



GSI Model 12

HIGH-SPEED FLOPPY & TAPE

ACCELERATOR BOARD

Installation Instructions

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This manual is applicable to all revisions of the Model 12 controller and BIOS versions 1.20 and later.

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INSTALLATION NOTES (back cover)

IMPORTANT INFORMATION

Thank you for purchasing a GSI controller. GSI is constantly striving to make our products easy to use and quick to install. Due to vast variations in motherboards, disk drives and operating systems it is impossible to test every combination, thus every installation is unique.

Please take the time to read the Quick Installation Section 2.0 and Basic Troubleshooting Appendix G carefully *before calling for technical support.*

After reading the installation and basic troubleshooting sections, if you are still having problems, please follow these steps:

- 1) Have your GSI Serial Number ready. The serial number is a six digit number located on the back of the board (GSI SN:XXXXXX). The serial number also comes up onscreen during the boot process in the GSI banner. The GSI Part Number PN:1533-12-XX-X is not the serial number.
- 2) Please fill in as much information on the back cover as possible and after doing so, call GSI technical support at 714-261-9744.

GSI requires the above two steps to be completed to provide accurate technical support in a timely manner. Remember, without the GSI Serial Number, GSI cannot provide technical support!

The following section summaries will help you identify the sections you need to read. For best results, however, we recommend that you read the entire manual before installing and using your Model 12.

Conventions Used

This section explains both text and graphics usage in this manual.

Product Overview

Explains the features and functions of the GSI Model 12 Accelerator.

Quick Install Guide for GSI Model 12

This section is intended to provide a quick reference for installation and using the GSI Model 12.

Appendices

The Appendices in this manual further explain items quickly referenced in the Quick Installation Reference.

Appendix G - Basic Troubleshooting

This important section provides basic troubleshooting should you experience difficulties during the installation process.

Installation Notes

During installation, you should take down specific notes regarding the GSI Model 12 and your system. These notes will be helpful should you need to troubleshoot your installation.

CONVENTIONS USED

This section explains both text and graphics usage in this manual.

Bold Type

Bold Type usually indicates a section heading. If bold type is used outside a heading, it is used to highlight a term of importance.

Courier Type

Courier Type is used to show responses from the computer, or commands to the computer.

<Bracketed Items>

Keys on the keyboard are enclosed in “brackets”, e.g., represents the Delete key, <A> represents the capital letter “A”, etc. Combination keystrokes run together without spaces, e.g., <Ctrl><Alt>.

Graphics

A few graphics are used to call attention to items:



Indicates a special note on a related subject.



Indicates an area where caution should be used.



Indicates where damage could occur.

Adapter layout- GSI Model 12 (1533-12-01-2)
(J4 Jumper Block is shown enlarged. Jumpers shown are factory default. See Appendix A.3.1)

1.0 PRODUCT OVERVIEW

The GSI Model 12 is a Four-Floppy and Tape Accelerator Board and is intended for use as either **primary** or **secondary** floppy controller in any IBM AT/XT-compatible PC with an available AT/XT-compatible slot.

The Model 12 supports up to four floppy drives itself, or can co-exist with a primary floppy controller allowing a total of four floppy drives in one system. The GSI Model 12 can control up to four floppy drives and one QIC-40, QIC-80, QIC-3010 or QIC-3020 floppy-based tape backup drive.

One major feature of the GSI Model 12 is the ability to *double or quadruple* the speed of QIC-80, QIC-3010 and QIC-3020 tape backup drives. The typical data transfer rate of these tape drives running off standard floppy controllers is 500Kb per second (or approximately 3.5MB per minute).

The Model 12 can double that data transfer rate to 1Mb per second (or approximately 7-9 MB per minute, depending on the software and compression used) with QIC-80 tape drives.

With the new QIC-3020 tape backup drives, the Model 12 can **quadruple** the data transfer rate to 2Mb per second (or approximately 15-17.7MB per minute, depending on the software and compression used)! It should be noted that to achieve this faster data transfer rate, a 90 Mhz Pentium or faster processor is required.

The Model 12's 8kB **Flash** BIOS and **Flash** Configuration Memory allows it to provide *Intelligent* floppy-drive support, including the following features:

- Supports **any mix** of up to four floppy drives (*system* total)
- Runs QIC-80, QIC-3010 and QIC-3020 tape backup drives at the faster 1 or 2 Mb per second data transfer rate - eliminating the need for expensive dedicated hi-speed tape-only controllers
- No special device drivers or system BIOS support required
- Able to work as primary floppy controller, or co-reside with other floppy controllers (including controllers built-in to the motherboard)
- Can support up to four floppy drives and one floppy-based tape backup drive
- Allows user to (re)assign floppy drive letters from the keyboard (using MSDOS 5.0 or greater and/or Windows® 3.x)
- Compatible with **most proprietary** PCs, such as IBM, Compaq, AST Epson, Tandy, etc.

2.0 QUICK INSTALL GUIDE FOR GSI MODEL 12

This section of the manual should allow you to quickly install the GSI Model 12 in your computer (for a typical DOS/Windows® 3.x system - for Windows®95, see Section C.4). Each step has, if needed, a bracketed [] reference to other sections in this manual that discuss that particular step in more detail. Should you have problems or questions regarding an INSTALLATION step, please read carefully the reference sections.

SELECT MODEL 12 MODE OF OPERATION

If the Model 12 is the **only** floppy disk controller in the system, change jumper J4 to "PR" (which selects PRIMARY MODE). If the Model 12 is going to co-reside with another controller in the system (either built into the motherboard or on a separate controller), leave jumper J4 set at "SE" (factory default for SECONDARY MODE). When the Model 12 is used in **secondary-address** mode, GSI recommends that:

- 1) **All** floppy drives be connected to the Model 12 (and be controlled by the GSI BIOS-Setup screen)
- 2) The existing floppy controller (primary) be left "as is", *without any attempt made to disable it.*

2.1 PHYSICAL INSTALLATION

- 1 With power OFF open the computer case (See precautions in Appendix A)
- 2 Install floppy drives. If you are installing a 2.88MB drive, see Appendix D.
- 3 Check Model 12 J4 jumpers in relation to the Model 12's BIOS address. In most cases, the factory default BIOS address setting should work. If you encounter problems, see Appendix A.2, and Appendix F.3 for selecting an alternate BIOS address.
- 4 Connect all floppy drives to Model 12 with PC-standard twisted cables. Make sure to match Pin-1 of the cable to Pin-1 of the drive and connector on the Model 12. Floppy connector definitions:

Connector	Used For
J3 (Regular floppy)	This is the primary floppy connector for use with Regular 5.25" 1.2MB and 360kB floppy drives, as well as 3.5" 720kB and 1.44MB floppy drives.
J2 (2.88 floppy/tape)	This is the secondary floppy connector for use with 2.88MB drives or additional Regular drives. If you do not have a 2.88MB floppy drive, you can use standard floppy drives from this connector. Tape backup drives could also be connected to this connector.



Note: For Windows®95, see section C.4.

2.0 QUICK INSTALL GUIDE FOR GSI MODEL 12 (CONT.)

2.1 PHYSICAL INSTALLATION (Continued)

- 6 Floppy-based tape backup units typically share the floppy cable with the floppy drives. For information on how to this “cable-sharing” is done, refer to the tape backup drive’s installation guide or Appendix F in this manual.
- 7 Install the Model 12 controller in either an 8-bit or 16-bit slot and power on.

2.2 SYSTEM BIOS SETUP AND MODEL 12 GSI SETUP

- 1 Run your System BIOS Setup and set Floppy Drives to ‘None’ or ‘Not Installed’. (For an XT, see B.1.3)
- 2 In the System BIOS Setup, turn **OFF shadowing** of **GSI BIOS** until GSI Setup is done. BIOS shadowing is usually in the Advanced section of the system BIOS setup. (See Appendix B.3)
- 3 Reboot, watch for GSI Boot-time Banner & “Press INSERT to run GSI Setup”
- 4 Enter GSI-BIOS Setup by pressing *either* of the INSERT keys at reboot and follow GSI Setup directions to configure the Model 12’s floppy drives (See B.2)
- 5 For best **performance**, reboot and go back until the system BIOS setup. In this setup, turn **ON** system **shadowing** of GSI-BIOS memory area or shadow the BIOS using memory manager software (See Appendix B.3)

2.3 POST-INSTALLATION CHECKOUT

- 1 Test each floppy disk drive. Format diskettes, run CHKDSK, etc.
- 2 Test floppy-based tape backup drive. Format tapes, backup and restore.
- 3 Further in the GSI Model 12 Reference Manual are special topics for special configurations: old DOSs (Appendices B.2 and C.1), Memory Managers (Appendix C.2), Windows® (C.3), OS/2 (C.5) & tape backup drives (F.1).

A black circle with the word "STOP!" written in white, slanted capital letters.

Note: Take a moment here to write down the **Serial Number** of the GSI controller on your product registration card. Please remember to send in this registration card to GSI. GSI cannot provide technical support or register your product without the Serial Number!!

Your Model 12 controller should now be up and running. The following appendices provide more detailed information and there is a Basic Troubleshooting Section [Appendix H], should you encounter installation difficulties.

APPENDIX A — PHYSICAL INSTALLATION

General Precautions: Turn system power **OFF** and let disk drives **stop** before working on the computer. Remove the case cover to gain access to the connectors (slots) on the computer's main board. All electronic equipment is sensitive to *static electricity* at levels below those humans notice. Take care to **touch the metal case parts before** touching the electronics.

A.1 FLOPPY DRIVE INSTALLATION

A.1.1 Caution! Avoid Certain Cable-to-Drive Adapters! — for 2.88MB Drives

Do **not** use **pre-2.88 pin-header to card-edge adapters** on **2.88MB** drives! Doing so causes the drive to report the wrong diskette type to the controller. Use cables with **pin-header connectors**, which are designed to plug **directly** into 3.5" drives. (See also Appendix E.)

A.1.2 Setting the Drive-Select Jumpers on the Floppy Drives

All floppy disk drives should be set to Drive Select 1 (**DS1** of DS0 thru DS3), the normal factory setting for PC usage with standard twisted cables. (For "combo" floppy drives, see F.2)

A.1.3 Floppy Cable Attachment

It is usually easier to attach cables before inserting the controller into the computer. Regular and 2.88MB drives require separate but identical cables due to a slight difference in their interface. Two cable attachment headers are provided on the GSI Model 12 for the 2.88 and REGular (standard *twisted* PC-type 2-drive) cables:

Connector	Used For
J3 (Regular floppy)	This is the primary floppy connector for use with Regular 5.25" 1.2MB and 360kB floppy drives, as well as 3.5" 720kB and 1.44MB floppy drives.
J2 (2.88 floppy/tape)	This is the secondary floppy connector for use with 2.88MB drives or additional Regular drives. If you do not have a 2.88MB floppy drive, you can use standard floppy drives from this connector. Tape backup drives could also be connected to this connector.

Each drive should be connected to the proper cable type. If 2.88MB and Regular drives **share** a cable, the 2.88MB **must** be declared as a GSI Type **7** (See App. E). Be careful to connect the **Pin-1** color-marked side of the **cable** to the Pin-1 side of its header (Read the card markings) and of the floppy **drive**. (The *slot-cut* in 5.25" floppy-drive edge connectors is toward the Pin-1 side.)



Note: Model 12s shipped in GSI retail kits (Part #1533-12-Vx-x) include one floppy cable that can connect two FDs, one at the End position and one at the Center position.

A.1.4 Floppy Drive Letter Assignment

Floppy drive letters A:, B:, etc., are keyboard-reassignable by running the GSI Setup in **DOS and Windows® 3.X environments ONLY**. At system reboot, you are prompted to press the <IN-SERT> key if you want to enter Floppy Drive Setup. GSI Setup uses the *dummy* names **3:** and **4:** for 3rd and 4th floppy drives. The drive letters which DOS will eventually assign vary with DOS version and details of the system HW/SW configuration.



Note: Press the **SPACE-bar** if you want to bypass the 4-second wait to boot more quickly.

A.2 MODEL 12 CONTROLLER INSTALLATION

A.2.1 Setting the Controller's BIOS-Address and PR/SE-Mode Jumpers

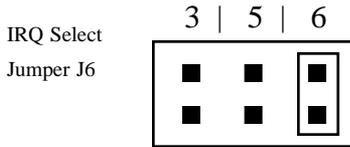
Jumper block **J4** lets you choose any of four GSI BIOS addresses and *either* **Primary** or **Secondary** Mode. The GSI BIOS must not overlap any other controller BIOS (For SCSI, see also F.3). The jumper-selected GSI BIOS address is reported *on-screen* as part of the GSI Bootup Banner.

For Model 12 with Part# 1533-12-01-X (shown on the product label on the card):

BIOS ADDRESS	Put Jumper On J4 Rows	Diagram
C800-C9FF	B1 and B3	
CC00-CDFE FACTORY DEFAULT	B1 and B4	
D000-1DFF	B2 and B3	
E000-E1FF The E000 address is provided to allow compatibility with very old VGA boards which interfere with 8-bit read/write operations throughout the entire C and D memory pages. Unfortunately, some system BIOSs do not search for a controller BIOS at E000.	B2 and B4	
PRI = PRImary FDC use if it is the <i>only</i> FDC		
SEC = SEConary FDC use if it is the <i>2nd</i> FDC FACTORY DEFAULT		

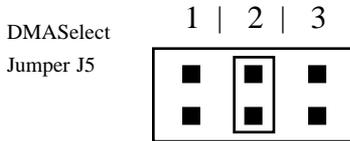
A.2.2 Setting the Controller's IRQ Select

Jumper block **J6** lets you choose any of three IRQ's for the GSI Model 12 to use. The **factory default** setting is **IRQ 6**, used by all standard operating systems and application software. This setting should not be changed unless you have a special software requirement for a different IRQ option. To change the IRQ, simply move the jumper to the IRQ option you wish (options are IRQ 3, IRQ 5 or factory default IRQ 6).



A.2.3 Setting the Controller's DMA Select

Jumper block **J5** lets you choose any of three DMA's for the GSI Model 12 to use. The **factory default** setting is **DMA2**, used by all standard operating systems and application software. This setting should not be changed unless you have a special software requirement for a different DMA option. To change the DMA, simply move the jumper to the DMA Select you wish (options are DMA 1, factory default DMA 2 or DMA 3).



A.2.4 Inserting the Controller

Choose an open slot in the computer's motherboard and remove the rear-panel blanking plate in line with the slot, saving the screw to anchor the card in place. Gently but firmly press the GSI Model 12 into the slot, fastening it into place with the retaining screw.

B.1 CMOS SETUP AND XT- SWITCH SETTINGS

B.1.1 Should Your Model 12 be the *Primary* FDC or the *Secondary* FDC?

If you have not yet decided whether to operate your Model 12 as a Primary FDC or as a Secondary Floppy Disk Controller (FDC), read Section 2.1. The difference between primary and secondary FDC modes is the *I/O address range* of the controller's Control and Status Registers. In general, a secondary FDC can do anything that a primary FDC can do, except where programs *arbitrarily limit* themselves to operating with a primary FDC (See C.3).



Note: When FDs are *split* between primary and secondary FDCs, drives attached to the primary will be assigned drive letters first.

B.1.2 Adding the Model 12 to 286, 386, or 486 AT-Compatible Systems

B.1.2.1 **Model 12 as Secondary FDC — Declaring Floppy Drives in System BIOS**

Where the Model 12 is controlling all of the PC's floppy drives (FDs) as the secondary controller, run the System Setup procedure, per system manual, and declare 'None'.

In the rare case where some of the PC's FDs must be left attached to a **non-GSI** Primary FDC (See 2.1), **those** drives **should** be declared in the System BIOS Setup. The Model 12 Setup process will inquire about only those FDs attached to it: namely, B:, 3rd, and 4th, as appropriate.

B.1.2.2 **Model 12 as Primary FDC — Declaring Floppy Drives in System BIOS**

Run the System Setup procedure, per the system manual, to set up the BIOS floppy drive (FD) configuration. For most *non-proprietary* systems, try declaring '**None**'. If you *must* declare one or two FDs to the System Setup, for Drive A: report the FD at the Regular-cable End Position; for Drive B:, the FD, if any, at the Regular-cable Center Position. For any non-360kB drive, if the System Setup does not offer you a choice of the *actual* drive type, declare it as a **1.2MB** drive. (Also see Appendix E.)

B.1.2.3 **Model 12 as Secondary FDC in a Proprietary, Non-Clone AT-Compatible PC**

Some PCs (usually proprietary, non-clone PCs, such as Compaq, Epson, IBM, etc.) **insist** that you declare at least one floppy drive in the System Setup — whether or not there really is any floppy drive connected to a primary floppy controller. If there are actually **no** drives connected to a Primary FDC, the drive type which you declare for its make-believe Drive A: should be irrelevant.

The Model 12 BIOS contains logic to allow it to be used as Secondary FDC in those proprietary PCs which **insist** that at least one floppy drive be declared in System Setup. If, as you run the GSI Setup, **exactly one** primary-FDC drive is reported to the Model 12 by the System BIOS, you will be asked to confirm whether there **really is** a floppy drive **A:** attached to the Primary FDC. 'N' will tell the GSI Setup to ignore the make-believe Drive A: 'Y' will cause the GSI Setup to ask you about those floppy drives found attached to the GSI Model 12 — by the drive letters **B:, 3, and 4.**

B.1.3 Adding the Model 12 to IBM and 'Clone' XT_s

The Model 12 controller can be added successfully to *many* XT-class computers, whether IBM XT_s or XT clones. Special XT considerations are:

- 1) System BIOS date
- 2) Setting the XT motherboard's configuration switches
- 3) Special rules for choosing GSI floppy-drive cable positions

Historically, many XT BIOS_s were produced which were not 100% IBM/PC-compatible. Even though many GSI Model 12_s are in use in various clone XT_s, GSI cautions that the Model 12 *may* not work with any specific non-IBM, XT-class system BIOS.

B.1.3.1 XT System BIOS Dates

IBM XT_s with BIOS dated August 16, 1982 (or IBM PC_s dated October 27, 1982) or later have the ability to find and activate the GSI BIOS. Clone XT_s from 1984 or later should have this ability; earlier ones may not.

B.1.3.2 Setting the XT -Motherboard Configuration Switch-Block

Set configuration switch positions 7 and 8 to ON/ON (= 1/1), to announce just one floppy drive.

B.1.3.3 Special Rules for Choosing XT Floppy-Drive Cable Positions

One of your (up to four) floppy drives will have to be at the **End Position** on the **Regular** cable — to avoid the XT error message '601 Error — Press F1 to continue' during bootup. This drive can be **any** of the drive types, even a **2.88MB** drive. Additional drives can be at any cable position, subject, however, to the other guidelines presented in this manual.

B.2 MODEL 12 BIOS SETUP — DECLARING FLOPPY DRIVES AND DOS VERSION

The GSI Model 12 remembers the drive/system configuration in *Flash* memory. If you install a *brand new* Model 12, you will automatically enter GSI Setup on your first system boot-up. Also, if the Model 12 detects any *configuration change* that affects it, it may ask you to rerun GSI Setup.

B.2.1 GSI-BIOS Controller Setup — Floppy Drives

To run the GSI-BIOS Setup Utility for Floppy Drives, reboot and press INSERT (when prompted) to enter Floppy Drive Setup. You will be shown the Current Drive Settings, if any. If you want to make changes, you will be asked, in turn, to select which drive you want as A:, B:, 3rd, and 4th, with New Choices shown alongside Current Settings.

For each drive selection, the Setup Utility lights the LED on the next available drive and asks whether this is your choice for Drive X:. Entering "N" advances the LED-ON indication to the next available drive; "Y" accepts the lighted drive as X: and advances to the "Enter Drive Type for X:" dialog.



Note: If cables are installed correctly and FD jumpers are **all** at *DSI*, answering "N" repeatedly *should* light the floppy drive LEDs, one at a time, in successive fashion. (If using 'combo' 1.2/1.44MB drives, See F.2)

B.2.2 Getting DOS 4.01/3.30 or DRDOS 6.0 to Assign C: to the Boot Hard Drive

On *floppy-only* systems, the 3rd and 4th FDs (“3” and “4” in GSI Setup) will be assigned “C:” and “D:”. On hard-drive systems, the **3rd** and **4th** FDs will get DOS-assigned drive letters as follows:

- 1) Under DOS 6.0/5.0 — the next two letters *after* all hard-drive letters (normal usage)
- 2) Under DOS 4.01/3.30 or DRDOS 6.0 — C: and D: (This *can* be avoided; see below.)

The GSI Setup asks you whether you are using a DOS **other than DOS 6.0/5.0**. If you are, it asks whether you intend to keep “C:” assigned to the *bootable* hard drive (by using a DRIVER.SYS line in your CONFIG.SYS file). If you say “**Yes**”, the GSI BIOS alters its interaction with DOS to help you accomplish this. An example DRIVER.SYS line, for a **2.88MB** drive as Drive **3**, is

```
DEVICE = DRIVER.SYS /d:2 /c /f:7 /s:36 /t:80
```



Note: **d:2** = ‘Drive 3’ and **d:3** = ‘Drive 4’

which makes the older DOSs assign drive letters to Floppy Drives 3 and 4 **after** all **hard drive** partitions have been assigned their letters. For more DRIVER.SYS information, please refer to DOS documentation.

B.2.3 Saving GSI-Setup Choices or Restarting GSI Setup

After you assign a letter to each floppy drive and declare your DOS type, you are asked: “Save new choices?” “**Y**” saves the New Choices and reboots the system. “**N**” restarts the Floppy Setup dialog with the “Want to make changes?” question. “**N**” at this point exits Setup **without** saving any configuration-data changes. After system reboot, remember to turn **ON** shadowing of GSI BIOS.

B.3 Shadowing of GSI BIOS: ON for Normal Operation, OFF during GSI Setup

Most 386 or 486 System Setups offer *shadowing* of controller-card BIOSs like GSI's. A shadowed BIOS is executed from a *hi-speed* RAM copy, not from the slow 8-bit BIOS chip. Shadowing of the GSI BIOS should be **ON** for normal operation, but **OFF** while running GSI Setup.

See Section A.2.1 for the GSI BIOS address range for which you should enable shadowing via System Setup. Failure to shadow *may* result in an "Unable to Write Boot Record" message from DOS FORMAT, when you attempt to format a 2.88MB diskette (not common, but likeliest on 486 or 386 systems).

System BIOSs for *most* 386 and 486 systems allow you to turn ON shadowing (in the C, D, and E pages of memory) in 16kB, 32kB, or 64kB blocks. *Any* of these block-sizes will *totally contain* the Model 12's 8kB-size BIOS. Note your GSI BIOS Start Address as shown in your GSI Bootup Banner and request shadowing, in your System Setup, as follows:

GSI-BIOS Address (HEX)	How to Choose System-Setup BIOS Shadowing		
	If 16kB Region	If 32kB Region	If 64kB
C800-C9FF	C800-CBFF	C800-CFFF	C000-CFFF
CC00-CDFF	CC00-CFFF	C800-CFFF	C000-DFFF
D000-D1FF	D000-D3FF	D000-D7FF	D000-DFFF
E000-E1FF	E000-E3FF	E000-E7FF	E000-EFFF

See Section A.2.1 for details of the Model 12's J4 jumper settings vs. GSI BIOS address.

B.4 Floppy Drive Types Supported — GSI Floppy Drive Types

The Model 12 accommodates all 5.25"/3.5" floppy drive types which have been *de facto* standards in the IBM-compatible marketplace, even the 600/720rpm drives not usually found except in commercial floppy-duplicating equipment. Drive types shown in the GSI-BIOS Setup screen are:

Standard 300/360 RPM Drives		Hi-Speed 600/720 RPM Drives	
GSI Type #	Floppy Type Description	GSI Type #	Floppy Type Description
1	5.25" 360kB	11	5.25" 360kB
2	5.25" 1.2MB	12	5.25" 1.2MB
3	3.5" 720kB	13	3.5" 720kB
4	3.5" 1.44MB	14	3.5" 1.44MB
5	3.5" 2.88MB ED-H	NO DRIVE OR DRIVE UNAVAILABLE	
6	3.5" 2.88MB ED-L		
7	3.5" 2.88MB ED-N		
		0	Absent/Unavailable



Note: Drive Types 1-7 are for normal, industry standard, floppy drives. Drive Types 11-14 are for the High Speed 600/720 RPM floppy drives used primarily by diskette duplicators.

C.1 FORMATTING DISKETTES IN A 2.88MB DRIVE

Use the DOS FORMAT command to format 3.5-inch diskettes in the 2.88MB drive. See the following table, which describes the necessary switch settings for FORMAT for each diskette type, 2.88MB floppy drive Type (as determined by the GSI BIOS Setup) and operating system:

Diskette Capacity	Operating System	GSI BIOS Type 5 or 6 Floppy Disk Drive	GSI BIOS Type 7 Floppy Disk Drive
2.88MB	DOS 6.0/5.0 DOS 4.01/3.30 DRDOS 6.0	FORMAT A: FORMAT A: /t:80 /n:36 FORMAT A: /f:2.88	FORMAT A: FORMAT A: /t:80 /n:36 FORMAT A: /f:2.88
1.44MB	DOS 6.0/5.0 DOS 4.01/3.30 DRDOS 6.0	FORMAT A: FORMAT A: /t:80 /n:18 FORMAT A: /f:1.44	FORMAT A: /f:1.44 FORMAT A: /t:80 /n:18 FORMAT A: /f:1.44
720kB	DOS 6.0/5.0 DOS 4.01/3.30 DRDOS 6.0	FORMAT A: FORMAT A: /t:80 /n:9 FORMAT A: /f:720	FORMAT A: /f:720 FORMAT A: /t:80 /n:9 FORMAT A: /f:720

*When using the FORMAT command, substitute the appropriate drive designation for “A:”.



Note: When using DOS 4.01/3.30, so specify during GSI Floppy Setup. This will activate a GSI BIOS correction of a DOS 4.01/3.30 Format bug during 2.88MB-disk formats.

C.2 USING MEMORY MANAGER SOFTWARE

If you use memory-manager software, such as EMM386, QEMM, 386MAX, or Netroom, you may experience faulty handling of some diskette types — for example, a 720kB disk in a 1.44MB drive. Try **excluding** the memory region of the **GSI BIOS** from the memory manager’s optimization process.

For example, when using EMM386 or QEMM, in the CONFIG.SYS file add the ‘X=’ option

```
Device = C:\QEMM\QEMM.SYS X=CC00-CDFE
(For more information, refer to the memory manager documentation)
```

for a Model 12 whose BIOS is at the **CC00** address. (Confirm BIOS address from GSI Banner.)



Note: If you use 2.88MB **disks** and DOS’s driver **EMM386.EXE**, use the **d=32** switch.

C.3 MS/PCDOS, DRDOS, AND DOS-BASED APPLICATIONS

Normal DOS software usage rules apply to systems using the GSI Model 12 card. Considerable effort has been made to ensure compatibility with the most commonly used DOSs: MS/PCDOS 6.0/5.0/4.01/3.30 and DRDOS 6.0. (See Sections B.2.2 and C.1 if using a DOS version other than DOS 6.0/5.0.) Common DOS commands like Chkdsk, Copy, Xcopy, Diskcopy and Format should work straightforwardly. Properly programmed DOS applications should be expected to run normally with all floppy drive and diskette types.

The MSDOS 6.0 Upgrade needs special mention on two counts:

- 1) DOS 6.0's DBLSPACE disk-compression appears to be compatible with the Model 12
- 2) With one hard drive and 3 or 4 floppy drives, MSDOS 6.0 *may* make boot-time read attempts to Floppy Drive 3:. If this happens, you can leave a readable diskette in Drive 3: to allow DOS to finish booting without numerous time-consuming retries.

Consult Microsoft DOS 6.0 Technical Support for further information, if necessary. You may find that a *few* maintenance utilities (e.g., copy or backup programs), make *unwarranted assumptions* about drive letter assignments or about total system floppy-drive count (which may exceed 2). Refer such problems to the software vendor's Tech Support Dept.

C.4 WINDOWS® 95

C.4.1 Model 12 in Primary Mode with Existing Windows® 95 System

Remove or disable the existing primary floppy controller. Set the jumpers on block J4 to configure the Model 12 for primary mode of operation. Attach floppy drives to floppy cable using physical drive location (A: floppy connected to the end of the cable, B: floppy at center). Identify the floppy drives in the system Setup/CMOS. After booting into Windows®95, run the "Add New Hardware" wizard (found in the control panel).

C.4.2 Model 12 in Primary Mode in System with Windows® 95 Not Yet Installed

Remove or disable the existing primary floppy controller. Set the jumpers on block J4 to configure the Model 12 for primary mode of operation. Attach floppy drives to floppy cable using physical drive location (A: floppy connected to the end of the cable, B: floppy at center). Identify the floppy drives in the system Setup/CMOS. Install Windows®95 software.

C.4.3 Model 12 in Secondary Mode with Existing Windows® 95 System

As of the printing of this manual, the Windows®95 software did not properly support the secondary floppy I/O address. However, if Windows®95 is being installed to a system that is already running a Model 12 in Secondary Mode, no Microsoft Windows®95 driver will be installed for the floppy controller. This allows the floppy drives to operate, but only in DOS-compatibility mode. Until the Windows®95 software correctly identifies the secondary floppy I/O address as 370-377, controllers like the Model 12 will not run in all modes.

C.5 WINDOWS® 3.X AND APPLICATIONS SOFTWARE

The GSI Model 12 is compatible with Windows® 3.x in all Windows® modes and for all floppy services. If you are having problems, check your Windows® SYSTEM.INI file, [386enh] section, to see that you have the following line:

DMABUFFERSIZE=18 (or higher)

Properly programmed Windows® applications should be expected to work normally with all floppy drive and diskette types. Windows® 3.0 *will* work with the Model 12, does *not fully* support 2.88MB **drives** — only "low density" and "high density". You cannot specify "1.44MB disk in 2.88MB drive".

C.6 OS/2 Warp 2.0

The GSI Model 12 is compatible with OS/2 Warp v2.0. However, GSI's *floppy drive-letter remapping* feature is **not** available under OS/2. Consequently, you should plan your floppy drive-letter assignments at physical installation time and cable-connect the drives accordingly:

Drive	Cable/Header	Position on Cable
A:	J3	END
B:	J3	CENTER
3:	J2	END
4:	J2	CENTER

When GSI Setup asks, for each drive letter, "Choose Drive X:. Is the drive with the light ON your choice?" answer 'Y'.

If you do skip a floppy-cable position, OS/2 will **ignore** all higher-lettered floppies! If, due to this limitation, you must put a *normally* Type-5 (or Type- 6) **2.88MB** drive on the **REG** cable, remember to declare it as a **Type 7** in GSI Floppy Setup.

As shipped, OS/2 2.0 is limited to **three** floppy drives. However, an updated IBM1FLPY.ADD driver is available through IBM OS/2 Tech. Support to provide support for **four** floppy drives.

APPENDIX D — 2.88MB FLOPPY DRIVES AND DISKETTES

D.1 2.88MB DRIVE AND DISKETTE BASICS

Some basic facts which you should know about 2.88MB drives and diskettes are the following:

- 2.88MB drives are 100% read/write/format-compatible with 720kB and 1.44MB diskettes
- 2.88MB drives often come with IBM *PS/2-mode* jumpering. For desired PC/XT/AT standard operation, you **must** use jumpering as shown in Section **D.3** of this manual.
- 2.88MB diskettes must be used with a 2.88MB format (Note: **all** 3.5" disks **must** be formatted **per disk-jacket holes** — 720kB/1.44MB/2.88MB) — (standard PC usage)
- The Model 12 tells DOS & Windows 3.1 what diskette type is currently in the 2.88MB FD
- *Most* 2.88MB floppy drives have a *dual* (HD/ED) hole-sensor & report diskette-type to the Model 12
- '4MB' diskettes (**unformatted capacity**) are the same as '2.88MB' disks (formatted capacity)
- 2.88MB diskettes are marked 'ED' and have a barium ferrite (**not** iron oxide) coating
- 2.88MB diskettes do **not** have the HD (1.44MB) jacket-hole but **do** have an ED (2.88MB) hole (like the HD hole, but just *behind* the HD-hole position, at the *right* edge of the diskette)
- 2.88MB diskettes have **36 sectors per track**, whereas 1.44s have **18** and 720s have **9**

D.2 TABLE OF 2.88MB DRIVES, BY MANUFACTURER

Below are the GSI BIOS-Setup floppy drive selections for the Model 12, by manufacturer. Be sure to note the exact Part Number of the Model 12 (printed on a label on the board) and use the correct GSI Floppy Drive Type from the following table:

**Model 12 with Part Number
1533-12-01-X or later**

2.88MB Floppy Drive		Use GSI-Setup
Make	Model #	Drive Type #
Chinon	FZ-358	5
Citizen	OSDF	5
Epson	SMD-1060	5
Mitsubishi	MF356F-252UG	6
Mitsumi	D352T2	5
Panasonic	JU-259AP	7
Sony	MP-F40W-15	6
TEAC	FD-235J-363 n	5
TEAC	FD-235J-365 n	5
Toshiba	PD211	7
Y-E Data	YD-742	5

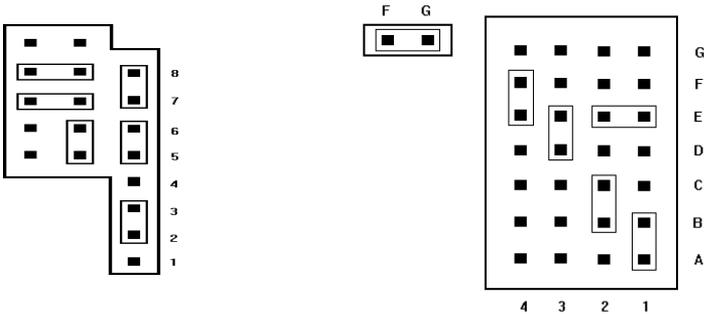
The make and model information provided above is for the convenience of installers. Check with drive manufacturers for current accuracy. (Note: **n** in the TEAC Model #s is a bezel-color digit.)

D.3 2.88MB FLOPPY DRIVE JUMPER INFORMATION

For 2.88MB drives with jumper blocks shown below, you **must** set the jumpers as shown, to ensure proper PC/XT/AT/386/486-compatible operation. This information is included here for installers' convenience. Check carefully that your drive's model name matches *exactly*, because some manufacturers make *special* 2.88MB drive models for *non-standard proprietary* PCs.

Epson Model SMD-1060

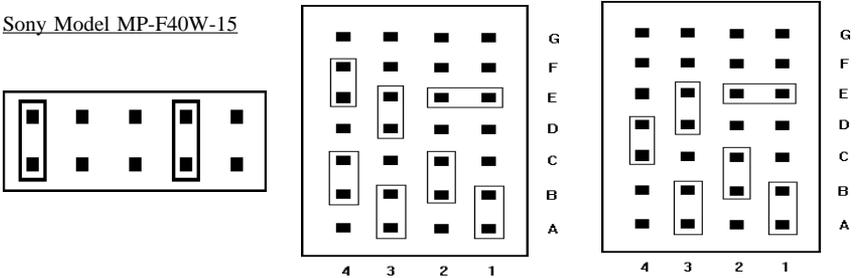
Mitsumi Model D352T2



TEAC Model FD-235J-363n

TEAC Model FD-235J-365n

Sony Model MP-F40W-15



APPENDIX E — FLOPPY DRIVE MIX POSSIBILITIES

The Model 12 4-Floppy Controller can accommodate **any** mix of up to four 5.25"/3.5" floppy drives. What restrictions there are relate mostly to 2.88MB drives. If you have a **smart** 2.88MB Type-5/6 drive (one which reports to the FDC what type of diskette is currently in the drive) and you want **automatic** disk-type reporting to DOS and WINDOWS, you should observe the following rules:

- 1) Do **not** use an old-style pre-2.88MB adapter (that is, one with all of the odd pins grounded) to connect the 2.88MB drive to its cable
- 2) Do **not** connect any other type of drive (i.e., Tape, 360kB/720kB/1.2MB/1.44MB, or **non**-reporting 2.88 drive) on the same cable as a Type-5/6 media-reporting 2.88 drive

When you break either of these rules, the 2.88MB drive will **always** report that it contains either: a '720kB diskette' or 'no diskette'. **If** you must break **either** of these two rules, you should declare your media-reporting drive as a **non**-reporting **Type-7** drive during GSI Floppy Setup. In this case, some floppy processes may take *slightly* longer than usual, because the controller must perform special tests to determine the type of diskette which is currently loaded.

F.1 INTEGRATING FLOPPY-INTERFACE TAPE UNITS

The GSI Model 12 can control **one** QIC-40, QIC-80, QIC-3010 or QIC-3020 tape unit — along with up to **four floppy** drives. In fact, the Model 12 operates **QIC-80, QIC-3010 and QIC-3020** tape units at their faster transfer rate (**1 or 2Mbit/sec**), saving you the cost of a separate hi-speed **tape-only** controller. For tape-unit installation, follow the cabling and jumpering suggested in the tape-drive maker's user manual **if and only if** you have at most two floppy drives **and** you install **all** floppy and tape drives on the **same cable**.



Note: If you have any **2.88MB** drives on this cable, you must declare them as GSI **Type 7, not 5 or 6**, in the GSI Setup, per Appendix E.

For all other cases, read further in this section. If problems persist, consult the tape-drive maker.

F.1.1 Background on Floppy-Interface Tape Units

Floppy-interface QIC-80 and QIC-40 tape units are designed to operate on the same cable as **one** or **two** floppy drives. To do this, the tape units use various techniques to **sense the presence** of the floppy drives. If the tape unit receives a command sequence **but** sees that a **floppy drive is currently selected** (by checking the cable's Drive Select signals), the tape unit then **ignores** the commands. Otherwise, the tape unit decides that they are tape commands and processes them. This mode of operation is often called 'Transparent Mode'. Most tape units are factory-set to operate in this mode, although most of them *can* be jumpered to use a Drive Select signal, just as floppy drives do. However, do not presume that all tape units' Transparent Modes will work with a **two-cable four-floppy** controller. Many will not, for they will **interfere with** any floppy drives which **do not share a cable** with them.

F.1.2 Case 1: Tape Unit Shares a Cable with All of the Floppy Drives (2 FDs Max.)

When the tape unit can share a cable with **all** of the floppy drives (by definition, **one** or **two** FDs), connection of a tape unit is straightforward. For this is essentially like using a standard 2-floppy-only controller. In this case you can use the typical manufacturer-supplied add-on tape-drive cable and can operate the tape unit in Transparent Mode. (This cable provides a connector which is the equivalent of a **second** Center-Position connector on the basic floppy cable. In fact, if, after installing your floppy drives, you still have a spare Center-Position connector available on your floppy cable, you can attach the tape unit to that spare connector and not even bother to use the add-on tape-unit cable.)

F.1.3 Case 2: Where Both J2 and J3 Cables Are In Use and a Tape Unit Is Present

When **both** of the Model 12 floppy cable-headers (J3/REG and J2/2.88) are used to connect floppy drives and a tape drive, by definition there is **at least one** floppy drive which is **not on the same cable** as the tape drive. As discussed in F.1.1, *most* tape units are factory-set to a Transparent Mode which will **not** work properly in this environment.

Your tape-drive maker may offer a non-transparent Drive-Select Mode (See F.1.1). In this mode, you will be limited to **three** floppy drives. For drive-select and cable-position details, see Sec. F.5.

F.1.4 An Additional Problem — Due to Commercial Backup-Software Deficiencies

An additional problem for tape unit installers is that *some* commercial tape-backup software has not been written flexibly enough to operate with a **secondary-address** floppy disk controller — like the Model 12 used as **secondary**. If you expect to operate the GSI Model 12 as a Secondary FDC, check with your backup-software company's Tech Support Dept. if you suspect this problem.

F.2 COMBINATION (TWO-IN-ONE) FLOPPY DRIVES

For two-in-one floppy drives (for example, TEAC Combo or Canon 5.25" ½-ht 1.2MB+1.44MB), follow these guidelines:

- A combo drive cannot share its floppy cable with any other floppy drive, but **can** with a tape unit which is operating in **Transparent Mode** (where no Drive Select signal is used)
- Treat the 1.2MB and 1.44MB drive sections **as if they were two separate floppy drives**: that is, identify the 1.2MB section as a GSI-BIOS Type 2 and the 1.44MB as a Type 4
- You must put **diskettes** in the TEAC Combo to see its LEDs light during GSI Setup
- The TEAC Combo drives are useable with factory default jumpering. One drive select jumper will be on DS1 (or D1) and the other on DS2 (or D2). Attaching the Combo to the center floppy cable connector will reverse the drive letter assignments of the 1.2MB and 1.44MB units.

F.3 MODEL 12 CO-EXISTS WITH A SCSI OR ESDI CONTROLLER

The Model 12 has been designed to be able to **co-exist** with **SCSI** or **ESDI** controllers. Unfortunately, many SCSI and ESDI controller BIOSs are *ill behaved*. That is, they have been written on the unwarranted assumption that there would **never** be any **other drive controller** with a **BIOS** co-residing in the system with them. If you do **not** even see a GSI Banner at boot time, check that you have situated the **GSI BIOS** at a **higher-numbered address**: for example, SCSI at D000 and GSI at DC00. (See Section A.2.1)

F.4 THE MODEL 12 WITH AN EISA-BUS MOTHERBOARD

EISA-bus motherboards have a built-in system configuration protocol that is intended to provide automatic setup of add-on cards. This automated procedure deals with the add-on cards one at a time, working its way from one side of the computer to the other. The sequence in which two add-on cards get scanned for EISA-bus setup *may* affect proper card operation for one or both cards. This consideration is analogous to the order of BIOS addresses for two cards, as discussed in Section F.3. Therefore, try interchanging slot positions of the Model 12 and other cards with BIOS.

F.5 MODEL 12 DRIVE-SELECT USAGE

As seen from the Model 12's floppy *controller chip connections*, the Drive-Select *signal* to cable-position correspondence is as follows:

DS0 = GSI Regular Cable, End Position	DS1 = GSI Regular Cable, Center Position
DS2 = GSI 2.88 Cable, End Position	DS3 = GSI 2.88 Cable, Center Position

During Floppy Setup, the Model 12 searches for drive presence in the order DS0, DS1, DS2, DS3.

F.5.1 Drive-Select Jumpering and Cable Position: Floppy Drives

GSI has designed the Model 12 to use two 2-drive PC-standard cables (that is, IBM-style cables with a *twist*). As in normal PC-clone usage, jumper **all floppy drives as DS1**, for **any** cable position. The Model 12 can find and use all floppy drives attached to it, regardless of cable position. However, follow normal PC floppy-cable ground rules (use end position first, then center) whenever possible, to avoid user confusion.

F.5.2 Drive-Select Jumpering and Cable Position: Tape Drives

Follow your tape drive manufacturer's user manual and Technical Support guidance regarding mode jumpers and cable position. Note that some tape-makers use Drive Select notation based on pre-IBM/PC *straight*-cable usage.

F.6 **MODEL 12 FACTORY DEFAULT SETTING**

The factory default Interrupt (IRQ), DMA Channel and I/O Control/Status Port Addresses used by the GSI Model 12 controller card all conform to absolutely PC-standard usage. They are as follows:

IRQ	DMA	I/O Address (SEC)
6	2	370-377

APPENDIX G — BASIC TROUBLESHOOTING

The following are some basic troubleshooting tips you should read if experiencing problems with your installation. Each problem is followed by some suggestions and then references an **Appendix** for more reading. Below, SW=software, HD=hard drive, FD=floppy drive & TD=tape drive.

G.1 GSI Banner Is Not Seen:

- Is there a *second* BIOS at the same address as the GSI BIOS? [A.2.1]
- Old-style System BIOS *may* not be looking for GSI BIOS at **E000** address. [A.2.1]
- Ill-behaved VGA card in **16-bit** BIOS mode (Try it in an *8-bit slot*.) [A.2.1]
- Ill-behaved **SCSI/ESDI** adapter with BIOS at *higher* address than GSI BIOS? [F.3]
- Another card using C/D memory (LAN, multimedia, scanner, etc)? Try removing it.

G.2 Floppy Drive Select and/or LED Indicator Problems

- Are **all** floppy drives set to **DS1** (by jumpers or switches on the drive)? [A.1.2]
- Does the GSI Setup see all of the floppy drives? [B.2.1]
- Are cables the wrong type, faulty, or put on with the Pin-1 orientation backwards? [A.1.3]
- Do you have two drives at the *same* position (Center/End) on the *same* cable? [A.1.3]
- Are all floppy-drive and tape-drive power cables connected?
- Do TEAC Combo 1.2/1.44 drive *LEDs* not turn ON during GSI Setup? [F.2]
- Are some of the floppy drives not being seen by **OS/2**? [C.5]
- Are DIR or SW-Install unable to see disk-change? DC jumper wrong on FD or adapter?

G.3 Floppy Errors with DOS or Other Software

- Diskette may be faulty and unusable or need reformatting. Replace or re-format diskette.
- You may have assigned an incorrect GSI Drive Type number in GSI Setup. [D.2]
- Is Memory Manager software in use without the required **exclude** of GSI-BIOS area? [C.2]
- Getting a format or read/write error from a diskette formatted *contrary to jacket holes*? [D.1]
- Error using copy-protected, diagnostic, configuration-checking or other utility software [C.3]
- Floppy-drive error where a QIC-80/40 tape unit is on the *other* floppy cable? [F.1]
- Has ill-behaved tape-backup software altered floppy-drive parameters? [F.1.4]
- TEAC/other 1.44MB FD set up for PS/2-mode? Change it to clone-compatible mode.

G.4 2.88MB-Drive/Disk Errors

- Are the 2.88MB-drive's jumpers set exactly per GSI information in this manual? [D.3]
- Was the wrong GSI Drive Type declared in GSI Setup? [D.2]
- Is an adapter or a second floppy drive defeating the 2.88's diskette-type reporting? [App. E]
- Does DOS FORMAT report "Unable to write Boot Record" — due to **unshadowed** GSI BIOS? Occasionally seen in 486 or 386 systems? [B.3]
- Windows error due to lack of DMABUFFERSIZE = 18 statement in SYSTEM.INI? [C.4]
- DOS error reported due to EMM386 in CONFIG.SYS without **d=32** switch? [C.3]
- 2.88-diskette bad blocks or *lost data*, from 720/1.44-type disks formatted as 2.88MB? [D.1]

G.5 Tape Unit Problems

- Tape Unit is not seen when Model 12 is Secondary FDC. Consult Tape Maker's Technical Support Department for backup software update. [C.3]
- Tape Unit backup not running at full data transfer rate. Ask Tape Manufacturer's Technical Support Dept. about updates to backup software or tape-unit firmware. [C.3]

G.6 Windows 95 Problems

- Unable to access disk or tape drive? [C.4]

INSTALLATION NOTES

During installation, you should take down the following information. This information will be useful should you need to contact technical support. GSI's Authorized Distributors can provide you technical support, or you can contact **GSI Technical Support at (714) 261-9744** or by fax (714) 757-1778. When calling either Technical support department, **MAKE SURE TO HAVE THE FOLLOWING INFORMATION READILY AVAILABLE.**

SUPPLIER INFORMATION

Date of Purchase: _____ Invoice #: _____

Product Purchased From: _____

Seller's Tech Support Phone #: _____

GSI PRODUCT INFORMATION

GSI Model 12 Part #: 1533-12-__-__ GSI Model 12 Serial #: _____

GSI Model 12 BIOS Version : _____

GSI BIOS Address Used: _____

OTHER INFORMATION

System Information: _____

Disk Drive Information: _____

Other Cards in System: _____

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