

# TITAN

AEL Embedded Linux  
Development Kit

Quickstart Manual



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## Revision History

<i>Manual</i>	<i>PCB</i>	<i>Date</i>	<i>Comments</i>
Issue A		26 <sup>th</sup> August 2007	First full release of manual.
Issue B		16 <sup>th</sup> October 2007	Minor updates, Eurotech rebranding.

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For contact details, see page [15](#).



ISO 9001  
FM12961

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# Introduction

The TITAN is an ultra low-power, low-cost PC/104 form-factor Single Board Computer (SBC) based on the Intel PXA270 XScale processor. The PXA270 is an implementation of the Intel XScale micro architecture combined with a comprehensive set of integrated peripherals, including a flat panel graphics controller, interrupt controller, real time clock and various serial interfaces. The TITAN board offers a wide range of features making it ideal for power sensitive embedded communications, asset monitoring solutions and compact MMI solutions.

The TITAN includes:

- PXA270 CPU.
- On-board Boot Flash memory.
- On-board SDRAM memory.
- Ethernet controller.
- MMC card interface.
- Additional 16550 compatible UART.
- PC104 interface.
- On-board AC'97 codec (optional).

The TITAN module provides a complete development SBC. See the *TITAN Technical Manual* for details about the SBC features.

## Handling your board safely

### *Anti-static handling*

This board contains CMOS devices that could be damaged in the event of static electricity being discharged through them. At all times, please observe anti-static precautions when handling the board. This includes storing the board in appropriate anti-static packaging and wearing a wrist strap when handling the board.

### *Packaging*

Please ensure that should a board need to be returned to Eurotech Ltd, it is adequately packed, preferably in the original packing material.

## About this manual

This manual helps you get your TITAN Single Board Computer up and running as quickly as possible. It provides information about the components contained in your TITAN development kit and tells you how to configure the board and connect it to the host system.

### Related documents




This manual only contains basic setup information. For more detailed and up-to-date information please refer to the documentation available on the CD that accompanies your development kit. This includes:

- *Development Kit CD Quickstart Guide* (HTML), which provides detailed information, organised in easy-to-access pages that you can navigate with your browser. It tells you how the CD is organised, where to find things and how to get more information for a particular topic.
- *TITAN Technical Manual*, which provides detailed reference information about all aspects of the TITAN
- *AEL Embedded Linux Technical Manual*, which provides the following detailed information about AEL Embedded Linux:
  - Configuration files and boot scripts.
  - Procedure for making an application run automatically at boot.
  - AEL Embedded Linux contents.
  - Installation instructions.
  - Utilities.
  - Secure Shell (SSH) information.
  - Procedure for compiling a kernel.

## 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*

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

Font	Explanation
<i>Italics</i>	A reference to another document.
<b>Bold</b>	Information that you enter yourself.
<code>screen text</code>	Information that is displayed on screen.

# Getting started

## What's in the kit?

The standard TITAN AEL Embedded Linux development kit contains the following items:

- TITAN-M64-F32-R6 boards.
- +5V @2.5 A (110-240V AC input) power supply..
- Other technical manuals are included on the CD.
- Serial port breakout cable.
- RS-232 null modem adapter.
- RS-232 serial cable (ribbon, 2m).
- Flat panel display cable.
- Touchscreen cable.
- FPIF-CRT (breakout assembly with standard CRT socket).
- Ethernet breakout assembly with standard RJ45 socket.
- USB breakout cable.
- Audio breakout cable.
- PC/104 mounting pillars (two sets).

The development kit also includes:

- AEL Embedded Linux support and installation CD.
- Fedora 7 DVD installation media<sup>1</sup>.
- *AEL Embedded Linux Technical Manual* on CD.

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<sup>1</sup> <http://fedoraproject.org>

## What else do I need?

In addition to the items contained in the development kit, you need an x86 Linux system compliant with version 1.3 of the Linux Standard Base for the AEL Embedded Linux host environment. Suitable systems include computers running Debian GNU/Linux, RedHat Linux, Fedora Core, or SUSE Linux. For further details, see [www.linuxbase.org](http://www.linuxbase.org).

The Linux system requires a spare RS232 serial port (capable of 115200 bit/s) with a male DB-9 connector and suitable terminal emulation software, such as minicom.

You also need the following information:

- Networking details for the TITAN. If your network does not have a DHCP server, ask your network or system administrator for the following:
  - IP address and subnet mask (netmask).
  - Default gateway IP address (if required).
  - Name server (DNS) IP address (optional).
- Networking details for the host machine.



As an alternative for standalone systems, you can connect your TITAN board directly to your host machine's Ethernet interface using a crossover Ethernet cable. In this case, the above networking details are not required.

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## What peripherals are supported?

The TITAN AEL Embedded Linux development kit supports the following peripherals in this release:

- 32MB on-board Flash Memory with JFFS2 file system.
- 64MB on-board SDRAM (32-bit wide data bus).
- Five serial ports: COM1 to COM5 (these include the processor's internal FFUART, BTUART, STUART and two external UARTs. COM5 can be configured as RS-422/RS-485).
- USB 1.1 host and client controller port supporting 12Mb/s and 1.5Mb/s speeds.
- MMC/SD/SDIO interface.
- I<sup>2</sup>C bus.
- Ethernet.
- 16-bit flat panel display interface.
- Four-wire analogue touchscreen.
- AC'97 compatible codec.
- Real time clock.
- LVDS video output.
- SRAM.
- PC/104.

## Unsupported peripherals

For more information regarding peripherals that are supported and details of those that are not, refer to the *Getting Started* section of the *Development Kit CD Quickstart Guide* (HTML)

## Connecting up your TITAN

This section guides you, step-by-step, through the process of connecting up the TITAN for the first time and powering up the system. More detailed instructions are provided in the startup and user guide present on the Development kit CD. For more information refer to page 6 in the development kit CD quick start guide.

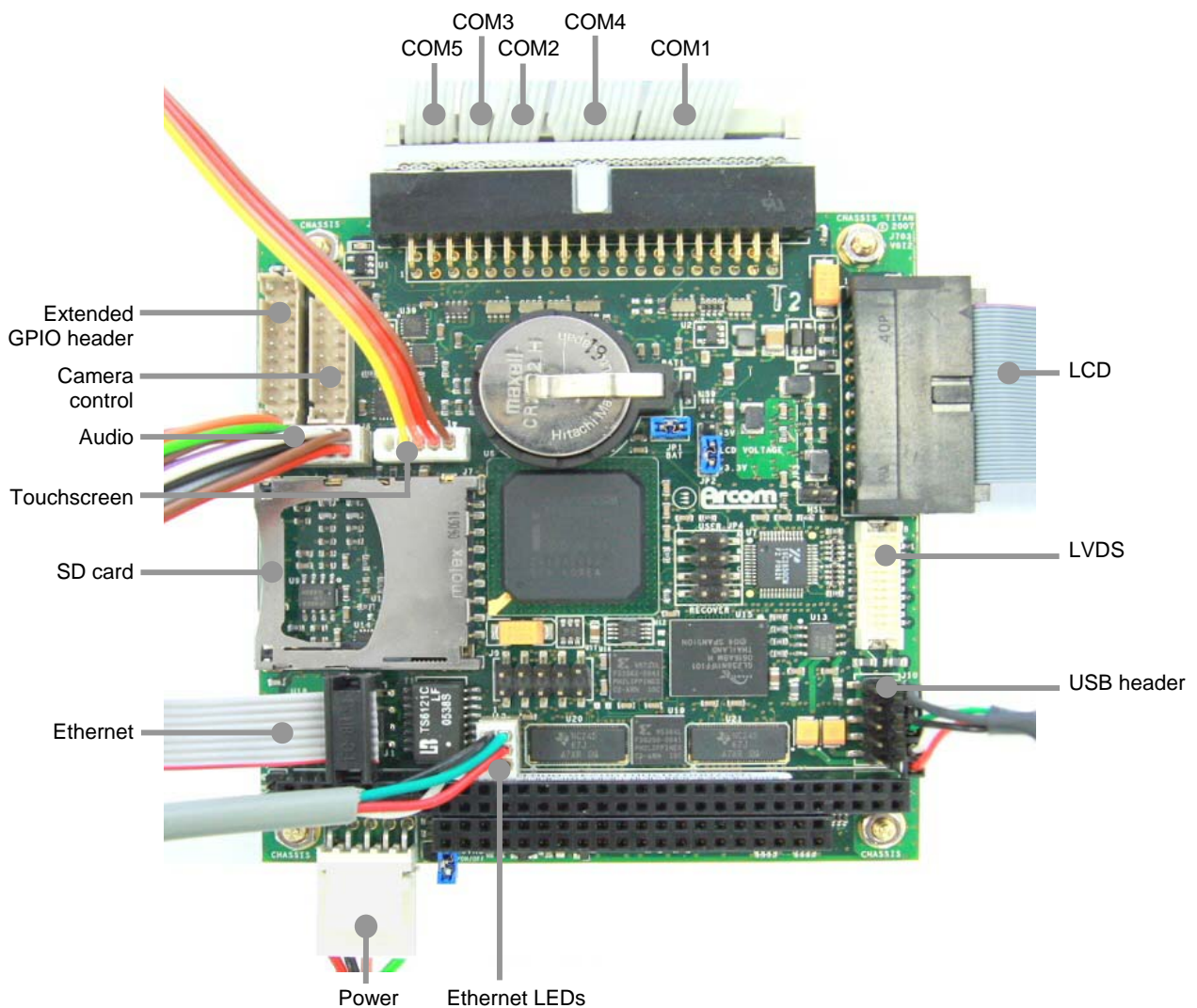


Please note:

- A number of the components are static-sensitive, so standard anti-static precautions must be taken during use. For more information, see [Anti-static handling](#), page 4.
- If the board shows any signs of damage during transit, please contact Eurotech Ltd before proceeding.

### Connecting TITAN to the host PC

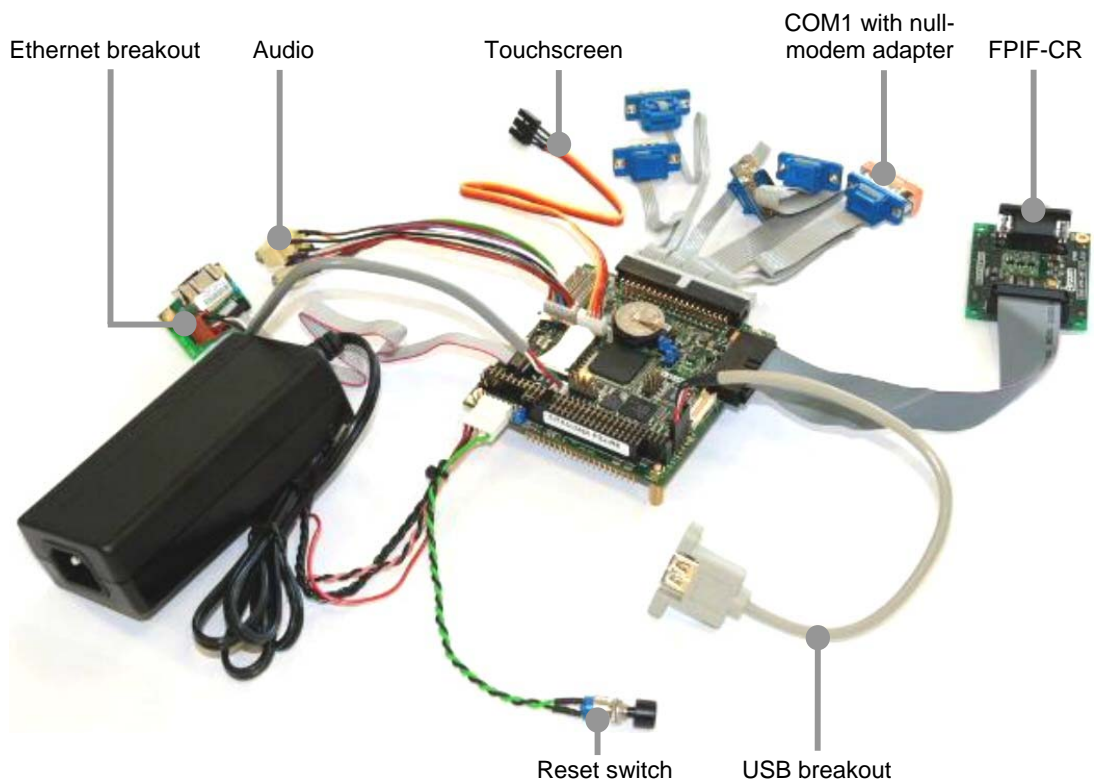
- 1 Remove the TITAN board and all other cables from the development kit box and place them on a static-free work surface.



- 2 Connect the appropriate cable to the TITAN board. You can either use a crossover Ethernet cable to connect the TITAN Base Board directly to your host PC, or a straight cable to connect via an Ethernet hub.



- 3 Connect the null modem cable (supplied with the kit) from COM0 on the TITAN Base Board to your host PC. Your host PC should be running a terminal emulator (e.g. Hyperterminal or TeraTerm on Windows, minicom on Linux). AEL Embedded Linux on the TITAN uses /dev/ttyS0 (FFUART) as its console.
- 4 Connect the power supply adapter (supplied with the kit) into the power jack J200 which is the DC input for the TITAN Base Board.



- 5 Configure the terminal emulator as follows:
  - 115200 baud.
  - No parity.
  - 8 data bits.
  - 1 stop bit.
  - No flow control.
- 6 Switch the TITAN system power ON.

#### After switch-on

If the above procedure is followed correctly, the board powers up and starts the RedBoot boot loader. At this point you can interrupt the boot process (using CTRL-C), if you wish, and access the RedBoot command prompt.

If you do not interrupt the normal boot sequence, after a one second pause the system continues to load and boot AEL Embedded Linux. The Linux operating system is loaded from the on-board Flash array and the board displays the Linux login prompt. AEL Embedded Linux is fully operational after approximately 30 seconds from power-up.

# AEL Embedded Linux

## What is AEL Embedded Linux?

AEL Embedded Linux is a space-optimised standard Linux system that includes many of the standard file, shell, and text utilities. As well as the basic Linux system, the default installation includes:

- OpenSSH Secure Shell.
- Web server.

For a complete list of the software included and an explanation of how to add and remove packages, please consult the *AEL Technical Manual* on the development kit CD.

## Booting the system

Upon booting, the TITAN displays a Linux prompt as follows:

```
Uncompressing Linux..... done,
booting the kernel.
Linux version 2.6.16.28-arcom1-titan
...
INIT: version 2.85 booting
...
Configuring network interfaces... done.
...
INIT: Entering runlevel: 2
...
Arcom Embedded Linux V0I2 (ttyS0)
titan login:
```



Please note:

- The versions of software components running on the TITAN may differ from those shown in the above example boot sequences.
  - If you do not have a DHCP server and you have not configured a static IP address, the board pauses during this process (while configuring network interfaces) as it searches for a DHCP server.
- 

## Logging in

Log in to the TITAN as root (the superuser or administrator) using the following:

- Login name:root
- Default password:**arcom**

Optionally you may log into a user account called arcom using the following details:

- Login name: **arcom**
- Default password: **arcom**

## Using the TITAN system

Once you have logged in, the TITAN system should be fully operational. For more information on how AEL Embedded Linux is configured for the TITAN, such as file system layout, kernel setup and general hardware layout, refer to the *Development Kit CD Quickstart Guide* (HTML)

For more general information about AEL Embedded Linux refer to the *AEL Embedded Linux Technical Manual*, which is also on the CD and referenced in the *Software Documentation* section of the *Development Kit CD Quickstart Guide* (HTML).

## Appendix A – Contacting Eurotech Ltd

### Eurotech Ltd sales

Eurotech Ltd's sales team is always available to assist you in choosing the board that best meets your requirements.

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Email: [sales@eurotech-ltd.co.uk](mailto:sales@eurotech-ltd.co.uk)

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

[www.eurotech-ltd.co.uk](http://www.eurotech-ltd.co.uk).



While Eurotech Ltd'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. Eurotech Ltd's entire liability in respect of the boards or systems is as set out in Eurotech Ltd'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 Eurotech Ltd's products. It has not been commercially tested. No warranty is made in respect of this code and Eurotech Ltd shall incur no liability whatsoever or howsoever arising from any use made of the code.

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### Eurotech Ltd technical support

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

Tel: +44 (0)1223 412428

Fax: +44 (0)1223 410457

Email: [support@eurotech-ltd.co.uk](mailto:support@eurotech-ltd.co.uk)

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