The Amlyn A506

Dynamic Winchester Backup

Plug compatible with the Seagate ST506 or equivalent Winchester drive, Amlyn's A506 delivers 25% more storage capacity while assuring on-line backup in the event of primary drive failure, unlike when using streaming tape devices. For instance, the Amlyn Model A506 diskette surfaces match each of the four ST506 surfaces with 153 data tracks, plus one alternate track. The fifth diskette provides an additional 25% more storage capacity, which may be used for operating system load, or other requirements. Should the Winchester system fail, the Amlyn backup is designed to duplicate its operation, though at a slower date transfer rate due to disk rotational speed differences.

CONTROL ELECTRONICS Drive electronics are contained on two printed circuit cards: the Motor Drive card and the Drive Control card. The Drive Control card includes the Intel 8051 microprocessor and associated support chips, the read/write circuits, and the reference track detection circuits. Also provided are self diagnostics and photo interrupter circuitry for control sensors such as: door closed, diskette picker, Pac home, write protect, index/segment and head carriage home, as well as the carriage scale sensors which detect the direction of motion and location of the R/W head cartridge.

The Motor Drive card contains the drive circuitry for the head carriage motor, the spindle drive motor, the Pac articulator motor and the diskette picker motor.

PAC ARTICULATOR This mechanism positions the MiniPac cartridge for selection of a diskette using a stepper motor under microprocessor control to move a predetermined number of steps from the "Pac home" position. This position is determined when a flag on the cartridge tray passes between a photo-interrupter switch module designated as the Pac home sensor.

DISKETTE PICKER The diskette picker is controlled in a manner similar to the Pac articulator. The picker selects the appropriate diskette from the articulated cartridge, moves and centers it over the spindle and clamps the diskette to the spindle. When a different diskette is addressed, the action is reversed and then repeated to load the new diskette.

SPINDLE DRIVE Two microprocessor controlled rotational speeds are provided: Normal operating speed is 360 RPM; a second speed of 600 RPM is used to rotate standard diskettes recorded at 48, 96 or 100 TPI so that read data is provided at the rates required by the Amlyn drives.

The spindle drive motor is a DC motor, eliminating belt and drive pulleys changes for 50 or 60 Hz. power.

READ/WRITE HEAD The R/W head which records and reads data on the diskettes is a single element, hot pressed man-

ganese/zinc/ferrite device which has tunnel erase elements to erase data between tracks.

The head surface has been designed to obtain maximum signal transfer to and from the magnetic surface of the diskette with minimal wear of both the head and the diskette. The diskettes used with the Amlyn drives are multiple sourced.

HEAD CARRIAGE POSITIONING

The R/W head carriage assembly is positioned via a heliband which connects the drive motor to the assembly. The drive motor is a 1.8 degree stepper motor which drives the R/W head in 5.9 mil increments which are equivalent to the 5.9 mil spacing of the data tracks on the diskette. Microprocessor control of this assembly results in virtually noiseless positioning of the R/W head. Ultra fine movements in increments as small as 59 microinches provide a high degree of accuracy.

The assembly contains an optical scale which passes between LED and phototransistor sensors. The lines on the scale are spaced at .59 mil increments, or 1/10th the spacing of the data tracks. The control circuitry counts the lines on the scale by monitoring the output of the four scale sensors and uses a quadrature detection scheme to determine the direction of the scale motion and the number of lines that pass between the sensors. Intelligent control allows much faster access speed than blind stepping techniques.

Since the scale is made of Mylar, the same material used in the diskettes, it expands and contracts at the same rate as the diskette media under typical environmental conditions. This means that the location of all the data tracks can be determined by counting the scale reticle lines from the reference track and moving the head carriage assembly accordingly, eliminating touchy field or installation adjustments.

REFERENCE TRACK LOCATION

The reference track on any individual diskette is determined each time a diskette is removed from the cartridge and clamped to the spindle. To find the reference point from which the data tracks are located, the head/carriage assembly is moved to the carriage home position, which is well outside the reference track on the edge of the diskette. Once in this position, the assembly is microstepped in toward the reference track until the reference track is detected.

Eccentricities are determined by locating the reference point at eight locations around the diskette. Any eccentricity offsets are stored for those eight locations to automatically microstep the head cartridge assembly in compensating directions as the diskette rotates to accurately follow the data tracks.

ADVANTAGES

- 8-Mbyte dynamic backup
- Seagate ST506 compatible
- Twenty-five per cent greater capacity
- No touchy installation/field adjustments
- Flexible formats
- High data rates
- Cartridge diskette protection/versatility
- Self contained diagnostics
- Quiet stepping, fast access
- Changeable diskettes within cartridge
- Energy efficient motor

Physical Specifications

Environmental Limits (Operational)
Ambient Temperature = 40° to 104° F (4° to 40°C)
Relative Humidity = 20% to 80% Noncondensing
Maximum Wet Bulb = 78°F (25°C)

DC Power Requirements
+12 VDC ±5% @ 1.2 A typical
+ 5 VDC ±5% @ 0.9 A typical

Weight = 2.5 lbs. (1.2 kg)

Mounting Envelope Dimensions
Height = 3.25 inches (82.6 mm)
Width = 5.75 inches (146.0 mm)
Depth = 8.11 inches (206.0 mm)

Heat Dissipation = 86 BTU/hr. typical (25 watts)

Media Requirements
5 each UHR I or equiv. Mini-Diskettes

Diskette Cartridge Requirements
1 each MiniPac cartridge

Performance Specifications

Unformatted Capacity	**Double Density**
Per MiniPac Cartridge	8 mbytes
Per Diskette Surface	1600 kbytes
Per Track	10.4 kbytes

Formatted Capacity
Seagate
ST506 Format

Per MiniPac Cartridge	6.3 mbytes
Per Diskette Surface	1253.4 kbytes
Per Track	8192 bytes

Transfer Rate = 500 kbits/sec

Average Rotational Latency = 83 ms

Access Time:
Adjacent Track to Track = 3 msec
Track 00 to Track 153 = 230 msec
Average Access Time = 85 msec
Settling Time = 15 msec
Diskette to Diskette = 1.9 sec average, 2.9 sec max.

Functional Specifications

Rotational Speed = 360 rpm
Recording Density = 9500 bpi (inside track double density)
Flux Density = 9500 fci
Track Density = 170 tpi
Track Width = 3.5 mils
Cylinders = 154
Tracks = 770
Heads = 1
Encoding Method = FM, MFM, M^2FM

Reliability Specifications

MTBF: 8000 POH under typical usage

MTR: 30 minutes

Component Life: 15,000 POH

Error Rates:
Soft Read Errors = 1 per 10^9 bits read
Hard Read Errors = 1 per 10^{12} bits read
Seek Errors = 1 per 10^6 seeks

Media Life:
Passes per Track = 3.5×10^6
Insertions = 30,000+

amlyn
Amlyn Corporation
1758-H Junction Avenue
San Jose, CA 95112
(408) 275-8616