GSI Model 18

Enhanced IDE Accelerator Adapter

For ISA Systems

Installation Instructions

BEFORE CALLING GSI TECHNICAL SUPPORT, PLEASE READ THE INSTALLATION SECTION OF THIS MANUAL (PAGES 2-4) *COMPLETELY* AND HAVE ALL INFORMATION ON PAGE 25 READY!

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This manual is applicable to all revisions of the Model 18 controller and BIOS versions 2.xx and later.

Technical Reference Appendicies:

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 the GSI Model 18.

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

Product Overview
Explains the features and functions of the GSI Model 18 Enhanced IDE Accelerator Board.

Quick Installation Reference
This section is intended to provide a quick reference for installation and using the GSI Model 18.

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

Appendix H — 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 18 and your system. These notes will help should you need to troubleshoot your installation.

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., <Del> represents the Delete key, <A> represents the capital letter "A", etc. Combination keystrokes run together without spaces, i.e., <Ctrl><Alt><Del>.

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.

Abbreviations
A few abbreviations are used in this manual:

HD for **H**ard **D**rive
TD for **T**ape **D**rive

IMPORTANT - READ THIS FIRST
Installation and Support of your GSI Product

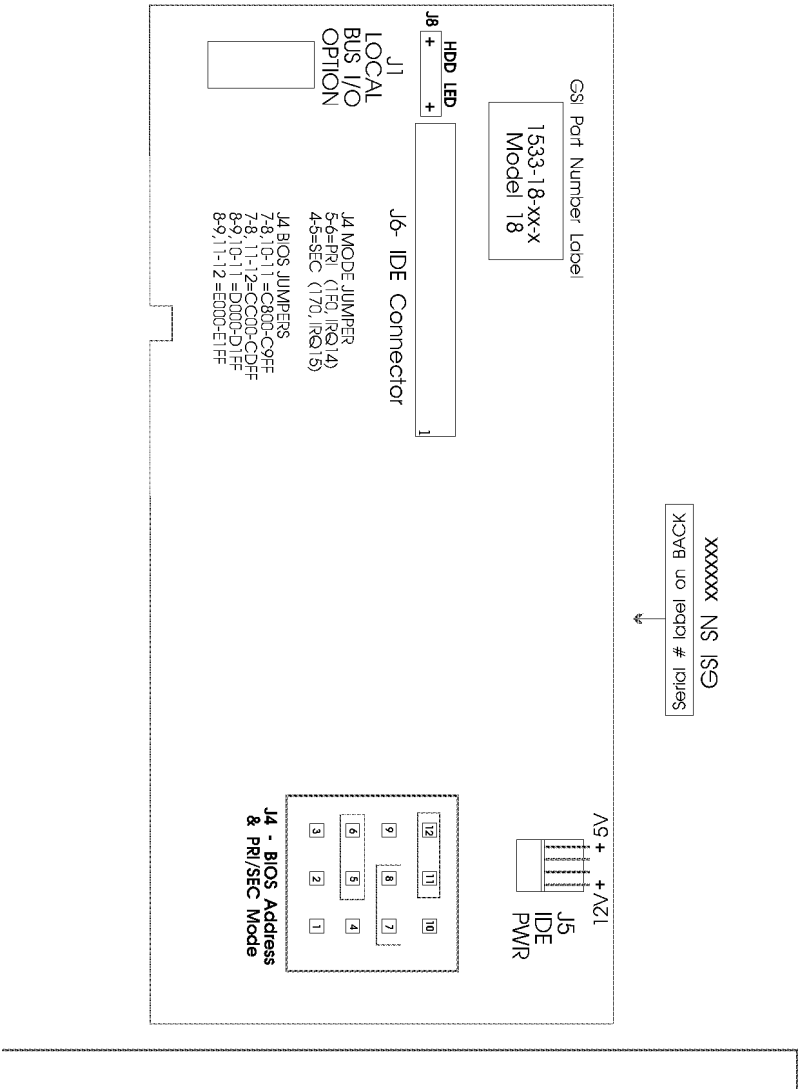
Thank you for purchasing a GSI controller. GSI is constantly striving to make our products easy and quick to install. Due to the vast variations in motherboards, disk drives and operating systems it is impossible to test every combination, thus every installation is unique. Please take the time to **read the Installation Section (Page 2) and Basic Troubleshooting Section (Page 23) carefully** - *before calling for technical support.*

After reading the installation and basic troublshooting sections, if you are still having problems with installation, please follow the below steps:

1. Have your serial number ready. The serial number is a six digit number located on the back of the board. It also comes up onscreen during the boot process in the GSI banner. **The part number (1533-18-XX-X) is NOT the serial number.**

2. Please fill in as much information on page 25 as possible and after doing so, call GSI 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!**



Board layout- GSI Model 18
(GSI PN#1533-18-06-1 shown, for earlier board revisions, see G.3)
(Jumpers shown are factory default. See Appendix A.2.1)

1.0 PRODUCT OVERVIEW

The Model 18 is an Enhanced IDE controller for ISA systems. The Model 18 is a 16-bit ISA-bus controller that supports EIDE & IDE hard drives, Enhanced IDE (ATAPI) CD-ROMs, and IDE tape drives. The Model 18 uses a state-of-the-art 8kB *Flash* BIOS to make installation quick and easy (without the need for drivers or system CMOS support), while also *accelerating* hard drive throughput.

For extreme flexibility in ***co-existing*** with other controllers (for example, a SCSI, an ESDI, an MFM/RLL, or another IDE), the Model 18 is jumper selectable for primary or ***secondary*** operation. This allows the Model 18 to be the only hard disk drive controller in the system or to co-reside with other disk drive controllers and support up to four hard drives in one system (two off the original controller and two off the Model 18).

The Model 18 provides features compliant with the ANSI ATA-2 standard and it's industry extensions: Enhanced IDE and Fast ATA. These features are:

- Supports high-capacity IDE drives
- Increases IDE hard drive data transfer rates (using Read/Write Multiple)
- Supports primary or secondary mode of operation for adding IDE drives

Enhanced IDE Support

- ***ISA Acceleration***: Uses the IDE Read/Write Multiple commands to provide up to 80% data transfer rate acceleration for most (E)IDE hard drives, compared to standard passive IDE adapters
- ***VESA Acceleration***: The Model 18 can be upgraded, using the GSI VESA Extender Module, to support full PIO Mode 3 & Mode 4 data transfer rates. The VESA Extender is simply an add-on module that converts the Model 18 into a VESA controller. Contact GSI or the place you purchased the Model 18 from for more information on the GSI VESA Extender Modules. You **must** have a VESA system to use this add-on product (See Appendix F)
- ***"Auto-Senses" Hard Drive:*** The Model 18's *flash* BIOS automatically reads the hard drives information, no drivers or system CMOS support required
- ***Large-Drive Support:*** Handles high-capacity EIDE drives, allowing a single DOS partitions (drive letter) larger than 528MB
- ***Auto-Install***: Automatically detects, analyzes, and sets up any partitions which it finds already set up on your IDE drive
- ***Compatibility:*** DOS, Windows 3.xx, Windows NT Windows 95, Novell NetWare 3.x & 4.x, and OS/2 Warp & 2.x
- ***EIDE CD-ROM:*** Supports an EIDE-interface (ATAPI) CD-ROM drive — either as Slave to an IDE hard drive or by itself
- ***IDE Tape Support:*** Supports an IDE-interface tape drive (QIC-80/40 type) — either as Slave to an IDE hard drive or by itself

2.0 INSTALLING THE GSI MODEL 18

This section of the manual should allow you to quickly install the Model 18 in your computer. Each step has, if needed, a bracketed **[ ]** reference to other sections in this manual that discuss that step in more detail. Should you have problems, or questions regarding a QUICK INSTALL step, please read carefully the reference sections.

CAUTION! - Do not use any other hard drive partitioning software (like Disk Manager) in conjunction with the Model 18. If the hard drive has already been formatted and partitioned using a software package (like Disk Manager), you MUST back up the data and delete the partitions from the drive. The Model 18 will NOT work with a drive partitioned using Disk Manager or Drive Pro or SuperStor! See D.3 for more information on these utilities.

2.1 PHYSICAL INSTALLATION

(1) With the system power OFF, open the computer case.

CAUTION! Let disk drives stop before working on the computer. All electronic equipment is sensitive to **static electricity** at levels far below those that humans notice. Take care to **touch the metal case** parts **before** touching the electronics.

(2) Check the jumpers on the (E)IDE drive [A.1.1]

The hard, tape or CD-ROM drive jumper settings should be kept at the factory default setting when you have only one drive on the GSI Model 18. If there are two IDE devices connected to the Model 18, you must set one as the Master and the other as the Slave.

Note: Master/Slave jumper settings are for drives that share a cable. If you have a primary controller with one hard drive and the Model 18 only has one drive attached to it, both drives should be set as Standalone (or Master if there is no Standalone option). Only when two drives share the **same cable** (or run off the same controller channel) should one be set as Master and the other as Slave.

(3) Attach the IDE data cable [A.1.2]

Connect the ribbon cable to the IDE drives and to the Model 18 **J6** connector. Note that the colored band on the cable edge indicates the Pin-1 side.

(4) Attach power cables to the IDE drives [A.2.2]
Attach the power cable(s) to the IDE drive(s).

CAUTION! — If using the Model 18's **J5** connector as a power source, **first** read Appendix A.2.2.

(5) Install the drives into the computer case

(6) Check the Model 18's BIOS Address Jumper [A.2.1]
In most cases skip this step as the factory BIOS address setting should work fine.

(7) Check the Model 18's Primary/Secondary Mode Jumper [A.2.1]
Try factory-default Secondary Mode. (For Primary Mode option, see E.6.)

(8) Install the Model 18 into a 16-bit AT-type bus slot and Power ON

2.2 SYSTEM CMOS SETUP & GSI FLASH BIOS AUTO-INSTALL

(1) System CMOS Setup — Select *NONE* or *NOT INSTALLED* [B.1]
Do **not** select a CMOS drive type for drives attached to the Model 18. Select 'None'.

(2) Advanced CMOS Setup — Turn OFF GSI-BIOS shadowing [B.3]
Many 386 or 486 System Setups offer *shadowing* of an adapter's BIOS, like the Model 18's. A shadowed BIOS is executed from a hi-speed RAM copy and may enhance performance. Shadowing of the GSI BIOS should be **ON** for normal operation, but **OFF** when first installing the GSI board or whenever reconfiguring hard drive setup.

(3) Complete the boot-up sequence — watch for GSI Banner [B.2.1]
The GSI Model 18's BIOS will **Auto-Install** the IDE hard drives, reading their parameters and saving them in the controller's configuration memory.

(4) For NEW hard drives — Accept Auto-Prep feature [B.2.2]
The Model 18 will offer to **Auto-Prep** (FDISK and/or FORMAT) each **new** (E)IDE hard drive for you. This is a very quick and easy way to install **new** hard drives! This utility will automatically FDISK the hard drive, creating a single partition using the full capacity of the drive. Auto-Prep will also DOS-format the drive, but not make it bootable.

(5) Install DOS, if needed, using DOS' install procedure

(6) For hard drives already formatted & CD-ROM drives [B.2.2]
As mentioned in Step 4, **do not attempt** to use the Model 18 with an IDE hard drive previously formatted using a special disk partitioning software. If your hard drive was formatted using this type of software, you must back-up the data before putting the drive on the GSI Model 18 and then use FDISK to "clean" the drive. See Appendix D.3.1 for more on this process.

For hard drives not formatted using partitioning software and for Enhanced IDE (ATAPI) CD-ROM drives, the Model 18 will simply "auto-sense" the drives and show you the information onscreen during the boot process. No options are given. A GSI banner will appear onscreen during the boot process showing the drives attached to the GSI controller.

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 register your product without the Serial Number!!**

(7) Test each hard, tape and/or CD-ROM drive for proper operation

Your Model 18 controller should now be up and running. The following appendices provide more detailed information and there is a Basic Trouble-shooting 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 (motherboard). All electronic equipment is sensitive to ***static electricity*** at levels below those that humans notice. Take care to **touch the metal case** parts **before** touching the electronics.

A.1 INSTALLING IDE HARD DRIVES AND TAPE DRIVES

A.1.1 Setting the IDE Drive's Mode Jumpers for *Standalone*, *Master* or *Slave*

IDE (AT-bus) hard drives and tape drives usually have one or two jumpers (shunts) to set the drive to operate as either *Standalone* (the only IDE drive), *Master* (of a Master/Slave pair) or *Slave* (of a Master/Slave pair). Set these jumpers appropriately, per this manual's Appendix D.1.2 and the drive manufacturers' instructions.

If you mix drives from two *different* manufacturers as Master and Slave, you run a greater risk that the drives will not work together satisfactorily. This aspect of compatibility is **not** under the control of GSI and does not arise from any design detail of the GSI Model 18. Therefore, for Master/Slave problems, contact the *drive manufacturers*' Technical Support Departments for help.

A.1.2 Hard-Drive Cable Attachment

Use a standard straight 40-pin cable for connection of one or two IDE drives. Observe Pin-1 markings on the IDE cable (colored band at edge = Pin 1) and on the Model 18 J6 connector (Pin 1 is toward the metal bracket). Model 18 boards shipped in GSI *VAR* Packs (Part #1533-18-**V**x-x — shown on the outside of a GSI box) include a cable (Part #1548-02-01-9) suitable for one or two IDE drives.

A.2 INSTALLING THE GSI MODEL 18 BOARD

A.2.1 Setting the GSI BIOS Start Address and SEC/PRI-Mode Jumpers

Jumper block J4 allows you to alter the Model 18's operation in two respects, by choosing:

1) the GSI BIOS Start Address (any of four choices), for the 8kB GSI ***Flash*** BIOS

2) either Secondary or Primary Mode (I/O-Port Start Address: 170 or 1F0 & Interrupt: 15 or 14).

Confirm the **actual** current GSI BIOS address (**hhhh**) by reading it from the GSI BIOS Banner, on-screen at boot time (**see Appendix B.2 for the GSI banner example**).

Changing the GSI BIOS address will usually have no effect **unless** another controller board (e.g. SCSI or sound card) is using the same memory address and conflicting with the Model 18's BIOS. In some cases VGA cards cause conflicts. In such cases, trying the **E000** GSI BIOS address may escape this conflict.

Choice of Secondary or Primary Mode will probably have no effect unless there is another drive controller (with BIOS) in your system. See Section 1.0 and Appendix H.

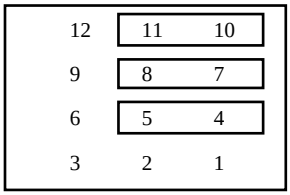
A.2.1 Setting the GSI BIOS Start Address and SEC/PRI-Mode Jumpers (cont.)

To change the Model 18's BIOS address or mode of operation (primary or secondary), simply use the jumpers on Jumper Block J4.

For Model 18 with Part #1533-18-**06**-1 **or later** (for Part #, see the product label on the card):

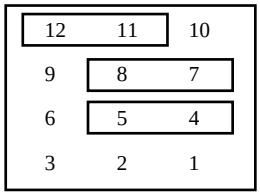
Mode of Operation	**Jumper Pins**	**Selects**
Secondary Mode (Factory Default)	4 and 5	IRQ15, I/O Address 170-177
Primary Mode	5 and 6	IRQ14, I/O Address 1F0-1F7

BIOS ADDRESS
C800-C9FF (**Default**)



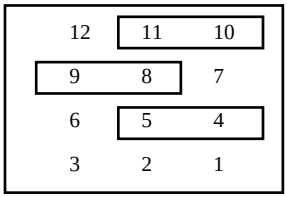
J4

BIOS ADDRESS
CC00-CDFF



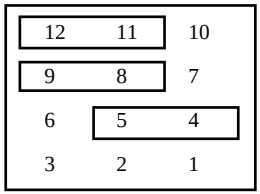
J4

BIOS ADDRESS
D000-D1FF



J4

BIOS ADDRESS
E000-E1FF



J4

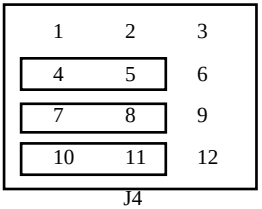
Note: Pins 1, 2, & 3 are **not used**.

A.2.1 Setting the GSI BIOS Start Address and SEC/PRI-Mode Jumpers (cont.)

For Model 18 with Part#'s:1533-18-**04**-7 & 1533-18-**05**-4 (see the product label on the card):

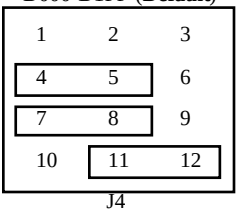
Mode of Operation	**Jumper Pins**	**Selects**
Secondary Mode (Factory Default)	4 and 5	IRQ15, I/O Address 170-177
Primary Mode	5 and 6	IRQ14, I/O Address 1F0-1F7

BIOS ADDRESS
C800-C9FF



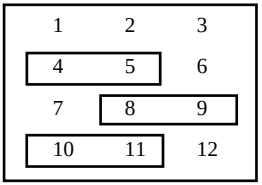
J4

BIOS ADDRESS
D000-D1FF (**Default**)



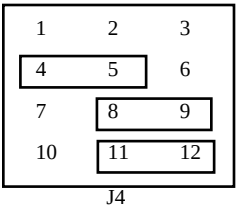
J4

BIOS ADDRESS
D800-D9FF



J4

BIOS ADDRESS
E000-E1FF



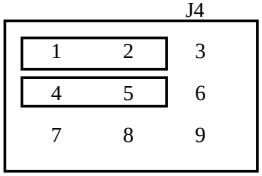
J4

Note: Pins 1, 2, & 3 are **not used**.

For Model 18 with Part #1533-18-**03**-1 or **earlier** (for Part #, see the product label on the card):

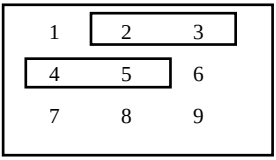
BIOS ADDRESS
C800-C9FF

J4



BIOS ADDRESS
D800-D9FF (**Default**)

J4

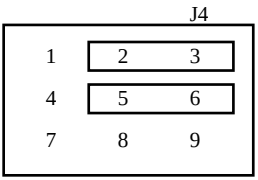


Note: Pins 7, 8, & 9 are **not used**. Early Model 18s (Part #1533-18-**03**-1 or **earlier**) operate in **SEC**ondary Mode **only**.

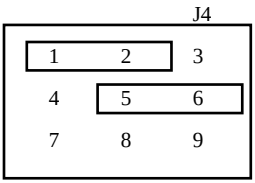
A.2.1 Setting the GSI BIOS Start Address and SEC/PRI-Mode Jumpers (cont.)

For Model 18 with Part #1533-18-**03**-1 or **earlier** (for Part #, see the product label on the card):

BIOS ADDRESS
DC00-DDFF



BIOS ADDRESS
E000-E1FF



Note: Pins 7, 8, & 9 are **not used**. Early Model 18s (Part #1533-18-**03**-1 or **earlier**) operate in **SEC**ondary Mode **only**.

A.2.2 Inserting the Controller; Connecting the LED & Power Wiring

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 18 into the slot, securing it in place with the retaining screw.

Connector **J8** provides an output to light a standard *HD-Active* LED whenever a drive connected to the Model 18 is currently *active* (being accessed). If your chassis offers an HD-Active LED for drives attached to the Model 18 (Drives #1 & #2 if in Primary Mode; Drives #3 & #4 if in Secondary), attach the LED wire-pair connector to J8, with it's **colored** wire going to *either* positive (+) end pin.

Connector **J5** is a 4-pin power connector like the one found on most 3.5" floppy drives. You can use it to supply 12V and 5V power to your hard drive (especially handy for IBM PS/2 Model 30-286 applications).

However, if your power supply has an unused power connector, it is **safer** to connect your drive to that **unused power-supply connector** — because a few hard drives, mostly the older 1.625"-high drives, exceed the 12V/5V power feed limit of the motherboard and/or the GSI Model 18.

Caution! The 12V and 5V loads attached to the Model 18 **J6** power connector **must not exceed**:

5V LIMIT — 2.0 Amps maximum (= 10 Watts)
12V LIMIT — 1.5 Amps maximum (= 18 Watts)

Exceeding *either* maximum, *even for a moment*, may seriously damage motherboard or Model 18.

APPENDIX B — SYSTEM SETUP PROCEDURE

B.1 SYSTEM CMOS SETUP — DRIVE CONFIGURATION DATA

B.1.1 System CMOS Setup — Hard Drives (HDs) and Tape Drives (TDs)

IDE **Tape** and **CD-ROM** Drives should **never** be declared in your System CMOS Setup. IDE **Hard** Drives, *when attached to the Model 18*, should also **no**t be declared in CMOS. (A possible exception exists. In the **rare** case where experimentation has shown that you *must* use the Model 18 in Primary Mode, you *must* declare the Model 18's HDs in CMOS. See Appendix E.6)

B.1.2 Advanced System CMOS Setup — *Shadowing* the GSI BIOS

Selecting BIOS *shadowing* causes the BIOS programming to be copied to RAM memory and executed from the high-speed RAM copy. Shadowing of the GSI BIOS should be **OFF** *during GSI Auto-Install*, but should be **ON** for normal operation. See Section B.3 for more information.

B.2 GSI MODEL 18 FLASH BIOS OPERATION

B.2.1 GSI Boot-Time Banner (Example)

The GSI Banner appears each time the system is booted. When installed using factory default settings, the banner should appear similar to the following (for BIOS versions 3.07 and later):

GSI BANNER EXAMPLE:

```
GSI Model 18 Enhanced-IDE Adapter – BIOS v3.07 at C800-C9FF (c)1992-95 GSI
 GSI Serial# A12345  – in Secondary Mode (IDE Ch2 IRQ15h I/Oaddr 170-77h)

Searching Model 18 (IDE Channel 2) for Hard Drives & IDE-ATAPI Drives –
Found . . .

  MASTER: System HD#2 – 1038MB IDE Hard Drive (= 1083 million bytes)
           "ST31220A"   fw:800500   sn:00DN291458
              ** Using GSI Enhanced-IDE Large-Drive Support **

  SLAVE:  IDE/ATAPI CD-ROM Drive
           "CM207"    fw:1.10   sn:none
```

The above banner example shows two drives attached, one Enhanced-IDE large capacity hard drive and one CD-ROM drive. If only one drive were attached (set as Standalone or Master), the Model 18 would only report the one drive. In the above example, the Model 18 is running in Secondary Mode. There is one hard drive attached to the primary controller (whatever controller that may be); therefore, the first hard drive on the Model 18 is considered the System Hard Drive number 2.

STOP!: It may be wise to note **YOUR SERIAL NUMBER** from your system's boot-time banner for use in registering your GSI product (using the Product Registration Card) and for future GSI BIOS upgrades. Remember to write this number in the **Installation Notes** section of this manual.

B.2.2 ***Auto-Install:*** Automatic Hard Drive Configuration Setup

The Model 18 remembers the *system* drive configuration in ***Flash*** memory. If you install a brand new card, change hard drives, or move a card to a different type of PC, the Model 18 will automatically detect the change and revise its setup (that is, perform *Auto-Install*) to accommodate the new HD and/or motherboard. In addition, the Model 18 extracts the necessary hard drive parameters (#cylinders, #heads, & #sectors) from either:

1) an existing partition — for a HD already prepared for use
2) the HD's response to the IDE Identify Drive interrogation — for an unprepared HD. (See D.1.3)

B.2.3 ***Auto-Prep:*** Automatic Partition & Format Service for **New** Hard Drives

When the Model 18 encounters a hard drive which has not yet been *both* **partitioned and DOS-Formatted**, it announces its partition and DOS-Format finding to the user on-screen. The Model 18 BIOS then *offers to*:

1) create a single **primary** partition of the hard drive's full capacity & DOS-FORMAT it — **if** no partition exists yet. **(If you currently have more than one drive letter for hard drives, carefully read the note below.)**

2) DOS-Format an existing, but not yet formatted, partition — if that is what is found on the HD

Note: In Case #2, **only the first *logical*** HD associated with each physical hard drive will be auto-formatted. Fortunately, for DOS 5.0/6.0 users, there is almost always only one partition per hard drive.

During this **Auto-Prep** sequence, you will be asked whether you are using either:

1) DOS 6.0 or DOS 5.0, **or**

2) some *older* pre-5.0 DOS, most often MS/PCDOS 3.30 (If you answer '**2'**, a *32MB-only* single primary partition — the pre-5.0 DOS maximum — will be created on your Hard Drive.)

Note: Some proprietary DOS versions (e.g., COMPAQ DOS 3.31) supported large, >32MB, partitions *before* MSDOS 5.0 was issued. For such a DOS, or for MSDOS 4.01, answer that you do have DOS 5.0 or later.

B.2.4 When to Refuse GSI **Auto-Prep** & Use DOS' FDISK Instead

For cases where you want an **Extended** Partition, not a single Primary partition, **refuse** the Model 18's offer to prepare the hard drive, and use DOS' **FDISK** utility instead. You might want an Extended Partition, for example, if you have *logical* Drive Letters C:, D:, and E: all assigned to a first *physical* hard drive. If your new hard drive, supported by the Model 18, were to get a *Primary* Partition, DOS would treat the new System HD#2 as *Drive D:* — with the old *D:* and *E:* Extended-Partition references *s l i p p i n g* to *E:* and *F:*. If, instead, System HD#2 were to get an *Extended* Partition, DOS would make HD#2 *Drive F:*.

Note: DOS' FDISK is always available to you for partition creation and deletion. If, for example, you allow the Model 18 BIOS to create a *primary* partition for you — and you later realize that you prefer an *extended* partition (see discussion above), you can use FDISK to customize your partitions.

B.2.5 An Overview of DOS Drive Letter Assignments

DOS itself assigns drive letters (A:, B:, etc.) in the following sequence:

1) Floppy drives *A:* & *B:* — if at least one floppy drive exists

2) All hard drive partitions known to DOS before boot-time CONFIG.SYS file processing

   a) First, all hard drive **primary** partitions (C:, D:, etc., one letter per primary partition)
   b) Then, all *logical drives* (one letter to each) defined within HD **extended** partitions

3) Floppy drives *3:* & *4:*, if known to DOS *before* boot-time CONFIG.SYS file processing (that is, if supported by BIOS rather than by device driver via Config.Sys)

4) Any hard drives, floppy drives, and other drive types (e.g., RAM drives or CD-ROMs) made known to DOS by processing of the CONFIG.SYS file —in the *order of appearance* in CONFIG.SYS

Example —

Note that any drive that is initialized (made known to DOS) via CONFIG.SYS will be assigned a drive letter *later* than those of all drives known before CONFIG.SYS processing. Thus a PC with DOS 5.0/6.0, four floppy drives, two IDE HDs, and a SCSI HD and CD-ROM *might* boot with:

A: & B: = Floppy drives #1 & #2 (selected via INT13 Drive #0 & Drive #1)

C: & D: = IDE hard drives #1 & #2

E: = CD-ROM drive supported via a BIOS on the SCSI controller

F: & G: = Floppy drives #3 & #4 (selected via INT13 Drive #2 & Drive #3)

H: = SCSI hard drive supported via a driver invoked in CONFIG.SYS

Note the possibility that hard drive letters *may not be contiguous* (other drive types may be in between).
See also Section E.1 regarding environments with multiple fixed drives.

Review of *Drives*, *Logical Drives*, & *Partitions* — Relative to DOS Drive Letter Assignment

- Each HD may have a Primary Partition, an Extended Partition, or both (note: DOSs FDISK limits either to 2GB). An extended partition may contain either one logical drive or *multiple* logical drives (drive letters). Logical drives exist **only** within extended partitions.

- Within any drive group above, DOS assigns letters to drives according to the order in which the drives are initialized at boot time.

- For logical drives, DOS assigns letters to ***all*** logical drives in the **first** extended partition found, then to ***all*** logical drives in the **next** extended partition found, and so on.

B.3 SHADOWING OF GSI FLASH BIOS: *ON* FOR NORMAL OPERATION, *OFF* DURING GSI SETUP

Shadowing the GSI BIOS address region is a **must** for performance. Most 386 or 486 System Setups offer *shadowing* of controller card BIOSs like GSI's in their Advanced System Setup options.

Shadowing can also be done using a memory manager software utility. You may shadow the GSI BIOS using **either** of these methods. The primary difference between the two methods is that memory manager software-shadowing allows you to rerun GSI BIOS Setup whenever you want, without needing to go back into your system's CMOS and disabling, then re-enabling, shadowing each time.

To ENABLE shadowing of the GSI BIOS with DOS 6.x's EMM386.EXE memory manager, make sure the following line is in your CONFIG.SYS:

```
device = EMM386.EXE ROM=AddressRange
```

where *AddressRange* is the GSI BIOS's 8kB address range (e.g., C800-C9FF).

Note: If the Model 18 detects a write-to-BIOS problem during **Auto-Install**, it will stop the system at the GSI Bootup Banner with an error message, requesting that you run your System CMOS Setup to turn OFF (*disable*) shadowing in the memory region occupied by the GSI BIOS. After you allow your system to reboot once, turn GSI BIOS shadowing back ON — for hard drive *speed*.

System BIOSs for most 486 and some 386 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 GSI Model 18's **8kB** BIOS. Note your GSI BIOS Start Address as shown in your GSI Bootup Banner and request shadowing, in your Advanced CMOS System Setup, as follows:

GSI-BIOS Address (HEX)	In System Setup Shadowing, Enable: If 16kB Block	If 32kB Block	If 64kB Block
C800-C9FF	C800-CBFF	C800-CFFF	C000-CFFF
CC00-CDFF	CC00-CFFF	CC00-CFFF	CC00-CFFF
D000-D1FF	D000-D3FF	D000-D7FF	D000-DFFF
D800-D9FF	D800-DBFF	D800-DFFF	D000-DFFF
DC00-DDFF	DC00-DFFF	D800-DFFF	D000-DFFF
E000-E1FF	E000-E3FF	E000-E7FF	E000-EFFF

See Section A.2.1 for details of the Model 18's J4 jumper block settings vs. GSI BIOS address.

APPENDIX C — SYSTEM AND SOFTWARE USAGE

C.1 USING MEMORY MANAGER SOFTWARE

If you use memory manager software, such as QEMM, 386MAX, or Netroom, you may experience abnormal hard drive operation. Try **excluding** the memory region of the **GSI BIOS** from the memory manager's optimization process.

E.g., if using QEMM (or 386MAX or Netroom), in your CONFIG.SYS file add the **exclude** option:

```
Device = C:\QEMM\QEMM.SYS  exclude=C800-C9FF
```

(For 386MAX and Netroom, do similarly)

if your Model 18 BIOS is at **C800**. (Confirm your GSI BIOS address from the GSI Bootup Banner.)

Note: Memory managers cause 386, 486, & 586 PCs to run in **Virtual Mode.** This mode of operation can dramatically **s-l-o-w** your PC's HD/FD I/O processes.

GSI BIOS Address (HEX)	In Your *Device=QEMM.SYS...* Statement in Your CONFIG.SYS File, Add the Phrase:
C800-C9FF	**exclude=C800-C9FF**
CC00-CDFF	**exclude=CC00-CDFF**
D000-D1FF	**exclude=D000-D1FF**
D800-D9FF	**exclude=D800-D9FF**
DC00-DDFF	**exclude=DC00-DDFF**
E000-E1FF	**exclude=E000-E1FF**

C.2 DOS AND DOS-BASED APPLICATIONS SOFTWARE

Normal DOS software usage rules apply to systems using the GSI Model 18 card. Considerable effort has been made to ensure compatibility with the most commonly used DOSs. (See Sections B.2.2 and C.1 if using a DOS versions 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 the Model 18.

The Model 18 is fully compatible with most of the popular disk defragmentation software shipping today. As a precaution, check with the *software vendor*'s technical support department to verify compatibility with the hard drive you have chosen. Make sure that the defragmentation software you chose to run is fully compatible with Enhanced IDE or large-capacity IDE hard drives.

C.3 ENHANCED IDE (ATAPI) CD-ROM DEVICE DRIVERS

The GSI Model 18 should be compatible with the new IDE (ATAPI) CD-ROM drives and their device driver software, provided the drive and software were designed to comply with the new ATAPI standard.

C.4 WINDOWS 3.1/3.11, WINDOWS NT AND WINDOWS 95

The Model 18 is compatible with Windows 3.1, Windows for Workgroups 3.11, Windows NT (only with GSI BIOS 3.07 and later) and Windows 95. Properly programmed Windows applications should be expected to work normally when they are controlled by the Model 18. However, normal caution is advised when installing and making first use of any application which writes to disk. As of this printing, GSI has tested early beta versions of Windows 95's and 32-bit mode has worked fine with the GSI Model 18 in primary or secondary mode.

C.4.1 Windows 3.1 32-bit Disk Access Mode (also known as Fastdisk)

In order to run in 32-Bit Disk Access Mode, Windows 3.1 must be dealing with IDE hardware (IDE controller plus IDE Hard Drive) which is 100% compatible with the historic WD1003 IBM/AT hard drive controller. The Model 18 (running in **primary mode**), when used with IDE drives conforming to the ANSI ATA (IDE) standard, **is fully WD-1003 compatible**. The Windows 32-bit disk access driver does not support *secondary controllers.*

C.4.1.1 High-Capacity IDE Hard Drives (Larger than 528MB)

The Microsoft Windows 3.1 32-bit disk access (and Windows for Workgroups 3.11 32-bit disk access) drivers were not written to accommodate large IDE drives. Because of this, most IDE drives larger than 528MB will not work with the 32-bit disk access function. At the time of this printing, Western Digital has an updated driver for *their drives* that will work with the Model 18. Other drive manufacturers may provide similar driver replacements. The Model 18's flash BIOS **does support** the Enhanced Drive Parameter Table (EDPT) used by WD. **Without** an updated driver for your IDE hard drive (from the drive vendor or Microsoft), you can not use the the 32-bit disk access.

C.5 THE MODEL 18 WITH OS/2 WARP, 2.1 & 2.0, UNIX & LINUX

The GSI Model 18 is compatible with OS/2 Warp, OS/2 Versions 2.1 and 2.0 and UNIX operating systems **only if** it carries a GSI Part #1533-18-**nn**-x, where **nn = 04** or **higher**. (Look at the board for the label displaying the GSI Part #.)

For UNIX — that is, your particular version of UNIX — you *may* need to invoke a UNIX-supplied device driver **if** you want to use the Model 18 as a **Secondary**-Address IDE Host Adapter. At the time of this printing a third-party was developing IDE drivers for Linux. If you need those drivers, contact GSI for the name of that provider.

C.6 THE MODEL 18 WITH A NOVELL NETWORK

C.5.1 Model 18 as **Primary**-Address Controller

When using the Model 18 as a **Primary**-Mode IDE Controller, either:

1) declare the HD as CMOS Type 1 & use Novell's built-in AT driver (for drives <528MB) or
2) use the Novell IDE driver (IDE.DSK) with setup parameters, IRQ & I/O address, as shown in Section E.3.

C.5.2 Model 18 as **Secondary**-Address Controller

When using the Model 18 as a **Secondary**-Mode IDE Controller, do the following:

1) Novell 4.0/3.12 — Use the Novell IDE Driver which you received with your Novell kit.
2) Novell 3.11 — Get the IDE Driver from Novell's BBS (not supplied with 3.11 kit)
3) Novell 3.0 — Contact Novell about their network operating system *upgrade* options.

C.5.3 Running Novell's *Compsurf* Installation Utility Program

When running Novell's Compsurf software, do **not** accept the Format Hard Drive option!

APPENDIX D — (E)IDE DRIVE SETUP & OPERATION

D.1 IDE HARD DRIVE (HD) SETUP

IDE hard drives are an evolutionary outgrowth of the older ST506-class MFM and RLL drives. Most of the electronic functions of the MFM & RLL controllers have been miniaturized and incorporated into the IDE drives own circuit board. Today's IDE adapter circuits simply perform the necessary signal buffering to extend motherboard AT-bus signals onto a flexible cable and then on to the hard drive.

Note: A **primary-address** IDE adapter (like the GSI Model 18 in *primary* Mode) plus an IDE HD are an **alternative** to the older MFM or RLL controller plus HD. The two **cannot be used together** in the same system. However, a *secondary*-address IDE card, like the Model 18, in Secondary Mode, **can** be used to add an IDE HD so that it can **co-exist** with an MFM or RLL HD.

D.1.1 IDE Drive Cables

Most IDE drive cables can connect two IDE hard drives (or IDE hard drive plus tape drive), one at the End Position and one at the Center. The IDE (CAM-ATA) Interface Specification specifies a **maximum** cable length of **18"**. GSI ships the Model 18 in two ways (with and without an IDE cable), see Appendix F for product versions.

D.1.2 IDE Master, Slave & Standalone Jumpers

IDE hard drives, IDE (ATAPI) CD-ROM drives *and IDE tape drives* usually have jumpers (shunts) to allow operation in one of three modes: Standalone, Master or Slave. These settings relate only to drive operation on a single controller. It is possible that a situation may arise where you have two controllers, each running only a single drive. In that scenario, both drives would be set in Master or Standalone operation — as they are the only drive on each controller!

Standalone

This mode is for running only one hard drive **on the Model 18**. Many hard drives come factory default in this mode. If your hard drive does not have a Standalone mode, it can be set to Master.

Master

The Master mode can be used for two situations. If you have only one hard drive (or other IDE device) attached to the Model 18, it can be set as Master **or** Standalone. If you are running two drives **on the Model 18**, one should be set as Master and the other as Slave.

Slave

When you are running two IDE drives together, ON THE SAME CONTROLLER, one must be set as Master and the other as Slave. This mode is usually the factory default setting for IDE (ATAPI) CD-ROM drives and IDE tape backup drives.

Note: In setting the Standalone, Master & Slave jumpers for IDE hard drives (and IDE CD-ROM and tape drives), ignore all other drives that are attached to any other controller (even IDE) in the system. These settings relate to drives that SHARE THE SAME CABLE.

Some IDE drives *may* not work as master (or slave) with drives from other makers — sometimes even with other drive models from the *same* maker! Consult drive makers about such problems.

D.1.3 Achieving Proper Use of Your *Entire* IDE Hard Drive

For any IDE hard drive which you are installing on a Model 18, two cases should be distinguished:

1) Partition exists (maybe more than one)
2) No partition exists

D.1.3.1 Partition Exists

If your hard drive has a **valid partition** (has already been prepared for use), the Model 18 will **analyze** this existing partition and **will support it**, by setting up proper parameters for the drive.

If you were only able to use part of the drive's capactity before using the Model 18 and would like to now use the full capacity, you must back up your data, delete the existing partitions and reboot. This will enable the Model 18's Auto-Prep utility that will allow the full capacity to be used.

D.1.3.2 No Partition Exists

If your hard drive is **not yet prepared** with a partition, the Model 18 will use the hard drive's IDE Identify Drive response information to read the hard drive's parameters. In so doing, the Model 18 should be making use of 100% of the hard drive's capacity — **if** the hard drive's on-board firmware issues a *correct* Identify Drive report. Where the hard drive lies about its parameters (and a few hard drives **do**), a workaround procedure is necessary. (See D.1.4.)

Note 1: If you want to **abandon** existing partitions on your hard drive, use DOS' **FDISK** to delete them.

Note 2: If the Model 18 is running in PRIMARY MODE and your choice of HD Type, in System Setup, declares a drive capacity that *exceeds* the actual HD capacity, the HD will usually declare an error — reported as 'HD *controller* failure" — when the System BIOS first tries to initialize it — *before* the GSI BIOS is even made active.

D.1.4 Incorrect Parameters Reported to GSI Model 18

Unfortunately, an occasional IDE hard drive will report *incorrect* #Cylinders, #Heads, & #Sectors translation parameters. This drive is not operating as a proper IDE hard drive, conforming to the industry-standard IDE specification (ANSI X3T9.3). That is, it is a faulty hard drive. Fortunately, most reported cases have been on 20, 40, or 80MB HDs, although a few cases involved recent production large hard drives. Check with the drive manufacturer's Tech Support Department, as they may have a hard drive firmware update to correct this problem.

Remember that if your hard drive already has a **valid partition** on it, the Model 18 installs the drive with parameters matching those of the partition, to ensure that you can read any files which already exist. (See D.1.3.1) Even if your drive reports *incorrect* #Cylinders, #Heads, & #Sectors parameters (due to drive manufacturer's faulty firmware), you should not experience any difficulties because of this.

If, however, your hard drive does **not** have a valid partition, you *may not* be able to get your drive installed successfully with the Model 18 — ***if*** it reports incorrect parameters.

There are two different cases to discuss:

Case 1: The unprepared HD reports a capacity *less than its actual capacity*.
In this case, the HD will usually appear to work okay but its working capacity will be only as large as the capacity it reported to the Model 18 in its Identify Drive report.

D.1.4 Incorrect Parameters Reported to GSI Model 18 (cont.)

Case 2: The unprepared HD does not even accept the very parameters which it reported! A few HDs report parameters which they **cannot even accept** when these identical parameters are sent right back to them by the Model 18 as part of HD initialization! In this case, the Model 18 receives an error status from the HD. The Model 18, in turn, will report *'Drive 0 Error'* on-screen, just below the GSI Bootup Banner. The incorrect #Cylinders, #Heads, & #Sectors parameters being reported by the hard drive usually fall into one of the following categories:

1) indicating a hard drive capacity which *exceeds* the drive's *actual* capacity

2) unacceptable to the HD because it does not offer industry-standard *universal translation* capability (that is, the ability to accept *any* legal CYLs/HDs/SECs combination, as long as the indicated capacity does not exceed the actual capacity) — common on 20MB or 40MB IDE hard drives

3) all zeroes (0/0/0), reporting a drive with no storage capacity at all! (seen on a *few* 80MB hard drives)

Workaround: If you have access to a basic IDE controller and a system whose System BIOS provides a user-definable HD Type (like AMI's Type 47), use them and DOS' FDISK to create a partition with capacity and shape (#CYLs, #HDs, #SECs) as recommended by the hard drive maker. Once you have created this partition, the Model 18 will probably work fine with such a faulty drive.

D.2 MODEL 18 IDENTIFY DRIVE SUPPORT

D.2.1 Native Mode

The Model 18 BIOS uses the IDE Identify Drive command to *Auto-Sense* (E)IDE drives. This allows the Model 18 to *Auto-Install* virtually any IDE hard drive which has already been in use with DOS and has **DOS-standard** partitions (like those created using DOS' FDISK utitlity). This ability is useful for when there is no User Definable Drive Type option (like AMI Type 47), when the drive parameters are unknown or for installing high-capacity IDE drives that exceed the system BIOS' capability.

The Model 18 uses the *recommended* mode for operating your hard drive(s). This is the drive's *Native Mode* (or default Translation Mode) because it usually gives maximum performance and storage capacity. The ANSI Standard for IDE HDs provides an optional-to-manufacturer (and usually implemented) Identify Drive Command, which allows GSI Intelligent controllers to interrogate the drive as to the Hds, Cyls., and Sect. counts (as well as other technical parameters). The Model 18 uses this feature to provide Native Mode operation for a new HD which has *not yet been prepared* for use.

Some older IDE drives (particularly 20MB and 40MB drives) do **not** conform to this standard. See D.1.4 for more information.

D.3 GSI ENHANCED-IDE LARGE-DRIVE SUPPORT

New Enhanced IDE drives that are larger than 528MB are supported by the Model 18. When the GSI Model 18 is connected to such a drive, it *automatically* uses a special setup strategy to handle this problem effortlessly for the installer.

The GSI Model 18 provides BIOS-level support for IDE hard drives, up to **8GB's** in capacity! The large hard drive can be treated as one drive volume and will be reported to DOS as having up to 8GB capacity. No device drivers are needed! It is transparent to the user that there is anything unusual about the GigaByte-plus hard drive. You can also use DOS's FDISK to configure various partitions.

CAUTION!: Do not use the GSI Model 18 in conjunction with any special disk partitioning software like **OnTrack's Disk Manager**. This software is **not** needed when using a GSI controller. Removing a disk partition software package, like Disk Manager, can be difficult. Contact the manufacturer of the software to find out how to completely remove the partitioning software **before** using the hard drive with a GSI controller!

D.4 INTEGRATING IDE (ATAPI) CD-ROM AND TAPE DRIVES

An IDE (ATAPI) CD-ROM and/or tape backup drive can be operated on the Model 18 in either Slave Mode (where there is also a hard drive in *Master Mode* on the Model 18) or in Standalone Mode (where there is no other IDE drive on the Model 18).

In either case, the IDE (ATAPI) CD-ROM or tape drive should **not** be declared in the System CMOS Setup procedure. Both the Mountain and the Summit IDE (non-ATAPI, but compatible) tape drives are shipped set up for Slave Mode but they also provide jumpers which allow setup for Standalone Mode. Follow the drive manufacturer's installation and user manual information.

D.5 SYQUEST EXCHANGEABLE-CARTRIDGE IDE HARD DRIVES

GSI Model 18 BIOS **v2.14** introduced special exchangeable-cartridge support for the SyQuest 3.5" exchangeable-cartridge IDE drives. The Syquest exchangeable-media drive should be connected to the Model 18 just the same as any other IDE hard drive would.

SyQuest provides a SQATDRVR.SYS driver which enables DOS to cope with cartridge exchanges. Two variations of the driver have been issued by SyQuest. The GSI BIOS cooperates with this SyQuest-supplied driver SQATDRVR.SYS. To allow DOS to cope with cartridge exchanging, include the following line in your CONFIG.SYS file, depending on the SyQuest driver version:

For older versions of SQATDRV.SYS (version 1.21 and earlier):

```
device = path\SQATDRVR.SYS /I
```

For newer versions of SQATDRV.SYS (version 1.63 aor later):

```
device = path\SQATDRVR.SYS
```

where *path* reflects where you stored SQATDRVR.SYS — for example, *C:\SYQUEST*.

APPENDIX E — OTHER SYSTEM INTEGRATION TOPICS

E.1 CONTROL OF MULTIPLE HARD DRIVES

If you have an **AT-compatible** hard drive controller in your system (Model 18 as Primary, or any other), the first drive attached to it will be the system's boot hard drive, virtually always *Drive C:*.

If you do **not** have such a controller and drive, the situation can be more complex to analyze.

E.1.1 Secondary Mode: Co-Existing with AT-Compatible Primary Controller

As discussed in the preceding topic, if an AT-compatible controller and drive exist in a system, the first hard drive on the AT-compatible controller (that is, the first hard drive declared in CMOS) will be treated by DOS as Drive C:. The hard drive(s) on the Model 18 as Secondary will be assigned drive letters higher than those assigned to the drive(s) attached to the AT-compatible controller.

E.1.2 Secondary Mode: No Other Hard Drive Controller

If the Model 18, jumpered for Secondary Mode, is your *only* hard drive controller, the Standalone IDE Drive (or Master of a Master/Slave pair) attached to it will be *Drive C:*.

E.1.3 Secondary Mode: Co-Existing with **Non**-AT-Compatible Controllers

When the Model 18 as Secondary co-exists with another ***non****-conforming* (read '**not** AT-compatible') hard drive controller, *Drive C:* letter assignment (that is, drive bootability) is best checked by *experiment*. There are some general guidelines to consider. If, for example, SCSI drives are also in the system, their controller may use its own BIOS or rely solely on device drivers. If the SCSI controller's **total** drive-initialization support comes from an **installable device driver** (via a '*DEVICE= xxxxxxxx.sys*' statement in the CONFIG.SYS file), you can be sure that a drive attached to it will **not** be Drive C:. If, on the other hand, its initialization support comes from a controller **BIOS**, the SCSI hard drive *may* be assigned *C:* by DOS. Such drive letter assignment depends upon the order in which the various system hard drives become known to DOS.

Experimentation *may* show that reversing the BIOS address order for the SCSI controller and the Model 18 also reverses the hard drive letters assigned. (See Section A.2 regarding the Model 18 BIOS address options.) Whether or not BIOS-address order affects drive letter assignment depends on subtleties of drive initialization procedures which are beyond the scope of this manual.

E.1.4 Special Case: SCSI Controllers Which Try to Offer a Bootability Option

Some hard drive controllers exist which have been engineered to offer a Boot Drive option to the user. A case in point is the Quantum Passport XL SCSI **removable** hard drive. The GSI Model 18 has been engineered to be compatible with the Standard (**Non**-Boot) Mode of such controllers. Whether or not you can use such controllers in their Boot Mode (along with any other GSI or non-GSI hard drive controller), depends essentially on non-standard implementation techniques used in such SCSI products. For help with such problems, contact the SCSI controller's manufacturer.

E.2 MODEL 18 CO-EXISTS WITH A SCSI OR ESDI CONTROLLER

The Model 18 has been designed to be able to co-exist with **SCSI** or **ESDI** controllers. Unfortunately, many SCSI and ESDI controller BIOSs are *ill behaved*. They have been written on the assumption that there would **never** be any **other drive controller** with a **BIOS** co-residing in the system with them. If you do **not** see a GSI Banner at boot time, and **if** you have situated the GSI BIOS at a *lower address* than the SCSI/ESDI BIOS, try putting the **GSI BIOS** at a **higher address** — or vice versa. (See A.3.1)

Note: Some SCSI controllers expect the user to have set up an installable device driver (via a 'device=...' statement in CONFIG.SYS) whenever they see that *at least two* other HDs are already known to the system. *Removable* SCSI Hard Drives, like the QUANTUM PASSPORT XL, can co-exist with a Model 18 (GSI BIOS v2.14 or later) — but you *may* not have flexibility as to which drive is the system's Boot Drive, *C:*.

E.3 MODEL 18 CO-EXISTING WITH AN RLL CONTROLLER

The Model 18 has been designed to be able to co-exist with RLL (Run Length Limited) hard drive controllers. Unfortunately, many of the RLL controllers are ill behaved. Specifically, they have control logic such that they will not allow any other drive controller with a BIOS to co-exist. GSI has taken the trouble to incorporate the necessary run-time functional support for RLL drive(s) so that the RLL controller's BIOS can be *deactivated.* This RLL support is provided *transparently*, without any user intervention necessary, after initially deactivating the RLL BIOS (see below).

RLL controllers usually were designed such that a jumper was available to allow deactivation of the on-board RLL BIOS. If you have such a jumper available, set it to the *BIOS-Inactive* position. If not, you can usually remove the BIOS chip from its socket (Very few RLL BIOS chips were soldered onto the RLL card; most used a socket). Remove the BIOS chip, **being careful to retain** it, in case you want to re-install it to use the RLL BIOS utilities, such as low-level formatting.

The two steps necessary to prepare the RLL hard drive controller to coexist with the Model 18 are:

1) Deactivate the RLL controller's BIOS, either by jumper or chip-pull (see previous paragraph)
2) Declare the RLL HD(s) as *Type 1* in the System CMOS Setup.

Caution! Back up your RLL Hard Drive contents to tape or floppy *first — before* undertaking integration of a Model 18 with a system already containing one or more RLL Hard Drives and RLL controller.

E.4 EISA-BUS MOTHERBOARD INTEGRATION

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 E.3. Therefore, try interchanging slot positions of the Model 18 and other cards with BIOS.

E.5 MODEL 18 I/O-ADDRESS, INTERRUPT, AND DMA USAGE

I/O Port Addresses, Interrupt (IRQ), and DMA Channel used by the GSI Model 18 vary with its Secondary/Primary-Address Mode setting (J4 Pins 4, 5, & 6) and are as follows:

I/O-Address Mode	I/O Addresses Used	IRQ	DMA	J4 Pins
Secondary	170-177 (& 376-7)	15	none	4-5
Primary	1F0-1F7 (& 3F6-7)	14	none	5-6

These are standard usages for PCs and should pose no incompatibility issues.

E.6 WHEN TO USE THE MODEL 18 IN PRIMARY-ADDRESS MODE

Some PCs made by IBM and Mitsubishi have been reported to *hang* while attempting to boot from a Model 18 operating in Secondary Mode. For *those* PCs, rejumpering the Model 18 to Primary-Address Mode cured this problem. Declare your Model 18 hard drive(s) in **System CMOS**, with each drive attached designated as Drive '`Type 1`' (which is usually a 10MB hard drive). If your system's drive Type 1 is **not a 10MB hard drive**, use the user-definable (usually Type 47) and input '306' for cylinders, '4' for heads and '17' for sectors (these are the usual Type 1 parameters). If your system has no Type 47, try Type 23 which should have the above parameters.

APPENDIX F — VESA LOCAL BUS OPTION

F.1 VESA LOCAL BUS EXTENDER MODULE(S)

The GSI Model 18 Enhanced IDE controller can be upgraded to support the VESA local bus. GSI has two VESA Extender Modules available to convert the GSI ISA Enhanced IDE controllers. One VESA Extender (GSI Part #: 1645-V1-xx-x) supports only a single IDE channel (or two drives). The other VESA Extender (GSI Part #: 1645-V2-xx-x) supports two channels (or four drives) — provided your system has two channels. The two channel VESA Extender cannot add a second channel to the GSI Model 18, your system must have two GSI ISA channels already (i.e. a GSI Model 21 in primary mode and the GSI Model 18 in secondary mode).

Both old and new GSI Model 18's can be upgraded with the VESA Extender Module. Model 18's with GSI Part #1533-18-06-1 or later have a Local Bus I/O Option header. Older versions of the Model 18 (with Part #1533-18-05-4 and earlier) do not have this header, but can be upgraded using a special Local Bus I/O Option adapter-interface that comes with the VESA Modules.

F.2 VESA EXTENDER MODULE FEATURES

The GSI 1645-V1 and 1645-V2 VESA Extender Modules eliminate the ISA-bus performance limitation by providing full PIO Mode 3 and PIO Mode 4 data transfers. The GSI VESA Modules simply extend any GSI ISA Accelerator board to the VESA local bus. Using the VESA local bus with new Enhanced IDE and Fast ATA (or Fast ATA-2) hard drives, the GSI VESA Modules can allow these drives to achieve their maximum data transfer rates. Using an advanced engineering process the GSI VESA Modules have the unique ability to Mix & Match various Modes of drives without performance loss! GSI VESA Modules can run Mode 4 drives on the same cable as Mode 1 drives while maximizing the performance of each!

GSI 1645-V1 VESA Extender Module Features:

- 32-bit VESA Compliant with new Enhanced IDE and Fast ATA(2) standards
- Provides full PIO **Mode 3** (11.1MB/s) & **Mode 4** (16.6MB/s) performance with I/O Channel Ready
- Simply extends any GSI ISA Accelerator Board to the VESA local bus
- Supports DMA Multiword Modes 1 & 2
- Will operate at speeds up to 50MHz
- **Mix & Match** older Mode 0, 1 or 2 drives with new Mode 3 or 4 drives on the same cable — with no performance loss!
- Onboard Flash BIOS provides quick, easy installation, but takes NO memory addressing!
- **No device drivers required** for any operating system or software (totally transparent to the operating system!)
- Compatible with DOS, Windows 3.x, Windows for Workgroups, NT, OS/2 and Novell
- Designed, manufactured & tested in the U.S.A.

GSI 1645-V2 VESA Extender Module Features:

- Same high performance and easy installation features as 1645-V1 VESA Module
- Supports four (4) IDE drives on two (2) IDE channels

For more information on the GSI VESA Extender Modules, contact GSI at (714) 261-7949.

APPENDIX G — MODEL 18 PRODUCT SPECIFICATION

G.1 PRODUCT VERSIONS — BULK & VAR-PACK

The GSI Model 18 Enhanced IDE Adapter is distributed in two ways:

1) in *bulk* (board and manual only) — GSI Part # 1533-18-xx-x, where *xx-x* is the Model 18 revision number, and
2) in *VAR packs* (board, manual, & GSI IDE 2-drive cable packaged up in a retail GSI box) — GSI Part # 1533-18-**V**x-x

G.2 PRODUCT SPECIFICATIONS

Model 18 Board Dimensions: 2.80" x 5.96"

Bus Slot Requirements:
16-bit ISA-compatible — conforming to IEEE-P996-ISA specification

Power Consumption:
4 watts (board itself, without J5 drive-power load considered)

IDE Drive Compatibility:
Supports any IDE drive which conforms to ANSI X3T9.3 ATA (IDE) specifications

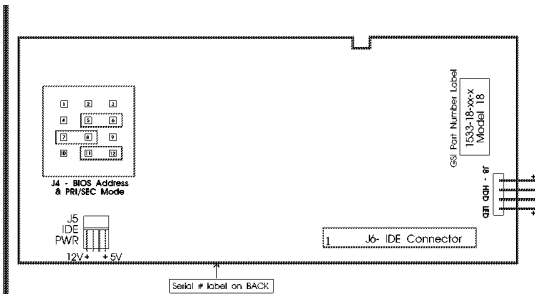
Western Digital (WD) Enhanced IDE Guidelines:
Supports Enhanced Drive Parameter Table (EDPT) to handle drives of up to 8.4GB capacity

Drive Ribbon-Cable Connector:
standard 40-pin (2x20) IDE connector, 3M 3417-7000 or equivalent

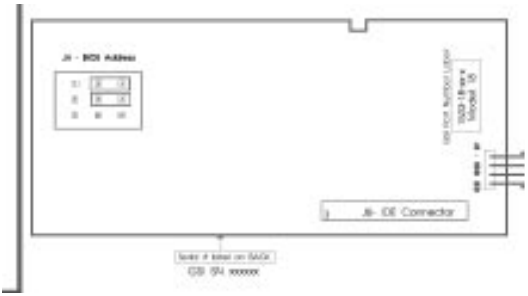
For Interrupt, DMA, and I/O-Address usage, see Section E.5.

G.3 BOARD LAYOUTS FOR OLDER MODEL 18 BOARDS

Model 18 boards with GSI Part #1533-18-**04**-7 to GSI Part #1533-18-**05**-4 have the following layout:



Model 18 boards with GSI Part #1533-18-**03**-1 and earlier have the following layout:



APPENDIX H – BASIC TROUBLESHOOTING — SYMPTOMS AND CURES

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.

H.1 GSI Banner is Not Seen On-Screen During Bootup:

- Is there a *2nd* controller BIOS at the same address as the GSI BIOS? **A.2.1**
- System BIOS, if non-AMI, *may* not find GSI BIOS if set at **E000** address. **A.2.1**
- Badly behaved VGA card in **16-bit** BIOS mode? (Try it in an ***8****-bit slot* — or wrap paper around its 16-bit connector edge & re-insert in 16-bit slot.) **A.2.1**
- Badly behaved **SCSI**/ESDI adapter with BIOS at *higher/lower* address than GSI BIOS? Re-jumper to put GSI BIOS at *lower/higher* address. **E.2-*V***
- 2nd card with BIOS in C000-DFFF area, or with same IRQ, or I/O address. (LAN, multimedia, scanner, etc)? Remove it to pinpoint where the conflict is. **E & A.2**
- *'BIOS found — bad checksum'* bootup message. Request a GSI BIOS-Update diskette from GSI's Tech Support Dept. (It re-writes Model 18 ***Flash*** BIOS.)

H.2 '*HD Controller Error*' Message after System Memory Test — *PRI Mode*

- Ribbon cable or power cable improperly attached to HD / GSI-18? **2.1**
- Ribbon-cable Pin 1 orientation wrong at HD or GSI-18? Reverse it. **A.2.2**
- User-selected CMOS HD Type *exceeds* the HD's *actual* capacity? **D.1.4**
- Check HD's Standalone/Master/Slave *jumpers* vs. HD-maker's tech info. **D.1**
- HD balking at HD/CYL/SEC values it just reported as default? **D.1.4-G**
- HD may need more time before first command. Enable 'Floppy Seek at Boot' and 'Test Memory beyond 1MB' options, if available, in System CMOS Setup.
- Only on very fast PC, SYS-BIOS reports 'HD-Controller Failure'. (HD issued false *HD-Ready* to SYS-BIOS.) Call HD Tech Support: Is HD firmware latest?
- ***SEC/PRI: IDE Tape*** or ***CD-ROM*** Drive is declared in CMOS & *should not be*. **B.1**
- ***SEC Mode:* HD** on Model 18 is declared in CMOS & *should not be*. **B.1**

Note: The HDD Controller Failure message can appear if there is a timing problem involved in a Master/Slave drive relationship. Try running one of the drives as a Standalone (disconnecting the other drive) to ascertain if that is indeed the problem. If it is, contact the HD manufacturer for possible drive firmware correction.

H.3 Hard Drive(s) Are Not Found by GSI Model 18

- Check that Standalone/Master/Slave jumpers *on the HD* are correct. **D.1.2**
- Check HD's Standalone/Master/Slave *jumpers* vs. maker's tech info. **D.1**
- Did you forget to connect power cable or ribbon cable to HD? **2.1**

H.4 System Will Not Boot to a *C:* Hard Drive Which is on the Model 18

- Partition not *Active* or w/o .SYS files. Fix with DOS' FDISK or FORMAT. **D.1.3**
- HD's Master Boot Record may be corrupt. Try *FDISK /mbr* to fix it. **D.1.3**

H.5 HD Read/Write Operations Appear to be Faulty

- Garbled data in GSI-Banner HD description (rare! — Faulty HD-I/O). **-G**
- Excessive IDE cable length (>18" IDE-spec. max.)? Try a shorter cable. **D.1.1**

H.6 HD Capacity Seems to be Wrong, After Preparation with Model 18

- Capacity<normal: HD is reporting wrong HDs/CYLs/SECs. Temporary Fix: Use another controller to prepare proper partition. Perm.: HD-firmware update. **-G**
- If Model 18 is in Primary Mode, make sure to set system CMOS as Drive `Type 1`, which is 10MB hard drive, but tells system CMOS that GSI controller is handling the drive capacity. If your system CMOS Type 1 is not 10MB, see E.6

H.7 IDE Hard Drive Performance Not Increased

- Does your IDE hard drive support read/write multiple? Ask HD manufacturer.
- Are you shadowing the GSI BIOS? **B.3**
- Did you remember to exclude the GSI BIOS Address range with your memory manager? **C.1**

H.8 'Configuration Not Set' Message Appears

- Are you trying to use a special software partitioning package like Disk Manager with the Model 18? If you are transferring a drive from an older controller (and it was partitioned using a Disk Manager-type of software) you must first back up the data and delete those partitions BEFORE using the drive with the Model 18.
- Did you remember to turn OFF shadowing of GSI BIOS while making changes?
- If you changed partitions using FDISK, did you remember to rerun the GSI BIOS-setup to allow the Model 18 to adapt to the change?
- Did you remember to exclude the GSI BIOS Address range with your memory manager? **C.1**

-V = Check with GSI that you have the latest GSI BIOS version for your Model 18 card.
-G = Ask vendor's Tech Support Dept. or contact GSI's Tech Support Dept.

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 18 Part #: 1533-18-___-__ GSI Model 18 Serial #: _____

GSI Model 18 BIOS Version : _____

GSI BIOS Address Used: _____

OTHER INFORMATION

System Information:_____

Disk Drive Information: _____

Other Cards in System: _____

GSI manufactures other disk & I/O products including:

The **GSI Model 12** -- An 8-bit high-speed floppy-tape accelerator adapter capable of supporting data transfer rates up to 2Mb per second. Perfect accelerator for QIC-3010 and QIC-3020 tape backup drives or for adding more floppy drives to any system.

The **GSI Model 2C** -- New Dual-Channel EIDE Accelerator Adapter. Directly supports up to four EIDE drives. Onboard Flash BIOS eliminates need for drivers or CMOS support and upgrades existing IDE to EIDE. Capable of supporting up to eight EIDE drives.

The **GSI Model 21** -- Enhanced IDE, Floppy & Tape Accelerator Adapter for ISA Systems. **Increases IDE throughput up to 80%**. Supports two IDE, four floppy (including 2.88MB) and one floppy-tape drive. **Doubles the speed of QIC-80 tape backup units**.

The **GSI Model 32** -- EIDE, Floppy, Tape & I/O Accelerator Adapter for ISA Systems. This has all of the GSI Model 21 features, plus two 16550-UART high speed serial ports and one bi-directional parallel port!

The **GSI Model 4C** -- The GSI Model 4C Disk Accelerator Adapter supports EIGHT IDE hard drives on FOUR separate channels. Perfect for Novell duplexing or mirroring!

GSI
Post Office Box 17118
Irvine, CA 92623-7118
(714) 261-7949
(714) 261-9744 Tech Support
(714) 757-1778 Fax

yes NetWare Tested and Approved

ENHANCED IDE

All GSI products are designed, manufactured and tested in the U.S.A.

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