

S T 1 3 8 R - 0 SEAGATE  
 NO MORE PRODUCED

		Native   Translation	
		-----+-----+-----+-----	
Form	3.5"/HH	Cylinders	615
Capacity form/uniform	33/ 38 MB	Heads	4
Seek time / track	38.0/ 8.0 ms	Sector/track	26
Controller	RLL / ST412	Precompensation	65535
Cache/Buffer	KB	Landing Zone	
Data transfer rate	0.938 MB/S int	Bytes/Sector	512
	0.938 MB/S ext		
Recording method	RLL 2/7		
		operating   non-operating	
		-----+-----+-----+-----	
Supply voltage	5/12 V	Temperature *C	10 50   -40 60
Power: sleep	W	Humidity %	8 80   5 90
standby	W	Altitude km	-0.305 3.050   -0.305 9.140
idle	W	Shock g	10   60
seek	W	Rotation RPM	3600
read/write	8.0 W	Acoustic dBA	40
spin-up	W	ECC Bit	-
		MTBF h	150000
		Warranty Month	
Lift/Lock/Park	YES	Certificates	CSA, FCC, IEC435, TUV, UL478, VDE

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 L A Y O U T  
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 SEAGATE ST124/125/138/138R/157R PRODUCT MANUAL 36045-006, REV.F

			1+-+	XX DATA
			J7	XX Connector
		Configuration		XX 20-pin
alternate		Jumper block +-+		XX J2
Position	1-----+		+-+	
of J7	+-----+	Termination		XX
		Resistor		XX
		Pack +-+1		XX
				XX
				XX Connector
				XX 34-pin
				XX J1
				XX
				XX
				XX Power J3

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 Alternate Location On Drive PC Board of the User Configuration Jumper. Note position of Pin 1 on both configurations. Jumper blocks in either position are identical in function.

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 J U M P E R S  
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Jumper setting  
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- J7 Radial/Daisy-Chain Mode  
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 1- 2 CLOSED Radial mode  
 1- 2 OPEN Daisy-Chain mode

This drive can be configured in either Radial or Daisy-Chain mode. Radially-selected drives are allways selected. The Radial option is enabled by shorting pins 1-2 at the User Configuration block. The resistor termination pack must remain installed on any radially-selected drive. In a Daisy-Chain, the last drive on the chain must have the resistor pack installed.

NOTE: Termination resistors on the ST124 are NOT REMOVABLE!

- J7 Not used  
 -----  
 3- 4 OPEN Not used

J7 Write Fault Latch

Write Fault is indicated by a latched signal on the interface. It can be cleared by deselecting the drive or with a power-off/on cycle. When the Radial jumper (pin 1-2 shorted at user configuration jumper block) is used, the drive is continuously selected and requires a power-on/off cycle to clear Write-Fault.

- 5- 6 OPEN The Write Fault signal can only be cleared by a power on/off cycle. Use of this option in conjunction with the DC-unsafe option is not recommended.
5- 6 CLOSED The Write Fault signal can be cleared by deselecting the drive. When the drive is deselected and the fault condition is corrected, the Write Fault signal will be false.

These options allow the user to configure the Write Fault reset to specific system requirements.

JP1/J7 Write Fault Options

Implementation of the Write Fault Option (Pins not illustrated) is by factory order only. Jumper pins must be factory-installed. JP1 has three jumper pads, and is located adjacent to the 34-pin J1 connector.

- Standard: 1 and 2 jumpered on JP1
Write Fault will be cleared when Write Gate is false.
A Write Fault will only occur when Write Gate is true.
Latched: 2 and 3 jumpered on JP1
This option will maintain Write Fault true after Write Gate goes false and is recommended for controllers that do not edge-detect Write Fault. The latched option has two configurations which are provided at the User Configuration block, pins 5-6.

J7 Factory test

- 7- 8 OPEN This is a test function used during the manufacturing process and is not recommended for field use. When shorted, the actuator will continuously seek between Track 0 and the maximum data cylinder, ignoring control signals sent via the interface.

J7 Drive select

Table with 5 columns: Drive Select, 9-10, 11-12, 13-14, 15-16. Rows show configurations for Drive 4, Drive 3, and Drive 2.



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

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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

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When the read/write heads are positioned in the shipping zone, all portions of the head/slider assembly park inboard of the maximum data cylinder.

ALL DRIVES EXCEPT ST124: The read/write heads automatically move to the shipping zone at power-down.

The read/write heads may be parked by issuing a seek command to any cylinder between 614 and 666.

When power is applied, the heads will recalibrate to Track 0. If the heads are parked while power is applied, any step pulse will cause the unit to recalibrate to Track 0.

#### Input Noise

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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 20 resistive load on the +12 V line and an equivalent 8 load on the +5 V line.

#### FCC Verification

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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.  
As a subassembly, no Federal Communications Commission authorization, verification or certification of the drive is required.  
Seagate Technology, Inc. has tested these devices in an enclosure as described above to ensure that the total assembly (enclosure, disk drive, motherboard, power supply, etc.) does comply with the limits for a Class B computing device. Operation with non-certified assemblies is likely to result in interference to radio and television reception.

#### Recording Method

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The ST124, ST125 and ST138 drives are designed to operate with the

ST412 interface with MFM encoding at 5.0 Mbits/sec. transfer rate.

Caution: Operation of an MFM-certified drive with an RLL controller is not approved by Seagate and may void your warranty.

The ST138R and ST157R are designed to operate with the ST412 interface with Run Length Limited (2,7) encoding at 7.5 megabits/sec. data transfer rate.

#### Handling and Static-Discharge Precautions

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After unpacking, and prior to system integration, the drive may be exposed to potential handling and ESD hazards. It is mandatory that you observe standard static-discharge precautions. A grounded wrist-strap is preferred. Handle the drive by the frame only and always rest the drive on a padded surface until it is mounted in the host system.

#### DC Power specifications

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Power may be applied or removed in any sequence without loss of data or damage to the drive, except during a write operation. Typical current and power specifications assume nominal voltages applied, 25°C ambient temperature, sea level and spindle rotating. Voltage tolerance (incl. ripple): 5%

#### Precompensation

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The drive family does not require precompensation

#### Auto Truncation

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If the controller issues an excessive number of step pulses that would place the read/write heads outside Track 0, or inside the maximum track, the drive enters auto-truncation mode.

#### Shipping

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When transporting or shipping a drive, a Seagate-approved container MUST BE USED. SHIPPING A DRIVE IN A NON-APPROVED CONTAINER WILL VOID THE DRIVE WARRANTY!

#### Drive configuration

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##### SET DRIVE TERMINATION RESISTORS

Daisy-Chain: A daisy-chain configuration allows connection of a maximum of two drives on a common control cable. A separate data cable is required for each drive. The last drive in the chain (physically farthest from the controller) requires termination. All other drives should not be terminated. Maximum permitted cable length, measured from the controller to the last drive is 30.5 cm.

Radial: Each radially connected drive has its own control and data cable. This configuration is not required for PC applications.

#### ATTACH CONTROL AND DATA CABLES

On most cables a colored stripe down one side designates pin 1. This should be aligned with pin 1 on the drive and controller connectors.

#### SET DRIVE SELECT AND CHECK CONTROL CABLE PINS

If pins 25 through 29 on the wide control cable are twisted, then both drives should be set to Drive Select 2. If these pins are not twisted on the command cable, the boot drive should be set to Drive Select 1, while the second drive (if present) should be set to Drive Select 2. In all cases, the boot drive must be physically located at the end of the drive cable.

#### CMOS configuration

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Basic information about the drive must be entered into the host system CMOS, so that it may properly access the drive for reading and writing data. The number of heads, cylinders and sectors per track are specific to each drive and collectively define the drive's geometry. CMOS configuration is system dependent and is usually accomplished through a utility such as SETUP.

If the controller has an onboard BIOS, the drive type should be set to type zero, or the "no drive installed" option.

If your system CMOS does not offer an exact match to the geometry listed, set the drive to a type which closely matches the drive geometry, BUT DOES NOT EXCEED THE HEAD AND CYLINDER COUNT SPECIFIED. A drive type which matches the number of heads exactly with a cylinder count less than or equal to the number of cylinders specified is preferred.

After the drive has been properly configured for the system, and the correct drive type has been specified to the system CMOS, the drive should be low-level formatted.

#### Low Level Formatting

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After the drive has properly configured for the host system, it may need to be low-level formatted. The low-level format writes the sector boundaries and track information to the drive. This provides the system with head positioning and defect management information.

You will need to boot the system to the floppy drive. Run the DEBUG utility provided with DOS to access the low-level format program present on the controller card. Refer to the controller for the specific address needed to initiate the low-level format routine. The most common command to initiate this routine is: g=C800:5. Verify the address (C800) and the offset with your controller manual. If a hard-error map has been provided with the drive, make shure the errors are specified to the utility during the low-level format process.

If the controller does not have a ROM BIOS, you need a third-party software package such as Ontrack's Disk Manager or IBM's Advanced Diagnostics for low-level formatting the drive.

### Partitioning

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A drive can be subdivided into "partitions", which behave as individual drives within the system. Earlier versions of DOS have a limitation on maximum drive capacity and consequently require high capacity drives to be divided into smaller partitions. For DOS users, each partition will be assigned a different letter, i.e., C: and D: for a drive with two partitions.

Drive partitioning in DOS is done by using the FDISK utility. After the drive has been configured, defined in CMOS and low-level formatted (if necessary), the user must boot the system to the floppy drive with a bootable DOS diskette. The user must then run the FDISK utility to partition the drive. Refer to your DOS manual for instruction on using FDISK.

Many UNIX based operating systems allow partitioning of the drive for use by DOS applications. In UNIX, drive formatting and partitioning are both done by a single operating system utility. Refer to your system documentation for instructions.

### High level formatting

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High-level formatting verifies the information written by the low-level format and establishes drive access information used by the operating system.

High-level formatting in DOS creates the File Allocation Table used by DOS for all drive access. The high-level format is initiated in DOS by the FORMAT command.

High-level formatting in UNIX creates the I-NODE used by the system for file access information. In UNIX, drive formatting and partitioning are both done by a single operating system utility.

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F E A T U R E S  
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### Media Defects

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

A label is fixed to the drive listing the location of any media defects by cylinder, head and bytes from index.

### ST124/ST125

There will be no more than twenty-one (21) defects total per drive. Cylinders 0, 1, 2 and 3 are free of defects.



ST138

There will be no more than forty-nine (49) defects total per drive. Cylinders 0, 1 and 2 are free defects.

ST138R

There will be no more than thirty-two (32) defects total per drive. Cylinders 0, 1 and 2 are free of defects.

ST157R

There will be no more than forty-nine (49) defects total per drive. Cylinders 0 and 1 are free defects.

Bit Jitter

Bit jitter reduction determines the relationship between the leading edge of read data and the center of the data window. The specified read error rates are based on the following bit jitter specifications: 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.

Seek Time Definition and Timing

Seek time is defined as the time from leading egde of the first step pulse received to Seek Complete, including settling. All seek times are true statistical averages and are calculated with a step pulse of 10 sec., nominal power, sea level and 25\*C ambient temperature.

Important Note: Early ST125, ST138 and ST157 drives offered Dash-0 and Dash-1 versions. All drives currently produced feature the Dash-1 seek times.

		ST124	ST125-0	ST125-1
			ST138-0	ST138-1
			ST138R-0	ST138R-1
			ST157R-0	ST157R-1
Track-to-Track	msec. typ.	12	8	8
	msec. max.	15	10	10
Average	msec. typ.	38	38	28
	msec. max.	40	40	30
Full-Stroke	msec. typ.	90	90	70
	msec. max.	95	95	70
Latency	msec. avg.	8.33	8.33	8.33

DC Power Specifications

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

UL/CSA Listing

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The St157 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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G E N E R A L  
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SEAGATE SUPPORT SERVICES

Seagate Technology

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Technical Support Services

If you need assistance installing your drive, consult your dealer. Dealers are familiar with their unique system configurations and can help you with system conflicts and other technical issues. If you need additional assistance with your Seagate(r) drive or other Seagate products, use one of the Seagate technical support services listed below.

SeaFONE at 1-800-SEAGATE (1-800-732-4283)

Seagate's 800 number allows toll-free access to automated self-help services, providing answers to commonly asked questions, troubleshooting tips and specifications for disc drives and tape drives. This service is available 24 hours daily and requires a touch-tone phone. If you need to speak to a technical support engineer, dial this number and listen to the options for technical support. (International callers can also reach this automated self-help service by dialing 408-456-4496).

Seagate Technology online services

Using a modem, you can obtain troubleshooting tips, free utility programs, drive specifications and jumper settings for Seagate's entire product line. You can also download software for installing and analyzing your drive.

SeaNET

You can obtain technical information on Seagate drives, Seagate software and much more over the Internet from Seagate's World Wide Web home page (<http://www.seagate.com>) or Seagate's ftp server (<ftp://ftp.seagate.com>).

You may also send E-mail with your questions to [DiscSupport@Seagate.com](mailto:DiscSupport@Seagate.com) or [TapeSupport@Seagate.com](mailto:TapeSupport@Seagate.com).

SeaBOARD

SeaBOARD is a computer bulletin board system (BBS) that contains information about Seagate's disc and tape drive products and is available 24 hours daily. Set your communications software to eight data bits, no parity and one stop bit (8-N-1). SeaBOARD phone numbers are listed in the following table.

BBS Location	Modem number
United States	Disc: 408-434-1080; Tape: 408-456-4415
England	44-1628-478011
France	33 1-48 25 35 95
Germany	49-89-140-9331
Singapore	65-292-6973
Thailand	662-531-8111
Australia	61-2-9756-2359
Taiwan	886-2-719-6075

#### Seagate CompuServe forum

Online technical support for Seagate products is available on CompuServe. To access our technical support forum, type go seagate. This forum provides information similar to that found on SeaBOARD. In addition, you can type questions or browse through previous questions and answers on the forum messages.

#### Seagate Technology FAX services

##### SeaFAX

You can use a touch-tone telephone to access Seagate's automated FAX system to receive technical support information by return FAX. This service is available 24 hours daily.

Location	Telephone number
United States	1-800-SEAGATE or 408-456-4496
England	44-1628-894084
Australia	61-2-9756-5170

#### Seagate technical support FAX

You can FAX questions or comments to technical support specialists 24 hours daily. Responses are sent during business hours.

Location	FAX number
United States	408-944-9120
England	44-1628-890660
France	33 1-46 04 42 50
Germany	49-89-1430-5100
Australia	61-2-9725-4052
Singapore	65-293-4722
Hong Kong	852-2368 7173
Taiwan	886-2-715-2923
Korea	82-2-556-7294/4251

#### Seagate technical support

You can talk to a technical support specialist during business hours Monday through Friday for one-on-one technical help. Before calling, note your system configuration and drive model number (STxxxx). There are several technical support phone numbers available for various Seagate products.

Location	Telephone number
United States	Please dial 1-800-SEAGATE for the specific product telephone number. (6:00 A.M. to 11:15 A.M., 12:30 P.M. to 5:00 P.M., Pacific time, M-F)
England	44-1628-894083 (10:00 A.M. to 1:00 P.M., 2:00 P.M. to 5:00 P.M., M-F)
France	33 1-41 86 10 86 (9:30 A.M. to 12:30 P.M., 2:00

	P.M. to 5:00 P.M., M-F)
Germany	Disc: 49-89-140-9332; (9:30 A.M. to 12:30 P.M., 2:00 P.M. to 4:00 P.M., M-F) Tape: 49-89-140-9333
Australia	61-2-9725-3366 (9:00 A.M. to 5:00 P.M., M-F)
Singapore	65-290-3998 (9:00 A.M. to 12:00 P.M., 2:00 P.M. to 5:00 P.M., M-F)
Hong Kong	852-2368 9918
Taiwan	886-2-514-2237
Korea	82-2-556-8241

SeaTDD 408-944-9121

Using a telecommunications device for the deaf (TDD), you can send questions or comments 24 hours daily and exchange messages with a technical support specialist between 6:00 A.M. to 11:15 A.M. and 12:30 P.M. to 5:00 P.M. (Pacific time) Monday through Friday.

#### Customer Service Centers

Seagate direct OEM, Distribution, System Integrator and Retail customers should contact your Seagate Service Representative for warranty information. Other customers contact your place of purchase. Seagate offers comprehensive customer support for all Seagate drives. Seagate customer service centers are the only facilities authorized to service Seagate drives. These services are available worldwide.

Location	Telephone number	FAX number
United States	1-800-468-3472;	405-949-6740
Other Americas (Canada & Brazil)	405-949-6706;	405-949-6738
Mexico	525-546-6965;	525-546-4888
Europe, Middle East & Africa	31-2065-43300;	31-2065-34320
Asia Pacific & Australia	65-485-3595;	65-485-4980
Japan	81-3-5462-2904;	81-3-3462-2979

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