


```

|                                     +-----+    +-+ |XX
|                                     +-J9--+    | | |XX
|                                     | | |XX
|                                     Resistor+-+ |XX
|                                     Termination |
|                                     Pack          |XX Power
|                                               |XX J3
+-----+

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Jumpers

SEAGATE ST4053/ST4096/ST4144R PRODUCT MANUAL 36039-002, REV.D

Jumper setting

IMPORTANT CONFIGURATION INFORMATION!

The Write Fault jumpers at J8, JP5, and JP2 are jumpered at the factory.

J8 Shipped with pins 11-12 shorted

JP5 Shipped with pins 2- 3 shorted

JP2 Shipped with pins 2- 3 shorted

JP1 DC-Unsafe option

A DC-unsafe condition occurs when the drive DC power input is out of the specified tolerances.

If pins 1-2 are shorted, a DC-unsafe condition will cause a Write Fault at the interface.

JP2 Shipped with Pins 2-4 shorted

1- 2 CLOSED Write Fault will be true for the duration of the fault.

3- 2 CLOSED Provides latched Write Fault. To recover, deselect the drive. Note: If this option is enabled, pins 11-12 at J8 must remain shorted.

x 4- 2 CLOSED A Write Fault will occur when a fault is true for a minimum of 2 msec.

JP5 Shipped with Pins 2-3 shorted

If write data is present at pin-13 at the J2 interface connector and Write Gate is false, a Write Fault will occur.

If write data is not present at pin-13 at the J2 interface connector and Write Gate is true, a Write Fault will occur.

JP6 Write Fault ready, Latch option

1- 2 CLOSED Ready will be false during a Write Fault

1- 2 OPEN Write Fault will not affect Ready.

J8 Drive select

Drive Select	8-7	6-5	4-3	2-1
Drive 4	CLOSED	OPEN	OPEN	OPEN
Drive 3	OPEN	CLOSED	OPEN	OPEN
Drive 2	OPEN	OPEN	CLOSED	OPEN
Drive 1	OPEN	OPEN	OPEN	CLOSED

The Drive Select line enables the controller to select and address the drive. Control cable interface options may use either a daisy-chain or radial configuration.

J8 Write Fault

x11-12 CLOSED Factory set
See also JP2, pins 2-3

J8 Recovery Mode

13-14 CLOSED Recovery mode is a user-selectable option. It may be enabled by shorting pins 13-14 at the J8 shunt block. It is initiated when the controller asserts the Recovery Mode line true at the interface. This changes the step line to a microstep function after 100 nsec. A step pulse will now cause Seek Complete to go false 100 nsec. after the drive receives the pulse. The drive then microsteps off-track using the optimum algorithm, allowing 8 msec. for the read/write heads to settle and then takes the Seek Complete line true.

Note: Recovery Mode is optional and is not required for standard operation.

J8 Daisy-Chain/Radial Drive Configuration

This drive family can be configured in either a daisy-chain or radial mode.

15-16 CLOSED The Radial option is enabled by shorting pins 15-16 at J8. The resistor termination packs must remain installed on any radially configured drives.

x15-16 OPEN In a daisy-chain configuration, the last drive in a chain must have the resistor termination pack installed.

Install

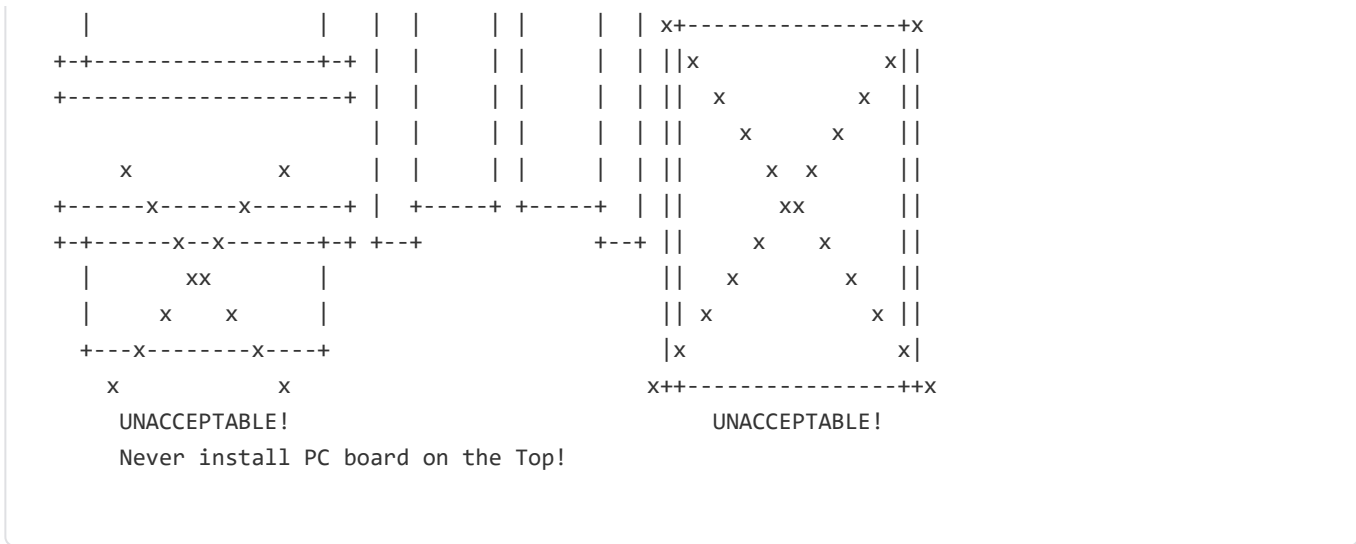
SEAGATE ST4053/ST4096/ST4144R PRODUCT MANUAL 36039-002, REV.D

Notes on installation

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Drive mounting

horizontally	vertically
+-----+	+--+ +--+ +-----+
	+-----+ +-----+
	x



The drive may be mounted horizontally with the PC board down or on either side. Mounting vertically on either end is a prohibited orientation.

The drive should not be tilted front or back, in any position, by more than 5°. For optimum performance, the drive should be formatted in the same position as it will be mounted in the host system.

Shock and vibrations

 All shock and vibration specifications assume that the drive is mounted in an approved orientation with the input levels at the drive mounting screws.

Shipping zone

 AT power-down, the actuator will automatically position the read/write heads over the shipping zone and the carriage lock will engage. All portions of the head/slider assembly park inboard of the maximum data cylinder.

When power is applied, the heads will recalibrate to Track 0 and the lock will automatically disengage.

FCC Verification

 These drives are devices which are intended to be contained solely within a personal computer or similar enclosure and not attached to an external device. As such, they are considered to be subassemblies even when individually marketed to the customer.

Input Noise

Maximum permitted input noise ripple: 100 mV (peak-to-peak)

Maximum permitted input noise: 20 MHz.

Ripple measured at the host system power supply across an equivalent 8 resistive load on the +12 V line and an equivalent 3 load on the +5 V line.

Handling Precautions

After unpacking, and prior to system integration, the drive may be exposed to potential handling and ESD hazards.

Do not touch the PCB edge-connectors, board components or the printed circuit board without observing static-discharge precautions.

Handle the drive by the frame only.

Always rest the drive on a padded surface until it is mounted in the host system.

Bit Jitter

Bit jitter reduction determines the relationship between the leading edge of read data and the center of the data window.

The data separator must provide at least -40dB of bit jitter reduction at 2F with an offset of less than 1.5 nsec. shift from the center of the data window.

Interface and Recording Method

The ST4053 and ST4096 are designed for operation with the ST412 interface with MFM encoding at 5.0 Mbits/sec. data transfer rate.

Operation of an MFM drive with an RLL controller is not approved by Seagate and will void the drive warranty.

The SR4144R is designed to operate with the ST412 interface with Run Length Limited (2,7) encoding at 7.5 Mbits/sec. data transfer rate.

Auto-Truncation

The drive will enter the auto-truncation mode if the controller issues an excessive number of step pulses, which would place the read/write heads outward beyond Track 0 or inward beyond the maximum data cylinder.

With auto-truncation active, the drive will ignore additional pulses, take control of the actuator, and recalibrate the heads to Track 0.

Caution: If the controller is still issuing slow-step pulses after the drive issues Seek Complete from auto-truncation mode, the drive will either reenter auto-truncation mode with Direction In true.

DC Power Requirements

Power may be applied or removed in any sequence without loss of data or damage to the drive.

Precompensation

The drive family does not require precompensation.

Step Pulse Period and Seek Method

The Step signal is a 1.5 sec. minimum width pulse which initiates read/write head motion. The Step pulse period determines the access method. The number of pulses determines the seek length.

Buffered-Seek: 3 sec. to 75 sec.

Slow-Step: Greater than or equal to 3 msec.

Step pulses may be lost at periods between 75 sec. and 3 msec.

Seek-Retry

Seek-Retry is an internally generated command implemented by the drive to enhance seek performance.

If the drive detects an off-track condition, or the seek was not completed, the drive will recalibrate the heads to Track 0 and retry the seek. All writing is inhibited during retry. The maximum time that Seek Complete will be false is 6 seconds, during a seek-retry.

If the target track is still not achieved, or the seek was not completed after two retries, the drive will set Write-Fault true, and Ready and Seek Complete false. Write-Fault will remain active until the condition that causes the fault is corrected and the reset is

completed.

Features

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Media Defects

A media defect is a read error when the data, which has been correctly written, cannot be recovered within 16 retries.

A printout will be provided with each drive shipped listing the location of any defect by head, cylinder, sector and byte. The defect map will specify the number of bytes from index. For MFM this will be based on 1.6 sec./byte. RLL encoding is based on 1.056 sec./byte.

Some drives will have the defect map fixed to the drive top cover.

ST4053 There will be no more than 44 defects total per drive.
Cylinders 0, and 1 will be free defects.

ST4096 There will be no more than 80 defects total per drive.
Cylinders 0, and 1 will be free defects.

ST4144R There will be no more than 122 defects total per drive.
Cylinders 0, and 1 will be free defects.

Access Time Definition and Timing

Access time is defined as the time from leading edge of the first step pulse received to Seek Complete (including setting).

All seek times are true statistical averages and are calculated with a step pulse period of 10 sec. at nominal power and temperature.

Access times may be degraded at step pulse periods greater than 20 sec.

		ST4***	
-----+-----			
Track-to-Track	msec. typ.	8	
	msec. max.	10	
	Average msec. typ.	28	
	Average msec. max.	30	

Full Stroke	msec. typ	55	
	msec. max.	57	
Latency	msec. avg.	8.33	
-----+-----+			

UL/CSA Listing

 The drive family is listed in accordance with UL 478 and CSA C22.2 (0-M1982), and meets all applicable sections of IEC 380 and VDE 0806/08.81, as tested by TUV-Rheinland, North America.

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