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PRIME ITEM DEVELOPMENT SPECIFICATION FOR DIGITAL MESSAGE DEVICE--ETC(U)
APR 75 DAAB07-76-C-1677
UNCLASSIFIED EL-SS-2603-TF NL

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(6) PRIME ITEM DEVELOPMENT SPECIFICATION
FOR
DIGITAL MESSAGE DEVICE (DMD)
FOR
TACTICAL FIRE DIRECTION SYSTEM (TACFIRE).

(15) DAAB07-76-C-1677

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SPECIFICATION CHANGE NOTICE
(SEE MIL-STD-490 FOR INSTRUCTIONS)

DATE PREPARED 21 October 1977

1. ORIGINATOR NAME AND ADDRESS	2.	3. CODE IDENT.	4. SPEC. NO.
Magnavox Government and Industrial Electronics Company 1313 Production Rd., Fort Wayne, IN 46308	☐ PROPOSED ☒ APPROVED	80063 5. CODE IDENT. 37695	EL-SS-2603-TF 6. SCN NO. 11

7. SYSTEM DESIGNATION	8. RELATED ECP NO.	9. CONTRACT NO.	10. CONTRACTUAL ACTIVITY
AN/PSG-2(XE-2)	011	DAAB07-76-C-1677	Contract Modification

11. CONFIGURATION ITEM NOMENCLATURE	12. EFFECTIVITY
Message Device, Digital, AN/PSG-2(XE-2)	S/N 001

THIS NOTICE INFORMS RECIPIENTS THAT THE SPECIFICATION IDENTIFIED BY THE NUMBER (AND REVISION LETTER) SHOWN IN BLOCK 4 HAS BEEN CHANGED. THE PAGES CHANGED BY THIS SCN BEING THOSE FURNISHED HEREWITH AND CARRYING THE SAME DATE AS THIS SCN. THE PAGES OF THE PAGE NUMBERS AND DATES LISTED BELOW IN THE SUMMARY OF CHANGED PAGES COMBINED WITH NON-LISTED PAGES OF THE ORIGINAL ISSUE OF THE REVISION SHOWN IN BLOCK 4, CONSTITUTE THE CURRENT VERSION OF THIS SPECIFICATION.

13. SCN NO.	14. PAGES CHANGED (INDICATE DELETIONS)	* S	* A	15. DATE
11	Page Changed and Transmitted Herewith 27	X		
	Summary of Changed Pages			
1	29 and 30	X		10/18/76
2	8	X		10/18/76
3	27	X		11/3/76
4	17	X		4/7/76
5	8	X		4/7/76
6	9 and 21	X		4/7/76
7	22	X		4/7/76
8	10	X		4/7/76
9	166-169, 171, 177	X		4/7/76
10	129, 139-141, 143, 145, 148, 150, 151, 155, 157 and 175	X		4/7/76
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DATE 28 OCT 1977

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* "S" indicates supersedes earlier page. "A" indicates added page.

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Specification Number EL-SS-2603-TF
Code Ident 80063
7 April 1975

PRIME ITEM DEVELOPMENT SPECIFICATION

FOR

DIGITAL MESSAGE DEVICE (DMD)

FOR

TACTICAL FIRE DIRECTION SYSTEM (TACFIRE)

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DRCPM-TDS-CV

SUBJECT: AN/PSG-2( ) Digital Message Device Specification Change Notices (SCN's) ECPs 001 and 002

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14 April 1977

Department of the Army
Project Manager, Army Tactical Data Systems
Fort Monmouth, New Jersey 07703

Attention: DRCPM-TDS-CM, Mr. G. Ring

Subject: Contract Number DAAB07-76-C-1677-DMD

Reference: ARTADS Correspondence DRCPM-TDS-CM
dated 23 March 1977 w/encls.

Gentlemen:

Engineering Change Proposal Numbers 004R1, 005, 006, 007, 008, 009 and 010, applicable to the subject contract, were approved by the referenced correspondence.

To finalize remaining requirements and in keeping with obligations of Contract Clause J23(b), twenty-five (25) copies of Specification Change Notice, DD Form 1696, for each mentioned ECP is enclosed.

If Magnavox can be of further assistance, please advise.

Very truly yours,

R. G. Campbell
Contract Administrator
Sensor & Signal Processing
Operation

RGC/ck

Enc.: As Stated

cc: ARTADS - Attn: DRCPM-TDS-TF, LTC R. E. Oswandel w/encl.

ECOM - Attn: DRSEL-PP-C-ES-4(GAB) w/encl.

DCASMA - Attn: DCRI-GFCA/TER w/encl.
DCRI-GFPE/EVM w/encl.

EL-SS-2603-TF
7 April 1975

DIGITAL MESSAGE DEVICE

(DMD)

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1. SCOPE

1.1 This specification establishes the requirements for performance, design, fabrication and test of a Digital Message Device, herein referred to as the DMD. This device shall be used by the Forward Observer to transmit and receive tactical digital messages over standard Army tactical communications equipment as part of the Tactical Fire Direction System (TACFIRE).

2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issue in effect on date of invitation for bids, form a part of this specification. In the event of conflict between documents referenced herein and other detailed contents of this specification, the detail requirements of this specification shall be considered a superseding requirement.

SPECIFICATIONS

Military

MIL-P-116	Preservation, Methods of
MIL-E-4158E	Electronic Equipment, Ground Requirements for
MIL-P-9024	Packaging, Materiels Handling, and Transportability System and System Segments, General Specification of
MIL-Q-9858	Quality Program Requirements
MIL-P-11268	Parts, Materials and Processes Used in Military Electronics Equipment
MIL-M-13231	Marking of Electronic Items

MIL-F-14072	Finishes for Ground Signal Equipment
MIL-L-19590	Marking of Commodities and Containers to Indicate Radioactive Material
MIL-S-22710	Switch, Rotary (Printed Circuit), General Specification for
MIL-H-46855	Human Engineering Requirements for Military Systems, Equipment and Facilities

Electronics Command

EL-SS-2604-TF (Secret)	Tempest Requirements for the Digital Message Device (DMD)
EL-CP-00041109B	CEI Specification for Data Terminal Unit (DTU) for Fire Direction System, Artillery AN/GSG-10( )(V)

STANDARDS

Federal

FED-STD-102	Preservation, Packaging, and Packing Levels
FED-STD-595	Color

Military

MIL-STD-129	Marking for Shipment and Storage
MIL-STD-188	Military Communication System Technical Standards
MIL-STD-252	Classification of Visual and Mechanical Defects for Equipment, Electronic, Wired, and Other Devices
MIL-STD-415D	Test Provisions for Electronic Systems and Associated Equipment, Design Criteria for
MIL-STD-454	Standard General Requirement for Electronic Equipment
MIL-STD-461A	Electromagnetic Interference Characteristics, Requirements for Equipment

MIL-STD-462	Measurement of Electromagnetic Interference Characteristics
MIL-STD-470	Maintainability Program Requirements for Systems and Equipments
MIL-STD-471	Maintainability Demonstration
MIL-STD-756	Reliability Prediction
MIL-STD-781	Reliability Tests, Exponential Distribution
MIL-STD-785	Reliability Program for Systems and Equipment Development and Production
MIL-STD-810	Environmental Test Methods
MIL-STD-1275	Electrical Circuit, 28 Volt DC, Transient Char
MIL-STD-1472	Human Engineering Design Criteria for Military Systems, Equipment and Facilities

Publications

AMCP-706-134	Maintainability Guide for Design
MIL-HDBK-217	Reliability Stress and Failure Rate Data for Electrical Equipment
MIL-HDBK-472	Maintainability Prediction
USAECOM Directorate of Maintenance Memo 750-5	Maintenance of Supplies and Equipment Maintenance Evaluations
FM 3-10	Employment of Chemical Agents
FM 3-10B(C)	Employment of Chemical Agents
TM 3-220	Chemical, Biological, Radiological Decontamination
MTP-5-2-591	Freezing Rain Test
NSA CSEEB-6A TSEC/KY-8	Half-Duplex, Wideband, Speech Security Equipment (U)

NSA CSEEB-13C TSEC/KY-28	Speech Security Equipment, Half-Duplex, Wideband, Air Borne (U)
NSA CSEEB-18A TSEC/KY-38	Speech Security Equipment, Half-Duplex, Wideband, Portable (U)
National Electric Codes (NFPA 70-1971)	

(Copies of specifications, standards, drawings, and publications required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer. Both the title and number or symbol should be stipulated when requesting copies).

3. REQUIREMENTS

3.1 ITEM DEFINITION. The DMD shall be a small, lightweight, source data automation device to allow tactical units to transmit and receive digital messages.

3.1.1 Employment. The DMD will be employed in TACFIRE (See para 6.1) as the forward observers input/output device. In this capacity, the DMD shall be highly human factors oriented with automatic prompting of the operator through message composition, and through review of both composed and received messages. The DMD shall provide ease of effective operation under periods of extreme combat stress. Figure 1 is a block diagram illustrating a typical employment of the DMD in a Battalion TACFIRE. To accomplish its mission, the DMD shall operate with that standard Army tactical communications equipment shown in Figure 2. Connections shall be via cables furnished with each DMD as shown in Figure 2. Each DMD shall transmit and receive addressed messages to and from other DMD's and Digital Data Terminals (DDT's) Spec No.EL-CP-00041109B of TACFIRE by interfacing in accordance with 3.1.4.

3.1.2 Formats. The DMD shall store and retrieve the message formats of TACFIRE shown in Appendix 1. All formats shall be stored and displayed electronically. The DMD shall allow replacement of formats and data elements at DS level maintenance.

3.1.3 Operational Constraints. The DMD shall be operable in 10^{-3} to 10^{+4} ft candles ambient illumination with the operator wearing protective clothing

including protective mask and five-finger gloves. No external source of light shall be required. In addition, the DMD shall be capable of hand held operation while being transported on foot.

3.1.4 Interface. The DMD shall transmit and receive over standard Army Tactical Communications equipment shown in Figure 2 with DMD connection cabling only.

3.1.4.1 Cables. The following cables, built to MIL-P-11268, shall be provided by the contractor. One end of each cable shall have a connector which mates with the appropriate connector on the DMD.

3.1.4.1.1 Power Cables.

a. Cable three feet (±2 inches) long for use with external batteries if these batteries are used for operation of the DMD below 0°F (3.2.2.1.2). 5

b. Cable six feet (±2 inches) long with vehicular battery alligator clamps. 12

c. Cable six feet (±2 inches) long to connect the DMD to a vehicular receptacle power source. Male connector on the cable shall mate with: Connector, receptacle, electrical, NSN 2590-321-6209. 2

3.1.4.1.2 Communications Cables

a. Cable, four feet (± 2 inches) long to connect the DMD with the standard 5-pin audio connector of the type used on the AN/VRC-12, AN/PRC-25 and AN/PRC-77 radios, or AN/GRA-39 (plug, 5 pin audio cable mounted U229/U, NSN5935-992-2035). 15

b. Cable, four feet (±2 inches) long to connect the DMD with the standard 10-pin audio connector of the type used on the AN/GRC-106 radio (plug, 10 pin audio cable mounted U77/U, NSN5935-283-2950). 5

c. Y-type cable, three feet (± 2 inches) long to connect the DMD, pilot's helmet (e.g. SPH-4), and aircraft audio plug (e.g. U-94A/U or

2

U-92A/U).

d. Cable, six feet (± 2 inches) long to connect the DMD with the GLLD (GLLD connector, NSN 5935-328-0666). 5

3.1.4.2 Security. The DMD shall interface with the TSEC/KY-8, TSEC/KY-28 via aircraft intercom system, and TSEC/KY-38.

3.1.5 Modularity.

3.1.5.1 Definition. The DMD shall be designed and constructed so that the electronic circuitry for decoding received messages and encoding messages for transmission be removable by use of plug-in modules which can be replaced at Direct Support Maintenance level with no calibration or adjustment to the basic DMD. The logical interpretation of message formats and data elements for both composition and received message display shall be contained in a single module. It is desired, but not required, that EDC (3.2.1.5.7), TDC (3.2.1.5.9), and single/double block (3.2.1.5.8) logic be included in the format/data-element module or a separate single module. It is desired, but not required, that the modem be included in the EDC/TDC module.

3.1.5.2 Partitioning. Firmware operating sequences, message formats, data elements, and prompters shall be partitioned in a manner which allows addition, modification, or deletions to data elements or formats at minimum cost in components and labor to implement the change to existing modules.

3.2. CHARACTERISTICS

3.2.1 Performance. The DMD shall enter, edit, transmit, receive and display alphanumeric messages and acknowledgements and non-acknowledgements.

3.2.1.1 Keyboard. The DMD shall have a keyboard which allows the operator to enter the characters shown in Table 1. Legibility shall confirm with 3.2.1.11.

3.2.1.1.1 Bounce. The DMD keyboard shall not exhibit observable effects of electrical switching bounce.

3.2.1.1.2 Lighting and Control. There shall be night illumination of the DMD keyboard and it shall be evenly distributed and continuously adjustable from detent off to full-brightness(3.2.1.10.1.1).

3.2.1.1.3 Pressure. The pressure required to activate the DMD keyboard shall be 13±3 ounces.

3.2.1.2. Display. The DMD shall display both composed and received messages and initialization data. It is preferred that the entire message be displayed at one time; however, sequential display is acceptable. In both cases, the display shall include name of message type, field names and data entry names. Legibility shall conform with 3.2.1.11.

3.2.1.2.1. Configuration. DMD displayed characters shall be formed by dot matrices whose dimensions are 5 x 7 or greater. The ratio of character width to height shall be at least 1:2 and no greater than 1:1. Spacing between characters shall be no less than 2/5 the character width.

3.2.1.2.2. Turn Off. The DMD display shall not be extinguished automatically

in less than 20 sec. The DMD shall allow the operator to extinguish the display at any time without removing power from the DMD.

3.2.1.2.3 Return. After the DMD display times out or is extinguished, upon operator action the display shall be activated at the same point in the operational sequence as when the display timed out or was extinguished.

3.2.1.2.4 Brightness Control. A control shall be provided on the DMD to permit continuous adjustment from a detent off to full brightness of alphanumeric display elements and operator signals (3.2.1.9, 3.2.1.10.1.1), except for the MSG lamps as noted in paragraph 3.2.1.9.1.1.

3.2.1.3 Initialization. Initialization of the DMD shall include all actions from application of power until the DMD is ready to conduct an operational mission. Initialization shall be accomplished in less than 2 minutes.

3.2.1.3.1 DMD Address. The DMD shall be addressed uniquely by a sender. Each DMD shall provide for the selection of its unique address from the characters Ø - 9 and A - Z (use Table 1). This character shall be transmitted in the sixth character position in the standard message header shown in Figure 3. It shall be indicated visually in an alphanumeric display space. This address shall be operator changeable within 10 seconds.

3.2.1.3.2 Destination Address. The DMD shall send its messages to unique addresses. Such destination addresses shall be the first character in the standard message header shown in Figure 3. Destination addresses

shall be selected from the characters Ø - 9 and A - Z (use Table 1) and shall be operator changeable within 10 seconds.

3.2.1.3.3 Test/Data Designator. The DMD shall allow the operator to specify a one character test/data designator to be the fifth character in the standard message header shown in Figure 3. This designator shall be operator changeable in 10 seconds.

3.2.1.3.4 Single/Double Block Transmission. The DMD shall allow the operator to select single or double block transmission (3.2.1.5.8). This selection shall be operator changeable in 10 seconds.

3.2.1.3.5 Transmission Rate. The DMD shall allow the operator to select a transmission rate of 600 or 1200 bits per second (3.2.2.2). This selection shall be operator changeable in 10 seconds.

3.2.1.3.6 Preamble. The DMD shall allow the operator to select a preamble which conforms with 3.2.1.5.2. This selection shall be operator changeable in 10 seconds.

3.2.1.3.7 Setting Advance Delay. The DMD shall allow the operator to select the advance delay time in accordance with 3.2.1.4.1.3. This selection shall be operator changeable in 10 seconds.

3.2.1.3.8 Setting Audible Signals. The DMD shall allow the operator to select the volume level of the audible signals for the keyboard feedback and message, ACK/NAK receipt. This selection shall be in accordance with 3.2.1.9.2 and each adjustment shall be operator changeable in 10 seconds.

3.2.1.4 Message Composition. The DMD shall enable the operator to compose and enter any message described in Appendix 1 utilizing the characters shown in Table 1. Any unused character positions shall be filled with the ASC II space character code.

3.2.1.4.1 Operator Prompting. The DMD shall prompt the operator through the composition of the message. During composition, it is not necessary to display the entire message; one field at a time is sufficient. It is desired that the operator be able to stop composing and view all data previously entered at any point in the composition sequence, then return to the same point and resume composition.

3.2.1.4.1.1 Illegal Entries Prevented. During composition all entries which are not legal entries (Appendix 1) shall be prevented automatically.

3.2.1.4.1.2 Character Storage. Once composition is initiated all characters entered in a composed message but not yet transmitted shall be stored in a way so that they are not disrupted or lost by reception of an incoming message.

3.2.1.4.1.3 Advance Delay. After the last entry in a field, the DMD shall display the last selection and pause before going on to the next field. This pause shall be variable, by operator adjustment, from zero to two seconds in 0.2 second increments.

3.2.1.4.1.4 Message Type in Summary. If a summary display, consisting of several message fields, is employed in the DMD, the DMD shall display the name of the message type simultaneously with the summary.

3.2.1.4.1.5 Character and Data Element Sequencing. Positioning of the next character or data element to be entered shall be automatically sequenced with the entry of each character or data element. The position of the next character or data element to be entered shall be positively

indicated to the operator and shall be changeable by the operator without destroying previously entered data.

3.2.1.4.1.6 Attitude. In the fixed format messages (Appendix 1) if either Radius/Length or Width is entered as NOT GIVEN the "ATTITUDE" field shall not be displayed, and the default value (Appendix 2) shall be entered for it.

3.2.1.4.1.7 Shift. Entry field SHIFT shall not be displayed as a single separate entry field. The SHIFT entry shall be determined by DMD prompting of the operator in combination with selections for RIGHT/LEFT, ADD/DROP and UP/DOWN, in that order.

3.2.1.4.1.8 Target Type Not Given. It is preferred that during the DMD display of target types a 17th field, NOT GIVEN, be displayed. Selection of Target Type NOT GIVEN shall cause the display to skip target subtype and shall cause transmission of a target subtype "NOT GIVEN" and target type "PERSONNEL".

3.2.1.4.2 Authentication of Messages. During Message Composition the DMD shall place in positions 3 and 4 in the message header (Figure 3), a two-character authentication code selected by the operator. These characters shall be changeable to any of the characters Ø - 9 and A - Z. They shall be changeable to any desired code in 10 seconds. The authentication characters shall be entered during the composition sequence, and shall be stored in memory until overwritten by operator entry of a new authentication code. The last authentication code entered in either fire mission sequence (3.2.1.4.3.2.1) shall be the authentication code displayed in the next composed or composition message display, regardless of any previously-entered or stored authentication codes.

3.2.1.4.3 Default Values. When a message format is called up, its fields shall have pre-entered default values. Some of these values are fixed (3.2.1.4.3.1) while others are dynamic (3.2.1.4.3.2). The DMD shall allow the operator to overwrite any of the default values during message composition.

3.2.1.4.3.1 Fixed. Fixed default values are shown in Appendix 2.

3.2.1.4.3.2 Dynamic. Dynamic default values shall depend upon previous entries by the operator or upon the contents of messages received by the DMD. The dynamic defaults and their source shall be as described in Figure 4 and Table 2 in conjunction with Appendix 2.

3.2.1.4.3.2.1 Two Fire Missions. The DMD shall store automatically two separate sets of retained entries, sufficient for two separate fire missions, and shall allow the operator to select either set to be active at any time. A fire mission consists of a fire request; subsequent adjustments EOM/Surveillance and a precision adjustment message pertaining to one target. The DMD shall give clear indication to the operator of which fire mission is active.

3.2.1.4.3.2.1.1 Active Fire Mission. The DMD shall allow the operator to switch from either one of the stored fire mission sequences to the other in 5 seconds.

3.2.1.4.3.2.1.2 Fire Mission Associated with Target Number. Each set of retained entries shall be associated with the Target Number of the Fire mission for that set. Character position 42 in the Message to Observer (MTO) (Appendix 1) shall indicate which set (1 or 2) the MTO is associated with. When a MTO is received the DMD shall associate the Target Number it contains with the appropriate set of retained Fire mission entries.

3.2.1.4.3.2.2 High Burst Mean Point of impact. Upon receipt of an HB/MPI message, information shall be transferred as indicated in TABLE 2.

3.2.1.4.3.2.3 LASER. Each time the GLLD rangefinder trigger is activated the 48 bit word in Figure 7 is passed through the GLLD interface to the DMD laser interface (3.2.1.14). The information shall be demodulated (3.2.2.3), stored and transferred in accordance with 3.2.1.4.3.2. if the condition of acceptance in Fig 7 are appropriate

3.2.1.4.4 Required Information. Until the operator has entered all information designated in Appendix 2 as required, as well as the Destination Address, the DMD shall prevent transmission of the message. When the operator attempts to transmit a message without all required entries, the DMD shall automatically sequence to the operational state where it is prepared for entry of the first element of missing required data, and indicate to the operator the entry that is required.

3.2.1.4.5 Review and Editing. Upon indication by the operator that message review is desired, the DMD shall display the composed message (3.2.1.2). The DMD shall prompt the operator through editing of any field in the message.

3.2.1.4.6 Composition Time. The DMD shall allow an unskilled operator to enter any message in less than 60 seconds. The DMD shall allow an unskilled operator to enter the REQUIRED data (Appendix 2) in a FIRE REQUEST MESSAGE (Appendix 1) in less than 20 seconds.

3.2.1.4.7 Correction. The DMD shall enable the operator to select and change any desired character. Changes to characters which already have been entered shall be accomplished by an overwrite procedure, without a separate erase action.

3.2.1.5 Message Transmission and Reception. The DMD shall provide all timing and control to include radio keying (3.1.4) necessary to transmit and receive a message in the format shown in Figure 3.

3.2.1.5.1 Composed Message Retention. The DMD shall retain in memory two composed messages and associate each composed message with the fire mission sequence which was active when the message was composed (3.2.1.4.3.2.1). Each composed message shall be retained in memory until composition of a new message has begun in the fire mission sequence with which the composed message is associated.

3.2.1.5.2 Preamble. The transmitted preamble shall be variable from 0.2 to 4 seconds (± .1 second) in 0.2 second increments, under operator control. The DMD shall accept incoming messages with any preamble equal to or greater than 0.1 seconds.

3.2.1.5.3 Synchronization. A four character synchronizing (sync) word shall immediately follow the keying block. The sync word shall consist of four 8 bit ASCII characters, 7 bits from Table 1 and 1 bit for odd parity. The first three characters shall be "SYN" (TABLE 1) characters. The fourth shall be a "SI" (TABLE 1) character. The sync characters shall not be subject to block formatting, (3.2.1.5.8), TDC (3.2.1.5.9) or EDC (3.2.1.5.7).

3.2.1.5.4 Transmission Number. Position number two of the message header shall be used to indicate whether or not the message is a retransmission. Display of a zero shall indicate to the DMD operator that the composed message has not been transmitted. After the message is transmitted, the DMD shall automatically display a 1 in that position. With each subsequent transmission the DMD shall automatically increment this position by 1. (Maximum value of this position shall be three). Transmission number transmitted shall be that which was displayed when the transmit control was activated. A third retransmission, or any change in the destination, origin, or the body of the message shall cause the transmission number to return to zero. A change of authentication code shall not affect the transmission number.

Although the transmission number is automatically sequenced, the operator shall be able to alter the transmission number (3.2.1.4.7).

3.2.1.5.5 End of Transmission (EOT) The EOT code shall be automatically inserted at the end of composed messages and ACK/NAK messages upon or before activation of the "Message Transmit" control. ~~Each composed message shall be three 16-character~~ blocks and each ACK/NAK message ~~shall~~ be one 16-character block. The last 4 characters in either a composed message or ACK/NAK message shall be 4 EOT characters. ASC II space characters shall be added as required to fill in all remaining unused spaces in a composed message. EOT characters shall be used to fill in all unused characters in an ACK/NAK message.

3.2.1.5.6 Transmission/Reception Correction The DMD shall provide: Error Detection and Correction, Single and Double Block Transmission, and Time Dispersed Coding of Messages. The DMD shall allow selection of a single or double block mode and a transmission/reception rate of 600 or 1200 bits per second.

3.2.1.5.7 Error Detection and Correction (EDC) For purposes of transmission and reception, characters shall be subjected to hamming coding to produce a 12-bit character. Each seven-bit character shall have five odd parity bits formed as follows:

P1 is odd parity on the 7 data bits.

P2 is odd parity on bits 1, 3, 5, 7.

P3 is odd parity on bits 2, 3, 6, 7

P4 is odd parity on bits 4, 5, 6, 7

P5 is odd parity on the 7 data bits and P1-P4.

The character produced is $b_1b_2b_3b_4b_5b_6b_7P_1P_2P_3P_4P_5$, where the b_1-b_7 are the ASCII code designators as shown in Table 1. Double bit errors in all messages shall be detected and indicated to the operator. Single bit errors shall be corrected. A diamond symbol shall be **displayed in the received message to indicate where a double bit error has occurred.**

3.2.1.5.8 Single and Double Block Transmission/Reception. Sixteen 12-bit characters shall constitute a block. Transmission/reception of all information in the messages other than the Preamble and Sync shall be on a block basis. In the double block mode, each block of data shall be transmitted twice, as shown in Figure 5. In receiving double block transmissions, the DMD shall examine the first block of the two block pair. If the first block is correct or correctable, the second block shall be ignored. If the first block is not correctable, the second block shall be used. If both blocks are in error, it shall be indicated to the operator (3.2.1.5.7). It is desired that the DMD be able to compare the two blocks position by position to allow retrieval of all characters which are not uncorrectable in both blocks.

3.2.1.5.9 Time Dispersed Coding (TDC). The block of 16 twelve bit characters shall be transmitted in the following sequence: Bit 1 (ASCII b_1) of characters 1 through 16, Bit 2 of all characters, Bit 3 of all characters, and so forth until Bit 12 (b_7) of all characters is transmitted, as shown in Figure 6. Incoming messages shall be subjected to the inverse process which restores the original bit sequence.

3.2.1.6 Message Receipt. The DMD shall receive messages as specified in Appendix 1. Received messages shall be placed in internal storage, and a received message indicator shall be displayed to the operator.

3.2.1.6.1 Queue. The DMD shall store two received messages in a first-in first-out queue. The queue shall not include a message being displayed.

3.2.1.6.1.1 Viewing. The DMD shall display the next message in the queue when the operator activates a control to bring the message out of storage. It is desired that the entire message with message type and all format field descriptors be displayed at one time. Sequential display of format field descriptors and field categories under operator control is allowed.

3.2.1.6.1.2 Storage Location. Once a message is brought out of storage to be displayed, a storage location in the received message queue shall be made available for a new incoming message.

3.2.1.6.1.3 Protection. If the DMD is storing two received messages (not including the one being displayed) no further messages shall be received by the DMD.

3.2.1.6.1.4 Non-Retention. Once a received message is called up by the operator for display it shall not be restored except for the provisions of 3.2.1.2.3.

3.2.1.6.1.5 Indicators. The DID received message indicators shall conform with 3.2.1.9.

3.2.1.7 Acknowledgements and Non-Acknowledgements.

3.2.1.7.1 Transmit. The DMD shall transmit an automatic ACK for received messages as illustrated in Table 4, except that an automatic ACK shall not be transmitted if the message contains uncorrectable errors. The transmission of the Auto ACK shall take place at 300 msec ±50 msec after receipt of the last character sent with a message without uncorrectable errors.

3.2.1.7.2 Receive. The DID shall receive, store and display one acknowledgement or non-acknowledgement as illustrated in Table 3. A received ACK or NAK shall be stored until cleared by operator action. The DMD shall allow a newly received ACK or NAK to overwrite one already in storage.

3.2.1.8 Storage.

3.2.1.8.1 Separate. The DMD shall have segments of storage which are separated logically, each of which is used only for storage of the information described here and illustrated in Figure 4.

a. Formats and Fixed Defaults (3.1.2, 3.2.1.4.3.1)

b. Composition (3.2.1.4)

c. Dynamic Defaults (3.2.1.4.3.2)

d. Received Message Queue (3.2.1.6.1)

e. Acknowledgements and Non-Acknowledgements (3.2.1.7)

3.2.1.8.2 Stability. Contents of storage locations identified in 3.2.1.8.1 shall be altered only under the conditions specified in the paragraphs listed in 3.2.1.8.1.

3.2.1.8.2.1 Loss of Power. During loss of power, all storage and initialization values (3.2.1.3) shall be saved for at least two minutes.

3.2.1.8.3 Transfer. Information shall be transferred to and from the locations identified in 3.2.1.8.1 as specified in Table 2.

3.2.1.9 Operator Signals.

3.2.1.9.1 Visual. The DMD shall have visual signals for received messages, acknowledgement and non-acknowledgement. Legibility shall conform with 3.2.1.11.

3.2.1.9.1.1 Received Message. The DMD shall have two received message indications, one indication for each position in the received message queue (3.2.1.6.1). The received message indicators shall not be blocked by anylid or operational carrying configuration. Each received message indication shall be lit when a received message is stored in the corresponding position in the received message queue, and shall be extinguished when there is no message being stored in its corresponding position in the received message queue. Each received message indication shall indicate whether the received message stored in its corresponding position in the received message queue is or is not an FO Command Message (FORMAT 21, Appendix 1). The received message indication lamps shall remain lit when the display brightness control (3.2.1.2.4) is turned fully counter-clockwise.

3.2.1.9.1.2 Acknowledgement Indicator. The DMD shall have an indication for received acknowledgements (3.2.1.7). The indication shall light when an acknowledgement is received, and shall be extinguished in the following manner.

a. Operator activiation of received Ack display. If Ack is displayed automatically, visual indicator shall not be extinguished at that time.

b. Operator activiation of or control which does not affect display.

3.2.1.9.1.3 Non-Acknowledgement Indicator. The DMD shall have an indication for received non-Acknowledgements (3.2.1.7). The indication shall light when a non-Acknowledgement is received, and shall be extinguishable by operator action.

a. Operator activiation of received NAK display. If NAK is displayed automatically, visual indicator shall not be extinguished at that time.

b. Operator activiation of control which does not affect display.

3.2.1.9.2 Audible. The DMD shall have audible signals which are independently adjustable incrementally in seven (7) steps from full-off to full-on. At full-on, the sound level of the signal two feetfrom the DMD shall be at least 80 dB, and in accordance with para. 5.3.3.1.1 of MIL-STD 1472.

3.2.1.9.2.1 Message and Ack/Nak. There shall be an audible signal to indicate the receipt of a message (3.2.1.5) or an acknowledgement or non-acknowledgement (3.2.1.7). The audible signal used to indicate the receipt of an FO Command Message (Format 21, Appendix 1) shall sound different and be readily distinguishable from the signal indicating receipt of another message, acknowledgement, or non-acknowledgement, as well as from the keyboard feedback signal.

2. Operator activation of received message or Ack/NAK display. If Ack/NAK is displayed automatically, audible signal shall not be turned off at that time.

b. Operator activiation of control which does not affect display.

3.2.1.9.2.2 Keyboard. The DMD shall have an audible keyboard feedback signal.

3.2.1.1Ø Controls.

3.2.1.1Ø.1 Hardware.

3.2.1.1Ø.1.1 Rotary. The DMD shall have the following rotary controls which shall be continously adjustable from detent off to full brightness and shall stop at both ends of a single revolution.

a. One control (3.2.1.2.4) for the display and operator signals.

b. One control for night illumination and keyboard illumination (3.2.1.1.2).

3.2.1.1Ø.1.2 Switch. The DMD shall have a switch (3.2.2.1) which provides for selection of either "off", "internal power", or "external power".

3.2.1.1Ø.2 Software. It is desired that the DMD have as many functions as possible under software control.

3.2.1.1Ø.2.1 Initialization Default Values. Software controls (3.2.1.3) shall be initialized to the default values in Table 5 when memory is cleared (3.2.1.15).

3.2.1.11 Legibility. The DMD keyboard, operator signals and display shall be legible from a distance of 24 inches in an ambient light intensity from 10^3 ft candles to 10^4 ft candles incident on the surfaces.

3.2.1.11.1 Display and Keyboard. The DMD display and keyboard shall be legible from all directions at an angle of at least 20° from a line normal to the surface and in the center of the display and keyboard.

3.2.1.11.2 Operator Signals. The DMD operator signals shall be legible in all directions at an angle of at least 45° from a line normal to each operator signal.

3.2.1.12 Operator Tests. The DMD shall have operator controls to initiate tests of indicators and display.

3.2.1.12.1 Visual.

3.2.1.12.1.1 Display. Each light-emitting element of the display shall be activated, either simultaneously or sequentially, when the corresponding control is operated.

3.2.1.12.1.2 Visual Indicators. Each visual indicator shall be activated, either simultaneously or sequentially, when the corresponding control is activated (3.2.1.9.1).

3.2.1.12.2 Audible. Each audible signal shall be activated sequentially when the corresponding control is operated.

3.2.1.12.3 Operability. The DMD shall perform a complete test of the operability of all circuits and components upon activation by the operator, and shall give a clear "Go-NO GO" indication to the operator. This test

may be integrated with the BITE (3.2.5.2.2), but shall not require more than a single operator action to complete the test.

3.2.1.13 Operation Without Connector Caps. The DMD shall be fully operable without the presence of any connector caps, dust covers, or shorting caps.

3.2.1.14 Laser Interface. The DMD shall have a laser interface. Forty-eight bits of coded information--which includes direction, slant distance and vertical angle--shall be received by the DMD each time the laser is triggered. The DMD shall demodulate (3.2.2.3) and decode the laser information and store it in accordance with 3.2.1.4.3.2.3. Upon receipt of an FO COMMAND message (FORMAT 21, Appendix 1) with DESIGNATE coded in character position 8, the DMD shall send the Designate Command pulse to the GLLD in accordance with Figure 7.

3.2.1.15 Memory Clear. The DMD shall clear memory within two seconds on activation by the operator. If software control is employed, the total time to display the control, operate it, and have memory cleared is included in the two second limit. The control shall be protected against accidential activation.

3.2.2 Electrical Characteristics.

3.2.2.1 Power. The DMD shall be capable of accepting power from either internal batteries or 20-32 volt DC vehicular external power, in accordance with MIL-STD-1275. A switch shall be provided for selection of either "off", "internal power", or "external power", If the DMD has a cover, it shall include a power interlock to turn off power to only the display whenever the cover is closed. It shall be possible to charge an internal battery when rechargeable batteries are installed while the DMD is operating on external power. The DMD shall operate from external power without the presence of an internal battery. The DMD shall have a small internal running time meter, with no moving parts. It shall be connected to register time whenever the DMD is turned on.

3.2.2.1.1 Converter. Any converter necessary to allow the DMD to operate from external power, to include any required filtering may be built into the DMD power cable (3.1.4.1.1).

3.2.2.1.2 Batteries. The DMD shall operate from internal primary and/or secondary batteries. These batteries should be standard military batteries. They shall be available in the military inventory or off the shelf from commercial sources. They shall be operator replaceable within 2 minutes without tools. They shall be capable of operating within the environmental conditions specified in 3.2.6, with the exception that batteries may be removed and used externally at temperatures below 0°F. If external batteries are to be used, the specific temperature below which those external batteries are required to meet battery life requirements shall be identified.

3.2.2.1.2.1 Level Indicator. The DMD shall provide a battery level indicator which gives an easily identifiable and reliable indication of the remaining capacity of the battery. If remaining battery capacity is below the level required for the proper operation of the DMD, the indicator shall indicate that replacement is required.

3.2.2.1.3 Battery Utilization. Batteries within the DMD shall enable it to compose, review, edit and transmit, or receive and display at least a total of 72 messages in a 24-hour period at an ambient temperature from 0°F to 160°F without battery replacement. The ratio of transmitted to received messages shall be 2:1; i.e., of 72 messages, 48 shall be composed and transmitted and 24 received.

Half of the messages so handled shall be in darkness without other lighting while the other half shall be in 2000 foot candle ambient illumination. It is desired that 200 messages be transmitted and 100 messages received in 24 hrs. without battery replacement. For battery life computation and testing combined compose, review, edit, and transmit time shall be 120 seconds. Overall viewing time for received messages will be 30 seconds for display of the entire message at once. The DMD shall be in a mode capable of receiving a message for the entire 24 hour period.

3.2.2.2 Electrical Interface. The format for message transmission and reception shall be as shown in Figure 3. Characters (prior to EDC) shall be in ASCII code. The EDC, TDC and Block Transmission shall be performed automatically once the operator has initiated transmission. Messages shall be transmitted and received serially at selectable data rate of 600 or 1200 bits per second + 0.1%. The DMD shall convert data to and from continous phase frequency shift keying (FSK) signals.

a. Logical ONES: 1200 Hertz ± 0.1%

b. Logical ZEROES: 2400 Hertz ± 0.1%

3.2.2.2.1 Output. Those signals supplied to an associated communications device shall have the following characteristics:

a. Radio/Security equipment: 5.0 millivolts ± 1mv RMS into 150 Ohms (FOR FM)
~~20~~ millivolts ± 10% RMS into ~~600~~ 50 Ohms (FOR AM)
Pin J signal
Pin H ground

b. Wire: 0 ± 1 dBm into 600 Ohms

3.2.2.2.2 Input. The input levels shall be between the following levels and shall include the end points: - 40 dBm to 0 dBm. The DC resistance accross the wire input shall be 100K Ohms or greater.

3.2.2.3 Laser Interface. The DMD shall receive a 48 bit word in the format shown in figure 7, using pulse width modulation (PWM). The DMD input levels from the laser shall be as shown in figure 7.

3.2.3 Physical Characteristics.

3.2.3.1 Size. Height, width, and depth shall be less than 12" with cover, if any, closed. The product of the maximum length times the maximum width times the maximum depth shall be less than 300 cubic inches.

3.2.3.2 Weight. The DMD shall weigh less than 10 lbs. with cover, if any. This includes battery weight, but not associated cables.

3.2.3.3 Battery Compartment. The DMD shall contain a separate internal battery compartment which is sealed from electronic components to insure against damage from battery leakage. The battery compartment shall have an exhaust pressure valve to release automatically any buildup of gas within the compartment which exceeds the outside pressure by over ~~2~~ 0.5 psi. A means to equalize manually compartment pressure with outside pressure shall be provided. The battery compartment shall meet Requirement 27 of MIL-STD-454.

3.2.3.4 Strain Relief. The DMD shall have mechanical strain relief for the wire-line connection.

3.2.3.5 Mounting. The DMD shall have connections which allow it to be strapped easily to a backpack or strapped in conjunction with the AN/PRC-77 or AN/PRC-25, at the option of the operator. Mounting shall allow operation.

3.2.4 Reliability. The DMD shall have a specified mean-activations-between-failure of 21,000 activations when tested in accordance with paragraph 4.2.

3.2.5 Maintainability. The equipment shall be designed to facilitate maintenance actions. AMCP-706-134 shall be used as the maintainability design guide for the DMD.

3.2.5.1 Operator-Organizational Level Maintenance. Operator Maintenance shall be limited to inspection, time compliant replacement of batteries, normal servicing, and cleaning. Failed DMDs shall be replaced and removed for corrective maintenance.

3.2.5.1.1 Adjustments. Electronic design shall be such that no maintenance adjustments are required during the normal operation of the equipment.

3.2.5.1.2 Direct Level Maintenance. Scheduled maintenance requiring taking the equipment off-line shall not exceed 15 minutes in 24 hours.

3.2.5.2 Direct Level Maintenance.

3.2.5.2.1 Mean-Time-To-Repair. The mean-time-to-repair (MTTR) shall be less than 20 minutes. Maintenance shall consist of fault detection, isolation and replacement of the Least Replaceable Unit (LRU)(a circuit card or equivalent sub-assembly).

3.2.5.2.2 Built-In-Test-Equipment (BITE). The DMD shall contain built-in diagnostic and indicator circuitry for fault detection and isolation down to the LRU. This requirement shall be implemented in the DMD by provision of external test controls and indicators readily accessible to and readable by the user personnel. No external maintenance equipment shall be

required to detect and isolate faults to the LRU level.

3.2.5.2.3 LRU Adjustment. The equipment shall be designed so that no maintenance adjustments are required after installation of a serviceable LRU as a replacement for a failed LRU.

3.2.5.2.4 Higher Level Maintenance. For repairs which cannot be accomplished at the direct level maintenance, LRU's will be evacuated to higher level.

3.2.5.3 Service and Access. Structural members of the equipment or chassis shall not prevent access to components that require servicing.

3.2.5.4 Tools. Maintenance of the DMD shall be accomplished using existing standard Army tools to the maximum extent possible. Special tools, if required and approved by the procuring agency, shall be designed to withstand the intended use throughout the life of the equipment. All tools required for maintenance action shall be listed and identified. No tools shall be required to extract cards.

3.2.5.5 Test Provisions. Test provisions shall be to full extent of MIL-STD-415D. This includes Class A, B, C, and D test provisions and automatic checkout, built in test, and test point requirements as defined in MIL-STD-415D.

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3.2.6 Environmental Conditions.

The DMD, including its integral battery, shall withstand the following environmental conditions and combinations of field service conditions thereof without degradation of performance specified in paragraph 3 and its sub-paragraphs, and paragraphs cited below. The DMD shall be constructed so that no part shall be loosened, cracked, flaked, pitted, or blistered during or as a result of an environmental test specified in paragraph 4.2.

3.2.6.1 Temperature.

3.2.6.1.1 High Temperature. The DMD shall operate at external ambient operating temperatures as high as 71°C (160°F). The DMD shall be operated by its internal battery without any degradation in specified performance and in accordance with paragraph 3.2.2.1.3, at temperatures as high as 63°C (145°F). The equipment shall perform without any degradation when tested in accordance with paragraph 4.2. The DMD shall withstand prolonged storage at temperatures of up to 68°C (155°F) without any deteriorative effects on the equipment's capability to function over the specified range of operating temperatures.

3.2.6.1.2 Low Temperature. The DMD shall operate at ambient temperatures as low as -40°C (-40°F). This operation does not require internal battery utilization; internal battery utilization in conjunction with the operation of the DMD is required at temperatures as low as 0°F. The DMD shall operate from external battery between the lower temperature limit of internal battery operation (3.2.2.1.2) and -40°C in accordance with 3.2.2.1.3. The DMD shall withstand prolonged storage at temperatures as low as -62°C (-80°F) without any deteriorative effects on the equipment's capability to function over the specified range of operating temperatures.

3.2.6.2 Humidity. The DMD shall operate and shall exhibit no physical damage, such as corrosion, rust, blistering, swalling or deterioration of parts and materials, when tested in accordance with paragraph 4.2.

3.2.6.3 Dust. The DMD shall exhibit no evidence of dust accumulation within enclosed portions of the equipment, damage or inoperation due to dust when tested in accordance with paragraph 4.2.

3.2.6.4 Rain. The DMD shall exhibit no evidence of water penetration when tested in accordance with paragraph 4.2.

3.2.6.5 Altitude. The DMD shall be subjected to the altitude of 50,000 ft. (above sea level), nonoperating, and 10,000 ft. (above sea level), operating, when tested in accordance with paragraph 4.2.

3.2.6.6 Vibration. The DMD shall withstand vibration induced during field transport by military ground vehicles, rotary and fixed wing aircraft, and watercraft. The DMD shall exhibit no mechanical damage when tested in accordance with paragraph 4.2.

3.2.6.7 Bounce, Loose Cargo. The DMD shall withstand bouncing induced during field transport. The DMD shall show no evidence of breakage or loosening of parts or damage to its case when tested in accordance with paragraph 4.2.

3.2.6.8 Shock, Transit Drop. The DMD shall withstand shock induced by field loading or unloading. The DMD shall show no evidence of breakage or loosening of parts or damage to its case when tested in accordance with paragraph 4.2.

3.2.6.9 Shock, Bench Handling. The DMD shall withstand the shocks encountered during servicing. The DMD shall exhibit no damage when tested in accordance with paragraph 4.2.

3.2.6.10 Salt Fog. The DMD shall be resistant to the corrosive effects of salt-sea atmosphere. After the salt fog test of paragraph 4.2. , the DMD, when examined visually with the aid of a 10-power magnifier, shall show no evidence of degradation, such as flaking, pitting, blistering or loosening of finish or metal surface. There shall be no clogging or binding of controls or other moving parts following the test of paragraph 4.2.

3.2.6.11 Fungus. The equipment, in the assembled and ready for delivery condition, shall provide no nutrients in material coating or contaminate form, to support fungal growth when tested in accordance with paragraph 4.2. Only inherently fungus resistant grades of materials per Requirement 4, MIL-STD-454 shall be used. Prior to delivery, all fungus nutrient contaminants or residues shall be removed. After the fungus test of 4.2 , the equipment shall be visually examined, using a 10-power magnifier. The equipment shall show no more than six minute unrelated spots, each no greater than 0.15 square inch in area, of sparse microbial growth (see 6.2) as evidenced by growth colonization (see 6.2)(which includes branching (see 6.2) and sporulation (see 6.2) on or within each cubic foot, or fraction thereof, of equipment assembly volume. Isolated instances of partial tubular germination (see 6.2) shall not be included in this evaluation.

3.2.6.12 Explosive Atmosphere. The DMD shall not ignite the explosive atmosphere, when tested in accordance with paragraph 4.2.

3.2.6.13 Immersion. The DMD shall be immersion proof to a covering depth of 3 feet of water for a period of not less than 2 hours. The DMD shall exhibit no evidence of water leakage when tested in accordance with paragraph 4.2.

3.2.6.14 Orientation. The DMD shall operate in orientations up to a 90° rotation about any axis from the normal operating configurations when tested in accordance with paragraph 4.2.

3.2.6.15 Icing. The DMD shall withstand surface deposits of ice in the form of glaze, rime, and hoarfrost continually for a twenty-four hour period without damage to the equipment.

3.2.6.16 Snow. The DMD shall operate under the conditions of blowing snow with crystal size ranging from 0.02 to 0.9 mm diameter (with median of 0.5 mm for temperatures above 14°F and median of 0.1 mm for temperatures below +14°F) blown with wind speeds of up to 10 knots.

3.2.6.17 Temperature Shock. The DMD shall operate following the test performed in accordance with paragraph 4.2.

3.2.6.18 Sunshine. The DMD shall operate when tested in accordance with requirements of paragraph 4.2.

3.2.6.19 Chemical, Biological, (CB). The DMD shall sustain no permanent damage or performance degradation after exposure to the following condition:

Chemical and Biological Agents. Agents as described by FM3-10 and classified supplement FM3-10B.

3.2.6.19.1 Decontamination. The DMD equipment shall be fully operationable after the following decontamination proceedures:

Chemical and Biological Agents. In accordance with the provisions specified by TM 3-220.

3.2.7 Useful life. The expected useful life of the DMD shall be 10 years.

3.3. Design and Construction

3.3.1 Parts, materials and processes. Electronic components, parts, devices, materials, techniques and technologies, including micro-electronics, shall conform to MIL-P-11268.

3.3.1.1 Solid state components. Maximum use shall be made of LSI/MOS techniques to reduce size, weight and power consumption of the equipment.

3.3.1.2 Finish. The equipment shall be finished in accordance with MIL-F-14072. The final paint film on type 1 surfaces shall be semigloss enamel, Color Nr. X24087 of FED-STD-595.

3.3.1.3 Switches. Quietness of operation shall be a prime consideration in the selection of switches.

3.3.1.4 Receptacle caps. Receptacle caps shall be provided. Quietness in use shall be a prime factor in the selection.

3.3.1.5 Fastener hardware. The selection of fastener shall be in accordance with Requirement 12, Fastener Hardware of MIL-STD-454.

3.3.1.6 Corrosion of metal parts. Dissimilar metals shall be selected to minimize corrosion behavior factors in accordance with Requirement 16, Dissimilar Metals, of MIL-STD-454.

3.3.2 Electromagnetic Compatibility. There shall not be any malfunction or undesired response of the DMD components or the GFE equipment to be interfaced with the DMD due to electromagnetic interference generated, induced, or emitted by the subject equipments.

3.3.2.1 Electromagnetic Interference. The DMD, associated cables, and power adapters, shall be designed for compliance with the following emission and susceptibility requirements of MIL-STD-461A, Notice 4:

CE01	CS01	RE02	RS03
CE03	CS02	RE02.1	RS03.1
CE04	CS06		
CE05			

3.3.2.2 Bonds and grounds. Surface preparation for bonds, grounds, EMI gaskets and panel mounted components shall be accomplished by removing all anodic film, grease, paint, lacquer or other high resistance properties from the immediate areas of contact. The DC resistance of bonds and grounds shall not exceed 2.5 milliohms. On completion of the bonding assembly or installation of panel mounted components and ascertainment of the required bonding impedance, the equipment finish shall be restored to its original condition in accordance with MIL-F-14072.

3.3.2.3 Cables and Connectors. Coaxial cables as required shall be of the double shielded type. Other interconnecting cables requiring an overall shield shall have a minimum of ninety per cent (90%) coverage. The shield shall be constructed of braided tinned copper wire. All shielded cables shall be terminated in approved military connectors provided with an EMI back shell for bonding of the cable shield. The use of the shielded cables shall be kept to a minimum by the use of alternative suppression techniques such as connector pin filters. Panel mounted connectors shall be bonded to the mounting panel in accordance with 3.3.2.2.

3.3.2.4 Tempest. The DMD shall meet the TEMPEST requirements of EL-SS-2604-TF.

3.3.3 Marking. Marking shall conform to MIL-M-13231. Wherever practicable, parts, sub-assemblies and assemblies shall be so mounted that their identification markings will be readily visible with minimum disassembly of the unit.

3.3.4 Workmanship. The minimum acceptable standards of workmanship for the equipment shall be in accordance with Requirement 9, MIL-STD-454 and applicable portions of MIL-P-11268, MIL-STD-252, and MIL-E-4158D.

3.3.5 Interchangeability. Interchangeability shall be in accordance with MIL-STD-454, Requirement 7, Interchangeability.

3.3.6 Safety. Design criteria shall be in accordance with MIL-STD-454, Requirement 1; and MIL-STD-1472, paragraph 5.13 and shall include but not limited to the following:

3.3.6.1 Personnel Safety. The system shall minimize the possibility of injury to operational, installation, and maintenance personnel.

3.3.6.1.1 Mechanical Safety. Provisions shall include paragraph 8, MIL-STD-454, Requirement 1 and the following:

a. Finished item(s) shall bear no raw, sharp, rough metal edges, or sharp corners or protrusions on the DMD.

b. Adequate lifting and carrying provisions (MIL-STD-1472, paragraph 5.9. 11.3).

c. Adequate safeguards to prevent inadvertent entrapment of body parts and clothing.

3.3.6.1.2 Electrical Safety. Provisions shall include paragraph 5 of MIL-STD-454, Requirement 1.

3.3.6.2 Equipment Safety.- The system shall minimize the possibility of equipment damage, degradation of efficiency or mission failure due to the following conditions:

a. Operator induced errors.

b. Improper cabling.

c. Power failure or electrical overstress on components.

d. Secondary failures.

e. Installation, storage, operation handling, maintenance and transportation.

f. Overload protection, Requirement 8, MIL-STD-454.

g. Contacts used on chassis, panels or cable entrance connectors shall be recessed to prevent breakage or damage. Socket connectors shall be used on electrically hot contacts such as power sources.

3.3.6.3 Environmental Safety.

3.3.6.3.1 Hazardous Environments. The equipment shall preclude ignition or explosion when operated in a Class I (gases or vapors) or Class II (combustible dusts) hazardous atmospheres of National Electric Codes (NFPA 70-1971).

3.3.6.3.2 Radioactive Materials. Radioactive materials shall be per the following:

a. Usage shall abide by Atomic Energy Commission regulations and shall require approval of the procuring activity. Radium shall not be used to achieve self-luminosity.

b. Marking or labeling of commodities containing intentionally added radioactive materials shall conform to MIL-M-19590. Packages and containers shall be marked in accordance with MIL-STD-129 and DOT regulations.

3.3.7 Human Engineering. Human engineering shall be conducted in accordance with MIL-H-46855, and shall include identification and analysis of impacts on human engineering factors associated with any design changes to the equipment. The specific design of the equipment shall be guided by the human engineering criteria and principles cited in MIL-STD-1472. These criteria shall be applied to the equipment design to assure that optimum performance of man-machine system, consistent with other requirements is realized. Maximum effort shall be directed toward reduction of human operational error. In particular, the design criteria cited in MIL-STD-1472 relating to visual and auditory displays, controls, labeling, man-transportability, maintainability and safety, shall be utilized except for conflicts with specific provisions of this specification. In addition, the design shall conform to the following:

3.3.7.1 Mnemonics. The operator shall not have to remember mnemonics or codes for the purpose of composing or reading messages.

3.3.7.2 Display Fields. Fields of data display shall be separated distinctly by spacing, heavy lines, shading or other system. All portions of the display shall be visible under the lighting conditions specified in 3.2.1.1.2. Luminance (brightness) of display shall be compatible with the expected ambient illuminance level, and shall be 10% greater than the surrounding luminance.

3.3.7.3 Entering Data. The means of entering data shall not require a high

degree of dexterity. The operator's hand shall not need to move from one area to another during message composition. Operation shall be equally easy for right or left-handed operators.

3.3.7.4 Numbers. Numbers entered shall be complete. For example, 470 meters shall be entered as 0470 rather than as 470 when entered in a four digit field. (used to tell box when to go to next field)

3.3.7.5 Configuration. Accessibility and configuration shall be such that the equipment can easily be operated and maintained by US Army personnel whose body dimensions fall within the 5th and 95th percentiles as defined in MIL-STD-1472.

3.3.7.6 Labeling. Equipment labeling shall conform to the requirements of MIL-STD-1472.

3.3.7.7 Malfunction. Equipment malfunction detection and equipment removal replacement and repair capability shall conform to the requirements of MIL-STD-1472. Controls and indicators for operation or maintenance functions shall conform to the requirements of MIL-STD-1472.

3.4 Documentation. Documentation requirements for the DMD are specified in the contract.

3.5 Logistics. Logistic requirements, such as spare parts list, provisioning, tools and test equipment, etc. shall be provided as specified in the contract and as specified in 3.4.

3.6 Training. Personnel training requirements shall be as specified in the contract.

4. QUALITY ASSURANCE PROVISIONS

4.1 General.

This section contains the requirements for verification of Configuration Item (CI) performance. The CI shall conform to all the requirements of this specification. Formal qualification acceptance criteria (Section 3) is applicable to all DMD models.

4.1.1 Responsibility for Verification

Unless otherwise specified in the contract or purchase order, the supplier shall be responsible for the performance of all verification requirements, Section 3.0, as specified herein. Except as otherwise specified, the supplier will utilize his own facilities or any other facility acceptable to the Government. Government personnel shall witness Formal Qualification Tests and verify total compliance of requirements specified herein. The Government reserves the right to perform any of the verifications set forth in the specifications, where such verifications are deemed necessary to ensure that supplies and services conform to prescribed requirements. The Government reserves the right to attend and observe any verifications at the contractors location of performance of the verification or of any lower tier supplier. The Verification methods are Inspection, Analysis, Demonstration, and Test.

4.1.2 Classification of Verification

Verifications shall be classified as follows:

a. Engineering test and evaluation

b. Preliminary qualification

c. Formal qualification

4.1.2.1 Engineering Test and Evaluation. The supplier shall conduct those tests and evaluations which are an essential part of the development process of software, breadboard/brassboard, subassemblies up to CI level in order to assure that critical items of the design satisfy the detailed requirements. The data acquired may be used in certain instances to augment or satisfy some of the quality conformance verifications of 4.2 that require analysis for verification.

4.1.2.2 Preliminary Qualification. Unless otherwise specified by the contract, or order, preliminary qualification verification is oriented toward verifying proper performance of the assemblied CI prior to formal qualifications. These verifications shall be conducted in accordance with a Government approved test plan and procedure.

4.1.2.3 Formal Qualification. The supplier shall conduct formal qualification verifications in accordance with the provisions specified herein. These verifications shall demonstrate compliance with all of the characteristics stipulated in this specification, and shall be conducted in accordance with a Government approved test plan and procedure. The Government plans to witness these verifications formally. Starting with the first equipment to be subjected to FQT and ending with the completion of FQT and final acceptance of the equipment by the Government, operation time of each CI under test shall be recorded along with the failures and time between failures over the entire battery of tests.

4.1.3 Test Conditions

Unless otherwise specified, verifications shall be performed under the following conditions.

4.1.3.1 Atmospheric Conditions. Except for those tests of the CI which are to be performed under the environmental extremes specified herein, all tests shall be performed at an atmospheric pressure within the range of 24 to 31 inches of mercury, a temperature of between +16 degrees and +32 degrees C (+60 degrees and +90 degrees F) and a relative humidity of not more than 80 percent. Actual atmospheric conditions shall be recorded during all tests and included in reports of test results.

4.1.3.2 Tolerances of Test Conditions. Unless otherwise specified, the maximum allowable tolerances of test conditions shall be as specified in the appropriate test documentation referenced herein.

4.1.3.3 Accuracy of Test Equipment. The accuracy of instruments and test equipment used to control or monitor the test parameters shall be such that all tests can be performed with an accuracy of at least two times better than the tolerance of the variable to be measured.

4.1.3.4 Input Power. Input power provided during operational tests shall be 20VDC to 32VDC meeting the requirements under all environmental conditions.

4.1.3.5 Adjustments During Tests. Changes to the CI shall not be permitted during qualification tests. Adjustments during tests shall be considered as failures.

4.1.3.6 Disassembly after Tests. Where considered necessary components of the CI shall be disassembled after qualification testing is completed and inspected to determine margins of safety and potential failure modes.

4.1.3.7 Test Plans & Reports

4.1.3.7.1 Test Plans

All test plans and test procedures as described herein and the contract shall identify the procedures used to perform the tests required by 4.2.
The test plans and procedures shall be submitted for approval (in accordance with CDRL schedules) by the Contracting Officer's Representative (COR).

The test plans shall contain as a minimum, but not be limited to the following:

a. Time schedule sequence of tests.
b. Procedures for all tests necessary to demonstrate compliance with this specification, the referenced specifications, and their subsidiary specifications.
c. Measurement values, together with permissible tolerances.
d. Block diagram of test set up.
e. Identification of test instruments.
f. Personnel - Type, Quantity & TASK Performed.
g. Identification of Facilities, Type & Location.

4.1.3.7.2 Test Reports

The contractor shall submit a test report after completion of each specified acceptance test or groups of major tests, such as the initial Engineering Test and Evaluation, performance tests (initial (PQT) & Final (FQT)) EMI, Tempest, environmental, reliability, maintainability). The reports shall be designed to be stand-alone reports (sequential volumes) which can be combined with a Summary Report reflecting all retesting without rework of the basic stand-alone volumes.

A final report complete in detail shall cover all inspections, analysis demonstrations, tests with correlation to CI specification requirements whether conducted at the contractor's facilities or elsewhere. The reports shall contain all test procedures, test results, observations, calculations and all essential details of the testing equipment (manufacturer's model, serial number, date of calibration, etc.).

The reports shall indicate that the equipment (CI) complies with each individual electrical, mechanical, or other specification requirements. The compliance shall be expressed in the report by the use of the same terms as those used in the specification to express the requirement. If at any time after testing begins, but prior to completion of all specified tests of the CI, the CI is modified in any manner, to correct any fault; the CI shall be retested at any or all levels at the Government's option, unless a waiver is submitted and approved by the Government. The diagnosis of the fault and the corrective modifications and date shall be documented in this report.

A complete record of tests performed on the CI shall be made, including test conditions, results (operating time, failures, and time between failures of each CI), and a summarization, all which shall be provided upon submission of the CI tested. All test results shall be maintained for a period of not less than three years.

4.1.3.7.3 Rejection and Retest. Noncompliance with the requirements of any test shall be cause for rejection. Adjustments during tests shall also be cause for rejection. The cause of any failure shall be determined prior to retest. Upon evaluation of the cause of failure and correction of

the failure, the test shall be repeated in which the failure occurred. If the Government determines that the failure has an impact on prior tests, then the prior tests must be repeated.

4.1.3.7.4 Test Sequence. The contractor shall conduct all necessary tests specified herein on the CI's within the specified time frame to ensure that all deliverable CI's are fully qualified. The suggested allocation of CI's by test shall be reviewed and addressed by the contractor. Contractor shall submit in response to the RFP, any alternate allocations of CI's by test which will improve the overall delivery schedule and/or test schedule, and reduce the Government's cost in development of the CI's. Contractor's alternative allocation and/or test sequence shall be submitted for Government approval. The Government suggested minimum allocation of CI's by test is as follows:

a. Performance & Functional Demonstration & Test - two (2) CI's.

b. DMD TACFIRE Systems Integration Test - one (1) CI.

c. MEE and Maintainability Demonstration - one (1) CI.

d. EMI and TEMPEST - one (1) CI.

e. Environmental Tests - three (3) CI's. The test sequence on page 48 Table 7, shall be used for the limited sample size.

f. Reliability Test - four (4) CI's.

The remaining CI's shall undergo sufficient performance and functional tests to demonstrate compliance with all the requirements specified herein. The Contractors Test Plan of what constitutes the above remaining tests and compliance of same shall be submitted to the Government for approval.

TEST SEQUENCE FOR SUBMITTED SAMPLE SIZE

UNITS AVAILABLE

3			2	
Unit 1	Unit 2	Unit 3	Unit 1	Unit 2
Altitude Low Temperature High Temperature Rain Sunshine Freezing Rain Temperature Shock	Orientation Explosion CB (3)	Immersion (2) Sand & Dust	Altitude Low Temperature High Temperature Rain Sunshine Freezing Rain Temperature Shock	Immersion (2) Sand & Dust Orientation Explosion CB (3)
Humidity	Salt fog	Vibration Shock Fungus Bounce, Loose Cargo	Humidity Salt fog	Vibration Shock Fungus Pounce, Loose Cargo

NOTE: (1) The tests above the broken line are considered non-damaging. The order of these tests and choice of units to use may be varied if convenient.
(2) The immersion test shall be performed prior to and following shock testing of the same test item.
(3) Following CB and salt fog testing, the test item shall be thoroughly washed, cleaned, dried and refurbished, if necessary, before proceeding with the subsequent tests.

TABLE 7

4.2 Quality Conformance Verifications

Formal verification of the requirements presented in this specification shall be as indicated in the following paragraphs by Inspection, Analysis, Demonstration, and Test. Table 8 correlates the requirements and the method of verification.

The multiple entries per paragraph indicate more than one type of verification will be required by the contractor in the respective Test Methods time frame; to ensure the quality of the finished product, as well as, to allow for early alerting to the Government of deviation from the CI specification requirements.

This does not relieve the contractor of his responsibility for performing any additional verifications which are necessary to control the quality of the product and to assure compliance with all specification requirements.

The initial delivered CI's shall have the same physical and functional characteristics; including finish, and shall be subject to the same quality assurance control as the final units delivered. All CI's shall contain the same level of modifications. All formal tests performed with the respective CI's shall be conducted with their respective sets of deliverable cables.

The following subparagraphs specify the methods for formally verifying that all requirements set forth herein have been met. Verification shall be established by:

a. Inspection. The contractor shall show through visual means, physical manipulation, gauging, or measurement that the requirements have been met.

b. Analysis. The contractor shall show through review of applicable and adequate documentation that the requirements have been met. Verification shall be by mathematical analysis, statistical analysis (sampling), the correlation of measured data and observed test results with calculated expected values, and conformance of end items with contractor generated specifications and documentation to lower tier supplier, as well as, government approved CI specifications and documentation.

c. Demonstration. The contractor shall show through actual exercises of equipment that the requirements have been met.

d. Tests. The contractor shall show through functional and electrical, mechanical, and environmental tests, including the collection and analysis of data, that the requirements have been met.

The test methods shall form the basis for the preparation of test plans and procedures as required by the contract or order.

(PAGES 51 & 52 NOT USED)

Verification Method:

NA - Not Applicable
I - Inspection
A - Analysis
D - Demonstration
T - Test

Test Types:

1 - Engineering Test & Evaluation
2 - Preliminary Qualification
3 - Formal Qualification

Requirement			Verification Method					Test			
								Type			Page
Page	Paragraph	Title	NA	I	A	D	T	1	2	3	
5	3.	REQUIREMENTS	NA								65
5	3.1	ITEM DEFINITION	NA								65
5	3.1.1	Employment				D				3	65
5	3.1.2	Formats				D			2	3	65
5	3.1.3	Operational Constraints				D			2	3	65
6	3.1.4	Interface				D				3	66
6	3.1.4.1	Cables				D				3	66
6	3.1.4.1.1	Power Cables				D				3	66
6	3.1.4.1.2	Communications Cables				D				3	66
7	3.1.4.2	Security				D				3	66
7	3.1.5	Modularity	NA								66
7	3.1.5.1	Definition				D		1	2	3	66
7	3.1.5.2	Partitioning		I							66
8	3.2	CHARACTERISTICS	NA								66
8	3.2.1	Performance				D			2	3	66
8	3.2.1.1	Keyboard				D			2	3	66
8	3.2.1.1.1	Bounce				D			2	3	67

Verification Cross-Reference Index
Table 8

(PAGES 51 & 52 NOT USED)

Verification Method:

NA - Not Applicable
I - Inspection
A - Analysis
D - Demonstration
T - Test

Test Types:

1 - Engineering Test & Evaluation
2 - Preliminary Qualification
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Requirement			Verification Method					Test			
								Type			Page
Page	Paragraph	Title	NA	I	A	D	T	1	2	3	
8	3.2.1.1.2	Lighting and Control					T		2	3	67
8	3.2.1.1.3	Pressure					T		2	3	67
8	3.2.1.2	Display					T		2	3	67
8	3.2.1.2.1	Configuration					T		2	3	67
8	3.2.1.2.2	Turn Off					T		2	3	67
9	3.2.1.2.3	Return				D			2	3	67
9	3.2.1.2.4	Brightness Control					T		2	3	67
9	3.2.1.3	Initialization					T		2	3	68
9	3.2.1.3.1	DMD Address					T			3	68
9	3.2.1.3.2	Destination Address					T			3	68
10	3.2.1.3.3	Test/Data Designator					T			3	68
10	3.2.1.3.4	Single/Double Block Transmission					T			3	68
10	3.2.1.3.5	Transmission Rate					T			3	68
10	3.2.1.3.6	Preamble					T			3	68
10	3.2.1.3.7	Setting Advance Delay					T			3	68
10	3.2.1.3.8	Setting Audible Signals					T		2	3	69
10	3.2.1.4	Message Composition				D			2	3	69

Verification Cross-Reference Index
Table 8

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Requirement			Verification Method					Test			
								Type			Page
Page	Paragraph	Title	NA	I	A	D	T	1	2	3	
11	3.2.1.4.1	Operator Prompting				D				3	69
11	3.2.1.4.1.1	Illegal Entries Prevented				D				3	69
11	3.2.1.4.1.2	Character Storage				D				3	69
11	3.2.1.4.1.3	Advance Delay					T		2	3	69
11	3.2.1.4.1.4	Message Type in Summary				D				3	69
11	3.2.1.4.1.5	Character & Data Element Sequencing				D			2	3	69
12	3.2.1.4.1.6	Attitude				D				3	69
12	3.2.1.4.1.7	Shift				D				3	69
12	3.2.1.4.1.8	Target Type Not Given				D				3	70
12	3.2.1.4.2	Authentication of Messages					T			3	70
13	3.2.1.4.3	Default Values				D			2	3	70
13	3.2.1.4.3.1	Fixed				D			2	3	70
13	3.2.1.4.3.2	Dynamic				D			2	3	70
13	3.2.1.4.3.2.1	Two Fire Missions				D			2	3	70
13	3.2.1.4.3.2.1.1	Active Fire Mission					T		2	3	70
13	3.2.1.4.3.2.1.2	Fire Mission Associated with Target Number				D			2	3	70
14	3.2.1.4.3.2.2	High Burst Mean Point of Impact				D			2	3	70

Verification Cross-Reference Index
Table 8

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Requirement			Verification Method					Test			
								Type			Page
Page	Paragraph	Title	NA	I	A	D	T	1	2	3	
14	3.2.1.4.3.2.3	Laser				D			2	3	70
15	3.2.1.4.4	Required Information				D			2	3	71
15	3.2.1.4.5	Review and Editing				D				3	71
15	3.2.1.4.6	Composition Time					T		2	3	71
15	3.2.1.4.7	Correction				D				3	71
15	3.2.1.5	Message Transmission & Reception				D				3	71
16	3.2.1.5.1	Composed Message Retention				D				3	71
16	3.2.1.5.2	Preamble					T			3	71
16	3.2.1.5.3	Synchronization				D				3	71
16	3.2.1.5.4	Transmission Number				D			2	3	71
17	3.2.1.5.5	End of Transmission (EOT)				D				3	71
17	3.2.1.5.6	Transmission/Reception Correction					T			3	71
17	3.2.1.5.7	Error Detection & Correction (EDC)					T		2	3	72
18	3.2.1.5.8	Single & Double Block Transmission/Reception					T		2	3	72
19	3.2.1.5.9	Time Dispersed Coding (TDC)					T		2	3	72
19	3.2.1.6	Message Receipt				D			2	3	72
19	3.2.1.6.1	Queue				D			2	3	72

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Table 8

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Requirement			Verification Method					Test			
Page	Paragraph	Title						Type			Page
			NA	I	A	D	T	1	2	3	
19	3.2.1.6.1.1	Viewing				D			2	3	72
19	3.2.1.6.1.2	Storage Location				D			2	3	72
19	3.2.1.6.1.3	Protection				D			2	3	72
20	3.2.1.6.1.4	Non-Retention				D			2	3	72
20	3.2.1.6.1.5	Indicators				D			2	3	73
20	3.2.1.7	Acknowledgements and Non-Acknowledgements	NA								73
20	3.2.1.7.1	Transmit					T			3	73
20	3.2.1.7.2	Receive					T			3	73
20	3.2.1.8	Storage	NA								73
20	3.2.1.8.1	Separate				D				3	73
20	3.2.1.8.2	Stability				D				3	73
21	3.2.1.8.2.1	Loss of Power				D			2	3	73
21	3.2.1.8.3	Transfer				D		1		3	73
21	3.2.1.9	Operator Signals	NA								74
21	3.2.1.9.1	Visual					T		2	3	74
21	3.2.1.9.1.1	Received Message				D			2	3	74
21	3.2.1.9.1.2	Acknowledgement Indicator				D			2	3	74

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Requirement			Verification Method					Test			
								Type			Page
Page	Paragraph	Title	NA	I	A	D	T	1	2	3	
22	3.2.1.9.1.3	Non-Acknowledgement Indicator				D			2	3	74
22	3.2.1.9.2	Audible					T		2	3	74
22	3.2.1.9.2.1	Message and Ack/NAK				D				3	74
23	3.2.1.9.2.2	Keyboard				D			2	3	74
23	3.2.1.10	Controls	NA								74
23	3.2.1.10.1	Hardware	NA								74
23	3.2.1.10.1.1	Rotary		I						3	74
23	3.2.1.10.1.2	Switch				D				3	75
23	3.2.1.10.2	Software				D				3	75
23	3.2.1.10.2.1	Initialization Default Values				D			2	3	75
23	3.2.1.11	Legibility					T	1	2	3	75
23	3.2.1.11.1	Display and Keyboard					T	1	2	3	78
24	3.2.1.11.2	Operator Signals					T	1	2	3	78
24	3.2.1.12	Operator Tests				D				3	78
24	3.2.1.12.1	Visual	NA								78
24	3.2.1.12.1.1	Display				D				3	78
24	3.2.1.12.1.2	Visual Indicators				D				3	79

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Requirement			Verification Method					Test			
								Type			Page
Page	Paragraph	Title	NA	I	A	D	T	1	2	3	
24	3.2.1.12.2	Audible				D				3	79
24	3.2.1.12.3	Operability				D				3	79
25	3.2.1.13	Operation Without Connector Caps				D				3	79
25	3.2.1.14	Laser Interface				D				3	79
25	3.2.1.15	Memory Clear					T			3	79
25	3.2.2	Electrical Characteristics	NA								79
25	3.2.2.1	Power				D				3	79
26	3.2.2.1.1	Converter				D				3	79
26	3.2.2.1.2	Batteries					T			3	79
26	3.2.2.1.2.1	Level Indicator					T			3	80
26	3.2.2.1.3	Battery Utilization					T		2	3	80
27	3.2.2.2	Electrical Interface					T			3	80
27	3.2.2.2.1	Output					T			3	80
28	3.2.2.2.2	Input					T			3	80
28	3.2.2.3	Laser Interface					T			3	80
28	3.2.3	Physical Characteristics	NA								80
28	3.2.3.1	Size		I					2	3	80

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Requirement			Verification Method					Test			
								Type			Page
Page	Paragraph	Title	NA	I	A	D	T	1	2	3	
28	3.2.3.2	Weight		I					2	3	81
28	3.2.3.3	Battery Compartment					T	1		3	81
28	3.2.3.4	Strain Relief		I						3	81
28	3.2.3.5	Mounting				D				3	81
29	3.2.4	Reliability					T			3	81
29	3.2.5	Maintainability			A					3	87
29	3.2.5.1	Operator Maintenance			A					3	87
29	3.2.5.1.1	Adjustments				D				3	87
29	3.2.5.1.2	Scheduled Maintenance				D				3	87
29	3.2.5.2	Organizational Level Maintenance	NA								87
29	3.2.5.2.1	Mean-Time-To-Repair					T			3	87
29	3.2.5.2.2	Built-In-Test-Equipment (BITE)					T			3	88
30	3.2.5.2.3	LRU Adjustment				D				3	88
30	3.2.5.2.4	Higher Level Maintenance			A					3	88
30	3.2.5.3	Service and Access				D				3	88

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Requirement			Verification Method					Test			
								Type			Page
Page	Paragraph	Title	NA	I	A	D	T	1	2	3	
30	3.2.5.4	Tools				D				3	89
30	3.2.5.5	Test Provisions					T			3	89
31	3.2.6	Environmental Conditions					T			3	89
31	3.2.6.1	Temperature	NA								90
31	3.2.6.1.1	High Temperature					T			3	90
31	3.2.6.1.2	Low Temperature					T			3	91
32	3.2.6.2	Humidity					T			3	91
32	3.2.6.3	Dust					T			3	92
32	3.2.6.4	Rain					T			3	92
32	3.2.6.5	Altitude					T			3	93
32	3.2.6.6	Vibration					T			3	93
32	3.2.6.7	Bounce, Loose Cargo					T			3	95
32	3.2.6.8	Shock, Transit Drop					T			3	95
33	3.2.6.9	Shock, Bench Handling					T			3	95
33	3.2.6.10	Salt Fog					T			3	95
33	3.2.6.11	Fungus					T			3	96
33	3.2.6.12	Explosive Atmosphere					T			3	98

Verification Cross-Reference Index
Table 8

Verification Method:

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Test Types:

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Requirement			Verification Method					Test			
								Type			Page
Page	Paragraph	Title	NA	I	A	D	T	1	2	3	
34	3.2.6.13	Immersion					T			3	98
34	3.2.6.14	Orientation					T			3	99
34	3.2.6.15	Icing					T			3	99
34	3.2.6.16	Snow			A					3	100
34	3.2.6.17	Temperature Shock					T			3	100
34	3.2.6.18	Sunshine					T			3	101
34	3.2.6.19	Chemical, Biological (CB)					T			3	101
34	3.2.6.19.1	Decontamination					T			3	101
35	3.2.7	Useful Life			A					3	101
35	3.3	Design and Construction	NA								101
35	3.3.1	Parts, Materials and Processes			A			1			101
35	3.3.1.1	Solid State Components			A			1			102
35	3.3.1.2	Finish			A					3	102
35	3.3.1.3	Switches			A					3	102
35	3.3.1.4	Receptacle Caps		I						3	102
35	3.3.1.5	Fastener Hardware			A					3	102
35	3.3.1.6	Corrosion of Metal Parts			A					3	102

Verification Cross-Reference Index
Table 8

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Verification Method:

NA - Not Applicable
I - Inspection
A - Analysis
D - Demonstration
T - Test

Test Types:

1 - Engineering Test & Evaluation
2 - Preliminary Qualification
3 - Formal Qualification

Requirement			Verification Method					Test			
								Type			Page
Page	Paragraph	Title	NA	I	A	D	T	1	2	3	
35	3.3.2	Electromagnetic Compatibility					T			3	103
36	3.3.2.1	Electromagnetic Interference					T			3	103
36	3.3.2.2	Bonds and Grounds					T			3	103
36	3.3.2.3	Cables and Connectors					T			3	104
37	3.3.2.4	Tempest					T			3	104
37	3.3.3	Marking		I						3	104
37	3.3.4	Workmanship		I						3	104
37	3.3.5	Interchangeability				D				3	104
37	3.3.6	Systems Safety			A					3	104
37	3.3.6.1	Personnel Safety			A					3	105
37	3.3.6.1.1	Mechanical Safety			A					3	105
37	3.3.6.1.2	Electrical Safety			A					3	105
38	3.3.6.2	Equipment Safety					T			3	105
38	3.3.6.3	Environmental Safety	NA								105
38	3.3.6.3.1	Hazardous Environments			A					3	105
38	3.3.6.3.2	Radioactive Materials			A					3	106

Verification Cross-Reference Index
Table 8

Verification Method:

NA - Not Applicable
I - Inspection
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Test Types:

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Requirement			Verification Method					Test			
								Type			Page
Page	Paragraph	Title	NA	I	A	D	T	1	2	3	
39	3.3.7	Human Engineering				D				3	106
39	3.3.7.1	Mnemonics				D				3	106
39	3.3.7.2	Display Fields					T		2	3	106
39	3.3.7.3	Entering Data				D			2	3	106
40	3.3.7.4	Numbers				D			2	3	106
40	3.3.7.5	Configuration				D				3	107
40	3.3.7.6	Labeling		I						3	107
40	3.3.7.7	Malfunction				D				3	107
40	3.4	Documentation		I						3	107
40	3.5	Logistics		I						3	107
40	3.6	Training		I						3	107

Verification Cross-Reference Index
Table 8

4.2 Equipment Performance Verification (Inspection (I), Analysis (A), Demonstration (D), Test (T))

Paragraph	Verification Method	Requirements
3.	N/A	Requirements
3.1	N/A	Item Definition
3.1.1	D	Employment - Operation of the DMD with the TACFIRE System shall be demonstrated. A TACFIRE System will be made available at a Government test site for this purpose. Prior to this demonstration, full compliance with the performance characteristics of 3.2. and its subparagraphs shall be verified. This demonstration shall include all modes of operation and shall exercise all messages of Appendix 1 to verify interfaces and operability with TACFIRE.
3.1.2	D	Formats - All message formats of Appendix I shall be exercised.
3.1.3	D	Operational Constraints

Paragraph	Verification Method	Requirements
3.1.4	D	Interface
3.1.4.1	D	Cables - The Government shall inspect cable sets in addition to Formal Demonstration of use of cables.
3.1.4.1.1	D	Power Cables - The Government shall inspect cables in addition to Formal Demonstration of use of cables.
3.1.4.1.2	D	Communications Cables - The Government shall inspect cables in addition to Formal Demonstrations of use of sets of cables.
3.1.4.2	D	Security
3.1.5	N/A	Modularity
3.1.5.1	D	Definition
3.1.5.2	I	Partitioning
3.2	N/A	Characteristics
3.2.1	D	Performance
3.2.1.1	D	Keyboard- To insure that the 3.2.1.1 requirements are met, the Government shall require a legibility and

Paragraph	Verification Method	Requirements
3.2.1.1 (continued)		mechanical test of the keyboard in the final assembled deliverable CI.
3.2.1.1.1	D	Bounce
3.2.1.1.2	T	Lighting and Control
3.2.1.1.3	T	Pressure - Assurance that the pressure requirements are met shall be determined by a mechanical test of the keyboard in the final assembled CI recording actual depression (Pressure to actuate) pressure of each key.
3.2.1.2	T	Display - Demonstration of CI shall be integrated into a formal test.
3.2.1.2.1	T	Configuration - Demonstration shall be integrated into a formal test.
3.2.1.2.2	T	Turn Off
3.2.1.2.3	D	Return
3.2.1.2.4	T	Brightness Control

Paragraph	Verification Method	Requirements
3.2.1.3	T	Initialization - Demonstration shall be integrated into a formal test.
3.2.1.3.1	T	DMD Address - Demonstration shall be integrated into a formal test.
3.2.1.3.2	T	Destination Address - Demonstration shall be integrated into a formal test.
3.2.1.3.3	T	Test/Data Designator - Demonstration shall be integrated into a formal test.
3.2.1.3.4	T	Single/Double Block Transmission - Demonstration shall be integrated into a formal test.
3.2.1.3.5	T	Transmission Rate - Demonstration shall be integrated into a formal test.
3.2.1.3.6	T	Preamble - Demonstration shall be integrated into a formal test.
3.2.1.3.7	T	Setting Advance Delay - Demonstration shall be integrated into a formal test.

Paragraph	Verification Method	Requirements
3.2.1.3.8	T	Setting Audible Signals - Demonstration shall be integrated into a formal test.
3.2.1.4	D	Message Composition - Each message in Appendix 1 shall be composed and entered into the DMD.
3.2.1.4.1	D	Operator Prompting
3.2.1.4.1.1	D	Illegal Entries Prevented
3.2.1.4.1.2	D	Character Storage
3.2.1.4.1.3	T	Advance Delay
3.2.1.4.1.4	D	Message Type in Summary
3.2.1.4.1.5	D	Character and Data Element Sequencing
3.2.1.4.1.6	D	Attitude
3.2.1.4.1.7	D	Shift

Paragraph	Verification Method	Requirements
3.2.1.4.1.8	D	Target Type Not Given
3.2.1.4.2	T	Authentication of Messages - Demonstration shall be integrated into a formal test.
3.2.1.4.3	D	Default Values
3.2.1.4.3.1	D	Fixed
3.2.1.4.3.2	D	Dynamic
3.2.1.4.3.2.1	D	Two Fire Missions
3.2.1.4.3.2.1.1	T	Active Fire Mission - Demonstration shall be integrated in a formal test.
3.2.1.4.3.2.1.2	D	Fire Mission Associated with Target Number.
3.2.1.4.3.2.2	D	High Burst Mean Point of Impact
3.2.1.4.3.2.3	D	Laser

Paragraph	Verification Method	Requirements
3.2.1.4.4	D	Required Information
3.2.1.4.5	D	Review & Editing
3.2.1.4.6	T	Composition - Demonstration shall be integrated into a formal test.
3.2.1.4.7	D	Correction
3.2.1.5	D	Message Transmission & Reception
3.2.1.5.1	D	Composed Message Retention
3.2.1.5.2	T	Preamble - Demonstration shall be integrated in a formal test.
3.2.1.5.3	D	Synchronization
3.2.1.5.4	D	Transmission Number
3.2.1.5.5	D	End of Transmission (EOT)
3.2.1.5.6	T	Transmission/Reception -Correction - Demonstration shall be integrated into a formal test.

Paragraph	Verification Method	Requirements
3.2.1.5.7	T	Error Detection and Correction (EDC) - Demonstration shall be integrated into a formal test.
3.2.1.5.8	T	Single and Double Block Transmission/ Reception
3.2.1.5.9	T	Time Dispersed Coding (TDC) - Demonstration shall be integrated into a formal test.
3.2.1.6	D	Message Receipt
3.2.1.6.1	D	Queue
3.2.1.6.1.1	D	Viewing
3.2.1.6.1.2	D	Storage Location
3.2.1.6.1.3	D	Protection
3.2.1.6.1.4	D	Non-Retention

Paragraph	Verification Method	Requirements
3.2.1.6.1.5	D	Indicators
3.2.1.7	N/A	Acknowledgements and Non-Acknowledgement
3.2.1.7.1	T	Transmit
3.2.1.7.2	T	Receive
3.2.1.8	N/A	Storage
3.2.1.8.1	D	Separate - An analysis shall be provided by the contractor, in addition to a Formal Demonstration.
3.2.1.8.2	D	Stability - An analysis shall be provided by the contractor in addition to a Formal Demonstration.
3.2.1.8.2.1	D	Loss of Power - An analysis shall be provided by the contractor in addition to a Formal Demonstration.
3.2.1.8.3	D	Transfer - An inspection shall be made by the Government; the contractor shall provide an analysis in addition to a formal test.

Paragraph	Verification Method	Requirements
3.2.1.9	N/A	Operator Signals
3.2.1.9.1	T	Visual - Demonstration shall be integrated into a formal test.
3.2.1.9.1.1	D	Received Message
3.2.1.9.1.2	D	Acknowledgement Indicator
3.2.1.9.1.3	D	Non-Acknowledgement Indicator
3.2.1.9.2	T	Audible - Demonstration shall be integrated into a formal test.
3.2.1.9.2.1.	D	Message and Ack/NAK
3.2.1.9.2.2	D	Keyboard
3.2.1.10	N/A	Controls
3.2.1.10.1	N/A	Hardware
3.2.1.10.1.1	I	Rotary

Paragraph	Verification Method	Requirements
3.2.1.10.1.2	D	Switch - The Government shall perform an inspection during Formal Demonstrati
3.2.1.10.2	D	Software - The contractor shall provide an analysis, in addition to a Formal Demonstration.
3.2.1.10.2.1	D	Initialization Default Values
3.2.1.11	T	Legibility - Prequalification test shal be performed and witnessed by governmen as early in the program as practicable; use of a breadboard model is permitted. Final acceptance shall be made during the final qualification tests to be conducted on the assembled unit. The tests shall be conducted in accordance with the following procedure (1) Four operators shall be selected who have normal color vision and 20/20 (corrected) visual accuracy. For the tests, the operators shall be seated, centered with respect to the device, so that initially the normal viewing distance between the plane of the

Paragraph	Verification Method	Requirements
3.2.1.11 (continued)		display and each operator's eye position shall be 24 inches. The horizontal centerline of the device shall be at eye level. The legibility tests shall be performed with an ambient light intensity of 10^{-3} ft. candles and 10^{4} ft candles incident on the surfaces to be tested. (2) The first series of tests shall be conducted at the normal viewing angle. The same ten (10) dissimilar messages shall be required to be read by each operator. The number of characters read in error shall be recorded, along with the particular character in error and its postiion on the dispaly. Correct recognition of at least 97 percent of the total characters, as an average, under each ambient lighting conditions shall be achieved for acceptance and before proceeding onto the next series of tests. The alphanumeric keyboard and indicators shall be read without error.

Paragraph	Verification Method	Requirements
3.2.1.11 (continued)		(3) The second series of tests shall be conducted with the device rotated 20° on its horizontal axis in a direction away from the operators. The test shall then proceed as in paragraph (2) with the same ten different messages. Measurements shall be taken as in paragraph (2) with the same acceptance criteria.
		(4) The first two series of tests shall be repeated with the operators placed at a position $\pm 20^{\circ}$ to the normal, with respect to the vertical axis. Acceptance criteria shall remain the same.
		(5) The indicator shall be able to be correctly read within the volume formed by an angular sector with the radius equal to 24 inches and the angle of the vertex being 90° ($\pm 45^{\circ}$ to the normal to the front face of the device), rotated 180° about the normal axis.

Paragraph	Verification Method	Requirements
3.2.1.11.1	T	Display and Keyboard
3.2.1.11.2	T	Operator Signals
3.2.1.12	D	Operator Tests - The Government shall inspect the CI, in addition to the Formal Demonstration.
3.2.1.12.1	N/A	Visual
3.2.1.12.1.1	D	Display

Paragraph	Verification Method	Requirements
3.2.1.12.1.2	D	Visual Indicators
3.2.1.12.2	D	Audible
3.2.1.12.3	D	Operability
3.2.1.13	D	Operation Without Connector Caps
3.2.1.14	D	Laser Interface
3.2.1.15	T	Memory Clear - Demonstration shall be integrated into a formal test.
3.2.2	N/A	Electrical Characteristics
3.2.2.1	D	Power
3.2.2.1.1	D	Converter
3.2.2.1.2	T	Batteries - Government shall inspect CI, Batteries, Battery sources. The contractor shall provide an analysis in addition to a formal test.

Paragraph	Verification Method	Requirements
3.2.2.1.2.1	T	Level Indicator - Demonstration shall be integrated into a formal test.
3.2.2.1.3	T	Battery Utilization - The Government shall inspect CI. The contractor shall provide an analysis, in addition to a formal test.
3.2.2.2	T	Electrical Interface - Demonstration shall be integrated into a formal test.
3.2.2.2.1	T	Output
3.2.2.2.2	T	Input
3.2.2.3	T	Laser - Demonstration shall be integrated into a formal test.
3.2.3	N/A	Physical Characteristics
3.2.3.1	I	Size - The contractor shall measure and record the CI dimensions.

Paragraph	Verification Method	Requirements
3.2.3.2	I	Weight - The contractor shall weigh and record the weight of a deliverable CI and each respective sets of cables separately.
3.2.3.3	T	Battery Compartment - The CI shall be inspected during formal test.
3.2.3.4	I	Strain Relief
3.2.3.5	D	Mounting - The Government shall inspect the CI in transport mode, in addition to Formal Demonstration.
3.2.4	T	Reliability - The contractor shall provide an analysis in addition to a formal test. A reliability test shall be conducted in accordance with MIL-STD-781, except as modified below.

Paragraph	Requirements
3.2.4 (Continued)	(1) Test Type: Life test terminated in 60,000 activations with replacement (repair) of failed samples. a. Discrimination ratio: 3:1 b. Test Sample: 4 DMDs (2) Test Description: Place 4 DMDs on test and perform the phases shown in table 9. Each phase shall be completed prior to the start of the next phase. a. Duty Cycle: Each DMD shall be subjected to the 11 minute duty cycle shown in figure 8. There shall be no time gap between duty cycles. b. Activation: An Activation is a message composition, display, edit, and transmission or a message reception and display. The time indicated for each activation shall be totally utilized. The time associated with each segment of an activation shall closely approximate, if not equal,

Paragraph	Requirements
3.2.4 (Continued)	the times specified herein. The transmission, reception, and display of Acknowledgements and non-acknowledgements shall be made part of the activation times.
	The display brightness shall be set at a level consistent with legibility requirements under the ambient lighting condition of approximately 2,000 ft. candles incident on the surface of the display.
	Audible signals shall be set at full level.
	c. Message Sequence: The following sequence of message is suggested:
	1. Fire Request - Grid Coordinates, Format #1
	2. Message to Observer, Format #19
	3. Subsequent Adjustment, Format #4
	4. Subsequent Adjustment, Format #4
	5. End of Mission, Format #7

Paragraph	Requirements
3.2.4 (Continued)	(3) Demonstration of Compliance: Upon completion of 60,000 activations, a compliance decision shall be made as follows: a. The DMD shall be considered to comply to the requirement of paragraph 3.2.4 with four or less chargeable failures. b. The DMD shall be considered to be noncompliant with the requirement of paragraph 3.2.4 with five or more chargeable failures. (4) Failure Categories: The contractor shall tentatively classify each test failure into two main categories, (a) chargeable and (b) nonchargeable. The Government shall make a final determination of chargeability at the test conclusion. Chargeable failures shall be counted toward test compliance.

Paragraph	Requirements
3.2.4 (Continued)	a. Chargeable Failures: Failures shall be classified chargeable in accordance with paragraph 5.5.1 of MIL-STD-781.
	b. Nonchargeable Failures: All failures not classified as chargeable to include:
	(1) Human errors in operation and maintenance.
	(2) GFE equipments.
	(3) Test equipment excluding BITE.
	(4) Test set-up errors.

PHASE	TEMPERATURE °C	VIBRATION*	ACTIVATIONS PER DMD
1	25 ± 5	Yes	3,000
2	0 ± 5	Yes	1,500
3	50 ± 5	Yes	10,500

* See paragraph 5.3.2 of MIL-STD 781

TABLE 9

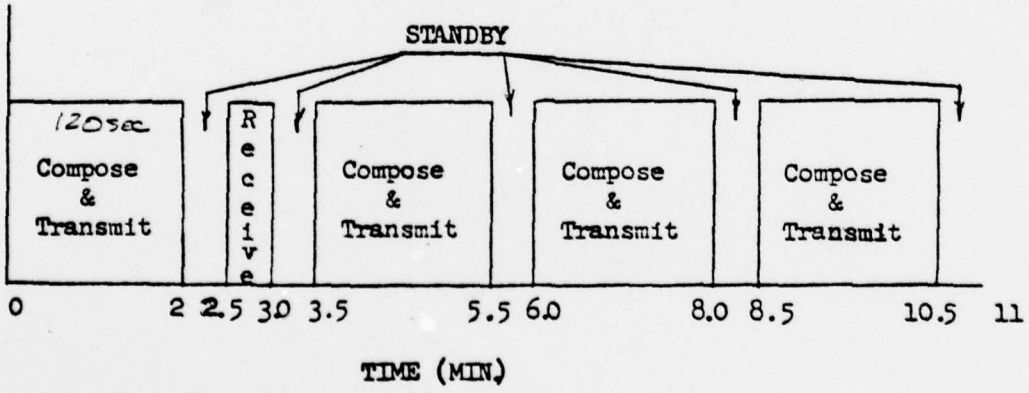

FIGURE 8 - DUTY CYCLE

Paragraph	Verification Method	Requirement
3.2.5	A	Maintainability - The Government shall inspect CI, in addition to analysis.
3.2.5.1	A	Operator Maintenance - The Government shall inspect CI, in addition to analysis
3.2.5.1.1	D	Adjustments - The Government shall inspect CI, in addition to contractor performed formal demonstration.
3.2.5.1.2	D	Scheduled Maintenance
3.2.5.2	N/A	Organizational Level Maintenance
3.2.5.2.1	T	Mean Time to Repair - Compliance with the requirements of the specification shall be demonstrated during a Maintainability Demonstration Test using test B, method 1, MIL-STD-471. Test design parameters to be used are: Desired MTTR= 20 minutes Maximum tolerable MTTR= 40 minutes Consumer's risk = 10% Producer's risk = 10% The contractor shall estimate the value of the variance from prior

Paragraph	Verification Method	Requirement
3.2.5.2.1 (continued)		experience. The variance estimate shall be subject to government approval.
3.2.5.2.2	T	Built-In-Test-Equipment (BITE) - The contractor shall provide an analysis in addition to Formal Maintainability Demonstration Test.
3.2.5.2.3	D	LRU Adjustment - To be verified under the Maintainability Demonstration Test
3.2.5.2.4	A	Higher Level Maintenance
3.2.5.3	D	Service & Access - The Government shall inspect the CI during the demonstration. In addition, a Formal Maintenance Engineering Evaluation (MEE) shall be conducted in accordance with USAECOM Directorate Maintenance Engineering Memorandum

Paragraph	Verification Method	Requirements
3.2.5.3 (continued)		Number 750-5, with published changes, entitled "Maintenance of Supplies and Equipment, Maintenance Evaluation."
3.2.5.4	D	Tools- The Government shall inspect the tools during the demonstration, in addition to a Formal Maintenance Engineering Evaluation (MEE) which shall be conducted in accordance with USAECOM Directorate Maintenance Engineering Memorandum Number 750-5, with published changes.
3.2.5.5	T	Test Provisions - Government shall require the contractor to provide an analysis preceding formal test.
3.2.6	T	Environmental Conditions - The DMD shall be subjected to the following MIL-STD-810 tests. The DMD shall

Paragraph	Verification Method	Requirements
3.2.6 (Continued)		be tested with its battery installed. The DMD shall be powered by either the installed battery or by the external power source. The equipment shall be fully operational prior to, during, and following the tests as required by the test procedures specified herein. Each operational test shall include, but not necessarily be limited to, a demonstration of the following paragraphs, in accordance with a government approved scenario. 3.2.1.1 - 3.2.1.15 Inclusive 3.2.2.1 - 3.2.2.2 Inclusive 3.2.3.3
3.2.6.1	N/A	**Temperature**
3.2.6.1.1	T	High Temperature - Method 501, MIL-STD-810 Procedure II shall be employed. **Operating temperature (Step 7) shall**

Paragraph	Verification Method	Requirements
3.2.6.1.1 (Continued)		be 71°C (160°F) which includes the effects of solar radiation).
3.2.6.1.2	T	Low Temperature - Method 502, MIL-STD-810, Procedure I shall be employed. The storage temperature (Step 2) shall be -62°C (-80°F) and shall be maintained for a period of not less than 2 hours following stabilization of the test item. Low operating temperature (Step 4) shall be -40°C (-40°F).
3.2.6.2	T	Humidity - The DMD shall be subjected to the humidity test specified in Method 507, Procedure III of MIL-STD-810. Operational test will be conducted during the last 5-hour period of each 48-hour cycle in Step 6, and at the end of each 24 hour period during the 480 hour period in Step 8. Wiping of the display and keyboard with clothing is permitted during the operation of the DMD. In Step 7

Paragraph	Verification Method	Requirements
3.2.6.2 (continued)		The DMD shall be opened so as to expose to the chamber environment areas normally sealed during operation by gasket or other non-hermetic seal.
3.2.6.3	T	Dust - The DMD shall be subjected to the dust test specified in Method 510, Procedure I of MIL-STD-810, with operation during Step 5. The DMD will be rotated on each of its six sides for one hour each during non-operating six hour time in Steps 1 and 3.
3.2.6.4	T	Rain - The DMD shall be subjected to the rain test specified in Method 506, Procedure I of MIL-STD-810, with operation during times specified in Procedure I. For each 30 minute period, the wind will remain on for 15 minutes before being shut off, as described in Procedure I. The DMD will be operated for the last 10 minutes of each 30 minute rain period. Wiping of the display and

Paragraph	Verification Method	Requirements
3.2.6.4 (Continued)		keyboard with clothing is permitted during the operation of the DMD.
3.2.6.5	T	Altitude - MIL-STD-810 - Method 500, Procedure I, shall be employed
3.2.6.6	T	Vibration - Mounting techniques (1) The equipment in its combat transportation mode (in its transit or combination transit case, if any,) shall be attached to the vibrator exciter table by its normal mounting means or by means of a rigid fixture capable of transmitting the vibration conditions as specified herein. Precautions shall be taken in the establishment of mechanical interfaces to minimize the introduction of undesirable responses in the test setup. Whenever possible the test load shall be distributed uniformly

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Paragraphs	Requirements
3.2.6.6 (Continued)	on the vibrator exciter table in order to reduce to the smallest amount, effects of unbalanced loads. Vibration amplitudes and frequencies shall be measured by techniques that will not significantly affect test item input control or response. The input control sensing device(s) shall be rigidly attached to the vibration table or to the intermediate structure, "if used", at or near as possible to the attachment point(s) of the test item.
	(2) Cycling. The test item shall be vibrated along each of its three mutually perpendicular axis in accordance with Test Level, Frequency Range, and Time Schedule outlined below. The frequency of the applied vibration shall be swept logarithmically over the specified frequency range.

Paragraphs	Verification Method	Requirements
3.2.6.6 (Continued)		Test Level: 1.5 G's Frequency Range: 5 to 200 Hz Time Schedule: 84 minutes per axis Sweep Rate: 5 - 200 - 5 Hz in twelve (12) minutes At the conclusion of the above test, visually inspect the test item for any evidence of mechanical damage and operate the test item and compare the results with preperformance test data.
3.2.6.7	T	Bounce, Loose Cargo - Method 514, MIL-STD-810 , Procedure XI, Part 2, shall be employed.
3.2.6.8	T	Shock Transit Drop - Method 516, MIL-STD-810 , Procedure II, shall be employed.
3.2.6.9	T	Shock, Bench Handling - Method 516, MIL-STD-810, Procedure V of MIL-STD-810 shall be employed.
3.2.6.10	T	Salt Fog - The equipment shall be subjected to the test of Method 509, Procedure I, of MIL-STD-810. Operation of the equipment

Paragraphs	Verification Method	Requirements
3.2.6.10 (Continued)		is not required and failure criteria shall be limited to corrosions of finished and metals and to the clogging or binding of mechanical moving parts. Corrosion shall be defined as any visible degradation of the equipment surfaces that can be attributed to flakey, pitted, blistered, or otherwise loosened finish or material surface. All mechanical moving parts (switches, push buttons, etc.) shall be operated following the test to insure that no binding or clogging has resulted.
3.2.6.11	T	Fungus Resistance - Parts and sub-assemblies of the DMD in the assembled and as ready for delivery condition, shall be subjected to 28 days of Method 508, MIL-STD-810. The equipment test parts/sub-assemblies shall not be specially cleaned for the fungus test, except for the cleaning it received during or after production.

Paragraphs	Requirements
3.2.6.11 (Continued)	If it is necessary for the manufacturer after assembly to remove accumulated production and handling contaminants by cleaning prior to packaging and delivery, the equipment parts/sub-assemblies shall not be tested for three days after cleaning to allow for complete evaporation of the cleaning compound. All enclosed or gasketed assemblies shall be opened and the interior sprayed with the specified mixed spore suspension. After 14 and 28 days of test, the control items per paragraph 3.1.3 and 3.1.4 of Method 508, MIL-STD-810 shall show profuse growth over at least 50% of the area of the control items. After 28 days, based upon visual examination, the equipment assembly shall pass if it shows no more growth than that specified in 3.2.6.11.

Paragraph	Verification Method	Requirements
3.2.6.11 (continued)		No operational test is required after the fungus test to pass the test. The part or sub-assembly shall fail if it shows more than the growth specified above. The test shall be repeated if the control items fail to show profuse growth after 14 and 28 days of test. Test data on representative parts and materials may be submitted to the government for approval, in lieu of actual testing to demonstrate compliance with MIL-STD-454.
3.2.6.12	T	Explosive Atmosphere - The DMD shall be subjected to Method 511, Procedure I of MIL-STD-810.
3.2.6.13	T	Immersion - The DMD shall be subjected to the test Method 512, Procedure I of MIL-STD-810.

Paragraph	Verification Method	Requirements
3.2.6.14	T	Orientation - The DMD shall be operated for a minimum of five minutes during inclination in each plane(forward, backward, left, right) to an angle of 90 ± 3 degrees.
3.2.6.15	T	Icing (Freezing Rain) - This test shall be conducted in accordance with the following procedure: a. Reduce the chamber temperature to minus 17.8 degrees Centigrade (0°F) and allow the test item temperature to stabilize. b. Raise the chamber temperature to minus 6.7 degrees Centigrade (20°F) and start rainfall. c. Simulate a rainfall of from 0.1 to 1.0 inch per hour and maintain it until a 0.5 inch layer of ice is deposited on the test item.

Paragraphs	Verification Method	Requirements
3.2.6.15 (Continued)		NOTE: The simulated rain shall be introduced through spray nozzles located at the top of the chamber. Specific instruction concerning rainfall, size of droplets, direction, etc. are in MTP 5-2-591. d. Visually inspect the test item. e. Return test item to ambient conditions and allow ice deposit to melt. f. Functionally operate the test item, less packaging materiel. g. Record all specified operating characteristics. h. Return the chamber temperature to ambient conditions at the completion of the rainfall.
3.2.6.16	A	Snow
3.2.6.17	T	Temperature Shock - The DMD shall be subjected to the temperature shock test specified in Method 503, Procedure I of MIL-STD-810.

Paragraph	Verification Method	Requirements
3.2.6.18	T	Sunshine - The DMD shall be subject to the sunshine test specified in Method 505. Procedure II, of MIL-STD-810, with operation during the times specified in Procedure II.
3.2.6.19	T	Chemical Biological (CB). The DMD shall be subjected to the Chemical & Biological agents.
3.2.6.19.1	T	Decontamination - The DMD shall be operated after the decontamination procedures of 3.2.6.19.1.
3.2.7	A	Useful Life - This requirement shall be verified by analysis using design documentation, maintenance characteristics, and component part characteristics.
3.3	N/A	Design and Construction
3.3.1	N/A	Parts, Materials & Processes - The Government shall inspect same, in addition to analysis.

Paragraph	Verification Method	Requirements
3.3.1.1	A	Solid State Components
3.2.1.2	A	Finish - The Government shall inspect the equipment, in addition to contractor analysis.
3.3.1.3	A	Switches - The Government shall inspect the equipment, in addition to contractor's analysis.
3.3.1.4	I	Receptacle Caps
3.3.1.5	A	Fastner Hardware - The Government shall inspect the equipment, in addition to contractor's analysis.
3.3.1.6	A	Corrosion of Metal Parts - The Government shall inspect the equipment in addition to the contractor's analysis.

Paragraph	Verification Method	Requirements
3.3.2	T	Electromagnetic Compatibility - The Digital Message Device shall be tested for compliance with the requirements of 3.3.2. Test methods and procedures shall be in accordance with MIL-STD-462, Notice 3. The Government shall require an analysis in addition to a demonstration. The demonstration shall be integrated into the formal test.
3.3.2.1	T	Electromagnetic Interference - The Government shall require an analysis in addition to a demonstration. The demonstration shall be integrated into the formal test.
3.3.2.2	T	Bonds and Grounds - The Government shall inspect in addition to formal test. Bonding resistance measurements shall be recorded and included in the EMI/EMC test report.

Paragraph	Verification Method	Requirements
3.3.2.3	T	Cables and Connectors - The Government shall inspect in addition to formal test.
3.3.2.4	T	Tempest - A TEMPEST test shall be conducted on the DMD for compliance with the conducted and radiated emanations requirements of EL-SS-2604-T (Secret).
3.3.3	I	Marking
3.3.4	I	Workmanship - Shall meet provisions of MIL-STD-252, MIL-E-4158D and MIL-STD-454.
3.3.5	D	Interchangeability - The Government shall inspect the CI. The contractor shall provide an analysis, in addition to a Formal Demonstration.
3.3.6	A	Safety - The Government shall inspect, in addition to evaluation of contractor's analysis.

Paragraph	Verification Method	Requirements
3.3.6.1	A	Personnel Safety - The Government shall inspect, in addition to evaluation of contractor's analysis.
3.3.6.1.1	A	Mechanical Safety - The Government shall inspect, in addition to evaluation of contractor's analysis.
3.3.6.1.2	A	Electrical Safety - The Government shall inspect, in addition to evaluation of contractor's analysis .
3.3.6.2	T	Equipment Safety - The Government shall inspect and evaluate contractor's analysis in addition to formal test.
3.3.6.3	N/A	Environmental Safety
3.3.6.3.1	A	Hazardous Environments - The Government shall inspect, in addition to evaluation of the contractor's analysis.

Paragraph	Verification Method	Requirements
3.3.6.3.2	A	Radioactive Materials - The Government shall inspect, in addition to evaluation of the contractor's evaluation.
3.3.7	T	Human Engineering - Human Engineering Testing shall be integrated into other tests described herein. Government shall inspect, evaluate contractors analysis in addition to a demonstration which shall be integrated into a formal test.
3.3.7.1	D	Mnemonics
3.3.7.2	T	Display Fields - The Government shall inspect key features. Demonstration shall be integrated into formal test
3.3.7.3	D	Entering Data
3.3.7.4	D	Numbers

Paragraph	Verification Method	Requirements
3.3.7.5	D	Configuration
3.3.7.6	I	Labeling
3.3.7.7	D	Malfunction
3.4	I	Documentation
3.5	I	Logistics
3.6	I	Training

5.0 PREPARATION FOR DELIVERY

5.1 Preservation and Packaging. The DMD (CI), cable sets and Documentation shall be packaged in accordance with good commercial practice and in a manner that will afford protection against corrosion, deterioration and physical damage during direct shipment to the first receiving activity for immediate use. Marking of the interior and shipping containers will be in accordance with MIL-STD-129.

The CI shall be cleaned, preserved, and packaged for protection against corrosion, other forms of deterioration, and physical damage during shipment from the contractor's facility to the point of destination. The protective processes to be used shall be the minimum required for adequate protection under conditions of normal handling, shipment, and anticipated storage. The methods employed shall be generally selected from those described in Specification MIL-P-116. Special packaging designs, when applicable, shall be developed using MIL-P-9024 as a guide. Preservation and packaging level shall be in accordance with FED-STD-102.

5.1.1 Preservation Materials. Preservative compounds shall not be applied if the necessary removal of such compounds prior to

service could not readily be accomplished in the field using available materials and equipment. Instead, alternate methods affording equal or better protection shall be used.

5.1.2 Packaging Materials. Packaging materials used shall be consistent with good commercial practice and shall comply with all applicable carrier and safety regulations. Where warranted, special packaging and transportation method shall be used to provide adequate protection and control during shipment.

5.2 Packing.

Packing shall be the minimum required to ensure adequate protection to the CI in consideration of the modes of transportation, the distance to be traversed, the climatic conditions prevailing, and the mechanics of handling during loading and unloading. Packing level shall be in accordance with FED-STD-102.

5.3 Marking.

Marking shall be in general accordance with the requirements of MIL-STD-129 and shall have the following minimum information legibly marked or labeled.

a. Contractor's Part Number

b. Contractor's Name

c. Serial Number or Lot Number, as applicable

d. Procuring Activity Purchase Order Number

e. Quantity

6.0 NOTES

6.1 Ordering Data.

Procurement documents should specify the following:

a. Title, number and date of this specification.

b. Any exceptions to this specification.

c. Whether special preservation, packaging and marking is required.

d. Assigned activity for testing.

6.2 Definitions. The following is a list of acronyms and special terms used within the specification:

ARTADS	Army Tactical Data Systems
ASCII	American Standard Code Information Interchange
BDE	Brigade
BN	Battalion
Branching	Branching is a connected arrangement of filaments (hyphae) formed by shoots or secondary stems growing from the main stem or filament (hypha).
CAV	Cavalry
CBT	Combat
CCU	Communication Control Unit

CI	Configuration Item
Data Element	A character or string of characters which may be used in a field as described in Appendix I.
Data Element Name	A humanly understandable descriptor associated with one and only one Data Element.
DDT	Digital Data Terminal
DIV	Division
DMD	Digital Message Device
ECOM	Electronics Command (Ft. Monmouth, New Jersey)
EDC	Error Detection Correction
FDC	Fire Direction Center
Field	A position or group of positions in a format, as described in Appendix I.
Field Name	A humanly understandable descriptor associated with one and only one field within a format.
Format	A combination of fields as described in Appendix I.
Format Name	A humanly understandable descriptor associated with one and only one format.
FSE	Fire Support Element
FSK	Frequency Shift Keying

Growth Colonization	Growth colonization is a mass of individual plants, generally of one species, living together; or a group of hyphae which is formed from one spore or cell and may be one individual plant. Colonization which completely covers the surface of the nutrient material constitutes abundant growth.
Legal Entry	For a given field, one of the set of data elements which may be inserted in accordance with Appendix I.
Microbial Growth.	Microbial growth is the growth of very minute organisms. Such organisms when present in large numbers may provide a colony visible to the naked eye.
OPM, ARTADS	Office of the Project Manager, ARTADS
QCS	Query Control Station
Sporulation	Sporulation is the formation of minute unicellular reproductive or dormant bodies, called spores.
SWBD	Switchboard
TACFIRE	Tactical Fire Direction System
TDC	Time Dispersed Coding
Tubular Germination	Tubular germination is partial growth by the production of hyphae, which are tubular shaped fungal filaments. Tubular germination constitutes restricted individual spore growth not proceeding to colonization.

VFMED	Variable Format Message Entry Device
Life Expectancy	Life expectancy is defined as the period from the time of delivery of the CI to the procuring agency until identity of the CI is destroyed by classification as salvage or is subjected to cannibalization.

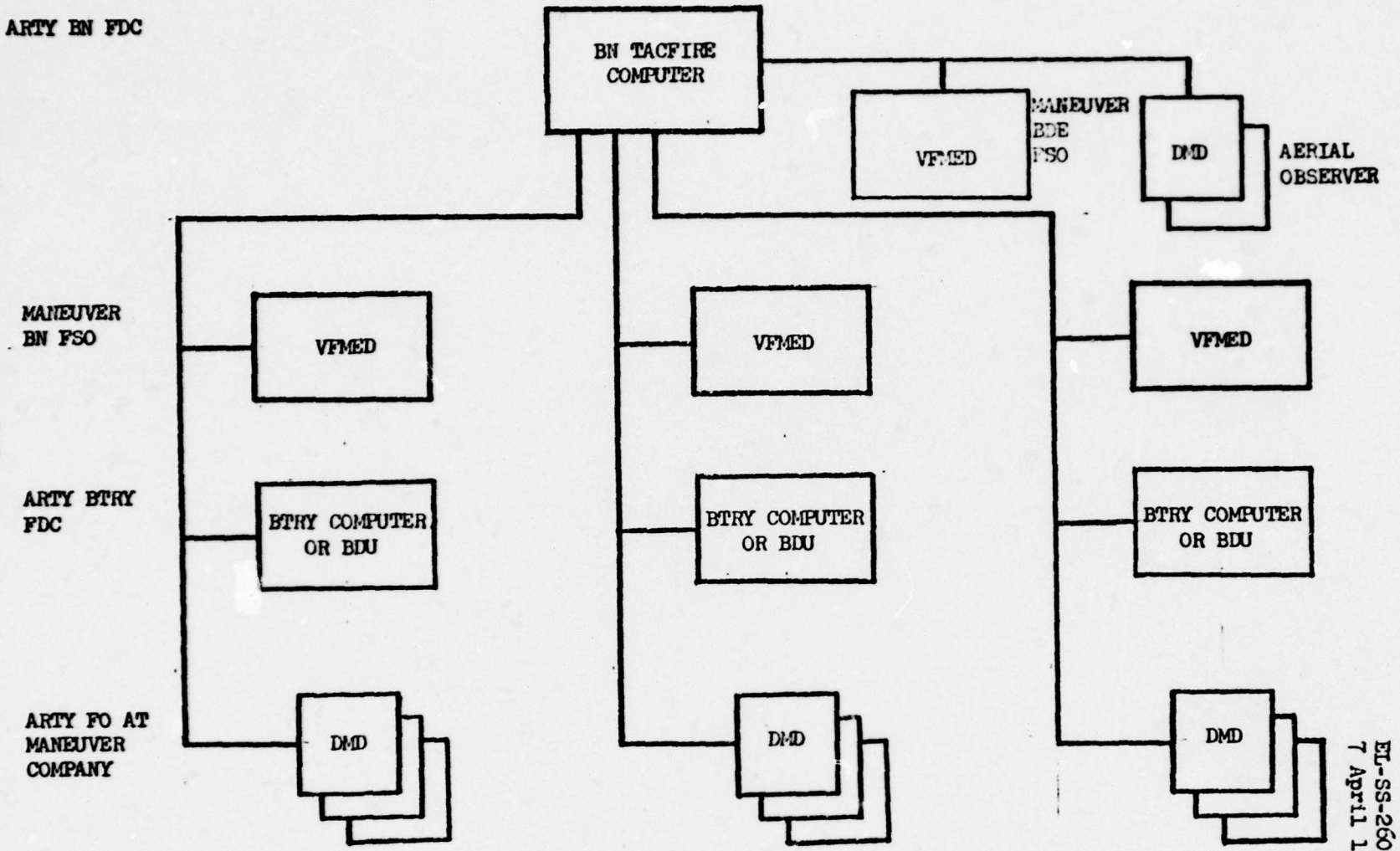

FIGURE 1. TACFIRE SYSTEM DIAGRAM

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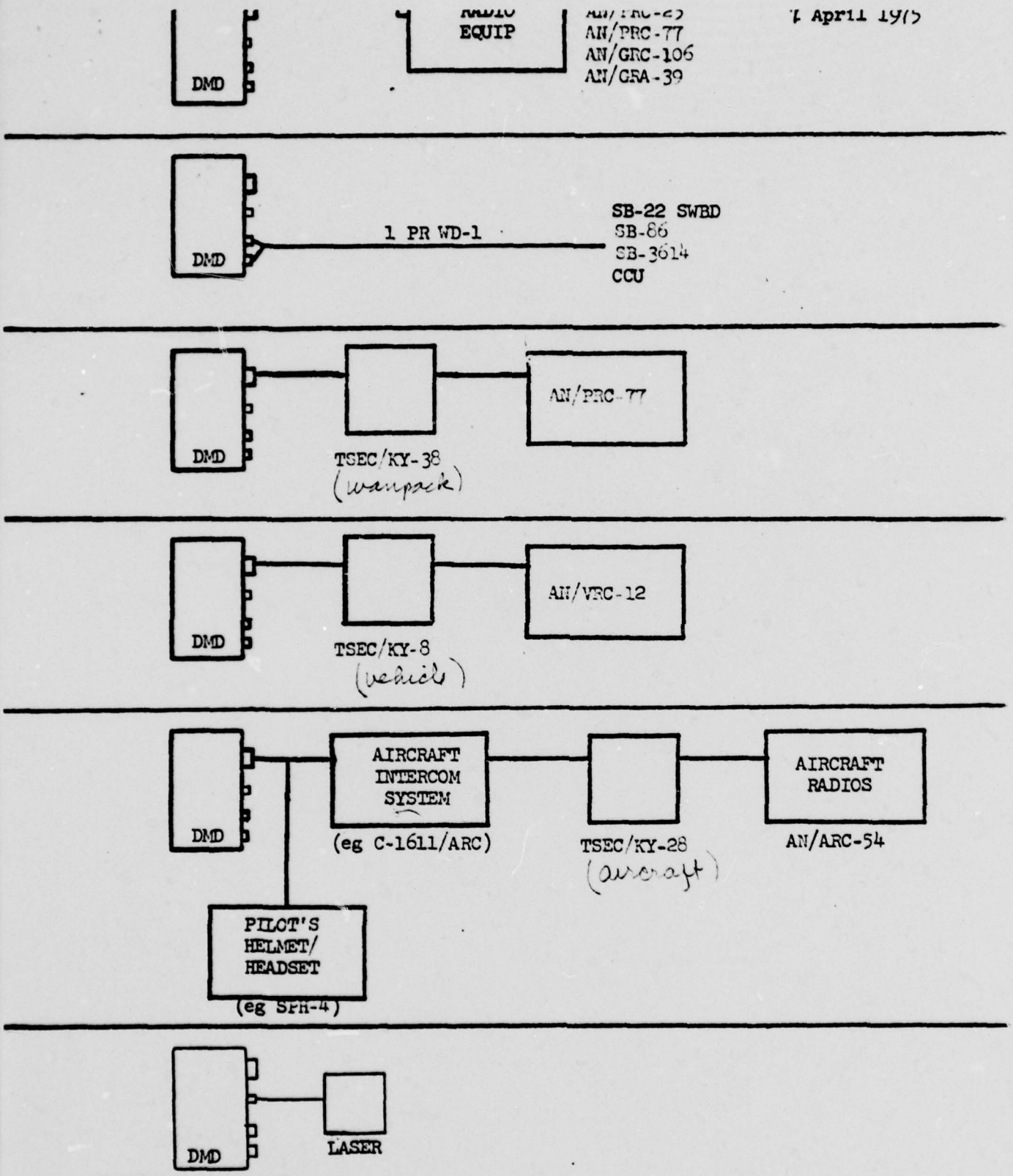


FIGURE 2. DMD OPERATIONAL MODES

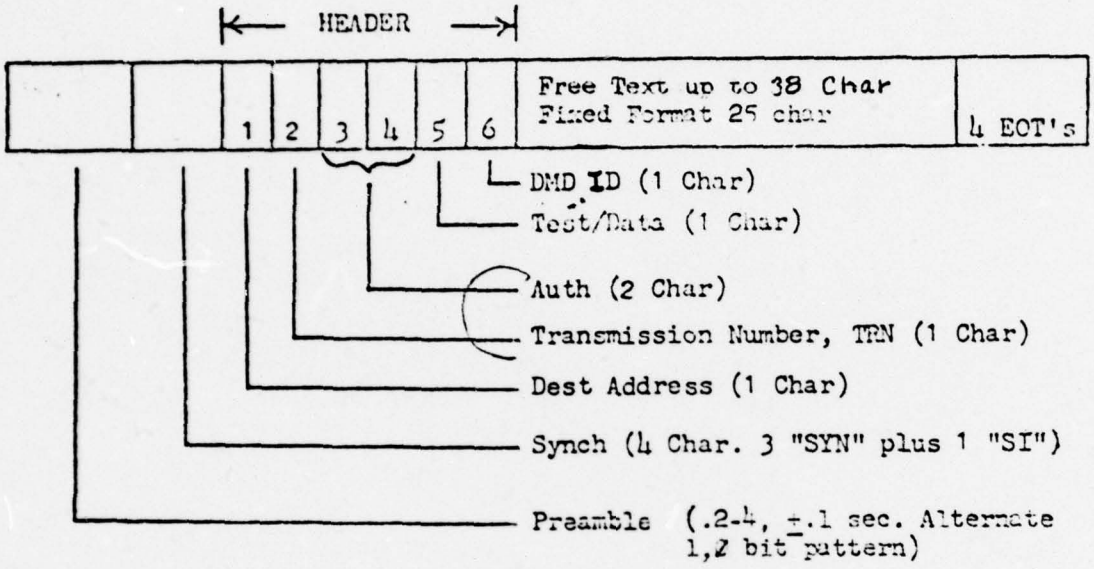


Figure 3. Data Message Format

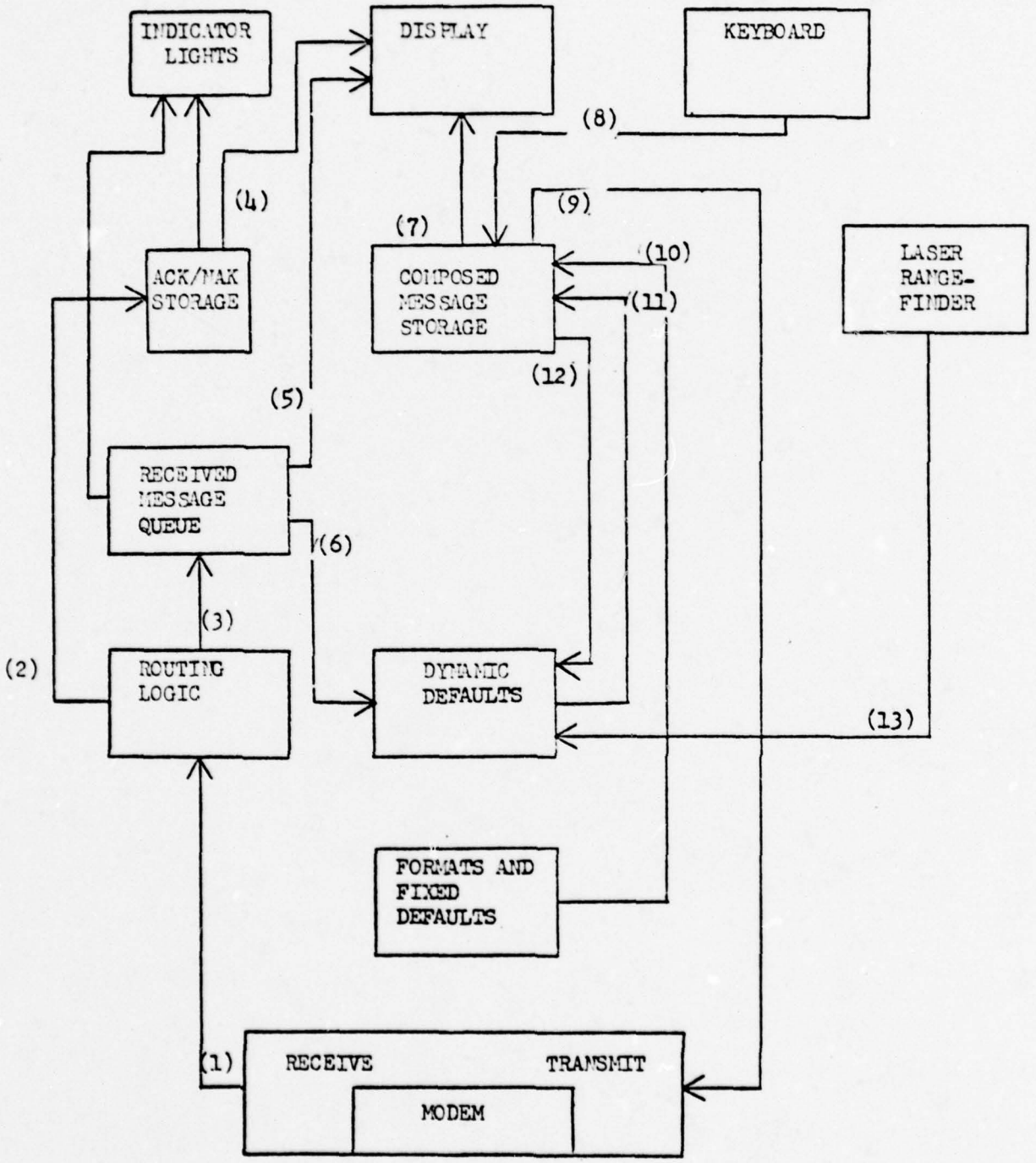
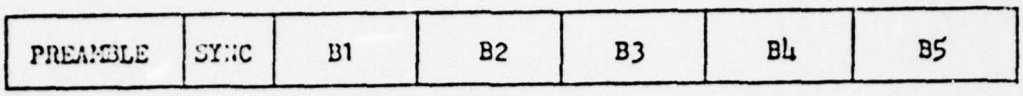
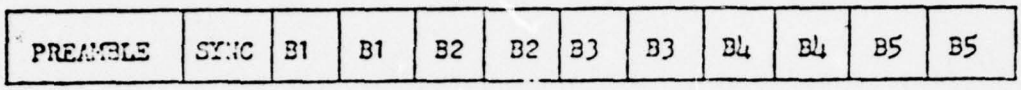


FIGURE 4. DMD INFORMATION TRANSFER (PARENTHETICAL NUMBERS REFER TO TABLE 2)



SINGLE BLOCK



DOUBLE BLOCK

Block 1 = Char 1-16
Block 2 = Char 17-32
Block 3 = Char 33-48
Block 4 = Char 49-64
Block 5 = Char 65-80

Figure 5. Single and Double Block Transmission

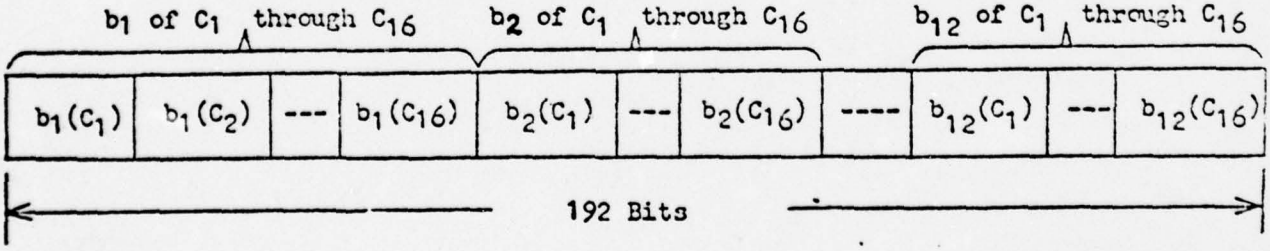


Figure 6. Time Dispersed Coding

FIGURE 7. LASER INPUT WORD

Bit	1 2 3 4	5 6 7 8 9 10 11 12 13 14 15 16 17	22 33	44	45	46	47	48
Contents	ϕ ϕ ϕ ϕ	Value of Range to nearest 10 meters (3 BCD Digits)	Value of Azimuth in Mils (4 BCD Digits)	Value of Elevation in Mils (3 BCD Digits)	Neg Elev	Fail	ϕ	Parity
Description	Sync	10 20 40 80 100 200 400 800 1000 2000 4000 8000	1 2 4 8 10 20 40 80 100 200 400 800 1000 2000 4000 8000	1 2 4 8 10 20 40 80 100 200 400 800				

NOTES:

1. Bit 45 is set to one if elevation is negative.
2. Bit 46 is set to one if word is invalid.
3. Bits 1, 2, 3, 4, and 47 contain zeroes under all circumstances.
4. Bit 48 is odd parity on the entire word.

ELECTRICAL VALUES AND TIMING:

1. Idle state 0 to 0.4v.
2. Active state 5.5 to 2.4v.
3. Logic zero 5 microsecond pulse. ±1
4. Logic one 15 microsecond pulse. ±1
5. Clock period 20 microseconds ±1

CONNECTOR:

1. GLLD connector: NSN 5935-328-0666
2. Pin assignment: Computer word little "f"
   Return little "g"
   Lase command little "h"

DESIGNATE COMMAND:

1. Requires 5 volts to be applied for a duration of 3 seconds, at 20 milliamps.

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Table 1. Keyboard Characters and Operational Codes

Column---			2	3	4	5
b_7 b_6 b_5	0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1
b4b3b2b1						
0 0 0 0			SP	ø		P
0 0 0 1				1	A	Q
0 0 1 0				2	B	R
0 0 1 1				3	C	S
0 1 0 0	EOT			4	D	T
0 1 0 1		NAK		5	E	U
0 1 1 0	ACK	SYN		6	F	V
0 1 1 1				7	G	W
1 0 0 0				8	H	X
1 0 0 1				9	I	Y
1 0 1 0				:	J	Z
1 0 1 1			+	;	K	
1 1 0 0			,		L	
1 1 0 1			-		M	
1 1 1 0			.		N	
1 1 1 1	SI		/		O	

TABLE 2 DMD INFORMATION TRANSFER
(to be used with Figure 4)

1. RECEIVED MODEM TO ROUTING LOGIC

   A. ALL FIXED FORMAT MESSAGE

      1) FIELDS TO BE TRANSCRIBED: ALL FIELDS

      2) CONDITION OF TRANSCRIPTION: UPON RECEIPT OF MESSAGE

      3) REMARKS: None

   B. ACKNOWLEDGEMENTS/NONACKNOWLEDGEMENTS

      1) FIELDS TO BE TRANSCRIBED: ALL FIELDS

      2) CONDITION OF TRANSCRIPTION: UPON RECEIPT OF ACK/NAK

      3) REMARKS: None

2. ROUTING LOGIC TO ACK/NAK STORAGE

   A. ACKNOWLEDGEMENTS/NONACKNOWLEDGEMENTS

      1) FIELDS TO BE TRANSCRIBED: ALL FIELDS

      2) CONDITIONS OF TRANSCRIPTION: UPON RECEIPT OF ACK OR NAK

      3) REMARKS: Receipt of a new ACK or NAK will cause an overwrite of an ACK or NAK which is still in storage, if the operator has not cleared the old one.

3. ROUTING LOGIC TO RECEIVED MESSAGE QUEUE

   A. ALL FIXED FORMAT MESSAGES

      1) FIELDS TO BE TRANSCRIBED: ALL FIELDS

      2) CONDITION OF TRANSCRIPTION: UPON RECEIPT OF MESSAGE

      3) REMARKS: If there are two messages already in storage a new one will not be accepted into the received message queue until there is room.

4. ACK/NAK STORAGE TO DISPLAY

A. ALL ACKNOWLEDGEMENTS

1) FIELDS TO BE TRANSFERRED: (SEE TABLE 3)

"NUMBER" (POSITION 2 IN HEADER)

"AUTH" (POSITIONS 3, 4 IN HEADER)

"ORIGINATOR" (POSITION 6 IN HEADER)

2) CONDITIONS OF TRANSFER: THE CONDITION OF TRANSFER MAY BE BY OPERATOR ACTION OR AUTOMATICALLY.

3) REMARKS: When displayed "ACK" will be displayed to the operator.

B. ALL NON ACKNOWLEDGEMENTS

1) FIELDS TO BE TRANSCRIBED: (FROM TABLE 3)

"NUMBER" (POSITION 2 IN HEADER)

"AUTH" (POSITIONS 3, 4 IN HEADER)

"ORIGINATOR" (POSITION 6 IN HEADER)

"NUMBER" (POSITIONS 9, 10)

2) CONDITIONS OF TRANSCRIPTION: THE CONDITION OF TRANSFER MAY BE BY OPERATOR ACTION OR AUTOMATICALLY.

3) REMARKS: When displayed "NAK" will be displayed to the operator.

5. RECEIVED MESSAGE QUEUE (RMQ) TO DISPLAY

A. ALL FIXED FORMAT MESSAGES

1) FIELDS TO BE TRANSFERRED: ALL FIELDS (subject to Appendix 2)

2) CONDITION OF TRANSFER: UPON OPERATOR ACTION

3) REMARKS: When an operator calls up a message from the RMQ the message will be cleared from the RMQ making room in the RMQ for receipt of a new message.

6. RECEIVED MESSAGE QUEUE (RMQ) TO DYNAMIC DEFAULTS

A. MESSAGE TO OBSERVER (MTO, FORMAT #19)

1) FIELDS TO BE TRANSCRIBED:

"TARGET NUMBER" (CHAR POS 8-15)

"FIRE MISSION BUFFER" (CHAR POS 42)

2) CONDITION OF TRANSCRIPTION: ON ENTRY OF MTO INTO RMQ (SEE REMARKS)

3) REMARKS: The "target number" is to be associated with the proper fire mission sequence. This will be done by using the "FIRE MISSION BUFFER" number. A 1 or 2 gives the proper fire mission sequence for association. If "NOT GIVEN" or any other character besides 1 or 2 is in character position 42 transfer will not take place.

B. HIGH BURST MEAN POINT OF IMPACT (HB/MPI FORMAT #6)

1) FIELDS TO BE TRANSCRIBED:

"REFERENCE DIRECTION" (CHAR POS 8-11)

"REFERENCE VERTICAL ANGLE" (CHAR POS 13-16)

"TARGET NUMBER" (CHAR POS 22-29)

"TYPE REG AND OBS VERT ANGLE" (CHAR POS 31)

2) CONDITIONS OF TRANSCRIPTION: ON ENTRY OF HB/MPI INTO RMQ

3) REMARKS: This information will be copied into the Dynamic Defaults and it will overwrite the last entries, if any.

7. COMPOSED MESSAGE STORAGE (CMS) TO DISPLAY

A. ALL FIXED FORMAT MESSAGES

1) FIELDS TO BE TRANSCRIBED: ALL FIELDS

2) CONDITION OF TRANSCRIPTION:

a. UPON ACTION OF THE OPERATOR TO CALL UP A COMPOSED MESSAGE

b. DURING COMPOSITION ENTRIES MADE WILL BE BROUGHT UP AND DISPLAY AS THEY ARE MADE

3) REMARKS: The composed message transcribed to the display will the one assiciated with the active FIRE MISSION sequence.

8. KEYBOARD TO COMPOSED MESSAGE STORAGE

A. FOR ALL LEGAL ENTRIES

1) LEGAL ENTRIES TO BE TRANSFERRED: ALL

2) CONDITIONS OF TRANSFER: UPON OPERATOR ACTION

3) REMARKS: None

9. COMPOSED MESSAGE STORAGE TO TRANSMIT

A. ALL FIXED FORMAT MESSAGES

1) FIELDS TO BE TRANSCRIBED: ALL FIELDS

2) CONDITION OF TRANSCRIPTION: UPON OPERATOR ACTIVATION OF THE TRANSMIT CONTROL

3) REMARKS: None

10. FORMATS AND FIXED DEFAULTS TO COMPOSED MESSAGE STORAGE

A. ALL FIXED FORMAT MESSAGES

1) FIELDS TO BE TRANSCRIBED: SEE APPENDIX 2 (SEE REMARKS)

2) CONDITION OF TRANSCRIPTION: UPON ACTION OF THE OPERATOR TO CALL UP A MESSAGE FORMAT INTO THE COMPOSED MESSAGE BUFFER.

3) REMARKS: Appendix 2 has all the defaults for the fixed format message entry fields.

11. DYNAMIC DEFAULTS TO COMPOSED MESSAGE STORAGE

A. SUBSEQUENT ADJUSTMENT (SUBQ ADJ, FORMAT #4)

1) FIELDS TO BE TRANSFERRED:

"DIRECTION" (TO POSITIONS 8-10)

"TARGET NUMBER" (TO POSITIONS 22-29)

"SHELL/FUZE" (TO POSITION 30)

"CONTROL" (TO POSITION 31)

2) CONDITIONS OF TRANSFER: UPON ACTION BY THE OPERATOR TO CALL UP THE SUBQ ADJ FORMAT

3) REMARKS: The "DIRECTION," "TARGET NUMBER,"* "SHELL/FUZE" and "CONTROL" transferred will be those associated with the FIRE MISSION sequence active when the operator called up the SUBQ ADJ format

B. PRECISION ADJUSTMENT (PREC ADJ, FORMAT #5)

1) FIELDS TO BE TRANSFERRED:

"DIRECTION" (TO POSITIONS 7-9)

"TARGET NUMBER" (TO POSITIONS 21-28)

"CONTROL" (TO POSITION 31)

2) CONDITIONS OF TRANSFER: UPON ACTION BY THE OPERATOR TO CALL UP THE SPOTTING FORMAT.

3) REMARKS: The "DIRECTION," "TARGET NUMBER"* and "CONTROL" transferred will be those associated with the FIRE MISSION sequence active when the operator called up the precision adjustment format.

C. MEAN POINT OF IMPACT AND HIGH BURST REGISTRATION MESSAGE (HB/MPI, FORMAT #6)

1) FIELDS TO BE TRANSFERRED:

* See footnote pg 129

"REFERENCE DIRECTION" (TO POSITION 8-11)
"REFERENCE VERTICAL ANGLE" (TO POSITION 13-16)
"TARGET NUMBER" (TO POSITIONS 22-29)
"TYPE REG AND OBS VERT ANGLE" (TO POSITION 31) *

2) CONDITION OF TRANSFER: UPON ACTION BY THE OPERATOR TO CALL UP THE HB/MPI FORMAT

3) REMARKS: The entries in the fields in 1 will be those sent in the HB/MPI message last sent by the FDC or they will be the most recent entries made in those fields by the operator which ever is most recent.

D. END OF MISSION AND SURVEILLANCE MESSAGE (EOM & SURV, FORMAT #7)

1) FIELDS TO BE TRANSFERRED:

"DIRECTION" (TO POSITIONS 8-10)
"TARGET TYPE" (TO POSITION 18)
"TARGET SUBTYPE" (TO POSITION 19)
"TARGET NUMBER" (TO POSITIONS 22-29)

2) CONDITIONS OF TRANSFER: UPON ACTION BY THE OPERATOR TO CALL UP THE EOM & SURV FORMAT.

3) REMARKS: The "DIRECTION", "TARGET TYPE", "TARGET SUBTYPE", and "TARGET NUMBER" * will be those associated with the FIRE MISSION sequence active when the operator called up the EOM & SURV format

E. FIRE REQUEST USING LASER MESSAGE (FR LASER, FORMAT #17)

1) FIELDS TO BE TRANSFERRED:

"DIRECTION" (TO POSITIONS 8-11)

* See footnote pg 129

"SLANT DISTANCE" (TO POSITIONS 12-14)

"VERT ANGLE" (TO POSITIONS 16-20)

2) CONDITION OF TRANSFER: UPON ACTION BY THE OPERATOR TO CALL UP THE FR LASER FORMAT

3) REMARKS: The "DIRECTION", "SLANT DISTANCE", and "VERT ANGLE" transferred will be those associated with the FIRE MISSION sequence active when the operator called up the FR LASER format. If the format is being viewed in the display, the fields in PAR 1 will be overwritten by new laser information when the information is received through data path 13. (FIGURE 4) ← also

F. SUBSEQUENT ADJUSTMENT USING LASER MESSAGE (SA LASER, FORMAT #18)

1) FIELDS TO BE TRANSFERRED:

"DIRECTION" (TO POSITIONS 8-11)
"SLANT DISTANCE" (TO POSITIONS 12-14)
"VERT ANGLE" (TO POSITIONS 16-20) TGT No (22-29)
"SHELL FUZE" (TO POSITION 30)
"CONTROL" (TO POSITION 31)

2) CONDITION OF TRANSFER: UPON ACTION BY THE OPERATOR TO CALL UP THE SA LASER FORMAT

3) REMARKS: The "DIRECTION," "SLANT DISTANCE," "VERT ANGLE," Tgt #* "SHELL/FUZE" and "CONTROL" transferred will be those associated with the FIRE MISSION sequence active when the operator called up the SA LASER format. If the format is being viewed in the display, the "DIRECTION," "SLANT ANGLE" and "VERT ANGLE" will be overwritten by new laser information when the information is received through data path 13 (FIGURE 4). If the display of the format has timed out, receipt of new laser info will cause the fields in par 1 to be overwritten by the new laser info & at the same time cause the updated display to be recalled

G. FO COMMAND MESSAGE (FO CMD, FORMAT #21)

1) FIELD TO BE TRANSFERRED:

"TARGET NUMBER" (TO CHAR POS 9-16)

2) CONDITION OF TRANSFER: Upon action by the operator to call up the FO CMD Format.

3) REMARKS: The "TARGET NUMBER" will be that associated with the FIRE MISSION sequence active when the operator called up the FO CMD Format.

H. FR QUICK

1) Field to be Transferred:

"TARGET NUMBER" (to CHAR POS 9-16)

2) Condition of Transfer:

Upon action by the operator to call up the FR QUICK format.

3) Remarks:

The "TARGET NUMBER" will be that associated with the FIRE MISSION sequence active when the operator called up the FR QUICK format.

12. COMPOSED MESSAGE STORAGE TO DYNAMIC DEFAULTS:

A. FIRE REQUEST USING GRID COORDINATES (FR GRID, FORMAT #1)

1) FIELDS TO BE TRANSCRIBED:

"DIRECTION" (FROM POS 8-10)
"TARGET TYPE" (FROM POS 23)
"TARGET SUBTYPE" (FROM POS 24)
"SHELL/FUZE" (FROM POS 30)
"CONTROL" (FROM POS 31)

2) CONDITIONS OF TRANSCRIPTION: UPON OPERATOR ACTIVATION OF THE TRANSMIT CONTROL OR IF THE OPERATOR LEAVES THE COMPOSED MESSAGE MODE

3) REMARKS: The field entries in PAR 1 shall be stored in association with the FIRE MISSION sequence active when the condition in PAR 2 occurred.

B. FIRE REQUEST USING SHIFT FROM A KNOWN POINT (FR SHIFT, FORMAT #2)

1) FIELDS TO BE TRANSCRIBED:

"DIRECTION" (FROM POS 8-10)
"TARGET TYPE" (FROM POS 23)
"TARGET SUBTYPE" (FROM POS 24)
"SHELL/FUZE" (FROM POS 30)
"CONTROL" (FROM POS 31)

2) CONDITIONS OF TRANSCRIPTION: UPON OPERATOR ACTIVATION OF THE TRANSMIT CONTROL OR IF THE OPERATOR LEAVES THE COMPOSED MESSAGE MODE

3) REMARKS: The field entries in PAR 1 shall be stored in association with the FIRE MISSION sequence active when the condition in PAR 2 occurred.

C. FIRE REQUEST USING POLAR COORDINATES (FR POLAR, FORMAT #3)

1) FIELDS TO BE TRANSCRIBED:

"DIRECTION" (FROM POS 8-11)
"TARGET TYPE" (FROM POS 23)
"TARGET SUBTYPE" (FROM POS 24)
"SHELL/FUZE" (FROM POS 30)
"CONTROL" (FROM POS 31)

2) CONDITIONS OF TRANSCRIPTION: UPON OPERATOR ACTIVATION OF THE TRANSMIT CONTROL OR IF THE OPERATOR LEAVES THE COMPOSED MESSAGE MODE

3) REMARKS: The field entries in PAR 1 shall be stored in association with the FIRE MISSION sequence active when the condition in PAR 2 occurred.

D. SUBSEQUENT ADJUSTMENT (SUBQ ADJ, FORMAT #4)

1) FIELDS TO BE TRANSCRIBED:

"DIRECTION" (FROM POS 8-10)
"TARGET NUMBER" (FROM POS 22-29)
"SHELL/FUZE" (FROM POS 30)
"CONTROL" (FROM POS 31)

2) CONDITIONS OF TRANSCRIPTION: UPON OPERATOR ACTIVATION OF THE TRANSMIT CONTROL OR IF THE OPERATOR LEAVES THE COMPOSED MESSAGE MODE

3) REMARKS: The field entries in PAR 1 shall be stored in association with the FIRE MISSION sequence active when the condition in PAR 2 occurred.

E. PRECISION ADJUSTMENT (PREC ADJ, FORMAT #5)

1) FIELDS TO BE TRANSCRIBED:

"DIRECTION" (FROM POS 7-9)

"TARGET NUMBER" (FROM POS 21-28)

"CONTROL" (FROM POS 31)

2) CONDITIONS OF TRANSCRIPTION: UPON OPERATOR ACTIVATION OF THE TRANSMIT CONTROL OR IF THE OPERATOR LEAVES THE COMPOSED MESSAGE MODE

3) REMARKS: The field entries in PAR 1 shall be stored in association with the FIRE MISSION sequence active when the condition in PAR 2 occurred.

F. MEAN POINT OF IMPACT HIGH BURST REGISTRATION MESSAGE (HB/MPI, FORMAT #6)

1) FIELDS TO BE TRANSCRIBED:

"REFERENCE DIRECTION" (FROM POS 8-11)

"REFERENCE VERTICAL ANGLE" (FROM POS 13-16)

"TARGET NUMBER" (FROM POS 22-29)

"TYPE REG AND OBS VERT ANGLE" (FROM POS 31)

2) CONDITIONS OF TRANSCRIPTION: UPON OPERATOR ACTIVATION OF THE TRANSMIT CONTROL OR IF THE OPERATOR LEAVES THE COMPOSED MESSAGE MODE

3) REMARKS: The field entries in PAR 1 shall be stored in association with the FIRE MISSION sequence active when the condition in PAR 2 occurred.

G. END OF MISSION AND SURVEILLANCE MESSAGE (EOM & SURV, FORMAT #7)

1) FIELDS TO BE TRANSCRIBED:

"DIRECTION" (FROM POS 8-10)

"TARGET TYPE" (FROM POS 18)

"TARGET SUBTYPE" (FROM POS 19)

"TARGET NUMBER" (FROM POS 22-29)

2) CONDITIONS OF TRANSCRIPTION: UPON OPERATOR ACTIVATION OF THE TRANSMIT CONTROL OR IF THE OPERATOR LEAVES THE COMPOSED MESSAGE MODE

3) REMARKS: The field entries in PAR 1 shall be stored in association with the FIRE MISSION sequence active when the condition in PAR 2 occurred.

H. FIRE REQUEST USING LASER MESSAGE (FR LASER, FORMAT #17)

1) FIELDS TO BE TRANSCRIBED:

"DIRECTION" (FROM POS 8-11)

"SLANT DISTANCE" (FROM POS 12-14)

"VERT ANGLE" (FROM POS 16-20)

"TARGET TYPE" (FROM POS 23)

"TARGET SUBTYPE (FROM POS 24)

"SHELL/FUZE" (FROM POS 30)

"CONTROL" (FROM POS 31)

2) CONDITIONS OF TRANSCRIPTION: UPON OPERATOR ACTIVATION OF THE TRANSMIT CONTROL OR IF THE OPERATOR LEAVES THE COMPOSED MESSAGE MODE

3) REMARKS: The field entries in PAR 1 shall be stored in association with the FIRE MISSION sequence active when the condition in PAR 2 occurred.

I. SUBSEQUENT ADJUSTMENT USING LASER MESSAGE (SA LASER, FORMAT #18)

1) FIELDS TO BE TRANSCRIBED:

"DIRECTION" (FROM POS 8-11)

"SLANT DISTANCE" (FROM POS 12-14)

"VERT ANGLE" (FROM POS 16-20)

"TARGET NUMBER" (FROM POS 22-24)

"SHELL/FUZE" (FROM POS 30)

"CONTROL" (FROM POS 31)

2) CONDITIONS OF TRANSCRIPTION: UPON OPERATOR ACTIVATION OF THE TRANSMIT CONTROL OR IF THE OPERATOR LEAVES THE COMPOSED MESSAGE MODE

3) REMARKS: The field entries in PAR 1 shall be stored in association with the FIRE MISSION sequence active when the condition in PAR 2 occurred.

J. FO COMMAND MESSAGE (FO CMD, FORMAT #21)

1) FIELD TO BE TRANSCRIBED:

"TARGET NUMBER" (TO CHAR POS 9-16)

2) CONDITION OF TRANSCRIPTION:

UPON OPERATOR ACTIVATION OF THE TRANSMIT CONTROL OR IF THE OPERATOR LEAVES COMPOSED MESSAGE MODE.

3) REMARKS: The field entry in PAR 1 shall be stored in association with the FIRE MISSION sequence active when the condition in PAR 2 occurred.

13. LASER RANGE FINDER TO DYNAMIC DEFAULTS

A. LASER WORD

1) FIELDS TO BE TRANSFERRED:

"DIRECTION"

"SLANT DISTANCE"

"VERT ANGLE"

2) CONDITIONS OF TRANSFER: WHEN THE LASER IS OPERATED THE INFORMATION WILL BE PASSED TO THE DMD

3) REMARKS: This information shall be stored in association with the FIRE MISSION sequence active when the information was passed from the laser to the DMD.

SOURCE	TYPE ACK/NAK	FORMAT & CONTENTS	INFORMATION DISPLAYED
FDC (Computer Center)	ACK	PREAMBLE | SYNC | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | EOT 1 - DESTINATION (1 CHAR) 2 - NUMBER (1 CHAR) 3,4 - AUTH (2 CHAR) 5 - MESSAGE TYPE ACK (5) 6 - ORIGINATOR (1 CHAR) 7,8 - TEXT (A, ACK)	6 - ORIG (1 CHAR) 2 - NUMBER (1 CHAR) 3,4 - AUTH (2 CHAR) , INDICATE "ACK"
	NAK	PREAMBLE | SYNC | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | EOT 1 - DESTINATION (1 CHAR) 2 - NUMBER (1 CHAR) 3,4 - AUTH (2 CHAR) 5 - MESSAGE TYPE ACK (5) 6 - ORIGINATOR (1 CHAR) 7,8 - TEXT (A, NAK) 9,10 - NUMBER (2 CHAR)	6 - ORIG (1 CHAR) 2 - NUMBER (1 CHAR) 3,4 - AUTH (2 CHAR) 9,10 - NUMBER (2 CHAR) INDICATE "NAK"

TABLE 3 ACK/NAK FROM FDC TO DMD

SOURCE	TYPE ACK/NAK	FORMAT & CONTENTS	INFORMATION DISPLAYED
DMD			
	AUTO ACK	PREAMBLE | SYNC | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | EOT 1 - DESTINATION (1 CHAR) 2,3,4 - NOT USED (3 SPACE CHAR) 5 - MESSAGE TYPE ACK (5) 6 - ORIGINATOR (1 CHAR) 7,8 - TEXT (A, ACK)	6 - ORIGINATOR INDICATE "AUTO ACK"

TABLE 4 AUTO ACK

TABLE 5 INITIALIZATION DEFAULT VALUES

	OPERATOR ENTRY REQUIRED	DEFAULT VALUE
DMD ADDRESS (3.2.1.3.1)	YES	
DESTINATION ADDRESS (3.2.1.3.2)	YES	
TEST/DATA DESIGNATOR (3.2.1.3.3)	NO	DATA
SINGLE/DOUBLE BLOCK TRANSMISSION (3.2.1.5.8)	NO	SINGLE
TRANSMISSION RATE (3.2.2.2)	NO	1200
PREAMBLE (3.2.1.5.2)	NO	2.2 Sec
ADVANCE DELAY (3.2.1.4.1.3)	NO	.4 Sec
AUDIBLE SIGNALS (3.2.1.3.8)		
KEYBOARD	NO	OFF
MESSAGE/ACK/NAK	NO	OFF

APPENDIX 1

MESSAGE FORMATS FOR USE BY THE DMD IN TACFIRE

MSG TYPE	DIRECTION MILS	EASTING 10 MTRS	NORTHING 10 MTRS	ALTITUDE 10 MTRS	GRID ZONE	TYPE	SUB TYPE	ATTITUDE 100 MILS	DOP	RADIUS/ LENGTH	WIDTH	STRENGTH	SHELL/ FUZE	CONTROL	MISSION
	000	0000	0000	000	STD	SPECIAL	SEE TARGET SUBTYPE LIST	0 16	PRMD	50	50	NOT GVN	NO PREF	ADJ FIRE	0
1	111	1111	1111	111	E	PERSONEL		1 17	PROBE	100	100	1	HE/QUICK	DES AF	1
	222	2222	2222	222		WEAPON		2 18	PROG	150	150	2	HE/DELAY	DEST AF	2
	333	3333	3333	333		ARMOR		3 19	PROVER	200	200	3	HE/TIME	FFE	3
	444	4444	4444	444		ARTY		4 20	DUG IN	250	250	4	HE/VT	INTENT	4
	555	5555	5555	555		ARMOR		5 21	COVER	300	300	5	WP/QUICK	ADJ AF	5
	666	6666	6666	666		VEHICLE		6 22	NOT GVN	400	400	6	WP/DELAY	ADJ DES	6
	777	7777	7777	777		RKT/MSL		7 23		500	500	7	WP/TIME	ADJ DEST	7
	888	8888	8888	888		SUPPLY		8 24		650	650	8	HE & WP	ADJ FFE	8
	999	9999	9999	999		CNTER		9 25	PRMD	800	800	9	HC SMOKE	ADJ FPT	9
	3					EQUIP		10 26	PROBE	1000	1000	10	CLUSP	CHG FFE	J
	4					BUILDING		11 27	PROG			25	ILLUM	TOT	K
	5					BRIDGE		12 28	PROVER			50	CONT ILL	DO AF	L
	6					TERRAIN		13 29	DUG IN			100	COND ILL	DO FFE	M
	[illegible]			[illegible]		ASSEMBLY		14 30	COVER			200	ICM	ECH PAT	N
	[illegible]			[illegible]		ADA		15 31	NOT GVN	NOT GVN	NOT GVN	500	OTHER	ECH	O
7	*0 9 10	11 12 13 14 15	16 17 18 19 20	21	22	23	24	25	26	27	28	29	30	31	

CHARACTER POSITION

FORMAT FOR FIRE REQUEST USING GRID COORDINATES (FR GRID)

*CHARACTER POSITION 8 shall be used to indicate the active fire mission (1 or 2) when the message was transmitted. Transmitted characters ZERO (0) through 6 and letter O designate mission Number 1. Transmitted characters 7 through N designate mission Number 2. See 3.2.1.4.3.2.1.

MSG TYP	DIRECTION MILS	EASTING 10 MTRS	NORTHING 10 MTRS	ALTITUDE 10 MTRS	GRID ZONE	TARGET DESCRIPTION: TYPE	SUB TYPE	ATTITUDE 100 MILS	DOP	RADIUS/ LENGTH	WIDTH	STRENGTH	SHELL/ FUZE	CONTROL	XSN
	000	0000	0000	000	STD	SPECIAL	SEE TARGET SUBTYPE LIST	0 16	PRAND	50	50	NOT GVN	NO PREF	ADJ FIRE	Ø
1	111	1111	1111	111	E	PERSONEL		1 17	PRONE	100	100	1	HE/QUICK	REG AF	1
	222	2222	2222	222		WEAPON		2 18	PRUG	150	150	2	HE/DELAY	DEST AF	2
	333	3333	3333	333		MORTAR		3 19	PROVER	200	200	3	HE/TIME	FFE	3
	444	4444	4444	444		ARTY		4 20	DUGIN	250	250	4	HE/VT	REPEAT	4
	555	5555	5555	555		ARMOR		5 21	COVER	300	300	5	WP/QUICK	ADJ AF	5
	666	6666	6666	666		VEHICLE		6 22	NOT GVN	400	400	6	WP/DELAY	ADJ REG	6
	077	7777	7777	777		RKT/MSL		7 22 23	E<3200	500	500	7	WP/TIME	ADJ DEST	7
	188	8888	8888	888		SUPPLY		8 24	W>3200	650	650	8	HE & WP	ADJ FFE	8
	299	9999	9999	999		CENTER		9 25	PRAND	800	800	9	HC SMOKE	ADJ PRT	9
	3					EQUIP		10 25 26	PRONE	1000	1000	10	CLOT	CHG FFE	J
	4					BUILDING		11 27	PRUG			25	ILLUM	TOT	K
	5					BRIDGE		12 28	PROVER			50	CONT ILL	DC AF	L
	6					TERRAIN		13 29	DUGIN			100	COND ILL	DC FFE	M
	[illegible]			NEG ALT OR ELEV		ASSEMBLY		14 30	COVER			200	ICM	EOM RAT	N
	[illegible]					ADA		15 31	NOT GVN	NOT GVN	NOT GVN	500	OTHER	EOM	O
7	*8 9 10	11 12 13 14 15	16 17 18 19 20	21	22	23	24	25	26	27	28	29	30	31	

CHARACTER POSITION

op will be able to select

FORMAT FOR FIRE REQUEST USING GRID COORDINATES (FR GRID)

0-6300

0-31 → E 0-31

32-63 → W 0-31?

W 31-0?

*CHARACTER POSITION 8 shall be used to indicate the active fire mission (1 or 2) when the message was transmitted. Transmitted characters ZERO (Ø), through 6 and letter O designate mission Number 1. Transmitted characters 7 through N designate mission Number 2. See 3.2.1.4.3.2.1.

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7 April 1975

ITEM NO	DIRECTION 10 MILS		KNOWN POINT No.		SHIFT	RIGHT/LEFT 10 MTRS			ADD/DROP 10 MTRS			UP DOWN METERS			TARGET DESCRIPTION							SHELL/ FUZE	CONTROL	X
															TYPE	SUB TYPE	ATTITUDE 100 MILS	DOP	RADIUS/ LENGTH	WIDTH	STRENGTH			
	0				R-0	0	0	0	0	0	0	0	0	0	SPECIAL	SEE TARGET SUBTYPE LIST	0 16	PRIMD	50	50	NOT GVN	NO PREF	ADJ FIRE	
	1	1	1	1	R-1	1	1	1	1	1	1	1	1	1	PERSONEL		1 17	PROBE	100	100	1	RE/QUICK	FDC AF	
2	2	2	2	2	R-2	2	2	2	2	2	2	2	2	2	WEAPON		2 18	PNEU	150	150	2	RE/DELAY	DEST AF	
	3	3	3	3	R-3	3	3	3	3	3	3	3	3	3	ICBM/AR		3 19	PROVER	200	200	3	RE/TIME	FFE	
	4	4	4	4	L-4	4	4	4	4	4	4	4	4	4	ARTY		4 20	DUG IN	250	250	4	RE/VT	REPEAT	
	5	5	5	5	L-5	5	5	5	5	5	5	5	5	5	ARMOR		5 21	COVER	300	300	5	WP/QUICK	ADD AF	
	6	6	6	6	L-6	6	6	6	6	6	6	6	6	6	VEHICLE		6 22	NOT GVN	400	400	6	WP/DELAY	ADD FDC	
	0	7	7	7	L-7	7	7	7	7	7	7	7	7	7	RIT/ISL		7 23		500	500	7	WP/TIME	ADD DEST	
	1	8	8	8		8	8	8	8	8	8	8	8	8	SUPPLY		8 24		650	650	8	RE & WP	ADD FFE	
	2	9	9	9		9	9	9	9	9	9	9	9	9	CENTER		9 25	PRIMD	800	800	9	NO SHIFT	ADD RET	
	3														EQUIP		10 26	PROBE	1000	1000	10	CLOP	CHG FFE	
	4														BUILDING		11 27	PNEU			25	ILLUM	TOT	
	5														BRIDGE		12 28	PROVER			50	CONT ILL	DC AF	
	6														TERMAIN		13 29	DUG IN			100	COND ILL	DC FFE	
															ASSEMBLY		14 30	COVER			200	ICM	ECM PAT	
						NOT GVN	NOT GVN			NOT GVN			NOT GVN		ADA		15 31	NOT GVN	NOT GVN	NOT GVN	500	OTHER	ECM	
7	* 8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	

CHARACTER POSITION

FORMAT FOR FIRE REQUEST USING SHIFT FROM KNOWN POINT (FR SHIFT)

*CHARACTER POSITION 8 shall be used to indicate the active fire mission (1 or 2) when the message was transmitted. Transmitted characters ZERO (Ø) through 6 designate mission Number 1. Transmitted characters 7 through M designate mission Number 2. See 3.2.1.4.3.2.1.

MSG TYPE	DIRECTION MILS				NOT USED			DISTANCE METERS				VERT CORR	UP DOWN METERS				TARGET DESCRIPTION							SHELL/ FUZE	CONTROL	XMSN
																	TYPE	SUB TYPE	ATTITUDE 100 MILS	DOP	RADIUS/ LENGTH	WIDTH	STRENGTH			
	0	0	0	0				0	0	0	0	UP	0	0	0		SPECIAL		0 16	PRIMD	50	50	NOT GVN	NO PREF	ADJ FIRE	0
	1	1	1	1				1	1	1	1	DOWN	1	1	1		PERSONEL		1 17	PRONE	100	100	1	HE/QUICK	FOG AF	1
	2	2	2	2				2	2	2	2		2	2	2		WEAPON		2 18	PRUG	150	150	2	HE/DELAY	DEST AF	2
3	3	3	3	3				3	3	3	3		3	3	3		MORTAR	SEE TARGET SUBTYPE LIST	3 19	PROVER	200	200	3	HE/TIME	FFE	3
	4	4	4	4				4	4	4	4		4	4	4		ARTY		4 20	DUGIN	250	250	4	HE/VT	REPEAT	4
	5	5	5	5				5	5	5	5		5	5	5		ARMOR		5 21	COVER	300	300	5	WP/QUICK	ADJ AF	5
	6	6	6	6				6	6	6	6		6	6	6		VEHICLE		6 22	NOT GVN	400	400	6	WP/DELAY	ADJ FFE	6
	7	7	7	7				7	7	7	7		7	7	7		INF/ISL		723		500	500	7	WP/TIME	ADJ DEST	7
	8	8	8	8				8	8	8	8		8	8	8		SUPPLY		8 24		650	650	8	HE & WP	ADJ FFE	8
	9	9	9	9				9	9	9	9		9	9	9		CENTER		9 25	PRIMD	800	800	9	HC SMOKE	ADJ FPF	9
																	EQUIP		10 26	PRONE	1000	1000	10	CLCP	CHG FFE	J
	4																BUILDING		11 27	PRUG			25	ILLUM	TOT	K
	5																BRIDGE		12 28	PROVER			50	CONT ILL	DC AF	L
	6																TRENCH		13 29	DUGIN			100	COND ILL	DC FFE	M
																	ASSEMBLY		14 30	COVER			200	ICM	ECH RAT	N
												NOT GIVEN	NOT GIVEN				ADA		15 31	NOT GVN	NOT GVN	NOT GVN	500	OTHER	ECH	0
7	* 8	9	10	11	12	13	14	15	16	17	18	19	20	21	22		23	24	25	26	27	28	29	30	31	

CHARACTER POSITION

FORMAT FOR FIRE REQUEST USING POLAR COORDINATES (FR POLAR)

*CHARACTER POSITION 8 shall be used to indicate the active fire mission (1 or 2) when the message was transmitted. Transmitted characters ZERO (Ø) through 6 designate mission Number.1. Transmitted characters 7 through M designate mission Number 2. See 3.2.1.4.3.2.1.

MSG TYPE	DIRECTION 10 MILS			OBSN	SHIFT	RIGHT/LEFT 10 METERS			ADD/DROP 10 METERS			UP/DOWN METERS			TARGET NUMBER								SHELL/ FUZE	CONTROL	X-MSN
	0	0	0	OK	R+U	0	0	0	0	0	0	0	0	0	→	P	→	P	0	0	0	0	NO PREF	ADJ FIRE	Ø
	1	1	1	DUD	R+D	1	1	1	1	1	1	1	1	1	A	Q	A	Q	1	1	1	1	HE/QUICK	ADJ AF	1
	2	2	2	LOST	R-U	2	2	2	2	2	2	2	2	2	B	R	B	R	2	2	2	2	HE/DELAY	DEST AF	2
	3	3	3	TGT NO	R-D	3	3	3	3	3	3	3	3	3	C	S	C	S	3	3	3	3	HE/TIME	FFE	3
4	4	4	4		L+U	4	4	4	4	4	4	4	4	4	D	T	D	T	4	4	4	4	HE/VT	REPEAT	4
	5	5	5		L+D	5	5	5	5	5	5	5	5	5	E	U	E	U	5	5	5	5	WP/QUICK	ADJ AF	5
	6	6	6		L-U	6	6	6	6	6	6	6	6	6	F	V	F	V	6	6	6	6	WP/DELAY	ADJ ADJ	6
		7	7		L-D	7	7	7	7	7	7	7	7	7	G	W	G	W	7	7	7	7	WP/TIME	ADJ DEST	7
		8	8			8	8	8	8	8	8	8	8	8	H	X	H	X	8	8	8	8	HE & WP	ADJ FFE	8
		9	9			9	9	9	9	9	9	9	9	9	I	Y	I	Y	9	9	9	9	NO SHOOT	ADJ MET	9
															J	Z	J	Z					CLGP	CHG FFE	J
															K		K						ILLUM	TOT	K
															L		L						CONT ILL	DC AF	L
															M		M						CORD ILL	DC FFE	M
															N		N						ICM	ECM PAT	N
	USE GT				NOT GIVEN	NOT GIVEN			NOT GIVEN			NOT GIVEN			O	←	O	←					OTHER	ECM	O
7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	

CHARACTER POSITION

FORMAT FOR SUBSEQUENT ADJUSTMENT (SUBQ ADJ)

MSG TYPE	DIRECTION 10 MILS			COMMAND	SHIFT	RIGHT/LEFT METERS			ADD/DROP METERS			UP/DOWN METERS			TARGET NUMBER								FUZE	CONTROL	XMSN
	0	0	0		R+U	0	0	0	0	0	0	0	0	0	→	P	→	P	0	0	0	0	QUICK		@
	1	1	1	1 RDD	R+D	1	1	1	1	1	1	1	1	1	A	Q	A	Q	1	1	1	1	TIME RPT	RDG AF	1
	2	2	2	2 RDDS	R-U	2	2	2	2	2	2	2	2	2	B	R	B	R	2	2	2	2	DELAY	DEST AF	2
	3	3	3	3 RDDS	R-D	3	3	3	3	3	3	3	3	3	C	S	C	S	3	3	3	3	CP		3
	4	4	4	RCRD REG PT	L+U	4	4	4	4	4	4	4	4	4	D	T	D	T	4	4	4	4			4
5	5	5	5	RCRD AS T1 REG PT	L+D	5	5	5	5	5	5	5	5	5	E	U	E	U	5	5	5	5			5
	6	6	6	REG NEXT LOT	L-U	6	6	6	6	6	6	6	6	6	F	V	F	V	6	6	6	6		AMC REG	6
		7	7		L-D	7	7	7	7	7	7	7	7	7	G	W	G	W	7	7	7	7		AMC DEST	7
		8	8			8	8	8	8	8	8	8	8	8	H	X	H	X	8	8	8	8			8
		9	9			9	9	9	9	9	9	9	9	9	I	Y	I	Y	9	9	9	9			9
															J	Z	J	Z							J
															K		K								K
															L		L								L
															M		M								M
															N		N								N
	SEE 01			NOT GIVEN	NOT GIVEN	NOT GIVEN			NOT GIVEN			NOT GIVEN			0	←	0	←					NOT GIVEN	EOM	0
7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	

CHARACTER POSITION

FORMAT FOR PRECISION ADJUSTMENT ([redacted]) Precision Registration

MSG TYPE	REFERENCE DIRECTION MILS				OBS ERR	REFERENCE VERTICAL ANGLE MILS				DIRECTION ERROR MILS			VA ERROR MILS		TARGET NUMBER								OBSN	REG & VERT ANGLE	MSN
	0	0	0	0	BA	+	0	0	0	0	0	0	0	0	→	P	→	P	0	0	0	0	OK	HB/YES	0
	1	1	1	1	BB	-	1	1	1	1	1	1	1	1	A	Q	A	Q	1	1	1	1	DNO	HB/NO	1
	2	2	2	2	LA		2	2	2	2	2	2	2	2	B	R	B	R	2	2	2	2	LOST	SAT/YES	2
	3	3	3	3	LB		3	3	3	3	3	3	3	3	C	S	C	S	3	3	3	3	IGN PL	SAT/NO	3
	4	4	4	4			4	4	4	4	4	4	4	4	D	T	D	T	4	4	4	4			4
	5	5	5	5			5	5	5	5	5	5	5	5	E	U	E	U	5	5	5	5			5
6	6	6	6	6			6	6	6	6	6	6	6	6	F	V	F	V	6	6	6	6			6
		7	7	7			7	7	7	7	7	7	7	7	G	W	G	W	7	7	7	7			7
		8	8	8			8	8	8	8	8	8	8	8	H	X	H	X	8	8	8	8			8
		9	9	9			9	9	9	9	9	9	9	9	I	Y	I	Y	9	9	9	9			9
															J	Z	J	Z							J
															K		K								K
															L		L								L
															M		M								M
															N		N								N
						GOT GIVEN				NOT GIVEN			NOT GIVEN		O	←	O	←							O
7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	

CHARACTER POSITION

FORMAT FOR MEAN POINT OF IMPACT AND HIGH BURST REGISTRATION MESSAGE (REGISTN) HE/MPI

TYPE	DIRECTION 10 HILS			SHIFT	RIGHT/ LEFT 10MTRS	ADD/ DROP 10MTRS	UP/ DOWN METERS	TYPE	SUB TYPE	DISP	CAS	TARGET NUMBER														CON-TROL	CKSM
												→	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	
	0	0	0	R-U	0	0	0	SPECIAL		NEUT	NOT USED	1	A	Q	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
	1	1	1	R-D	1	1	1	PERSONEL		WIDE NEUT		2	B	R	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1
	2	2	2	R-U	2	2	2	WEAPON				3	C	S	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
	3	3	3	R-D	3	3	3	MORTAR		DEST		4	D	T	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3
	4	4	4	L-U	4	4	4	ARTY		CHO		5	E	U	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4
	5	5	5	L-D	5	5	5	ARMOR		UNK		6	F	V	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5
	6	6	6	L-U	6	6	6	VEHICLE		HOME		7	G	W	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6
7	7	7	7	L-D	7	7	7	RST/TSL				8	H	X	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7
	8	8			8	8	8	SUPPLY				9	I	Y	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8
	9	9			9	9	9	CENTER				10	J	Z															9
								EQUIP				25	K																A
								BUILDING				50	L																B
								BRIDGE				100	M																C
								TERRAIN				200	N																D
								ASSEMBLY				300	O	←															E
								ADA																					F
7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31					

SEE TARGET SUBTYPE LIST

CHARACTER POSITION

FORMAT FOR END OF MISSION AND SURVEILLANCE MESSAGE (EOMSURV)

MSG TYPE	ENTRY NUMBER	EASTING 10 METERS	NORTHING 10 METERS	ENTRY NUMBER	EASTING 10 METERS	NORTHING 10 METERS	GRID ZONE	NOT USED	HEX
	0	0 0 0 0	0 0 0 0	0	0 0 0 0	0 0 0 0	STD		Ø
	1	1 1 1 1	1 1 1 1	1	1 1 1 1	1 1 1 1	E		1
	2	2 2 2 2	2 2 2 2	2	2 2 2 2	2 2 2 2	2		2
	3	3 3 3 3	3 3 3 3	3	3 3 3 3	3 3 3 3	3		3
	4	4 4 4 4	4 4 4 4	4	4 4 4 4	4 4 4 4	4		4
	5	5 5 5 5	5 5 5 5	5	5 5 5 5	5 5 5 5	5		5
	6	6 6 6 6	6 6 6 6	6	6 6 6 6	6 6 6 6	6		6
	7	7 7 7 7	7 7 7 7	7	7 7 7 7	7 7 7 7	7		7
8		8 8 8 8	8 8 8 8	8	8 8 8 8	8 8 8 8	8		8
	9	9 9 9 9	9 9 9 9	9	9 9 9 9	9 9 9 9	9		9
									J
									K
									L
									M
									N
				HOT GIVEN					O
7 8 9	10	11 12 13	14 15 16	17 18	19 20	21 P2 P3	P4 P5 P6	P7 P8	29 30 31

CHARACTER POSITION

FORMAT FOR FRONT LINE TRACE MESSAGE (FL TRACE)

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MSG TYPE	DIRECTION 10 MILS	EASTING METERS	NORTHING METERS	GRID ZONE	WPN TYPE	SUB TYPE	CALIBER MILLIMETERS	RDS	TIME	TEST
	0	0	0	STD			0	[illegible]	0	/
	1	1	1	E		SEE TARGET SUBTYPE LIST	1	1	1	1
	2	2	2	2			2	2	2	2
	3	3	3	3	MORTAR		3	3	3	3
	4	4	4	4	ARTY		4	4	4	4
	5	5	5	5			5	5	5	5
	6	6	6	6			6	6	6	6
	7	7	7	7			7	7	7	7
	8	8	8	8			8	8	8	8
	9	9	9	9			9	9	9	9
								10		J
								25		K
								50		L
								100		M
								200		N
							UNK	500		O
7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31

CHARACTER POSITION

FORMAT FOR ARTILLERY TARGET INTELLIGENCE SPOTTING REPORT (SHELREP)

MSG TYPE	EASTING METERS					NORTHING METERS					ALTITUDE METERS				GRID ZONE	TARGET DESCRIPTION									
																TYPE	SUB TYPE	ATTITUDE 100 MILS	DOP	RADIUS/ LENGTH	WIDTH	STRENGTH	REL	MSG SUB TYPE	MSN
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	STD			0 16	PRIMD	50	50	NOT GVN	GOOD	0	0
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	E	PERSONEL		1 17	PRONE	100	100	1	FAIR		1
	2	2	2	2	2	2	2	2	2	2	2	2	2	2		WEAPON		2 18	PRNE	150	150	2	EXC		2
	3	3	3	3	3	3	3	3	3	3	3	3	3	3		MORTAR	SEE TARGET SUBTYPE LIST	3 19	PROVER	200	200	3	DMA		3
	4	4	4	4	4	4	4	4	4	4	4	4	4	4		ARTY		4 20	DUGIN	250	250	4	DMO		4
	5	5	5	5	5	5	5	5	5	5	5	5	5	5		ARMOR		5 21	COVER	300	300	5			5
	6	6	6	6	6	6	6	6	6	6	6	6	6	6		VEHICLE		6 22	NOT GVN	400	400	6			6
	7	7	7	7	7	7	7	7	7	7	7	7	7	7		MKT/TSL		7 23		500	500	7			7
	8	8	8	8	8	8	8	8	8	8	8	8	8	8		SUPPLY		8 24		650	650	8			8
	9	9	9	9	9	9	9	9	9	9	9	9	9	9		CENTER		9 25	PRIMD	800	800	9			9
10																EQUIP		10 26	PRONE	1000	1000	10			10
																BUILDING		11 27	PRNG			25			11
																BRIDGE		12 28	PROVER			50			12
																TERRAIN		13 29	DUGIN			100			13
											NEG ALT					ASSEMBLY		14 30	COVER			200			14
											NOT GVN					ADA		15 31	NOT GVN	NOT GVN	NOT GVN	500	NOT GIVEN		0
7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	

CHARACTER POSITION

FORMAT FOR ARTILLERY INTELLIGENCE REPORT USING GRID COORDINATES (ATI GRID)

148

LATITUDE												LONGITUDE									NOT USED			SUB TYPE	MSG
MSG TYPE	SEQUENCE NUMBER		DEGREES			MINUTES		SECONDS (HUNDREDTHS)				DEGREES			MINUTES		SECONDS (HUNDREDTHS)								
	0	0	N	0	0	0	0	0	0	0	0	W0	0	0	0	0	0	0	0	0					@
	1	1	S	1	1	1	1	1	1	1	1	W1	1	1	1	1	1	1	1	1				1	1
	2	2		2	2	2	2	2	2	2	2	E0	2	2	2	2	2	2	2	2					2
	3	3		3	3	3	3	3	3	3	3	E1	3	3	3	3	3	3	3	3					3
	4	4		4	4	4	4	4	4	4	4		4	4	4	4	4	4	4	4					4
	5	5		5	5	5	5	5	5	5	5		5	5	5	5	5	5	5	5					5
	6	6		6	6		6		6	6	6		6	6		6		6	6	6					6
	7	7		7	7		7		7	7	7		7	7		7		7	7	7					7
	8	8		8	8		8		8	8	8		8	8		8		8	9	8					8
	9	9			9		9		9	9	9			9		9		9	9	9					9
10																									:
																									;
																									<
																									=
																									>
																									?
																									O
7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	

CHARACTER POSITION

FORMAT FOR ARTILLERY INTELLIGENCE REPORT USING GEOGRAPHIC COORDINATES (PART 1) (ATI GE01)

MSG TYPE	SEQUENCE NUMBER		NOT USED										ALTITUDE METERS				TARGET DESCRIPTION							REL	ISG SUB TYPE	DESIG
																	TYPE	SUB TYPE	ATTITUDE 100 MILS	DOP	RADIUS/ LENGTH	WIDTH	STRENGTH			
	0	0											0	0	0	0			0 16	PRIMD	50	50	NOT GVN	GOOD		A
	1	1											1	1	1	1	PERSONEL		1 17	PRONE	100	100	1	FAIR		1
	2	2											2	2	2	2	WEAPON		2 18	PRUG	150	150	2	EXC	2	2
	3	3											3	3	3	3	MORTAR		3 19	PROVER	200	200	3	DNA		3
	4	4											4	4	4	4	ARTY		4 20	DUG IN	250	250	4	DNC		4
	5	5											5	5	5	5	ARMOR		5 21	COVER	300	300	5			5
	6	6											6	6	6	6	VEHICLE		6 22	NOT GVN	400	400	6			6
	7	7											7	7	7	7	MT/ISL		7 23		500	500	7			7
	8	8											8	8	8	8	SUPPLY		8 24		650	650	8			8
	9	9											9	9	9	9	CENTER		9 25	PRIMD	800	800	9			9
10																	EQUIP		10 26	PRONE	1000	1000	10			J
																	BUILDING		11 27	PRUG			25			K
																	BRIDGE		12 28	PROVER			50			L
																	TERRAIN		13 29	DUG IN			100			M
													NEG ALT NOT GIVEN				ASSEMBLY		14 30	COVER			200			N
																	ADA		15 31	NOT GVN	NOT GVN	NOT GVN	500	NOT GIVEN		O
7	8	9	10	11	12	13	14	15	16	17	18		19	20	21	22	23	24	25	26	27	28	29	30	31	

SEE TARGET SUBTYPE LIST

CHARACTER POSITION

FORMAT FOR ARTILLERY INTELLIGENCE REPORT USING GEOGRAPHIC COORDINATES (PART 2) (ATI GEO2)

150

MSG TYPE	DIRECTION MILS			NOT USED			DISTANCE METERS				VERT CORR	UP/DOWN METERS			TARGET DESCRIPTION							PRI	NOT USED	SVC
															TYPE	SUB TYPE	ATTITUDE 100 MILS	DOP	RADIUS/ LENGTH	WIDTH	STRENGTH			
	0	0	0	0			0	0	0	0	UP	0	0	0			0 16	PRIMD	50	50	NOT GVN	GOOD		0
	1	1	1	1			1	1	1	1	DOWN	1	1	1	PERSONEL		1 17	PRONE	100	100	1	FAIR		1
	2	2	2	2			2	2	2	2		2	2	2	WEAPON		2 18	PRUG	150	150	2	[illegible]		2
	3	3	3	3			3	3	3	3		3	3	3	MORTAR		3 19	PROVER	200	200	3	[illegible]		3
	4	4	4	4			4	4	4	4		4	4	4	ARTY		4 20	DUGIN	250	250	4	[illegible]		4
	5	5	5	5			5	5	5	5		5	5	5	ARMOR		5 21	COVER	300	300	5			5
	6	6	6	6			6	6	6	6		6	6	6	VEHICLE		6 22	NOT GVN	400	400	6			6
	7	7	7	7			7	7	7	7		7	7	7	NKT/ESL		7 23		500	500	7			7
	8	8	8	8			8	8	8	8		8	8	8	SUPPLY		8 24		650	650	8			8
	9	9	9	9			9	9	9	9		9	9	9	CENTER		9 25	PRIMD	800	800	9			9
															EQUIP		10 26	PRONE	1000	1000	10			10
11															BUILDING		11 27	PRUG			25			11
															BRIDGE		12 28	PROVER			50			12
															TERRAIN		13 29	DUGIN			100			13
															ASSEMBLY		14 30	COVER			200			14
											NOT GIVEN	NOT GIVEN			ADA		15 31	NOT GVN	NOT GVN	NOT GVN	500	NOT GIVEN		0
7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	

SEE TARGET SURFACE LIST

CHARACTER POSITION

FORMAT FOR ARTILLERY INTELLIGENCE REPORT USING POLAR COORDINATES (ATI POLAR)

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EL-SS-2603-TF
7 April 1977

MSG TYPE	KNOWN POINT NUMBER		NOT USED													TARGET NUMBER								NOT USED	[illegible] NUMBER	MSN
	0	0														→	P	→	P	0	0	0	0		[illegible] GVN	ø
	1	1														A	0	A	0	1	1	1	1		1	1
	2	2														B	P	B	R	2	2	2	2		2	2
	3	3														C	S	C	S	3	3	3	3			3
	4	4														D	T	D	T	4	4	4	4			4
	5	5														E	U	E	U	5	5	5	5			5
	6	6														F	V	F	V	6	6	6	6			6
	7	7														G	W	G	W	7	7	7	7			7
	8	8														H	X	H	X	8	8	8	8			8
	9	9														I	Y	I	Y	9	9	9	9			9
	ASSIGN KNPT FIRE FFF															J	Z	J	Z							J
																K		K								K
12	FIRE TGT NO.															L		L								L
																M		M								M
																N		N								N
																O	←	O	←							O
7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		

CHARACTER POSITION

FORMAT FOR QUICK RESPONSE FIRE REQUEST (FR QUICK)

This selection of the word must mean that a TR will be fired and therefore default from if previous mission would [illegible]

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7 April 1975

| MSG TYPE | EASTING METERS | | | | | | NORTHING METERS | | | | | | ALTITUDE METERS | | | | | GZ | NOT USED | | | | | |

FORMAT FOR RADAR REGISTRATION (RDR REG)

CHARACTER POSITION

MSG TYPE	DIRECTION (MILS)				DISTANCE SLANT (METERS)				VERT ANGLE					TYPE MISSION	FT NO	TARGET DESCRIPTION							SHELL/ FUZE	CONTROL	MSN
											(MILS)					TYPE	SUB TYPE	ATTITUDE 100 MILS	DOP	RADIUS/ LENGTH	WIDTH	STRENGTH			
	0	0	0	0	0	0	0	0	UP	0	0	0	0	STA TGT	1	SPECIAL	SEE TARGET SUBTYPE LIST	0 16	FIXED	50	50	NOT GVN	NO TIME	ADJ FIRE	0
	1	1	1	1	1	1	1		DOWN	1	1	1	1	PRED PNT	2	PERSONEL		1 17	PHOSE	100	100	1	IM/QUICK	FCM AP	1
	2	2	2	2	2	2	2				2	2	2	TRAK TGT		VEHICLE		2 18	PROG	150	150	2	IM/DELAY	DEST AP	2
	3	3	3	3	3	3	3				3	3	3	TRAV TGT		TANK		3 19	POWER	200	200	3	IB/FUZE	FIX	3
	4	4	4	4	4	4	4				4	4	4	LAST PNT		AIRCRAFT		4 20	DEPTH	250	250	4	IE/AT	ILLUM AT	4
	5	5	5	5	5	5	5				5	5	5	TRIAT		ARMOR		5 21	COVER	300	300	5	WP/QUICK	ADJ AP	5
	6	6	6	6	6	6	6				6	6	6	RESECT		VEHICLE		6 22	NOT GVN	400	400	6	WP/DELAY	ADJ PFF	6
	0	7	7	7	7	7	7				7	7	7			PERSONEL		7 23		500	500	7	WP/FUZE	ADJ ILLUM	7
	1	8	8	8	8	8	8				8	8	8			BUILDING		8 24		650	650	8	IE & WP	ADJ FIX	8
	2	9	9	9	9	9	9				9	9	9			CANNON		9 25	FIXED	800	800	9	HC SMOKE	ADJ DET	9
	3															EQUIP		10 26	PHASE	1000	1000	10	CAMP	CLD FIX	J
	4															BUILDING		11 27	PROG			25	ILLUM	TGT	K
	5															BRIDGE		12 28	POWER			50	CONT ILL	DC AP	L
	6															TERRAIN		13 29	DEPTH			100	COLD ILL	DC FIX	M
															Not Used	ASSEMBLY		14 30	COVER			200	ICM	ECM DET	N
																AEA		15 31	NOT GVN	NOT GVN	NOT GVN	500	OTHER	ECM	0
																									P
17																									Q
																									R
																									S
																									T
																									U
7	*8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	

CHARACTER POSITION

FORMAT FOR FIRE REQUEST TO/FM LASER (FR LASER)

*CHARACTER POSITION 8 shall be used to indicate the active fire mission (1 or 2) when the message was transmitted. Transmitted characters ZERO (Ø) through 6 designate mission Number 1. Transmitted characters 7 through M designate mission Number 2. See 3.2.1.4.3.2.1.

MSG TYPE	DIRECTION (MILS)	SLANT DISTANCE (METERS)	VERT ANGLE	OBSN	TARGET NUMBER	SHELL/FUZE	CONTROL	VOICE
	0 0 0	0 0 0 0	UP 0 0 0 0	OK-TGT →	P → P 0 0 0 0	NO PREF	ADJ FIRE	0
	1 1 1	1 1 1 1	DOWN 1 1 1 1	OK-BT A	A Q Q 1 1 1 1	HE/QUICK	REG AF	1
	2 2 2	2 2 2 2	2 2 2 2	DNO-TGT B	B R R 2 2 2 2	HE/DELAY	DEST AF	2
	3 3 3	3 3 3 3	3 3 3 3	LOST-TGT C	C S S 3 3 3 3	HE/TIME	FFE	3
	4 4 4	4 4 4 4	4 4 4 4	LOST-BT D	D T T 4 4 4 4	HE/VT	ADJ FIRE	4
	5 5 5	5 5 5 5	5 5 5 5	TGT-NO E	E U U 5 5 5 5	WP/QUICK	ADJ AF	5
	6 6 6	6 6 6 6	6 6 6 6	F	F V V 6 6 6 6	WP/DELAY	ADJ REG	6
	7 7 7	7 7 7 7	7 7 7 7	G	G W W 7 7 7 7	WP/TIME	ADJ DEST	7
	8 8 8	8 8 8 8	8 8 8 8	H	H X X 8 8 8 8	HC & WP	ADJ FFE	8
	9 9 9	9 9 9 9	9 9 9 9	I	I Y Y 9 9 9 9	HC SMOKE	ADJ BST	9
				J	J Z Z	CLOSE	CHG FFE	J
				K	K	ILLUM	TGT	K
				L	L	CONT ILL	DC AF	L
				M	M	COND ILL	DC FFE	M
				N	N	ICM	ECM RAT	N
				O	O ←	OTHER	ECM	O
					←			P
								Q
18								R
								S
								T
								U
7	8 9	10 11 12	13 14 15	16	17 18 19	20 21	22 23 24 25	26 27 28 29	30	31

CHARACTER POSITION

FORMAT FOR SUBSEQUENT ADJUSTMENT USING LASER (SA LASER)

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MSG TYPE	TARGET NUMBER								ADJUSTING UNIT TO FIRE								NO VOL		NO UNITS		PER Prob Eff Rq			ASF Adj SH/FZ	SF 1st VOL SH/FZ	SF SUBQ VOL SH/FZ	ME Method of Engag.	CONT Control	TIME OF FLIGHT			ANGLE T TO 100 MILS >500		FIRE MISSION BUFFER	WORD
	→	P	→	P	0	0	0	0	0	G	→	P	0	0	0	0	0	0	0	0	0	0	0	NO PREF	NO PREF	NO PREF	HIGH/DC	WR/AF	0	0	0	0	0	[illegible]	A
	A	Q	A	Q	1	1	1	1	1	1	A	Q	1	1	1	1	1	1	1	1	1	1	1	HE/QUICK	HE/QUICK	HE/QUICK	HIGH/PEG	WR/AFFE	1	1	1	1	1	1	1
	B	R	B	R	2	2	2	2	2	2	B	R	2	2	2	2	2	2	2	2	2	2	2	HE/DELAY	HE/DELAY	HE/DELAY	HIGH/TOT	WR/RFFE	2	2	2	2	2	2	2
	C	S	C	S	3	3	3	3	3	3	C	S	3	3	3	3	3	3	3	3	3	3	3	HE/TIME	HE/TIME	HE/TIME	LOW/DC	ANC/AF	3	3	3	3	3		3
	D	T	D	T	4	4	4	4	4	4	D	T	4	4	4	4	4	4	4	4	4	4	4	HE/VT	HE/VT	HE/VT	LOW/PEG	ANC/FFE	4	4	4	4	4		4
	E	U	E	U	5	5	5	5	5	5	E	U	5	5	5	5	5	5	5	5	5	5	5	WP/QUICK	WP/QUICK	WP/QUICK	LOW/TOT	ANC/RFFE	5	5	5	5	5		5
	F	V	F	V	6	6	6	6	6	6	F	V	6	6	6	6	6	6	6	6	6	6	6	WP/DELAY	WP/DELAY	WP/DELAY	DEST/DC	CHO/AF	6	6	6	6	6		6
	G	W	G	W	7	7	7	7	7	7	G	W	7	7	7	7	7	7	7	7	7	7	7	WP/TIME	WP/TIME	WP/TIME	DEST/PEG	CHO/FFE	7	7	7	7	7		7
	H	X	H	X	8	8	8	8	8	8	H	X	8	8	8	8	8	8	8	8	8	8	8	HE & WP	HE & WP	HE & WP	DEST/TOT	CHO/RFFE	8	8	8	8	8		8
	I	Y	I	Y	9	9	9	9	9	9	I	Y	9	9	9	9	9	9	9	9	9	9	9	NO SMOKE	NO SMOKE	NO SMOKE			9	9	5	9	9		9
	J	Z		Z						R	J	Z												CHAP	CHAP	CHAP									J
	K		K							C	K													ILLUM	ILLUM	ILLUM									K
	L		L							L	L													CONT ILL	CONT ILL	CONT ILL									L
	M		M								M													COORD ILL	COORD ILL	COORD ILL									M
	N		N								N													ICM	ICM	ICM									N
	O	←	O	←							O	←												OTHER	OTHER	OTHER									O
																																				P
																																				Q
																																				R
19																																				S
																																				T
																																				U
7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	

CHARACTER POSITION

FORMAT FOR INSMAGE TO OBSERVER (MTO)

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XMSN	MSG TYPE	FIRE INFORMATION	TARGET NUMBER								NOT USED	
Ø		SHOT	→	P	→	P	0	0	0	0		
1		SPLASH	A	Q	A	Q	1	1	1	1		
2		DESIGNATE	B	R	B	R	2	2	2	2		
3		FIRE	C	S	C	S	3	3	3	3		
4		CHECK FIRE	D	T	D	T	4	4	4	4		
5			E	U	E	U	5	5	5	5		
6			F	V	F	V	6	6	6	6		
7			G	W	G	W	7	7	7	7		
8			H	X	H	X	8	8	8	8		
9			I	Y	I	Y	9	9	9	9		
J			J	Z	J	Z						
K			K		K							
L			L		L							
M			M		M							
N			N		N							
O			O	←	O	←						
P												
Q												
R												
S												
T												
U	21											
	7	8	9	10	11	12	13	14	15	16	17	31

CHARACTER POSITION

FORMAT FOR FO COMMAND MESSAGE (FO CMD)

Only one will be sent by TF ships.

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TARGET SUBTYPE LIST

TARGET * TYPE CHAR	TARGET TYPE ARGUMENT	TARGET * SUBTYPE CHAR	TARGET SUBTYPE ARGUMENT
0	Special (SPECIAL)	∅	Oncall (ON CALL)
		1	Illum - 1 Gun (ILL1GUN)
		2	Illum - 2 Gun (ILL2GUN)
		3	Illum - 2 Gun Deflection Spread (ILL2GUND)
		4	Illum - 2 Gun Range Spread (ILL2GUNR)
		5	Illum - 4 Gun (ILL4GUN)
		6	Not Used
		7	" "
		8	" "
		9	" "
		J	Gas-Nonpersistent (GAS NONP)
		K	Gas-Persistent (GAS PERS)
		L	Leaflets (LEAFLET)
		M-N	Not Used
		O	Target Type/Subtype-Not Given (N/G)
1	Personnel (PERSONEL)	∅	Unknown
		1	Infantry
		2	Observation Post (OP)
		3	Patrol
		4	Work Party (WKPTY)
		5	Position
		6-N	Not Used
		O	Target Type/Subtype-Not Given (N/G)
2	Weapons (WEAPON)	∅	Unknown
		1	Light Machine Gun (LT M GUN)
		2	Antitank Gun (AT GUN)
		3	Heavy Machine Gun (HVY MGUN)
		4	Recoiless Rifle (RCLR)
		5	Position
		6-N	Not Used
		O	Target Type/Subtype-Not Given (N/G)
3	Mortars (MORTAR)	∅	Unknown
		1	Light
		2	Medium
		3	Heavy
		4	Very Heavy (VERY HVY)
		5	Position
		6-N	Not Used
		O	Target Type/Subtype-Not Given (N/G)

* "∅" is number ZERO, and "O" is letter O (TABLE 1).

TARGET * TYPE CHAR	TARGET TYPE ARGUMENT	TARGET * SUBTYPE CHAR	TARGET SUBTYPE ARGUMENT
4	Artillery (ARTY)	ø	Unknown
		1	Light
		2	Medium
		3	Heavy
		4	Not Used
		5	Not Used
		6	Position
		7-N	Not Used
		0	Target Type/Subtype-Not Given
5	Armor (ARMOR)	ø	Unknown
		1	Light
		2	Medium
		3	Heavy
		4	Armored Personnel Carrier (APC)
		5	Position
		6-N	Not Used
		0	Target Type/Subtype-Not Given
6	Vehicles (VEHICLE)	ø	Unknown
		1	Light Wheeled (LT WHEEL)
		2	Heavy Wheeled (HVYWHEEL)
		3	Reconnaissance (RECON)
		4	Boats (BOAT)
		5	Aircraft
		6	Helicopter (HELICPTR)
		7-N	Not Used
		0	Target Type/Subtype-Not Given
7	Rockets/Missiles((RKTMSL)	ø	Unknown
		1	Antipersonnel (APERS)
		2	Light Missile (LT MSL)
		3	Medium Missile (MDM MSL)
		4	Heavy Missile (HVY MSL)
		5	Antitank
		6	Position
		7-N	Not Used
		0	Target Type/Subtype-Not Given

* "ø" is number ZERO, and "O" is letter O (TABLE 1).

TARGET * TYPE CHAR	TARGET TYPE ARGUMENT	TARGET * SUBTYPE CHAR	TARGET SUBTYPE ARGUMENT
8	Supply Dumps (SUPPLY)	ø	Unknown
		1	Ammunition (AMMO)
		2	Petroleum, Oil (PTL,OIL)
		3	Not Used
		4	Bridging Equipment (BRG EQPT)
		5	Class I
		6	Class II
		7-N	Not Used
		0	Target Type/Subtype-Not Given
9	Centers (CENTER)	ø	Unknown
		1	Small
		2	Battalion (BN)
		3	Regiment (REGT)
		4	Division
		5	Forward
		6-N	Not Used
		0	Target Type/Subtype-Not Given
J	Equipments (EQUIP)	ø	Unknown
		1	Radar
		2	Electronic Warfare (EW)
		3	Searchight (SLT)
		4	Guidance
		5	Loudspeaker (LOUDSPKR)
		6-N	Not Used
		0	Target Type/Subtype-Not Given
K	Buildings (BUILDING)	ø	Unknown
		1	Wooden
		2	Brick or Stone (MASNRY)
		3	Concrete
		4	Metal
		5	Special Purpose (SPECIAL)
		6-N	Not Used
		0	Target Type/Subtype-Not Given

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* "ø" is number ZERO, and "O" is letter O (TABLE 1).

TARGET * TYPE CHAR	TARGET TYPE ARGUMENT	TARGET * SUBTYPE CHAR	TARGET SUBTYPE ARGUMENT
L	Bridges (BRIDGE)	ø	Unknown
		1	Foot Pontoon (FOOT PON)
		2	Vehicle Pontoon (VEH PONT)
		3	Concrete
		4	Wooden
		5	Steel
		6	Site
		7	Raft
		8	Ferry
		9-N	Not Used
		0	Target Type/Subtype-Not Given
M	Terrain Features (TERRAIN)	ø	Unknown
		1	Road
		2	Junction
		3	Hill
		4	Defile
		5	Landing Strip (LDG STRP)
		6	Railroad
		7-N	Not Used
		0	Target Type/Subtype-Not Given
N	Assembly Areas (ASSEMBLY)	ø	Unknown
		1	Troops
		2	Troops and Vehicles (TRP & VEH)
		3	Mechanized Troops (TRP MECH)
		4	Troops and Armor (TRP & ARM)
		5-N	Not Used
		0	Target Type/Subtype-Not Given
O	Air Defense Artillery (ADA)	ø	Unknown
		1	Light
		2	Medium
		3	Heavy
		4	Missile
		5	Position
		6-N	Not Used
		0	Target Type/Subtype-Not Given

* "ø" is number ZERO, and "O" is letter O (TABLE 1).

APPENDIX 2

DEFAULT VALUES, DISPLAY SEQUENCE FOR ENTRY FIELDS AND REQUIRED ENTRIES FOR TACFIRE DMD MESSAGES

FORMAT #1 FIRE REQUEST GRID COORDINATES

ENTRY FIELD AND DISPLAY SEQUENCE	REQUIRED	DEFAULT	CHAR X-MTD*	SEE PARAGRAPH
MESSAGE TYPE	YES		1	
EASTING	YES		N/A	
NORTHING	YES		N/A	
ALTITUDE	YES		N/A	
GRID ZONE	NO	STD	ø	
DIRECTION	NO	USE GT	N OR O	
TARGET TYPE	NO	PERSONNEL	1	3.2.1.4.1.8
TARGET SUBTYPE	NO	NOT GIVEN	O	3.2.1.4.1.8
STRENGTH	NO	NOT GIVEN	ø	
DOP	NO	NOT GIVEN	6	
MAD/LENGTH	NO	NOT GIVEN	O	
WIDTH	NO	NOT GIVEN	O	
ATTITUDE	NO	ø	ø	3.2.1.4.1.6
SH/FZ	NO	NO PREF	ø	
CONTROL	NO	AF	ø	

* N/A in character transmitted is used for required entries. The actual character transmitted will depend on the entry made by the operator. "ø" is number ZERO, and "O" is letter O (Table 1).

FORMAT #2 FIRE REQUEST - SHIFT FROM KNOWN POINT

ENTRY FIELD AND DISPLAY SEQUENCE	REQUIRED	DEFAULT	CHAR X-TD*	SEE PARAGRAPH
MESSAGE TYPE	YES		2	
KNOWN POINT NO.	YES		N/A	
DIRECTION	YES		N/A	
SHIFT	NO	NOT GIVEN	O	
RIGHT/LEFT	Yes (1)	NOT GIVEN	O	
ADD/DROP	Yes (1)	NOT GIVEN	O	
UP/DOWN	Yes (1)	NOT GIVEN	O	
TARGET TYPE	NO	PERSONNEL	1	3.2.1.4.1.8
TARGET SUBTYPE	NO	NOT GIVEN	O	3.2.1.4.1.8
STRENGTH	NO	NOT GIVEN	Ø	
DOP	NO	NOT GIVEN	6	
RADIUS/LENGTH	NO	NOT GIVEN	O	
WIDTH	NO	NOT GIVEN	O	
ATTITUDE	NO	Ø	Ø	3.2.1.4.1.6
SH/FZ	NO	NO PREF	Ø	
CONTROL	NO	AF	Ø	

(1) The magnitude of the shift is required if a shift direction is selected. If NOT GIVEN is selected for shift direction, then the magnitude is not required.

* N/A in character transmitted is used for required entries. The actual character transmitted will depend on the entry made by the operator. "Ø" is number ZERO, and "O" is letter O (Table 1).

FORMAT #3 FIRE REQUEST - POLAR COORDINATES

ENTRY FIELD AND DISPLAY SEQUENCE	REQUIRED	DEFAULT	CHAR X-TD*	SEE PARAGRAPH
MESSAGE TYPE	YES		3	
DIRECTION	YES		N/A	
DISTANCE	YES		N/A	
~~VERTICAL CORRECTION~~	~~NO~~	~~NOT GIVEN~~	~~0~~	
UP/DOWN METERS	Yes (1)	NOT GIVEN	0	
TARGET TYPE	NO	PERSONNEL	1	3.2.1.4.1.8
TARGET SUBTYPE	NO	NOT GIVEN	0	3.2.1.4.1.8
STRENGTH	NO	NOT GIVEN	ø	
DOP	NO	NOT GIVEN	6	
RADIUS/LENGTH	NO	NOT GIVEN	0	
WIDTH	NO	NOT GIVEN	0	
ATTITUDE	NO	ø	ø	3.2.1.4.1.6
~~SH/FZ~~	~~NO~~	~~NO PREF~~	ø	
CONTROL	NO	AF	ø	

(1) See Page 166

* N/A in character transmitted is used for required entries. The actual character transmitted will depend on the entry made by the operator. "ø" is number ZERO, and "O" is letter O (Table 1).

FORMAT #4 SUBSEQUENT ADJUSTMENT

ENTRY FIELD AND DISPLAY SEQUENCE	REQUIRED	DEFAULT	CHAR X-MTD*	SEE PARAGRAPH
MESSAGE TYPE	YES		4	
DIRECTION	YES	AS CARRIED FROM 1) FIRE REQUEST OR 2) LAST ADJ WHICHEVER MOST RECENT	N/A	
OBSERVATION	NO	OK	ø	
SHIFT	NO	NOT GIVEN	0	3.2.1.4.1.7
RIGHT/LEFT	Yes (1)	NOT GIVEN	0	
ADD/DROP	Yes (1)	NOT GIVEN	0	
UP/DOWN	Yes (1)	NOT GIVEN	0	
TARGET NUMBER	YES	AS RECEIVED FROM FDC IN MTO OR CARRIED FROM LAST ADJ: OTHERWISE OPERATOR ENTRY	N/A	
SH/FZ	NO	AS CARRIED FROM 1) FIRE REQUEST OR 2) LAST ADJ WHICHEVER MOST RECENT	N/A	
CONTROL	NO		N/A	

(1) See Page 166.

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* N/A in character transmitted is used for required entries. The actual character transmitted will depend on the entry made by the operator. "ø" is number ZERO, and "O" is letter O (Table 1).

FORMAT #5 FORMAT FOR PRECISION ADJUSTMENT

ENTRY FIELD AND DISPLAY SEQUENCE	REQUIRED	DEFAULT	CHAR X-MTD*	SEE PAR
MESSAGE TYPE	YES		5	
DIRECTION	YES	AS CARRIED FROM 1) FIRE REQUEST OR 2) LAST ADJ WHICHEVER IS MOST RECENT	N/A	
~~COMMAND~~	~~NO~~	~~1 ROUND~~	~~1~~	
SHIFT	NO	NOT GIVEN	0	3.2.1.4.1.7
RIGHT/LEFT	Yes (1)	NOT GIVEN	0	
ADD/DROP	Yes (1)	NOT GIVEN	0	
UP/DOWN	Yes (1)	NOT GIVEN	0	
TARGET NUMBER	YES	AS RECEIVED FROM FDC IN MTO OR CARRIED FROM 1) LAST ADJ WHICHEVER IS MOST RECENT OTHERWISE OPERATOR ENTRY	N/A	
FUZE	NO	NOT GIVEN	0	
CONTROL	NO	AS CARRIED FROM 1) FIRE REQUEST 2) LAST ADJ WHICHEVER IS MOST RECENT (CONTROL WILL BE CARRIED ONLY IF IT IS ONE OF THE VALID ENTRIES FOR THE CONTROL FIELD IN THE PREC ADJ FORMAT, OTHERWISE IT WILL DEFAULT TO REG AF)	N/A	
(1) See Page 166.				AMENDMENT 16 JULY 1975 PAGE 42 OF 47

* N/A in character transmitted is used for required entries. The actual character transmitted will depend on the entry made by the operator. "ϕ" is number ZERO, and "O" is letter O (Table 1).

FORMAT #5 FORMAT FOR PRECISION ADJUSTMENT

ENTRY FIELD AND DISPLAY SEQUENCE	REQUIRED	DEFAULT	CHAR XMTD*	SEE PAR
MESSAGE TYPE	YES		5	
DIRECTION	YES	AS CARRIED FROM 1) FIRE REQUEST OR 2) LAST ADJ WHICHEVER IS MOST RECENT	N/A	
COMMAND	NO	1 ROUND	1	
SHIFT	NO	NOT GIVEN	0	3.2.1.4.1.7
RIGHT/LEFT	NO	NOT GIVEN	0	
ADD/DROP	NO	NOT GIVEN	0	
UP/DOWN	NO	NOT GIVEN	0	
TARGET NUMBER	YES	AS RECEIVED FROM FDC IN MTO OR CARRIED FROM 1) LAST ADJ WHICHEVER IS MOST RECENT OTHERWISE OPERATOR ENTRY	N/A	
FUZE	NO	NOT GIVEN	0	
CONTROL	NO	AS CARRIED FROM 1) FIRE REQUEST 2) LAST ADJ WHICHEVER IS MOST RECENT (CONTROL WILL BE CARRIED ONLY IF IT IS ONE OF THE VALID ENTRIES FOR THE CONTROL FIELD IN THE PREC ADJ FORMAT, OTHERWISE IT WILL DEFAULT TO REG AF)	N/A	
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* N/A in character transmitted is used for required entries. The actual character transmitted will depend on the entry made by the operator. "Ø" is number ZERO, and "O" is letter O (Table 1).

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7 April 1975

FORMAT #6 MEAN POINT OF IMPACT AND HIGH BURST REGISTRATION

ENTRY FIELD AND DISPLAY SEQUENCE	REQUIRED	DEFAULT	CHAR X-TD*	SEE PARAGRAPH
MESSAGE TYPE	YES		6	
REFERENCE DIRECTION	YES	AS CARRIED FROM HB/MPI MESSAGE SENT BY FDC: OTHERWISE OPERATOR ENTRY	N/A	
OBSERVED ERROR	YES		N/A	
REFERENCE VERTICAL ANGLE		AS CARRIED FROM HB/MPI MESSAGE SENT BY FDC: OTHERWISE OPERATOR ENTRY	N/A	
DIRECTION ERROR	NO	NOT GIVEN	O	
OBS VERT ANGLE	NO	AS CARRIED FROM HB/MPE MSG SENT FROM FDC: OTHERWISE "YES"	Ø	
VERTICLE ANGLE ERROR	NO	NOT GIVEN	O	
TARGET NUMBER	YES	AS CARRIED FROM HB/MPI MESSAGE SENT BY FDC: OTHERWISE OPERATOR ENTRY	N/A	
OBSERVATION	NO	OK	Ø	
REG & VERT ANGLE	YES		N/A	

* N/A in character transmitted is used for required entries. The actual character transmitted will depend on the entry made by the operator. "Ø" is number ZERO, and "O" is letter O (Table 1).

FORMAT #7 END OF MISSION AND SURVEILLANCE MESSAGE

ENTRY FIELD AND DISPLAY SEQUENCE	REQUIRED	DEFAULT	CHAR X-TD*	SEE PARAGRAPH
MESSAGE TYPE	YES		7	
DIRECTION	NO	AS CARRIED FROM FIRE REQUEST OR ADJ WHICHEVER LAST USED: OTHERWISE USE GT	N/A (USE GT:O)	
SHIFT	NO	NOT GIVEN	O	3.2.1.4.1.7
RIGHT/LEFT	Yes (1)	NOT GIVEN	O	
ADD/DROP	Yes (1)	NOT GIVEN	O	
TARGET TYPE	NO	AS CARRIED FROM FIRE REQUEST OTHERWISE : PERSONNEL	N/A (PERSONNEL:1)	3.2.1.4.1.8
TARGET SUBTYPE	NO	AS CARRIED FROM FIRE REQUEST OTHERWISE: NOT GIVEN	N/A (NT GVN:O)	3.2.1.4.1.8
CAS	NO	NOT GIVEN	ø	
TARGET NUMBER	YES	AS CARRIED FROM MTO OR ADJ WHICHEVER LAST USED : OTHERWISE OPERATOR ENTRY	N/A	
CONTROL	NO	EOM		
See Page 166.				AMENDMENT 16 JULY 1975 PAGE 43 OF 47

* N/A in character transmitted is used for required entries. The actual character transmitted will depend on the entry made by the operator. "ø" is number ZERO, and "O" is letter O (Table 1).

FORMAT #8 FRONT LINE TRACE MESSAGE

ENTRY FIELD AND DISPLAY SEQUENCE	REQUIRED	DEFAULT	CHAR XMTD*	SEE PARAGRAPH
MESSAGE TYPE	YES		8	
ENTRY NUMBER	YES		N/A	
EASTING	YES		N/A	
NORTHING	YES		N/A	
ENTRY NUMBER	NO	NOT GIVEN	0	
EASTING	YES - IF 2nd ENTRY NOT USED	IF 2nd ENTRY IS NOT GIVEN SEND ALL Øs	N/A	
NORTHING				
GRID ZONE	NO	STD	Ø	

* N/A in character transmitted is used for required entries. The actual character transmitted will depend on the entry made by the operator. "Ø" is number ZERO, and "O" is letter O (Table 1).

FORMAT #9 SHELLING REPORT

ENTRY FIELD AND DISPLAY SEQUENCE	REQUIRED	DEFAULT	CHAR X-MTD*	SEE PARAGRAPH
MESSAGE TYPE	YES		9	
DIRECTION	YES		N/A	
EASTING	YES		N/A	
NORTHING	YES		N/A	
GRID ZONE	NO	STD	ø	
WEAPON TYPE	YES		N/A	
SUB TYPE [1]	NO	UNK	ø	
CALIBER	YES		N/A	
ROUNDS	NO	NOT GIVEN	ø	
TIME	YES		N/A	

[1] Subtype display for Target Type MORTAR and ARTY shall not display POSITION.

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* N/A in character transmitted is used for required entries. The actual character transmitted will depend on the entry made by the operator. "ø" is number ZERO, and "O" is letter O (Table 1).

FORMAT #1ø/ø ATI USING COORDINATES

ENTRY FIELD AND DISPLAY SEQUENCE	REQUIRED	DEFAULT	CHAR XMTD*	SEE PARAGRAPH
MESSAGE TYPE	YES		J	
EASTING	YES		N/A	
NORTHING	YES		N/A	
ALTITUDE	NO	NOT GIVEN	0	
GRID ZONE	NO	STD	ø	
TARGET TYPE	NO	PERSONNEL	1	3.2.1.4.1.8
TARGET SUBTYPE	NO	NOT GIVEN	0	3.2.1.4.1.8
STRENGTH	NO	NOT GIVEN	0	
DEGREE OF PROTECTION	NO	NOT GIVEN	6	
RADIUS/LENGTH	NO	NOT GIVEN	0	
WIDTH	NO	NOT GIVEN	0	
ATTITUDE	NO	ø	ø	3.2.1.4.1.6
RELIABILITY	NO	NOT GIVEN	0	
MSG SUBTYPE **	YES			

** This field is not displayed.

* N/A in character transmitted is used for required entries. The actual character transmitted will depend on the entry made by the operator. "ø" is number ZERO, and "O" is letter O (Table 1).

FORMAT #10 A/1 ATI GEO 1

ENTRY FIELD AND DISPLAY SEQUENCE	REQUIRED	DEFAULT	CHAR XMTD*	SEE PARAGRAPH
MESSAGE TYPE	YES		J	
MESSAGE SUBTYPE **	YES		1	
LATITUDE	YES		N/A	
LONGITUDE	YES		N/A	
Sequence No.	YES	-	N/A	

** This field is not displayed.

* N/A in character transmitted is used for required entries. The actual character transmitted will depend on the entry made by the operator. "Ø" is number ZERO, and "O" is letter O (Table 1).

FORMAT #10 B/2 ATI GEO 2

ENTRY FIELD AND DISPLAY SEQUENCE	REQUIRED	DEFAULT	CHAR X-MTD*	SEE PARAGRAPH
MESSAGE TYPE	YES		J	
SEQUENCE NO	YES		N/A	
ALTITUDE	NO	NOT GIVEN	0	
TARGET TYPE	NO	PERSONNEL	1	3.2.1.4.1.8
TARGET SUBTYPE	NO	NOT GIVEN	0	3.2.1.4.1.8
STRENGTH	NO	NOT GIVEN	∅	
DOP	NO	NOT GIVEN	6	
RADIUS/LENGTH	NO	NOT GIVEN	0	
WIDTH	NO	NOT GIVEN	0	
ATTITUDE	NO	∅	∅	3.2.1.4.1.6
RELIABILITY	NO	NOT GIVEN	0	
MESSAGE SUBTYPE **	YES		2	

** This field is not displayed.

* N/A in character transmitted is used for required entries. The actual character transmitted will depend on the entry made by the operator. "∅" is number ZERO, and "0" is letter O (Table 1).

FORMAT #11 ATI POLAR COORDINATES

ENTRY FIELD AND DISPLAY SEQUENCE	REQUIRED	DEFAULT	CHAR X-TD*	SEE PARAGRAPH
MESSAGE TYPE	YES		K	
DIRECTION	YES		N/A	
DISTANCE	YES		N/A	
~~VERTICAL CORRECTION~~	~~NO~~	~~NOT GIVEN~~	O	
UP/DOWN	Yes (1)	NOT GIVEN	O	
TARGET TYPE	NO	PERSONNEL	1	3.2.1.4.1.8
TARGET SUBTYPE	NO	NOT GIVEN	O	3.2.1.4.1.8
STRENGTH	NO	NOT GIVEN	ø	
DOP	NO	NOT GIVEN	6	
RADIUS/LENGTH	NO	NOT GIVEN	O	
WIDTH	NO	NOT GIVEN	O	
ATTITUDE	NO	ø	ø	3.2.1.4.1.6
~~RELIABILITY~~	~~NO~~	~~NOT GIVEN~~	O	

(1) See Page 166.

* N/A in character transmitted is used for required entries. The actual character transmitted will depend on the entry made by the operator. "ø" is number ZERO, and "O" is letter O (Table 1).

FORMAT #11 ATI POLAR COORDINATES

ENTRY FIELD AND DISPLAY SEQUENCE	REQUIRED	DEFAULT	CHAR X-MTD*	SEE PARAGRAPH
MESSAGE TYPE	YES		K	
DIRECTION	YES		N/A	
DISTANCE	YES		N/A	
VERTICAL CORRECTION	NO	NOT GIVEN	O	
UP/DOWN	NO	NOT GIVEN	O	
TARGET TYPE	NO	PERSONNEL	1	3.2.1.4.1.8
TARGET SUBTYPE	NO	NOT GIVEN	O	3.2.1.4.1.8
STRENGTH	NO	NOT GIVEN	Ø	
DOP	NO	NOT GIVEN	6	
RADIUS/LENGTH	NO	NOT GIVEN	O	
WIDTH	NO	NOT GIVEN	O	
ATTITUDE	NO	Ø	Ø	3.2.1.4.1.6
RELIABILITY	NO	NOT GIVEN	O	

* N/A in character transmitted is used for required entries. The actual character transmitted will depend on the entry made by the operator. "Ø" is number ZERO, and "O" is letter O (Table 1).

FORMAT #12 QUICK RESPONSE FIRE REQUEST

ENTRY FIELD AND DISPLAY SEQUENCE	REQUIRED	DEFAULT	CHAR X-TD*	SEE PARAGRAPH
MESSAGE TYPE	YES		L	
KNOWN POINT NO [1]	YES		N/A	
TARGET NUMBER	YES [2]	As carried from ACTIVE MISSION seq.	N/A	

[1] The following entries shall be made for the dynamic default values associated with the active FIRE MISSION sequence when (1) a known point number is entered, (2) FIRE FPF is entered, or (3) FIRE TGT NO is entered.

	ENTRY
DIRECTION	USE GT
TARGET TYPE	PERSONNEL
TARGET SUBTYPE	NOT GIVEN
SH/FZ	NO PREF
CONTROL	AF

Entry of ASSIGN KNPT shall not affect the existing entries for the dynamic default values associated with the active FIRE MISSION SEQUENCE.

[2] This is a required entry if (1) ASSIGN KNOWN POINT or (2) FIRE TARGET NUMBER is entered in KNOWN POINT NO, otherwise it is not a required entry.

* N/A in character transmitted is used for required entries. The actual character transmitted will depend on the entry made by the operator. "Ø" is number ZERO, and "O" is letter O (Table 1).

FORMAT #13 OBSERVERS GRID COORDINATES

ENTRY FIELD AND DISPLAY SEQUENCE	REQUIRED	DEFAULT	CHAR X-TD*	SEE PARAGRAPH
MESSAGE TYPE	YES		M	
EASTING	YES		N/A	
NORTHING	YES		N/A	
ALTITUDE	NO	NOT GIVEN	ø	
GRID ZONE	NO	STD	ø	

*/A in character transmitted is used for required entries. The actual character ransmitted will depend on the entry made by the operator. "ø" is number ZERO, and O" is letter O (Table 1).

FORMAT #14 RADAR REGISTRATION

ENTRY FIELD AND DISPLAY SEQUENCE	REQUIRED	DEFAULT	CHAR XMTD*	SEE PARAGRAPH
MESSAGE TYPE	YES		N	
EASTING	YES		N/A	
NORTHING	YES		N/A	
ALTITUDE	YES		N/A	
OBSN	YES		N/A	
TARGET NO	YES		N/A	

* N/A in character transmitted is used for required entries. The actual character transmitted will depend on the entry made by the operator.

FORMAT #17 FIRE REQUEST - LASER

ENTRY FIELD AND DISPLAY SEQUENCE	REQUIRED	DEFAULT	CHAR X-MTD*	SEE PARAGRAPH
MESSAGE TYPE	YES		Q	
DIRECTION	YES		N/A	
SLANT DISTANCE	YES		N/A	
SLANT ANGLE	YES		N/A	
TYPE MISSION	NO	STATIONARY TARGET	Ø	
POINT NUMBER	YES if TRILAT is entered in TYPE MISSION otherwise NO	This field is displayed to the operator only if TRILAT is entered in TYPE MISSION	N/A if displayed otherwise 0	
TARGET TYPE	NO	PERSONNEL	1	3.2.1.4.1.8
TARGET SUB TYPE	NO	NOT GIVEN	0	3.2.1.4.1.8
STRENGTH	NO	NOT GIVEN	Ø	
DOP	NO	NOT GIVEN	6	
RADIUS/LENGTH	NO	NOT GIVEN	0	
WIDTH	NO	NOT GIVEN	0	
ATTITUDE	NO	Ø	Ø	3.2.1.4.1.6
SHELL/FUZE	NO	NO PREF	Ø	
CONTROL	NO	AF	Ø	

* N/A in character transmitted is used for required entries. The actual character transmitted will depend on the entry made by the operator. "Ø" is number ZERO, and "O" is letter O (Table 1).

FORMAT #18 SUBSEQUENT ADJUSTMENT LASER

ENTRY FIELD AND DISPLAY SEQUENCE	REQUIRED	DEFAULT	CHAR XMTD*	SEE PARAGRAPH
MESSAGE TYPE	YES		R	
DIRECTION	YES	AS CARRIED FROM 1) FR - LASER 2) SUB ADJ LASER OR 3) NEW LASER READ OUT WHICHEVER IS MOST RECENT	N/A	
SLANT DISTANCE	YES		N/A	
SLANT ANGLE	YES		N/A	
OBSERVATION	NO	OK - BURST	1	
TARGET NUMBER	YES	AS RECEIVED FROM FDC IN MTO OR LAST PRIOR ADJ OTHERWISE OPERATOR ENTRY	N/A	
SHELL/FUZE	NO	AS CARRIED FROM 1) FIRE REQUEST 2) LAST ADJ WHICHEVER IS MOST RECENT	N/A	
CONTROL	NO		N/A	

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* N/A in character transmitted is used for required entries. The actual character transmitted will depend on the entry made by the operator. "Ø" is number ZERO, and "O" is letter O (Table 1).

FORMAT #19 MESSAGE TO OBSERVER

ENTRY FIELD AND DISPLAY SEQUENCE	REQUIRED	DEFAULT	CHAR X-TD*	SEE PARAGRAPH
MESSAGE TYPE	YES		S	
TARGET NUMBER	YES ← only thing passed to Dynamic Default Fcb		N/A	
ADJUSTING UNIT TO FIRE	YES		N/A	
NUMBER OF VOL	YES		N/A	
NUMBER OF UNITS	YES		N/A	
PROBABLE ERROR	NO	NOT GIVEN	O	
ADJ SHELL/FUZE	YES		N/A	
SHELL/FUZE 1ST VOL	YES		N/A	
SHELL/FUZE SUB VOL	YES		N/A	
METHOD OF ENGAGEMENT	YES		N/A	
CONTROL	YES		N/A	
TIME OF FLIGHT	YES		N/A	
ANGLE T	NO	NOT GIVEN	O	
FIRE MISSION BUFFER	NO	NOT GIVEN	ø	
		Default Buffer. 1. Tgt No 2. Direction 3. Tgt Type .. Sub type 4 Shell/FZ 5 Cnt		

* N/A in character transmitted is used for required entries. The actual character transmitted will depend on the entry made by the operator. "ø" is number ZERO, and "O" is letter O (Table 1).

FORMAT #20 FREE TEXT MESSAGE

ENTRY FIELD AND DISPLAY SEQUENCE	REQUIRED	DEFAULT	CHAR X-MTD*	SEE PARAGRAPH
MESSAGE TYPE	YES		T	
TEXT	YES		N/A	

* N/A in character transmitted is used for required entries. The actual character transmitted will depend on the entry made by the operator. "Ø" is number ZERO, and "O" is letter O (Table 1).

ENTRY FIELD AND DISPLAY SEQUENCE	REQUIRED	DEFAULT	CHAR X-MTD*	SEE PARAGRAPH
MESSAGE TYPE	YES		U	
COMMAND INFO	YES		N/A	
TARGET NUMBER	YES	AS CARRIED FROM 1) MESSAGE TO OBSERVER 2) LAST ADJ whichever is most recent otherwise operator entry	N/A	

N/A in character transmitted is used for required entries. The actual character transmitted will depend on the entry made by the operator.

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