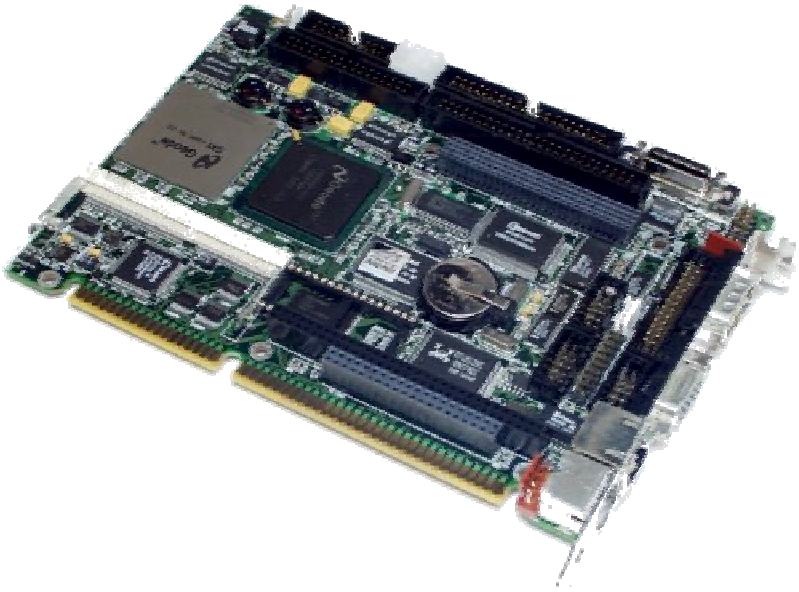
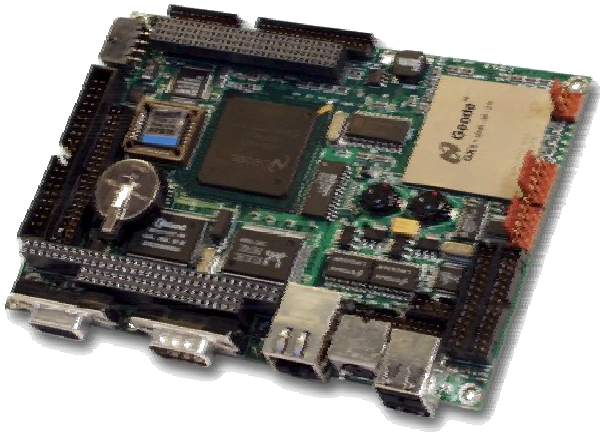
GX1LCD
User's Software Manual





Ver. 1.2 – 17. May. 2002.

INSIDE TECHNOLOGY

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Document revision history.

Revision	Date	By	Comment
1.0	15. July.2001	PJA	Initial release.
1.1	9. Nov 2001	PJA	Production update.
1.2	17. May 2002	JSN	Manual update

Table of contents

1. Introduction

This manual describes the software configuration of the GX1LCD/S and GX1LCD/3.5" boards made by INSIDE Technology A/S. These boards will also be denoted GX1LCD or GX1 family if no differentiation is required.

These boards are based on the Geode GX1 processor with MMX enhancement from National ®. This processor is abbreviated GX1 in this manual.

Use of this manual implies a basic knowledge of PC-AT hard- and software. This manual is focused on describing the GX1LCD Board's special features and is not intended to be a standard PC-AT textbook.

The software manual consist of four main sections:

- BIOS configuration. Which describes the configuration of the basic operation environment of the board. Examples of such configurations are Harddisk identification, Peripheral port configuration and additional features provided by Inside Technology A/S.
- User Utility section describing the use of the Software Watchdog function and Windows Advanced Programming Interface (API).
- Driver installation for Windows 98, NT 4.0, and Win2000.
- Inside Technology GX1LCD Windows CE3.0 and CE.net Board Support Package.

For a hardware description of the board (e.g. connector layout and signal definition), refer to the hardware manual.

2. BIOS configuration

This section describes the BIOS configuration in the GXm board family.
The BIOS is based on Phoenix PicoBIOS 4.0 Release 6.0 extended with additional configuration items in order to support the extra features provided on this board.
The setup is divided in a hierarchy based on menu selections. This organisation provides a good overview of the configurable options of the board.
For each setup screen a configuration table showing possible settings is shown. Settings shown in **Bold** font is the default setting.

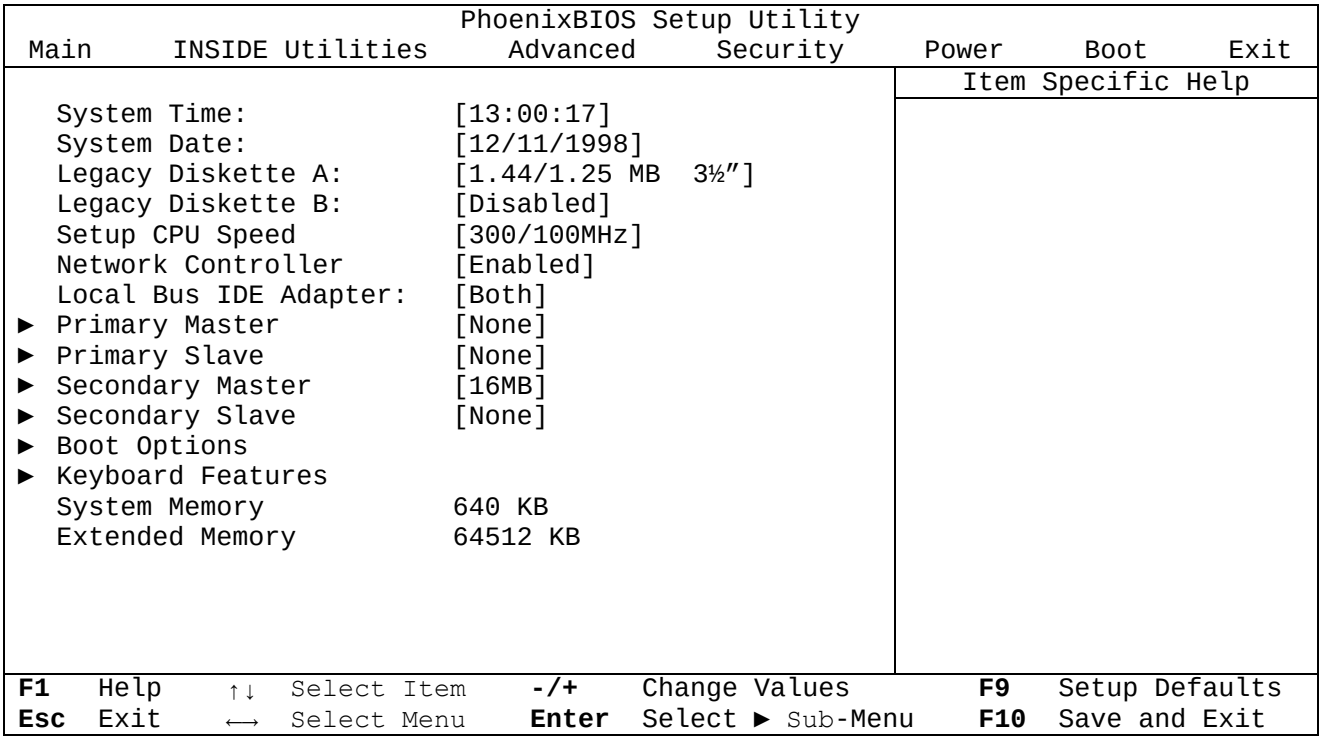
2.1 Entry to the BIOS setup

The BIOS setup may be entered in two ways:

- On user request by pressing <F2> during or after the memory check
- In case of incorrect configuration values. The user may in this case continue by pressing <F1> or enter the setup by pressing <F2>.

The configuration is described in the following sections in a structure reflecting the hierarchy in the menus/screens.

2.2 Configuration screen overview



The Menu Bar

The Menu Bar at the top of the window lists these selections :

Main	Use this menu for basic system configuration.
Inside Utilities	Use this menu for configuration of special features implemented by Inside.
Advanced	Use this menu to set the Advanced Features available on your system's chipset.
Security	Use this menu to set User and Supervisor Passwords and the Backup and Virus- Check reminders.
Power	Use this menu to configure Power-Management Features.
Boot	Use this menu to set the Boot sequence.
Exit	Exits the current menu.

Use the left / right < ← > / < → > arrow keys to make a selection.
See the section below, *"Exiting Setup"* for a description on exiting the Main Menu.

The Legend Bar

Use the keys listed in the legend bar on the bottom to make your selections or exit the current menu.
The chart on the following page describes the legend keys and their alternates :

Key	**Function**
<F1> or <Alt- H>	General Help window (See below).
<Esc>	Exit this menu.
< ← > or < → > arrow keys	Select a different menu.
< ↑ > or < ↓ > arrow keys	Move cursor up and down.
<Tab> or <Shift- Tab>	Cycle cursor up and down.
<Home> or <End>	Move cursor to top or bottom of window.
<PgUp> or <PgDn>	Move cursor to next or previous page.
<F5> or <->	Select the Previous Value for the field.
<F6> or <+> or <Space>	Select the Next Value for the field.
<F9>	Load the Default Configuration values for this menu.
<F10>	Load the Previous Configuration values for this menu.
<Enter>	Execute Command or Select Submenu.
<Alt-R>	Refresh screen.

To select an item, use the arrow keys to move the cursor to the field you want. Then use the plus- and- minus value keys to select a value for that field.
The Save Values command in the Exit Menu saves the values currently displayed in all the menus.
To display a sub menu, use the arrow keys to move the cursor to the sub menu you want. Then press <**Enter**>.
A pointer "►" marks all sub menus.

The Field Help Window

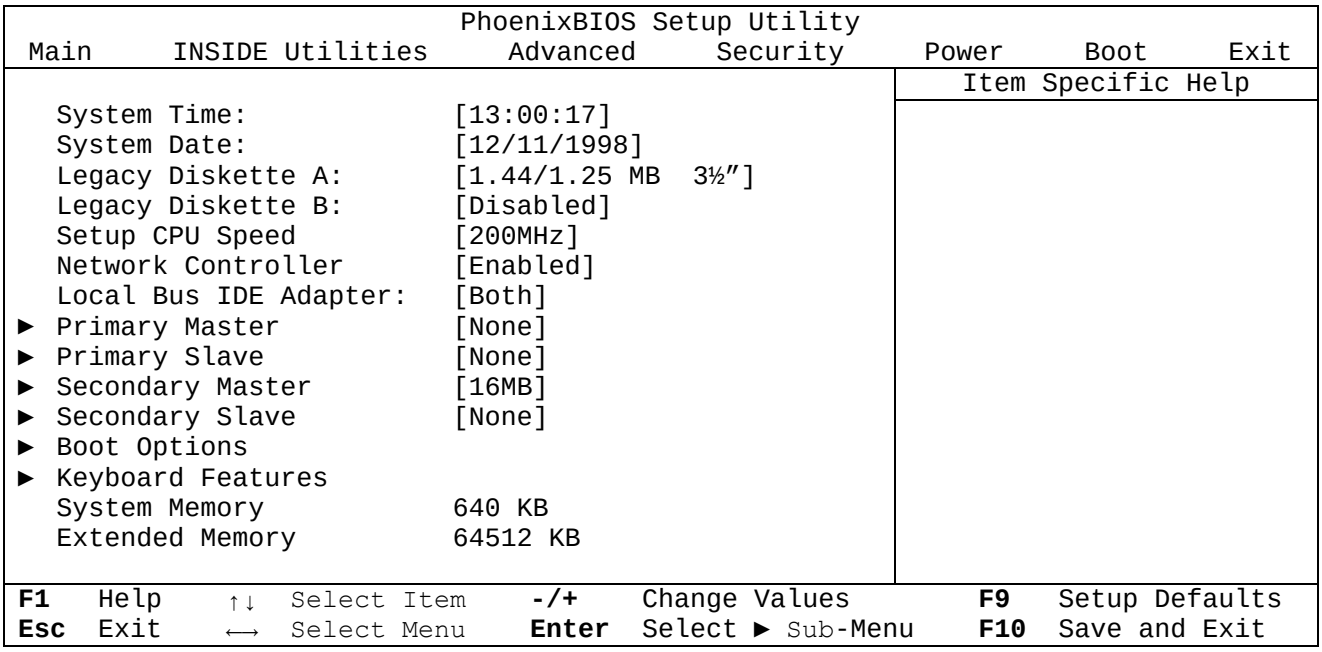
The help window on the right side of each menu displays the help text for the currently selected field. It updates as you move the cursor to each field.

The General Help Window

Pressing **<F1>** or **<Alt- H>** on any menu brings up the General Help window that describes the legend keys and their alternates:

The scroll bar on the right of any window indicates that there is more than one page of information in the window. Use **<PgUp>** and **<PgDn>** to display all the pages. Pressing **<Home>** and **<End>** displays the first and last page. Pressing **<Enter>** displays each page and then exits the window. Press **<Esc>** to exit the current window.

2.3 Main section



Main Menu Selections

You can make the following selections on the Main Menu itself.
Use the sub menus for other selections.

Feature	Options	Description
System Time	HH:MM:SS	Set the system time.
System Date	MM/DD/YYYY	Set the system date.
Legacy Diskette A: Legacy Diskette B:	Disabled 360 kB, 5 ¼" 1.2 MB, 5 ¼" 720 kB, 3 ½" **1.44/ 1.25 MB, 3 ½"** 2.88 MB, 3 ½"	Select the type of floppy- disk drive installed in your system. 1.25 MB is a Japanese media format that requires a 3½" 3-Mode Diskette drive.
Setup the CPU Speed	**133/67MHz (Low Power)**, 200/67MHz, 300/86MHz* 300/100MHz*	Select the CPU operating frequency. The maximum CPU operating frequency is printed on the label on the board. The Frequency shown after the "/" is the SDRAM speed. **When using 300/100MHz setting PC133 SDRAM must be used.** *Only available on Plus boards.
Network Controller	**Enabled** Disabled With RPL/PXE boot	Enables, Disables the onboard network controller. RPL/PXE boot selection allows net-boot with either protocol.
Local Bus IDE Adapter	Disabled, Primary, Secondary, **Both**.	Enables the integrated local bus IDE adapter.

Primary Master, Primary Slave, Secondary Master, Secondary Slave	Sub-menu	Setup parameters for specific adapters.
Boot Options	Sub-menu	Contain different boot options.
Keyboard Features	Sub-menu	Setup concerning the keyboard.
System Memory	N/A	Displays amount of conventional memory detected during bootup.
Extended Memory	N/A	Displays the amount of extended memory detected during bootup.

2.3.1 Harddisk configuration

You can set the boot sequence of the bootable drives by selecting Boot Sequence on the Main Menu or opening the Boot Menu.

Masters and Slaves

The **Master** and **Slave** settings on the Main Menu control these types of devices:
- Hard- disk drives
- CD- ROM drives

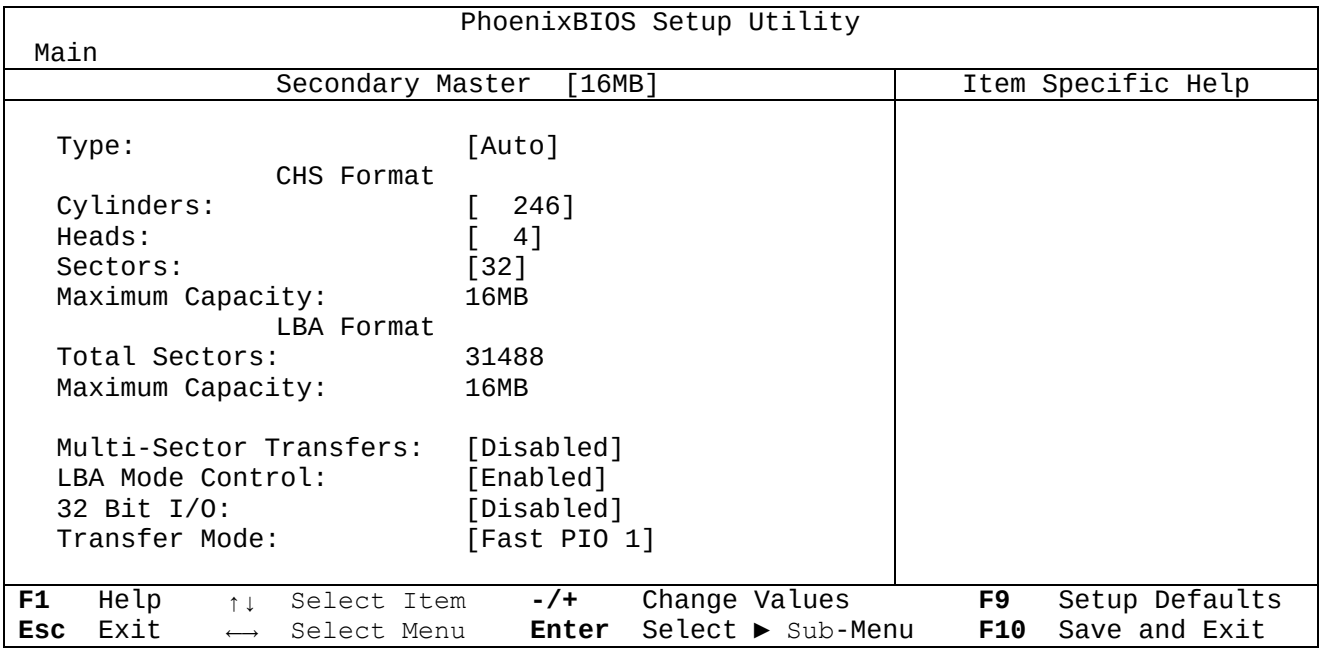
Phoenix BIOS 4.04 supports up to two **IDE disk adapters**, called **primary** and **secondary** adapters. Each adapter supports one **master drive** and one optional **slave drive** in these possible combinations :
- **1 Master**
- **1 Master, 1 Slave**
- **2 Masters**
- **2 Masters, 1 Slave**
- **2 Masters, 2 Slaves**

On the GX1LCD boards the primary IDE channel is offered through IDE1 and supports one master and one slave drive.
The Compact Flash is attached to the secondary channel master drive. On the GX1LCD/3.5” Boards the secondary channel is also available on IDE2; but is shared with the Compact Flash socket if used.
The *Phoenix* BIOS 4.04 does not support Slave devices to be detected if no Master device is attached to the Primary or Secondary channel.

When you enter Setup, the Main Menu displays the results of **Autotyping–** each drive provides information about its own size and other characteristics– and how they are arranged as Masters or Slaves on your machine.

Note: Do not attempt to change these settings unless you have an installed drive that does not autotype properly (such as an older hard- disk drive that does not support autotyping).

If you need to change your drive settings, use one of the Master or Slave sub- menu as explained in the following. Selecting one of the Master or Slave sub- menus on the Main Menu displays a menu like this:



Use the legend keys listed on the bottom to make your selections and exit to the Main Menu.
Use the chart on the following page to configure the hard disk drive with Advanced Hard Disk Features:

Feature	Options	Description
Type	None ATAPI Removable IDE Removable CD- ROM User **Auto**	None = Autotyping is not able to supply the drive type or end user has selected Disabling any drive that may be installed. ATAPI and IDE Removable = Removable Device is installed. CD- ROM = CD-ROM drive. User = The User supply the hard- disk drive information in the following fields. Auto = Autotyping, the drive itself supplies the information.
Cylinders	1 to 65,536	Number of cylinders.
Heads	1 to 16	Numbers of read/ write heads.
Sectors / Track	1 to 63	Number of sectors per track.
Multi- Sector Transfers	Disabled Standard 2 sectors 4 sectors 8 sectors 16 sectors	Any selection except Disabled determines the number of sectors transferred per block. Standard is 1 sector per block.
32- Bit I / O	Enabled Disabled	Enables 32- bit communication between CPU and IDE card. Requires PCI or local bus.

Transfer Mode	Standard Fast PIO 1 Fast PIO 2 Fast PIO 3 Fast PIO 4 FPIO 3 / DMA 1 FPIO 4 / DMA 2	Selects the method for transferring the data between the hard disk and system memory. The Setup menu only lists those options supported by the drive and platform.

WARNING : Incorrect settings can cause your system to malfunction.

2.3.2 Boot Options

Selecting "Boot Options" on the Main Menu displays the Boot Options menu :

```
                              PhoenixBIOS Setup Utility
 Main
┌──────────────────────────────────────────────────────┬──────────────────────┐
│                     Boot Options                     │  Item Specific Help  │
│                                                      │                      │
│  Summary screen:            [Enabled]                │                      │
│  Keyboard check:            [Disabled]               │                      │
│  Time and Date check        [Enabled]                │                      │
│  Floppy check:              [Disabled]               │                      │
│  Hard Disk Pre-Delay:       [Disabled]               │                      │
│  Quick boot                 [Enabled]                │                      │
│                                                      │                      │
│                                                      │                      │
│                                                      │                      │
│                                                      │                      │
│                                                      │                      │
│                                                      │                      │
│                                                      │                      │
│                                                      │                      │
└──────────────────────────────────────────────────────┴──────────────────────┘
F1   Help   ↑↓  Select Item    -/+    Change Values        F9   Setup Defaults
Esc  Exit   ←→  Select Menu    Enter  Select ► Sub-Menu    F10  Save and Exit
```

Use the legend keys to make your selections and exit to the Main Menu.

Use the following chart to select your boot options:

Feature	Options	Description
Summary screen	**Enabled** Disabled	Displays system summary screen during bootup.
Keyboard Check	Enabled **Disabled**	Allow the system to skip keyboard test, allows for boot without a keyboard attached.
Time and Date check	**Enabled** Disabled	Check Time and Date validity on boot.
Floppy check	Enabled **Disabled**	Seeks diskette drives during bootup. Disabling speeds boot time.
Hard Disk Pre-Delay	**Disabled** 3 sec, 6 sec, 9 sec, 12 sec, 15 sec, 21 sec, 30 sec	Adds a delay before the first access of a hard disk. Some hard disks hang, if accessed before they have initialized themselves.
Quick boot	**Enabled** Disabled	Option to bypass part of the Memory test to decrease boot time.

2.3.3 Keyboard and PS/2 mouse configuration

Keyboard Features

Selecting "Keyboard Features" on the Main Menu displays the following menu :

```
                        PhoenixBIOS Setup Utility
 Main
┌──────────────────────────────────────┬──────────────────────────────┐
│          Keyboard Features           │      Item Specific Help      │
│                                      │                              │
│  Numlock:                  [Auto]    │                              │
│  Key Click:                [Disabled]│                              │
│  Keyboard auto-repeat rate:[30/sec]  │                              │
│  Keyboard auto-repeat delay:[1/2 sec]│                              │
│                                      │                              │
│                                      │                              │
│                                      │                              │
│                                      │                              │
│                                      │                              │
│                                      │                              │
│                                      │                              │
│                                      │                              │
│                                      │                              │
└──────────────────────────────────────┴──────────────────────────────┘
F1  Help   ↑↓  Select Item   -/+   Change Values     F9   Setup Defaults
Esc Exit   ↔   Select Menu   Enter Select ► Sub-Menu F10  Save and Exit
```

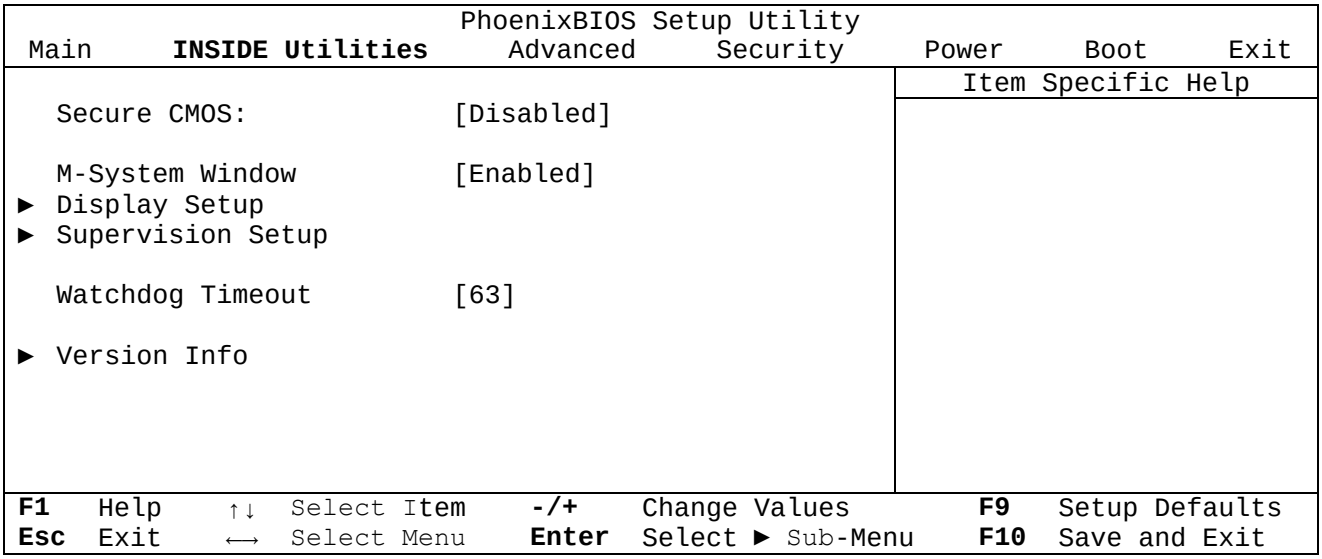
Use the legend keys to make your selections and exit to the Main Menu.

Use the following chart to configure the keyboard features:

Feature	Options	Description
Numlock	**Auto** On Off	On or Off turns NumLock on or off at bootup. Auto turns NumLock on if it finds a numeric keypad.
Key Click	Enabled **Disabled**	Turns audible key click on.
Keyboard auto- repeat rate	2/ sec 6/ sec 10/ sec 13.3/ sec 18.5/ sec 21.8/ sec 26.7/ sec **30/ sec**	Sets the number of times a second to repeat a keystroke when you hold the key down.
Keyboard auto-repeat delay	¼ sec **½ sec** ¾ sec 1 sec	Sets the delay time after the key is held down before it begins to repeat the keystroke.

2.4 Inside section

Selecting “Inside Utilities” on the Main menu displays the following menu :

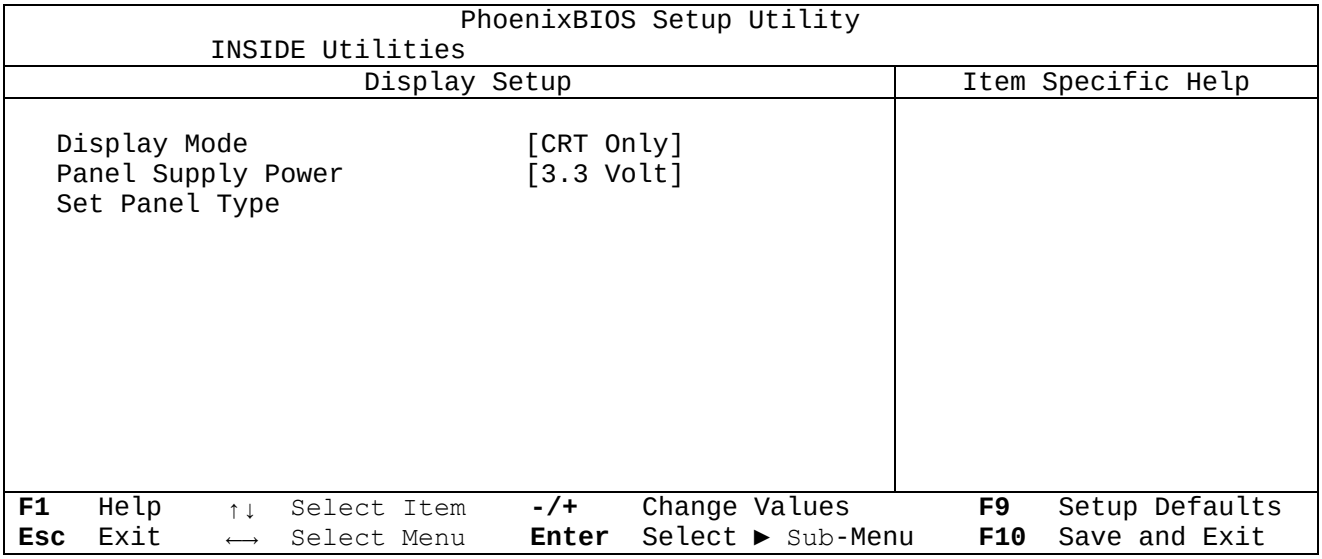


Use the legend keys to make your selections and exit to the Main Menu.
Use the following chart to configure the Inside Utilities features:

Feature	Options	Description
Secure CMOS:	**Disabled** Enabled Update	Disabled, use normal CMOS. Enabled, use Flash copy of CMOS if battery backup fails. Update, store current CMOS settings in Flash.
Display Setup	See sub-menu below	
Supervision Setup	See sub-menu below	
M-System Window (GX1LCD/S only)	Disabled **Enabled**	This option is only available on GX1LCD/S Boards. If enabled memory area E0000-E3FFF is used as window for M-System Flash Disk. **This window must be enabled in order to update the on-board BIOS.**
Watchdog Timeout	0..63	Selection of Software Watchdog Timeout for boot up. One unit equals 30secs. Set to “0” to disable Watchdog.
Version Info	Sub-menu	Contains Product name, PCB, PLD, and BIOS version. The Ethernet OUI address is shown as well.

2.4.1 Display Setup

Selecting “Display Setup” on the Inside Utilities menu displays the following menu :



Use the legend keys to make your selections and exit to the Inside Menu.
Use the following chart to configure the Display Setup features:

Feature	Options	Description
Display Mode	**CRT Only** Panel Only CRT + Panel	Select output device for the onboard VGA-controller. If CRT is installed it will be detected and enabled in all modes.
Panel Supply Power	**3.3 Volt** 5 Volt	Select supply voltage for connected LCD Panel. Signal levels will always be 3.3 Volt.
Set Panel Type	Display block See Display Selection block next page.	Press Enter to enter Panel Type Setup Select Panel Type according to Panel technology and resolution.

Display Selection block for Panel Selection.
Selections can be made with the keys ↑, ↓, Tab and Enter. When the 3 criteria are selected: Resolution, Technology and Manufacturer, possible display Partnumbers or "Non" will be displayed in the Code field to the right. Select the exact code according to the display.

```
                        Display module V1.09

     Resolution             Manufacturer             Code

     320 X 240              Standard             >   LCA4VE02A
 =>  640 X 480              Fujitsu
     800 X 600              IBM
     854 X 480              FPD
     1024 X 768             Sharp
     1280 X 1024        >   Goldstar
                            Toshiba
     Technology             Hitachi
                            Hosiden
     STN Mono               Kyocera
     EL Mono                NEC
     TFT Mono               Optrex
     STN Color              Planar
     EL Color               Samsung
  >  TFT Color              Torisan
     Plasma                 Siemens
                            Primeview

                        Display driver : 05h
```

2.4.2 Supervision Setup

Selecting "Supervision Setup" on the Inside Utilities menu displays the following menu :

```
                        PhoenixBIOS Setup Utility
            INSIDE Utilities
Supervision Setup                                  Item Specific Help

  Board temperature            25C
  CPU temperature              41C
  CPU temperature limit        [85]
  CPU overheat action          [None]

  Core                         1.98V
  VCC3 (3.3)                   3.28V
  VCC5 (5.0)                   5.04V

  Fan speed                    N/A
  Fan low limit                [3000]
  Fan low speed action         [None]

F1  Help   ↑↓  Select Item   -/+   Change Values      F9   Setup Defaults
Esc Exit   ↔   Select Menu   Enter Select ▶ Sub-Menu  F10  Save and Exit
```

Use the legend keys to make your selections and exit to the Inside Menu.
Use the following chart to configure the Supervision features:

Feature	Options	Description
CPU temperature limit	0..127	Limit for CPU temperature before overheat action is generated. CPU is rated for 85°C. Can be set between 0 and 127°C.
CPU overheat action	**None** GPIO5 Speaker	CPU overheat action. Selectable as None, GPIO5 and Speaker.
Fan low limit	**3000** 4000 5000 6000	Lower limit for Fan RPM on onboard Fan connector before low speed action is generated
Fan low speed action	**None** GPIO7 Speaker	Fan low speed action. Selectable as None, GPIO7 and Speaker.

2.5 Advanced section

The Advanced Menu

Selecting "Advanced" from menu bar on the Main Menu displays a menu like this:

```
                              PhoenixBIOS Setup Utility
 Main     INSIDE Utilities     Advanced     Security     Power     Boot     Exit
                                                                 Item Specific Help
                        Setup Warning
   Setting items on this menu to incorrect values
   may cause your system to malfunction.

► Advanced Chipset Control
► I/O Device Configuration
► Audio Option Menu
► PCI Configuration
   Secured Setup Configurations  [No]
   Reset Configuration Data:     [No]
   Large Disk Access Mode:       [DOS]

F1   Help    ↑↓  Select Item    -/+   Change Values        F9   Setup Defaults
Esc  Exit    ←→  Select Menu    Enter Select ► Sub-Menu    F10  Save and Exit
```

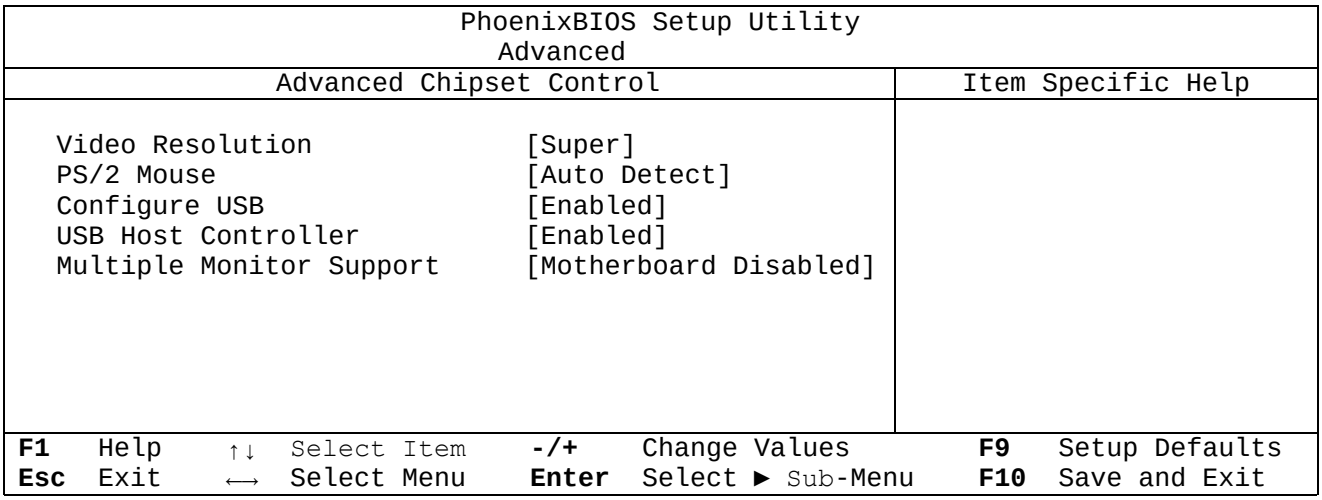
Use the legend keys to make your selections and exit to the Main Menu. Use the following to make your selection.

Feature	Options	Description
Secured Setup Configurations	Yes **No**	Yes prevents the Operating System from overriding selections you have made in Setup.
Reset Configuration Data	Yes **No**	Yes erases all configuration data in ESCD, which stores the configuration settings for non-PnP plug-in devices. Select Yes when required to restore the manufacturer's defaults. After next boot this setting is always reset to No.
Large Disk Access Mode	**DOS** Other	Select DOS if you have DOS. Select Other if you have another operating system such as UNIX. A large disk is one that has more than 1024 cylinders, more than 16 heads, or more than 63 tracks per sector.

2.5.1 Chipset configuration

Advanced Chipset Control

Selecting "Advanced Chipset Control" from the Advanced menu displays a menu like this :



The chipset is a computer chip that acts as an interface between the CPU and the system's hardware. You can use this menu to optimize the performance of your computer. Use the legend keys to make your selections and exit to the Main Menu.

Use the following chart to configure the chipset:

Feature	Options	Description
Video Resolution	Low Medium High **Super**	Reserved System Memory for Video display: 1.5 Mbyte 1.5 Mbyte 2.5 Mbyte 4.5 Mbyte
PS/2 Mouse	Disabled Enabled **Auto Detect**	Disabled free up IRQ12. Enabled forces the PS/2 mouse port to enabled regardless if a mouse is present. Auto Detect will enable the PS/2 mouse only if present.
Configure USB	**Enabled** Disabled	Set to Enabled to configure USB.
USB Host Controller	**Enabled** Disabled	Enable or Disable the USB Hardware.
Multiple Monitor Support	Motherboard Primary **Motherboard Disabled** Adapter Primary	Motherboard Primary enables onboard VGA-controller. Motherboard Disabled does not use onboard VGA-controller, if external VGA-card is present. Adapter Primary enables an external VGA-card.

2.5.2 I/O device configuration

Most devices on the computer require the exclusive use of **system resources** for operation. These system resources can include Input and Output (I/O) port addresses and Interrupt lines for getting the attention of the CPU.
Allocating these resources to various devices is called **device configuration.**
Your system has a separate on-board I/O chip, select "I/O Device Configuration" on the Advanced Menu to display this menu and specify how you want to configure these I/O Devices :

```
                    PhoenixBIOS Setup Utility
                          Advanced
I/O Device Configuration                    Item Specific Help

  Serial port A:                [Enabled]
    Base I/O address:           [3F8]
    Interrupt:                  [IRQ 4]
    Interface:                  [RS232]
  Serial port B:                [Auto]
    Mode:                       [Normal]
  Serial port C:                [Disabled]
  Serial port D:                [Disabled]
  Parallel port:                [Enabled]
    Mode:                       [ECP]
    Base I/O address:           [378]
    Interrupt:                  [IRQ 7]
    DMA Channel:                [DMA 3]
  Floppy disk controller:       [Enabled]
  Base I/O address:             [Primary]

F1  Help   ↑↓  Select Item   -/+   Change Values     F9   Setup Defaults
Esc Exit   ↔   Select Menu   Enter Select ► Sub-Menu F10  Save and Exit
```

This menu lets you specify how the Input and Output ports are configured :

- Manually by the user.
- Automatically by the BIOS during POST, or by a PnP Operating System (such as Windows 98) after the Operating System boots.

Use the legend keys to make your selections and exit to the Main Menu. Use the following chart to configure the Input / Output settings :

Feature	Options	Description
Serial port A:	Disabled Enabled **Auto**	Disabled turn off the port. Enabled requires you to enter the base Input/ Output address and the Interrupt number on the next line. Auto makes the BIOS or OS auto-configure the port.
Base I/ O Address	3F8 2F8 3E8 2E8	If you select Enabled, choose one of these addresses.
Interrupt	IRQ3 IRQ4	If you select Enabled, choose one of these Interrupts.

Interface	**RS232** RS422 – TX Enabled RS422 – TX by DTR RS422 – TX by RTS	Serial port A can operate in RS232 or RS422 (RS485) mode. **It should be noticed that the power-up default is RS232 mode which means that the port always will be in the RS232 mode during the first seconds after power-up or hardware reset.** RS422 – TX Enabled = RS422 Transmitter is always on. RS422 – TX by DTR = RS422 Transmitter is controlled by DTR. RS422 – TX by RTS = RS422 Transmitter is controlled by RTS.
Serial port B:	Disabled Enabled **Auto**	As for Serial port A above.
Mode	**Normal** IR	Serial port B can set to operate in standard RS232 or IR mode.
Serial port C: GX1LCD/S only	Disabled Enabled **Auto**	As for Serial port A above.
Interrupt	IRQ 3 IRQ 5 IRQ 9	If you select Enabled, choose one of these Interrupts.
Serial port D: GX1LCD/S only	Disabled Enabled **Auto**	As for Serial port A above.
Interrupt	IRQ 3 IRQ 5 IRQ 10 IRQ 11	If you select Enabled, choose one of these Interrupts.
Parallel Port:	Disabled Enabled **Auto**	Disabled turn off the port. Enabled requires you to enter the base Input / Output address and the Interrupt number below. Auto makes the BIOS auto-configure the port during POST.
Mode	Output only Bi- directional EPP **ECP**	Selects Printer Port operation mode.
Base I/ O Address	378 278 3BC	If you select Enabled for the Parallel Port, choose one of these I/ O addresses.
Interrupts	IRQ5 IRQ7	If you select Enabled for the Parallel Port, choose one of these interrupt options.
DMA Channel	DMA1 DMA3	If you select ECP mode for the Parallel Port, choose one of these DMA channel options.
Floppy Disk Controller	Disabled **Enabled**	Enables the on-board legacy diskette controller. Disabled turn off all legacy diskette drives.
Base I/ O Address	**Primary** Secondary	If you select Enabled for the Diskette Controller, choose Primary for one diskette drive installed or Secondary for two diskette drives installed.

Warning : If you choose the same I/ O address or Interrupt for more than one port, the menu displays an asterisk (*) at the conflicting settings. It also displays this message at the bottom of the menu :
*** Indicates a DMA, Interrupt, I/ O, or memory resource conflict with another device.**
Resolve the conflict by selecting other settings for one of the devices.

2.5.3 Audio configuration

Selecting "Audio Options Menu" on the Advanced Menu to display this menu and specify how you want to configure the Audio Device :

```
                    PhoenixBIOS Setup Utility
                          Advanced
Audio Options Menu                          Item Specific Help

  Sound:                        [Enabled]
    Base I/O address:           [220 – 22F]
    MPU I/O address:            [330 – 331]
    Interrupt:                  [IRQ 5]
    8-bit DMA channel:          [DMA 1]
    16-bit DMA channel:         [DMA 5]

F1  Help   ↑↓  Select Item   -/+   Change Values      F9   Setup Defaults
Esc Exit   ↔   Select Menu   Enter Select ▶ Sub-Menu  F10  Save and Exit
```

Use the legend keys to make your selections and exit to the Main Menu. Use the following chart to configure the Input / Output settings :

Feature	Options	Description
Sound	**Enabled** Disabled Auto	Enabled : user can configure settings below. Disabled : Sound device not installed. Auto : BIOS or OS chooses settings.
Base I/O address	**220-22F** 240-24F 260-26F 280-28F	Set I/O address for the sound device.
MPU I/O address	300-301 **330-331**	Set I/O address for the MPU device.
Interrupt	IRQ2, **IRQ5**, IRQ7, IRQ10	Set interrupt for the sound device.
8-bit DMA channel	DMA0, **DMA1**, DMA3	Set 8-bit DMA channel for the sound device.
16-bit DMA channel	**DMA5**, DMA6, DMA7	Set 16-bit DMA channel for the sound device.

Warning : If you choose the same I/ O address, Interrupt or DMA channel for more than one port, the menu displays an asterisk (*) at the conflicting settings. It also displays this message at the bottom of the menu :

*** Indicates a DMA, Interrupt, I/ O, or memory resource conflict with another device.**

Resolve the conflict by selecting other settings for one of the devices.

2.5.4 PCI configuration

Selecting "PCI Devices" from menu bar on the Advanced menu displays a menu like this :

```
                    PhoenixBIOS Setup Utility
                          Advanced
PCI Configuration                          | Item Specific Help
                                           |
► PCI/PNP ISA UMB Region Exclusion          |
► PCI/PNP ISA IRQ Resource Exclusion        |
► PCI/PNP ISA DMA Resource Exclusion        |
  AT bus clock frequency          [8.3 MHz]|
  ISA graphics device installed:  [No]     |
  PCI IRQ line 1:                 [Auto Select]
  PCI IRQ line 2:                 [Auto Select]
  PCI IRQ line 3:                 [Auto Select]
  PCI IRQ line 4:                 [Auto Select]
                                           |
F1  Help  ↑↓  Select Item  -/+  Change Values   F9  Setup Defaults
Esc Exit  ←→  Select Menu  Enter Select ► Sub-Menu  F10 Save and Exit
```

PCI Devices are devices equipped for operation with a **PCI** (Peripheral Component Interconnect) **bus**, a standardized hardware system that connects the CPU with other devices.
Use this menu to configure the PCI devices installed on your system. If a non-PnP ISA board requires specific resources these can be excluded from the PnP pool here.
Use the legend keys to make your selections and exit to the Advanced menu.

Feature	Options	Description
PCI/PNP ISA UMB Region Exclusion	< sub-menu >	A sub-menu allows to set different memory blocks in the area C800-DFFF as : “Available” or “Reserved”. Set specific block as reserved, if a non-PNP ISA card requires a “memory hole”.
PCI/PNP ISA IRQ Resource Exclusion	< sub-menu >	A sub-menu allows to set different interrupts as : “Available” or “Reserved”. Set specific interrupt as reserved, if a non-PNP ISA card requires that interrupt.
PCI/PNP ISA DMA Resource Exclusion	< sub-menu >	A sub-menu allows to set different DMA channels as : “Available” or “Reserved”. Set specific DMA as reserved, if a non-PNP ISA card requires that DMA channel.
AT bus clock frequency	6.6 MHz **8.3 MHz** 11.0 MHz 16.5 MHz	Select the AT bus clock frequency.

ISA graphics device installed:	**No** Yes	PCI devices may need to know if an ISA graphics device is installed in the system in order to enable that card to function correctly.
PCI IRQ line 1:	Disabled, **Auto Select,** 3, 4, 5, 7, 9, 10, 11, 12, 14, 15	Interrupt from PCI devices are routed to ISA interrupts (IRQ's). Disabled do not route PCI interrupt. Auto Select lets the PNP system select IRQ. User can select specific IRQ, but care must be taken in order not to conflict with IRQ's allocated for other devices.
PCI IRQ line 2:	As above	As above
PCI IRQ line 3:	As above	As above
PCI IRQ line 4:	As above	As above

2.6 Security section

Selecting "Security" from the Main Menu displays a menu like this :

```
                          PhoenixBIOS Setup Utility
 Main     INSIDE Utilities     Advanced     Security     Power     Boot     Exit
                                                          Item Specific Help
   Supervisor Password Is:   Clear
   User Password Is:         Clear

   Set Supervisor Password   [Enter]
   Set User Password         [Enter]

   Diskette access:          [Supervisor]
   Fixed disk boot sector:   [Normal]
   Virus check reminder:     [Disabled]
   System backup reminder:   [Disabled]
   Password on boot:         [Disabled]

F1  Help   ↑↓  Select Item   -/+   Change Values      F9   Setup Defaults
Esc Exit   ←→  Select Menu   Enter Select ► Sub-Menu  F10  Save and Exit
```

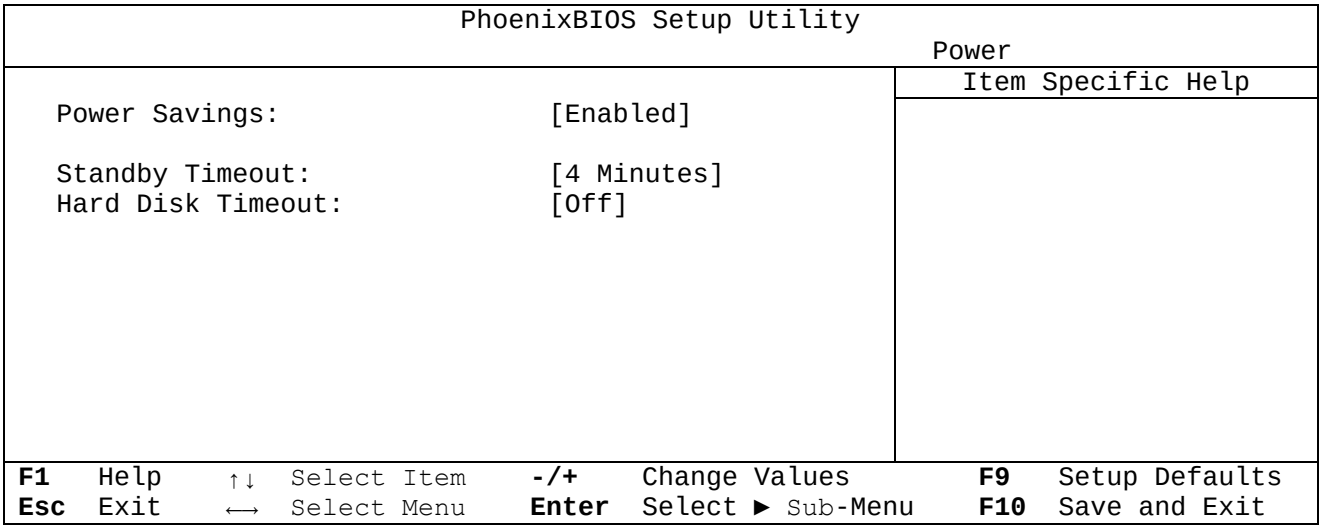
Use the legend keys to make your selections and exit to the Main Menu.
Enabling "Supervisor Password" requires a password for entering Setup. The passwords are not case sensitive.

Use the following chart to configure the system- security and anti- virus options:

Feature	Options	Description
Set Supervisor Password	Up to seven alphanumeric characters	Pressing <Enter> displays dialog box for entering the supervisor password. This password gives full access to SETUP menus.
Set User Password	Up to seven alphanumeric characters	Pressing <Enter> displays the dialog box for entering the user password. This password gives restricted access to SETUP menus. Requires prior setting of Supervisor password.
Diskette Access	**Supervisor** User	Supervisor restricts use of floppy drives to supervisor. Requires setting the Supervisor password.
Fixed disk boot sector	**Normal** Write Protected.	Write protected helps prevent viruses.
Virus check reminder System backup reminder	**Disabled** Daily Weekly Monthly	Displays a message during bootup asking (Y/ N) if you have backed up the system or scanned it for viruses. Message returns on each boot until you respond with "Y". Daily displays the message on the first boot of the day, Weekly on the first boot after Sunday, and Monthly on the first boot of the month.
Password on boot	Enabled **Disabled**.	Enabled requires a password on boot. Requires prior setting of the Supervisor password. If supervisor password is set and this option disabled, BIOS assumes user is booting.

2.7 Power section

Selecting "Power" from the menu bar displays a menu like this :



Use this menu to specify your settings for Power Management.
A power- management system reduces the amount of energy used after specified periods of inactivity. The Setup menu pictured here supports a **Full On** state, a **Standby** state with partial power reduction, and a **Suspend** state with full power reduction.
The use and effect of this BIOS feature will depend on the Operating system under which this is used.

Use the legend keys to make your selections and exit to the Main Menu. Use the following chart in making your selections:

Feature	Options	Description
Power Savings	Enabled **Disabled**	Select enabled to make your own selections from the following fields. Disabled turn off all power management.
Standby Timeout	Off, 1 min, 2 min, 4 min, 5 min, 10 min, 20 min, 30 min, 1 hour.	Inactivity period required to put system in Standby (partial power shutdown).
Harddisk Timeout	Off, 1 min, 2 min, 4 min, 5 min, 10 min, 20 min, 30 min, 1 hour.	Inactivity period of fixed disk required before standby (motor off).

2.8 Boot section

Boot Menu

After you turn on your computer, it will attempt to load the operating system (such as Windows 95) from the drive of your choice. If it cannot find the operating system on that drive, it will attempt to load it from one or more other drives in the order specified in the Boot Menu.

Note: Specifying any drive as a boot drive on the Boot Menu requires the installation of an operating system on that drive.

Selecting "Boot" from the Menu Bar displays the Boot menu, which looks like this:

```
                        PhoenixBIOS Setup Utility
                                                                  Boot
                                                        Item Specific Help

  1.   [Removable devices]
  2.   [Hard Drive]
  3.   [CD-ROM Drive]
  4.   [Network Boot]


▶ Hard Drive

F1   Help   ↑↓  Select Item    -/+    Change Values        F9   Setup Defaults
Esc  Exit   ←→  Select Menu    Enter  Select ▶ Sub-Menu    F10  Save and Exit
```

You can arrange the **boot order list** at the top of this menu to specify the order of the devices from which the BIOS will attempt to boot the Operating System. To move a device, first select it with the up- or- down arrows, and move it up or down using the <+> and <-> keys.
The boot selection menu can also be displayed by pressing ESC during boot.

Note: If you have more than one hard drive, or more than one removable drive, use the sub menus to specify which one to use on the boot order list, as described in the following.

Hard Drives

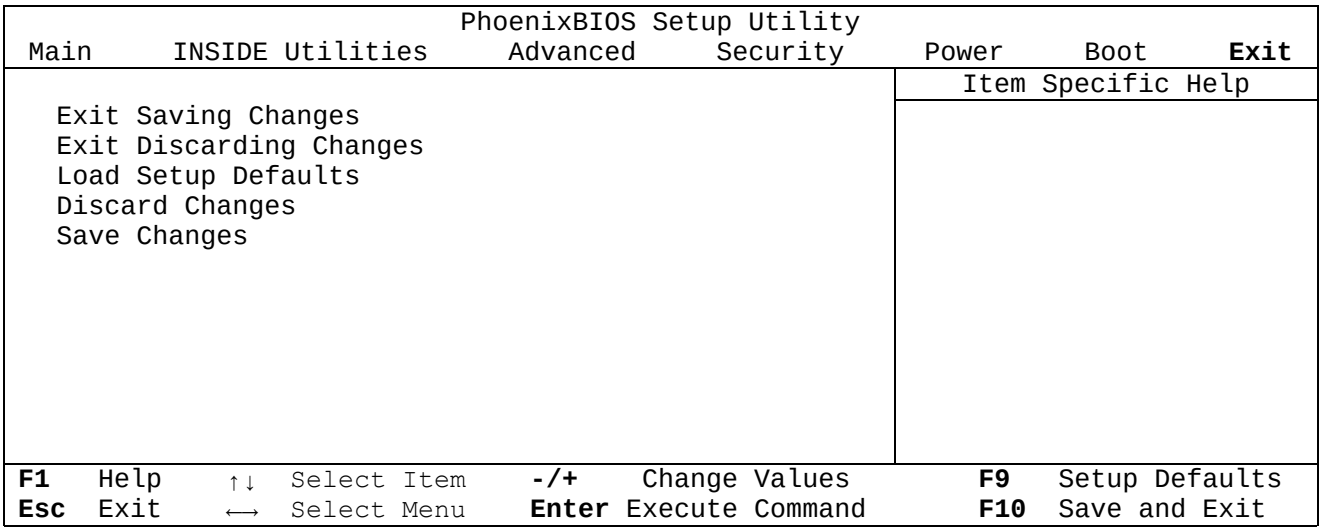
If you have more than one hard drive, selecting "Hard Drives" from the Boot Menu displays and a sub-menu appears with the different detected drives.
Select the hard drive to use for booting by using the up- and- down arrows. Then move it to the top of this list using the <+> key.

Network Boot

The Network boot options can be found by pressing Shift-F10 during boot. A selection of PXE or RPL Netboot options can be selected as well as Boot order can be setup.

2.9 Exit section

Selecting "Exit" from the menu bar displays this menu :



The following sections describe each of the options on this menu.

Exit Saving Changes

After making your selections on the Setup menus, always select either "Exit Saving Changes" or "Save Changes". Both procedures store the selections displayed in the menus in **CMOS** (battery-backed CMOS RAM) a special section of memory that stays on after you turn your system off. The next time you boot your computer, the BIOS configure your system according to the Setup selections stored in CMOS.

If you attempt to exit without saving, the program asks if you want to save before exiting.

During bootup, *Phoenix* BIOS attempts to load the values saved in CMOS. If those values cause the system boot to fail, reboot and press **<F2>** to enter Setup. In Setup, you can get the Default Values (as described below) or try to change the selections that caused the boot to fail.

Exit Discarding Changes

Use this option to exit Setup without storing in CMOS any new selections you may have made. The selections previously in effect remain in effect.

Load Setup Defaults

To display the default values for all the Setup menus, select "Load Setup Default" from the Main Menu.

If, during bootup, the BIOS program detects a problem in the integrity of values stored in CMOS, it displays this message :

```
System CMOS checksum bad - run SETUP
Press <F1> to resume, <F2> to Setup
```

The CMOS values have been corrupted or modified incorrectly, perhaps by an application program that changes data stored in CMOS.
Press **<F1>** to resume the boot or **<F2>** to run Setup with the ROM default values already loaded into the menus. You can make other changes before saving the values to CMOS.

Discard Changes

If, during a Setup Session, you change your mind about changes you have made and have not yet saved the values to CMOS, you can restore the values you previously saved to CMOS.
Selecting Discard Changes on the Exit menu updates all the selections.

Save Changes

Save Changes saves all the selections without exiting Setup. You can return to the other menus if you want to review and change your selections.

2.10 BIOS Post Beep Codes

When a recoverable error occurs during POST (Power On Self-Test), PhoenixBIOS displays an error message describing the problem. PhoenixBIOS also issues a number of beep tones depending of the error.
The beep codes are composed of 1 to 4 groups of beeps. In the table below are listed a number of beep codes and the corrective action.
Example: 1-3-1-1 means 1 beep pause 3 beeps pause 1 beep pause 1 beep.

If it beeps…	Then…
1-2-2-3	Clear the CMOS memory.
1-3-1-1 or 1-3-4-1 or 1-3-4-3 or 1-4-1-1	Re-insert or replace the SDRAM module.
1-3-1-3	Try a different keyboard.
1-2	Video configuration failed. Card not installed or faulty. Check external option ROM devices.

3. User utilities

3.1 General Purpose Control (GPIO)

The GX1LCD board allows the user to control the definitions of 8 GPIO pins available on the FEATURE connector described in the Hardware Manual.

Through I/O address F3h, the user can set the direction,'0' for input and '1' for output, of the GPIOs in the feature connector as indicated below. The data on the GPIOs can be read/written through I/O address F4h.

GPIO I/O Access:

00F3h	PCI/ISA	R/W	GPIO Configuration Bit 0 - Read / Set Direction of GPIO0. Input ("0"), Output ("1"). Bit 1 - Read / Set Direction of GPIO1. Input ("0"), Output ("1"). Bit 2 - Read / Set Direction of GPIO2. Input ("0"), Output ("1"). Bit 3 - Read / Set Direction of GPIO3. Input ("0"), Output ("1"). Bit 4 - Read / Set Direction of GPIO4. Input ("0"), Output ("1"). Bit 5 - Read / Set Direction of GPIO5. Input ("0"), Output ("1"). Bit 6 - Read / Set Direction of GPIO6. Input ("0"), Output ("1"). Bit 7 - Read / Set Direction of GPIO7. Input ("0"), Output ("1").
00F4h	PCI/ISA	R/W	GPIO Data

The GPIO access can also be directed through the Inside Technology Advanced Programming Interface (API), see the later section describing the use.

3.2 Software Watchdog Functionality

The GX1LCD board offers a hardware supervision of running software. The software watchdog can be enabled from the Inside Utilities Supervision Setup in the BIOS menu or by loading a value, in units of 30secs and less than FFh into the watchdog timer register. If the Watchdog is enabled in the BIOS a selectable counter value between 01h and 63h is loaded to the Watchdog timer register, which will initiate a countdown. Setting the Watchdog counter value to 00h disables the Watchdog. While the software watchdog is running, the user software must update the watchdog timer in order to avoid system reset. This means that the O/S and user software must be started and update the timer before it has terminated.
The software watchdog timer is accessed through I/O address FAh and can be updated by writing a new timer value, in units of 30 seconds from ½-128 minutes, into this register (bit 7-0). This will restart the countdown from the new value.
If the user software deadlocks or crashes, the GX1LCD board will be reset when the watchdog timer expires. If the watchdog was enabled in the BIOS the watchdog will still be running after a reset and must be serviced within the Counter value setup in the BIOS Watchdog Timeout.

Software Watchdog I/O Access:

00FAh	PCI/ISA	W	Watch Dog Counter Value Bit 7-0 - Counter Value for Software Watchdog in 30second units. Set to 00h to disable SW Watchdog.

3.3 Advanced Programming Interface (API)

This API was designed to enable users to access board features implemented on the GX1LCD Board family in Windows98, NT4.0, Win2K environment. The required files are available on the Driver and Manual CDROM for the GX1LCD Family.

3.3.1 Installation

The API contains the following files

NT Device Driver	Itlcd.sys
Win9x Device Driver	Itlcd.vxd
Dynamic programming library	Itlcd.dll
Static programming library	Itlcd.lib
API function declaration	Itlcd.h

Copy device driver Itlcd.sys to the C:\WinNT\System32 or where the System32 directory is located on NT platforms,

Copy device driver Itlcd.vxd to the C:\Windows\System or where the System directory is located on Win9x platforms,

All other files are platform independent and should be used within a programming project.

3.3.2 API function descriptions:

DWORD OpenItlcd(VOID) This function opens the device driver Itlcd.sys for hardware communication and must be called in order to use any other functions within this API. **Return** If the function succeeds, the return value is nonzero. Otherwise the value is zero.
DWORD CloseItlcd(VOID) This function closes the device driver. After closing the driver no attempt to communicate with the driver will be accepted. **Return** If the function succeeds, the return value is nonzero. Otherwise the value is zero.
DWORD ReadMonitor(HWMON *Mon) This function takes a HWMON structure and fills the structure with valid data. For return structure see Itlcd.h for the individual data types. **Return** If the function succeeds, the return value is nonzero. Otherwise the value is zero.
DWORD SetClrGPIO(BOOL SetClr,UCHAR GPIO) This function set or clears a GPIO pin, located on the feature port. Make sure to set pin direction before calling this function. **Return** If the function succeeds, the return value is nonzero. Otherwise the value is zero.
DWORD ReadGPIO(UCHAR GPIO) This function reads a GPIO pin, located on the feature port. Make sure to set pin direction before calling this function. **Return** If the function succeeds, the return value is nonzero. Otherwise the value is zero.
DWORD SetGPIODir(UCHAR GPIO) This function set the direction of the GPIO pins, located on the feature port. Make sure to call this function before calling ReadGPIO or SetClrGPIO. **Return** If the function succeeds, the return value is nonzero. Otherwise the value is zero.

DWORD SetLCDVCCControl(BOOL ON_OFF)
This function turns on/off the LCDVCC on the LCD display.

Return If the function succeeds, the return value is nonzero. Otherwise the value is zero.

DWORD SetLCDVCC(BOOL VCC5_VCC3)
This function sets the LCDVCC voltage on the LCD display.

Return If the function succeeds, the return value is nonzero. Otherwise the value is zero.

DWORD SetSerialInterface(UCHAR INTERFACE)
This function selects the serial interface. The following interfaces are provided: RS232, and RS485. The values to be used are listed in Itlcd.h.

Return If the function succeeds, the return value is nonzero. Otherwise the value is zero.

DWORD SetSerialInterfaceTransmitterEnable (UCHAR PIN)
This function selects the hardware transmitter enable control used on RS232 and RS485 interfaces. Selectable values are listed in Itlcd.h.

Return If the function succeeds, the return value is nonzero. Otherwise the value is zero.

DWORD ReadBoardHeader(PVOID Buffer)
This function read the Inside Header Info from the Memory Area. The argument passed to the function must be a pointer to a structure of minimum 8 Bytes. The information returned include Board name, Version of Hardware and Software, and OUI network address.

Return If the function succeeds, the return value is nonzero. Otherwise the value is zero.

DWORD SelectFanTempTacChannel(UCHAR Channel)

This function selects the hardware Fan/Temp and Tachometer channel default is channel 0.

Return If the function succeeds, the return value is nonzero. Otherwise the value is zero.

DWORD SetWDTimer(UCHAR Time)
This function sets the watchdog timer. An application must service this function and reload the timer to prevent reboot; the number of units is between 0-255. One unit equals 30 seconds.

Return If the function succeeds, the return value is nonzero. Otherwise the value is zero.

4. Driver Support and Installation.

4.1 GX1LCD Driver Support

The following table describes the Driver support for the GX1LCD Board series.

	Win98	WinNT4.0	Win2000
Video	Yes	Yes	Yes
Audio	Yes	Yes	No
LAN	Yes	Yes	Yes
IDE	Yes	Yes	Yes
IDE UDMA-33	Yes	No	No

4.2 GX1LCD Video Installation

The following steps will install the National Video drivers for the GX1LCD board family.

4.2.1 Windows 98

Install the package driver placed in the directory: W98_All. This package includes Video, Audio and UDMA support. Follow the instructions and point to the directory where the drivers are placed when unpacking. Restart when requested.
Update the Video driver as detailed below.
Video installation:

1. Insert the Driver CD.
2. Click the *Start* button, click on *Settings,* and on *Control Panel* to open the control panel.
3. Select System and Device Manager.
4. Select “Graphics adapter”
5. Click on Update Driver
6. Point to Driver CD directory: Graphics/win98 and click next.
7. Choose Finish to install the driver.
8. Reboot when requested.

4.2.2 Windows NT40

Video installation:

1. Insert the Driver CD.
2. Click the *Start* button, click on *Settings,* and on *Control Panel* to open the control panel.
3. Select the Multimedia, Device, Display.
4. Select the *Settings* tab.
5. Click the *Display Type* button.
6. Click the *Change* button in the ’Display Type’ window.
7. Click the *Have Disk* button and point to the location of files on the CDROM: Graphics\nt40
8. The display driver should now appear on the list. Click *Ok.*
9. The display driver is not a part of the NT4.0 package, but a third-party driver. Click *Yes* to install this driver. The driver will now be installed.
10. Close the ’Display Type’ window and ’Display Properties’ window.
11. After the restart display settings may be changed in the ’Display Properties’ window.

4.2.3 Windows 2000

Video installation:

1. Prior to the installation make sure the Video Resolution in the Advanced chipset control BIOS menu is set to “Super”.
2. Insert the Driver CD.
3. Click the *Start* button, click on *Settings,* and on *Control Panel* to open the control panel.
4. Select System, Hardware, Device Manager and click on Video controller.
5. Choose Reinstall driver.
6. Give Driver location on Driver CD: Graphics/Win2000/VSA1
7. If LCD support is required use the Driver in the location: Graphics/Win2000/VSA1withLCD.
8. Click Finish when requested and reboot.

4.3 GX1LCD Audio Installation

The following steps will install audio drivers for the GX1LCD board family.

4.3.1 Windows 98

Audio installation:

Install the package driver placed in the directory: W98_All. This package includes Video, Audio and UDMA support. Follow the instructions and point to the directory where the drivers are placed when unpacking. Restart when requested.

4.3.2 Windows NT4.0

Audio installation:

1. Insert the Driver CD.
2. Click the *Start* button, click on *Settings,* and on *Control Panel* to open the control panel.
3. Select Multimedia, Device and Add.
4. Point to Driver CD location: Audio/Winnt.
5. Select National xpressaudio(tm) driver.
6. When requested to select I/O addresses and IRQ for Audio Device, select to Disable MPU. NB. This MUST be done for the NT Audio Driver to work.
7. Reboot when requested.

4.3.3 Windows 2000

Audio installation:

Audio is currently not supported in Win2000, due to problems with the National Win2000 Driver.

4.4 GX1LCD Ethernet Installation.

The following steps describe the installation of the Ethernet drivers for the GX1LCD board families.

4.4.1 Windows 98

Ethernet installation:

1. Insert the Driver CD.
2. Click the *Start* button, click on *Settings*, and on *Control Panel* to open the control panel.
3. Select *System*, *Device Manager* and Click on *PCI Ethernet Controller*.
4. Click to Reinstall driver
5. Browse to Driver CD Directory: Network/win98 and select Realtek RTL8139 Family PCI Fast Ethernet NIC driver.
6. Click Finish and reboot when requested.

4.4.2 Windows NT 4.0

Ethernet installation:

1. Insert the Driver CD.
2. Right click on Network Neighbourhood and select Properties.
3. Click Yes to install Network driver.
4. Select Driver from List and enter directory on Driver CD: Network/Winnt.
5. Select Realtek 8139 Family PCI Fast Ethernet Adapter.
6. Continue, Enter NT root directory when requested.
7. Reboot when requested.

4.4.3 Windows 2000

Ethernet installation:

1. Win2000 install the correct driver Automatically.

4.5 GX1LCD UDMA IDE Installation

The following steps describe the installation of the National UDMA IDE drivers.

4.5.1 Windows 98

UDMA IDE Installation:
Install the package driver placed in the directory: W98_All. This package includes Video, Audio and UDMA support. Follow the instructions and point to the directory where the drivers are placed when unpacking. Restart when requested.

4.5.2 Windows NT 4.0

UDMA IDE Installation:
UDMA is currently not supported under Windows NT 4.0.

4.5.3 Windows NT 4.0

UDMA IDE Installation:
UDMA is currently not supported under Windows 2000.

4.6 GX1LCD ACPI Bridge Installation

The following steps describe the installation of the ACPI Bridge drivers.

4.6.1 Windows 98

ACPI Bridge Installation:
1. Insert Driver CD.
2. Click the *Start* button, click on *Settings,* and on *Control Panel* to open the control panel.
3. Select *System*, *Device Manager* and Click on *PCI Bridge*.
4. Click to Reinstall driver
5. Select Driver from Driver CD location: ACPI/Win98
6. Install driver and reboot.

Important:

Win2000 Installations will display a PCI Bridge Device in the Control Panel. This Device can be safely ignored and will not reduce functionality of the board under Win2000.

5. WinCE GX1LCD Board Support

5.1 Introduction

This section describes installing and using the Inside Technology GX1LCD Boards Support Packages for Windows CE versions 3.0 and CE.net. These packages can be used to generate Windows CE images to be run on the GX1LCD.
The use of the software supplied by Inside Technology requires that the User has already installed Microsoft Windows CE Platform Builder software on the Development system. Contact Your Microsoft distribution channel to purchase a copy of this.

The GX1LCD Board Support Package provided by Inside Technology will add a GX1LCD Driver library to the Microsoft Windows CE Platform Builder software environment. These drivers have been qualified to operate with the GX1LCD board and should be added when building CE images to be executed on GX1LCD.

Currently most functions on the board have been qualified to operate however please read below for the current WinCE3.0 and CE.net support restriction for the GX1LCD.

Current GX1LCD Windows CE3.0 Support:

Graphics	
Direct X	Supported
LCD Panels	All Panels supported by BIOS is supported by WinCE3.0: 320x240, 640x480, 800x600, 1024x768 & 1280x1024x8.
Communication	
Ethernet	Supported
Wake on LAN	Not Supported
Serial ports 1+2	Supported
Serial ports 3+4 (GX1LCD/S)	Supported
Parallel port	Supported
Floppy	Supported. Removable storage device operation not supported.
USB Channels	Not Supported
Sound	
AC97/98	Supported
DirectSound	Supported
Other	
M-System (GX1LCD/S)	Supported
IDE Channel	
Primary	Supported
Secondary	Supported
IDE CDROM	Supported
Keyboard	Supported
PS/2	Supported
Power Management	Not Supported

Current GX1LCD Windows CE.net Support:

Graphics	
Direct X	Supported
LCD Panels	All Panels supported by BIOS is supported by WinCE.net: 320x240, 640x480, 800x600, 1024x768 & 1280x1024x8.
Communication	
Ethernet	Supported
Wake on LAN	Not Supported
Serial ports 1+2	Supported
Serial ports 3+4 (GX1LCD/S)	Supported
Parallel port	Supported
Floppy	Supported. Removable storage device operation not supported.
USB Channels	Supported (USB Legacy not supported)
Sound	
AC97/98	Supported
DirectSound	Supported
Other	
M-System (GX1LCD/S)	Supported
IDE Channel	
Primary	Supported
Secondary	Supported
IDE CDROM/ DVD/ CF	Supported
Keyboard	Supported
PS/2	Supported
Power Management	Not Supported

5.2 GX1LCD Board Support Package Installation

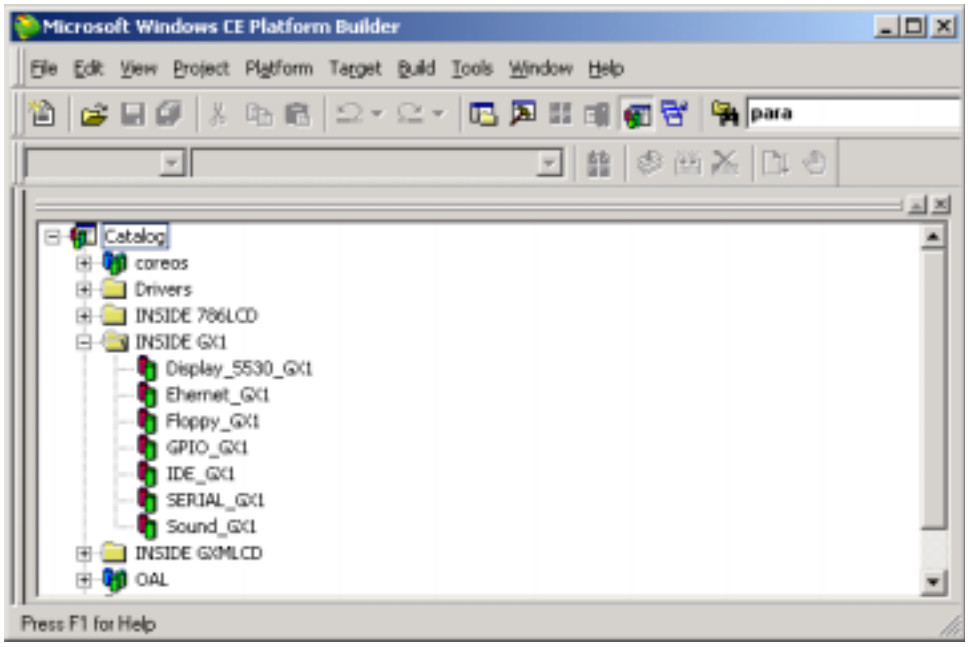
Prior to installation of the Inside Technology Board Support the Microsoft Windows CE Platform Builder must be installed on the Development platform.

The installation program will install all required files to create a Windows CE platform OS based on INSIDE Technology GX1LCD/S board hardware architecture. The setup creates an OAL platform within the Windows CE platform builder, and adds a hardware component group to the platform builder catalog tree. The developer can then add the desired components to a specific platform.

Installation:

The Setup.exe program file located on the CD must be executed to perform a complete installation. Make sure the Windows CE Platform Builder is installed on your system before running the setup file. Setup will fail the installation if the Platform builder is not correctly installed.

Setup will copy all needed files to the Windows CE Platform directory and will add a directory called GX1LCD. This directory contains several source and device driver files, to create a Windows CE OS image based on the GX1LCD hardware architecture. Do not modify any of these files.
The Setup.exe program also adds a “cec” file to the Platform builder containing information on the hardware components. If the package is already installed on your system the package will be removed and then reinstalled.
For future Board Support Package updates from Inside Technology including modification to source or device driver files, the latest files can be copied to the directories by re-running the Setup.exe.



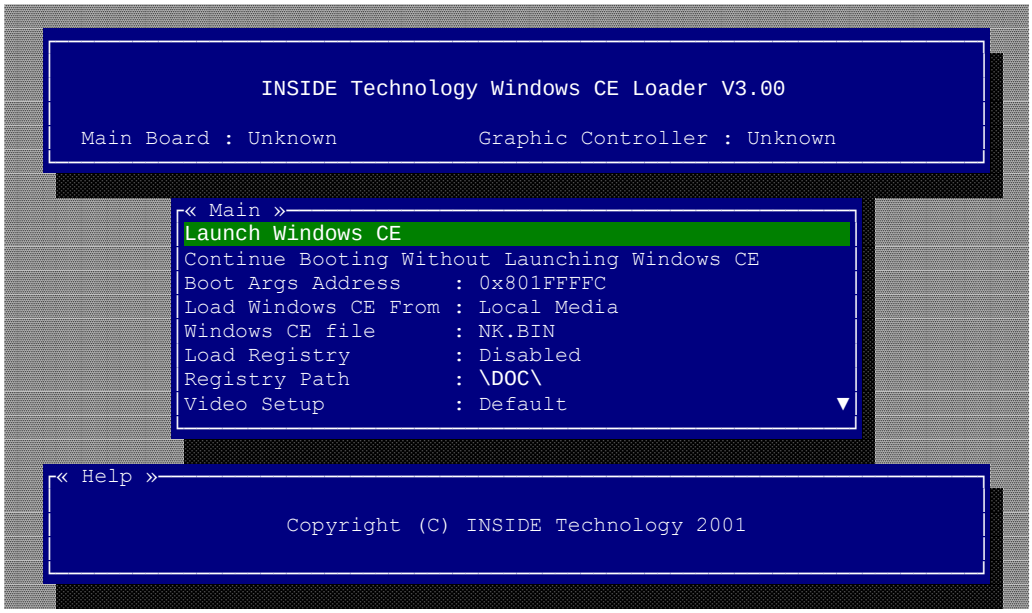
5.3 Installing the WinCE boot loader

The Windows CE Boot Loader is an utility offered by Inside Technology to allow to change various settings on a completed WinCE image on the Target system. Settings like Graphics resolution, Base addresses for onboard devices etc. can be changed.

Installation:
To install the loader on a HDD or flash disk follow the sequence below:

1.) First make a bootable DOS floppy disk, with FDISK and FORMAT
2.) Copy the loader.exe to the disk
3.) Use the disk to boot your Target Windows CE system.
4.) Use the FDISK and FORMAT to prepare the HDD / flash disk. Do not use SYS or FORMAT /s, the loader does not use DOS. The loader only supports FAT12 and FAT16. Not FAT32.
5.) Copy loader.exe to the root dir of the HDD / flash disk
6.) Change drive to HDD / flash disk
7.) Type “loader.exe /install bootsector” to install the loader.
8.) Remove the floppy disk and reboot the system.

Now the system will start the loader and show the menu:



5.4 Using the WinCE boot loader

The following section described each Menu point displayed in the Loader.

Launch Windows CE
Start Windows CE

Continue Booting Without Launching Windows CE / Exit To DOS
Exit the loader

Boot Args Address : 0x801FFFFC
Address for a pointer to the boot arguments

Load Windows CE From : Local Media

Local Media

Load the image from a HDD / flash disk

Serial Port

Download the image over a serial port

Parallel Port

Download the image over a parallel port

Ethernet

Download the image over Ethernet
This function uses the eboot.bin file

Windows CE file : NK.BIN

NK.BIN

File name for the Windows CE image

EBOOT.BIN

File name for Ethernet boot image file

Load Registry : Disabled

INSIDE.REG

Use the last saved registry.

INSIDE.BAK

Use the pre registry, the backup is made the first time the Flushreg is called.
This function can be used as a last known good boot (registry)

Disabled

Do not load the registry

Registry Path : \DOC

The path for the boot drive inside Windows CE. To store the registry on a device you need a Windows CE driver for the device.

Video Setup : Standard

Standard

0 320x200, 1 480x240 (640x480), 2 640x480, 3 800x600, 4 1024x768, 5 480x240 (640x480), 6 320x240, 7 320x240-2 (640x480), 8 1280x1024

VESA

The loader scans the bios to se if the requested modes are available in 8,16,24 & 32 Bits colours modes 320x200, 320x240, 640x480, 800x600, 848x480, 852x480, 853x480, 1024x768 & 1280x1024x8

Video Mode : 320x200x8

Selected mode.

Debug Port : Com2

Disabled or address for serial debug port

Debug Baud rate : 19200

Speed for serial debug port, note that the standard eboot.bin only use 38400

Parallel Port : LPT1: 0x3BC
Base addresses for debug parallel port

Ethernet Debug : Disabled
Use an Ethernet card for debug

Ethernet Card : NE 2000
SMC 9000 SMC9000 base Ethernet card

NE 2000 : ne2000 based Ethernet card

RTL8029 (NE 2000 PCI)
The loader scans for a RTL8029 controller
The first found is used as debug card

Ethernet IRQ : 10
IRQ for debug Ethernet card

Ethernet Base I/O : 0x0320
Base address for debug Ethernet card

Ethernet Debug IP : DHCP
DHCP : use server to get Debug IP address
Static : use entered IP address

EDBG Debug Zones : 0x0000
Sets debug zones.

Show loading picture : Disabled
This function is not available in this version

Menu popup : Always
Always
Only if F1 Press during boot
Never

Verbose : Disabled
Disabled : no information under boot
Enable : display information about nk.bin under boot

Store NK.BIN local : Disabled
Enable
This function only works if serial or parallel is used to download.

Install boot sector / Remove loader from boot sector
For install or removing the boot sector

Save menu options
Save the menu settings to the loader.exe

5.5 Inside Technology GX1LCD Hardware API for WinCE

This API was designed to enable users to access board features implemented on the GX1LCD Board family in Windows CE environment.

5.5.1 Installation

The API contains the following files

WinCE Device Driver	Itgx1.dll
API function declaration	Itlcdgx1.h
Test sample source	Ithwm.cpp

Please take a look at the Ithwm.cpp source file, which illustrate how to use the device driver.

5.5.2 API function descriptions:

DWORD InitHw(VOID) This function initializes the hardware and must be called in order to use any other functions within this API. **Return** If the function succeeds, the return value is nonzero. Otherwise the value is zero.
DWORD ReadMonitor(HWMON *Mon) This function takes a HWMON structure and fills the structure with valid data. For return structure see Itlcd.h for the individual data types. **Return** If the function succeeds, the return value is nonzero. Otherwise the value is zero.
DWORD SetClrGPIO(BOOL SetClr,UCHAR GPIO) This function set or clears a GPIO pin, located on the feature port. Make sure to set pin direction before calling this function. **Return** If the function succeeds, the return value is nonzero. Otherwise the value is zero.
DWORD ReadGPIO(UCHAR GPIO) This function reads a GPIO pin, located on the feature port. Make sure to set pin direction before calling this function. **Return** If the function succeeds, the return value is the GPIO pin state.
DWORD SetGPIODir(UCHAR GPIO) This function set the direction of the GPIO pins, located on the feature port. Make sure to call this function before calling ReadGPIO or SetClrGPIO. **Return** If the function succeeds, the return value is nonzero. Otherwise the value is zero.
DWORD SetLCDVCCControl(BOOL ON_OFF) This function turns on/off the LCDVVC on the LCD display. **Return** If the function succeeds, the return value is nonzero. Otherwise the value is zero.
DWORD SetLCDVCC(BOOL VCC5_VCC3) This function sets the LCDVVC voltage on the LCD display. **Return** If the function succeeds, the return value is nonzero. Otherwise the value is zero.
DWORD SetSerialInterface(UCHAR INTERFACE) This function selects the serial interface. The following interfaces are provided: RS232, and RS485. The values to be used are listed in Itlcdgx1.h. **Return** If the function succeeds, the return value is nonzero. Otherwise the value is zero.
DWORD SetSerialInterfaceTransmitterEnable (UCHAR PIN) This function selects the hardware transmitter enable control used on RS232 and RS485 interfaces. Selectable values are listed in Itlcdgx1.h. **Return** If the function succeeds, the return value is nonzero. Otherwise the value is zero.
DWORD SetWDTimer(UCHAR Time) This function sets the watchdog timer. An application must service this function and reload the timer to prevent reboot; the number of units is between 0-255. One unit equals 30 seconds. **Return** If the function succeeds, the return value is nonzero. Otherwise the value is zero.

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