

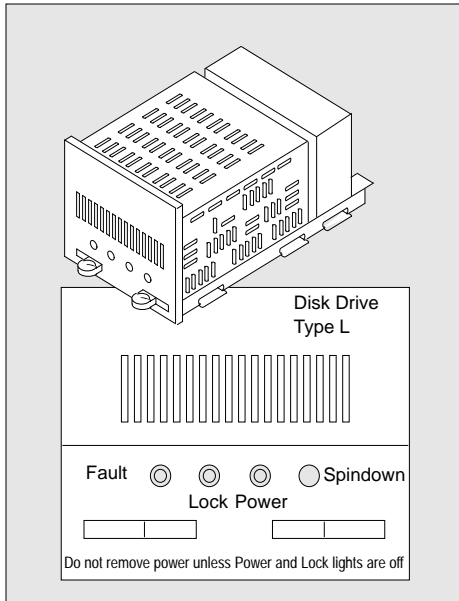
D650 Solid-State RAM Disk Drive

Service Announcement

(Revision 1)

The Stratus 428 MB D650 continuous data retention solid-state disk drive is a very high performance SCSI storage device. The D650 customer-replaceable unit (CRU) fits in the D600 peripheral enclosure and may only co-reside in that enclosure with other D650 devices.

Each D650 includes an embedded random access memory (RAM) disk and a small computer system interface (SCSI) hard drive. The volatile RAM functions as a memory cache for the disk drive subsystem. Data reads are done from RAM unless the disk is in initial RAM load. Data writes are done first to RAM and then written to disk in between command operations. The overall impact is that disk seeks are virtually eliminated, resulting in greatly improved performance. In the event of a power failure, the contents of the RAM disk is sent under battery power to the non-volatile hard disk. At power restart data is restored from the non-volatile hard disk to the embedded RAM. The D650 features:

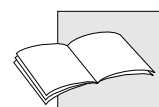


- continuous data retention and tracking as a background process for reduced back-up in case of a power failure;
- operating system utility for reading of battery charge status;
- access to data within 30 seconds after power-up when the battery is at the minimum charge threshold or above;
- automated battery full charge and trickle charge operation;
- power-on self-test that verifies the integrity of the electronics and firmware;
- SCSI-2 compliance.

Hardware Components

The D650 contains a central backplane to which the storage array modules, controller module with MC68020 processor, voltage regulators, internal battery with charger circuitry, and SCSI hard drive connect to the SCSI interface.

The internal NiCad battery is pre-charged at Stratus Manufacturing prior to shipment. The trickle charge process maintains the battery charge during operation. If a power failure causes the battery charge to fall below the battery low threshold, the battery voltage rises above eight volts, the battery temperature falls below 43° C, the D650 returns “busy”, and the firmware asserts fast charge. Only when the battery is drained to the floor of the trickle charge threshold does the fast-charge worst case scenario of twelve hours apply. The fast charge process restores the battery to 90% of full charge. The Maintenance Strategy section of this Service Announcement describes the battery charging thresholds for the disk drive and how to check battery status through a VOS utility.



Hardware Requirements

Modules that are equipped with an uninterruptible power supply (UPS) are less subject to interruption of operation in the unlikely event of D650 battery failure. For this reason, a UPS is highly recommended for these disk drives. However, the D650 does withstand two recursive power failures.

The D600 peripheral enclosure is the required housing for the D650 disk drive. The K121-10 SCSI IOA card, promcode rev. 32, is the SCSI adapter for the D650. Cable requirements are the same as for the D600-series disk drives.

Operating System Requirements

At GA, the D650 disk drive will be available on VOS only, Release 12.1 and above.

Configurations

The D650 disk drive is configurable on all modules that use the D600 peripheral enclosure, i.e., all XA/R modules. The D650 disk drives must reside in a D600 peripheral enclosure, and no other types of devices may co-reside with them.

Specifications

Operating		Environmental	
Start time when battery is charged	30 sec. max. to drive ready	Operating temperature with battery in fast charge	10 to 40° C (50 to 104° F)
Max save time due to power loss	8 minutes	with battery in trickle charge*	10 to 50° C (50 to 122° F)
Internal RAM disk to hard disk transfer rate	2 MB/second	Non-operating temperature	-40 to 66° C (-40 to 151° F)
Interface transfer rate	<u>synchronous</u> 10 MB/sec <u>asynchronous</u> 5 MB/sec	Operating relative humidity	10% to 90% non-condensing
Avg. read & write time	2-4 milliseconds typical	Non-operating relative humidity	8% to 95% non-condensing
Formatted capacity	428 MB	Maximum wet bulb Operating	25.6° C (78° F)
		Non-operating	46.0° C (115° F)
Dimensions		Electrical	
Height	8.26 cm (4.75")	Input voltage range (+5 V)	+4.75 V to +5.25 V dc
Width	14.7 cm (5.75")	Input voltage range (+12 V)	+11.4 V to +12.6 V dc
Depth	20.3 cm (11.75")	Battery life expectancy	3 years
Weight	2.55 kg (5 lbs., 10 oz)	Battery input power draw	.5 amps
		Battery power availability	3.3 amps for 15 minutes
* At temperatures above 40° C, the battery charges in trickle charge mode only, and the drive is operable as long as the battery is at minimum threshold. (Refer to the Maintenance Strategy section for more information.)			

Part Numbers

Marketing ID	Description	Part Number
D650	428 Mbyte capacity solid-state battery backed-up disk drive assembly	AA-D65000
D600	Peripheral enclosure, with three 5.25 inch form factor compartments, including: K121-10 SCSI IOA card data cable power cable	AA-K12110 AW-000540-xx AW-000574

Field-Replaceable Units

FRU Part Number	Description	FRU or CRU*
AA-K121-10	SCSI I/O adapter card	CRU
AA-D65000	5.25" 428 MB solid-state disk drive	CRU
AA-D60000	SCSI peripheral enclosure with IOA and cabling	FRU
AA-B65000	Charged 8.4 VDC NiCad battery pack	FRU
AW-000540-08	Cable for K121-10 SCSI IOA one cabinet from disk drive (8 ft)	FRU
AW-000540-12	Cable for K121-10 SCSI IOA two cabinets from disk drive (12 ft)	FRU
AW-000540-16	Cable for K121-10 SCSI IOA three cabinets from disk drive (16 ft)	FRU

* NOTE: All CRUs by definition are also field-replaceable.

Maintenance Strategy

Customers are expected to replace parts that are specified as CRUs. For this product, the CRUs consist of the K121-10 SCSI IOA and the D650 disk drive. The D650 internal NiCad battery pack, all associated cables and the D600 peripheral enclosure are Stratus field-replaceable only.

Stratus Manufacturing pre-charges the internal batteries prior to shipment. Batteries will be replaced on a preventive maintenance basis within the three year life expectancy. In the event of a battery failure at a customer site, a replacement disk drive CRU will be shipped. Every depleted NiCad battery pack that is removed from a D650 disk drive during preventive maintenance must be returned to Stratus Logistics for proper disposal.

Prior to physically removing a disk, first logical removal must be performed, and then the maximum save time of 8 minutes must be observed. For instructions on logical removal, refer to the *D600 Peripheral Subsystem Installation/Upgrade Guide* (HI023). The LEDs do not display activity during the logical removal and save processes.

Once the above preliminary procedures are completed, physical removal of the D650 disk drives from the D600 peripheral enclosure is the same as for the D60x disk drives. To remove a unit, open the locking levers and push the retainer at the bottom. After installing a unit, close the locking levers. The upgrade procedure is the same as for the D60x disk drives. For details, refer to the D60x publications listed in the Documentation Strategy section of this Service Announcement.

Logistics Strategy

In the U.S., primary spares support is provided from the central logistics stockroom in Marlboro, MA (Elm St.). The Federal Express Parts Bank located in Memphis, TN provides added coverage for after hours, weekends, and emergencies. Canadian spares support is provided in country from Toronto, Ontario and Vancouver, British Columbia, with repair and replenishment support coming from Marlboro, MA. Battery charging units will be placed at six to eight strategic stocking locations worldwide.

Internationally, there are six main field stockpoints located in the United Kingdom, Japan, Australia, Hong Kong, Singapore, and the Netherlands. Each country independently maintains the spare parts inventory for its respective support area. In continental Europe, spares are centrally located at Maarsse in the Netherlands to support all countries within the region. Ireland serves as the replenishment source for all international stockpoints to repair/replace the depleted inventories.

Training Strategy

Information about the D650 disk drive will be incorporated into the standard Stratus hardware training courses. These courses are available to Stratus employees as well as to customers.

Documentation Strategy

This Service Announcement is being distributed to Stratus CACs, CEs, OEMs, and distributors. With an internal purchase order or a sales order, others may obtain copies from Order Administration.

The following is a list of related Customer Service Documentation for the D650.

- *D600 Peripheral Subsystem Installation/Upgrade Guide (HI023)*
- *D600 Peripheral Subsystem Service Announcement (HA023)*

Stratus

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HA-060071
November, 1994