storage solutions for demanding applications™

Product Specification

3.5" Solid State IDE Flash Disk - I35FB

Adtron's I35FB is a 3.5" flash disk that provides high capacity, non-volatile flash storage. The I35FB provides long life operation that far exceeds the MTBF of hard disk drives and high performance and reliability with extreme durability. Designed for heavy duty operations, the I35FB flash disks perform under conditions of extended temperatures, high shock and vibration, and rapid temperature gradients.

The I35FB, enhanced by Adtron's flash-memory-based storage systems and solid state flash technology, delivers substantial performance improvements relative to an IDE hard disk drive without sacrificing disk drive functionality. As a result, the I35FB allows for easy to upgrade reliability of computing engines in all solid state performance.

I35FB

Flashpak™

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3.5" IDE FLASH DISK - I35FB

General Description

- The Adtron I35FB is an IDE based flash disk drive that uses solid state flash technology.
- This drive provides extreme durability and reliability in industrial and military applications and environments where traditional mechanical hard disk and tape drives fail.
- The Adtron I35FB flash disk offers capacities from 1GB to 128GB in a standard 3.5" wide IDE disk drive form factor.
- Supports sustained read and write rates up to 37MB/sec
- UDMA-100 with sustained rates up to 75MB/sec are available by special order.
- Adtron offers a comprehensive line of 2.5" and 3.5" IDE and SCSI flash drives.

Applications

- Radar mapping systems
- Avionics and airborne systems
- Electronic counter measures
- Telecommunications and fibre optic switches
- Streaming video
- Wirless base station controllers
- Network routers and switches
- CNC manufacturing equipment

Features

- Solid state flash technology
- Standard IDE 40-pin connector and interface
- No additional software drivers required for operation as a boot and data storage system
- Configures as a single Master or a Slave IDE device
- Solid state reliability to replace hard disks in applications where extreme temperature, shock and vibration prohibit use of traditional rotating media
- Standard 512 byte sectors with reliability ensured by ECC defect management similar to IDE disk drives
- 5V only operation eliminates the requirement for 12V power supply
- Secure erase option, compliant with NISPOM DoD 5220.22-M, NSA 130-2, Air Force AFSSI-5020, Army AR380-19 and Navy NAVSO P-5239-26
- Available in commercial (0 to +70ºC) and industrial (-40ºC to +85ºC) operating temperature ranges
- Tested to MIL-STD-810F specifications
- Standard Warranty: 3 years

PIN CONFIGURATION

Signal Connector Pinout

Pin #	Signal	Pin #	Signal
1	-RESET	2	GND
3	DD7	4	DD8
5	DD6	6	DD9
7	DD5	8	DD10
9	DD4	10	DD11
11	DD3	12	DD12
13	DD2	14	DD13
15	DD1	15	DD14
17	DD0	18	DD15
19	GND	20	KEY
21	DMARQ	22	GND
23	-DIOW	24	GND
25	-DIOR	26	GND
27	IORDY	28	CSEL
29	-DMACK	30	GND
31	INTRQ	32	-IOCS16
33	DA[1]	34	-PDIAG
35	DA[0]	36	DA2
37	-CS0	38	-CS1
39	-DASP	40	GND

Table 1: Signal Connector Pinout

I35FB Connector Pinouts

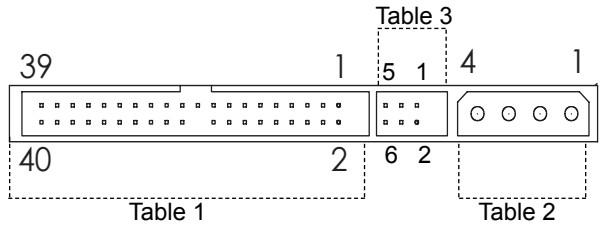


Figure 1: I35FB Connector

Power Connector Pinout

Pin Number	Description
1	Not Connected
2	Ground
3	Ground
4	+5V

Table 2: Power Connector Pinout

IDE Jumper Pinout

Pin Number	Signal
1	-SLAVE
2	GND
3	-MASTER
4	GND
5	-EXTLED
6	RES to +3V

Table 3: IDE Jumper Pinout

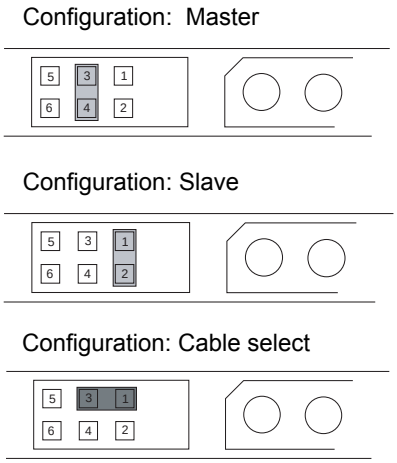


Figure 2: Jumper Descriptions

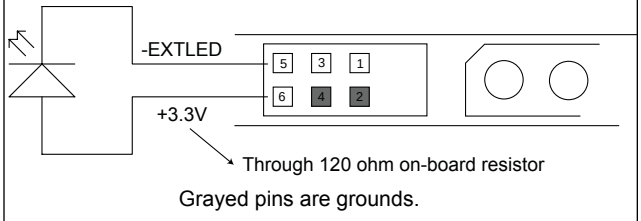


Figure 3: Remote LED Descriptions

CONNECTOR CONFIGURATION

Signal Name	Dir	Pin	Description
DA[2:0]	I	36, 33, 35	DA2-DA0 are used to select the one of eight registers in the Task File.
-CS[1:0]	I	38, 37	-CS0 is the chip select for the Task File registers while -CS1 is used to select the Alternate Status Register and the Device Control Register.
CSEL	I	28	Cable select. This internally pulled-up signal is used to configure this device as a Master or a Slave. When the pin is grounded, this device is configured as a Master. When the pin is open, this device is configured as a Slave.
DD[15:0]	I/O	18, 16, 14, 12, 10, 8, 6, 4, 3, 5, 7, 9, 11, 13, 15, 17	All Task File operations occur in byte mode on the low order bus DD0-DD7 while all data transfers are 16-bit using DD0-DD7.
-DASP	I/O	39	This input/output is the Disk Active/Slave Present signal in the Master/Slave handshake protocol.
DMARQ	O	21	DMA transfer request issued to host.
-DMACK	I	29	DMA request acknowledged by host.
-DIOW: STOP:	I	23	This I/O Write strobe pulse is used to clock I/O data on the Card Data bus into the Drive controller registers when the Drive is configured to use the I/O interface. The clocking will occur on the negative to positive edge of the signal (trailing edge). During Ultra DMA, this is the stop signal.
-DIOR: -HDMARDY: HSTROBE:	I	25	This is an I/O Read strobe generated by the host. This signal gates I/O data onto the bus from the drive. Ultra DMA control signal used to extend host transfer cycles.
INTRQ	O	31	Signal used to interrupt host when service is requested.
-IOCS16	O	32	This output signal is asserted low when the device is expecting a word data transfer cycle.
IORDY: -DDMARDY: DSTROBE	O	27	This output signal may be used as IORDY. Ultra DMA control signal used to extend host transfer cycles.
Key	--	20	This pin is keyed so that the drive can only be connected with the cable pin 1 to the drive pin 1.
-PDIAG -CBLID	I/O	34	This input/output is the Pass diagnostic signal in the Master/Slave handshake protocol. Also, cable assembly type identifier.
-RESET	I	1	This input pin is the active low hardware reset from the host.
GND	--	2, 19, 22, 24, 26, 30, 40	Ground

Table 2: 40-Pin Signal Description

Note: "-" Indicates signal is active low

I35FB CHARACTERISTICS

IDE Bus DC Characteristics

Parameter Symbol	Parameter Description	Test Conditions	Min	Max	Unit
ViH	Voltage Input High		2.0	VCC + 0.5	V
ViL	Voltage Input Low		VSS -0.5	0.8	V
VoH	Voltage Output High	IOH = -4mA	2.4	VCC	V
VoL (Note 1)	Voltage Output Low	IOL = 4mA	VSS	0.5	V
C	Capacitance			20.0	pF

Table 3

Note 1: -DASP IOL is 12mA as per ATA/ATAPI-5 specification

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
5V supply voltage	V_{CC}	-0.3 to +6.0	V
3V supply voltage	V_{DD}	-.05 to V_{CC} +3.6	V
All input/output voltages	V_{IN}, V_{OUT}	-0.5 to V_{CC} +0.5	V
Storage temperature range	T_{STG}	-40 to 85	˚C

Table 6

Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
5V supply voltage	Vcc	4.75	5	5.25	V
Commerical operating temperature	Ta	0	25	70	˚C
Industrial operating temperature	Ta	-40	--	85	˚C

Table 7

Environmental

Parameter	Unit
Relative Humidity (Note 2)	+60˚C and 95% RH, noncondensing
Altitude (Note 3)	24, 384m (80,000ft)
Operating Shock (SRS) (Note 4)	70g half-sine, 100-3000 Hz, 3X, 3 axes
Operating Vibration-random (Note 5)	Helicopter: 2.9g rms, 3-500 Hz random, 3 axes Jet: 10g rms, 5-2000 Hz random, 3 axes Jet: 16.4g rms, 10-2000 Hz random, 3 axes

Table 8

Notes:
2 Testing in accordance with MIL-STD-810F, Method 507.4
3 Testing in accordance with MIL-STD-810F, Method 500.4 Procedure 1
4 Testing in accordance with MIL-STD-810F, Method 516.5 Procedure 1
5 Testing in accordance with MIL-STD-810F, Method 514.5 Procedure IV (modified)

Power Requirements

Parameter (Note 6)	**Value**	**Unit**
Startup	2.00 max	A
Active	2.00 max	A
Standby	1.00 max	A

Table 9

Physical Characteristics

Parameter	**Operating Conditions**
Height	25.3mm [.995"]
Depth	145.6mm [5.734"] +/- .25mm [.010"]
Width	101.6mm [4.00"]
Weight	454g [16oz] (based on capacity)

Table 10

Compatibilities

IDE	ANSI-X3.279-1996 (ATA-2), ANSI-X3.298-1997 (ATA-3), ANSI NCITX 340-2000 (ATA/ATAPI-5)

Table 11

Performance

Item	**Performance**
Start up times (Reset to Busy)	100 ms or less
Start up times (Reset to Not Busy)	5 sec or less
Read (Sustained)	37MB/sec
Write (Sustained)	37MB/sec
Read (Burst)	66MB/sec
Write (Burst)	66MB/sec

Table 12

Reliability

Item	**Value**
MTBF (Note 7)	250,000 hours
Data Reliability	< 1 non-recoverable error in 10^{14} bits read
Write Endurance per Sector	Minimum: 300,000 write/erase cycles Typical: > 1,000,000 write/erase cycles
Read Endurance	Unlimited
Data Retention at 25˚C	> 10 years

Table 13

Notes:

6 Current measurements taken with 256MB capacity
7 Predicted by analysis performed per MIL-HDBK-217F, 30˚C

PACKAGE DIMENSIONS

Refer to the figure below for the enclosure and mounting dimensions of the I35FB 3.5" drive. Dimensions are shown in mm[inches].

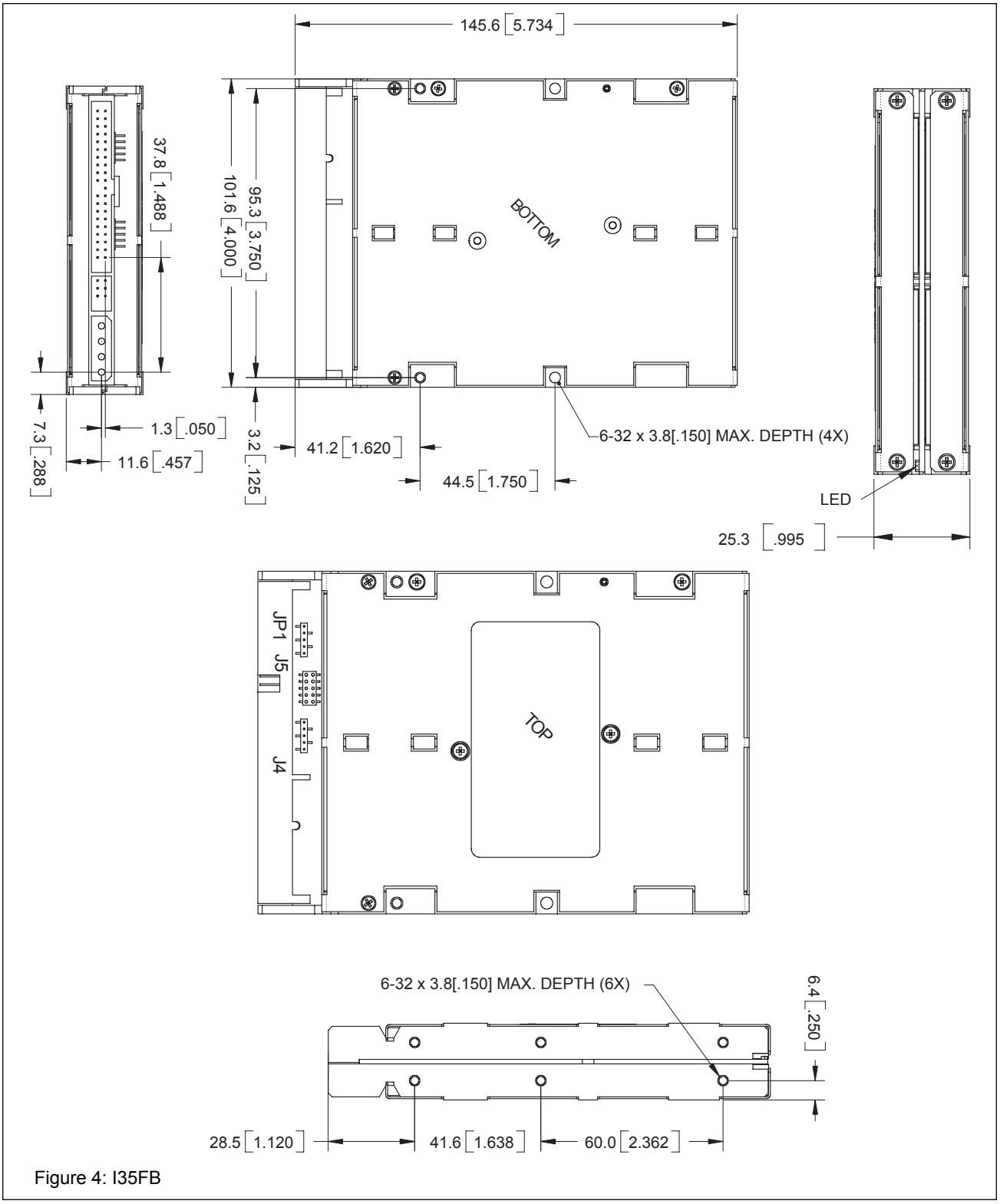
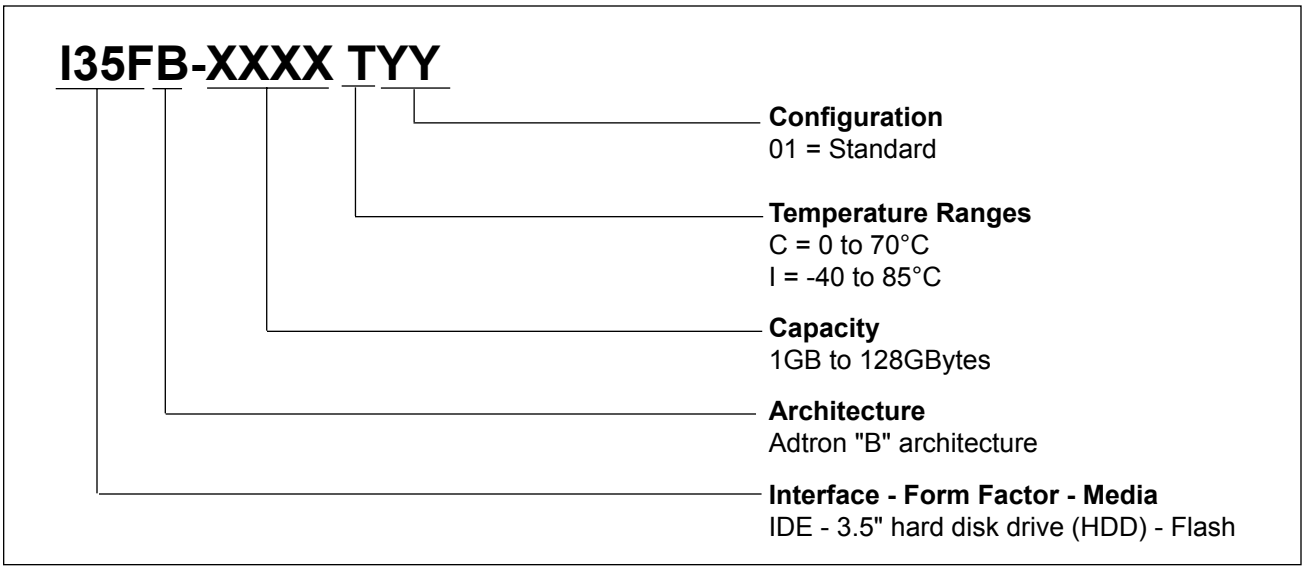


Figure 4: I35FB

ORDERING INFORMATION



Capacity Options	Units
1G, 2G, 4G, 8G, 16G, 24G, 32G, 40G, 48G, 56G, 64G, 80G, 96G, 112G, 128G	GBytes

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