . WASHER(AP)	1		
	MS35650-302	96906	. . NUT (AP)	1		
- 33	JJ-033	81349	. . RECEPTACLE (MIL-J-641)	1		
- 34	MS35058-22	81349	. . SWITCH	1		
- 35	1854-1	30150	. . PANEL, Case	1		



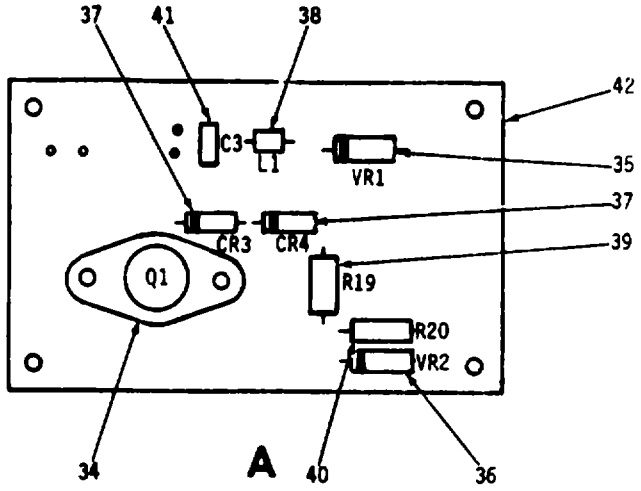


Figure 7-2. Circuit Board Assembly (Sheet 1 of 2)

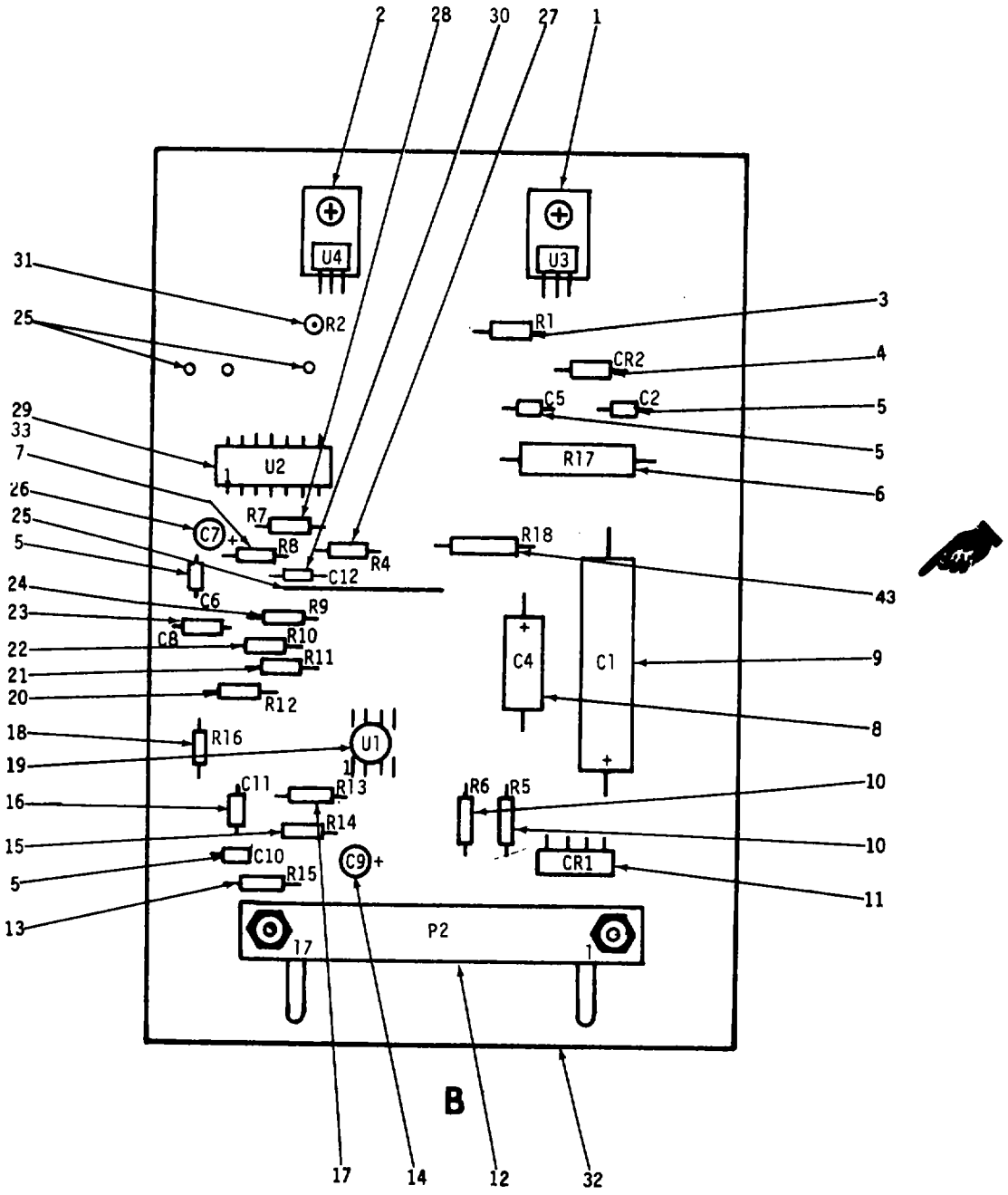


Figure 7-2. Circuit Board Assembly (Sheet 2 of 2)

FIGURE AND INDEX NO.	PART NO.	FSCM	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE	SMR
7-2	184		CIRCUIT BOARD ASSY (see fig. 7-1 for NHA) 1			
- 1	LM317T	12040	. IC Voltage reg	1		
	MS35206-230	96906	. SCVEW (AP)	1		
	MS35B49-262	96906	. NUT (AP)	1		
	MS35338-41	9690f	. WASHER (AP)	1		
	6073B	13103	. HEATSINK	1		
	120-2	05820	. COMPOUND, Heat dissipation	AR		
- 2	UA7824UC	07263	. IC, Voltage Regulator	1		
	MS35206-230	96906 .	. SCREW (AP)	1		
	MS35649-262	96906	. NUT (AP)	1		
	MS35338-41	96906	. WASHER (AP) 1	1		
	6073B	13103	. HEATSINK	1		
	120-2	05820	. COMPOUND, Heat dissipation	AR		
- 3	RC07GF241J	81349	. RESISTOR.	1		
- 4	IN914	81349	. DIODE.	1		
- 5	C420C104M	71590	. CAPACITOR	5		
- 6	RC32GF821J	81349	. RESISTOR.	1		
- 7	C3-403J	81349	. RESISTOR.	1		
- 8	TVA1308	80183	. CAPACITOR	1		
- 9	TVA1312	80183	. CAPACITOR	1		
-10	RC07GF7R5J	81349	. RESISTOR	2		
-11	MDA942A-1	04713	. DIODE, Bridge rectifier	1		
-12	00-7023-017-000-001	17357	. CONNECTOR	1		
	MS35206-218	81349	. SCREW	2		
	MS35649-242	96906	. NUT(AP)	2		
	MS35338-40	96906	. WASHER(AP)	2		
-13	RC07GF301J	81349	. RESISTOR	1		
-14	TVA1300	80183	. CAPACITOR	1		
-15	RC07GF821J	81349	. RESISTOR	1		
-16	DD750	71590	. CAPACITOR	1		
-17	RC07GF225J	81349	. RESISTOR	1		
-18	RC07GF1OZJ	81349	. RESISTOR	1		
-19	CA3094AT	86684	. IC, Amplifier, operational	1		
-20	RC07GF562J	81349	. RESISTOR	1		
-21	RC07GF474J	81349	. RESISTOR	1		
-22	RC07GF152J	81349	. RESISTOR	1		
-23	DD050	71590	. CAPACITOR	1		
-24	RC07GF155J	81349	. RESISTOR	1		
-25	NO NUMBER	NONE	. JUMPER, Bus wire, 20 AWG AR	AR		
-26	150D685X9035B2	71590	. CAPACITOR	1		
-27	RC07GF152J	81349	. RESISTOR	1		
-28	RC07GF563J	81349	. RESISTOR	1		
-29	LM377N	12040	. IC, Amplifier, operational	1		
-30	DD050	71590	. CAPACITOR	1		
-31	RC07GF121J	81349	. RESISTOR	1		
-32	184-1	30150	. BOARD, Circuit	1		
-33	214AG39D	13103	. SOCKET, Ic	1		
-34	2N6211	81349	. TRANSISTOR	1		
	MS35206-230	96906	. SCREW (AP)	2		
	MS35649-262	96906	. NUT(AP)	2		
	MS35338-41	96906	. WASHER (AP)	2		
-35	1N5656A	81349	. DIODE	1		
-36	1N3032B	81349	. DIODE	1		
-37	1N4150	81349	. DIODE	2		
-38	70F824A1	NONE	. COIL, RF (J.W. Miller Co.)	1		
-39	830A68	86684	. RESISTOR, Film, 6.8 ohm 1/2 W, 2%.	1		
-40	830310	86684	. RESISTOR, Film, 1iK, 1/2 W2%.	1		
-41	C420C104M	71590	. CAPACITOR	1		
-42	184-2	30150	. BOARD, Circuit	1		
	4230	83330	. SPACER (AP)	3		
	GC11-570	72653	. SCREW (AP).6			
	GC11-182	72653	. WASHER.(AP)	6		
43	RC07GF512J	81349	. RESISTOR	1		

By Order of the Secretary of the Army:

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General, United States Army
Chief of Staff

Official:

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Brigadier General, United States Army
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The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = .035 ounce
1 decagram = 10 grams = .35 ounce
acres
1 hectogram = 10 decagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47

1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
inches	centimeters	2.540	ounce-inches	Newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29,573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	Newton-meters	1.356	metric tons	short tons	1.102
pound-inches	Newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

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