

# FlashDisk® RAID

# RF-3U16 Series

## Rugged 3U RAID at COTS Prices Supports 8 TB HDD plus SSD & SED 5,500 MB/sec. - 1,200,000 IOPS - 128 TB per Shelf - Rugged 1U Tray

FlashDisk RF-3U16 is a rugged version of the commercial FX-3U16 with the same performance levels and Fibre Channel, iSCSI and SAS host support. However, these "COTS Rugged" disk arrays are designed to MIL-STD 810E/833E to store and protect data in harsh operating environments: tolerating levels of dust, moisture, shock and vibration not possible with standard commercial units - at far less expense than fully rugged systems. It supports 16 SAS disks (HDDs, SEDs or SSDs) per shelf and provides up to 128 TB of storage in the base unit, expandable to 1,920 TB. The US Army approved these units for field use and has deployed them worldwide in HUMVEE communication trailers. The front door is crafted of 3/4-inch milled aluminum to provide rigidity, structural integrity and prevent flying-object hazards. It also contains a heavy-duty filter to trap dust particles and provide a moisture shield to protect internal components. The LCD front panel is easily viewed by field personnel, is EMI shielded, and uses heavy-duty "positive feel" pushbuttons. The door also features a dust and raindrop seal. Optionally, the US Army, Navy and Air Force mount the unit to a chassis using five bolts, secured in a triangulated pattern for strength, to a Rugged 1U Tray for land, sea and air operations.



*Pushbuttons designed for "gloved hands," shown US Army Green.*

### Restricted Airflow Model

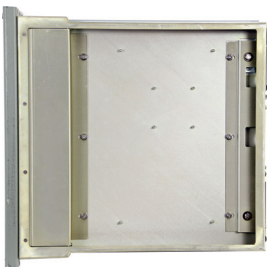


*This RF Series unit mounts flush to submarine bulkhead.*



*Side air intake provides cooling to disk drives and electronics.*

### Rugged 1U Tray Interior and Mounting



*Interior view of rugged 1U mounting tray.*



*Rugged unit on rugged 1U mounting tray with aluminum ball-bearing rails fully extended for rear access.*



*FlashDisk RF-3U16, shown in anodized black, offers 128 TB with 16 disks to 8 TB each - ideal for mobile applications - providing field reliability and data protection at COTS prices.*

### Rugged 1U Tray

#### 1U Tray Advantages

- > **Provides easy access to system**
  - Ballbearing aluminum rails, or heavy-duty steel slide rails
  - Full extension from rack
  - Rear access from front
  - Save 3 ft of service space in rear
  - Front handle for pulling tray
- > **Adds torsion strength and rigidity**
- > **Increases shock & crash tolerance**
- > **Customizable tray functionality**
  - Add UPS module into tray
  - Add EMI filters into tray
  - Add AC/DC power inverter
  - Add twist-lock power connectors
  - Enables special cable routing
- > **Short 21" depth matches system and accommodates shallow racks**
- > **Lightweight aluminum construction**



*FlashDisk RF-3U16 with 1U mounting tray.*



*FlashDisk RF-3U16 rear view with 1U mounting tray and secure power supply clamps.*



*Rugged 1U mounting tray fully extends for rear service access from the front - US Navy Gray.*

### Rugged Design Features

**MIL-STD 810E/833E; NEBS Level 3** Environmental, shock and vibration.

**200G Shock:** Tested for the US Navy to withstand 200G shock with 1U mounting tray.

**Milled Aluminum Door:** 3/4" milled aluminum provides rigidity and structural integrity; dust and raindrop seal.

**Reusable Air Filter:** Dust and moisture protection, field proven in harsh environments, washable.

**Rugged LCD:** Shatterproof LCD protects display under harsh usage and is EMI shielded.

**Gloved Access:** Heavy duty "positive feel" LCD pushbuttons and door thumbscrews for gloved use.

**Front Access Power Switch:** Perfect when no rear access.

**SEDs & Secure Erase:** Self Encrypted Drives (AES-256) with FIPS 140-2 validation, Seagate Instant Secure Erase.

**Auto Power On:** Unit restarts after brownouts and blackouts.

**Transit Case:** Field deployable transit case available.

**1U Tray:** Mounting tray secured to chassis by five bolts to in triangulated pattern for strength.

**Choice of Finish:** Doors and trays painted or anodized neutral black, US Army green, US Navy grey or custom.

**Batteryless Operation:** For fire safety, RAID unit runs without Lithium Ion battery and data written only to disk.

**SSDs for Vibration Resistance:** SSDs offer capacity to 2 TB each.

**Silent Running:** Includes fan speed control to maintain low noise levels.

## RF-3U16 Base Unit with RF-3U16 Expansion Shelf



*The RF-3U16 Series scales to 1,920 TB with 14 optional 3U16 expansion shelves using a total of 240 disks with 8 TB each.*

## RF-3U16 Models Rear View



*RF-3U16 with 4 Fibre Channel 16Gb ports plus 8 iSCSI 1GbE ports.*



*RF-3U16 with 8 Fibre Channel 8Gb ports plus 8 iSCSI 1GbE ports.*



*RF-3U16 with 4 iSCSI 10GbE ports plus 8 iSCSI 1GbE ports.*



*RF-3U16 with 16 iSCSI 1GbE ports.*



*RF-3U16 with 4 SAS 6Gb ports plus 8 iSCSI 1GbE ports.*



*RF-3U16 base unit with 8 iSCSI 1GbE ports.*



*RX-3U16 expansion with 4 SAS 6Gb ports.*

## System Options

Advanced Storage Services

LUN Masking

### RF-3U16 RAID Base Unit

RAID controller  
RAID levels supported  
Host interfaces  
Expansion shelf interface  
# HDD/SED/SSDs - Total capacity  
On-line capacity expansion  
Cache memory capacity  
Non-volatile cache  
Maximum LUN size  
Maximum number of LUNs  
Maximum number of hosts  
LUN mapping/filtering  
Host adapters available for  
Power supplies and AC inlets

### RX-3U16 Expansion Shelf

Expansion architecture  
Expansion shelf architecture  
Maximum drives/capacity  
Removable drive trays  
Power supplies  
Cooling system  
Active components  
S.E.S. monitoring controllers

### Controls and Indicators

LCD front operation panel  
LED indicators  
Alerting  
Component failure  
LCD front operating console

### Compatibility

Operating systems  
Platforms supported  
Cluster support  
Hypervisor support  
Remote monitoring ports  
Communication protocols

### Storage Management

Event notification  
FlashAlert call home service  
Manage out of band  
FlashDisk Global Manager GUI

### Environmental

Shock operating (half-sine)  
Vibration operating (random)  
Vibration operating (sine)  
Acoustic Noise  
Humidity  
Altitude  
Temperature

### General

Uninterruptible power supply  
Redundant AC power  
Power consumption  
RAID unit dimensions  
RAID unit weight  
Cooling system  
Compliance

### Warranty & Service

Standard warranty  
Service contracts  
Secure site  
Installation and service

Increases snapshots from 64 to 256 per volume; from 128 to 4,096 total and increases volume copies from 64 to 256 total.  
Enables volume protection needed in SAN environment.

Single/Dual redundant 64-bit, 13th generation controller  
0, 1, 3, 5, 6, 1+0, 15, 16, 30, 50, 60  
1GbE, 10GbE (copper or fiber), SAS 6Gb, FC 8Gb, FC 16Gb  
SAS 6Gb, 4 lanes - 24Gb per port - up to 48Gb per array  
16 (2.5"/3.5") disks in 3U16 base; 1,920 TB max.; (14) 3U16 expansions  
Automatically adds new drives to existing array - "on-the-fly"  
16 GB per controller, included standard  
Li-ION battery powered backup to flash memory  
512 TB  
1024 total, 64 per host ID  
8 SAS or 64 Fibre Channel  
Configurable per logical partition  
PCI-X, PCI Express  
Dual hot-swap redundant 530 W each; dual AC inlets

Dual/Quad SAS (Serial Attach SCSI) bus  
Multiplexed access to each drive within the shelf  
16 (2.5"/3.5") disks per 3U16 shelf to 128 TB; up to 14 expansion shelves  
Hot swappable; individual drive locks  
Dual hot-swappable; 530 Watts each; 320 Watts typical draw  
Dual hot-swappable fan modules  
No active data path components on the midplane  
Dual, hot-swappable SCSI Enclosure Services modules

2 x 16 character display, push button controls.  
LED power, battery, controller, and system status  
Audible and visual alerts  
Failure indication through LCD and GUI  
View/edit logical RAID/physical drives, setup hot-spare drives, map hosts, check parity, enable write-back cache, rebuild failed drive, view logs...

Supports Windows, Linux, MAC OS X, AIX and UNIX  
Intel, SUN, HP, IBM RS-6000, Apple, SGI  
Supports 9 industry-standards on Windows, Linux and UNIX  
VMware ESX, Citrix XenServer, Windows Hyper-V, RHEL KVM  
RJ45 10/100 Ethernet  
TCP/IP, SNMP, SSH

Automatic event and problem alert notification  
24-hour call center available for immediate action  
Ethernet  
Manage storage services of multiple FlashDisks from any web browser

### MIL-STD 810E/833E

5G, 11 ms pulse width  
5-500 Hz, (0.25 gm operating, 1.00 gm non-operating), X/Y/Z, 30 min.  
5-500 Hz, (0.20 gm operating, 1.00 gm non-operating), X/Y/Z, 60 min.  
65 dBA boundary, 60 dBA normal  
5% to 90% operating, 5% to 95% non-operating (non-condensing)  
12,000 feet operating, 40,000 feet non-operating  
0° to 40° C operating, -40° to 60° C non-operating

Required when using write-back cache  
Dual 90-260 VAC Inlet, 47-63 Hz  
100 VAC @ 8/10A; 240 VAC @ 3/5 A; 530 W with PFC; 340 W draw  
5.1"h x 17.5"w x 21"d  
Approximately 79 lbs. fully loaded with drives  
Two dual hot-swap, ball bearing blowers; 60 dB-A  
FCC, UL, CE, CSA

Three year factory warranty and toll free hotline during business hours  
Optional on-site service, spare parts and advance parts replacement  
Customizable service programs for classified sites  
On-site installation; 24x7 service available

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