Archive® Python™ DAT AutoLoader
Model 4590NT

PYTHON™

True Computer Grade DAT™ Peripherals

The growing number of large networks and very high capacity disk drives require fully unattended, high capacity backup devices. The Archive Python DAT Auto-Loader is a fully-integrated intelligent, Digital Data Storage (DDS) tape system designed specifically for large capacity data storage environments. The Python DAT AutoLoader stores up to 10 Gigabytes automatically, on a 5-cassette magazine, providing the lowest cost-per-megabyte backup solution in the industry, plus significant labor savings resulting from unattended operation. Its 5 1/4" half-height form factor allows easy integration into small workstations, towers, and network file servers.

The Python DAT AutoLoader is also well-suited for applications such as archival storage, unattended data collection, and secondary storage for large graphic images and data files, and its random access capabilities make it ideal for applications requiring high speed access in an on-line storage environment.

The unique combination of small form factor, relatively low cost per gigabyte, and built-in intelligence assures that the Python DAT AutoLoader will have a major impact on the way computer users backup, archive, and store data for years to come.

Exceptional Capacity and Performance
- 10 Gigabyte capacity with the 5 cassette magazine system using 2.0 Gigabyte, 90 meter DAT cassettes
- Optional magazine holds up to 12 cassettes, for a maximum capacity of 48 Gigabytes
- 5 1/4 inch half-height design operates in any of three drive orientations; horizontal, vertical right or vertical left
- Random Access Mode: DAT drive obtains comands from host through the SCSI interface
- Random access enables files to be retrieved in less than 1 minute, making it practical for near-line storage
- Magazine indexing: less than 10 seconds for load/unload cycle

Industry's Most Complete SCSI Implementation
- A wide array of standard SCSI-1 and SCSI-2 features plus options to suit any DAT application
- 512 Kilobyte data buffer for high performance; also available with optional 1 Megabyte buffer
- High speed SCSI transfer rate, 5 Megabyte/second burst mode

- Embedded, full LSI SCSI controller forwards SCSI commands to loader and returns loader status to host

Advanced Computer Grade Technology
- AutoLoader incorporates a DAT mechanism, SCSI electronics and loader mechanism in one low profile integrated system
- Accommodates a multi-cassette magazine or single cassette operation
- Automatically detects mounting or removal of magazine; quickly executes positioning, auto-load and auto-unload commands
- Low power consumption: 16 watts (typical)

Proven Reliability
- Ensures data integrity as well as trouble-free operation
- Read-after-write, four-head DAT drive design
- Digital Data Storage (DDS) tape format ensures data interchange
- Third-level ECC (C3) standard
- Loader uses simple robotic design; few moving parts for maximum reliability
- Uncorrectable error rate of less than 1 in 10^{15} bits

Archive® Python™ Internal SCSI DAT Products
Standard and DDS-DC Data Compression

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	Standard DDS Drives	**DDS-DC Compression Drives**

Drive Performance

Capacity		
60 meter tape:	1.3 Gigabytes	2.6 Gigabytes typical; 5.2 Gigabytes maximum
90 meter tape:	2.0 Gigabytes	4.0 Gigabytes typical; 8.0 Gigabytes maximum
Transfer Rate:		
Sustained:	183 Kbyte/sec. (11 Mbyte/min.)	366 Kbyte/sec. (22 Mbyte/min.) typical; 732 Kbyte/sec. (44 Mbyte/min.) maximum
Burst:	5 Mbyte/second	5 Mbyte/second
Search/Rewind Speed:	200x normal speed	200x normal speed
Average Access Time		
60 meter tape:	20 seconds	20 seconds
90 meter tape:	30 seconds	30 seconds
Tape Speed:	0.32 inches/sec. (8.15 mm/sec.)	0.32 inches/sec. (8.15 mm/sec.)
Head to Tape Speed:	123 inches/sec. (3,124 mm/sec.)	123 inches/sec. (3,124 mm/sec.)

General

Drive Type:	Computer grade, four Direct Drive(4DD) motors 3 1/2" mechanism	Computer grade, four Direct Drive (4DD) motors 3 1/2" mechanism
Recording Method:	Helical scan (R-DAT)	Helical scan (R-DAT)
Recording Format:	ANSI/ECMA DDS	ANSI/ECMA DDS-DC; DCLZ (Data Compression Lempel-Ziv) Algorithm
Error Rate:	Less than 1 in 10^{15} bits	Less than 1 in 10^{15} bits

SCSI Controller

Interface Format:	SCSI-1 or SCSI-2; hardware and software selectable	SCSI-1 or SCSI-2; hardware and software selectable
Transmission:	Single-ended, asynchronous or synchronous Differential models available	Single-ended, asynchronous or synchronous
In-Drive Buffer Size:	512KB	512KB; 1MB optional
Firmware EEPROM:	Simple OTP	Flash EEPROM standard

Media

Recording Media:	4mm DDS DAT metal particle (DDS qualified media recommended)
Cassette Size:	2.9 in. x 2.1 in. x 0.4 in. (74mm x 53mm x 10mm)
Tape Length:	197 feet(60meter); 295 feet(90meter)
Packing Density:	1,869 tracks/in. (73.6 tracks/mm)
Areal Density:	114 M bits/sq. in. (176,700 bits/sq.mm)

Power Requirements

+5VDC: Standard	0.9A (4520NT), 2.2A(4521NT), 0.7A(4320NT,4540NT)
+5VDC: DDS-DC	0.9A(4322NP, 4542NP)
+12VDC: Standard	0.4A(4520NT, 4521NT), 0.3A(4320NT, 4540NT)
+12VDC: DDS-DC	0.3A(4322NP, 4542NP)
Power consumption:	Below 9.5 watts (typical) (4520NT, 4521NT) Below 7 watts (typical) (432X, 454X models)

Physical Specifications

4320NT, 4322NP:	4.0in.(W) x 6.0in.(L) x 1.6in.(H) (101mm x 152mm x 41mm), Weight: 2.0 lbs (0.9kg)
4540NT, 4542NP:	5.7in. (W) x 7.1in. (L) x 1.6in. (H) (146mm x 180mm x 41mm), Weight: 2.4 lbs (1.1kg)
4520NT, 4521NT:	5.7in. (W) x 8.0in. (L) x 1.6in. (H) (146mm x 203mm x 41mm), Weight: 2.5 lbs (1.2kg)

Environmental Conditions

Ambient Temperature	
Operating:	41° to 113°F (5° to 45°C) mechanism and media
Non-operating:	-40° to 149°F (-40° to 65°C) mechanism
Relative Humidity	
Operating:	20% to 80% non-condensing, mechanism and media
Non-operating:	0% to 90% non-condensing, mechanism
Max. Wet Bulb Temp.:	78.8°F (26°C)

Product Certifications

UL 1950, FCC Class B, CSA C22.2 No. 220, IEC 950 (EN 60 950), VDE 0871

Expected Reliability

MTBF:	Greater than 40,000 hours at 30% duty cycle
MTTR:	Less than 0.5 hours

Qualified Media

60 meter:	Model M31300 DDS data cassette
90 meter:	Model M32000 DDS data cassette
Cleaning Cassette:	Model M7301 DDS cleaning cassette

Archive Python DAT Models

SCSI Interface	Standard DDS				DDS-DC Data Compression			
	Internal		External	AutoLoader	Internal		External	AutoLoader
	3 1/2"	5 1/4"			3 1/2"	5 1/4"		
Single Ended	4320NT	4540NT* 4520NT[1]	4350XT* 4330XT[2]	4590NT	4322NP	4542 NP	4352XP	4592NP

- * New model based on 3 1/2" drive.
- [1] Differential version - Model 4521NT
- [2] Differential version - Model 4331XT
- Buffer memory size: 512KB on standard models; 512KB or 1MB DDS-DC models.
- DDS-DC drives listed have flash EEFROM electrically upgradeable firmware for OEM customers.
- Additional models may be available, contact your Archive sales representative.

Archive® Python™ Internal SCSI DAT Products
Standard and DDS-DC Data Compression Drives

PYTHON™

Archive Python internal SCSI DAT models include standard DDS and DDS-DC data compression drives in both 3 1/2" and 5 1/4" form factors.

Data Compression Drives for Premium Capacity and Performance

- Industry standard DDS-DC (Digital Data Storage Data Compression) compresses data by up to 4 times
- Up to 8 Gigabytes of storage using compact 4mm DDS 90 meter tape; 4 GB typical
- Sustained transfer rate up to 732 Kilobyte/second (44 Megabyte/minute); 366 KB/second (22 MB/minute) typical
- Write and read both DDS-DC compressed and standard DDS data. DDS-DC compression is transparent to host computer; preserves software investment
- High speed random access : 30 seconds (average) to any file on a 90 meter tape

Standard DDS Drives for High Capacity and Performance

- Capacity of 2.0 Gigabytes using 90 meter tape; 1.3 GB with 60 meter tape
- Sustained transfer rate of 183 KB/second (11 MB/minute)
- High speed random access: 20 seconds (average) to any file on a 60 meter tape
- Advanced drive design and DDS format guarantees constant 2.0/1.3 Gigabyte capacity and fast transfer rate, independent of file lengths or host data disruptions

Industry's Most Complete SCSI Implementation

- All Python drives support SCSI-1 or SCSI-2 formats; hardware and software selectable on each internal drive
- 512 Kilobyte data buffer standard; high performance 1 Megabyte buffer available on DDS-DC drives
- SCSI command or hardware switch enables/disables DDS-DC compression

- High speed SCSI transfer rate; 5 Megabyte/second burst mode
- Standard drives proven compatible with industry's widest range of host computers, SCSI adapters, OS, network, and backup software.

Advanced Computer Grade Technology

- 3 1/2 inch DAT drive die cast aluminum mechanism, Archive-designed specifically for computer applications
- Four Direct Drive (4DD) motors eliminate belts and mechanical mode changes
- Silent read/write
- Advanced, Archive-designed LSI circuits for reliability and reduced cost
- Gentle tape handling allows efficient, reliable use of 90 meter tape in all drives
- Single chip, real time data compression on DDS-DC drives, modular circuitry
- Flash EEPROM on DDS-DC models enables OEM drive firmware upgrades via firmware cassette, SCSI bus, or drive serial port; secure implementation

Proven Reliability

- All Python drives use an identical, field proven 3 1/2 inch drive mechanism
- Read-after-write, four head design; third level ECC (C3) standard
- Industry-standard DDS or DDS-DC format insures data interchange
- Front bezel LEDS indicate when head cleaning or tape replacement needed
- Electronic tape path control ensures long head, drum, and key component life
- Uncorrectable error rate of less than 1 in 10^{15} bits
- Expected MTBF greater than 40,000 hours at 30 percent duty cycle

True Computer Grade DAT™ Peripherals

Computer systems of all types now demand dedicated removable storage peripherals which combine high capacity, exceptional performance and low cost with absolute reliability - all in a small form factor. The Python family of True Computer Grade Digital Audio Tape (DAT)™ products provide a balance of these features which is unequalled, in both standard Digital Data Storage (DDS) tape drives and new DDS-DC data compression models, providing up to 8 Gigabytes of storage on a single 4mm cassette.

Available in both 3 1/2 inch and 5 1/4 inch versions in standard as well as DDS-DC models, Python internal drives are designed for use in standalone and networked PC's, file servers, workstations, minicomputers and multiuser systems. With a field-proven 3 1/2" mechanism and innovations such as flash EEPROM, Python drives continue to set new levels of industry performance for reliable, low-cost, multi-Gigabyte, fixed disk backup on popular DOS, NetWare, OS/2, UNIX, DEC, IBM, AS/400, Sun, Apple and many other platforms. New applications range from software and data distribution to random access on-line storage for data files, graphic images, and multimedia information.

Archive® Python™ DAT AutoLoader
Model 4590NT

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AutoLoader Tape Drive Performance

Capacity

6.5 Gigabytes:	Using a 5 cassette magazine system with 60 meter (1.3GB) 4mm DAT cassettes
10 Gigabyte:	Using a 5 cassette magazine system with 90 meter (2.0GB) *4mm* DAT cassettes
Sustained transfer rate:	183 Kbyte/second (11MB/min.)
Burst transfer rate:	5 Mbyte/second
Magazine Indexing:	Less than 10 seconds (time for load/unload cycle)
Drum rotation speed:	2,000 RPM
Tape speed:	0.32 in./sec. (8.15mm/sec.)
Head-to-tape speed:	123 in./sec. (3,124mm/sec.)

Environmental Conditions

Ambient temperature
- Operating: 41° to 113°F (5° to 45°C) mechanism and media
- Non-operating: -40° to 149°F (-40° to 65°C) mechanism

Relative Humidity
- Operating: 20% to 80% non-condensing, mechanism and media
- Non-operating: 0 to 90% non-condensing, mechanism
- Max. wet-bulb temp.: 78.8°F (26°C)

General

AutoLoader Tape Drive:	Computer grade, internal 5 1/4" half-height profile with frontal protrusion of less than 3 1/2"
Recording method:	Helical scan (R-DAT)
Recording format:	DDS ANSI
Internal diagnostics:	RS-232 serial port access (TTL)

Controller Interface

Interface format:	SCSI-1 or SCSI-2; hardware and software selectable
Commands implemented:	All SCSI-1 and SCSI-2 mandatory commands, most optional commands
Transmission mode:	Single-ended; asynchronous or synchronous
In-drive buffer size:	512 Kbyte; buffer parity standard

(right column)

Random access mode:	DAT drive obtains commands from host through the SCSI interface; serial between DAT drive and loader

Media

Recording media:	4mm DAT metal particle tape (qualified media recommended)
Cassette:	2.9in. x 2.1in. x 0.4in. (73.7 mm x 53.3 mm x 10.2 mm)
Tape length:	197 ft. (60m); 295 ft. (90m)
Packing density:	1,869 tracks/in. (73.6 tracks/mm)
Areal density:	114 Mbits/sq. in. (176,700 bits/sq. mm)

Power Requirements

Power consumption: 16 watts (typical)

Physical Specifications

Form Factor:	5 1/4", half-height, internal mount

Drive Section
- Height: 1.6 in. (41.0mm)
- Width: 5.7 in. (146.0mm)
- Length: 8.0 in. (203.2mm)

Loader Section
- Height: 1.4 in. (35.5mm)
- Width: 5.7 in. (144.9mm)
- Length: 3.6 in. (91.4mm)

Product Certifications

(will be qualified to the following standards)
- UL recognition to UL 1950
- FCC Class B computing device
- CSA certification to C22.2 No. 220
- IEC 950 (EN 60 950)
- VDE 0871

Expected Reliability

AutoLoader MTBF:	Greater than 40,000 hours at 15% duty cycle
MTTR:	Less than 0.5 hour
AutoLoader Mechanism Load/Unload Cycles:	Greater than 30,000 cassette insertions and removals

Archive Python DAT Models

SCSI Interface	Standard DDS				DDS-DC Data Compression			
	Internal		External	AutoLoader	Internal		External	AutoLoader
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Single Ended	4320NT	4540NT* 4520NT[1]	4350XT* 4330XT[2]	4590NT	4322NP	4542 NP	4352XP	4592NP

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