

ST11M, ST11R

ST412 Interface Controller

Installation Guide

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Introduction

This installation guide supports the Seagate ST1 1M MFM and ST1 1 R RLL Controllers, ROM Version 2.0 or higher.

The ST1 1 M and ST1 1 R are 8-bit ST41 2 interface controllers designed for use in PC XT/AT systems with DOS-based applications. Use with other than DOS-based systems is beyond the scope of this guide. Contact your Distributor/Dealer.

- The ST1 1 M is designed for use with drives employing MFM data encoding.
- The ST1 1 R is designed for drives using RLL (2,7) data encoding. Seagate RLL drives are easily recognized by an R after the model number, e.g., ST157R. Seagate Technology, Inc. assumes no liability for installation of an RLL controller with an MFM-certified drive.
- The ST1 1 M/ST1 1 R have a unique recording format and therefore require all attached drives to be installed by one of the processes described in this guide before operation.

This guide may be used with Seagate Paired Program drives or as a controller-only installation guide.

Paired Program drives are shipped with a Seagate controller. They are recognized by a *PR* label on the drive top cover. Paired drives are shipped formatted with a small DOS partition containing the installation program, INSTALLR, which will low-level format and partition your drive. You must supply the DOS program. The ST1 1 M/ST1 1 R can recognize whether a drive has the Paired Program software loaded, or has been previously installed.

Paired Program drives with formatted capacities greater than 32 MBytes have DISK MANAGER partitioning software loaded. This utility has been customized by ONTRACK for Seagate. Refer to Section 2.1 for special instructions on formatting Paired Program drives.

Before You Begin...

Inspect the controller, drive, cables, mounting hardware/accessories, documentation and packaging. If any item is incorrect, missing or appears damaged, contact your Distributor or Dealer immediately.

Handling: Improper handling during transit/shipping accounts for many "installation" problems. Prior to installation, handle your drive/controller carefully.

Observe Static-Discharge Precautions: Keep the drive/controller in their static-shielded bags until you are ready to complete the installation. Use a grounded wrist-strap at your workstation; if unavailable, ground yourself frequently by touching the metal chassis of the system before handling any components. Avoid static-inducing carpeted areas.

Shipping: When transporting or shipping a drive or controller, a Seagate-approved container must be used. Keep your original box. They are easily identified by a red label identifying them as a Seagate *Approved Package*.

Shipping a drive in a non-approved container will void the drive warranty.

Repair centers may refuse receipt of components improperly packaged or obviously damaged in transit. Contact your Distributor to purchase additional boxes. Seagate recommends shipping by an air-ride carrier experienced in handling computer equipment

Maintenance: Seagate disc drives do not require any preventative maintenance. The head/disc assembly is sealed and does not contain any user-serviceable components. Tampering with the factory-seal will void the warranty.

Warranty: The terms of your warranty are determined by your authorized Seagate Distributor or Dealer. Warranties do not extend to data stored on drives.

1.0 ST1 1 M/ST1 1 R Controller Installation

Caution: Do not handle a drive or controller without observing static-discharge precautions. A grounded wrist-strap is preferred; if unavailable, ground yourself frequently by touching the metal chassis of the system before handling any components. Do not unpack the drive/controller until you are ready to complete the installation.

BEFORE ATTEMPTING ANY INSTALLATION, READ THROUGH ALL STEPS AND VERIFY THAT THE SYSTEM IS POWERED-DOWN.

During the formatting process, you will be asked to enter some simple drive specifications. Please refer to Figures I-2 for formatted capacity and basic specifications. For non-Seagate drives, refer to the manufacturer's instructions.

Figure 1: Seagate MFM Drive Setup — ST1 1 M

Model	Formatted MBytes	R/W Heads	Data Cylinders	Sectors per Track	Auto-Park
ST124	21.4	4	615	17	No
ST125	21.4	4	615	17	Yes
ST138	32.1	6	615	17	Yes
ST151	42.5	5	977	17	Yes
ST225	21.4	4	615	17	No
ST252	42.8	6	820	17	Yes
ST25 1	42.8	6	820	17	Yes
ST4053	44.5	5	1,024	17	Yes
ST4096	80.2	9	1,024	17	Yes

Figure 2: Seagate RLL Drive Setup – ST1 1R

Model	Formatted MBytes	R/W Heads	Data Cylinders	Sectors per Track	R/W Head Auto-Park
ST1 37R	32.7	4	615	26	No
ST1 38R	32.7	4	615	26	Yes
ST1 57R	49.1	6	615	26	Yes
ST225R	21.17	2	667	31	No
ST238R	32.7	4	615	26	No
ST250R	42.9	4	667	31	No
ST278R	65.5	6	820	26	Yes
ST277R	65.5	6	820	26	Yes
ST41 44R	122.7	9	1,024	26	Yes

Data Cylinders: User cylinders are calculated from logical zero, i.e., 0 to 614 equals 615 cylinders.

Write Precompensation (ST225 Only): For optimum performance, precompensation is recommended starting on cylinder 300. Enter the information, when prompted.

Interleave: Use optimum interleave as indicated in installation routine

Read/Write Head Parking: A PARK program is preloaded on all Paired Program drives, PARK.EXE or PARK.COM, which the INSTALLR software will copy to a diskette during installation. The following drives require parking before the drive/system is transported: ST124, ST137R, ST225, ST225R, ST238R, **ST250R**. All other Seagate drives feature automatic R/W head auto-park at power-down.

1.1 Set the Controller BIOS Address

Controllers and add-in boards are installed in the bus slots on the computer's motherboard. These slots are recognized by the computer BIOS address number. Each board installed must be jumpered for a specific address.

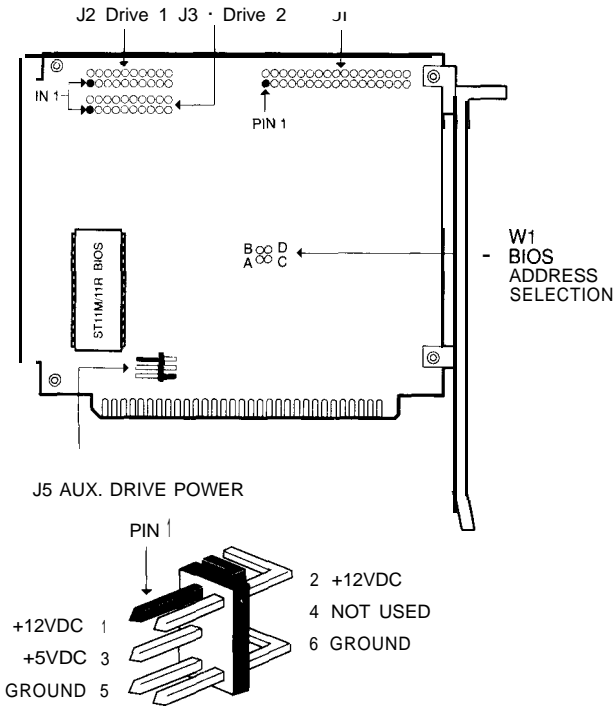
C8000H is the default BIOS address for the ST1 1M/ST1 1 R. If this address is already occupied by another board, use the jumpers provided to change the Seagate controller to another address. Refer to Figure 3.

When installing a ST1 1 M/ST1 1 R controller with a Seagate ST01/ST02 SCSI Host Adapter, the controller must be at the lowest address (C8000H).

When installing the ST1 1 M/ST1 1 R in a system already containing a hard disc controller, the Seagate controller must be jumpered at a higher BIOS address than the resident controller. If you are not sure of the other controller's address, try one of the higher addresses for the Seagate controller.

Controller physical installation will only involve setting the BIOS address (Figure 3), attaching the cables and inserting the controller in a system bus slot (Figure 4). It is often easier to attach the cables before you install the controller.

Figure 3: ST1 1M/ST11R ST412 Interface Controller



Jumper Setting at W1	BIOS Address	Port Address
No Jumpers Installed	C8000H (Default)	320H - 323H
Pins A-B Shorted	D0000H	324H - 327H
Pins C-D Shorted	D8000H	328H - 32BH
Pins A-B and C-D Shorted	E0000H (Do not use on AT-class system)	32CH - 32FH

1.2 Controller Physical Installation

CAUTION: VERIFY THAT THE POWER IS OFF.

1. Remove the System Cover (Refer to your system manual).

Access to the screws is usually at the back of the system. Save the screws. Systems vary, but most require you to slide the cover forward for removal.

2. Install the Controller as Illustrated in Figure 4.

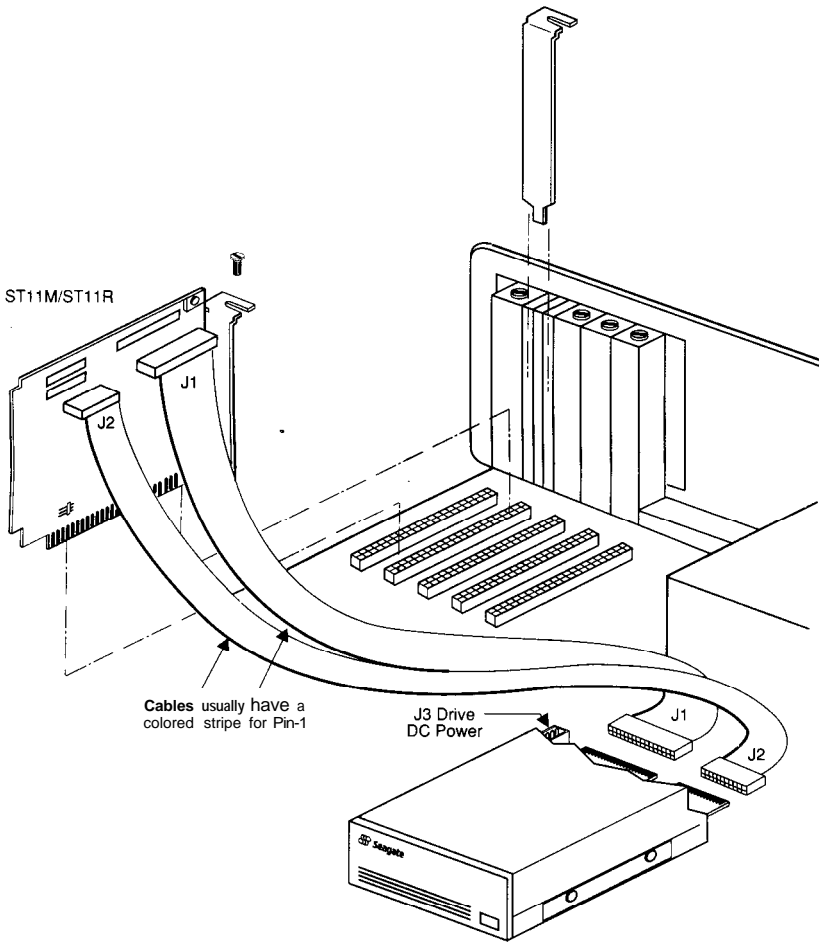
Verify that all connections are correct and replace the system cover

3. Optional Drive Power Connector on the ST1 1 M/ST1 1 R

Normally, drive power is supplied via a power harness from the system power supply directly to the drive's J3 DC power connector. The J5 connector on the ST1 1 M/ST1 1 R can be used to provide disc drive power in systems lacking an extra power harness or for Drive-on-a-Card applications. See connector J5, Figure 3.

A cable splitter, often called a Y-cable, may be used to tap off the diskette drive power cable. They are available from most Distributors/Dealers.

Figure 4: ST11M/ST11 R Controller Installation



2.0 Preparing to Format Your Drive

Please read this section before proceeding to the formatting instructions. Be sure to back up any drive containing data. Formatting at any level may result in partial or complete loss of data. Seagate Technology, Inc. assumes no liability for lost data.

- Always use the same version of DOS throughout the entire process. On two-drive systems: Always use the same version of DOS on both drives. When adding a second drive, it is sometimes necessary to reformat the first drive.
- DOS assigns a logical identifier (C, D, E . . .) to each partition that it recognizes during the boot load. It assigns these letters to the first partition on each physical drive in sequential order (e.g., C to Drive 1, D to Drive 2. Subsequent letters are assigned to the remaining partitions on Drive 1, followed by Drive 2. See table below for typical examples:

Partition	Drive 1	Drive 2
1	C	D
2	E	H
3	F	I
4	G	J

- For optimum performance, format the drive installed in your system in the same orientation in which it will be used.

2.1 Paired Program Drive Formatting

Paired Program drives are shipped with a small DOS partition containing Installation software and a README file which has the latest information for the drive being installed. See Section 3.0.

2.2 Non-Paired Drive formatting

Seagate non-paired drives do not have installation software or recognizable format. These drives may be installed by following the procedures in Section 4.0.

2.3 Paired Drives with Less than 32 Formatted MBytes

You will need one DOS-bootable diskette that has the boot files from the version of DOS that you plan to use on your Seagate drive. This diskette should also contain the FORMAT program provided with DOS, and sufficient space (approximately 50 KBytes) to save the installation programs from the hard drive. The diskette must not be write-protected.

2.4 Paired Drives with Greater than 32 Formatted MBytes

You will need two diskettes; one DOS-bootable with the version of DOS you plan to use. The second diskette must have at least 360K Bytes available to save the installation and DISK MANAGER programs. The diskettes must not be write-protected.

2.5 CMOS Configuration

If you are installing your drive in a PC/AT and a hard drive is not presently attached or operational, the hard drive count in CMOS will already be set to zero.

If a standard hard drive is already attached and operating, it will be the first drive and the Seagate Paired Program drive will be Drive 2. It is not necessary to change the CMOS hard drive count when installing with ST1 1 M/ST1 1 R controllers.

2.6 Read/Write Head Parking

A PARK program is preloaded on all Paired Program drives. The following drives require this program before the drive/system is transported: **ST124, ST137R, ST225 ST225R, ST238R, ST250R**. All other Seagate drives feature automatic head parking at power-down.

3.0 Paired Program Installations

Read Sections 1-2 before beginning any formatting. The entire software installation routine is menu-driven and takes from ten to thirty minutes, depending on drive size. For specific DOS questions, refer to the DOS manual supplied with your system. After the format is completed, the read/write heads will be parked. At the next power-up, the system will boot from the hard disc.

3.1 Paired Program Formatting

Place a DOS-bootable diskette (to boot simply means to start the system) in Drive A and switch the power on and follow the instructions displayed on the screen. If you are installing a second drive, type:

D:INSTALLR D

If **you** are installing a drive with DISK MANAGER software, and you already have a hard disc in your system, you must copy the DMDRVR.BIN and CONFIGSYS files from the DISK MANAGER diskette to the existing (first, or boot) drive.

If you already have a CONFIGSYS file on the boot drive, update the file to include the following line: **DEVICE=DMDRVR.BIN.**

Refer to your DOS manual for instructions on editing the CONFIGSYS file. DISK MANGER also provides help files which you may print using the standard DOS print commands.

4.0 Non-Paired Drive Formatting

Use this procedure for non-paired drives or when reformatting a paired drive whose installation software files were lost or not copied before formatting.

Be sure to back up any drive containing data. Formatting at any level may result in partial or complete loss of data. Seagate Technology, Inc. assumes no liability for lost data.

If you use the DOS DEBUG utility to low-level/primary format the drive, you must answer "YES" to the question, "Do you want to enter the defect map which is supplied on your hard disc drive cover". Proceed with entering all defects from the defect map.

Important Note: If you use the ST1 1 M/ST1 1 R controller, BIOS Version 2.0, with a Seagate Paired Program drive, but do not use the Seagate installation software (INSTALLR), you must manually enter the Manufacturer's Defect Map (attached to the drive top cover) during the low-level/primary formatting operation.

Always use the same version of DOS throughout the entire process. On two-drive systems: Always use the same version of DOS on both drives. When adding a second drive, it is sometimes necessary to reformat the first drive.

4.1 Low-Level Physical Format Using BIOS Facility

When using DEBUG to format in a AT system, the CMOS or system setup should be set to 0 (i.e., no hard drive installed).

1. Boot the system from the DOS system diskette
2. At the A: prompt, insert the DEBUG diskette and type:

```
DEBUG
```

```
<ENTER>
```

3. To access the controller's format routine; at the "-" prompt type:

G=XXXX:5 (Where XXXX is correct address, Refer to Fig 3.)

Note: Seagate controllers will step you through the process. Refer to the drive charts Figures I-2 for correct drive parameters.

On drives over than 32 formatted megabytes, DISK MANAGER will automatically partition and high-level format the drive.

Use FDISK and FORMAT on your DOS diskette for drives less than 32 formatted megabytes.

5.0 Troubleshooting Your Installation

If you have a problem getting the initial screen, or later getting the system to boot:

- Check the cabling between the controller and drive. Pin-I on the controller always corresponds to Pin-I at the drive connector. Most cables have a contrasting color on the cable to indicate Pin-I.
- Check the power cable to the drive. Can you hear the drive spinning up?
- Verify correct Drive Select number.
- Verify correct BIOS address for the controller. See page 6. If you have more than one board that uses BIOS ROM space, each must be configured to a different memory address. Addressing multiple boards at the same memory location can cause problems of a seemingly indeterminate nature.
- Low-level formatting takes too long or never completes.

Format again. Make sure correct drive parameters were entered and cable connections are correct.

- FDISK or Partitioning Error Messages: "Error reading fixed disc" "No fixed disc present"

Check correct drive parameters entered. Refer to pages 3-4. Turn the system off and power-up again. Rerun FDISK.

- High-Level Format Error Message: "Invalid drive specification"

Run FDISK again to make sure the DOS partition is active. Check drive parameters and low-level format again. Check controller jumpers.

In AT systems, check that no drive type is entered in the system CMOS setup for the drive attached to the ST1 1 M/ST1 1 R.

- Drive fails to recalibrate or test Ready.

Check installation, cables and drive select jumper.

- I/O error messages when using DISK MANAGER:

"Uncorrectable ECC - I/O Error"

"Unrecoverable I/O Error"

If you are formatting a drive in an XT or using the ST1 1 M/ST1 1 R controller in an AT, low-level format the drive through DEBUG using the controller's BIOS routine.

- After formatting with DISK MANAGER, your system does not recognize the D, E, F... partitions:

First, make sure that you boot from the hard drive. If you still cannot access these partitions, check that the DISK MANAGER device driver, DMDRVR.BIN is in the root directory of the C: (boot) drive. Verify that the CONFIG.SYS file contains the following line:

```
DEVICE = DMDRVR.BIN
```

If you experience problems accessing your DOS partition after installation, refer to the help files provided with DISK MANAGER.

For system or DOS help, contact your computer system manufacturer. For additional installation help, contact your authorized Seagate Distributor/Dealer.