



DATA TRANSFER SYSTEM MODEL NO. 65000

Description

The Data Transfer System (DTS), Model 65000, is built by Demo Systems LLC (DSL) and is used in military aircraft equipped with the MIL-STD-1553, Time Division Command/Response Multiplex Data Bus. The Model 65000 is a drop-in replacement for the older solid-state technology data cartridge and receptacle systems previously used in many military aircraft installations. This unit is compatible with the Air Force Mission Support System (AFMSS) used for mission planning.

The Model 65000 uses commercially available media: 3.5-inch floppy disks and Personal Computer Memory Card International Association (PCMCIA) cards. The DTS has the ability to load Operational Flight Program software into other system processors on the 1553 data bus in the DTS Memory Loader/Verifier (MLV) Mode of operation. This multi-tasking feature eliminates the need for additional ground support equipment and enhances bare-base operations, where test equipment may not be readily available.

The 65000-02 DTS is the most current version now being fielded by the Air Force. It was developed from a line of earlier versions of Demo Systems LLC (DSL) loaders for the military, including the Model ADL-1553, Model 60000 and the Model 65000-01.

Product Identification

National Stock No. 7025-01-492-4335 SO
Catalog Nomenclature Disk Drive Unit
Military Part No. RD-662B/A
Manufacturers Part No. 65000-02
Manufacturers Name Data Transfer System (DTS)

Applications

The aircraft that have a DSL data loader installed include the following:

MC-130E	Combat Talon I	Model ADL 1553
EC-130H	Compass Call	Model ADL 1553
RC-135()	Combat Sent	Model ADL 1553 (LN20)
HH-53()	Pave Low	Model 60000
AC-130U/H	Gunships	Model 65000
MC-130H	Combat Talon II	Model 65000
HH-60G	Pave Hawk	Model 65000

Hardware Description

The DTS is a single unit mounted with standard Dzus fasteners in a control panel configuration. The unit has four night vision goggle compatible indicator lights, Ready, Fail, Load and Verify. The Ready light intensity is adjustable by a cats eye lens. The Media access door has two twist fasteners and environmental seals. The 1.44Mbyte Floppy disk drive is shock mounted and heated to extend operation limits below +5°C. The two PCMCIA slots support Types I, II and III cards in combinations.

Characteristics

Size:	5.75"w x 4.5"h x 7"d
Weight:	6.5 lb
Power Requirements:	115VAC, 400Hz, 68 watts max. 17.5 watts nominal
Cooling Requirements:	No external cooling, convection cooled

Design Specifications

Basic Design Requirements	MIL-E-5400
Power	MIL-STD-704; MIL-E-7894
Indicator Lights	MIL-L-85762, NVIS compatible
Parts Standardization	MIL-E-5400 and MIL-HDBK-454
Corrosion Prevention	MIL-C-5541E, Class 3
Exterior Finish	MIL-STD-595, Color No. 37038, Black, Lusterless
Environmental Stress Screen	MIL-STD-785, Task 301; MIL-STD-2164
Salt Fog	MIL-STD-810E, Method 509.3 (door closed), 96 hours
Sand	MIL-STD-810E, Method 510.3 (door closed). 90 minutes per surface
Dust	MIL-STD-810E, Method 510.3 (door closed), 12 hours
Shock	MIL-STD-810E, Method 516.4 V & VI, Crash and Bench Handling
Temp - Operating	MIL-E-5400, Class 1B; MIL-STD-810E, Method 520.1, 30 minute warm up at -40°C permitted; -40°C to +55°C (-40°F to +131°F), and +71°C for 10 minutes.
Temp- Non Operating	MIL-E-5400, Class 1B; MIL-STD-810E, Method 520.1, -57°C to +85°C (-71°F to +185°F).
Altitude, Operating	MIL-E-5400, Class 1B; MIL-STD-810E, Method 520.1, 25,000 ft.
Altitude, Non Operating	MIL-E-5400, Class 1B; MIL-STD-810E, Method 520.1, 40,000 ft
Humidity	MIL-E-5400, Class 1B; MIL-STD-810E, Method 520.1.
Vibration, Sinusoidal	MIL-E-5400, Fig 2, Curve IIb; MIL-STD-810E, Method 520.1
Vibration, Random	MIL-E-5400, Fig 2, Curve IIb; MIL-STD-810E, Method 520.1
Explosion	MIL-STD-810E, Method 511.3
EMR	MIL-E-6051D, MIL-STD-461C
EMI	MIL-STD-461C (CE03, CD07, CS01, CS02, CS06, E02, RS-02 & RS03)

Built In Test

The Model 65000 has three forms of built-in-test (BIT). The types are: initialization (IBIT), commanded (CBIT), and periodic (PBIT).

- **IBIT**
At turn-on the DTS performs an Initialization BIT, which checks the internal hardware to ensure functionality. This test is completed within the first 10 seconds. If problems are detected, they are self analyzed and evaluated to determine the seriousness of the problem. If the unit is unusable or unreliable, then the FAIL light is turned on and the unit will not operate. If it is of minor seriousness, the problem is reported and the unit begins operation.
- **CBIT**
Commanded BIT is performed upon instruction by the 1553 Bus Controller (BC). The same elements checked during IBIT are checked and evaluated and reported back to the BC.
- **PBIT**
Periodic BIT is a set of background tests that are performed while the DTS is in use. These tests ensure the operational readiness of the DTS throughout the transfer of data.

Status Reporting

The DTS reports the status of its processes, such as waiting for additional instructions, internal malfunctions found as the result of BIT tests, and the results of Declassify operations to the BC in status messages. The status messages may be reviewed to determine the nature of operation and hardware faults. Status messages are also used to report the DTS configuration, software installed, and the media being used.

Declassify Capability

Two methods are available to erase data on the media, by instruction from the BC or by manual operation of a Declassify switch by an aircrew member. When the DTS receives the Declassify command, it stops all processes in work and immediately performs the erase operation required by AFSSI 5020, Remanence Security, in a Wash function. All media are erased simultaneously, and the speed of the operation depends on the size of the media. If the Wash routine fails to complete for all media installed, the FAIL light will illuminate.

Basic DTS Operation

The front panel Mode selector switch controls the operation of the DTS. There are two Modes of operation, DTS and MLV. The annunciator lights provide visual indications to the operator of the status of the loading processes being performed. The RDY (Ready) light indicates the unit is operational and ready to receive and act on data requests and instructions. The FAIL light indicates the DTS built-in-test has detected a fault, or that a load instruction has failed to perform. The Load and Verify lights are used in the MLV Mode only, and they display the status of the load being performed. The DTS operates on two 1553 bus channels, 0 and 1, which are mechanically switched by software command. The speed of data transfers is limited only by the speed of the 1553 bus itself.

DTS Mode

In the DTS Mode of operation the unit operates as a 1553 bus Remote Terminal (RT), receiving requests and instructions from the aircraft mission computer/bus controller (BC). Mission profile data is transferred by the DTS to set parameters in various Avionics Communications, Flight Control, and Navigation systems. The aircrew member planning the mission creates and stores profile data on the media using the AFMSS planning station or other compatible personal computer devices. Data is stored on the media in word blocks structured by AFMSS. The BC instructs the DTS to locate an address, move the data to RAM in the DTS, and then move it across the bus to the BC. The DTS reads the first 1 Mbyte of the load file into the image storage area. If the load file is larger than 1Mbyte, new data is placed into the image area as data is moved to the BC in a "walking window" technique, so the entire file is moved without interruption. The DTS has the ability to load data from multiple data disk sets and instructs the operator when the next disk is ready to be inserted. The DTS has the ability to search for a media type or locate a certain file on either the 3.5 inch floppy disks or the PC card slots. Data such as maintenance information for post mission analysis can also be passed to the DTS for storage.

MLV Mode

In the MLV Mode, the Model 65000 supports the uploading of operational flight program software into other Avionics or Electronic Warfare loadable systems/subsystems on the 1553 bus. In this Mode, the 65000 acts as the BC, so it prevents bus collisions by shutting down the normal BC and its backup, by using discrete signals. To enter the MLV Mode, a load disk must be installed in the drive before the Mode selector is moved to the MLV position. As a fail-safe feature, the unit will remain in the DTS Mode acting as an RT device if this sequence is not followed. There is a wide variety of upload protocols in use by equipment manufacturers, so it is not feasible to store all possible protocol combinations within the DTS OFP software. Thus, the 65000-02 has the capability of using two storage methods, Intrinsic and Extrinsic.

➤ **Intrinsic**

The original load protocols used in the MLV Mode are stored within the DTS OFP software, and are grandfather protocols. They include the following systems/subsystems:

- Mission Computer, IBM PN AP-102A, used on the MH-53 and Combat Talon II
- Integr. EW Mission Processor, BAE P/N CP-2309/ALQ, used on the MH-53
- Symbol Gen. Unit, BAE P/N SG-1355/ASN, used on the MH-53
- Digital Mapping Computer, Harris P/N CP-2308/ASN, used on the MH-53
- Multi. Access Tactical Term., Allied P/N 407-1734-1, used on the MH-53
- Control Display Unit, BAE P/N CMA 822-5, used on the MH-53 and HH-60G
- Symbol Generator Unit, BAE P/N SGB 55/ASN, used on the MH-53
- Display Elect. Unit, Honeywell P/N CP-2043/ASQ-204, used on Combat Talon II

➤ **Extrinsic**

The new 65000-02 DTS provides the capability of storing the upload protocols on the media along with the data to be uploaded. When these media are inserted, the DTS reads the load instructions stored on the media, performs the necessary set up and BC operations, and then loads the data stored on the same media. These new style load media are made by using Script File Language software coding techniques; thus, MLV load media may be created by the manufacturers or the users in the field. The following Extrinsic loads have been developed to date:

- Radar Warning Receiver, AN/ALR-69
- Elect. Warfare Mgt Unit, AN/ALQ-213
- Symbol Generator Unit (HH-60G), BAE P/N 2751-0204-2

Library of Loads

The DTS 65000-02 also provides the capability of storing load protocols on PC cards in a selectable menu available to the operator when viewed on a display, such as a CDU. This capability provides the user the ability to store all OFP uploads on a single card for each configuration and aircraft type. The menu is displayed on the CDU by equipment name and/or by equipment part number/CPIN, and the operator may scroll up and down the list until the desired load is found. When the operator makes a selection, the status of the loading process is displayed on a percent complete scale. This allows configuration management of all aircraft on-board OFP software by tail number, mission scenarios, etc.

Logistics Data

A two level maintenance support network, where level one is the User and level two is the Depot support activity, supports the DTS. The mean time between failures is in excess of 6,500 hours of operation. The mean time to repair on the aircraft is 0.5 hours. Turn-around-times between the owner and DSL as the Depot activity is less than ten days. Forty-eight hour MICAP support is provided.

Product Warranty

The DTS has a limited warranty. The standard warranty period is two years from the date of delivery. It covers materials and workmanship. As an option, the standard warranty can be extended to eliminate the need for developing organic repair capabilities. Normal extensions available are 1 year, 5 years, and 10 years.

Maintenance Support

Depot level maintenance support is typically provided by one of two methods. An IDIQ type contract is used by the Air Force to support Model 65000 repair of units processed thru WR-ALC under the MILSTRIP network. Other customers use a Time and Materials purchase agreement on a case-by-case basis.

Support Equipment

Two items of Support Equipment are available for the Model 65000 DTS.

➤ **Programmer Test Unit**

The PTU, P/N 67900-1, is used to perform OFP uploads to the DTS itself, as well as to serve as an intermediate level test harness and troubleshooting device. The tester comes with the primary test unit, a bus interface unit (BIU) and the DTS hookup cables. This unit has NSN 4920-01-463-8574 assigned with a catalog description of Test Set, Electronic System.

➤ **Script Development System**

The Script Development System, P/N 65645, is the computer workstation used to create Extrinsic MLV load files. This workstation comes with the computer system, Script Development System software, P/N 65647, and the Script Development Guide, P/N 65646. It includes the software required to create the Library of Loads disks.