Document 31200
Rev. C
September 27, 2005

OPERATION MANUAL

For The

PORTABLE DATA LOADER

(PDL PART NUMBER 30100)

Prepared

By

Demo Systems LLC

Demo Systems LLC • 379 Science Drive, Moorpark, CA 93021 • Tel: 805/529-1800; Fax: 805/529-7071

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1.0 SCOPE

The Portable Data Loader (PDL) is a hand-carried electronic device used to transfer Software Loadable Parts such as Navigation databases and operational programs into an aircraft's Flight Management Computers and other avionics subsystems. The PDL is designed to meet the requirements pertaining to the portable version of the data loader listed in the ARINC Report 615. The PDL is also backward compatible with computers formerly loaded by the Qantex cassette tape loader using the ARINC 603 protocol.

ARINC Report 615 is a commercial aircraft bus specification defining loading protocols. The specification includes the use of a high-speed ARINC 429 bus, and automatic protocols for uploading and downloading data to and from software loadable avionics systems. The ARINC Report 615 allows provisions for various loading methods but defines certain protocols that require little operator intervention.

There are two basic functional configurations for the PDL:

1. PDL-615, (P/N's 30100-Rev A and Rev B) without Mass Storage Device (MSD)
2. PDL-615/MSD, (P/N 30100-Rev C, Rev D or -2) with Mass Storage Device (MSD).

Both versions of the PDL contain provisions for recognizing and loading files for Litton avionics. This mode of operation is described in section 5.2.

1.1 PDL WITHOUT MASS STORAGE DEVICE: PDL- 615 (P/N 30100 – REV A & B)

The PDL-615 provides the capability to load databases and operational programs into an aircraft's avionics subsystems using floppy disks that contain the data files. In most cases, the operator is only required to turn the unit on and install the floppy disk(s) containing the data files. When the load is complete, the PDL will display a "*LOAD COMPLETE*" message to inform the operator. Sections 2.0 and 3.0 contain procedures used with the PDL-615 data loaders. Section 3.0 contains specific procedures applicable to loading L1011 avionics.

The PDL-615 is housed in an aluminum case and is designed to be lightweight (15 pounds) and rugged. The top of the case includes storage space for cables and diskettes and can be removed for indoor shop operation. The front panel contains a backlit LCD display, four function pushbuttons, and three discrete LED indicators to indicate power and status. The pushbutton function keys are not required for normal operation but provide optional functions such as Self-Test and disk directory information. The data storage media is 3.5" floppy disk(s). Figure 1 shows the PDL-615 front panel.

For loading devices from the PDL-615, two cables are included, one for ARINC 615 devices and an adapter cable for ARINC 603 devices. The 10' cable connects the PDL to ARINC 615 devices. The 1' adapter cable is added to the 10' cable to provide the interface with ARINC 603 devices. A maintenance disk is included to be used in conjunction with the self-test mode.

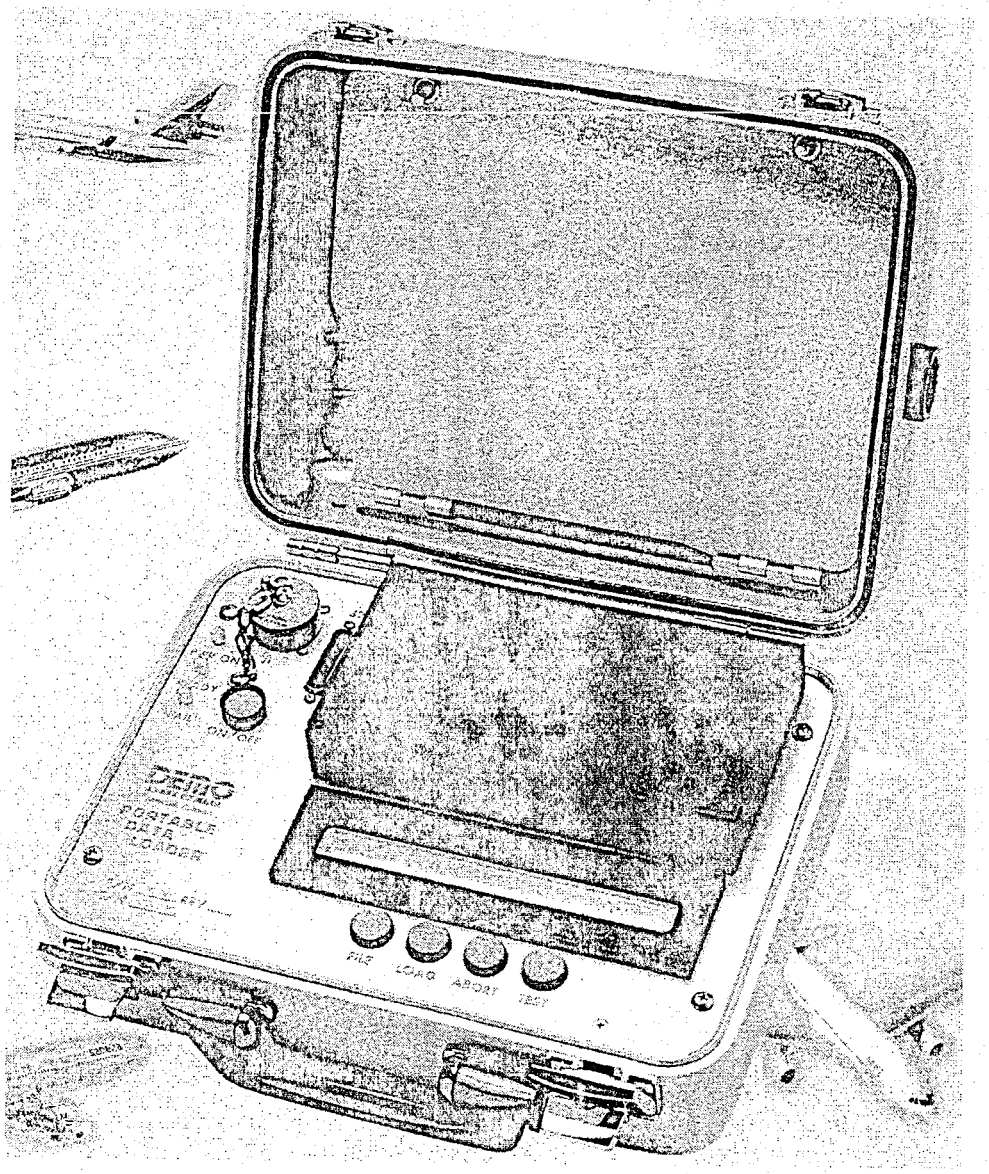

Figure 1. PDL-615 Front Panel

1.2 PDL WITH MASS STORAGE DEVICE: PDL- 615/MSD (P/N 30100 – REV C, REV D)

The PDL-615/MSD version comes with a built-in Mass Storage Device (MSD) that allows the operator to load software parts from the PDL's MSD. Loading a multiple disk set of loadable software parts from the PDL's MSD reduces the load time by eliminating the overhead time of swapping floppy disks. The unit also retains the capability of loading aircraft avionics from floppy disks in the same manner currently used by the PDL-615.

The MSD in the PDL-615/MSD is loaded using LoadStar® software. See Figure 2. LoadStar® is a software configuration management tool that is compatible with a Windows 2000 computer platform and is a built-in application on Demo Systems' Portable Maintenance Terminal 2000 (PMAT 2000®). LoadStar® on the PMAT 2000® allows the operator to select a set of loadable software parts by Aircraft model, avionics systems (LRU), and then software part number. The operator can then transfer the library of all the loadable software parts and their configuration into the PDL-615/MSD using LoadStar®. Once the PDL-615/MSD has been preloaded with the loadable software parts, the operator can select the loadable software part on the PDL-615/MSD display and perform loading of the aircraft. Section 4.0 contains the procedure used to load the MSD using LoadStar®.

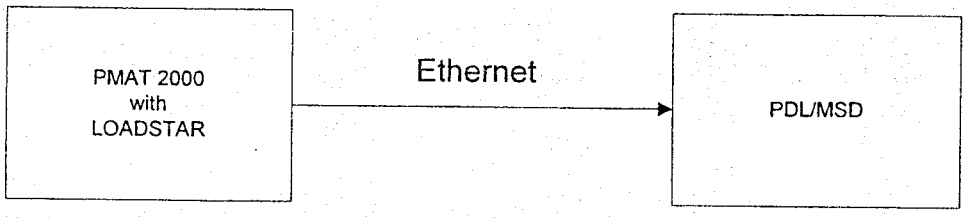

Figure 2. MSD Loading

The PDL-615/MSD housing is the same as the PDL-615 with the addition of alternate labeling of the four function keys on the front panel for the MSD operations. The top of the case can be removed for indoor operation and includes storage space for cables and diskettes. The data storage media are the 3.5" floppy disk, compatible with the IBM PC MS-DOS operating system, and the PDL's Mass Storage Device (MSD), if it has been preloaded with loadable software parts using LoadStar®. The minimum MSD size is 80MB for Rev C and 128MB for Rev D. The size installed is marked on the front of the PDL following the letters "MEM =". The PDL/MSD Operating Instructions Flip Chart (P/N 31204), containing step-by-step instructions on use of the MSD function, is included with each MSD unit. Figure 3 shows the PDL-615/MSD front panel with flip chart.

For loading devices from the PDL-615/MSD, two cables are included with the PDL, one for ARINC 615 devices and an adapter cable for ARINC 603 devices. The 10' cable connects the PDL to ARINC 615 devices. The 1' adapter cable is added to the 10' cable to provide an

interface with ARINC 603 devices. Also included is a maintenance disk to be used in conjunction with the self-test mode.

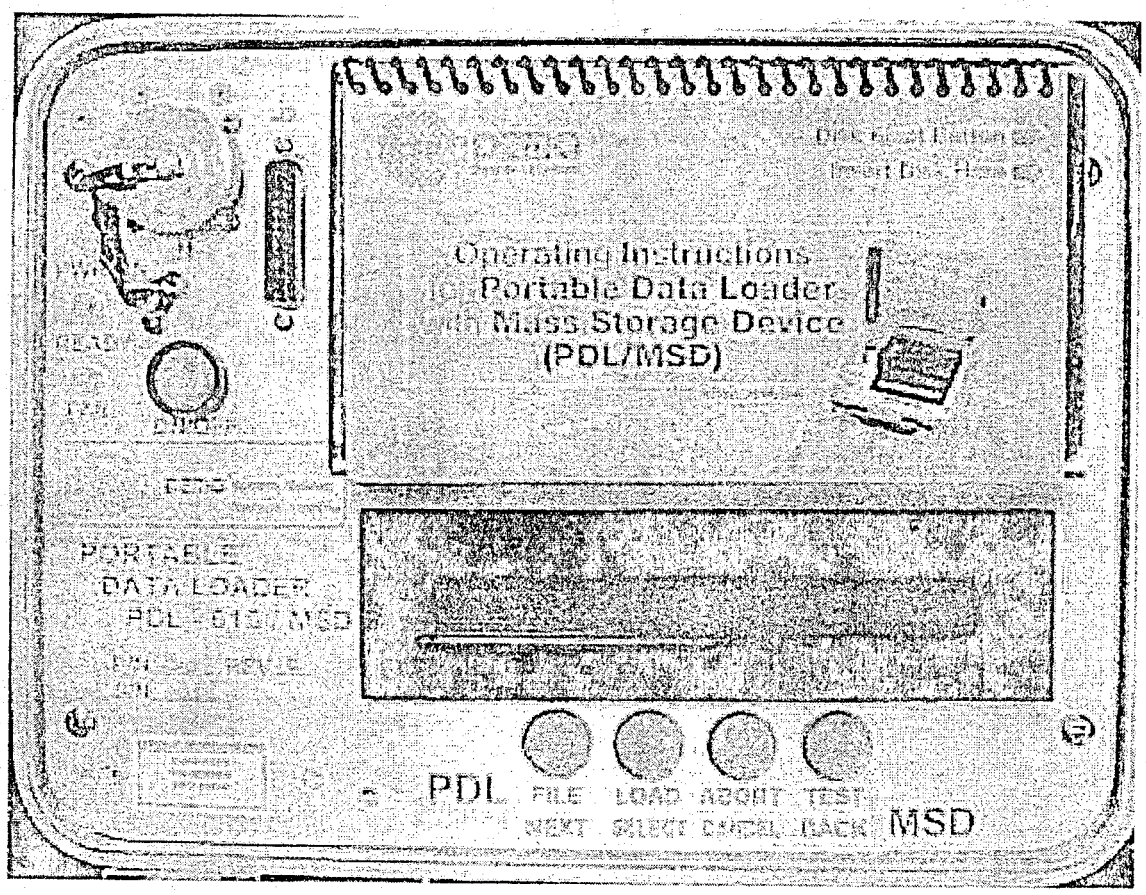

Figure 3. PDL-615/MSD Front Panel with Flip Chart

2.0 LOAD PROCEDURES FOR ARINC 615/603 AVIONICS

2.1 PROCEDURE FOR LOAD FROM FLOPPY DISK

Step	Action
1	Connect the 10' ARINC cable to the PDL J1 connector. The cable will connect directly to an ARINC 615 device. If the **computer being loaded is an ARINC 603 device, connect the 1' adapter cable to the** end of the 10' cable.
2	Turn on the aircraft computer and turn on power to the PDL.
3	If the PDL PWR ON LED does not indicate that power is on, press the ON/OFF pushbutton to apply power. Note that the ON/OFF pushbutton can be left in the on or off state.
4	At turn-on, the PDL-615 display will remain blank for 7 seconds, while the PDL performs initialization tests. {For the PDL-615/MSD, the turn-on message "*POWER ON SELF TEST*" appears for one second, then "*PLEASE WAIT....*" appears for approximately 25 seconds.} The display will then read, "*TESTING, PLEASE WAIT*" for 2 seconds.
5	When testing is completed, the PDL will search for a data disk. If none is found, it will display "*DISK NOT INSERTED*". If a data disk is found the PDL will automatically search for a data file and display the total number of blocks in the file and the filename.
6	If a disk has not yet been inserted, insert the 3.5" floppy data disk into the drive with the label facing up. The PDL will automatically search for a data file on the floppy disk and if found display the total number of blocks in the file and the filename.
7	If the aircraft computer is active, it will automatically initiate the load sequence. The PDL will display a countdown of the block count while the file is loading.
8	The PDL will automatically sequence to the next file if more than one file is to be loaded. If the data to be loaded is contained on more than one disk, the operator will be prompted to insert the next disk.
9	When the load is successfully completed, the PDL will display "*LOAD COMPLETE*", the FAIL LED and the READY LED will both be off.
10	Press the eject button to remove the disk. Press the PWR ON pushbutton to power off the PDL before removing the cable.

2.2 PROCEDURE FOR LOAD FROM MSD

Before you enter the PDL MSD mode to select the loadable software part for ARINC 615/603 data loading, verify that the PDL-615/MSD has been preloaded with the desired loadable software part. Using steps 1 through 6 below, check the contents of the MSD. If the contents of the MSD require changing, use LoadStar® as noted in section 4.0.

Procedure:

Step	Action
1	Connect the PDL-615/MSD to the Aircraft LRU using the PDL cable, turn on the Aircraft LRU, and then turn on the PDL-615/MSD.
2	Wait for the prompt "*DISK NOT INSERTED*" message. (Approximately 30 seconds) Press the NEXT button twice.
3	If the MSD has not been loaded, the display will read "*MSD NOT AVAILABLE*". For loading of the MSD, refer to the procedure in Section 4.
4	A list of AIRCRAFT MODELS is displayed. Press NEXT to see the next AIRCRAFT. Press BACK to see the previous AIRCRAFT category. Press SELECT to choose the AIRCRAFT category displayed. Press CANCEL to return to step 2 and exit the MSD mode.
5	A list of LRU Systems is displayed. Press NEXT to see the next LRU System. Press BACK to see the previous LRU System. Press SELECT to choose the LRU System displayed. Press CANCEL to return to step 4.
6	A list of PART NUMBERS is displayed. Press NEXT to see the next PART NUMBER System. Press BACK to see the previous PART NUMBER. Press SELECT to choose the PART NUMBER displayed. Press CANCEL to return to step 5.
7	Press SELECT to confirm the selected PART NUMBER (P/N will "flash"). Press SELECT again to load the software PART NUMBER. When complete, the PDL-615/MSD will display "*LOAD COMPLETE*".

3.0 LOAD PROCEDURE FOR L1011 RS-232

Unique procedures are required for the load of certain L1011 equipment. These are identified below along with the procedure to be followed.

Reference: L1011 MM 34-61-08 EFF 701-723, 725-741, 751-756*

Procedure:

Step	Action
1	Verify that the Aircraft MLG Gnd Sense Circuit Breaker is **closed.**
2	Pull FMS #2 Power Circuit Breaker
3	Pull FMS #1 Computer Power Circuit Breaker
4	Insert Demo System P/N 31516 Cable J-2 Connector in FDSU #2 Tray Connector
5	Connect the Portable Data Loader to the Cable Assy J-1 Connector
6	Reset the FMS #2 Power Circuit Breaker
7	Press the Data Loader Power Switch to Operate the Data Loader
8	Insert the Data Disk for L1011 in the PDL
9	Select the Disk File to be Loaded in the PDL Display, e.g., (GF 9102)
10	Reset the FMS #1 CB
11	Press the LOAD Pushbutton. The selected file will load into the FMS
12	The Data Loader will indicate "*Load Complete*".
13	Verify FMS Data is inserted on the FMS CDU.
14	Turn off the PDL
15	Pull FDSU #2 Power Circuit Breaker
16	Disconnect Interface Cable

*NOTE: Effectivity of this procedure is dependent upon the FMS/FDSU wiring diagrams. Other effectivity numbers will also apply as evaluations occur.

4.0 SETUP OF PDL-615/MSD USING LOADSTAR®

Communication between the PDL-615/MSD and the PMAT 2000® is through the Ethernet interface of the PMAT 2000® system. The PMAT 2000® to PDL/MSD Adapter Cable, Demo Systems' P/N 80045-1. This cable also allows the PMAT 2000® to charge batteries.

Procedure:

Step	Action
1	Connect J2 (53-pin) of the PMAT 2000® to PDL/MSD Cable (P/N 80045-1) to the PMAT 2000® J1 (twisting the outer ring clockwise locks the cable connector onto the PMAT 2000® connector). Connect P2 (DB25) of the cable to the PDL J2. Connect J1 of the cable to the PDL J1. Connect the cable's AC Power cord (P1) into 115 VAC (50 ~400Hz).
2	Verify that the PMAT 2000® IS turned on, LoadStar® is initiated and has been logged on.
3	Power on the PDL-615/MSD, and wait for about 20 seconds until the message "*NETWORK READY*" appears on the display.
4	PDL-615/MSD is ready to receive commands from LoadStar® .
5	When LoadStar® has completed the PDL-615/MSD configuration, power off the PDL-615/MSD and the PMAT 2000®. Disconnect all cable connections for the PDL-615/MSD and the PMAT 2000®.

5.0 OPERATIONAL DESCRIPTION

5.1 INITIALIZATION

The PDL is powered through the interface cable by the airborne computer. The unit will operate from either 28 VDC or 110 VAC (50-400 Hz). When power is applied to the unit the PDL will begin operation if the ON/OFF button is in the "ON" state. This switch is a pushbutton type and will remain in the last state it was left in until the pushbutton is pressed again. If the switch was left in the "ON" state the POWER ON indicator will illuminate. If the POWER ON indicator is not illuminated the switch needs to be pushed once to turn the PDL on. A floppy disk may be inserted at any time into the unit, or the MSD mode can be selected.

The PDL-615 (non-MSD) requires 7 seconds for initialization. During this time, the computer initializes various discretes and interrupts. The computer also reads the RS-232 discretes to set the configuration of the RS-232 port. After 7 seconds the PDL executes an automatic self-test which is indicated by the display reading "*TESTING - PLEASE WAIT*". This initial test takes approximately 3 seconds to execute. Refer to the PDL Diagnostic section for a description of this test. If any of the tests fail, the FAIL indicator is illuminated and the display indicates which failure has occurred.

The PDL-615/MSD version requires 30 seconds to initialize but the final 10 seconds of the turn-on sequence is the same as the PDL-615 version.

After automatic self-test, the PDL checks the floppy disk drive to see if it is at an operating temperature greater than 0°C. If the drive is at operating temperature, the PDL will turn on the READY indicator and go into the idle mode of operation. If the drive is not at operating temperature, the display will read "*HEATING - PLEASE WAIT*" and the READY indicator will blink. The heating operation will not exceed 5 minutes. After the drive reaches the operating temperature, the PDL will then turn off the READY indicator and enter the idle mode, displaying "*DISK NOT INSERTED*".

5.2 IDLE MODE OF OPERATION / LITTON MODE

When entering the idle mode, the PDL tests for the presence of a Litton cable to determine if the Litton unique mode of operation is requested. If this mode is requested the display reads "*LITTON MODE*" and enters the unique Litton (upload) mode of operation. Once the PDL is set to the Litton mode of operation, it will remain in this mode and will not respond to any ARINC 615 command. If no unique mode is set, the PDL enters the automatic mode and the display reads "*AUTOMATIC MODE*". From the automatic mode, the PDL can enter various uploading modes depending on whether a loadable software part floppy disk is inserted or the loadable software part is selected from the MSD. The PDL can also enter various control modes and the download mode if commanded by the airborne computer.

5.3 AUTOMATIC UPLOAD

When entering the automatic mode, the PDL checks to see:

- If a floppy is present and what files are on the disk.
- If a loadable software part is selected from its MSD.

Based on this information, the following operations may occur:

- If no disk is detected, the PDL will remain in the idle mode until a disk is inserted or the airborne computer commands the PDL to execute a control mode command.
- If a floppy disk is detected or a loadable software part in the MSD is selected but contains no files or the disk contains the single file CONFIG.LDR, then the display reads "*NO FILES FOUND*" and the PDL will "POL" in an attempt to start an automatic download. The file CONFIG.LDR is a unique configuration file specified by ARINC 615 and cannot be used as a file to be uploaded.
- If the disk or the loadable software part in the MSD contains a single data file (discounting the CONFIG.LDR file) and the PDL is in the (unique) Litton mode, the PDL enters the unique Litton upload mode. The display starts at Block number 0, and indicates the block number being transmitted and the file name being transmitted. After the file is transmitted, the display reads "*TRANSFER COMPLETE*". Ejecting the floppy (or pressing ABORT in MSD mode) reenters the idle mode.
- If the floppy disk or the loadable software part in the MSD contains a CONFIG.LDR file that has the default upload file name matching a file on the disk, then the PDL will enter the automatic upload mode. The PDL display will show the total block size of the file loaded, and the filename. As the transfer progresses, the block size will count down to zero. After the file is transmitted, the display reads "*LOAD COMPLETE*". Ejecting the floppy (or pressing ABORT in MSD mode) reenters the idle mode.
- If the disk or the loadable software part from the MSD contains multiple files and the CONFIG.LDR file has an upload file name that is not on the disk, the PDL displays the name of the first file found. The display also indicates the total number of files on the disk. The operator can select other files from the disk or from the loadable software part in the MSD by pressing the FILES button. Pressing this button will cause the PDL to display the next file of the disk directory or the part directory on the MSD. The PDL will store up to 30 file names for directory viewing. If the operator desires to upload any of the files displayed, the LOAD button is pressed and the file currently displayed is uploaded. The display will indicate the file and block count as described above.

5.4 CONTROL MODE

The PDL enters the Control Mode of operation when commanded by the airborne computer through the ARINC 429 interface. When commanded to enter this mode, the display reads "*CONTROL MODE*". The PDL displays the message "*BL:xxxx <filename>*" when a file is opened in this mode for uploading. When the file is closed, the display will read "*LOAD COMPLETE*".

Exit from the control mode is accomplished if the airborne computer commands the PDL to return to the automatic mode or if the PDL is turned off and back on.

5.5 DOWNLOAD MODES

The download capability can be performed from either the automatic or control modes. The airborne computer always initiates the download. The PDL displays the message "*INSERT DISK*" if it detects there is not enough space on the disk to store data for floppy disk download. The display reads "*DL:xxxx <filename>*" when a download is being performed. The block count will start at zero and increase as each block of data is transferred. The display will read "*LOAD COMPLETE*" when the airborne computer terminates the downloading.

6.0 INDICATORS, DISPLAYS AND KEYBOARD OPERATION

6.1 KEYBOARD OPERATION

The PDL contains four pushbuttons. They are labeled **FILE**, **LOAD**, **ABORT,** and **TEST for** traditional Floppy disk load operation and PDL self-test. The PDL's four pushbuttons are also used for loadable software parts selection from the MSD and they are labeled **NEXT, SELECT, CANCEL,** and **BACK**. See Figure 3 for the pushbuttons' label decal on the PDL. Pushing down until an audible click is heard from the pushbutton enables these pushbuttons. The pushbuttons have protective caps installed on them for environmental considerations.

FILES This pushbutton is used to display the name of the files contained on the floppy disk. The last two digits of the PDL display indicate the total number of files stored on the disk.

LOAD This pushbutton is used to initiate an automatic upload of the file indicated in the PDL display.

ABORT This pushbutton terminates all PDL file and ARINC bus activity and returns the PDL to its idle state.

TEST This pushbutton commands the PDL to perform the operator-initiated self-test on the PDL. Refer to the self-test mode Section 8.2 for a description of the tests performed.

NEXT Pushing this button twice commands the PDL to enter the MSD mode when the PDL is displaying the message "DISK NOT INSERTED". When the PDL is in MSD mode, this pushbutton allows the operator to choose the next item on the list.

SELECT This pushbutton commands the PDL to select the item currently displayed to the operator.

CANCEL This pushbutton commands the PDL MSD selection back to the last item level. This pushbutton also terminates all PDL file and ARINC bus activity and returns the PDL to its idle state during data loading.

BACK This pushbutton allows the operator to choose the previous item on the list in the MSD mode.

6.2 DISPLAYS AND INDICATORS

The PDL contains three indicators and a liquid crystal display (LCD). The three indicators are used to indicate the current PDL status and can be monitored from a distance. The LCD display is 20-character display used to give the operator a detailed status of the current PDL operation.

POWER ON Indicator: This green indicator is turned on whenever power is applied to the unit.

READY Indicator: This green indicator is illuminated whenever a usable disk is inserted and read by the PDL. At turn-on this indicator is flashed on and off during the heating phase (When required).

FAIL Indicator: The red indicator is turned on when a failure is detected during the turn-on test, during self-test, or if a download or upload transfer fails. The indicator is reset if self-test is rerun with no errors.

Note: The **READY Indicator** and/or the **FAIL Indicator** may illuminate during the (turn-on) initialization period on some units but have no significance during this period.

7.0 FLOPPY DRIVE

The PDL contains a 3.5" floppy disk drive unit. This drive will read data from disks that have been formatted to be compatible with the MS DOS 3.3 Operating System, at either the high density (1.44 M-bytes) or the low density (720 K-bytes). A disk is inserted into the PDL drive through the drive door located on the right side of the PDL. The disk is inserted with the disk label facing up and the disk arrow on top and pointing toward the PDL disk drive. The disk is fully inserted into the drive when an audible click is heard. The disk SHOULD NOT require excessive force to install. The disk is removed from the drive by pressing the eject button on the drive cover. The drive requires no operator maintenance.

Some brands of low-cost disks do not rigorously conform to the disk form factor and can cause problems when ejecting the disk. High-density or low-density disks manufactured by Sony, 3M and Fuji are recommended.

8.0 DIAGNOSTIC SUPPORT

The data loader has two built-in test modes: an automatic self-test performed at turn-on and an operator-initiated self-test.

The automatic self-test at turn-on is executed after the initialization period and the heating cycle are completed. The complete self-test mode is executed by pressing the TEST pushbutton when the PDL is not performing any other process. The self-test mode should be executed whenever the PDL displays a "*TRANSFER FAILED*" message or the turn-on test fails.

The operator-initiated test checks every internal module and displays the test results.

8.1 AUTOMATIC SELF-TEST AT TURN-ON

This initial test takes approximately 4 seconds and performs the following tests.

Step	Test Being Performed	Description/Operation
1	Function Discretes	The 4 function discretes are wrapped around for verification. Each discrete is set high and low to verify operation. If a failure is detected the display reads "*DISCRETES ON: <discrete #>*".
2	Memory Test	A memory read and write test is performed on the PDL internal memory. If a failure occurs, the display *reads "HEAP MEMORY FAILURE*".

If any of the tests fail, the FAIL indicator is illuminated and the display will indicate the type of failure (ex: Discrete, Memory) then "*SELF TEST FAILED*". Pressing the ABORT pushbutton will clear the LCD display and the FAIL indicator.

8.2 SELF-TEST MODE

This test is executed when the operator presses the TEST pushbutton while the PDL is not performing any other function. The display reads "*EXECUTING SELFTEST*" when this mode is entered. The following steps are performed in this test.

Step	Test Being Performed	Description/Operation
1	PDL Revision	The revision of the PDL software is indicated (ex: Revision: 6.00-M). If the unit is an MSD, the next screen displays BIOS: <BIOS version>, OS: >operating systems version>.
2	Indicator Test	The READY and FAIL indicators are turned on. The display reads "*INDICATORS ON*".
3	Memory Test	The memory test described in 8.1 is executed. If the memory test passes, the display reads "*MEMORY OK*". If the test fails the display reads "*HEAP MEMORY FAILURE*".
4	Discrete Test	The PDL's Function Discretes are tested. The Display indicates "*Discrete Test...*" then "*Discretes OK*". If a failure is detected, the display will show " *ON TEST FAILED: xxxx", or "OFF TEST FAILED: xxxx*", where xxxx indicates discrete number (1, 2, 3, or 4)
5	Keyboard Test	The operator is prompted to press the four pushbuttons. If the operator does not press each correct pushbutton within 5 seconds, or if a failure is detected in the

Step	Test Being Performed	Description/Operation
		keyboard, the display reads "*KEYBOARD FAIL*". If no failure is detected the display shows "*Keyboard OK*".
6	Test Cable Used	If the PDL is being tested with a PDL wraparound cable (P/N 31521-1), the operator is prompted to press LOAD. If the LOAD key is pressed, a complete wraparound test will be performed (Steps 7b, 8, 9, & 10). If the LOAD key is not pressed, wraparounds will not be performed (Step 7a & 10 Only). The message to acknowledge the test cable reads "*PRESS LOAD KEY IF*" for 1 second then reads "*TEST CABLE INSTALLED*" for two seconds. Each message is displayed twice.
7	ARINC 429 Test	a. If the LOAD key is not pressed, a short loop test is performed on the ARINC 429 interface. If a failure is detected, the display reads "*Internal Loop FAIL*". If no failures are detected, the display reads "*Internal Loop OK*". b. If the LOAD key is pressed, a long loop test is performed on the ARINC 429 interface. All transmitters and receivers are checked at both speeds in this test. If no failures are detected, the display reads "*External Loop OK*". If a failure is detected, the display reads "*XMIT xx RCV yyyy BAD*". The "*xx*" is the transmitter that failed (1 or 2) and yyyy is the receiver that is bad (1, 2, 3, or 4).

Step	Test Being Performed	Description/Operation
8	RS-232 Test	This test sends the ASCII pattern "PDL RS-232 OK" out through the serial port. If the test cable is installed, the test verifies this message is sent out and received by the PDL. The ASCII message is sent out at the baud rate and control parameters as indicated by the serial port configuration discretes defined in Table2. The display reads "*Serial Port Test*" when the test is initially called. If there is no failure found, the display reads "*Serial Port OK*". If the PDL times out during the serial port test, the display reads "*SERIAL PORT TIME OUT*". If the serial port CTS is set and no RTS is acknowledged, the display reads "*SERIAL LONG LP FAIL*".
9	Litton Discretes	The display reads "*Unique Discrete Test*" when first executed. This test emulates all the Litton commands that can be issued through the 28-volt discrete lines. If the test fails, the display reads "*Unique Discrete Fail*". Otherwise the PDL displays "*Unique Discrete OK*".
10	Floppy Test	The display reads "*TESTING FLOPPY*" when the test is first called. The operator is prompted to insert the diagnostic floppy to perform this test. The display shows "*INSERT DIAGNOSTIC*" for 1 second then "*FLOPPY DISK*" for two more seconds. This message is repeated twice to give the operator time to insert the disk. If no floppy is inserted, the display reads "*FLOPPY NOT FOUND*". If a floppy is installed that does not contain a configuration file with the Disk Maintenance flag set true, the display will also read "*FLOPPY NOT FOUND*". If the correct floppy is inserted, a read/write test will be performed on the disk. If there are no failures, the display will read "*FLOPPY TESTED OK*". If a failure is detected, the display will read "*FLOPPY FAILED*".

If any failure was detected during the self-test, the display will read "*SELFTEST FAILED*". If the self-test passed, the display will read "*SELFTEST PASSED*". This message will remain on the display until the operator presses any pushbutton or inserts a floppy.

9.0 FUNCTIONAL DESCRIPTION

9.1 ARINC INTERFACE

The PDL contains two independent ARINC transmitters each capable of operation at either the high (100 K bits/second) rate or the low (12.5 K bits/second) rate. The assignment of which transmitter is active is a function of the configuration file located on the current disk or contained in the system default settings.

The PDL also contains four independent ARINC receivers each capable of operating at either of the two ARINC bus speeds. The priority for bus usage shall be in accordance with ARINC 615.

The PDL has the capability of driving cables of up to 50 feet in length. Refer to Tables 1 and 2 for complete system interface definition.

9.2 FLOPPY INTERFACE

The PDL utilizes a 3.5 micro floppy disk for data storage. The floppy has a formatted capacity of 1.44 M-bytes and will be MS-DOS 3.3 compatible. The PDL will read disks formatted at high density (1.44 MB) or at low density (720 KB). Data files stored in the 615 format should be compatible with data files created by other 615-loader systems, which allows for file transportability between vendors.

9.3 RS-232 INTERFACE

The PDL contains an RS-232C interface. The connector pin out and the configuration shall be as defined in ARINC 615. The configuration program pins are read at the time of power on initialization. The PDL shall contain the necessary logic to initialize the RS-232 channel, however no communication shall be provided. This is included as an expandable feature of the PDL.

9.4 ETHERNET 10BASET

The PDL DB25 RS232 interface port has built-in pins for an Ethernet 10BaseT interface. The Ethernet 10BaseT interface is used by LoadStar® so the operator can pre-load and configure loadable software parts into the PDL-615/MSD.

9.5 FUNCTION DISCRETES

The PDL provides for four programmable function discretes that are under the control of the internal processor. Each discrete shall be capable of operating as input or an output. These discretes are enabled and disabled per ARINC 615 specifications.

Table 1. (J1) System Connector Pinout

Function	Pin	Function	Pin
Transmit	1	Future Spare	28
Data Bus Output #1	2	Reserved Receive	29
Transmit	3	Data Bus Input #5	30
Data Bus Output #2	4	Reserved Transmit	31
Output Bus Shields	5	Data Bus Input #6	32
Future Spare	6	Reserved Receive	33
Future Spare	7	Data Bus Input #7	34
Receive	8	Reserved Receive	35
Data Bus Input #1	9	Data Bus Input #8	36
Receive	10	Reserved +28 VDC Input	37
Data Bus Input #2	11	Reserved 28 VDC Return	38
Receive	12	Future Spare	39
Data Bus Input #3	13	RS-232 Transmit	40
Receive	14	RS-232 Receive	41
Data Bus Input #4	15	RS-232 Request to Send (RTS)	42
Input Bus Shields	16	RS-232 Clear to Send (CTS)	43
Future Spare	17	RS-232 BAUD Sel Bit 0	44
Link-A	18	RS-232 BAUD Sel Bit 1	45
Link-B	19	RS-232 BAUD Sel Bit 2	46
115 VAC Input	20	Select ARINC 429/RS-232	47
Chassis Ground	21	Logic Common (GND)	48
115 VAC Input	22	Logic Common (GND)	49
Future Spare	23	Function Discrete #1	50
Reserved Transmit	24	Function Discrete #2	51
Data Bus Output #3	25	Function Discrete #3	52
Reserved Transmit	26	Function Discrete #4	53
Data Bus Output #4	27		

Table 2. (J2) RS-232 Connector Pinout

Pin	Description
1	GROUND
2	SERIAL DATA INPUT
3	SERIAL DATA OUTPUT
4	CLEAR TO SEND
5	REQUEST TO SEND
6	NOT USED
7	GROUND
8	WORD CONFIGURATION*
9	WORD CONFIGURATION*
10	WORD CONFIGURATION*
11	NOT USED
12	PROGRAM GROUND
13	NOT USED
14	PROGRAM GROUND**
15	BAUD RATE SELECT**
16	BAUD RATE SELECT
17-25	NOT USED

* The Word Configuration Program pins have the following definition:

J2-8	J2-9	J2-10	Description
OPEN	OPEN	OPEN	7 BITS, EVEN PARITY, 1 STOP BIT
OPEN	OPEN	GROUND	7 BITS, ODD PARITY, 1 STOP BIT
OPEN	GROUND	OPEN	8 BITS, EVEN PARITY, 1 STOP BIT
OPEN	GROUND	GROUND	8 BITS, ODD PARITY, 1 STOP BIT
GROUND	OPEN	OPEN	8 BITS, NO PARITY, 1 STOP BIT

** The Baud Rate Program pins have the following definition:

J2-14	J2-15	Description
OPEN	OPEN	19200 BAUD
OPEN	GROUND	9600 BAUD
GROUND	OPEN	4800 BAUD
GROUND	GROUND	1200 BAUD

APPENDIX A
GLOSSARY

LCD	Liquid Crystal Display
LED	Light Emitting Diode
LRU	Line Replaceable Unit
MSD	Mass Storage Device
PDL	Portable Data Loader
P/N	Part Number