INCH-POUND
MIL-P-70850 (AR)
24 January 1992

MILITARY SPECIFICATION

PRINTED WIRING BOARD ASSEMBLY, HELMET (MWLD), SPECIFICATION FOR

This specification is approved for use by the U.S. Army Armament, Munitions and Chemical Command and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification establishes the requirements for manufacture, inspection, packaging and acceptance of the Printed Wiring Board Assembly (PWBA), Helmet (MWLD), part number 11749020.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander U.S. Army ARDEC, ATTN: SMCAR-BAC-S, Picatinny Arsenal, New Jersey 07806-5000 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A FSC 1265

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards and handbooks. The following specifications, standards and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATIONS

MILITARY

MIL-F-13926	-	Fire Control Materiel Manufacture and Inspection of, General Specification for
MIL-I-45607	-	Inspection Equipment, Acquisition, Maintenance and Disposition of
MIL-W-63150	-	Weapons and Support Materiel, Standard Quality Assurance Provisions for

STANDARDS

MILITARY

MIL-STD-129	-	Marking for Shipment and Storage
MIL-STD-454	-	Standard General Requirements for Electronic Equipment
MIL-STD-810	-	Environmental Test Methods
MIL-STD-1686	-	Electrostatic Discharge Control Program for Protection of Electrical and Electronic Parts, Assemblies and Equipment (Excluding electrically initiated explosive devices)
MIL-STD-1695	-	Environments, Working, Minimum Standards for
MIL-STD-2000	-	Standard Requirements for Soldered Electrical and Electronic Assemblies
MIL-STD-45662	-	Calibration Systems Requirements

HANDBOOK

MILITARY

DoD-HBK-263 - Electrostatic Discharge Control Handbook for Protection of Electrical and Electronic Parts, Assemblies and Equipment (Excluding electrically initiated explosive devices) METRIC

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from: Standardization Document Order Desk, Bldg. 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.1.2 Other Government documents, drawings, and publications. The following other Government documents, drawings and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

U.S. ARMY ARMAMENT RESEARCH, DEVELOPMENT AND ENGINEERING CENTER.

PRODUCT DRAWINGS (CAGE CODE 19200)

11749020	-	Printed Wiring Board Assy, Helmet (MWLD)
PL11749020	-	Printed Wiring Board Assy, Helmet (MWLD)
11749313	-	Schematic Diagram, Helmet (MWLD)

INSPECTION EQUIPMENT (CAGE CODE 19200)

11749279	-	Controller Gun (Ref.) (6.8)
11748854	-	Detector Module, Si-PN (6.8)

PACKAGING DATA SHEET (CAGE CODE 19200)

SPI-P11749020	-	Printed Wiring Board Assy, Helmet (MWLD)

(Copies of other Government documents, drawings and publications required by the contractor in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Item description. The Helmet board contains three custom large scale integrated (LSI) chips, a semiconductor controlled rectifier (SCR) and storage capacitor C14. The first two chips (U1 and U2) and their associated passive components comprise a pulse amplifier identical to the Helmet Man Worn Laser Detector (MWLD) part no. 11749020. The third chip (U3) provides a trigger for the SCR as well as charge energy storage capacitor C14.

When in use, the board is coupled to detector circuitry at the input (terminals 2 and 3) and a Helmet loop at the output (terminals 5 and 6). When a pulse is detected, the SCR is triggered, dumping the charge on C14 into the loop. U3 then provides a connect 20us delay prior to recharging C14 preparatory to the next pulse.

3.2 First article. When specified (see 6.4), a sample shall be subjected to first article inspection in accordance with 4.4.

3.3 Environmental stress screen (ESS). All assemblies shall be subjected to an environmental stress screen prior to conformal coating consisting of temperature cycling and soaking between the temperatures -55°C and +85°C. After exposure to ESS, the characteristics of 3.4 shall not be degraded.

3.4 Characteristics.

3.4.1 Operating conditions. The operating conditions shall be in accordance with Table I, measured under quiescent conditions. A sensitivity adjustment of the output signal's frequency shall be made prior to establishing performance requirements. For terminal and component designations called out in this specification, see drawing 11749313, Schematic Diagram, Helmet (MWLD).

TABLE I. Operating Conditions.

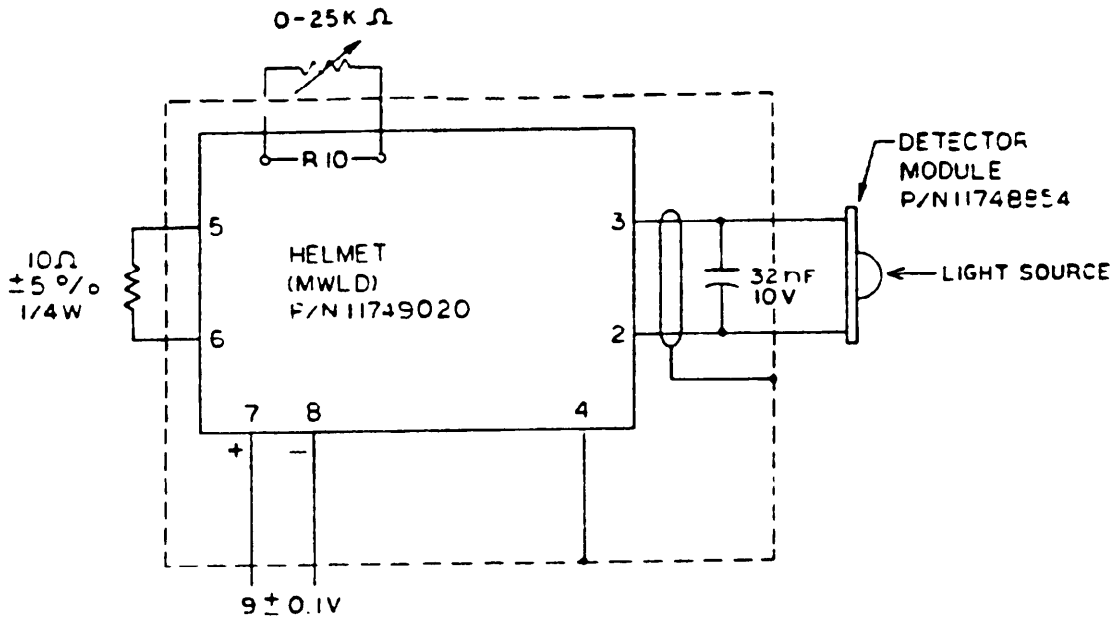
Parameter	Terminal	Minimum	Nominal	Maximum	Unit
Ambient Temperature		-35	25	62	°C
Input (+) Power	7	6.0	8.0	10.0	Vdc
Return (-) Power	8				
Input Current	7	0.7	1.0	1.4	mA

3.4.1.1 Sensitivity adjustment. With power applied to the PWBA (see Figure 1) and the Detector Module, part number 11748854, irradiated with the below light source (see Figure 2), R10 shall be adjusted such that a 815 ± 10% Hz, 9 ± 3V output signal is obtained at terminals 5 and 6 (see Figure 3). The light source must provide the following:

a. Energy level - 32 micro ergs/cm²
b. Wavelength - 904nm + 20nm
c. Pulse Width - 130 ± 50ns
d. Frequency - 1630 ± 25 Hz

3.4.2 Performance. Unless otherwise specified, the PWBA shall meet the requirements of this specification under the following conditions:

a.	Temperature	25° ± 10°C (77° ± 18°F)
b.	Relative humidity	50 ± 30 %
c.	Barometric pressure	725 + 50, -75mm Hg (28.5 + 2.0, -3.0 inches Hg)
d.	Input power and loads	See Figure 4



RESISTORS 1/4 W, ± 5%

FIGURE 1. Sensitivity Adjustment.

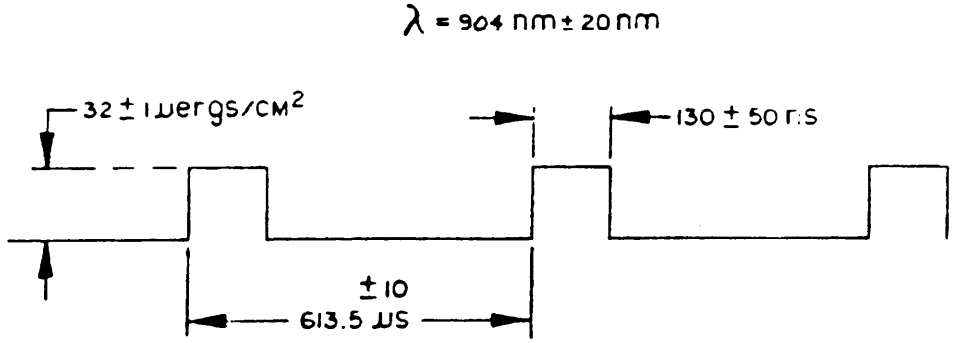


FIGURE 2. Light Source.

3.4.2.1 Current drain. Following application of power, the current drain of the PWBA shall be between 0.7 mA and 1.4 mA.

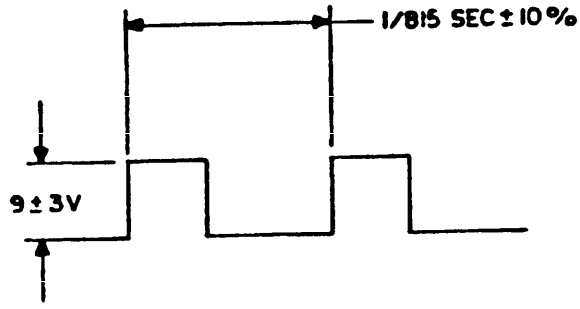


FIGURE 3. Output Waveform.

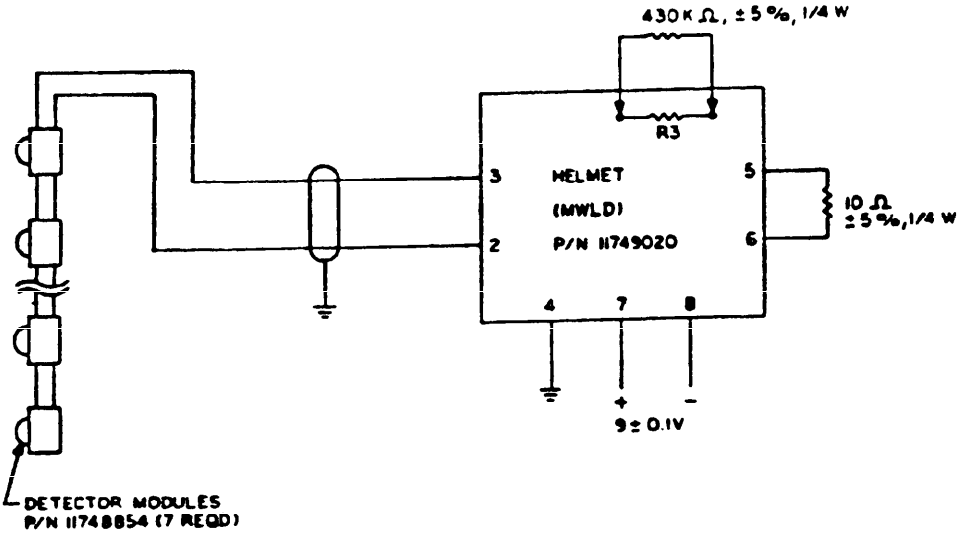


FIGURE 4. Helmet (MWLD) PWBA Power Source and Loads.

3.4.2.2 False alarm. With the current into terminal 3 set to 55 mA ± 0.1 mA, by varying the amount of light directed at the detector modules, an input voltage of 8.0 ± 0.1 Vdc applied to terminals 7 and 8 and 430 kohms connected across R3 on the PWBA, the false alarm bit rate output at terminal 5 shall be 10 counts/second or less when averaged over 10 seconds.

3.4.2.3 False alarm - high voltage. With the current into terminal 3 set to 55 ± 0.1 mA, by varying the amount of light

directed at the detector modules, a high voltage input of 10.0 (+0, -0.2) Vdc applied to terminals 7 and 8 and 430 kohms connected across R3 on the PWBA, the false alarm bit rate output at terminal 5 shall be 20 counts/second or less when averaged over 10 seconds.

3.4.2.4 False alarm - low voltage. With the current into terminal 3 set to 55 ± 0.1 mA, by varying the amount of light directed at the detector modules, a low voltage input of 6.0 (+0.2, -0) Vdc applied to terminals 7 and 8 and 430 kohms connected across R3 on the PWBA, the false alarm bit rate output at terminal 5 shall be 10 counts/second or less when averaged over 10 seconds.

3.4.3 Environmental requirements. Unless otherwise specified the assembly shall be subjected to the following environmental conditions and meet the stated requirements.

3.4.3.1 High temperature. The assembly shall not be damaged and shall meet the performance requirements of 3.4.2. when exposed to and after the following.

3.4.3.1.1 Operating temperature. The assembly shall operate up to a temperature of +62°C (+145°F).

3.4.3.1.2 Storage temperature. The assembly shall operate after exposure to a temperature of +85°C (+185°F) for a period of 48 hours.

3.4.3.2 Low temperature. The assembly shall not be damaged and shall meet the performance requirements of 3.4.2 when exposed to and after the following.

3.4.3.2.1 Operating temperature. The assembly shall operate down to a temperature of -35°C (-30°F) after exposure at -35°C for 4 hours.

3.4.3.2.2 Storage temperature. The assembly shall operate after exposure to a temperature of -55°C (-67°F) for a period of 24 hours.

3.4.3.3 Shock. The assembly shall meet the performance requirements of 3.4.2 after shocks with a nominal level of 40 g's terminal peak and nominal duration of 11 milliseconds as shown in Figure 5. Apply three shocks (18 total) in each direction of the three mutually perpendicular axes.

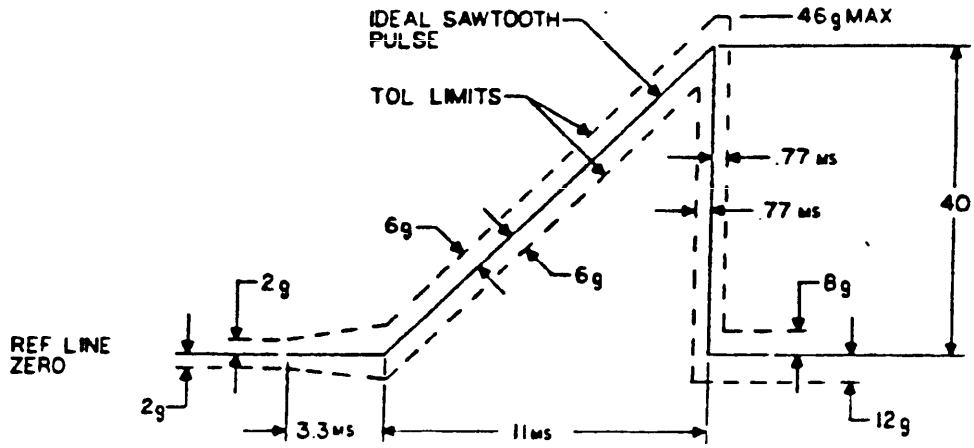


FIGURE 5. Shock Pulse.

3.4.3.4 Vibration. The assembly shall meet the performance requirements of 3.4.2 after sinusoidal vibrations of frequency and amplitude given below and in Figure 6 on three mutually perpendicular axes. Total duration shall be 60 minutes per axis.

Frequency	Amplitude	Sweep rate
7-30 Hz	±1.5 g	7-500-7 Hz
30-50 Hz	0.033" DA	in 15 minutes
50-500 Hz	±4.2 g	

3.5 Design and construction. The PWBA shall be fabricated and assembled in accordance with drawings, parts lists, and other documents specified on drawings 11749020. The PWBA shall be manufactured and tested in a working environment in accordance with Table I, work area 5 of MIL-STD-1695.

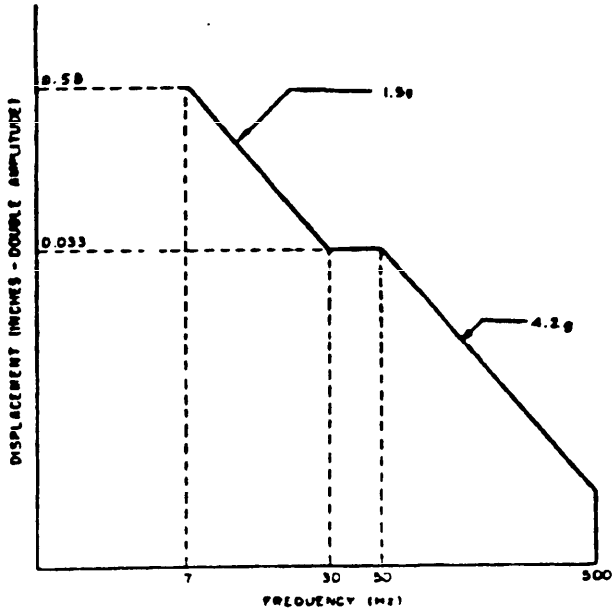


FIGURE 6. Vibration Test.

3.5.1 Standards of manufacture. Handling of Electrostatic Sensitive Parts. This equipment contains semiconductor devices such as CMOS, mosfets, and microelectronic devices which may be degraded or damaged by an inadvertent discharge of static electricity. To prevent damage to these components, the supplier shall provide for adequate handling procedures and equipment in accordance with MIL-STD-1686 and DoD-HBK-263.

3.5.2 Soldering. Soldering shall be in accordance with the general requirements of section 4 of MIL-STD-2000.

3.5.3 Workmanship. General workmanship shall be in accordance with requirement 9 of MIL-STD-454.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements

(examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in this specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.2 Classification of inspections. The inspection requirements specified herein are classified as follows:

a. First article inspection (see 4.4).

b. Environmental Stress Screen (see 4.5).

c. Quality conformance inspection (see 4.6).

d. Packaging inspection (see 4.6.4).

4.3 Inspection conditions. Unless otherwise specified, all inspections shall be performed in accordance with the working environment specified in 3.5 and at standard ambient conditions defined in 3.4.2 using the methods of 4.8 and 4.9.

4.4 First article inspection.

4.4.1 Sample. The contractor shall submit a first article sample as designated by the Contracting Officer for evaluation in accordance with provisions of 4.4.2. The first article sample shall consist of three printed wiring board assemblies.

4.4.2 Inspections to be performed. First article

inspections are listed in Tables III and IV. Each first article sample unit shall be inspected in accordance with the Table III before being subjected to the environmental tests in Table IV in the sequence listed. As determined by the Government, the first article assemblies may be subjected to any or all of the examinations and tests specified in this detail specification and be inspected for compliance with any or all requirements of the applicable drawings.

TABLE III. Examinations and Performance Tests. 1/ 2/

Class	Characteristics	Requirements Paragraph	Test/ inspection Method	First Article Sample Size	Quality 3/ Conformance Inspection Sample Size/ Acceptance Criteria
101	Current Drain	3.4.2.1	4.8.2.1	3	32/Acc-0,Rej-1
102	False Alarm	3.4.2.2	4.8.2.2	3	32/Acc-0,Rej-1
103	False Alarm - High Voltage	3.4.2.3	4.8.2.3	3	32/Acc-0,Rej-1
104	False Alarm - Low Voltage	3.4.2.4	4.8.2.4	3	32/Acc-0,Rej-1
201	Workmanship	3.5.3	Visual	3	125/Acc-0,Rej-1
202	Soldering 4/	3.5.2	Visual	3	125/Acc-0,Rej-1
203	Conformal Coating	3.5	Visual	3	125/Acc-0,Rej-1
204	Dim Characteristics	3.5	SME 5/	3	125/Acc-0,Rej-1
205	Comp Orientation	3.5	Visual	3	125/Acc-0,Rej-1
206	Comp and Board Identification	3.5	Visual	3	125-Acc-0,Rej-1

NOTES:
1/ ESS testing per 4.5 is required for all deliverable units.
2/ 200 class (minor charateristics) examinations required prior to 100 class (major characteristics) performance tests.
3/ For lot sizes less than 32 or 125 as listed, 100% inspection is required (see 4.6.5).
4/ Check before conformal coating is applied.
5/ Standard Measuring Equipment.

TABLE IV. Environmental Tests.

Class	Characteristic	Requirements Paragraph	Test Paragraph	First Article Sample Size	Quality Conformance Inspection Sample Size/ Acceptance Criteria
105	High temp	3.4.3.1	4.9.1	3	1/Acc-0, Rej-1
106	Low temp	3.4.3.2	4.9.2	3	1/Acc-0, Rej-1
107	Shock	3.4.3.3	4.9.3	3	1/
108	Vibration	3.4.3.4	4.9.4	3	1/

NOTE:
1/ Not required for quality conformance inspection.

4.4.3 Rejection. If any assembly fails to comply with any of the applicable requirements, the first article sample shall be rejected. The Government reserves the right to terminate inspection upon any failure of any assembly to comply with any of the requirements.

4.5 Environmental stress screen. An environmental stress screening program shall be established. All units shall be subjected to a thermal stress screen in accordance with Table V and the procedures below.

4.5.1 Conformal coating. Thermal stress screen shall be performed prior to conformal coating unless another method is approved by the Government.

TABLE V. ESS Temperature Cycling Requirements.

Low Temp	High Temp	Rate Change	Power	Monitor	Cycles/ Group A Test
-55°C	+85°C	15°C/minute	Off	No	20/Failure Free or Additional Cycle

4.5.2 Chamber temperature. Chamber temperature cycling shall be from -55°C to +85°C (-67°F to +185°F) and the duration of one cycle to be 8 minutes up and 8 minutes down plus 4 minutes dwell at high temperature and 4 minutes at low temperature for a total cycle duration of 24 minutes. The units shall begin and end the cycles at ambient temperature (see Figure 7).

4.5.3 Cycle frequency. A total of twenty temperature cycles are to be imposed on each unit.

4.5.4 Temperature cycles. Temperature cycling shall be conducted with units nonoperating and without power (static).

4.5.5 Test requirements. After the thermal stress screen, the units shall meet the Group A tests (4.6.2). If a unit is rejected, the unit shall be repaired (if possible) and be put through one additional cycle of ESS. The unit shall then undergo and pass Group A tests.

than 6.0 microseconds (measured between 10 and 90

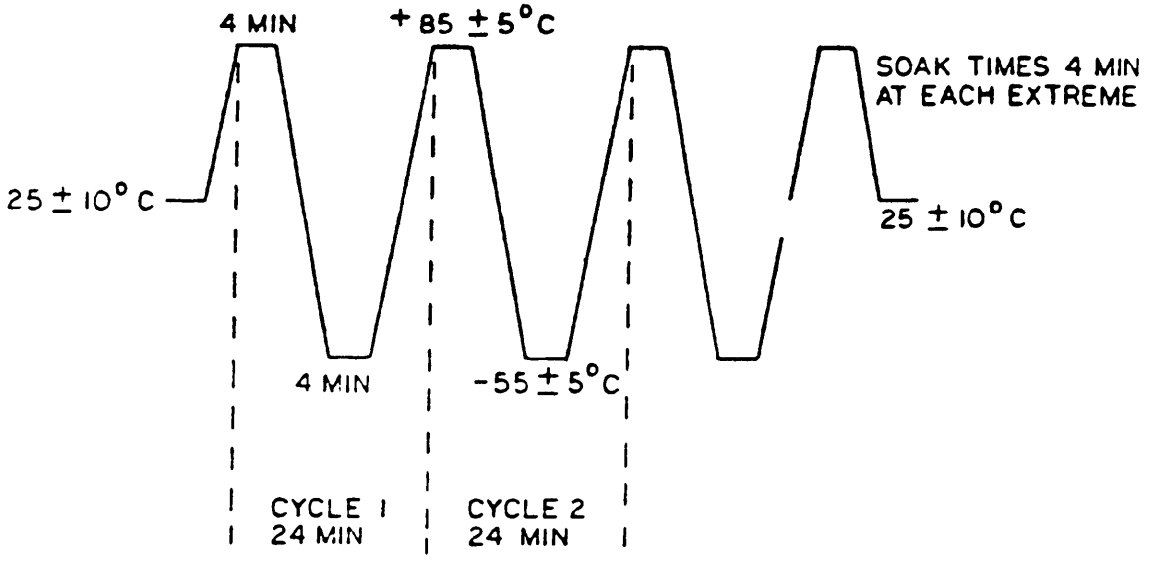


FIGURE 7. Environmental Stress Screen Temperature Profile.

4.6 Quality conformance inspection. Quality conformance inspection requirements are defined in 4.6.2 and 4.6.3.

4.6.1 Inspection lot formation. The term "inspection lot" is defined as a homogeneous collection of units of product from which a representative sample is drawn of which is inspected 100 percent to determine conformance with applicable requirements. Units of product selected for inspection shall represent only the inspection lot from which they are drawn and shall not be construed to represent any prior of subsequent quantities presented for inspection. Homogeneity shall be considered to

exist provided the inspection lot has been produced by one manufacturer, in one unchanged process, using the same materials and methods, in accordance with the same drawings, same drawing revisions, same specifications and same specification revisions. All material submitted for inspection in accordance with this specification shall comply with the homogeneity criteria specified herein, regardless of the type of inspection procedure which is being applied to determine conformance with requirements.

4.6.2 Group A tests. Group A tests consist of examinations and performance tests listed in Table III in the quantities specified.

4.6.3 Group B tests. Group B tests shall consist of the tests indicated in Table IV and shall be conducted on one sample unit per inspection lot which has been subjected to, and passed, Group A tests (see 4.6.2).

4.6.4 Inspection of packaging. The sampling and inspection of the preservation, packing, and container marking shall verify that the units are packaged in accordance with the requirements of 5.1. During the period of first article inspection, one additional unit, packaged in accordance with 5.1, shall be examined to the requirements for quality conformance inspection listed below. Failure of packaging shall be cause for rejection of packaging. Two units per lot shall be examined for the following:

a. Verify that the outside bag is marked in accordance with MIL-STD-129 and is properly closed.

b. Verify that sleeve is around box and that foam properly surrounds inner bag.

c. Verify that the inner bag is properly sealed.

d. Verify that the unit is not damaged after the removal of all packaging materials.

4.6.5 Failure of sample. Should any one sample fail to meet any of the specified examinations and test requirements, acceptance of the product shall be suspended by the Government until necessary corrections to all production since the last test as well as to current production has been accomplished in accordance with the provisions of the contract (see 6.7).

4.7 Inspection equipment.

4.7.1 Government-furnished inspection equipment. Where the contract provides for Government-furnished test equipment, supply and maintenance of test equipment shall be in accordance with the applicable requirements of MIL-I-45607 and MIL-W-63150.

4.7.2 Contractor-furnished inspection equipment.

4.7.2.1 Government design. Unless otherwise specified in the contract, all inspection equipment identified by drawing number in specifications or QAP/QARs forming a part of the contract shall be supplied by the contractor in accordance with the design specified. The contractor may, however, propose alternatives to Government designs (see 6.3).

4.7.2.2 Contractor design. The contractor shall design and supply inspection equipment compatible with the Methods of Inspection specified in 4.8 and 4.9 of this specification and with the component inspection procedures specified in Examination and Test Facilities requirements of MIL-F-13926, whenever Government designs are not specified (see 4.7.2.1). Since tolerance of test equipment is normally considered to be within ten percent of product tolerance for which it is intended, this inherent error in the test equipment design must be considered as part of the prescribed product tolerance limit. Thus, concept, construction, materials, dimensions and tolerances used in the design of test equipment shall be so selected and controlled as to ensure that the test equipment will reliably indicate acceptability of a product which does not exceed 90 percent of the prescribed tolerance limit and permit positive rejection when nonconforming. Construction shall be such as to facilitate routine calibration of test equipment. When specified in contract or purchase order, the contractor shall submit inspection equipment designs for government review and evaluation (see 6.3).

4.7.2.3 Test equipment. In conjunction with 4.7.2.1 and 4.7.2.2, the test equipment listed in Table VI (Test equipment list) shall be used in the performance of the applicable test methods and procedures as specified in 4.8.

TABLE VI. Test Equipment List. 1/

Power Supplies (DC)	Standard - capable of providing levels and limits stated in 4.8.
DC Voltmeter/Multimeter	Standard - capable of measuring voltages stated in 4.8.
Ammeter/Multimeter	Standard - capable of measuring currents stated in 4.8.2.
Counter	Standard - capable of counting pulses stated in 4.8.
Line Voltage Regulator	Standard - capable of providing levels and limits required in 4.8.2.
Variable Transformer	Equivalent to Ohmite Model Ohmitran VT3 1 phase, 120 V, 3.0 A (max), 60 Hz. Used in 4.8.2.
Radiometer/Photometer and Pulse Integration Module	Equivalent to EG & G Model 550-1 and 550-3 - capable of measuring levels required in 4.8.1.
LED Multiprobe	Equivalent to EG & G Model 550-2 - capable of detecting levels required in 4.8.1.
Flat-White Lambertian (Approx.) Reflector	Standard - as needed in 4.8.2.
Controller Gun	Part Number 11749279 - as needed in 4.8.1.
Aperture	Standard, diameter of 1 inch. Used in 4.8.2.
Sun Simulator	See Figure 8 - as needed in 4.8.2
Detector Modules, Si-PN	P/N 11748854 - as needed in 4.8.1.

NOTE: 1/ Must be calibrated to the requirements of MIL-STD-45662 prior to use.

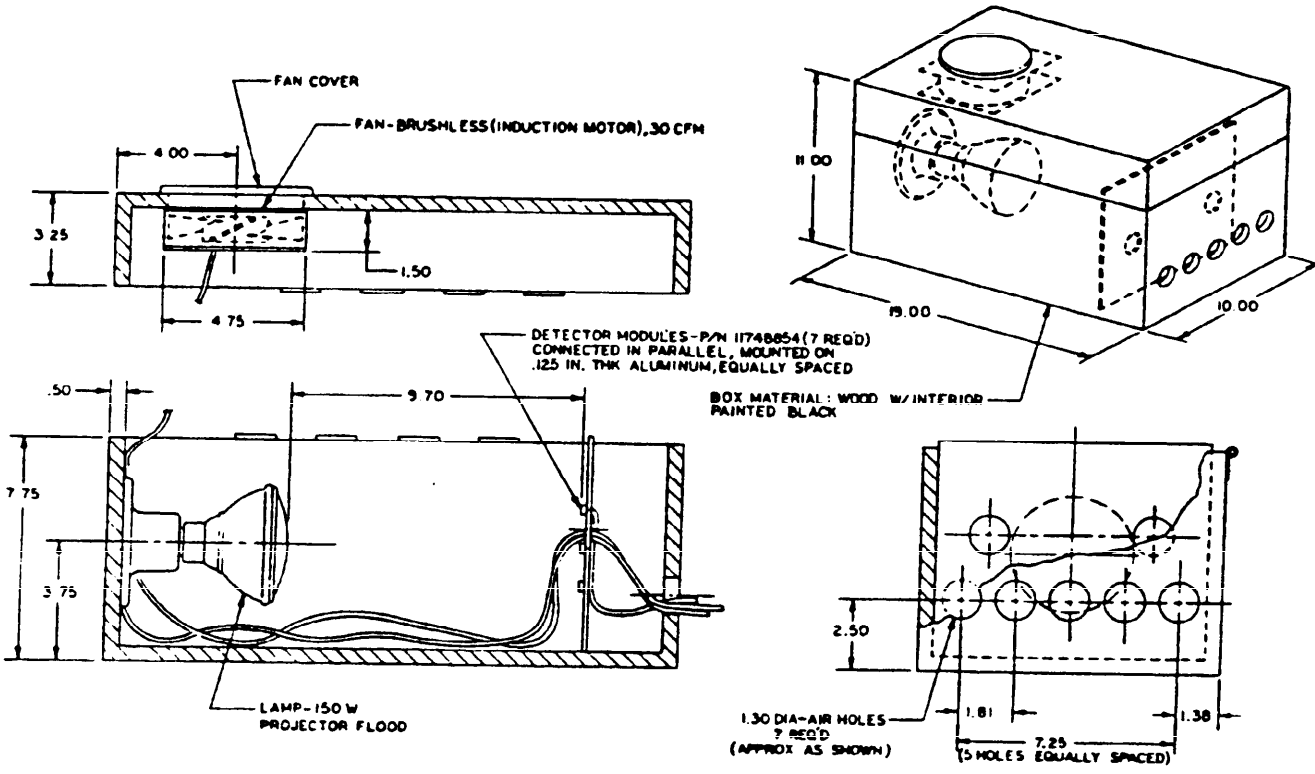


FIGURE 8. Sun Simulator.

4.8 Methods of inspection. Unless otherwise specified in the contract, the following procedures shall be utilized to conduct specified tests. If the contractor chooses to use alternate test procedures, a detailed description of the set-up and procedure shall be submitted to the Government procuring agency for approval prior to use (see 4.7.2.2).

4.8.1 Sensitivity adjustment. To make the sensitivity adjustment, place the PWBA into the circuit shown in Figure 9. Power the controller gun, and the radiometer/photometer. On the radiometer/photometer, turn on the autorange, and set the unit selector to micro Joules/cm^2. Set the decade range on the integrator to 10^{-3} and on the multiprobe, set the units to micro Joules/cm^2. Irradiate the multiprobe by reflecting light off the Lambertian reflector from the controller gun and vary the distance d until the radiometer/photometer reads 32 microergs/cm^2 per pulse (note that 1 erg = 10^{-7} Joules) in order to establish a calibrated signal. Apply the 32 microergs/cm^2 per pulse signal by reflecting off the Lambertian reflector in the same manner to the detector module and vary R10 until the counter reads 815 Hz ± 10%. Replace R10 with the nearest fixed resistor value specified in PL11749020.

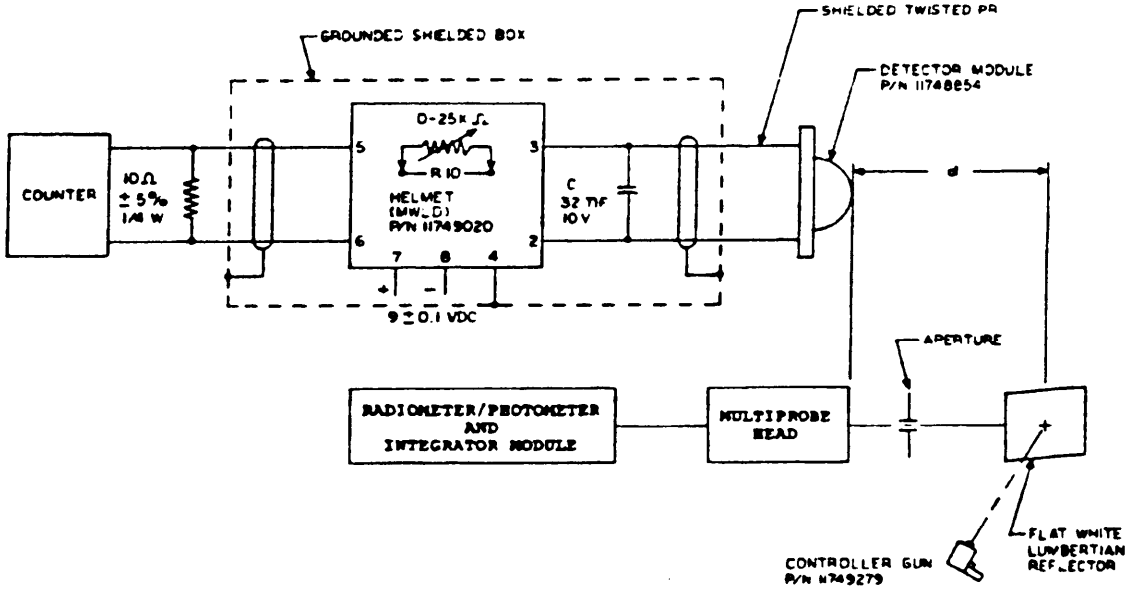


FIGURE 9. Sensitivity Adjustment.

4.8.2 Performance tests. After the sensitivity adjustment, the following tests and examinations shall be performed to demonstrate compliance with 3.4.2. The PWBA shall be connected to the circuit specified in Figure 10. Power the sun simulator cooling fan and voltage regulator with 120 V ac, 50-60 Hz. All switches shall remain as shown unless otherwise specified in 4.8.2.1 through 4.8.2.4.

4.8.2.1 Current drain. Apply input power as specified in 3.4.2.1 by turning ON S3. Verify that the quiescent current drain meets the requirements of 3.4.2.1.

4.8.2.2 False alarm. To verify the false alarm rate of 3.4.2.2, proceed as follows: power the sun simulator by turning on S4, set S1 to position B and adjust the variable transformer until I_{sun} = 55 $\pm$ 0.1 mA; set the power supply to 8V $\pm$ 0.1 Vdc; turn ON S2 and S3; and set S1 to A. Verify the counter reading meets the requirements of 3.4.2.2.

4.8.2.3 False alarm - high voltage. To verify the high voltage false alarm rate of 3.4.2.2, proceed as follows: power the sun simulator by turning on S4, set S1 to position B and adjust the variable transformer until I_{sun} = 55 $\pm$ 0.1 mA; set the power supply to 10V (+0,-0.2) Vdc; turn ON S2 and S3; and set S1 to A. Verify the counter reading meets the requirements of 3.4.2.3.

4.8.2.4 False alarm - low voltage. To verify the low voltage false alarm rate of 3.4.2.4, proceed as follows: power the sun simulator by turning on S4, set S1 to position B and adjust the variable transformer until I_{sun} = 55 $\pm$ 0.1 mA; set the power supply to 6V (+0.2,-0) Vdc; turn ON S2 and S3; and set S1 to A. Verify the counter reading meets the requirements of 3.4.2.4.

4.9 Environmental tests.

a. Unless otherwise specified, environmental tests shall be conducted in accordance with test conditions and general test performance guidance of MIL-STD-810. Test facilities, chambers and apparatus used in conducting the tests required by this specification shall be capable of meeting the conditions specified.

b. Where necessary in the following tests, it shall be permissible to temporarily open chamber doors to permit access to and manipulation of test equipment and sample.

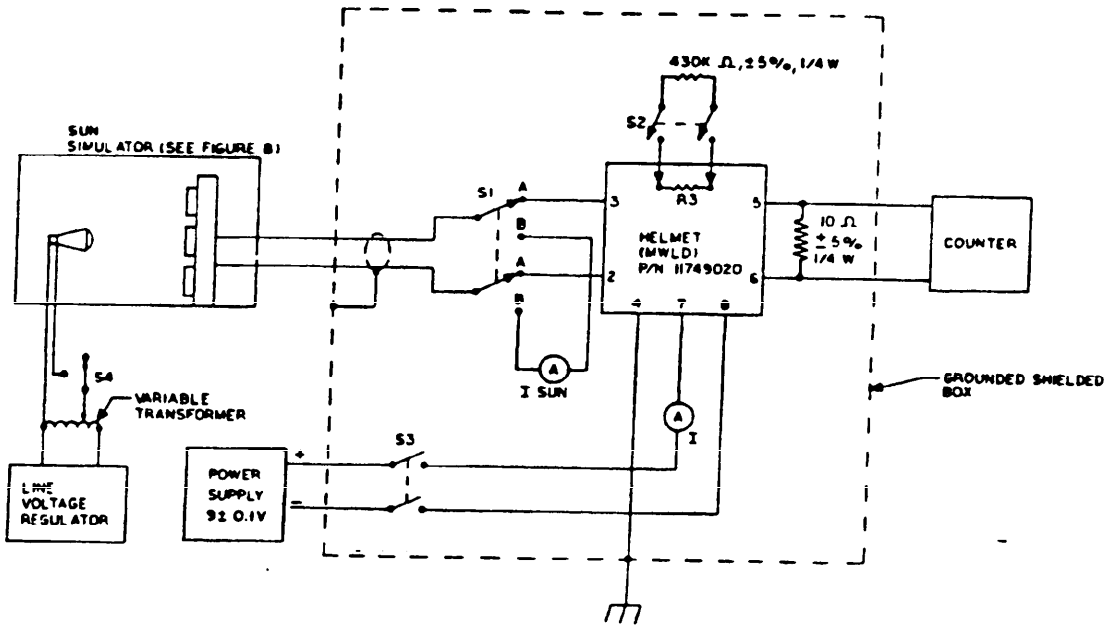


FIGURE 10. Test Circuit for Helmet (MWLD).

4.9.1 High temperature. This satisfies the storage and operating conditions of high temperature requirements as specified in 3.4.3.

4.9.1.1 Storage and operating. The assembly shall be tested in accordance with MIL-STD-810, Method 501 using the following procedure:

a. Step 1 - Place the test item, configured for high temperature test, into the temperature chamber.

b. Step 2 - Raise the internal temperature to 85°C (185°F).

c. Step 3 - Maintain the internal chamber temperature for a period of 48 hours while insuring the relative humidity is not in excess of 15 percent.

d. Step 4 - Adjust the internal chamber temperature to 62°C (145°F), the highest operating temperature for which the test item is designed to operate, and maintain until temperature stabilization of the item is reached.

e. Step 5 - Operate the test item until the item is stabilized and perform the tests required in 4.8.2.

f. Step 6 - Return the test item, nonoperating, to standard ambient condition and stabilize.

g. Step 7 - Visually inspect for physical damage and in the absence of physical damage, perform the tests required in 4.8.2.

4.9.2 Low temperature. This satisfies the storage and operating conditions of low temperature requirements as specified in 3.4.3.

4.9.2.1 Storage and operating. The assembly shall be tested in accordance with MIL-STD-810, Method 502 using the following procedure:

a. Step 1 - Place the test item, configured for low temperature test, into the temperature chamber.

b. Step 2 - Lower the internal chamber temperature to -55°C (-67°F) and maintain for a period of 24 hours after stabilization.

c. Step 3 - Adjust the internal chamber temperature to -35°C (-30°F) and maintain until temperature stabilization of the test item is reached.

d. Step 4 - Operate the test item until the item is stabilized and perform the tests required in 4.8.2.

e. Step 5 - Return the test item, nonoperating, to standard ambient conditions and stabilize.

f. Step 6 - Visually inspect for physical damage and in the absence of physical damage, perform the tests required in 4.8.2.

4.9.3 Shock. The assembly, when mounted on a fixture that simulates its next higher assembly (see Figure 11), shall be tested in accordance with MIL-STD-810, Method 516.3, Section II, Procedure I, with the following modifications:

a. Step 3 - the assembly shall be in a non-operational mode.

b. The step 3 test transient shall be in accordance with 3.4.3.3.

c. Step 5 - the assembly inspection and functional verification shall not be conducted until shock has been completed in all three axes.

d. After shock testing the assembly shall not be damaged and shall be subjected to the performance tests specified in 4.8.2.

4.9.4 Vibration. The assembly, when mounted on a fixture that simulates its next higher assembly (see Figure 11), shall be tested in accordance with MIL-STD-810, Method 514.3, Section II, Procedure I, for a duration of 60 minutes with the following modifications:

a. Step 4 - mount the test item on vibration equipment.

b. Step 5 - expose the assembly to test level and durations as specified in 3.4.3.4.

c. Step 6 - does not apply.

d. Step 7 - the assembly inspection and functional

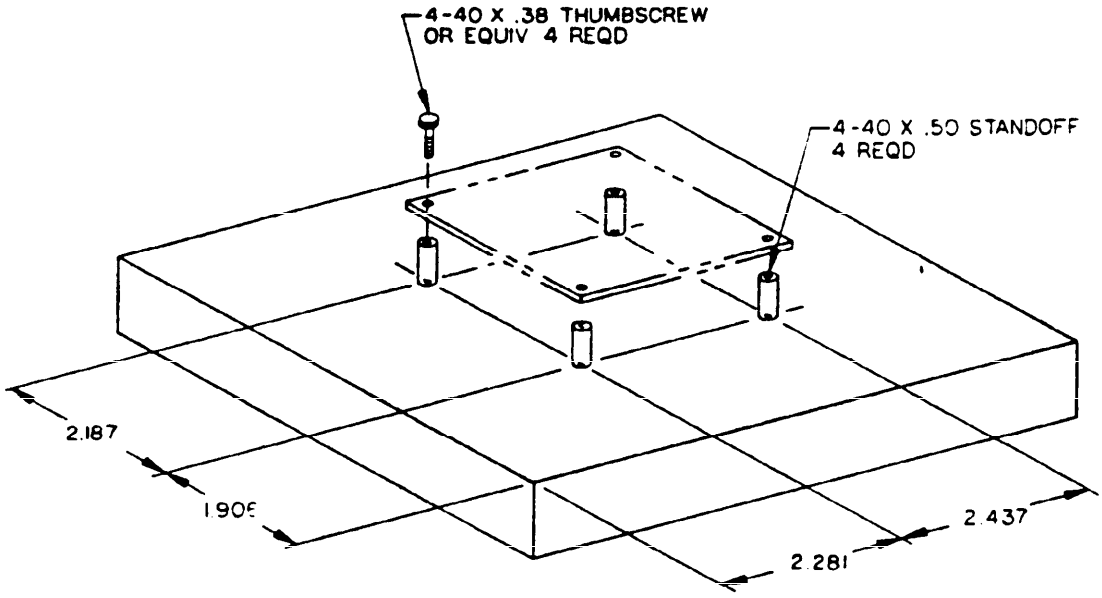


Figure 11. Mounting Configuration.

verification shall not be conducted until vibration has been completed in all three axes.

e. After vibration testing the assembly shall not be damaged and shall be subjected to the performance tests specified in 4.8.2.

4.10 Certifications. Certification shall be provided that all units have been produced in accordance with the requirements of 3.5 and packaged in accordance with the requirements of 5.1.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with SPI-P11749020. The level of protection shall be A, B, or C, as defined by the procurement document.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The Helmet (MWLD) Printed Wiring Board Assembly is part of the Multiple Integrated Laser Engagement System.

6.2 Acquisition requirements. Acquisition documents shall specify the following:

a. Title, number and date of this specification (see page 1).

b. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1).

c. Special tests and examinations required (see 4.2); the type of inspection required; and the activity responsible for testing, and its facility (see 4.1).

d. Whether a first article sample is required (see 3.2), and if so, pertinent details (see 4.4) including disposition of the first article sample.

e. Certification of conformance for each lot or shipment of product.

f. Whether Government-Loaned Property (Government Furnished inspection/test equipment) of 6.8 is available or will the contractor be required to furnish inspection equipment (see 4.7).

g. Applicable level(s) of preservation, packaging, packing and marking instructions (see 5.1).

6.3 Submission of contractor inspection equipment designs for approval. Unless otherwise specified, submit two copies of designs as required to: Commander, U.S. Army AMCCOM, ATTN: SMCAR-QAF- I, Picatinny Arsenal, NJ 07806-5000. This address will be specified on the Contract Data Requirements List, DD Form 1423, in the contract. The letter of submittal shall specify, the contractor; contract number; title, number and revision of this specification; item nomenclature; classification of defect and test paragraph.

6.4 Definitions.

6.4.1 MILES. Multiple Integrated Laser Engagement System.

6.4.2 SME. Standard Measuring Equipment.

6.4.3 False alarm. A hit acknowledged by a detector that occurred from a source other than a MILES transmitter.

6.5 Drawings. Drawings listed in Section 2 of this specification under heading U.S. Army Armament Research, Development and Engineering Center (ARDEC), may also include drawings prepared by, and identified as, U.S. Army Armament Research and Development Command (ARRADCOM), Frankford Arsenal, Rock Island or Picatinny Arsenal drawings. Technical data originally prepared by these activities is now under cognizance of ARDEC.

6.6 Noncompliance. If a sample fails to pass group B inspection, the manufacturer shall notify the qualifying activity and the cognizant inspection activity of such failure and take corrective action on the materials or processes, or both, as warranted, and on all units of product which can be corrected and which were manufactured with essentially the same materials and processes, and which are considered subject to the same failure. Acceptance and shipment of the product shall be discontinued until corrective action, acceptable to the qualifying activity has been taken. After the corrective action has been taken, group B inspection shall be repeated on additional sample units

(all tests and examinations, or the test which the original sample failed, at the option of the qualifying activity). Group A inspections may be reinstituted; however, final acceptance and shipment shall be withheld until the group B inspection has shown that the corrective action was successful. In the event of failure after reinspection, information concerning the failure shall be furnished to the cognizant inspection activity and the qualifying activity.

6.7 Government-loaned property. Unless otherwise specified (see 6.2), the contracting officer should arrange to loan the following Government-furnished Inspection/Test equipment specified below:

P/N	Title	Ref. Paragraph
11749279	Controller Gun	4.8.1
11748854	Detector Module, Si-PN	4.8.1

6.8 Subject term (key word) listing.

Controller Gun
Detector
Fire Control
Training Devices

Custodians:
Army - AR

Preparing Activity:
Army - AR

(Project 1265-A014)

changes in the positive direction through the range

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revi letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification requirements on current contracts. Comments submitted on this form do not constitute or imply authorizatio waive any portion of the referenced document(s) or to amend contractual requirements.

I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER	2. DOCUMENT DATE (YYMMDD)
	MIL-P-70850 (AR)	24 January 1992

3. DOCUMENT TITLE PRINTED WIRING BOARD ASSEMBLY, HELMET (MWLD), SPECIFICATION FOR

4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets if needed.)

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME (Last, First, Middle Initial)	b. ORGANIZATION	
c. ADDRESS (Include Zip Code)	d. TELEPHONE (Include Area Code) (1) Commercial (2) AUTOVON (If applicable)	7. DATE SUBMITTED (YYMMDD)

8. PREPARING ACTIVITY

a. NAME	b. TELEPHONE (Include Area Code)	
US ARMY ARDEC STANDARDIZATION OFFICE	(1) Commercial (201) 724-6674	(2) AUTOVON 880-6674
c. ADDRESS (Include Zip Code) ATTN: SMCAR-BAC-S PICATINNY ARSENAL,NJ 07806-5000	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340	

DD Form 1426, OCT 89 *Previous editions are obsolete.*