MEASUREMENT SYSTEM IDENTIFICATION

National Aeronautics and Space Administration

MSFC-SPEC-3322
Revision: D
EFFECTIVE DATE: April, 2004

George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama 35812

PRESSURIZED CARRIERS GROUP
MULTI PURPOSE LOGISTICS MODULE

DATA RECORDER
END ITEM SPECIFICATION

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CHECK THE MASTER LIST--
VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE
MSFC - Form 454 (Rev. October 1992)

Signature Page

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DOCUMENT HISTORY PAGE

Status (Baseline/Revision/ Cancelled)	Document Revision	Effective Date	Description
Baseline		March 2003	
Revision	A	June 2003	Remove Protoflight Testing and add Qualification and Acceptance testing levels.
Revision	B	July 2003	Revise Electrical Performance Characteristics; revise verification method for 3.3.1 and 3.3.2.4.1
Revision	C	August 2003	Revised Random Vibration Loads Tables IV and V
Revision	D	April, 2004	Revised Verification 3.3.7.3 to Class H electrical bond per drawing 96M25122

MP 4/12/04 RELEASE

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1. SCOPE

This specification establishes the performance, design, development, qualification and flight hardware requirements for the MPLM (Multi Purpose Logistics Module) programmable thermostat data recorder. These units will record the data from the programmable thermostats while in operation on orbit.

1.1 Objectives

The objective of the programmable thermostat data recorder is to have the capability to record data relative to each thermostat during the power on state for post mission analysis.

1.2 Description

The programmable thermostat data recorder will have the ability to record data from each of the thermostats through an RS-485 interface and will also be capable of downloading the recorded data to a GSE computer through an RS-485 interface cable.

2. APPLICABLE DOCUMENTS

The following documents, of the exact issue shown (or if no issue is specified, the issue in effect at the date of fabrication) form a part of this specification to the extent specified herein. In the event of conflict between documents the order of precedence for the design to requirements will be a follows:

a. This End Item Specification
b. National Aeronautics and Space Administration (NASA) documents
c. Other documents

MIL-STD-1285	Marking of Electrical and Electronic Parts
NHB 6000.1	Requirements for Packaging, Handling and Transportation
NASA-STD-6001	Flammability, Odor, Offgassing and Compatibility Requirements and Test Procedures for Materials in Environments that Support Combustion
MSFC-STD-2905	MSFC Tailoring Guide for NASA-STD-8739.4 Crimping, Interconnecting Cables, Harness, and Wiring
MSFC-RQMT-2918	Requirements For Electrostatic Discharge Control
MSFC-SPEC-521	Electromagnetic Compatibility Requirements on Payload Equipment and Subsystems
JSC-SP-R-0022	General Specification 0 Vacuum Stability Requirements of

	Polymeric Material for Spacecraft Application
NSTS-21000-IDD-ISS	International Space Station Interface Definition Document
ICD-A-21350	Shuttle Orbiter/MPLM Cargo Element Interfaces
ISS-MPLM-MAN-020	Programmable Thermostat Software Users Manual
ASME Y14.5M-1982	Dimensioning and Tolerancing
NHB 5300.4 (3A-1)	Requirements for Soldered Electrical Connections
NHB 5300.4 (3G)	Requirements for Interconnecting Cables, Harnesses, and Wiring
NHB 5300.4 (3H)	Requirements for Crimping and Wire Wrap
NHB 5300.4 (3I) Change Notice 1	Change Notice 1 Requirements for printed Wiring Board
NHB 5300.4 (3J)	Requirements for Conformal Coating and Staking of Printed Wiring Boards and Electronic Assemblies
NHB 5300.4 (3K)	Design Requirements for Rigid Printed Wiring Boards and Assemblies
SSP 41172, Rev. P	Qualification and Acceptance Environmental Test Requirements
ED17-MPLM-DATARECORDER-PROC-001	Full Functional Test Procedure for the Data Recorder Assembly of the Multi Purpose Logistics Module (MPLM)
ED17-MPLM-FUNCTIONAL-PROC-001	Functional Test Procedure for the Thermostat Assembly and/or Data Recorder Assembly of the Multiple Purpose Logistics Module (MPLM)
TIA/EIA-485-A	Electrical Characteristics of Generators and Receivers in Balanced Digital Multi-Point Systems

3. SYSTEM REQUIREMENTS

3.1 System Definition

This configuration will allow for data recording for each of the twenty-one thermostats.

A block diagram of the data recorder system is shown in Figure 1. The data recorder will be capable of recording data for each thermostat during the power on state. The data collected with the data recorder can be downloaded utilizing the GSE computer for post mission analysis.

The mounting assembly consists of an Aluminum bracket bonded to the MPLM external pressure shell or support structure. An adhesive will be used as the bonding agent. The data recorder will be secured to the mounting bracket via mounting screws (bolts, etc). This installation design allows for easy replacement of failed units.

3.1.1 Design Mission Life Requirements

The MPLM Data Recorder shall be designed for 25 missions.

3.2 Design, Construction, and Physical Dimensions

The general and individual item requirements shall be in accordance with NASA and MSFC handbooks and standards.

3.2.1 Data Recorder Envelope

The envelope dimensions shall be 2.00 in X 2.50 in maximum footprint and .75 in maximum height. Dimensioning and tolerancing shall be per ASME Y14.5M-1982. Mounting surface of the carrier shall be flat.

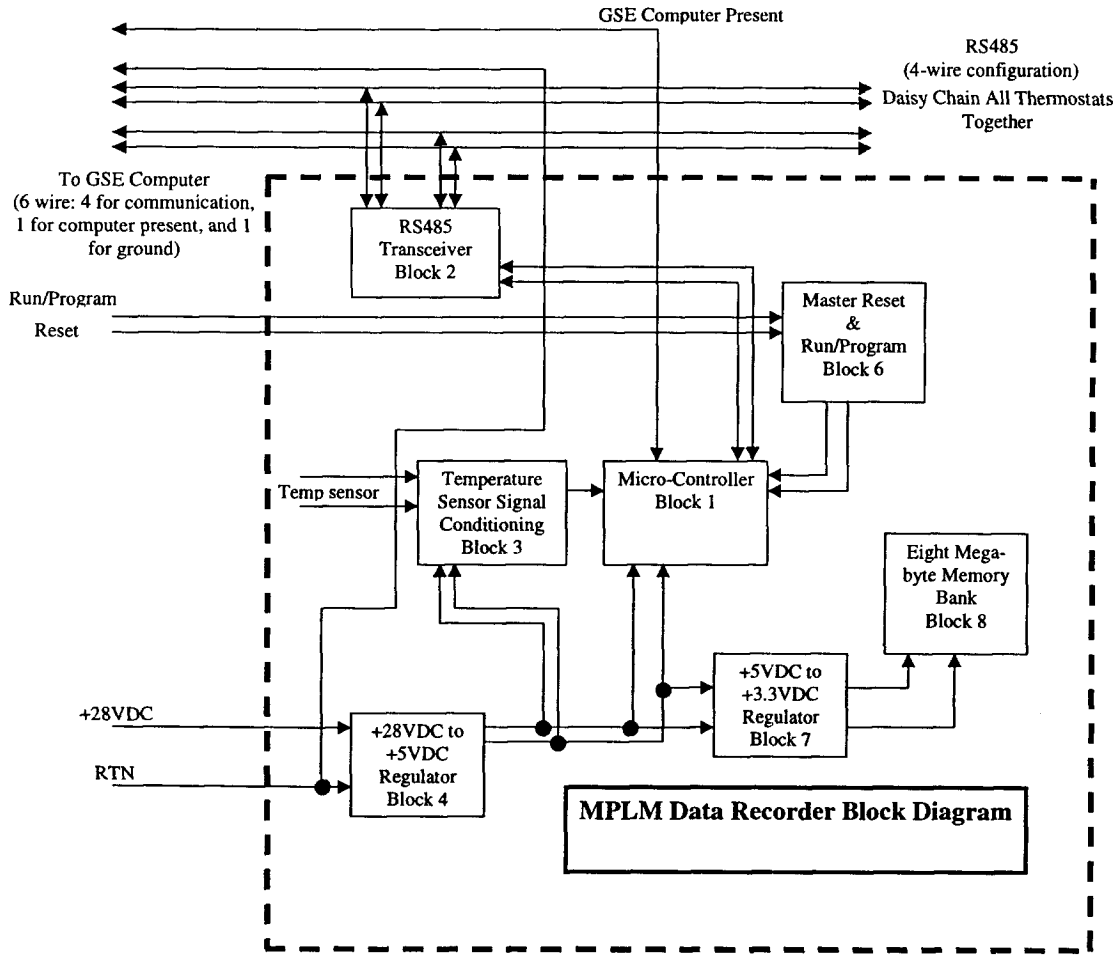

Figure 1: MPLM Data Recorder Block Diagram

3.2.2 Deleted

3.2.3 Input/Output Interface

3.2.3.1 Wire Terminal Interface

The power interface shall be pigtail leads. The power input pigtails shall be 20 AWG (American Wire Gauge) twisted pair. The twisted pair shall be twisted per NHB 5300.4 (3G). The wire terminal function shall be in accordance with Table I. MSFC-STD-2905 shall be followed.

Table I Wire Terminal Function Table

Terminal No Wire Color	Function	Description	Wire Size
1: Red	Power	28Vdc Input Power	AWG 20
2: Black	Power Return	28 V dc Input Power Return	AWG 20

3.2.3.2 Connector Interface

The RS-485, address, Program/Run, and Reset interfaces shall be provided in a connector. The connector part number and pin-out shall be as defined in Table II

3.2.4 EEE Parts

The use of commercial and industrial grade EEE (Electrical, Electronic, Electromechanical) parts is permitted in the design and fabrication of the electronics assembly. In particular, Plastic Encapsulated Microcircuits (PEMs) are allowed. Established reliability parts are encouraged where available. All EEE parts will be procured with Certificate of Compliance and identify manufacturer and lot/date code. There will be no additional testing performed at the piece part level and burn-in will be performed at the assembled unit level per SSP 41172 paragraph 5.1.8. The parts shall be verified by functional testing of the completed electronics assembly after required burn-in.

3.2.5 Materials

All materials shall meet outgassing and flammability requirements per NASA-STD-6001.

3.2.6 Ionizing Radiation

N/A

Table II Connector Pin Function Table

J1: MS-262-021-435-22OS

Pin Number	Function	Description
1	RS-485 RXD H	Receive hi
2	Ground	Ground
3	Ground	Ground
4	Load/Program	Programming control bit
5	Ground	Ground
6	Ground	Ground
7	Test Point 3	Test Point 3
8	Ground	Ground
9	Test Point 2	Test Point 2
10	GSE computer present	GSE computer present
11	+28 V dc	Input power
12	Ground	Ground
13	RS-485 RXD L	Receive lo
14	RS-485 TXD L	Transmit lo
15	RS-485 TXD H	Transmit hi
16	Test Point 1	Test Point 1
17	Ground	Ground
18	Ground	Ground
19	Ground	Ground
20	Ground	Ground
21	Reset	Reset

3.2.7 Temperature and Thermal Design

The data recorder shall be capable of operation within the temperature range of -20°C to 58°C in a vacuum. The thermal design shall insure adequate thermal conduction through the wiring and the mounting surface for operation at these temperatures.

3.2.8 Weight

The combined weight of the data recorder, including connector and mounting bracket shall not exceed 100 grams (3.53 oz). The weight of the pigtail wires is not included in this mass allotment.

3.3 Performance Characteristics

Unless otherwise specified, the electrical performance characteristics are as specified herein and apply over the full-recommended case operating temperature range specified in 3.2.7 herein.

3.3.1 Electrical Performance Characteristics

Electrical characteristics shall be as specified in Table III.

3.3.2 Electrical Function

The data recorder shall provide the capability to record data for all twenty-one thermostats for a minimum of 300 hours at a maximum rate of 1 data set per minute. As a minimum the data recorder shall record:

1. Thermostat Address
2. Temperature from external control RTD
3. Heater ON/OFF status
4. Set point and Span

Set Point and Span may not be returned with every data point since they are not dynamic. They will be returned periodically to confirm proper operation. Other status data may also be returned, but is not considered a part of the minimum data set.

The data recorder shall provide a 4 wire RS-485 serial interface to allow the data to be downloaded for post mission processing. The data recorder shall have the ability to act as the master controller when it is recording data and the ability to act as a slave when the data is being downloaded to the GSE computer. The data recorder shall recognize which mode (slave or master) to be in by the absence or presence of the computer present line between the GSE computer and the data recorder.

Table III Electrical Performance Characteristics

Test	Conditions unless Otherwise specified Input Voltage = 28 Vdc			Unit
Maximum Power Supply Current			40	mA
Maximum Recording Hours	Recording 1 data set per minute during a mission		300	hours

Note: If the recording rate (data sets per minute) go up or down the total recording hours will go down or up respectively.

3.3.2.1 Deleted

3.3.2.2 Deleted

3.3.2.3 Voltage Operation

The data recorder shall be designed for operation from 22 to 32 Vdc, and shall not be damaged by voltages less than 22 Vdc. Operating within this range, the data recorder shall meet the specifications of Table III.

3.3.2.3.1 Input Reverse Polarity Protection

The data recorder shall provide reverse polarity protection for the +28 Vdc input power.

3.3.2.4 Serial Interface

The data recorder shall incorporate an RS-485 serial link to allow both data recording and downloading of the data.

3.3.2.4.1 Electrical Characteristics

The serial interface shall meet the driver/receiver electrical characteristics as defined in TIA/EIA-485-A.

3.3.2.4.2 Serial Bus Address

The RS-485 address for the data recorder shall be 32.

3.3.2.4.3 Software Interface Definition

Software interface shall be in accordance with ISS-MPLM-MAN-020, Programmable Thermostat Software Users Manual.

3.3.3 Deleted

3.3.4 Program/Run Function

During programming and software testing the capability to modify the data recorder program code shall be provided by pulling the Program/Run line low.

3.3.5 Reset Function

During programming and software testing the capability to reset the data recorder microcontroller shall be provided by pulling the Reset line low.

3.3.6 Self-test Function

The capability to perform a self-test on the data recorder via RS-485 command shall be provided. The description of the command and response of the data recorder shall be as defined in ISS-MPLM-MAN-020.

3.3.7 Environments

3.3.7.1 Vibration Loads

The data recorder shall meet the random vibration loads as specified in Table IV for qualification and Table V for acceptance.

Table IV Data Recorder Design Vibration Levels

Frequency (Hz)	Design Level
20	0.04 g^2/Hz
20 to 65	+7.6 dB/Octave
65 to 180	0.8 g^2/Hz
180 to 360	-7.0 dB/Octave
360	0.16 g^2/Hz
360 to 1400	-2.6 dB/Octave
1400	0.05 g^2/Hz
1400 to 2000	-4.9 dB/Octave
2000	0.028 g^2/Hz
Composite	16.8 g_{rms}

Duration: 810 seconds (25 missions)
Three mutually perpendicular axes

Table V Data Recorder Acceptance Vibration Levels

Frequency (Hz)	Level
20	0.01 g^2/Hz
20 to 65	+7.6 dB/Octave
65 to 180	0.2 g^2/Hz
180 to 360	-7.0 dB/Octave
360	0.04 g^2/Hz
360 to 1400	-2.6 dB//Octave
1400	0.0125 g^2/Hz
1400 to 2000	-4.9 dB/Octave
2000	0.007 g^2/Hz
Composite	8.4 g_{rms}

Duration: 60 seconds
Three mutually perpendicular axes

3.3.7.2 Electromagnetic Interference (EMI)

The data recorder shall meet the emissions and susceptibility requirements of MSFC-SPEC-521. The data recorder shall also be compatible with transients produced by the Orbiter hydraulic circulation pump start-up as defined in section 7.3.4.2.2 of ICD-A-21350.

3.3.7.3 Grounding and Isolation

The data recorder chassis shall be electrically bonded to the MPLM structure and shall meet a Class H bond in accordance with NSTS 21000-IDD-ISS.

3.3.7.4 Electrostatic Discharge (ESD)

The data recorder shall be designed to comply with Class 2 minimum requirements in accordance with MSFC-RQMT-2918.

3.3.7.5 Thermal Requirements

The data recorder shall be designed to operate between -20° C and +58° C. The component qualification levels for thermal vacuum/cycle tests shall be -31° C and +69° C, while component flight acceptance test levels shall be -20° C and +58° C.

3.4 Electrical Test Requirements

The electrical test requirements shall be in accordance with ED17-MPLM-DATAREC-PROC-001 and ED17-MPLM-FUNCTIONAL-PROC-001. These test procedures shall identify procedures to verify the electronics at printed wiring assembly, complete functional test to verify all operational modes, and a monitoring test procedure to verify performance during system functional and environmental testing.

3.5 Marking

Part marking shall be in accordance with MIL-STD-1285 and shall include the following, in the order of precedence shown:

a. Part identification number per section 1.2.1.
b. Serial Number.
c. Electrostatic discharge sensitivity (ESDS) identifier.

d. Other information at the manufacturer's option.

3.6 External Non Metallic Materials

External nonmetallic materials, including those used for device marking, shall be flame resistant, odor free and non-toxic in accordance with NASA-STD-6001. All materials shall meet the thermal vacuum stability requirements as specified in JSC-SP-R-0022A. Nonmetallic materials shall be approved by the design activity.

3.7 Rework

Rework shall be in accordance with applicable workmanship standards in NHB 5300.4.

3.8 Handling

This device shall be handled in accordance with NHB 6000.1 and MSFC-RQMT-2918.

4.0 VERIFICATION

This section contains the requirements for formal qualification of the data recorder to be used on MPLM. The qualifications consist of:

a. Data for the reliability analysis will be collected and recorded during qualification.

b. Qualification requirements are specified in sections 4.2 and 4.3. Qualification represents the broadest scope of verification within design tolerances to which a configuration/end item is subjected. It encompasses the entire range of activity to verify that the design conforms to requirements when subjected to environmental life-cycle conditions. Flight-like hardware is normally used for qualification testing. If actual flight hardware is used for qualification testing, it shall be in accordance with SSP 41172. If development test data is intended to be used to qualify hardware, its intent shall be predeclared. Environmental models shall be used to represent environments that cannot be achieved under the conditions of ground testing. Simulators, used for verifying requirements, require validation so that the item undergoing qualification cannot distinguish between the simulator and actual operational hardware/software.

c. Integration testing and checkout shall be conducted during end item buildup. Activities such as continuity checking and interface mating will be performed. Activities such as major component operation in the installed environment, support equipment compatibility, and documentation verification will be proven during qualification.

d. Formal verification of performance characteristics occurs for the full range of performance requirements during qualification and for normal operational and critical physical requirements during acceptance.

4.1 General

Data recorder segment level qualification will be conducted by inspection, analysis, demonstration, or test. Test is chosen as the verification method to verify performance requirements that are not readily observable.

These methods are defined as follows:

a. Inspection. Engineering inspection, hereafter referred to as inspection, is a method of verification that determines conformance to requirements by the use of standard quality control methods to ensure compliance by review of drawings and data. This method is used wherever documents or data can be visually used to verify the physical characteristics of the product instead of the performance of the product.

b. Analysis. Analysis is a process used in lieu of, or in addition to, other methods to ensure compliance to specification requirements. The selected techniques may include, but not be limited to, engineering analysis, statistics and qualitative analysis, computer and hardware simulations, and analog modeling. Analysis may be used when it can be determined that: (1) rigorous and accurate analysis is possible, (2) test is not cost effective, and (3) inspection is not adequate.

Verification by similarity is the process of analyzing the specification criteria for hardware configuration and application for an article to determine if it is similar or identical in design, manufacturing process, and quality control to an existing article that has previously been qualified to equivalent or more stringent specification criteria. Special effort will be made to avoid duplication of previous test from this or similar programs. If the previous, application is considered to be similar, but not equal to or greater in severity, additional qualification tests shall concentrate on the areas of new or increased requirements.

c. Demonstration. Demonstration consists of a qualitative determination of the properties of a test article. This qualitative determination is made through observation, with or without special test equipment or instrumentation, which verifies characteristics such as human engineering features, services, access features, and transportability. Demonstration requirements are normally implemented within a test plan, operations plan, or test procedures.

d. Test. Test is a method in which technical means, such as the use of special equipment, instrumentation, simulation techniques, and the application of established principles and procedures, are used for the evaluation of components, subsystems, and systems to determine compliance with requirements. Test shall be selected as the primary method when analytical techniques do not produce adequate results; failure modes exist which could compromise personnel safety, adversely affect flight systems or payload operation, or result in a loss of mission objectives; or for any components directly associated with Space Station and Orbiter interfaces. The analysis of data derived from tests is an integral part of the test program, and should not be confused with analysis as defined above.

4.1.1 Responsibility for Verifications

Unless otherwise specified in the contracts, FD24 is responsible for assuring the closure of all verification activities as specified herein.

4.2 Segment Quality Conformance Inspections

Mandatory qualification test requirements for test setup, methodology, and conditions are as specified in SSP 41172. Demonstrations, analyses, inspections, and any additional test requirements are specified herein. Individual verification requirements do not require a standalone verification to be performed but may be combined with the satisfaction of other verification requirements to prevent unnecessary redundancy and optimize commonality.

4.3 System Requirement

No verification required.

4.3.1 System Definition

No verification required.

4.3.1.1 Design Mission Life Requirements

This requirement shall be verified by analysis.

4.3.2 Design, Construction and Physical Dimensions

This requirement shall be verified by inspection and test. The mechanical piece parts will be inspected by MSFC S&MA personnel.

4.3.2.1 Data Recorder Envelope

This requirement shall be verified by analysis.

4.3.2.2 Functional Design

N/R

4.3.2.3 Input/Output Interface

No verification required.

4.3.2.3.1 Wire Terminal Interface

This requirement shall be verified by inspection.

4.3.2.3.2 Connector Interface

This requirement shall be verified by inspection.

4.3.2.4 EEE Parts

This requirement shall be verified by demonstration.

4.3.2.5 Materials

This requirement shall be verified by analysis and inspection.

4.3.2.6 Ionizing Radiation

N/A

4.3.2.7 Temperature and Thermal Design

This requirement shall be verified by qualification and acceptance thermal vacuum and thermal cycle testing per SSP 41172 and by system level analysis.

4.3.2.8 Weight

This requirement shall be verified by test.

4.3.3 Performance Characteristics

4.3.3.1 Electrical Performance Characteristics

This requirement shall be verified by test and analysis.

4.3.3.2 Electrical Function

This requirement shall be verified by test.

4.3.3.2.1 Deleted

4.3.3.2.2 Deleted

4.3.3.2.3 Voltage Operation

This requirement shall be verified by test.

4.3.3.2.3.1 Input Reverse Polarity Protection

This requirement shall be verified by analysis or inspection.

4.3.3.2.4 Serial Interface

This requirement shall be verified by test.

4.3.3.2.4.1 Electrical Characteristics

This requirement shall be verified by analysis.

4.3.3.2.4.2 Serial Bus Address

This requirement shall be verified by test.

4.3.3.2.4.3 Software Interface Definition

This requirement shall be verified by test.

4.3.3.3 Deleted

4.3.3.4 Program/Run Function

This requirement shall be verified by test.

4.3.3.5 Reset Function

This requirement shall be verified by test.

4.3.3.6 Self-test Function

This requirement shall be verified by test.

4.3.3.7 Environments

This requirement shall be verified by test.

4.3.3.7.1 Vibration Loads

This requirement shall be verified by test.

4. 3.3.7.2 Electromagnetic Interference (EMI)

This requirement shall be verified by test.

4.3.3.7.3 Grounding and Isolation

This requirement shall be verified by test.

4.3.3.7.4 Electrostatic Discharge (ESD)

This requirement shall be verified by inspection.

4.3.3.7.5 Thermal Requirements

This requirement shall be verified by test.

4.3.4 Electrical Test Requirements

This requirement shall be verified by analysis.

4.3.5 Marking

This requirement shall be verified by inspection.

4.3.6 External Non Metallic Materials

This requirement shall be verified by analysis.

4.3.7 Rework

This requirement shall be verified by inspection.

4.3.8 Handling

This requirement shall be verified by inspection.

5.0 PACKAGING

5.1 Packing, Packaging and Preservation

The data recorder shall be preserved, packaged, packed, marked, labeled, handled, stored, and transported as specified in NHB 6000.1. Level C preservation, packing and packaging shall be used unless otherwise specified on the purchase contract.

5.2 Unit Packaging

Each data recorder shall be packaged in a manner so that the individual data recorder may be handled and stored without putting strain on the wire leads. The unit package shall be capable of reuse after opening.

6.0 ABBREVIATIONS AND ACRONYMS

A	Amperes
AQL	Acceptable Quality Level
AWG	American Wire Gauge
CSI	Customer Source Inspection
°C	Degree(s) Celsius
dB	decibel
dc	direct current
DPA	Destructive Physical Analysis
EEE	Electrical, Electronic, Electromechanical
EMI	Electro magnetic Interference
ESD	Electrostatic Discharge
g	grams
GSE	Ground Support Equipment
Hz	Hertz (cycles per second)
Km	kilometer
mA	milliamperes
micro A	microampere
MPLM	Multi Purpose Logistics Module
NASA	National Aeronautics and Space Administration
oz	ounce
RAM	Random Access Memory
RTD	Resistance Temperature Device
Rtn	return
S&MA	Safety and Mission Assurance
S/N	Serial Number
Vdc	Voltage, direct current

APPENDIX A: REQUIREMENTS VERIFICATION MATRIX

VERIFICTION TEST LEVEL
DEV DEVELOPMENT
QAL QUALIFICATION
ACC ACCEPTANCE
NR NOT REQUIRED

VERIFICATION ASSESSMENT METHOD
ANL ANALYSIS
INS INSPECTION
TST TEST
DEM DEMONSTRATION

Section 3 Requirements Paragraph	Verification Test Levels				Verification Assessment Method				Section 4 Verification Paragraph	Verification Responsibility
	NR	DEV	QAL	ACC	ANL	INS	DEM	TST		
3.1	X								4.3.1	
3.1.1						X			4.3.1.1	FD24
3.2						X		X	4.3.2	S&MA
3.2.1					X				4.3.2.1	S&MA
3.2.2	X								4.3.2.2	
3.2.3	X								4.3.2.3	
3.2.3.1						X			4.3.2.3.1	S&MA/ED17
3.2.3.2						X			4.3.2.3.2	S&MA/ED17
3.2.4							X		4.3.2.4	ED17
3.2.5					X	X			4.3.2.5	ED35
3.2.6	X								4.3.2.6	
3.2.7			X	X				X	4.3.2.7	ED26
3.2.8								X	4.3.2.8	S&MA/ED17
3.3	X								4.3.3	
3.3.1					X			X	4.3.3.1	ED17
3.3.2								X	4.3.3.2	ED17
3.3.2.3								X	4.3.3.2.3	ED17
3.3.2.3.1					X	X			4.3.3.2.3.1	ED17
3.3.2.4								X	4.3.3.2.4	ED17
3.3.2.4.1					X				4.3.3.2.4.1	ED17
3.3.2.4.2								X	4.3.3.2.4.2	ED17
3.3.2.4.3								X	4.3.3.2.4.3	ED17
3.3.4								X	4.3.3.4	ED17
3.3.5								X	4.3.3.5	ED17
3.3.6								X	4.3.3.6	ED17
3.3.7								X	4.3.3.7	S&MA
3.3.7.1								X	4.3.3.7.1	S&MA
3.3.7.2								X	4.3.3.7.2	S&MA
3.3.7.3								X	4.3.3.7.3	ED17
3.3.7.4						X			4.3.3.7.4	S&MA
3.3.7.5			X	X				X	4.3.3.7.5	ED26
3.4					X				4.3.4	ED17
3.5						X			4.3.5	S&MA
3.6					X				4.3.6	ED35
3.7						X			4.3.7	S&MA
3.8						X			4.3.8	S&MA
5.0	X								5.0	
5.1				X		X			5.1	FD24
5.2				X		X			5.2	FD24

PACKAGE NO. 10143R

DOCUMENTATION RELEASE LIST
GEORGE C. MARSHALL SPACE FLIGHT CENTER

MSFC CODE IDENT 14981
ISSUE DATE APR 12 2004

CH	DOCUMENT NUMBER	DRL DSH	DRL REV	TITLE	CCBD NO.	PCN	PC	EFFECTIVITY
*	MSFC-SPEC-3322	205	-	DATA RECORDER END ITEM SPECIFICATION	MP3-00-0075	MP00071	MP	1

CHG NO.	CHG REV	CHG NOTICE	RESPONSIBLE ENGINEER	RESPONSIBLE ORGANIZATION	ACTION DATE	DESCRIPTION
* 4	D	SCN000	MIKE MORELAN	FD24	04/12/04	RELEASE REVISION D TO MSFC-SPEC-3322 PRESSURIZED CARRIERS MULTI PURPOSE LOGISTIC MODULE PROGRAMMABLE DATA RECORDER SPECIFICATION.

CHECKER

DON HAMILTON
04/12/04

(FINAL)

MSFC DOCUMENTATION REPOSITORY - DOCUMENT INPUT RECORD

I. GENERAL INFORMATION

1. APPROVED PROJECT:	2. DOCUMENT/ DRAWING NUMBER:	3. CONTROL NUMBER:	4. RELEASE DATE:	5. SUBMITTAL DATE:
PressurizedCarriers Group/MPLM	MSFC-SPEC-3322	10143R	4-13-04	04/12/2004

6. DOCUMENT/DRAWING TITLE:	7. REPORT TYPE:
Programmable Data Recorder End Item Specification Rev. D	

8. CONTRACT NUMBER / PERFORMING ACTIVITY:	9. DRD NUMBER:	10. DPD / DRL / IDRD NUMBER:
477-72-61	NA	NA

11. DISPOSITION AUTHORITY (Check One):	12. SUBMITTAL AUTHORITY:	13. RELEASING AUTHORITY:
☒ Official Record - NRRS 8/5/A/1 (c) ☐ Reference Copy - NRRS 8/5/A/3 (destroy when no longer needed)	Mike Morelan/FD24	Randy McClendon/FD24

14. SPECIAL INSTRUCTIONS:
DISTRUBUTE PER MPLM DOCUMENTATION DISTRUBUTION LIST (attached)

IF ANY QUESTIONS CALL BESSIE LEE 544-7109

15. CONTRACTOR/SUBMITTING ORGANIZATION, ADDRESS AND PHONE NUMBER:	16. ORIGINATING NASA CENTER:
MSFC	MSFC
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