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SBC-GX1

**Windows XP Embedded
Development Kit**

Quickstart Manual

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Revision History

Manual	PCB	Date	Comments
Issue A		3rd May 2002	First full release of manual.
Issue B		26th Sep 2002	TSC1 added to LCD kit.
Issue C		8th Jun 2004	Second full release of manual.
Issue D		18th Jun 2004	Minor changes, updated layout.

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Contents

Important notice

Arcom's Windows XP Embedded Development Kit is supplied with a Microsoft Windows XP Embedded license. This allows you to develop, download and debug your Windows XP application on the CompactFlash card. The Windows XP Embedded operating system has been configured to run on the Arcom SBC-GX1 processor. A copy of the operating system image is included on the Development Kit CD and may be used to restore the image on the SBC-GX1 Development Kit. The Windows XP Embedded License label is attached to the solder side of the SBC-GX1 board. The operating system image on the CD may also be used to create production copies of the supplied operating system.

The Windows XP Embedded product may be used in your product under one of the following license options:

- By purchasing boards or systems from Arcom with the operating system pre-loaded onto a CompactFlash card, Arcom can supply Windows XP Embedded licenses. The Microsoft OEM Customer License Agreement signed by Arcom states that we must supply the Windows XP Embedded software pre-installed onto our equipment or drives. The license label is attached to the solder side of the SBC-GX1 board. Please contact Arcom for information about license label costs.

- If you intend to use the Windows XP Embedded operating system image supplied by Arcom and purchase the Windows XP Embedded licenses directly from your local Microsoft distributor, you must sign an OEM Customer License Agreement, which is supplied by your Microsoft distributor. You are responsible for installing the operating system on the Arcom product and applying the license label to your finished product. Contact your local Microsoft distributor for license label costs.

- If you intend to build your own version of the operating system and then purchase Windows XP Embedded licenses, you must purchase a copy of the authoring tools Windows Embedded Studio (consisting of Target Designer and Component Designer) and sign an OEM Customer License Agreement. Windows Embedded Studio is only available from a Microsoft distributor; it is not supplied by Arcom. Please contact your local Microsoft OEM distributor for price information and to obtain your OEM Customer License Agreement. On receipt of the signed OEM Customer License Agreement, Microsoft (or the distributor) will issue you with a PID number, which is an electronic key that allows you to create a specific operating system from your Target Designer tool set. You must buy licenses for Windows XP Embedded images you have created using Target Designer. You are responsible for installing the operating system onto the Arcom product and applying the license label to your finished product.

For more information about the End User License Agreement, see Appendix B – End User License Agreement (EULA), page 55.

Introduction

Arcom's Windows XP Embedded Development Kit is designed to provide a complete environment and thus allow software engineers to concentrate on the development of their application. The remainder of this manual describes the Windows XP Embedded Development Kit. More information about the features available within Windows XP Embedded can be found on the Microsoft web site, at www.microsoft.com/windows/embedded/xp.

This Development Kit supports Windows XP Embedded Service Pack 1.

Handling your board safely

Anti-static handling

The boards in this Development Kit contain CMOS devices. These could be damaged in the event of static electricity being discharged through them. Please observe anti-static precautions at all times when handling circuit boards. This includes storing boards in appropriate anti-static packaging and wearing a wrist strap when handling them.

Battery

The board contains a Lithium non-rechargeable battery. Do not short-circuit the battery or place it on a metal surface where the battery terminals could be shorted. During shipment, the battery is isolated from the board's circuitry. It should be connected before using the board. For details, refer to the Jumper and Connections section of the SBC-GX1 Technical Manual.

If the battery needs to be replaced, please ensure that the new part conforms to the same specification.

Packaging

Should a board need to be returned to Arcom, please ensure that it is adequately packed, preferably in the original packing material.

Electromagnetic Compatibility (EMC)

The SBC-GX1 is classified as a component with regard to the European Community EMC regulations. It is the user's responsibility to ensure that systems using the board comply with the appropriate EMC standards.

About this manual

This manual is designed to help you get your SBC-GX1 up and running as quickly as possible. It explains the components of your SBC-GX1 Development Kit you have received and tells you how to unpack and connect the board. It also explains, amongst other things, the use of Windows XP Embedded in the board and how you can transfer images to the board.

Related documents

The SBC-GX1 Quickstart Manual is supplied as part of the SBC-GX1 Development Kit. This kit also includes a CD-ROM with a copy of this manual and a copy of the SBC-GX1 Technical Manual. Other manuals may be referred to from time to time. These are normally provided on the CD-ROM that accompanies your Development Kit.

Conventions

Symbols
The following symbols are used in this guide:

Symbol	Explanation
	Note - information that requires your attention.
	Tip - a handy hint that may provide a useful alternative or save time.
	Caution – proceeding with a course of action may damage your equipment or result in loss of data.
	Jumper fitted on pin A.
	Jumper fitted on pin B.
	Jumper is fitted.
	Jumper is not fitted.

Getting started

What's in the kit?

Arcom's SBC-GX1 Windows XP Embedded basic kit comprises the following items:

- SBC-GX1 processor board with 256MB RAM and 16MB Flash.
- +5V @ 8A, +12V @ 1.7A (100-240V AC input) power supply.
- A power supply cable with either US-, UK- or European-style plug.
- Power supply adapter cable.
- PS/2 mouse.
- PS/2 to AT keyboard adapter.
- VGA adapter cable.
- Serial adapter cable.
- Floppy drive cable.
- Crossed RJ45 Ethernet cable.
- 512MB CompactFlash module pre-loaded with Windows XP Embedded.
- SBC-GX1 Windows XP Embedded Development Kit CD-ROM.
- Floppy disk containing the download utilities.
- Microsoft Windows XP Embedded license, attached to the board.
- Datalight Sockets license, attached to the floppy disk.
- Datalight ROMDOS license, attached to the floppy disk.
- Printed copy of the Windows XP Embedded Quick Start manual.
- USB CompactFlash reader/writer.
- Reset switch.

The following items are also included with the flat panel kit:

- NEC 6.5" color TFT flat panel display (NL6448BC20-08).
- Backlight inverter module.
- Flat panel cable assembly.
- Four wire resistive touchscreen.
- Arcom TSC1 (TouchScreen Controller).

What else do I need?

- A PS/2 or AT keyboard.

- A VGA monitor (if not using the flat panel kit).

- A PC with an Ethernet adapter configured for TCP/IP, running Windows XP or Windows 2000 Professional and with about 150MB of disk space.

  (If you intend to run Microsoft Windows Embedded Studio your system must have a Pentium III 600MHz or greater with 256MB, Microsoft Windows 2000 service pack 2 or later, Windows XP Professional, IE 5.5 or later, a CD-ROM or a DVD-ROM drive and about 1.2GB of free disk space.)

- A Win32 development tool to develop your application, such as Visual C++ or Visual Basic.

- A floppy drive if you want to download a new Windows XP Embedded image to the CompactFlash module on the target system.

- Microsoft Windows Remote Desktop. This is used to download files to the target and to provide access to headless systems.

Unpacking and connecting up

Arcom's Windows XP Embedded Development Kits are shipped 'ready to run'. You simply remove the various items from their packaging and connect them up. Remember that a number of these items are static-sensitive, so you must take standard anti-static precautions while unpacking. See Anti-static handling, page 7.

Refer to the diagram and procedure below to ensure that everything is connected up correctly.
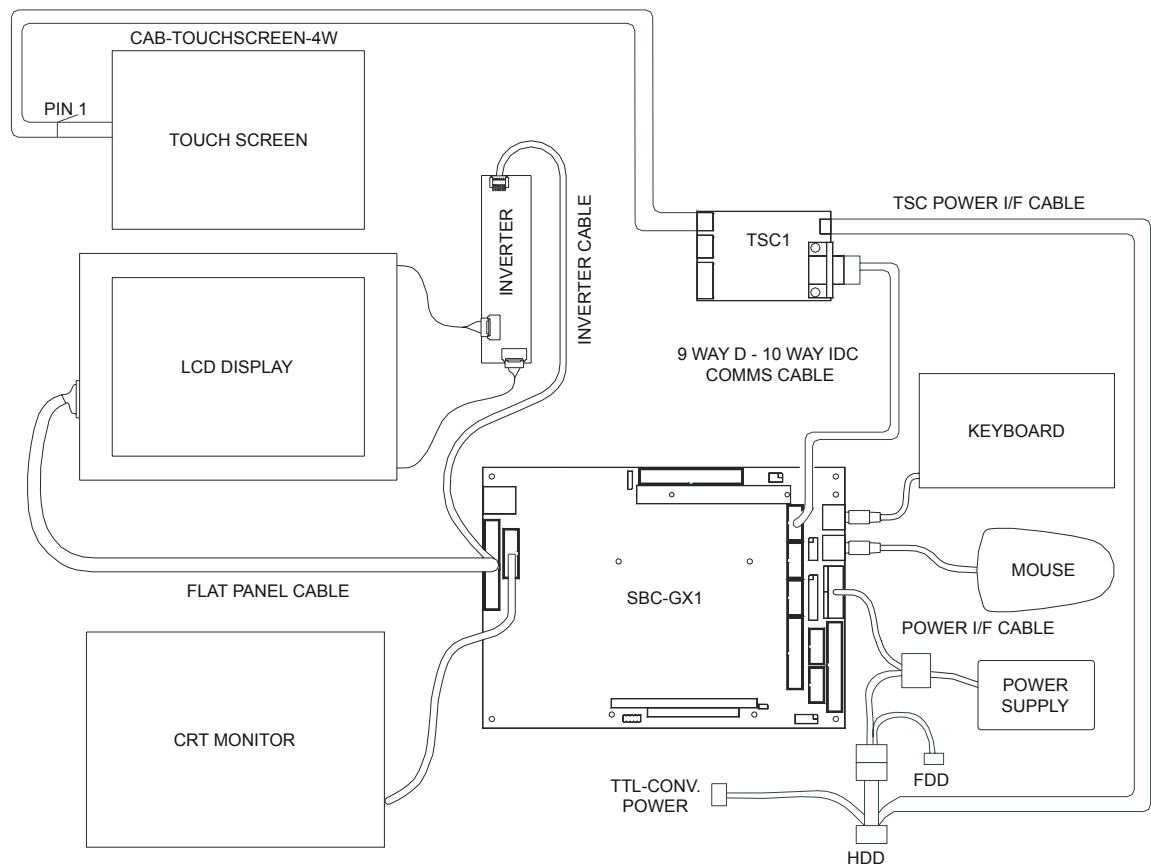
1   Remove the SBC-GX1 CPU board from its packaging and place it on a static-free work surface.

2   Enable the battery by moving the jumper labelled **LK7** to position **A**.

3   Plug the mouse into the socket labelled **PL9 MOUSE**.

4   Plug a keyboard into the socket labelled **PL7 KEYBOARD** (using the PS/2 adapter if required).

5   Plug one end of the Ethernet cable into the socket labeled **PL5 10/100-TX** and the other end into your development system.

> The cable supplied in the kit is crossed cable, designed to go directly between the SBC-GX1 and another PC. If you want to use a hub you must use a straight-through cable instead.

6   Do one of the following:

- If your kit does not include an LCD, plug one end of the supplied adapter cable into a video monitor and the other end into the socket labelled **PL11 VGA**.

- If your kit includes an LCD, plug the interface cable into the SBC-GX1 flat panel connector PL15. Plug the larger cable into the flat panel and the smaller cable into the backlight inverter.

> Make sure the power is off while connecting the LCD, as the backlight inverter generates high voltages.

7   If the touchscreen is to be used, do the following:

- Use the serial adapter cable provided to connect the 9-way D type on the TSC1 to COM3 on the SBC-GX1.

- Connect the touchscreen to the TSC1 using the 4-way ribbon cable.

> Pin 1 is marked on the touchscreen and the cable, but it can be difficult to see.

- Connect the TSC1 to the power supply.

8   Fit the SBC-GX1 power supply to the socket labelled **PL12 POWER**.

9   Fit the appropriate power lead to the power supply unit.

BIOS settings

The BIOS on the SBC-GX1 is from General Software Inc. Should you need to reset the BIOS, follow these steps:

1   Reset the board and press **Delete**. The BIOS set up screen is displayed.

2   Select **Reset CMOS to Factory Defaults** and press **Enter**.

3   Press **Delete** immediately to display the BIOS set up screen as the system reboots.

4   Select **Basic CMOS Configuration** and press **Enter**.

5   Set the **Date** and **Time** to current values.

6   Press **Esc** and choose **Save & Exit Setup** from the main BIOS menu.

7   Press **Enter**. The following message is displayed:

```
SAVE to CMOS and EXIT (Y/N)? Y
```

8   Press **Enter** to save your changes.

We use these settings when assembling the SBC-GX1 and recommend that you use them if you need to reset the BIOS.

Flat panels

The default BIOS can be used to drive the following flat panels:

- A 6.5" NEC TFT flat panel (part number NL6448AC20-08), as supplied in the flat panel variant of the Development Kit.

- A 10.4" NEC TFT flat panel (part number NL6448AC33-18/-27/-29).

For information about other flat panels supported by the SBC-GX1, contact Arcom technical support. See Appendix A – Contacting Arcom, page 54.

Using Windows XP Embedded

The SBC-GX1 loads the installed copy of Windows XP Embedded. This may take up to 2 minutes. When loading is complete, a Windows XP Embedded desktop icon appears. You do not need to enter a user name and password, because clicking on this icon logs you in automatically.

> The user name and password used in the automatic log in are both 'Administrator'.

At this point the target system behaves in much the same way as the normal desktop version of Windows XP, but with fewer applications available. Commands and utilities can be run from the **Start** menu in the normal way.

Networking

The SBC-GX1 appears on a standard Windows network in a workgroup called 'WORKGROUP'. The name assigned to the machine begins with 'GX1-', followed by a random series of characters unique to your system (generated by Windows XP Embedded) i.e. GX1-xxxxxxxx, where xxxxxxx is the random part of the name, for example GX1-TLTYYX.

To find out the name assigned to your SBC-GX1, follow these steps:

1　　　Click on the **Start** button, right-click on **My Computer** and select **Properties**.

2　　　Select **Computer Name** in the **System Properties** dialog box.

Files and folders on the SBC-GX1 can be shared, allowing easy access from another system. To share a folder on the target system right-click on the folder, select **Sharing and Security** and give it a name.

Application development

From an application development viewpoint, Windows XP Embedded behaves in the same way as desktop Windows XP. This means you can use the full range of Microsoft development tools including, for example, Visual Basic, Visual C++, and so on. The Windows XP Professional versions of the software development and driver development kits can also be used with Windows XP Embedded.

A copy of MSVCMON.EXE, Microsoft's remote debugging tool, is included on the target board, in the folder C:\Windows\System32. A shortcut to MSVCMON.EXE is available on the desktop, called Remote Debugging. To debug applications on the SBC-GX1, follow these steps:

1   Launch MSVCMON.EXE by double-clicking on the **Remote Debugging** shortcut on the desktop and then clicking on **Connect**.

2   Build your application on your host system in the normal way, using tools such as Visual C++.

3   Select **Debug Remote Connection** from the **Build** menu and then select **Network (TCP/IP)**.

4   Click on **Settings** and enter the name or IP address of your SBC-GX1 system.

When the debug session is started from Visual C++, the code actually runs on the SBC-GX1. For further details visit Microsoft's developer network site at www.msdn.microsoft.com and search for 'debugging remote applications'.

Device drivers

Installation of any new plug and play device and its driver on Windows XP Embedded should be carried out as follows:

- If Windows XP Embedded is successful in detecting your device, the following screen is displayed:

- If you have specific driver files, do not carry out automatic installation. Instead, **Cancel** the **Found New Hardware Wizard** and follow these steps:

    1   Open the Device Manager by selecting **Start** → **Control Panel** → **System** → **Hardware** → **Device Manager**.

    2   Right-click on your device, which is displayed in **Other devices**.

    3   Click on **Update Driver**.

    4   Follow the instructions on-screen to complete the installation.

- If device drivers are available with Windows XP Embedded, carry out automatic installation.

For non plug and play devices, the installation procedure is same as desktop Windows XP Professional. Any device drivers for Windows XP Professional should also work on Windows XP Embedded.

Touchscreen

The LCD version of the development kit is supplied with a touchscreen. A driver for the touchscreen is included, but is disabled by default as it takes over a COM port. The TSC1 touchscreen drivers include the following programs:

- **Main driver:**   Touchscreen.exe
- **Calibration program:**   Touchcal.exe.
- **Diagnostic program:**   Touchraw.exe.

To use the touchscreen on your flat panel, follow these steps:

1   Ensure the SBC-GX1 is powered off and the touchscreen is fixed securely to the flat panel.

2   Ensure that all electrical connections for the touchscreen and touchscreen controller are made.

3   Connect a +5V supply to the touchscreen controller, using the supplied cable.

4   Connect the touchscreen to the touchscreen controller, using the 4-wire connector.

> Make sure that pin 1 of the TSC1 goes to pin 1 of the touchscreen.

5   Connect the output of the touchscreen controller to serial port COM3 (PL27) on the SBC-GX1 board.

6   Start the SBC-GX1.

7   Create a shortcut to touchscreen.exe and place the shortcut in the **Startup** folder of Windows XP Embedded.

8   Restart the system.

The touchscreen and TSC1 are configured and calibrated as part of the production process, so are ready to use.

The touchscreen driver includes an automatic detection routine. This determines which COM port and baud rate to use. This is not normally required, but can be initiated by deleting the following two registry values in the key:

HKEY_LOCAL_MACHINE\Software\Arcom Control Systems\Touchscreen

"Calibrated"=dword:00000001

"TSC1Detected"=dword:00000001

If you download a new XP image to the SBC-GX1, this detection routine is carried out the first time the touchscreen driver is run. The calibration process must be completed and the results saved.

If the jumpers LK2 and LK3 are fitted on the TSC1, then TSC1 is in 10-bit mode. Otherwise it is in 8-bit mode.

For more details, refer to the document Touchscreen.html. This is on the CD that accompanies this Development Kit, in the folder \Documentation\DataSheets\Touchscreen.

Installing the support software

The Development Kit is supplied with two CDs. One of these is labelled 'Development Kit CD' and contains a number of support programs and examples. Use the 'Development Kit CD' to install all the support software on your development platform. This software is designed to help you develop your application and to create a version of Windows XP Embedded that best suits your project requirements.

The 'Development Kit CD' is divided into four areas:

- **Documentation:** Manuals and datasheets for the SBC-GX1 board.

- **Sample images:** Pre-built Windows XP Embedded images with varying functionality.

- **Target designer extensions:** Components and configurations for Microsoft Target Designer.

- **Tools and examples:** Tools and examples to help create and download new images.

A complete installation requires approximately 1.2GB of free disk space on your host development system.

To begin the installation, follow these steps:

1   Insert the CD in the drive on your host development system. After a few seconds an HTML page is displayed, describing various parts of the installation in more detail.

If this page does not appear, use Windows Explorer to select the CD and then double-click on the file readme.htm.

2   Choose the package you want to install and click on the corresponding link. An Internet Explorer dialog box is displayed.

3   Choose to **Run** this program from its current location and click on **OK**.

If a security warning is displayed, click on **Yes**.

The setup wizard installs the software on your system drive, in the folder \Arcom\XPEmbedded\SBC_GX1.

Do not use the other CD (labelled 'Installation CD') on your host development system. This may result in part of your hard disk being overwritten. The installation CD is only for use on the SBC-GX1 board.

Sample images

The Arcom Windows XP Embedded Development Kit includes two different Windows XP Embedded images with differing functionality, called Standard XPe and Minimal XPe. The Standard XPe image is installed on the CompactFlash for the SBC-GX1 board in the Development Kit. For instructions on installing the Minimal XPe image, see Installing the Windows XP Embedded Minimal XPe image, page 31.

Further details about both images are provided below:

Standard XPe

Summary:	Quite large, includes most important features.
Approximate image size:	389MB (98MB remaining).

Contains:
- Standard XP kernel.
- Full system administration.
- DP 83815 Ethernet driver.
- TCP/IP including Winsock & command line utilities.
- Remote administration.
- Native remote debugging.
- RAS with support for dial in and dial out.
- SNMP.
- Full workgroup participation with file and print sharing.
- Internet information server including active server pages.
- On-board serial, parallel, sound and AIM104 IO board drivers.
- Touchscreen.
- .NET framework v1.1.4.322.
- Internet Protocol version 6.
- Enhanced Write Filter
- WinHTTP Service.

Minimal XPe

Summary:	Very small, includes display.
Approximate image size:	161MB (327MB remaining).

Contains:
- Minimal XP kernel.
- DP 83815 Ethernet driver.
- TCP/IP including Winsock.
- Native remote debugging.
- On-board serial, parallel, sound and AIM104 IO board drivers.
- Enhanced Write Filter

.NET framework

Microsoft's .NET Framework v1.1.4.322 is included in the Standard XPe image. To develop .NET applications that run on this image, use Microsoft Visual Studio .NET 2003, which supports application development for .NET Framework version 1.1.4.322.

To perform remote debugging with applications that require the .NET Framework, additional remote debugging tools must be installed on the SBC-GX1. These tools require 44MB of disk space, so are not installed by default. For an explanation of the installation procedure and how to use these tools, please refer to the tools section of the accompanying Development Kit CD.

Network settings

The version of Windows XP Embedded installed on the CompactFlash module already contains a driver for the on-board Ethernet controller and Microsoft TCP/IP networking. It also contains a DHCP client that automatically configures TCP/IP to run on your network. If you don't use a DHCP server for network configuration you must configure TCP/IP manually from the control panel.

If the SBC-GX1 is connected to a workgroup-based network it appears in the network neighbourhood under the name 'WORKGROUP'. If you want to connect to an XP domain-based network, you must change from a workgroup to a domain-based network and enter the name of the domain you wish to join. To do this, follow these steps:

1 Select **Start** → **Control Panel** → **System** → **Computer Name** → **Change** → **Domain**.

2 Enter the name of the domain you want to join and click on **OK**.

You are asked for the user name and password of an account with permission to join the domain. You can get these from your network administrator.

3 Enter the user name and password and click on **OK**. Once the SBC-GX1 appears in your network neighborhood, files can be copied to and from the board in the same way as with any other desktop system on the network.

Remote Desktop Connection

During the development of applications that are to run on a system without a display (headless systems), Microsoft Remote Desktop Connection can be used to communicate with the SBC-GX1. Remote Desktop Connection enables the desktop of the headless system to be displayed in a window on the development system. The Remote Desktop tools are provided as standard with Windows XP Professional. Users of other Windows versions can download them from www.microsoft.com/windowsxp/pro/downloads/rdclientdl.asp.

To view the desktop of the target system, you must place a call to the target as follows:

1   Select **Start** → **All Programs** → **Accessories** → **Communications** → **Remote Desktop Connection**. The **Remote Desktop Connection** window is displayed:
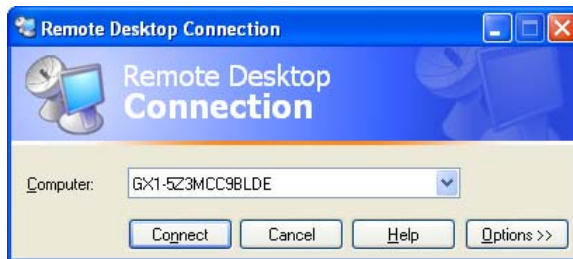

You can modify the **Options** if required, before connecting through Remote Desktop.

2   Click on **Connect**. Remote Desktop initiates a call to the target system and displays a log on box. This can take up to 30 seconds.

3   Enter the user name (Administrator) and password (Administrator). These are case sensitive:

The target's desktop is displayed in a window on the host development system. You can use this window as if your keyboard and mouse were plugged directly into the target system:
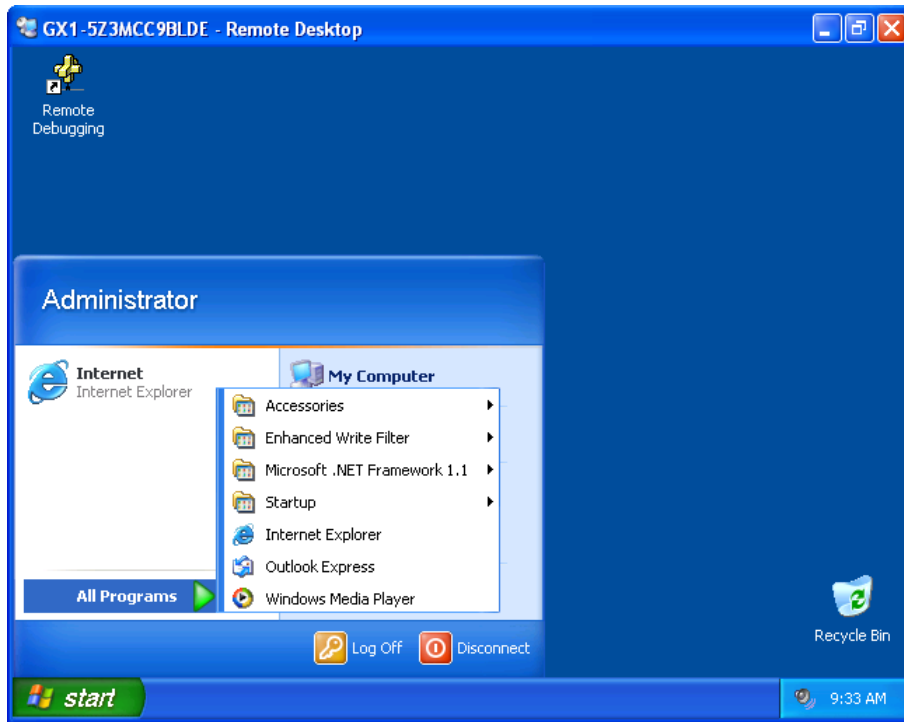
To shutdown the remote target, at the command prompt on Remote Desktop run **shutdown -s**.

To restart the remote target system, run **shutdown -r** at the command prompt.
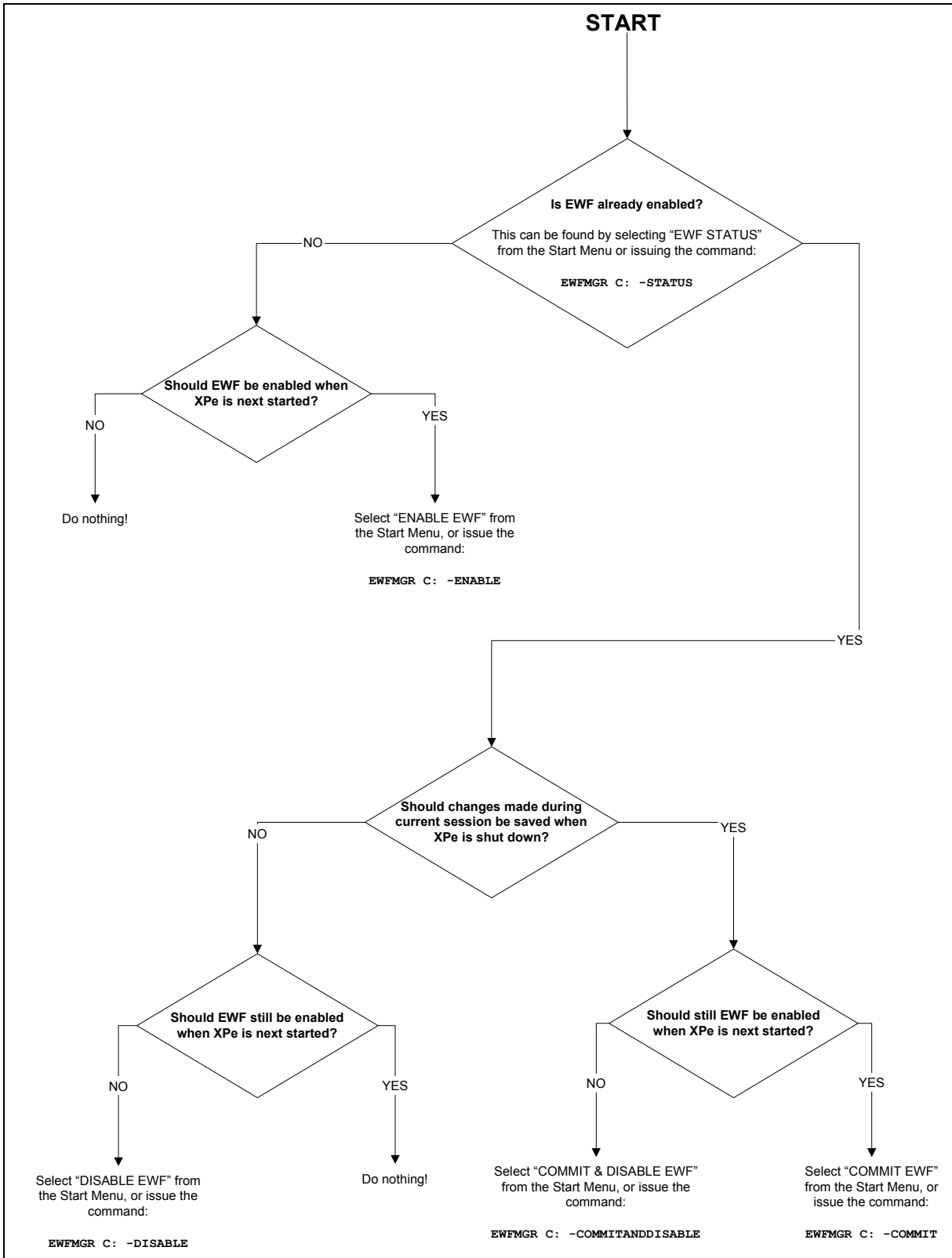
Enhanced Write Filter

RAM-based Enhanced Write Filter (EWF) allows you to protect the operating system so that any writes to the CompactFlash are not permanent. Instead, they are redirected to an overlay in memory so that whilst the operating system is running they appear permanent, but when it is shutdown or rebooted the writes are lost and the operating system reverts to the same state it was in at the previous boot. If you decide that the changes written to the overlay should be kept, a utility can be run and the changes are committed during the next shutdown.

The Standard XPe and Minimal XPe images are supplied with RAM-based EWF functionality included but disabled. The management utility ewfmgr.exe can be used to control the status of EWF. Several batch files are included on the **Start** menu. These files use the utility with the correct parameters to allow the status of EWF to be changed very simply.

When the status of the EWF is changed, the update does not happen immediately. The changes take effect as the operating system is shut down. If you use the **Start** menu shortcuts to change the status of EWF, you are prompted to restart the machine.

An API is included which allows the user to query and control the status of EWF from within their application. Full details of the functions and structures, along with some sample code, can be found at www.msdn.microsoft.com/library/en-us/xpehelp/html/xetbsEnhancedWriteFilterAPI.asp.

EWF usage flowchart

START

Is EWF already enabled?

This can be found by selecting "EWF STATUS"
from the Start Menu or issuing the command:

EWFMGR C: –STATUS

NO

**Should EWF be enabled when
XPe is next started?**

NO   YES

Do nothing!

Select "ENABLE EWF" from
the Start Menu, or issue the
command:

EWFMGR C: –ENABLE

YES

**Should changes made during
current session be saved when
XPe is shut down?**

NO   YES

**Should EWF still be enabled
when XPe is next started?**

NO   YES

Select "DISABLE EWF" from
the Start Menu, or issue the
command:

EWFMGR C: –DISABLE

Do nothing!

**Should still EWF be enabled
when XPe is next started?**

NO   YES

Select "COMMIT & DISABLE EWF"
from the Start Menu, or issue the
command:

EWFMGR C: –COMMITANDDISABLE

Select "COMMIT EWF"
from the Start Menu, or
issue the command:

EWFMGR C: –COMMIT

Changing the startup logo

The Windows XP Embedded image supplied with this Development Kit includes a custom logo, which appears between the BIOS screen and the Microsoft Windows XP splash screen on start-up. This logo can be changed to a custom image of your own, and can also be set to replace the Microsoft Windows splash screen if you want it to stay on the screen for longer.

To change the logo, you must replace the file called **boot.bmp** in the **C:\Windows** folder of the CompactFlash. Your new logo must comply with the following rules:

- The image size must be exactly 640x480.

- The color depth must be 4-bit (16 colors).

- The file type must be BMP. If you wish to save on disk space, an RLE encoded BMP is recommended.

By default, the logo is set to appear as a quick boot logo. A tool provided on the Development Kit CD can be used to change the length of time for which the logo appears on the screen. There are three options available:

- **No boot logo:** Windows XP Embedded boots without displaying a custom logo. The BIOS screen is displayed briefly, to be replaced by a quick progress bar across the bottom of the screen, followed by the 'Starting Microsoft Windows' screen.

- **Quick boot logo:** The custom logo is displayed briefly (for approximately 3 seconds) during start up, replacing the progress bar that appears between the BIOS screen and the Microsoft Windows XP splash screen.

- **Extended boot logo:** The custom logo replaces the progress bar and the Windows XP splash screen. It appears after the BIOS screen and stays until the desktop and mouse cursor appear (approximately 30 seconds). If you choose this logo, the image is static and there is no progress bar to indicate that Windows is loading. We therefore recommend that you include some text at the bottom of the image saying, for example, 'Please wait…'.

If you want the custom logo to stay on the screen after the initial loading sequence has been completed and the mouse has appeared, you can edit the following registry entry so that it points to the BMP logo file:

[HKEY_USERS\.DEFAULT\Control Panel\Desktop]
Wallpaper = "c:\windows\boot.bmp"

Reinstalling Windows XP Embedded

If you wish to reinstall Windows XP Embedded on the SBC-GX1 board as it was supplied with this Development Kit, you can do so using the 'Installation CD' provided. To do this, follow these steps:

1   Back up any important data or files from the present CompactFlash, as the whole CompactFlash will be overwritten.

2   Power off the SBC-GX1 and remove any hard disks connected to the SBC-GX1, leaving only the 512MB CompactFlash.

3   Connect the CD drive configured as the master drive to the SBC-GX1 board and start the SBC-GX1.

4   Insert the installation CD into the CD drive.

5   Restart the SBC-GX1 and press **Del** in order to enter the BIOS settings.

6   Go to **Basic CMOS Configuration** and press **Enter**.

7   Adjust the settings so that they appear as shown below:

```
                    System Bios Setup Basic CMOS Configuration
                 (C) 2001 General Software, Inc. All rights reserved

DRIVE ASSIGNMENT ORDER:     Date: Jan 01, 2004    Typematic Delay  : 250 ms
Drive A: Floppy 0           Time: 00 : 00 : 00    Typematic Rate   : 30cps
Drive B: <None>             NumLock:  Enabled     Seek at Boot     : None
Drive C: Ide 2/Sec Master                         Show "Hit Del"   : Disabled
Drive D: Ide 0/Pri Master   BOOT ORDER:           Config Box       : Disabled
Drive E: <None>             Boot 1st: CDROM       F1 Error Wait    : Disabled
Drive F: <None>             Boot 2nd: <None>      Parity Checking  : <Unused>
Drive G: <None>             Boot 3rd: <None>      Memory Test Tick : Enabled
Drive H: <None>             Boot 4th: <None>      Debug Breakpoints: <Unused>
Drive I: <None>             Boot 5th: <None>      Debugger Hex Case: Upper
Drive J: <None>             Boot 6th: <None>      Memory Test : FastLo FastHi
Drive K: <None>
Boot Method: Boot Sector    ATA DRV ASSIGNMENT:   Sect  Hds  Cyls    Memory
                            Ide 0: 5 = IDE CDROM                      Base:
FLOPPY DRIVE TYPES:         Ide 1: Not Installed                     633KB
Floppy 0: 1.44 MB, 3.5"     Ide 2: 3 = AUTOCONFIG, LBA               Ext:
Floppy 1: Not installed     Ide 3: Not Installed                     250MB

        ↑/↓/←/→/<CR>/<Tab> to select  or  <PgUp>/<PgDn>/+/- to modify
                       <Esc> to return to main menu
```

8   Press **Esc** and choose **Save & Exit Setup** from the main BIOS menu.

9   Press **Enter**. The following message is displayed:

   `SAVE to CMOS and EXIT (Y/N)? Y`

10   Press **Enter** to save your changes.

   The SBC-GX1 boots from the CD drive. Follow the instructions on-screen.

The Development Kit standard image is written to the CompactFlash. This takes about 15 minutes, after which the SBC-GX1 restarts. The Windows XP Embedded desktop appears after about a further 10 minutes.

> Do not use the installation CD on your host development system. This can result in part of your hard disk being overwritten. The installation CD is only for use on the SBC-GX1 board.

Installing the Windows XP Embedded Minimal XPe image

The support CD that accompanies the SBC-GX1 Development Kit includes an ISO image of a CD that you can use to install the Minimal XPe image onto your SBC-GX1 quickly and easily. When you install the images section of this CD, the ISO image is copied to your hard disk. It can be found in the following folder:

\Arcom\XPEmbedded\SBC_GX1\Images\MinimalXPe.iso

This ISO image creates a bootable CD, very similar to the installation CD provided with your Development Kit. This can be used to install the Minimal XPe image in exactly the same way as described in Reinstalling Windows XP Embedded, page 30.

Software such as Ahead's Nero Burning ROM or Roxio's Easy CD Creator can be used to burn the ISO image to CD-ROM.

Using PXE to remote boot Windows XP Embedded

The SBC-GX1 BIOS supports PXE remote booting. This allows Windows XP Embedded to run on the SBC-GX1 without a CompactFlash module. For a detailed description of how remote booting with Windows XP Embedded works, please refer to the following website:

msdn.microsoft.com/embedded/xp/deploy/rmboot/

PXE booting uses some of the available RAM on the SBC-GX1 as a virtual disk drive. This means that the amount of RAM available for the operating system and applications is decreased significantly. The general rule for PXE booting Windows XP Embedded is that the maximum amount of RAM that can be allocated for the virtual disk can be, at most, half of the available RAM on the SBC-GX1. Subsequently, as the SBC-GX1 is supplied with 256MB RAM, the maximum disk image size that can be used with PXE booting is 128MB.

Neither of the images supplied with this Development Kit are small enough to be used with PXE booting. If you want to build your own image, or customise one of the Arcom supplied images to make it smaller, you must use Target Designer to remove unwanted components.

To make use of PXE booting, you need an appropriately configured DHCP server attached to your network. You also need to have the **Remote Boot Tools** from Windows Embedded Studio installed on a development machine / server on your network.

For detailed instructions of how to create a PXE bootable disk image, and deploy it using **Remote Boot Tools**, please refer to this website:

msdn.microsoft.com/library/en-us/dnxpesp1/html/tchDeployingWindowsXPEmbeddedRemoteBoot.asp

Setting up Windows Embedded Studio

Arcom's Windows XP Embedded Development Kits are supplied with two pre-built images of the Windows XP Embedded operating system, each with different levels of functionality. Either of these may be used in a final deployed system. In cases where neither of them offers suitable functionality, Microsoft Windows XP Embedded Studio can be used to customise an existing image or to create a completely new one.

The Target Designer extensions supplied on the Development Kit CD support Windows XP Embedded service pack 1.

Target Designer extensions for the following devices and utilities are supplied on the support CD:

- The SBC-GX1 on-board sound adapter.

- Support for remote debugging.

- A general purpose IO driver.

- Arcom's AIM104 PC/104 IO boards.

- Arcom's watchdog support for the SBC-GX1 board.

- Touchscreen controller.

The CD also contains configuration information for Microsoft Windows XP Embedded Studio that enables any of the pre-built images to be reproduced or used as the basis for a custom configuration.

An evaluation copy of Microsoft Windows XP Embedded Studio is supplied with this Development Kit. It consists of Target Designer and Component Designer. To create distributable Windows XP Embedded images, a full version must be obtained from a Microsoft distributor.

Installation

Install Microsoft Windows XP Embedded Studio on the development PC following the instructions supplied, and then install the Target Designer Extensions package from the SBC-GX1 Windows XP Embedded support CD.

Target Designer extensions

To import Target Designer extensions, follow these steps:

1 Make sure you have write access to the Repositories folder (which is in the Windows Embedded Data folder). If you don't, create a share with your user name by right-clicking on the Repositories folder and then selecting **Properties** → **Sharing**.

2 Start Target Designer and select **Component Database Manager** from the **Tools** menu. The **Component Database Manager** window is displayed:
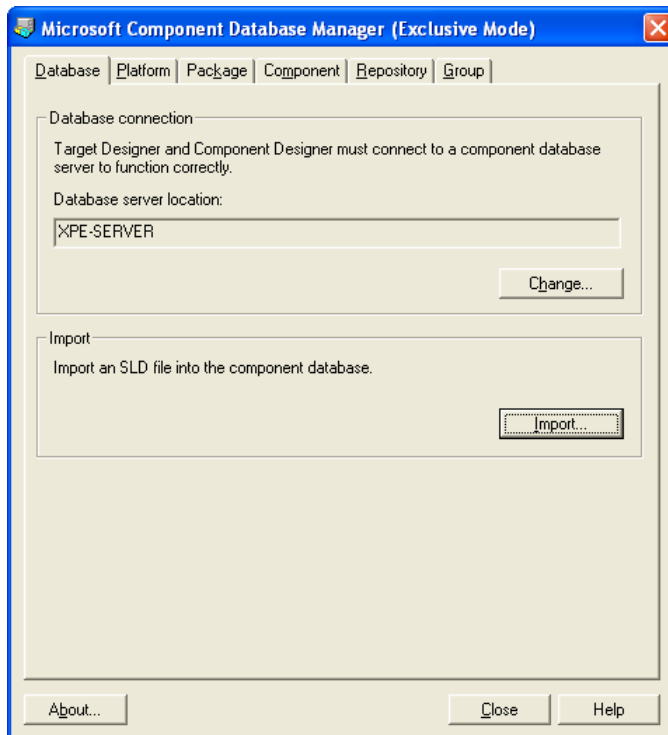
Target Designer extensions are stored in files with an '.sld' extension.

---

3 Click on **Import**. The **Import** SLD dialog box is displayed.

4 Select the file Arcom AIM104.sld from the following folder:

\Arcom\XPEmbedded\SBC_GX1\TDExtensions\Components\AIM104

5   Click on **Import**. Target Designer imports all files required by the SBC-GX1 AIM104 driver and adds them to its internal database:
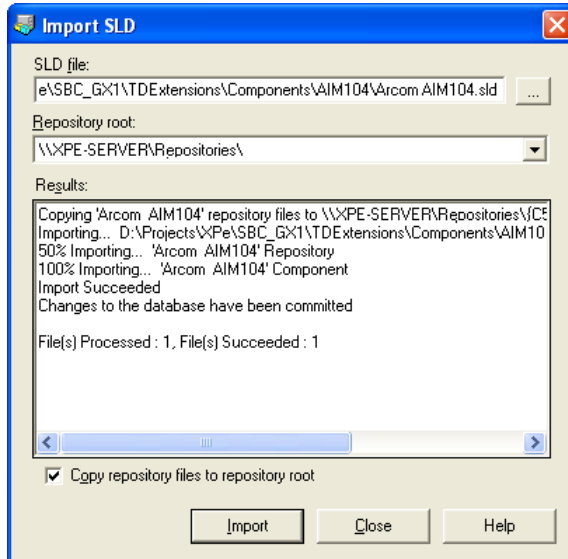
6   Click on **Close**.

7   Repeat steps 3 through 6 to add the following components to the component database manager:

- Arcom VCRemote Debugger.sld.

- Arcom Touchscreen.sld.

- Arcom Startup Logo.sld.

- Arcom EWF.sld.

- Arcom SBC_GX1 GPIO.sld.

- Arcom SBC_GX1 Audio XPe.sld.

- Arcom SBC_GX1 Watchdog.sld.

- Arcom SBC_GX1 Bug Fixes.sld.

These components are in the following folder:

\Arcom\XPEmbedded\SBC_GX1\TDExtensions\Components\

8   Import the Arcom SBC-GX1 design template Arcom SBC-GX1.sld from the following folder:

\Arcom\XPEmbedded\SBC_GX1\TDExtensions\Components\SBC-GX1DesignTemplate.

This design template has all the components for all the devices on Arcom's SBC-GX1 board. If you want to create a new configuration, you can add this component to your configuration. This design template appears as Arcom SBC-GX1 under **Design Templates** in the list of components.

Updates

The Microsoft .NET Framework 1.1 component was not available at the time Windows XP Embedded Studio (SP1) was released. To include this component, an update from Microsoft must be installed. A few additional updates are also required for the Standard XPe image included with the Development Kit. These updates are:

- **Q811279:**   Repository look-up may cause incorrect files to be copied.

- **Q831558:**   NET Framework 1.1 component for Windows XP Embedded with SP1.

- **Q810144:**   System cloning resets runtime information.

- **Q828741:**   Security update for Windows XP Embedded with SP1.

- **Q823025:**   Certain Enhanced Write Filter (EWF) commands do not work properly.

- **Q818822:**   Programmatically control EWF APIs.

- **Q816654:**   Blue screen error IRQL_NOT_LESS_OR_EQUAL using EWF.

The repository update (Q811279) is an update for Target Designer and must be installed prior to the other updates. All these updates can be downloaded from the Microsoft website at www.microsoft.com/downloads.

Viewing components

To view all the components, set the visibility to 100. To set the visibility, open Target Designer and select **Tools → Options → Advanced → Minimum visibility**.

If you just want to view Arcom components, you can create a filter by following the steps below:

1   Open Target Designer and select **Tools → Filter Manager → New**.

2   Enter the name **Arcom** to represent this new filter.

3   Double-click on **Component Display Name Contains** under **Filter Rules**.

4   Double-click on **Component Display Name Contains**, which now appears in the **Filter Description** window with the heading **Filter Rule and Edit box**. The following words are displayed:

```
Enter String
```

5   Enter the string **Arcom** in the edit box and then click on **OK**. You return to the **Filter Editor** window.

6   Click on **OK** in the **Filter Editor** window.

7 Click on **Apply Filter**. This displays all the components supplied by Arcom for the Windows XP Embedded SBC-GX1 Development Kit:
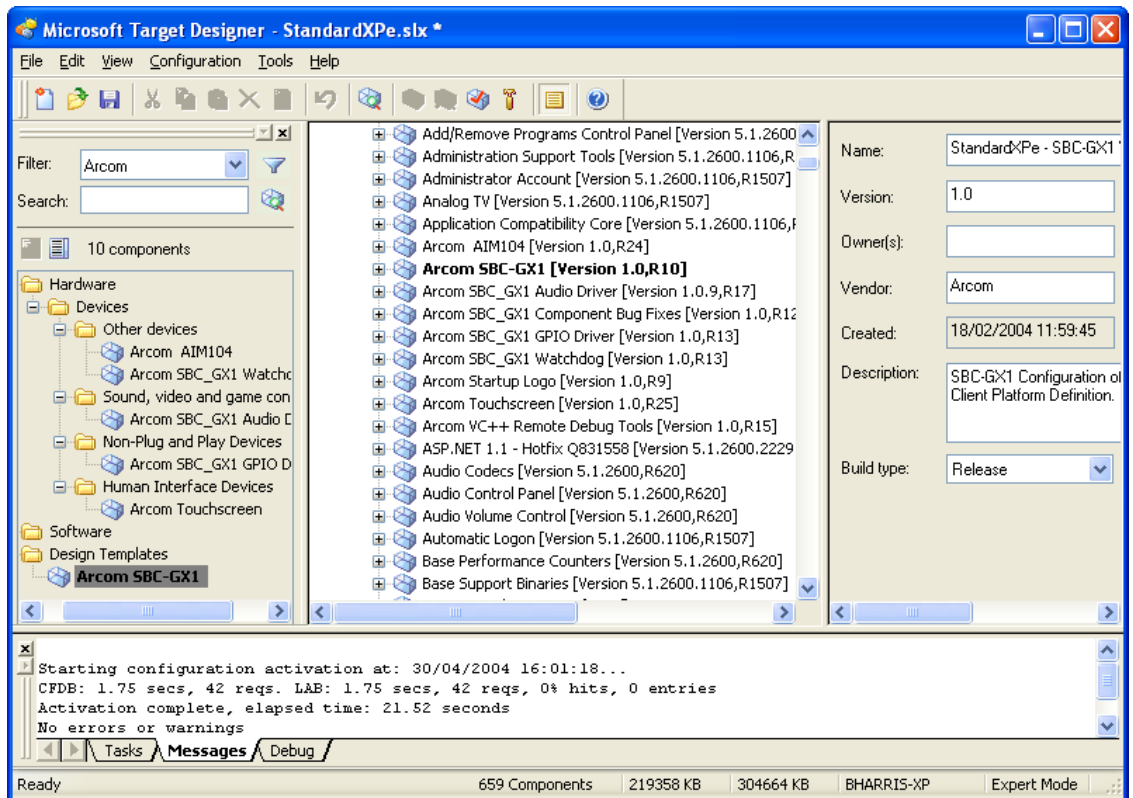
If you want to view all the components in the Target Designer, select **All Components** from the **Filter** drop-down list in the left-hand pane of the main Target Designer window.

Configuration information

Once all the components have been imported to the component database, you can open the specific configuration in Target Designer. For example, to select the Standard XPe configuration, open the file StandardXPe.slx located in the following folder:

\Arcom\XPEmbedded\SBC_GX1\TDExtensions\Configuration

To view target device settings, follow these steps:

1   Open Target Designer.

2   Click on **Settings**, under **StandardXPe.slx** in Target Designer.

3   Click on **How**, under **Target Device Settings**.

The target device settings shown suggest that images created using these settings must be run from drive C, with a boot partition size of 512MB. These are the settings used to create all the images shipped with this SBC-GX1 Windows XP Embedded Development Kit.

If you want to use CompactFlash with a boot partition size other than 512MB, change the Boot Partition Size settings under Target Device Settings.

If you want to use a boot drive other than the C drive, you must change the target device settings as appropriate. The settings you need to change may include the boot drive, Windows folder, program files folder, documents and settings folder and the boot ARC path.

To view information about any of these settings, click on (more info) next to the name of the setting.

Create a new XP Embedded image with these target device settings, copy the new image to the drive (as explained in Transferring a new image to the SBC-GX1, page 39) and then boot the system.

Transferring a new image to the SBC-GX1

The CompactFlash module supplied with the Development Kit is installed with a copy of the Standard XPe image. This contains many of the features available in Windows XP Embedded and is well suited to a development environment. Customers who wish to use an image created by Target Designer must download it from a host development system into the CompactFlash module on the SBC-GX1.

A special utility floppy disk is provided with the kit that allows the supplied CompactFlash module to be modified or a new one to be installed and configured. A floppy drive must be connected to the SBC-GX1, and you will need either a CompactFlash reader/writer on the host development system or an Ethernet connection between the SBC-GX1 and the host development system for this operation. If you are using the Ethernet connection to transfer the image, some of the images are quite large and may take up to 1½ hours or longer to transfer, depending on network traffic.

All the images for the SBC-GX1 Windows XP Embedded Development Kit shipped by Arcom are designed for 512MB CompactFlash only. If you want to use a CompactFlash size other than 512MB, you must use Windows XP Embedded Studio to modify the boot partition size from the corresponding configuration, and rebuild the image.

Also please note that the CompactFlash has to be on drive C on the SBC-GX1 board for the images shipped with this Development Kit to work. For details, see Configuration information, page 38.

Using the supplied utilities

To transfer a new image to the SBC-GX1, you use a range of utilities. To access these utilities, boot the SBC-GX1 from the utility floppy disk.

You may need to change the boot order in the BIOS to boot from drive A first.

This starts a ROM-DOS session with TCP/IP support. An attempt is made to obtain an IP address using DHCP. Make a note of the IP address assigned to the SBC-GX1, as it is required by utilities that run on the host development system. If DHCP is not available, a fixed address must be assigned. See Assigning an IP address, on the next page.

From your ROM-DOS session, you can then:

- Prepare a new CompactFlash module. See page 41.
- Format a CompactFlash module. See page 42.

- Transfer an image onto the SBC-GX1. The way you do this varies, depending on whether you have a CompactFlash adapter on your development system (see page 43) or not (see page 44).

- Add the XP boot loader to a CompactFlash module. See page 46.

Assigning an IP address

If a DHCP server is not available, the IP address can be assigned by editing a configuration file on the floppy. A text editor called **ned** is provided on the floppy to do this. Follow these steps:

1   Boot from the floppy, then type:

ned \sockets\socket.cfg

2   Edit the line **ip address 0.0.0.1** so that it shows the required address.

3   Save the file by pressing **F9**.

4   Exit and return to ROMDOS by holding down **Alt** and pressing **F4**.

The new IP address is used the next time the system is booted.

Preparing a new CompactFlash module

CompactFlash modules are available in various sizes from 4MB. Contact Arcom for further information about these parts. Arcom recommends the use of SanDisk SDCFB-xxx-201-80 CompactFlash cards (where xxx represents the CompactFlash size). These devices are supplied completely blank without partition information, and must be partitioned and formatted before they can be used. To do this, follow these steps:

1 Insert the new CompactFlash module into the socket on the under-side of the SBC-GX1.

2 Start the FDISK utility by typing **FDISK** and then pressing **Enter**.

3 View the current partitions by pressing **V**.

4 Verify that disk 1 is the CompactFlash module and that it does not contain any partitions. If partitions already exist, use the **Delete all partitions** option in the **FDISK** menu to remove them.

5 Partition the CompactFlash module as required. The following table lists the functions that are available as you do this:

Press...	To...
Esc	Return to the **FDISK** menu.
C	Create a new partition.
992	Use all but 1 cylinder on the CompactFlash. If you are not using the CompactFlash supplied with your development kit, you may have to adjust this to suit. (EWF does not work properly if you use all the cylinders.)
Enter	Create a single partition using the entire CompactFlash.
N	Return to the **FDISK** menu.
M	Write the master boot code.
S	Save the changes and restart.

Once the CompactFlash module has been partitioned, it must be formatted. See Formatting a CompactFlash module, page 42.

Formatting a CompactFlash module

To transfer a complete Windows XP Embedded image, the CompactFlash module must be completely erased. The easiest way to do this is to format the module, by typing:

format c:

This erases everything from the CompactFlash module, so make sure there is no useful data on the module before you do this.

Do not format the CompactFlash module using the CompactFlash reader/writer on your host PC as it may prevent Windows XPe from booting properly on the SBC-GX1.

Transferring an image

The easiest way of putting an image onto the SBC-GX1 is to use a USB or PCMCIA CompactFlash adapter on your development system. This can be used to copy files to the CompactFlash very quickly. The CompactFlash must be partitioned, formatted and completely blank before downloading the files. This should be done by formatting it as described in Formatting a CompactFlash module, page 42.

The CompactFlash must be formatted as a FAT16 device. If you are using an image with EWF included and the CompactFlash module has previously had an XPe installation on it, it is important to ensure that all partitions are removed beforehand and a new partition is created. The easiest way to wipe a CompactFlash module is to run **FDISK** from the bootable floppy disk to remove all partitions, create a new partition and format it as described in Formatting a CompactFlash module, page 42.

Both the Standard XPe and Minimal XPe images supplied include EWF.

Once the device has been prepared, simply copy the files using Windows Explorer. All the files and folders should be copied to the root folder. For example, if your CompactFlash drive appears as drive F: on your development system and you want to copy the Minimal XPe image, copy all the folders and files in the Minimal XPe folder to the F drive. When copying is complete, the folder structure under the F drive should look like this:
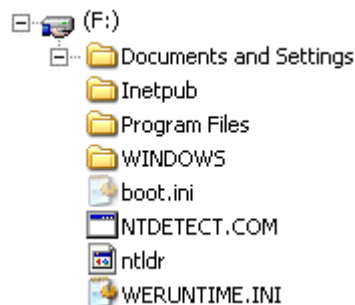
Insert this CompactFlash back into the SBC-GX1 CompactFlash drive and add the XP boot loader as described in Adding the XP boot loader, page 46.

An alternative method of transferring the image

If you do not have access to a CompactFlash adapter on your development system, you can transfer the files to the SBC-GX1 via a network connection. In order to download an image, the CompactFlash module must be completely blank. If you are using an image with EWF included and the CompactFlash module has previously had a Windows XP Embedded installation on it, it is important to ensure that all partitions are removed beforehand and a new partition is created. The easiest way to wipe a CompactFlash module is to run **FDISK** from the bootable floppy disk to remove all partitions, create a new partition and format it as described in Formatting a CompactFlash module, page 42.

Both the Standard XPe and Minimal XPe images supplied include EWF.

To download an image, follow these steps:

1   Start the SBC-GX1 download utility by typing **ftpd**.

2   Move to the development system and open the download utility from the **Start** menu by selecting **All Programs** → **Arcom XP Embedded** → **SBC-GX1** → **Tools** → **Icopy**.

The **icopy** dialog box is displayed:

Icopy.exe is in the \Arcom\XPEmbedded\SBC_GX1\Tools\Icopy folder.

3   Click on **Settings** to display the **Settings** dialog box.

4   Enter the IP address of the target system and the location of the folder containing the required Windows XP Embedded image, as shown:
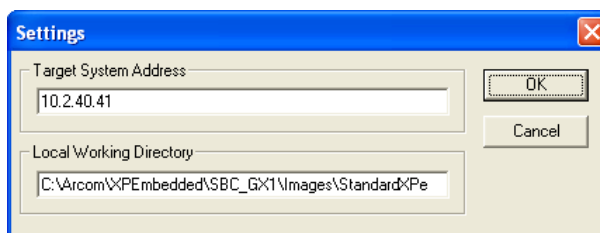
5   Click on **OK** to close the **Settings** dialog box and return to the **icopy** dialog box.

6   Click on **Start** to begin the transfer. The path name of the file being transferred is displayed in the **Downloading** panel. Image transfer should take between 45 minutes and 90 minutes, depending on image size and network traffic.
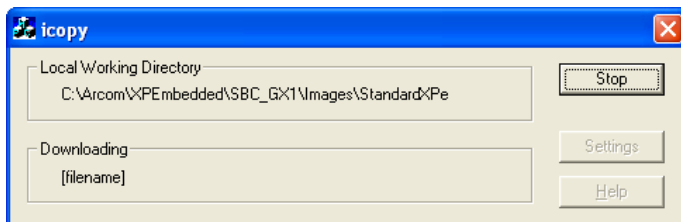
You can stop the transfer at any time by clicking on **Stop**.

When the transfer is complete, the following words are displayed:

`Finished downloading`

7   Type **X** on the SBC-GX1 when all the files have been transferred. You return to the ROMDOS prompt.

Adding the XP boot loader

Once all the files have been transferred, a copy of the XP boot loader must be transferred to the CompactFlash module. To do this, type **ntboot c:** on the SBC-GX1.

The CompactFlash module is now ready and boots into the new version of Windows XP Embedded the next time the SBC-GX1 is restarted without the utility floppy.

When the new Windows XP Embedded image boots for the first time, the first boot agent runs for approximately 35 minutes. Click on **OK** when the following message box is displayed:

FBReseal

Machine Resealed! Click OK to reboot.

OK
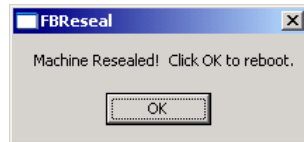
The system restarts and continues the boot process. It may take up to a further 12 minutes for the Windows XP Embedded desktop to appear. After this it typically takes 1½ minutes to boot.

Recreating the utility floppy

If the utility floppy becomes damaged it can be recreated from files on the Development Kit CD as follows:

1   Start an MS-DOS command window on your development system and change the folder to:

\Arcom\XPEmbedded\SBC_GX1\Tools\BootDisk

2   Insert a blank formatted floppy into your development system and type:

flwrite bootdisk.bin a:

The utility floppy contains licensed material and should only be recreated if the floppy supplied with the kit fails.

This copying utility changes the creation dates of the files to the date they were copied. This may cause problems for install programs that replace files only if they are newer than the existing ones.

Security and image duplication

Windows XP Embedded images can be duplicated via one of two possible methods, standalone and cloning. The standalone method is not recommended for production, but is useful during development, whereas the cloning method may be used during production.

Whichever method is used, it is essential that each duplicate module is allocated a unique computer security ID (SID). You must also ensure that you have the appropriate Windows XP Embedded licenses.

Start from the new image prepared using Microsoft Windows XP Embedded.

CompactFlash requirements

If you want to run the supplied sample images using any other CompactFlash, the boot partition size for that CompactFlash must be 512MB. If you wish to use a different size CompactFlash, you must prepare the Windows XP Embedded image accordingly using Windows XP Embedded Studio, as explained in Configuration information, page 38.

All the Windows XP Embedded images shipped with this Development Kit are configured for a boot partition size of 512MB.

The boot drive must be the C drive, as these images are configured to run from this drive.

Duplication of Windows XP Embedded images

Proper duplication can be achieved using either the standalone or the cloning method. These are described below:

Standalone method

This method simply involves copying the required folders and files to your CompactFlash module, then adding the required boot loader and rebooting the system. Follow these steps:

1   Copy all the folders and files for the required image to a properly formatted CompactFlash. For more information about image copying and the boot loader, see Transferring a new image to the SBC-GX1, page 39.

2   Add the boot loader for Windows XP Embedded. See Adding the XP boot loader, page 46.

3   Boot the individual system.

The sample image supplied with this Development Kit only works with 512MB CompactFlash devices. The complete boot process takes approximately 45 minutes for each system, depending on the image size.

When complete, the following message box is displayed:

4   Click on **OK**. The system restarts and continues the boot process. Once the boot procedure is complete, the Windows XP Embedded desktop is displayed.

Repeat this procedure for each individual CompactFlash to get duplicate OS images, each with its own unique SID.

Cloning method

You can use the cloning method described in Microsoft Windows XP Embedded Studio. This is a two-stage process. The first stage involves creating a master copy, which is duplicated in the second stage to create clones.

To use the cloning method, the system cloning tool component must be included in the image. All the sample images supplied with this Development Kit include this component. You require a floppy disk, a hard disk with a DOS file system and enough free space to copy the entire CompactFlash device.

Creating the master copy

Creating the master copy is similar to creating a standalone system. You must copy the required folders and files to your CompactFlash module, then add the required boot loader and reboot the system. Follow these steps:

1   Copy all the folders and files for the required image to a properly formatted CompactFlash. For more information about image copying and the boot loader, see <u>Transferring a new image to the SBC-GX1</u>, page <u>39</u>.

2   Add the boot loader for Windows XP Embedded. See <u>Adding the XP boot loader</u>, page <u>46</u>.

3   Boot the SBC-GX1 using a 512MB CompactFlash device until the following message box is displayed:

This takes approximately 35 minutes.

The sample image supplied with this Development Kit only works with 512MB CompactFlash devices.

4   Click on **OK** and wait for the system to reset, but don't allow the system to reboot. Instead, switch off the power as the SBC-GX1 begins to restart.

This CompactFlash is now the master copy and can be removed from the SBC-GX1.

> Make sure this master copy is not used to boot the system again.

Creating the clone CompactFlash card from the master

To copy the master CompactFlash onto another CompactFlash (the clone), follow these steps:

1   Power off the SBC-GX1 board.

2   Insert the master CompactFlash into the SBC-GX1.

3   Connect the floppy disk drive to the SBC-GX1 board using the floppy drive cable and connect the floppy drive power connector to the power supply.

4   Insert the utility floppy disk provided with this Development Kit in the floppy drive.

5   Connect the Ethernet cable to the SBC-GX1 Ethernet connector.

6   Connect the hard disk drive to the SBC-GX1 board, using the hard disk and power cables.

> Use a FAT formatted hard disk with enough free space to hold the entire master CompactFlash.

7   Start the SBC-GX1 and press **Del** in order to enter the BIOS settings.

8   Go to **Basic CMOS Configuration** and press **Enter**.

9   Adjust the settings so that they appear as shown below:

```
              System Bios Setup Basic CMOS Configuration
           (C) 2001 General Software, Inc. All rights reserved

DRIVE ASSIGNMENT ORDER:    Date: Jan 01, 2004    Typematic Delay  : 250 ms
Drive A: Floppy 0          Time: 00 : 00 : 00    Typematic Rate   : 30cps
Drive B: (None)            NumLock:   Enabled    Seek at Boot     : None
Drive C: Ide 2/Sec Master                        Show "Hit Del"   : Disabled
Drive D: Ide 0/Pri Master  BOOT ORDER:           Config Box       : Disabled
Drive E: (None)            Boot 1st: Drive A:    F1 Error Wait    : Disabled
Drive F: (None)            Boot 2nd: Drive C:    Parity Checking  : (Unused)
Drive G: (None)            Boot 3rd: (None)      Memory Test Tick : Enabled
Drive H: (None)            Boot 4th: (None)      Debug Breakpoints: (Unused)
Drive I: (None)            Boot 5th: (None)      Debugger Hex Case: Upper
Drive J: (None)            Boot 6th: (None)      Memory Test : FastLo FastHi
Drive K: (None)
Boot Method: Boot Sector   ATA DRV ASSIGNMENT:   Sect  Hds  Cyls   Memory
                           Ide 0: 3 = AUTOCONFIG, LBA               Base:
FLOPPY DRIVE TYPES:        Ide 1: Not Installed                     633KB
Floppy 0: 1.44 MB, 3.5"    Ide 2: 3 = AUTOCONFIG, LBA               Ext:
Floppy 1: Not installed    Ide 3: Not Installed                    250MB

      ↑/↓/←/→/<CR>/<Tab> to select   or   <PgUp>/<PgDn>/+/- to modify
                     <Esc> to return to main menu
```

10   Press **Esc** and then select **Save & Exit Setup** from the main BIOS menu.

11   Press **Enter**. The following message is displayed:

SAVE to CMOS and EXIT (Y/N)? Y

12   Press **Enter** to save your changes. The SBC-GX1 boots from the floppy drive into ROM-DOS.

13   Enter the following command at the ROM-DOS prompt:

A:> hdread d:\xpeimg.bin 80

The hdread utility stores the image of the master CompactFlash on the hard disk, as the file xpeimg.bin.

14   Switch off the SBC-GX1 board and remove the master CompactFlash from the SBC-GX1 board.

15   Insert the new CompactFlash card into the SBC-GX1. The new CompactFlash must be the same size as the master, but does not need to be formatted.

16   Power on the SBC-GX1, which again boots from the utility floppy disk into the ROM-DOS.

17   Type the following command at the ROM-DOS prompt:

A:> hdwrite d:\xpeimg.bin 80

The hdwrite utility writes the image of the master CompactFlash stored on the hard disk onto the new CompactFlash. The newly created CompactFlash is the clone device.

Repeat this procedure to create CompactFlash device you require.

Booting the SBC-GX1 using the clone CompactFlash

To boot the SBC-GX1 using the clone CompactFlash, follow these steps:

1   Insert the clone CompactFlash into the SBC-GX1.

2   Disconnect the hard disk from the SBC-GX1.

3   Start the SBC-GX1 and press **Del** in order to enter the BIOS settings.

4   Select **Reset CMOS to Factory Defaults** and press **Enter**.

5   Press **Del** immediately to display the BIOS set up screen as the system reboots.

6   Select **Basic CMOS Configuration** and press **Enter**.

7   Set the **Date** and **Time** to current values.

8   Press **Esc** and choose **Save & Exit Setup** from the main BIOS menu.

9   Press **Enter**. The following message is displayed:

```
SAVE to CMOS and EXIT (Y/N)? Y
```

10   Press **Enter** to save your changes.

The SBC-GX1 reboots and Windows XP Embedded goes through some more initialization to ensure that a new SID is created and the system security settings are set appropriately. This takes approximately 10 to 12 minutes.

Each clone created this way has a unique SID when it completes the boot process and shows the Windows XP Embedded desktop.

Do not duplicate the image from a CompactFlash card after it has completed the whole boot process. This would result in duplication of the computer security ID (SID).

Do not remove or insert the CompactFlash while the power is on.

Expansion boards

Arcom's Windows XP Embedded Development Kit includes a special kernel mode driver that allows direct access to hardware. This is used in conjunction with user mode DLLs to provide support for a number of specialised on-board features, such as the watchdog and Arcom's AIM104 range of PC/104 bus expansion boards. Full details of the programming interface, and its use with Visual Basic and Visual C++ are provided in the AIM104 Expansion Boards manual on the accompanying CD-ROM.

Appendix A – Contacting Arcom

Arcom sales

Arcom's sales team is always available to assist you in choosing the board that best meets your requirements. Contact your local sales office or hotline.

Sales office US

Arcom
7500W 161st Street
Overland Park
Kansas
66085
USA

Tel:　　　913 549 1000
Fax:　　　913 549 1002
E-mail:　　us-sales@arcom.com

Sales office Europe

Arcom
Clifton Road
Cambridge
CB1 7EA
UK

Tel:　　　01223 411 200
Fax:　　　01223 410 457
E-mail:　　euro-sales@arcom.com

Full information about all Arcom products is available on our Web site at www.arcom.com.

While Arcom's sales team can assist you in making your decision, the final choice of boards or systems is solely and wholly the responsibility of the buyer. Arcom's entire liability in respect of the boards or systems is as set out in Arcom's standard terms and conditions of sale. If you intend to write your own low level software, you can start with the source code on the disk supplied. This is example code only to illustrate use on Arcom's products. It has not been commercially tested. No warranty is made in respect of this code and Arcom shall incur no liability whatsoever or howsoever arising from any use made of the code.

Technical support

Arcom has a team of technical support engineers who can provide assistance if you have any problems with your SBC-GX1.

Technical support US

Tel:　　913 549 1010

Fax:　　913 549 1001

E-mail: us-support@arcom.com

Technical support Europe

Tel:　　+44 (0)1223 412 428

Fax:　　+44 (0)1223 403 409

E-mail: euro-support@arcom.com

Appendix B – End User License Agreement (EULA)

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Attachment A

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Microsoft OEM Customer License Agreement For Embedded Systems.

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