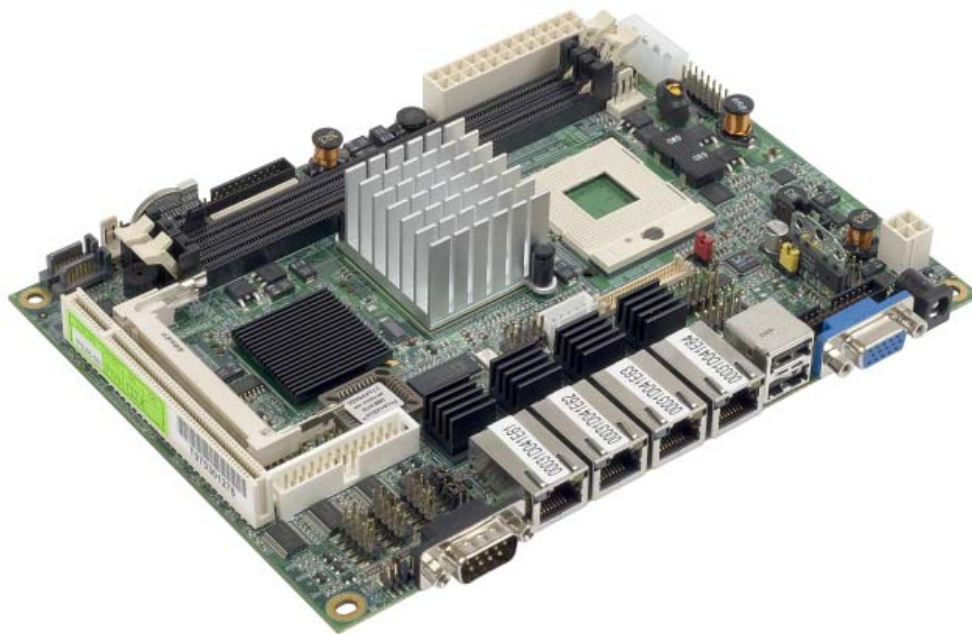


GEMINI

Linux Quickstart Manual



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Revision History

<i>Manual</i>	<i>PCB</i>	<i>Date</i>	<i>Comments</i>
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For contact details, see page [31](#).

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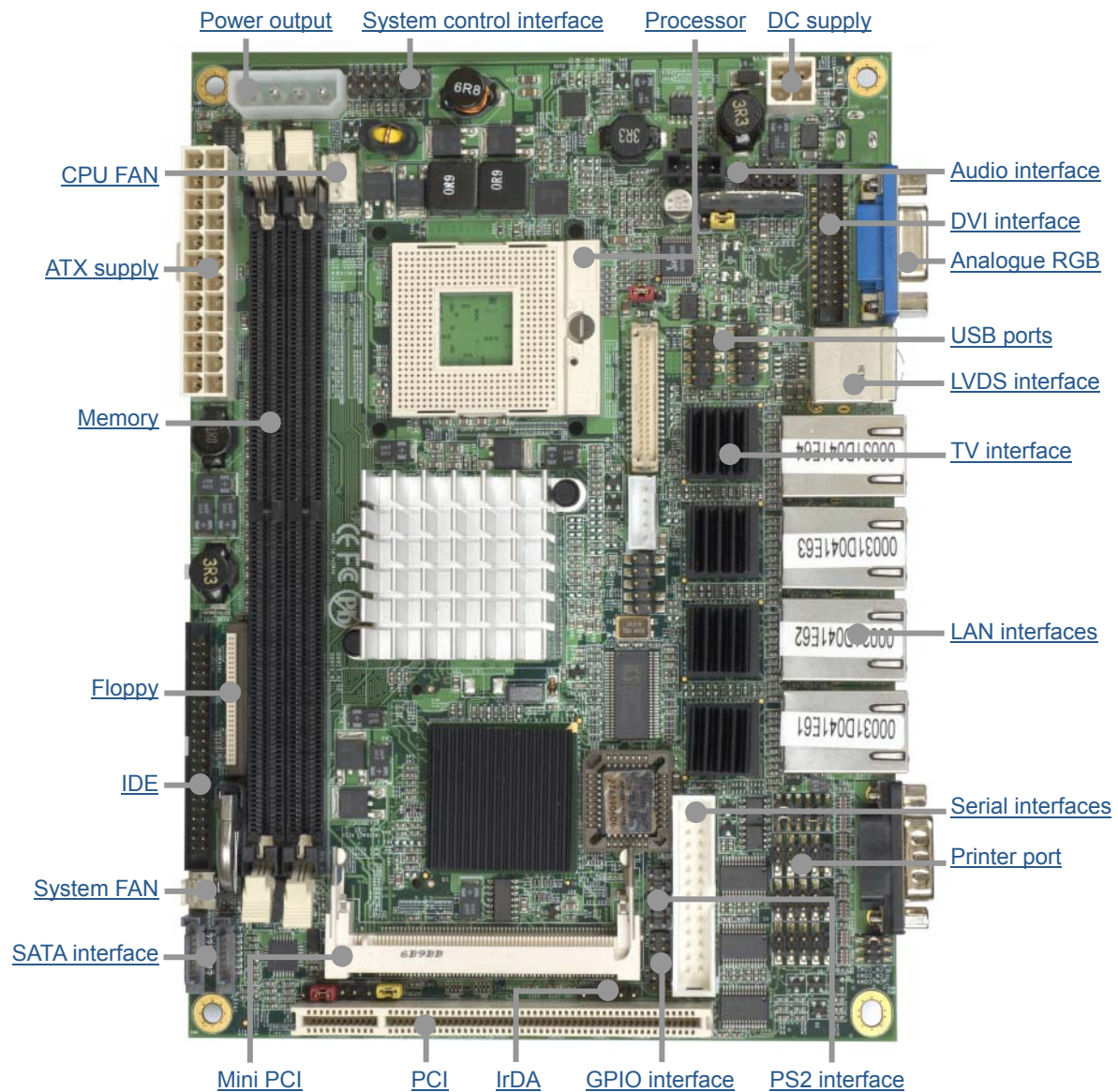
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Introduction

This Linux development kit features a fully configured version of the Fedora 8 Linux (kernel v2.6) operating system pre-loaded and configured on a 2GB USB Flash Disk. The operating system image is a comprehensive build of Linux, supporting most of the onboard features of the GEMINI.

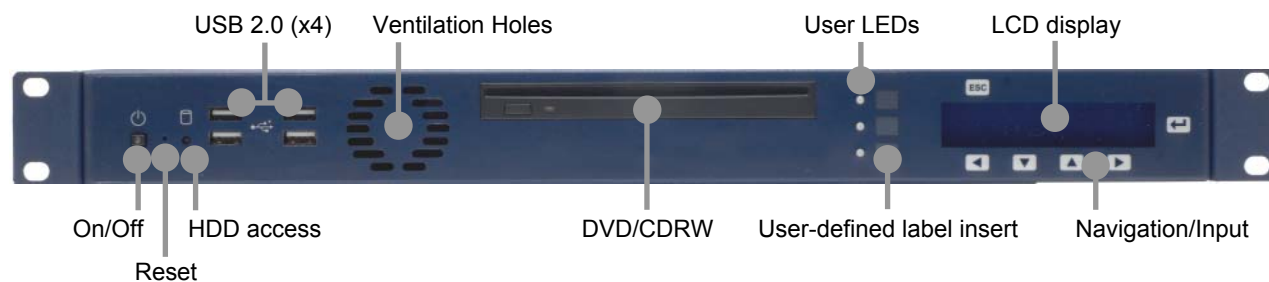
The development kit offers a ready-to-run, rapid application development environment which saves valuable engineering time.

GEMINI 'at a glance'

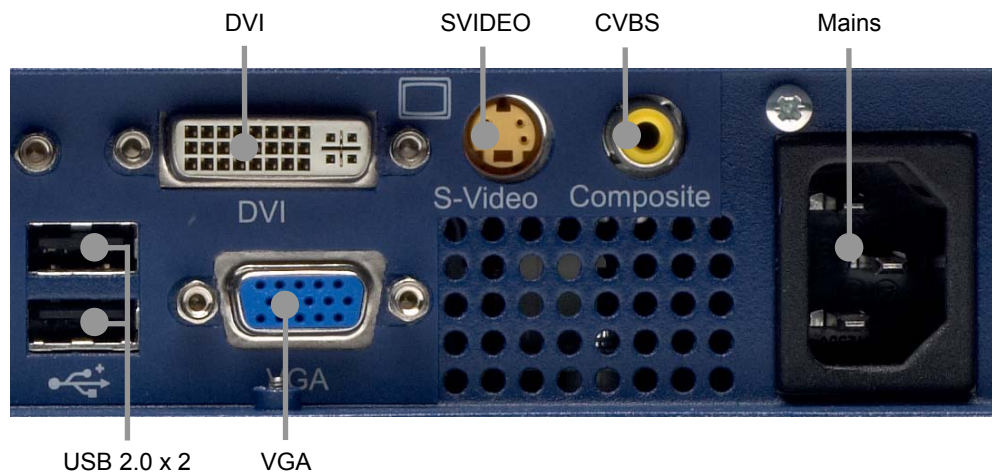
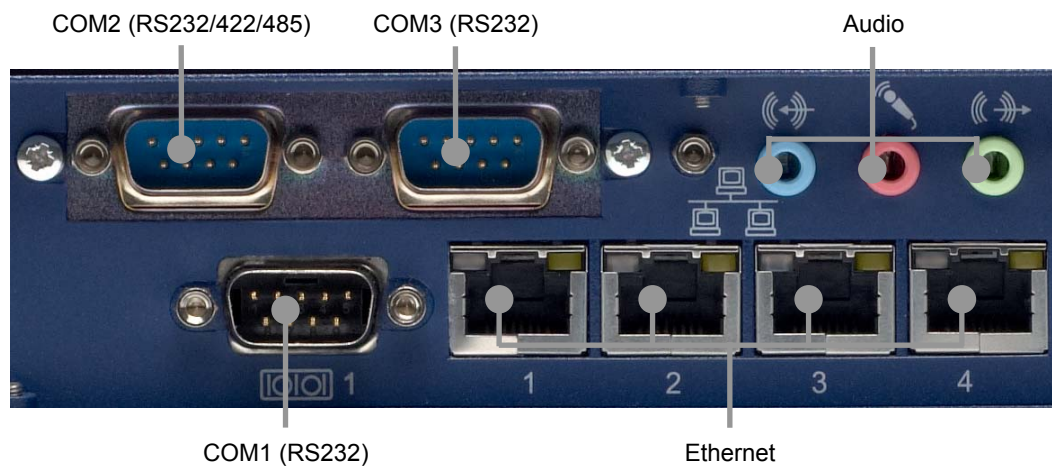


GEMINI 1U ICE 'at a glance'

Front panel view (both AC and DC versions)



Rear panel views (AC version)



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 an earthed 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.

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, please ensure that it is adequately packed, preferably in the original packing material.

Electromagnetic Compatibility (EMC)

The GEMINI 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 covers the GEMINI Linux development kit, which provides a complete environment for the development of Linux applications.



This manual does not cover the basics of administering a Linux distribution in general. Please consult your Linux distribution documentation for this information.

Related documents

Further manuals are provided on the DVD-ROM that accompanies your development kit, in the /manuals/ folder. These include:

- GEMINI Technical Manual: provides details about the GEMINI hardware.
- GEMINI ICE Technical Manual: covers the enclosure solution for the GEMINI.




The software supplied in the GEMINI development kit was developed and tested using Fedora 8 and the supplied binaries were compiled in a Fedora 8 environment. Although it should be possible to compile the source code for any common Linux distribution, this has not been tested.

More information about Fedora can be found on the Fedora website at fedora.redhat.com.

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.

Typographical conventions

This manual contains examples of commands that you can enter. These are shown as follows:

\$ make install DESTDIR=/tmp/target-install

The initial symbol (\$ in this case) indicates the prompt that the command is for, and should not be typed.

The prompts used are explained in the following table:

Prompt	Explanation
\$	Linux (bash shell) as a regular user.
#	Linux (bash shell) as root.

Different fonts are used throughout the manual to identify different types of information, as follows:

Font	Explanation
<i>Italics</i>	Parts of a command that should be substituted with appropriate values.
Bold	Information that you enter yourself.
<code>Screen text</code>	Information that is displayed on screen.

Getting started

What's in the kit?

GEMINI development kit

- GEMINI processor board:
 - 2.16GHz Intel core 2 Duo T7400 CPU.
 - 1024MB PC2-5300 DDR2 RAM.
- Low profile 180W Flex ATX power supply (100V - 240V AC Input).
- 2GB Intel USB Flash Disk module pre-loaded with Fedora 8.
- US, UK or European power cord.
- 2m CAT-5e cross-over Ethernet cable (suitable for Gigabit Ethernet).
- 2m RS-232 Null modem cable.
- PS/2 break-out cable.
- GEMINI Linux development kit DVD.
- Fedora 8 installation DVD.
- GEMINI interface board for power control switch, reset button, activity indicators, and USB ports - supplied with interconnecting cables.

What else do I need?

- Keyboard and mouse (PS/2 or USB).
- Monitor.

Unsupported hardware feature

The following hardware feature is not currently supported:

- Suspend and resume.

Unpacking and connecting up

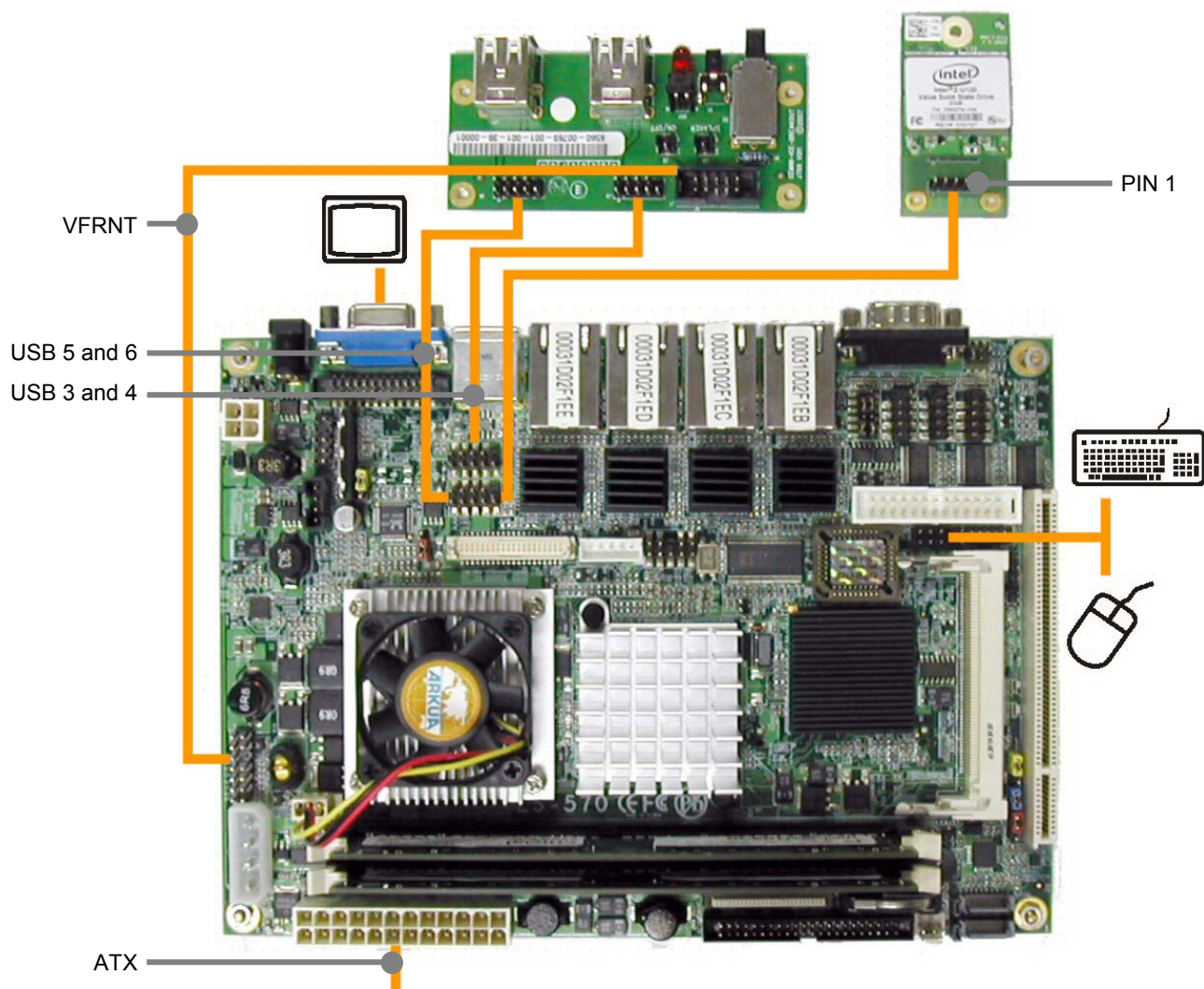
Arcom's Linux development kits are shipped 'ready to run'. You simply remove the various items from their packaging and connect them up.



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.

Using a VGA monitor

If you are using a VGA monitor, you can get started quickly and ensure everything is connected properly by referring to the following diagram and procedure:



To unpack and connect up the GEMINI, follow these steps:

- 1 Remove the GEMINI CPU board from its packaging and place it on a static-free work surface.
- 2 Connect up the breakout board, as shown in the diagram on the preceding page.
- 3 Do one of the following:
 - Plug the dual PS2 breakout cable into connector CN_PS2. Plug a keyboard into the socket with a purple marking, and a PS2 mouse the socket with a green marking.

-or-

 - Plug a USB keyboard and mouse into any of the USB sockets.
- 4 Plug a VGA monitor into the rear socket.
- 5 Using the supplied cable, connect the USB-VSSD-CARRIER board to USB connector CN_USB2. Make sure that the cable is round the correct way - so the red stripe is connected to pin 1 on the USB-VSSD-CARRIER board.
- 6 Plug the ATX Power Supply Unit (PSU) cable into the socket.
- 7 Fit the appropriate power lead to the PSU.



The power switch is located on the GEMINI breakout board.

BIOS settings

The BIOS on the GEMINI is from Phoenix - AWARD. Should you to set the BIOS to the default/factory settings, follow these steps:

- 1 Reset the board, wait for the system speaker to 'beep' and then press **Del**. The BIOS set up screen is displayed.
- 2 Select **Load Optimised Defaults** using the arrow keys and press **Enter**.
- 3 Select **[Y]es** and press **Enter**.
- 4 Select **Standard CMOS Features** and press **Enter**.
- 5 Use **Page Up** and **Page Down** to locate **Drive A** and set it to **None**.
- 6 Press **Escape** to return to the main menu.
- 7 Select **Advanced Chipset Features** and press **Enter**.
- 8 Locate **LCD Type** and set it to **3**.
- 9 Press **Escape** to return to the main menu.
- 10 Select **Integrated Peripherals** and press **Enter**.
- 11 Locate **Onboard serial Port 3** and set it to **IRQ4**.
- 12 Locate **Onboard serial Port 4** and set it to **IRQ3**.
- 13 Press **Escape** to return to the main menu.
- 14 Select **Save & Exit Setup** and press **Enter**.
- 15 Press **Enter** again to confirm. The GEMINI reboots with the correct BIOS settings.



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

Logging in

The default root password on systems provided by Arcom is 'admin1'. For security reasons you should change this as soon as possible. Follow these steps:

- 1 Log into the board as the root user.

- 2 Run the passwd utility:

```
# passwd
```

You are prompted:

```
Changing password for user root.  
New UNIX password:
```

- 3 Enter your password.



Your password is not echoed as you enter it.

You are then prompted to retype it:

```
Retype new UNIX password:
```

- 4 Re-type your password.

The following prompt is displayed confirming your password change:

```
passwd: all authentication tokens updated successfully.
```


System configuration

The Fedora 8 image shipped by Arcom is configured with many of the default Fedora 8 options, including those for keyboard mapping (US keyboard), time zone (North American EST) and network interfaces (eth0 DHCP, no eth1, eth2, eth3).

The following sections describe how to reconfigure these settings from a Linux command prompt.

Configuring keyboard mapping

The default keyboard mapping is for a US keyboard. If you are using a different keyboard layout, you can edit the file `/etc/sysconfig/keyboard` using the nano command:

```
# nano /etc/sysconfig/keyboard
```

Change the `KEYTABLE` variable to the correct value for your keyboard.

The available keytables can be found in the `/lib/kbd/keymaps` folder. Set the `KEYTABLE` to the filename you require, without the `.map.gz` suffix.



The correct `KEYTABLE` for a standard British keyboard is 'uk'.

When you have finished, press **Ctrl-X** to save and exit.

Configuring time zone

The default time zone is North American Eastern Standard Time (EST), which is five hours behind GMT. The time zone can be configured using the `tzselect` command:

```
# tzselect
```

```
Please identify a location so that time zone rules can be set correctly.  
[...]
```



In the default configuration, Fedora expects the hardware clock to be set to GMT, and correctly takes into account the local time zone.

Configuring network interfaces

The default network configuration in the Fedora 8 images provided by Arcom is to bring up eth0 automatically on boot using DHCP, and to leave eth1, eth2, eth3, eth4 down.

You can modify the network configuration by editing the files `/etc/sysconfig/network-scripts/ifcfg-INTERFACE`. For example:

```
# name /etc/sysconfig/network-scripts/ifcfg-eth1
```

You can also use `system-config-network` tool to configure the network.

```
#system-config-network
```

Fedora 8 Linux

Each GEMINI development kit is shipped with Fedora 8 pre-installed on the 2 GB Intel USB Flash Disk module.

The sections below explain how to reinstall Fedora 8 Linux should this be necessary. There are two options:

- Reinstall from the pre-prepared 2GB Intel USB Flash Disk image. See below.
- Reinstall from the Fedora 8 DVD. See [Reinstalling from the Fedora 8 DVD](#) on page [19](#).



These instructions apply specifically to the reinstallation of Fedora 8 Linux, but the general approach and principles relate to any Linux distribution of your choice.

Reinstalling from the pre-prepared Intel USB Flash Disk image

The Fedora 8 operating system can be reinstalled using the pre-prepared 2GB Intel USB Flash Disk image, *GeminiF8R1_2GB_USB_FD.bin*, supplied on the development kit DVD-ROM (in the */software/Fedora8/* folder).

You may prefer to reinstall from this image rather than installing Fedora 8 yourself. Details of this procedure are provided below.

To write the Fedora 8 Linux image to a Intel USB Flash Disk using a Linux Host system:

- 1 Power off the GEMINI and remove the Intel flash disk module.
- 2 Using the supplied cable, plug the Intel flash disk into a spare USB slot on your development computer.



The Intel flash disk is capable of operating under both USB and USB2 modes. If your computer has a USB2 slot, it greatly reduce the time required to program the flash disk.

- 3 Use the `dd` utility to write the image to the device:

`dd if=DVDROM/Software/Fedora8/GeminiF8R1_2GB_USB_FD.bin of=/dev/sda`

where ***DVDROM*** is the DVD mount point and ***/dev/sda*** is the correct device node.

Once complete, the following messages are displayed on screen:

```
4007936+0 records in
4007936+0 records out
```

The Intel USB Flash Disk module can now be removed and reinstalled into the GEMINI system.



When using the dd utility, you must specify the correct device node.

Under Linux, USB storage devices traditionally appear as SCSI disks. In a system which has no other SCSI disks this means that the Intel USB Flash Disk is available via the /dev/sda device node. If your host system has other SCSI disks then the Intel USB Flash Disk will be available via the next available SCSI device.

Alternatively, on newer Linux systems, a new USB Block (ub) device driver has been introduced. On systems which are configured to use this device the Intel USB Flash Disk will be available via /dev/uba (assuming it is the only ub device).

To write the Fedora 8 Linux image to a Intel USB Flash Disk using a Microsoft Windows Host system:

- 1 Power off the GEMINI and remove the Intel flash disk module.
- 2 Using the supplied cable, plug the Intel flash disk into a spare USB slot on your development computer.
- 3 Open an explorer window and determine the letters of your DVD drive (e.g. D:) and the removable Intel USB Flash Disk device (e.g. E:).
- 4 Display a command prompt window by:
 - i Clicking on the **Start** menu and selecting **Run...**
 - ii Typing **cmd** and clicking on **OK**.

- 5 Change to the DVD drive and select the /software/ folder:

```
C:\> d:
D:\> cd software
D:\Software>
```

- 6 Run the cfdclone utility, passing the name of the Intel USB Flash Disk image and the Intel USB Flash Disk drive letter:

```
D:\Software> cfdclone /r Fedora8\GeminiF8R1_2GB_USB_FD.bin e:
```



If any applications tried to autorun when you plugged in the Intel USB flash disk, you must close these down before the CFCLONE utility will run, as it must have exclusive access to the flash disk.

- 7 Click on the icon in the system tray near the clock to **Safely Remove Hardware**, once the CFCLONE utility has completed.

Reinstalling from the Fedora 8 DVD

The Fedora 8 operating system can also be installed to the Intel USB Flash Disk from the DVD supplied in the development kit. After doing this, some configuration is required to return the board to a state similar to when it was shipped by Arcom.

The Fedora Installation Guide is available at docs.fedoraproject.org

BIOS configuration

Before you begin reinstalling the Fedora 8 operating system you must make a change to the BIOS configuration. To do this, follow these steps:

- 1 On bootup, press **Del** to access the BIOS configuration screens.
- 2 Select **Advanced BIOS Features** and press **Enter**.
- 3 Locate **First Boot Device** and set it to **DVDROM**.
- 4 Locate **Second Boot Device** and set it to **Hard Disk**.
- 5 Press **Escape** to return to the main menu.
- 6 Select **Save & Exit Setup** and press **Enter**.
- 7 Press **Enter** again to confirm. The GEMINI reboots.

Installing to Intel USB Flash Disk

Installing Fedora to the Intel USB Flash Disk requires some additional configuration.



As an alternative to reinstalling from the Fedora 8 DVD, you can reinstall from the pre-prepared Fedora 8 Intel USB Flash Disk image. See [Fedora 8 Linux](#) on pages [17](#) and [18](#) for details.



The following instructions are specific to Fedora 8, but the general procedure is similar for any Linux distribution.

Follow these steps:

- 1 Insert the Fedora installation DVD in to the DVD drive and boot the GEMINI board. You are presented with the Fedora installation disc boot loader.
- 2 Press **Enter** to start the installer.
- 3 Follow the on-screen prompts to configure your installation. During this installation we recommend that you:
 - Select the Custom installation type. This enables you to choose packages individually, later in the installation process. For minimal installation you can disable all except base packages. It is important that you only install the packages required due to space limitations on the 2 GB USB Flash Disk.
 - Select the Manual Partition with Disk Druid option, and fill the entire USB Flash Disk with a single large ext2 partition. We recommend ext2 in

preference to ext3 because the journaling activity of the ext3 file system dramatically increases the number of writes performed, reducing the lifespan of the USB Flash Disk module. For this reason we also recommend that no swap partition is created.

- 4 When the installation is over, a 'Congratulations the installation is complete' screen is displayed.
- 5 Click on **Finish**. The GEMINI automatically reboots.
- 6 Remove the DVD from the optical drive, the Fedora 8 Linux starts for the first time.

Post installation configuration

Following installation some additional configuration is required. If you are using the supplied Intel USB Flash Disk, this configuration has been done for you.

The first stage is to register the Fedora Project cryptographic keys with the RPM system. This allows RPM to verify that packages from Fedora have not been tampered with. If you do not follow this step, rpm and yum may complain about missing keys.

```
# rpm --import /etc/pki/rpm-gpg/RPM-GPG-KEY*
```

Secondly, there are some additional packages which are required to support some of the special features of the GEMINI hardware.

The additional packages are on the development kit DVD-ROM in the /software/Fedora8 folder. You can install them all using the command:

```
# rpm -Uvh DVDROM/software/Fedora8/*.rpm
```

where **DVDROM** is the DVD mount point.

Finally, Run setup and choose System services tool.

setup

Turn OFF the following system services:

- Sendmail
- cups
- Smartd
- Irqbalance



If you use an ext2 or ext3 filesystem, it is advisable to turn off access time logging. This can be done by editing /etc/fstab.

/etc/fstab example :

```
/dev/hda1 /boot ext2 noauto,noatime 1 2 .
```

If you are not using Fedora 8 then the sections that follow may still be useful as they outline the general procedure for rebuilding the packages for other distributions.

Additional software available in Fedora 8

The pre-prepared Fedora 8 image supplied by Arcom contains a default selection of Fedora 8 packages. However, a large selection of software that is not installed is present on the Fedora DVD, in the /packages folder.

You can query a package using the RPM tool as follows:

```
# rpm -qip PACKAGE
```

where **PACKAGE** is the RPM package file you are interested in. This gives you a description of the package.

Once you have located a package that you want, you can install it using the following command:

```
# rpm -ivh PACKAGE
```

When you do this, RPM may inform you that the package has dependencies which are not satisfied. If this is the case, then identify the required package and append the filename to the RPM command line. The Fedora DVD should contain a closed set of packages and so all dependencies should be available on the disk.

If you have a network connection then you may like to take advantage of the yum command. This performs automatic dependency resolution, downloads software from the Fedora servers and installs it for you:

```
# yum install PACKAGE_NAME
```

where **PACKAGE_NAME** is the name of the package you want to install.

You can search for packages by keywords using yum's search facility:

```
# yum search KEYWORDS
```

More information about both rpm and yum can be found in their respective man pages.

Watchdog

The GEMINI watchdog driver is provided by the kernel module `iTCO_wdt`. It is loaded using the following command:

```
# modprobe iTCO_wdt
```

Once the driver has been loaded the watchdog is available via the `/dev/watchdog` device node.

On a system such as Fedora 8 which uses `udev` to manage device nodes dynamically, `/dev/watchdog` is created automatically. On other systems it may be necessary to create the correct device node as a character device with major number 10 and minor number 130. To do this, enter:

```
# mknod /dev/watchdog c 10 130
```

Once the device node has been created the watchdog is activated by opening the device and kicked by writing a single character to the device. Closing the device however does not stop the watchdog. To stop the watchdog a single character **V** must be written before closing the device.



Take care not to write any additional characters after the **V**, such as a carriage return or line-feed, as these re-arm the watchdog. In particular, if you are using `echo` command to trigger the watchdog from a script, pass the `-n` switch to prevent a carriage return from being added.

The watchdog timeout can be set by passing the `heartbeat` parameter when loading the module:

```
# modprobe iTCO_wdt heartbeat=10
```

The `heartbeat` is given as a number of seconds, valid values are 1, 10 and 60 seconds with 60 being the default.

The `gemini-utils.tar.gz` on DVD-ROM in the `/software/` folder contains a watchdog usage example. Run the following commands to extract and compile the code:

```
# cp /DVD-ROM/software/gemini-utils.tar.gz /tmp
# cd /tmp
# tar -xzf gemini-utils.tar.gz
# cd gemini-utils
# gcc -o watchdog-test watchdog-test.c
```

The precompiled binary is also available on DVD-ROM in the `/software/Fedora8` folder.

You can run it using following command:

```
# su -c ~ /DVD-ROM/software/Fedora8/watchdog-test ~
```

where DVD-ROM is the DVD mount point.

Front Panel Interface (GEMINI-FPI)

The GEMINI Front Panel Interface (FPI) is part of the GEMINI 1U Industrial Compact Enclosure (ICE). It contains an LCD controller, three status LEDs, three fan connectors, and several input buttons. The LCD display and other interfaces are controlled using LCDproc daemon.

The LCD and Front Panel Interface are shown in the following photograph:



LCDproc

LCDproc is a client/server architecture including drivers for LCD display and certain input/output devices.

The server LCDd runs on local machines and handles all access to the LCD Controller, keypad and output devices like Status LEDs, Fan.

The client applications connect to LCDd server through common TCP/IP sockets and control devices using widget commands.



Widget is the LCDproc Client/Server communication Protocol. See [LCDproc Client Language](#), page [27](#).

The GEMINI-FPI is fully compatible with the LCDproc daemon. A patch is provided that adds support for the GEMINI-FPI hardware interface.

A precompiled RPM package for Fedora 8 is provided on the development kit DVD-ROM, in the /software/Fedora8/ folder. It can be installed using the following command:

```
# rpm -ivh DVDROM/software/Fedora8/lcdproc-0.5.2-1_gemini_f8.i386.rpm
```

where **DVDROM** is the DVD mount point.

The RPM package installs LCDd server and sample client program lcdproc which displays things like CPU load, system load, memory usage, uptime, and a lot more.

The precompiled RPM may also be suitable for other systems. If it is not and changes are required, you can rebuild the RPM for your system. If you need to do this, the patch is provided on the development kit DVD-ROM in the /software/ folder.

To build LCDproc you must have a standard Linux development environment including rpmdevtools, gcc, libc and ncurses, with headers etc. You may need to install the development packages for these libraries. On Fedora this can be done using the yum command:

```
# su -c 'yum install rpmdevtools glibc-devel ncurses-devel'
```

(On other distributions the command and package name may differ.)

The following sections explain how to build and install LCDproc, using both RPM packages and manually on non-RPM based systems.

Building and installing LCDproc on RPM-based systems

To build and install LCDproc on an RPM-based system, follow these steps:



Do not build packages as root. Building packages as root is inherently dangerous and not required.



These instructions only apply to Fedora 8 and later releases.

- 1 Prepare the RPM package building environment in your home directory. Enter the following command:

```
# rpmdev-setuptree
```

- 2 Copy the sources to the RPM build area.

```
# cp DVDROM/software/lcdproc-0.5.2-gemini-f8-r1.diff ~/rpmbuild/SOURCES
```

```
# cp DVDROM/software/lcdproc-0.5.2.tar.gz ~/rpmbuild/SOURCES
```

```
# cp DVDROM/software/lcdproc.spec ~/rpmbuild/SPECS
```

where **DVDROM** is the DVD mount point.

On other systems the folder may be named differently. For example on a SuSE system you might need to copy the files to the folders beneath /usr/src/suse/ instead.

- 3 Build the RPM package:

```
# cd ~/rpmbuild/SPECS
```

```
# rpmbuild -ba lcdproc.spec
```

- 4 Install the package:

```
# rpm -ivh ~/rpmbuild/RPMS/i386/lcdproc-0.5.2-1.i386.rpm
```

LCDproc is now installed into the /usr/ directory. The LCDproc configuration file is installed into /etc/sysconfig/lcdproc. An example LCDd.conf configuration file is provided in DVDROM/software/LCDd.conf.

Building and installing LCDproc on non-RPM systems

If you are not using an RPM-based system then you may choose to build LCDproc by hand for your distribution. To do this:

- 1 Unpack the upstream source tarball:

```
# tar -xvzf DVDROM/software/lcdproc-0.5.2.tar.gz
# cd lcdproc-0.5.2
```

where *DVDROM* is the DVD mount point.

- 2 Apply the patch for GEMINI-FPI support:

```
# patch -i DVDROM/software/ lcdproc-0.5.2-gemini-f8-r1.diff -p1
```

- 3 Configure LCDproc. The GeminiFPI driver supports the GEMINI-FPI hardware interfaces. The curses driver can be useful for testing and development; it can optionally be omitted.

```
# ./configure --prefix=/usr --enable-drivers=GeminiFPI,curses
```

- 4 Build and install the daemon

```
# make
# make install
```

LCDproc is now installed into the `/usr/` directory. The LCDd daemon is installed into `/usr/sbin`. The LCDproc client utilities are installed in `/usr/bin`. The LCDproc library files are installed in `/usr/lib/lcdproc` and configuration files are installed in `/usr/etc`.

- 5 Arrange for the LCDd daemon to be started at boot time, either by using one of the example scripts (available in the `scripts` subdirectory of the `lcdproc` source tree, unpacked in step 1) or by some other distribution specific method. An example `LCDd.conf` configuration file is provided in `DVDROM/software/LCDd.conf`.

LCDproc client language

LCDproc clients such as lcdproc, connect over a network to LCDd. To communicate they use a protocol often referred to as the 'widget language'. This protocol defines how to connect to LCDd on the correct IP address, open a new session, send commands to display text on the LCD and control FPI hardware interfaces.

Please refer to the LCDproc 0.5 Developers Guide at lcdproc.org/ for more details about widget commands. Apart from those, three newly-added commands support GEMINI FPI status LEDs and fans.

The following table lists commands to access GEMINI FPI Status LEDs and fans:

Command	Syntax	Description
LED	LED { on off <num 0-7> get }	Command to set or get State of LED.
fan	fan { on off set <speed 0-100> get <fan 1-3> }	Command to set or get Fan speed.
auto_mesg	auto_mesg {on off}	Auto returns LEDs state and Fan speed to the current client.



GEMINI FPI fans are connected in parallel so are driven in common although the FPI can report the fan speed of each one independently.

Using LCDproc

During bootup, LCDproc is started automatically by the init scripts `/etc/rc.d/init.d/LCDd` and `/etc/rc.d/init.d/lcdproc`. If necessary you can manually start, stop or restart using following commands.

```
# /etc/rc.d/init.d/LCDd option  
# /etc/rc.d/init.d/lcdproc option
```

The available options are start, stop or restart. For an example to restart LCDproc,

```
# su -c '/etc/rc.d/init.d/LCDd restart'  
# su -c '/etc/rc.d/init.d/lcdproc restart'
```



The FPI board is interfaced to COM4 on the GEMINI. For the correct COM4 BIOS settings please see, [BIOS settings](#), on page [13](#).

The LCDproc source contains a number of examples in the clients folder and documentation in the docs folder. The LCDproc website at lcdproc.org/ contains further documentation as well as links to other clients.

PCI bus device descriptions

Fedora 8 ships with a utility named `lspci` (part of the `pciutils` package) which can be used to list the devices present on the PCI bus. The database of devices shipped with Fedora 8 does not cover all of the devices present on the GEMINI board. This makes no functional difference to the operation of the system but it can be useful to have a complete view of the system's PCI devices when administering the system. The device database can be updated using the following commands:

```
# wget http://pciids.sourceforge.net/pci.ids.bz2
# bunzip2 pci.ids.bz2
# mv pci.ids /usr/share/hwdata/pci.ids
```

You are prompted:

```
mv: overwrite '/usr/share/hwdata/pci.ids'?
```

Enter **y** to confirm the overwrite.

These instructions also work on other distributions, although the location of the `pci.ids` file may differ.

CPU frequency scaling

The standard Fedora 8 installation includes the cpuspeed daemon (provided by the kernel-utils packages). This daemon dynamically alters the processor's operating frequency based on the current workload.

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.

Arcom
7500W 161st Street
Overland Park
Kansas
66085
USA

Tel: 913 549 1000

Fax: 913 549 1002

E-mail: us-sales@arcom.com

Comprehensive information about our products is also available at our web site:
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.

Arcom technical support

Arcom has a team of dedicated technical support engineers available to provide a quick response to your technical queries.

Tel: 913 549 1010

Fax: 913 549 1001

E-mail: us-support@arcom.com

Eurotech Group

Arcom is a subsidiary of Eurotech Group. For further details, see www.eurotech.com

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