Hard Drive: TANDON: TM262 21MB 5.25"/HH MFM ST506

```
T M 2 6 2     TANDON
NO MORE PRODUCED                               Native|  Translation
                                               ------+-----+-----+-----
Form                 5.25"/HH     Cylinders     615|     |     |
Capacity form/unform   21/   25 MB Heads          4|     |     |
Seek time   / track  80.0/ 3.0 ms Sector/track   17|     |     |
Controller       MFM / ST506     Precompensation 65535
Cache/Buffer          KB         Landing Zone     663
Data transfer rate   0.625 MB/S int  Bytes/Sector    512
                     0.625 MB/S ext
Recording method     MFM                     operating  | non-operating
                                             -------------+--------------
Supply voltage    5/12 V    Temperature *C       4 50   |   -40 60
Power: sleep          W     Humidity    %        8 80   |     8 80
       standby        W     Altitude    km   -0.457  2.972| -0.457 12.195
       idle      10.0 W     Shock       g        10     |     40
       seek           W     Rotation    RPM    3568
       read/write     W     Acoustic    dBA
       spin-up        W     ECC         Bit    -
                            MTBF        h      15000
                            Warranty Month
Lift/Lock/Park    NO         Certificates    CSA,UL1950
```

Layout

TANDON TM362/TM262 PRODUCT SPECIFICATION AND USER'S MANUAL 1985

```
   +-------------------------------------------------------+  1
   |                                                    |XX
   |                                                    |XX J1
   |                                               +1  |XX
   |                                        Terminator|  |XX
   |                                        Resistor ||  |XX
   |                                                 ||  |XX
   |                                                 ++  |XX
```

```
                                              W1+--+ |
                                     Drive    W2|  | |XX1
                                     Address W3|  | |XX J2
                                             W4|  | |XX
                                             W5|  | |XX
                                               +--+ |XX
                                                    |XX
                                                    |  1
                                                    +---J3XX
                                                    +-----XX
  |                                                          |
  +----------------------------------------------------------+Power
```

Jumpers

Jumper Setting
==============

```
  Drive Address Jumper
  --------------------
                                           W1 Drive Select 0
  +--------+   +--------+   +--------+      W2 Drive Select 1
  ++++++++++   ++++++++++   ++++++++++      W3 Drive Select 2
       xx W1        xx W2       xx    W3    W4 Drive Select 0
                                 |          W5 Radial Configuration
  +--------+   +--------+      Jumper
  ++++++++++   ++++++++++
     xx    W4   xx     W5
     |          |
   Jumper     Jumper
```

The drive address option allows the user to daisy chain up to four drives, and to enable one drive at a time. Drive Select is implemented by shorting one of the four connections, using the Drive Select Jumper. The W5 location is used for radial configurations. The drive is selected at all times with the W5 jumper installed.

If jumper configurations are changed, power should be cycled off and on, so that the microprocessor can recognize the new configuration.

```
  Terminator Resistor
  -------------------
                        The terminator resistor pack, located on the
        +--------+      logic circuit board should be installed in the
       |********| ^    last drive of the daisy chain. All other
```

```
      +--------+ |     drives on the interface must have the
      ++++++++++       resistor pack removed. For a radial configura-
      +--------1       tion, all drives should have the terminator
                       resistor pack installed.
```

Install

Notes on Installation
======================

Installation direction

```
       horizontally                          vertically
     +-----------------+          +--+                      +--+
     |                 |          |  +-----+          +-----+  |
     |                 |          |  |     |          |     |  |
   +-+-----------------+-+        |  |     |          |     |  |
   +---------------------+        |  |     |          |     |  |
                                  |  |     |          |     |  |
       x            x             |  |     |          |     |  |
   +------x------x-------+        |  |     |          |     |  |
   +-+-------x--x-------+-+        |  +-----+          +-----+  |
     |       xx        |          +--+                      +--+
     |    x     x      |
     +---x--------x----+
       x            x
```
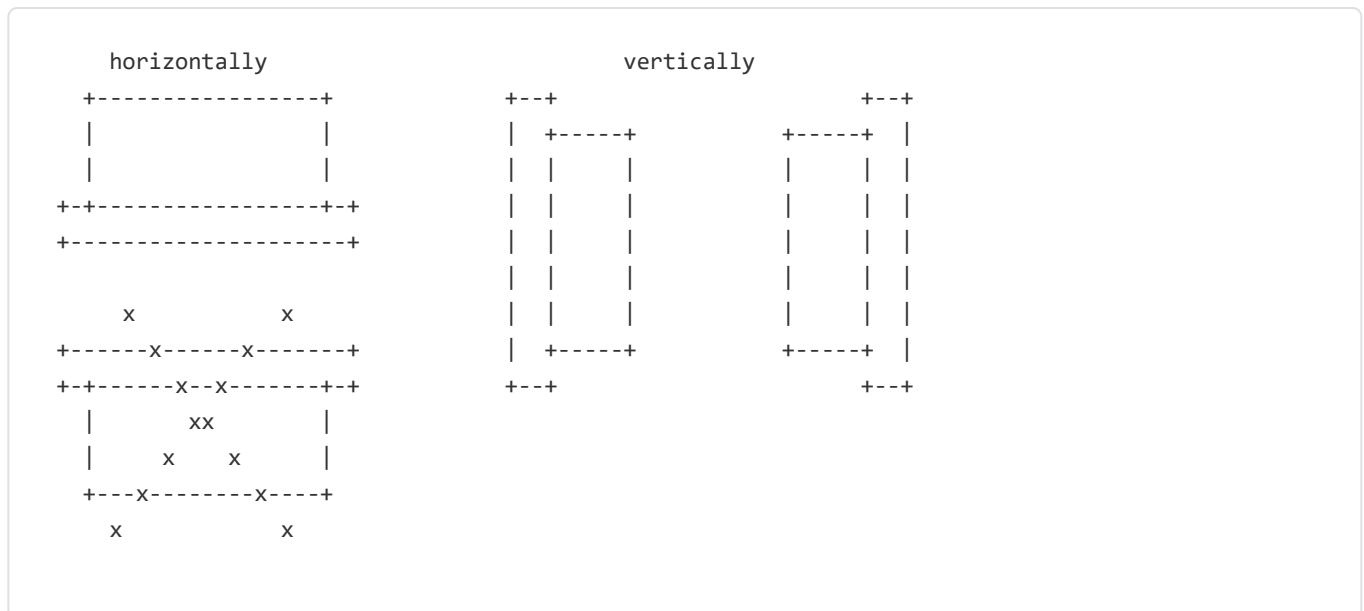
Mounting the Drive

The drive can be mounted in any vertical or horizontal plane. On the
TM362, eight 6-32 tapped holes are provided for mounting: two on each
side and four on the bottom of the frame. On the TM262 twenty-four
6-32 tapped holes are provided for mounting: eight on each side and
eight on the bottom of the frame. The drive is manufactured with some
critical internal alignments that must be maintained. Hence, it is
important the mounting hardware does not introduce significant stress
on the drive.

Any mounting scheme in which the drive is part of the structural
integrity of the enclosure is not permitted. Mounting schemes should
allow for adjustable brackets or incorporate resilient members to

accommodate tolerances.

A sway space is required between the head disk assembly and other assemblies in the user system to allow for movement of the housing on its shock mounts 0.060 inces minimum.

Daisy Chain/Radial Capability

The circuit board provides address selection and gating functions that allow a user to daisy chain up to four drives or configure the drive for radial connection. A SIP resistor pack is used to terminate the interface. The resistor pack is removed from its SIP socket on all drive except the last one in a daisy chain. When a single-drive system or a radial configuration is used, the resistor pack remains plugged into the SIP socket.

Both drives are compatible with controllers that use an ST506/412 industry standard interface.

Front Panel

Front panels equipped with an activity indicator are available for each of the drives.

Air Filtration

A self-contained, recirculating air filtration system supplies clean air through a 0.3-micron filter. A secondary breather filter is provided to allow pressure equalization with the ambient atmosphere without contamination. The entire head-disk-actuator compartment is maintained at a slightly positive pressure to further ensure an ultraclean environment.

Interface Connectors

The electrical interface between the drive and the host system is via three connectors. J1 provides control signals for the drive. J2 provides for the radial connection of read/write data signals. J3 provides for D.C. power.

J1/P1 Connector

Connection to J1 is through a thirty-four-pin circuit board connector. The pins are numbered 1 through 34. The even pins are

located on the solder side of the circuit board. A key slot is
provided between Pins 4 and 6. The recommended mating connector for
P1 is AMP ribbon connector P/N 88383-3, without ears.

J2/P2 Connector

Connection to J2 is through a twenty-pin circuit board edge
connector. The pins are numbered 1 through 20. The even pins are
located on the solder side of the circuit board. The recommended
mating connector for P2 is AMP ribbon connector P/N 88373-3, without
ears. A key slot is provided between Pins 4 and 6.

J3/P3 Connector

D.C. power connector J3 is a four-pin AMP Mate-N-Lok connector, P/N
1-480426-0. The recommended mating connector, P3, is AMP P/N
1-480424-0, utilizing AMP pins P/N 60619-4. J3 pins are labeled on
the J3 connector. J3 cabling must be 18 AWG minimum.

Interface Line Descriptions

The interface for the TM362 and TM262 drives is avilable in one
configuration. It is compatible with ST506/412 indutry standard
drives. Compatibility is defined as using the same pin assignment
where the signal and function are common.

The interface may be connected in the radial or daisy chain
configuration.

Features

TANDON TM362/TM262 PRODUCT SPECIFICATION AND USER'S MANUAL 1985

Introduction

This manual provides useful information to assist the customer when
incorporating the Tandon rigid disk drive into a system.

The TM362 and TM262 disk drives are full feature, compact units that
use a pseudo-closed-loop head positioning system in conjunction with
standard Winchester technology to store data on 3.5-inch plated
media. Voltage and signal requirements for both drives are identical
to those of Tandon Corporation's standard 5-1/4-inch family of rigid

disk drives.

Frame size is the only difference between the TM362 drive and the TM262 drive. The TM362 is designed to fit in a standard 3.5-inch cavity, and the TM262 is designed to fit in a standard 5-1/4-inch drive cavity.

The storage media is contained within the drive in a fixed, non-operator-removable configuration.

Purpose of the Drive

These drives are rotating disk memory devices designed for random access data storage and retrieval. Typical applications include word processing systems, entry level microprocessor systems, intelligent calculators, program storage, small business computer systems, and any application in which low cost, high speed random access data storage is required.

Microprocessor Control

The TM362 and TM262 drives feature an onboard microprocessor, providing five major functions:

```
    1. Self-calibration on power-up.
    2. Seek timing for the head positioning mechanism.
    3. Write current switching for optimal data recording quality.
    4. Power and track fault detection.
    5. Compensation for positioning errors caused by temperature and
       mechanical variations.
```

Functional Description

The functional characteristics of the TM362 and TM262 drives are identical. The drives are fully self-contained and require no operator intervention during normal operation. During the power-up sequence, the spindle motor reaches 3,568 RPM, and the positioning mechanism recalibrates the recording heads back to Track 0. If the spindle motor does not up to speed within 15 seconds, the drivers to the spindle motor will be turned off. A new power up sequence will be attempted when the power is momentarily removed and then restored.

The drives are designed to optimize MFM write and read data recording methods, as specified by the ST506/412 interface. Data recovery electronics include a low-level read amplifier, differentiator, a zero-crossover detector, and digitizing circuits. No data encoding or decoding features are provided on the drives.

The heads are positioned over the desired track by means of a stepper motor and a rack and pinion mechanism. Servo positioning pulses are recorded on the final segment of each Head 0 track, and, by continuously monitoring the location of the heads in relationship to those pulses, the drive is able to maintain highly accurate servo positioning.

The onboard microprocessor monitors all functions that could affect drive performance. If a problem exists, the drive will abort its power sequence or (after achieving a Ready state) declare a fault condition.

A parking zone is provided for the read/write heads at cylinder 663. The parking function is under the control of the drive controller.

```
Seek Time
---------

    +----------------------------------+--------+
    |                                  |362/262 |
    +----------------------------------+--------+
    |Track-to-Track        msec. typ.  |   3    |
    +----------------------------------+--------+
    |Average               msec. typ.  |  80    |
    |                      msec. max.   | 195    |
    +----------------------------------+--------+
    |Head Settling Time    msec.       |  15.0  |
    +----------------------------------+--------+
    |Latency               msec. avg.  |   8.41 |
    +----------------------------------+--------+
```

Power Sequencing

No power sequencing is required. The microprocessor starts the spindle motor when both voltages are present.

Soft and Hard Read Error Rates, Exclusive of Media Defects

For data that has been verified previously as error free, and when used in conjunction with a data separator and phase lock loop of good

design, the recoverable (soft) error rate for any subsequent read operation shall not exceed one error in 1 x 10(10) bits transferred. A recoverable read error is an error that may be corrected within five attempts to reread the data.

The nonrecoverable (hard) read error rates shall not exceed one error in 1 x 10(12) bits transferred. A nonrecoverable read error is an error that may not be corrected within five attempty to reread data, providing that the writing of the data previously has been verified as correct. The seek error rate is not exceed one error in 1 x 10(6) seeks.

Media Defects

Any defects on the media surface will be identified on a defect map provided with each drive. This defect map will indicate the head number, track number, and the number of bytes from index for each defect. Each defect shall be no longer than 16 bits. Cylinders 000 and 001 are guranteed error free.

The defect map is offered as a guide only. The number of defects and their locations can change due to customer system variations, such as data separators.

NOTE
A parking track is located at cylinder 663, to reduce the probability of damage to data tracks during extreme shock conditions.

Mean Time Between Failures 15,000 power on hours
Mean Time To Repair 30 minutes
Component Design Life 5 years
Preventative Maintenance Not Required

Dust Cover

The design of an enclosure should incorporate a means to prevent contamination from loose items (e.g. dust, lint, and paper chad) since the drive does not have a dust cover.

Write precompensation

Tandon does not recommended write precompensation.