



RE1
Single Board Computer
User Guide

Document Reference: RE1 User Guide
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Regulatory Statements

CE

This product meets the essential protection requirements of the European EMC Directive (2004/108/EC) and the Low Voltage Directive (2006/95/EC), and is eligible to bear the CE mark.

Warning

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

FCC

NOTE:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

WARNING:

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

Safety Warning for North America

If the power lead (cord) is not supplied with the computer, select a power lead according to your local electrical regulations. In the USA use a 'UL listed' lead. In Canada use a CSA approved or 'cUL listed' lead.

Si le cordon secteur n'est pas livré avec l'ordinateur, utiliser un cordon secteur en accord avec votre code électrique nationale. En l'Etat Unis utiliser un cordon secteur 'UL listed'. En Canada utiliser un cordon secteur certifié CSA, ou 'cUL listed'.

Manual Organisation

This manual describes in detail the RE1 Product range.

We have tried to include as much information as possible but we have not duplicated information that is provided in the standard Technical References, unless it proved to be necessary to aid in the understanding of the product.

The manual is sectioned as follows:

- Introduction;
- Overview, showing outline dimensions;
- Layout, showing where the various connectors are located, and their pin-out details;
- Firmware Setup
- Maintenance details

We strongly recommend that you study this manual carefully before attempting to interface with the RE1 or change the standard configurations. Whilst all the necessary information is available in this manual we would recommend that unless you are confident, you contact your supplier for guidance.

IT IS PARTICULARLY IMPORTANT THAT YOU READ THE SECTION 'PRECAUTIONS' BEFORE HANDLING ANY COMPONENTS INSIDE THE UNIT.

If you have any suggestions or find any errors concerning this manual and want to inform us of these, please contact our Technical Services department with the relevant details.

Introduction

The Blue Chip Technology RE1 (BCT-RE1) sets very high standards for integration of the processor, graphics, memory, and I/O technologies together with a unique connection system for selected LCDs.

The BCT-RE1 has two CPU options, 333MHz and 500MHz. The 333MHz CPU is also available as an extended temperature product. All RE1s are supplied with 64MB of SDRAM and 32MB of NOR Flash. There is an option to increase the on board Flash to 64MB if required. Alternatively NAND Flash can be added through either the optional SD Card or optional Compact Flash socket, if fitted.

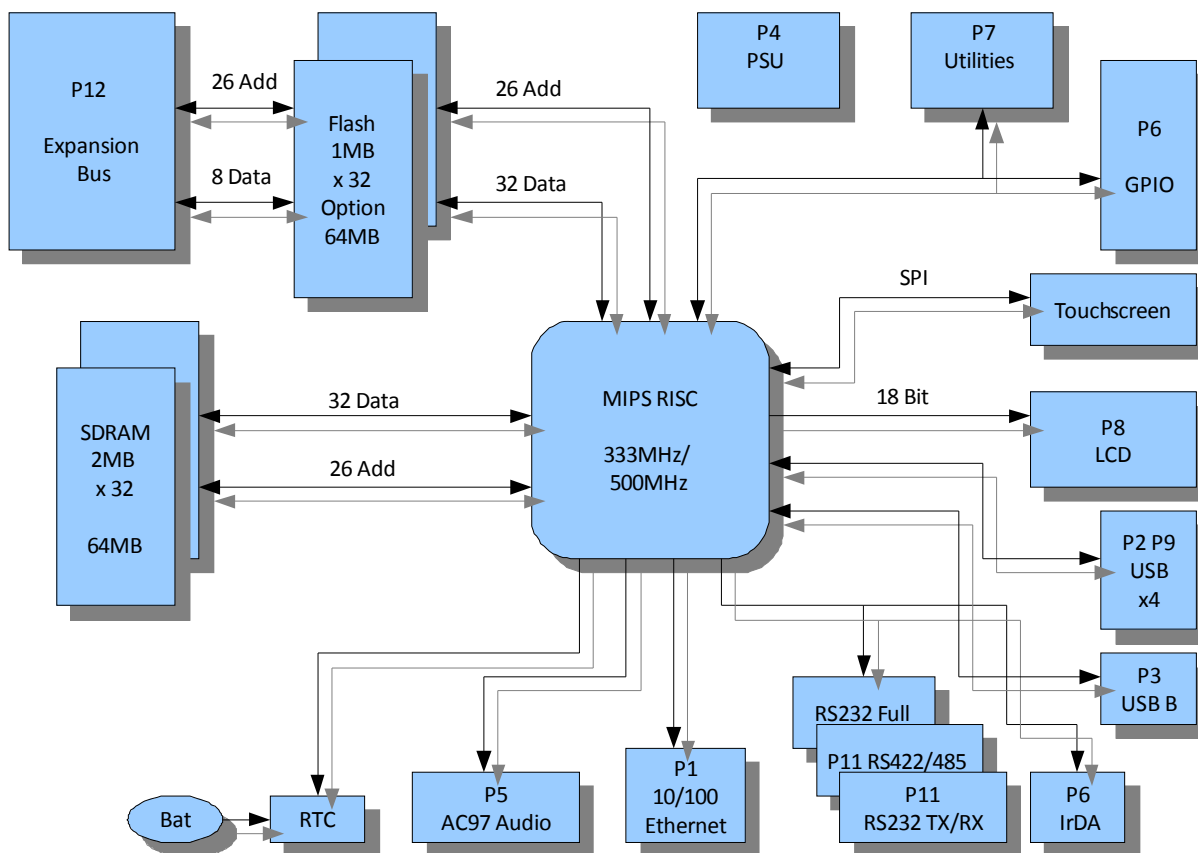
The BCT-RE1 can operate from 7V DC input through to 36V DC input. Power requirements will vary depending on the LCD panel and other peripherals attached to the RE1.

For example with the 500MHz BCT-RE1 with the U.R.T. UMSH-8227MD-1T 5.7" Combined LCD and Touch Screen, the operational power requirements will vary between 4.4W for Windows CE6, without applications running, up to 5.25W with applications running and peripherals attached.

On its own, the RE1 operates at less 1.5W

Functional Overview

The following block diagram shows the key components of the RE1



Specification

- AMD Au1100 MIPS32 CPU [333MHz or 500MHz - factory fit]
- 64 MB SDRAM soldered onboard
- 32 MB NOR Flash soldered onboard [Optional 64MB – factory fit]
- Optional Compact NAND Flash Storage
- Optional SD Card NAND Flash Storage
- Video Controller - 18 bit RGB TTL
- 4 wire Touchscreen Controller
- 10/100 Ethernet including magnetics
- Quad USB 1.1 Hosts
- Single USB 1.1 Device
- Dual RS-232
- Single RS-485
- IrDA Infra Red
- AC'97 Audio Codec Interface
- I2S Audio Interface
- Battery backed Real-Time Clock
- 8 bit Expansion Bus
- Numerous GPIO lines
- Utilities connector
- Wide Input Voltage – 8 to 36 volts
- Very low power consumption – typically 1.5 watts (LCD not included)

Memory Map

Type of Memory

The memory map for the RE1 processor is divided into various memory spaces based on the use of the memory.

These memory spaces include:

- **Hardware.** The hardware memory map controls where other memory regions within the MIPS addressable memory space are located.
- **SDRAM.** All executables and the associated data are stored in SDRAM (unless execute in place (XIP) is being used).
- **NOR Flash.** This flash memory contains all executables and persistent data.
- **NAND Flash.** This flash memory is used to hold all RW data and transient executables.

System Memory Map

| RE1 System Memory Map | | | | |
|---------------------------------------|------------------|-----------------|---------|--|
| Name | Physical Address | Virtual Address | Defined | Description |
| Memory Start | 00000000 | A0000000 | | The memory start address |
| Memory End (Minus 1) | 04000000 | A4000000 | | The memory end address |
| Flash start | 1E000000 | BE000000 | | Flash start address |
| OS start - Note1 | 1E000000 | BE000000 | | XIP Image start address |
| OS End (Minus 1) - Note1 | 1FC00000 | BFC00000 | | End of XIP image space |
| Monitor kernel and parameters - Note1 | 1FC00000 | BFC00000 | | Boot loader and parameters start address |
| Flash end (minus 1) | 20000000 | C0000000 | | Flash memory end address |

Note1: Subject to change

General Precautions

Your Single Board Computer is susceptible to damage by electrostatic discharges. In order to avoid damage, you should work at an anti-static bench and observe normal anti-static precautions. Wear an anti-static wrist strap connected to an earth point *before* opening any packaging.

Where a wrist strap is not available, discharge any static charge you may have built-up by touching an earth point. Avoid any further movement that could build up another static charge. Touch an earth point from time to time to avoid further build-up, and remove the items from their anti-static bags only when required

Electro-Static Discharges

If you are going to open up the unit, it is important to realise that the devices on the cards within this unit can be damaged by static electricity. Bear in mind that the damage caused by static electricity may vary from total destruction to partial damage, which may not be immediately obvious. This could have an effect on the product's reliability and warranty. Before opening the chassis, ensure that you take necessary static precautions. Ideally you should work at an anti-static bench and wear an approved wrist strap or if that is not possible, touch a suitable ground to discharge any static build up before touching the electronics. This should be repeated if the handling continues for any length of time.

If it is necessary to remove a board or electronic assembly, place it into an anti-static bag. This will prevent any static electricity build up damaging the board. Metallised bags are preferred. Do not use black anti-static bags for any item containing a battery because these tend to be conductive and will discharge the battery.

On-Board Battery

The processor board is fitted with a Lithium battery. Great care should be taken with this type of battery. If the battery is mistreated in any way there is a very real possibility of fire, explosion, and personal harm. Under NO circumstances should it be short-circuited, exposed to temperatures in excess of 100°C or burnt, immersed in water, recharged or disassembled.

Expired batteries remain hazardous and must be disposed of in a safe manner, according to local regulations.

Le panneau de processeur est équipé d'une batterie de lithium. Le grand soin devrait être pris avec ce type de batterie. Si la batterie est mistreated il y a de dans de toute façon un possibility très vrai du feu, d'explosion et de mal personnel. Dans au cunes circonstances il est sous peu circuité, exposé aux températures au dessus de 100 degrés de centigrade ou brûlé, immergé dans l'eau, rechargée ou dissassembled.

Les batteries expirées restent dazaedous et doivent être reejetées d'une façon sûre, selon des règlements locaux.

Electromagnetic Compatibility

This product has been assessed operating in representative, standard configurations. As with any PC product, however, final installation & configuration can vary significantly, and so the following guidelines are offered to help ensure that compatibility is maintained.

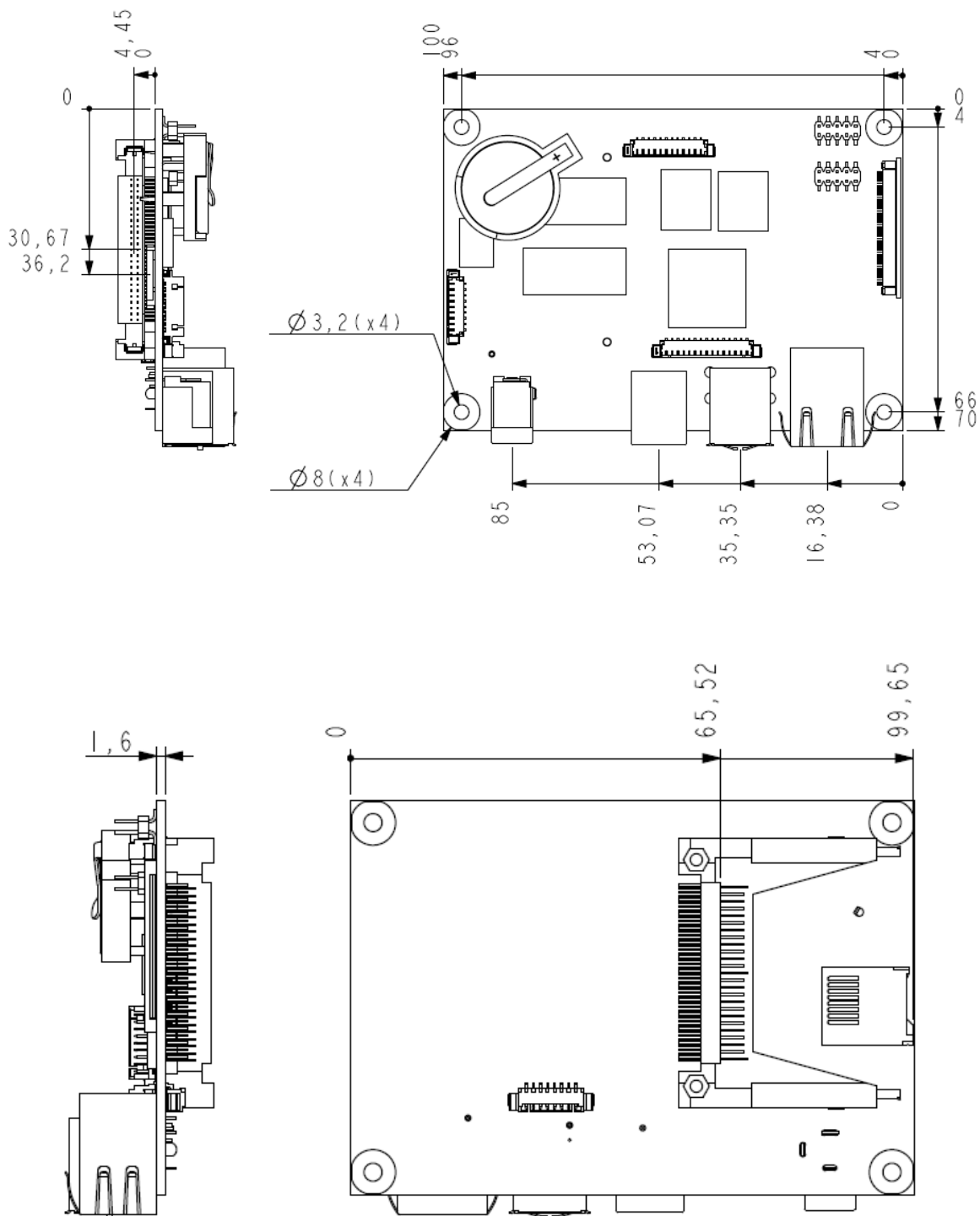
- All components added to a system should either carry appropriate equivalent levels of compliance, or be tested for compliance as part of the final system, and should be installed in accordance with supplier recommendations.
- The external enclosure should be securely fastened (with standard lids and covers in place) to ensure good metal-to-metal contact around the internal electronics

- Any metal back plate must be securely screwed to the chassis of the computer to ensure good metal-to-metal (i.e. earth) contact.
- Metal, screened, connector bodies should be securely connected to the enclosure.
- The external cabling to boards causes most EMC problems. It is recommended that any external cabling to the board be totally screened, and that the screen of the cable connects to the metal end bracket of the board or the enclosure and hence to earth. Round, screened cables with a braided wire screen are used in preference to those with a foil screen and drain wire. Wherever possible, use metal connector shells that connect around the full circumference of the cable screen: they are far superior to those that earth the screen by a simple “pig-tail”.
- The keyboard and mouse will play an important part in the compatibility of the processor card since they are ports into the board. Similarly, they will affect the compatibility of the complete system. Fully compatible peripherals must be used otherwise the complete system could be degraded. They may radiate or behave as if keys/buttons are pressed when subject to interference. Under these circumstances it may be beneficial to add a ferrite clamp on the leads as close as possible to the connector. A suitable type is the Chomerics type H8FE-1004-AS.
- USB cables should be high quality screened types.
- Ensure that the screens of any external cables are bonded to a good RF earth at the remote end of the cable.

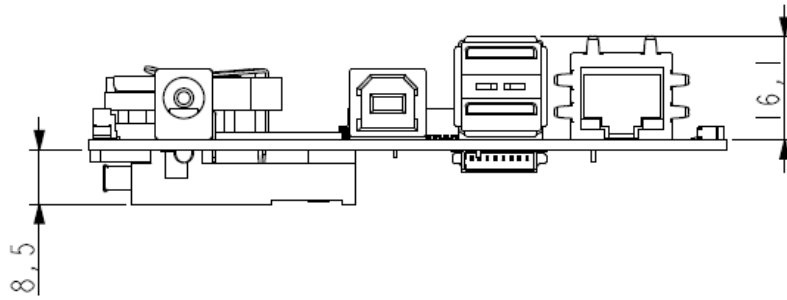
Failure to observe these recommendations may invalidate the EMC compliance

Mechanical Specifications

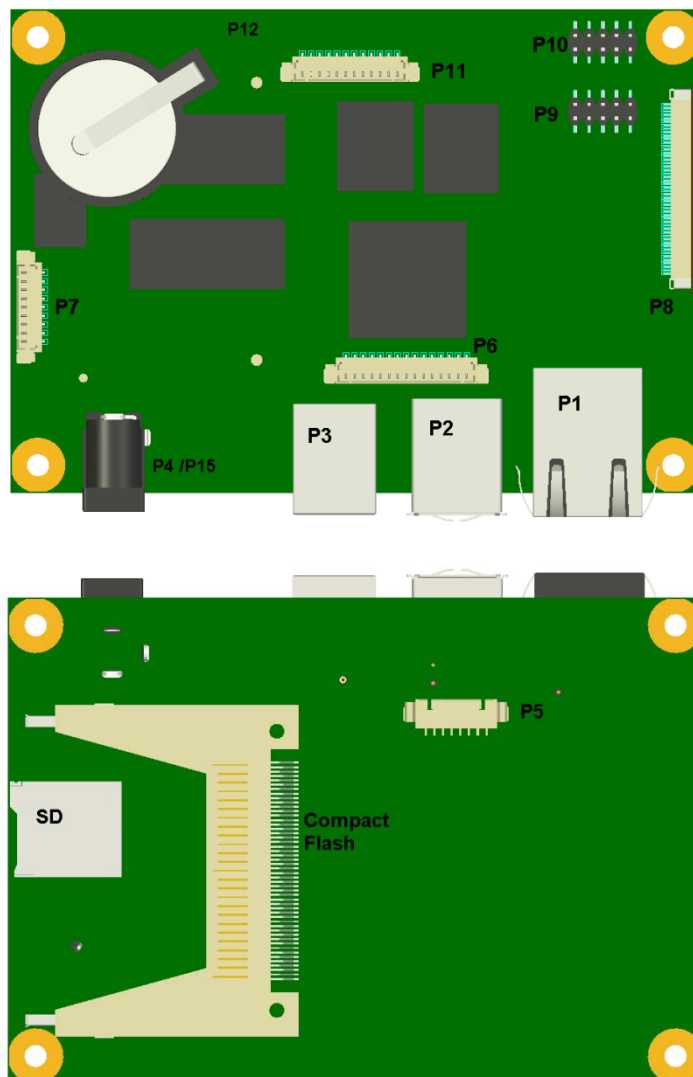
Outline Dimensions



Board Clearance



Connector Locations



| Connector | Description | Connector | Description |
|-----------|----------------------------------|-----------|-----------------|
| P1 | RJ45 Ethernet | P2 | USB-A x 2 |
| P3 | USB-B | P4 / P15 | Power Input |
| P5 | Audio | P6 | GPIO / IR / I2S |
| P7 | Utilities | P8 | Video |
| P9 | USB x 2 | P10 | RS232 (COM3) |
| P11 | RS232 (COM2) and RS422/485(COM1) | P12 | Expansion |

Note: Not all connectors are fitted

Connector Details

P1 – Ethernet Connector

| Pin | Signal | External Connections (RJ45) | Comments |
|-----|----------|-----------------------------|-------------------------|
| 1 | TD+ | 1 | Transit Data +ve |
| 2 | TD- | 2 | Transit Data -ve |
| 3 | CTT | - | Centre Tap Transmit |
| 4 | Ground | - | Electrical Ground |
| 5 | Ground | - | Electrical Ground |
| 6 | CTR | - | Centre Tap Receive |
| 7 | RD+ | 3 | Receive Data +ve |
| 8 | RD- | 6 | Receive Data -ve |
| 9 | VCC3 | - | Pull up to 3.3 volt VCC |
| 10 | LNK/#ACT | - | Link/Activity LED |
| 11 | SPD100# | - | Speed LED |
| 12 | VCC3 | - | Pull up to 3.3 volt VCC |
| 13 | Ground | - | Electrical Ground |
| 14 | Ground | - | Electrical Ground |

P2 – Dual USB Connector (Edge of Board)

| Pin | Signal | Comments |
|-----|--------|---------------------------------------|
| 1 | VBUS | +5 volts – Filtered & current limited |
| 2 | D+ | USB 1 Data Positive |
| 3 | D1 | USB 1 Data Negative |
| 4 | Ground | Filtered Electrical ground |
| 5 | VBUS | +5 volts – Filtered & current limited |
| 6 | D+ | USB 2 Data Positive |
| 7 | D- | USB 2 Data Negative |
| 8 | Ground | Filtered Electrical ground |

P3 – USB Device

| Pin | Signal | Comments |
|-----|--------|---------------------------------------|
| 1 | VBUS | +5 volts – Filtered & current limited |
| 2 | D- | USB 1 Data Negative |
| 3 | D+ | USB 1 Data Positive |
| 4 | Ground | Filtered Electrical ground |

P4/P15 – Power in Connector

The RE1 has the option to be powered from either a 2.5/5.5mm Power Jack (P4) or a 2 Pin Screw Terminal (P15)

| P15 | |
|-------|--------|
| Pin 1 | Ground |
| Pin 2 | Vcc |

P5 – Audio Connector

| Pin | Signal | Comments |
|-----|----------------|----------------------------|
| 1 | Line Out Right | Audio Output Right Channel |
| 2 | Line Out Left | Audio Output Left Channel |
| 3 | Audio Ground | Audio Ground |
| 4 | Line In Left | Audio In Left Channel |
| 5 | Line In Right | Audio In Right Channel |
| 6 | Audio Ground | Audio Ground |
| 7 | Audio Ground | Audio Ground |
| 8 | Microphone IN | Mono Audio Input |

P6 – GPIO Connector

| Pin | Signal | Comments |
|-----|---------------|---------------------------------|
| 1 | +5 volts | Fused voltage rail |
| 2 | GPIO 0 | GPIO 0 |
| 3 | GPIO 1 | GPIO 1 |
| 4 | GPIO 2 | GPIO 2 |
| 5 | GPIO 3 | GPIO 3 |
| 6 | GPIO 4 | GPIO 4 |
| 7 | GPIO 5 | GPIO 5 |
| 8 | GPIO 6 | GPIO 6 |
| 9 | I2SDIO/GPIO 7 | I2S DIO Signal or GPIO 7 |
| 10 | I2SCLK/GPIO 8 | I2S Clock Signal or GPIO 8 |
| 11 | I2SWRD/GPIO 9 | I2S Write/Read Signal or GPIO 9 |
| 12 | IRFIR/GPIO 10 | Infra Red FIR or GPIO 10 |
| 13 | IRTX/GPIO 11 | Infra Red TX or GPIO 11 |
| 14 | IRRX | Infra Red Rx |
| 15 | 0 volts | Electrical ground |

Comments:

1. All GPIO signals pulled up to 3.3 volts rail through 10K resistor.

P7 – Utilities Connector

| Power | | Wake | |
|------------|--------------|---------|-----------|
| 1 | Power_Off# | 8 | Wake# |
| 2 | Ground | 9 | Ground |
| Reset | | Battery | |
| 3 | Reset# | 10 | V battery |
| 4 | Ground | 11 | Ground |
| Serial Bus | | Setup | |
| 5 | Serial Clock | 12 | Setup# |
| 6 | Serial Data | 13 | Ground |
| 7 | Ground | | |

P9 – Dual USB Connector (Header)

| Pin | Signal | Comments |
|-----|--------|---------------------------------------|
| 1 | VBUS | +5 volts – Filtered & current limited |
| 2 | VBUS | +5 volts – Filtered & current limited |
| 3 | D+ | USB 3 Data Positive |
| 4 | D+ | USB 4 Data Positive |
| 5 | D- | USB 3 Data Negative |
| 6 | D- | USB 4 Data Negative |
| 7 | Ground | Filtered Electrical ground |
| 8 | Ground | Filtered Electrical ground |
| 9 | Key | Removed |
| 10 | NC | Not connected |

P10 – RS232 Full Connector

| Pin | Signal | Comments |
|-----|----------|---------------------------|
| 1 | XDCD3# | COM 3 Data Carrier Detect |
| 2 | XRX3 | COM 3 RX |
| 3 | XTX3 | COM 3 TX |
| 4 | XDTR3# | COM 3 Data Terminal Ready |
| 5 | 0 volts | Electrical ground |
| 6 | XDSR3# | COM 3 Data Send Ready |
| 7 | XRTS3# | COM 3 Ready To Send |
| 8 | XCTS3# | COM 3 Clear to Send |
| 9 | XRI# | COM 3 Ring indicator |
| 10 | +5 volts | Fused voltage rail |

P11 – RS232 & RS422/485 Connector

| Pin | Signal | Comments |
|-----|-------------|-----------------------------|
| 1 | 0 volts | Electrical ground |
| 2 | RS232 RX | COM 2 |
| 3 | RS232 TX | COM 2 |
| 4 | +5 volts | Fused voltage rail |
| 5 | 0 volts | Through 10K pull down |
| 6 | VCC | Through 10K pull up |
| 7 | Termination | 120R + 100nF link to pin 10 |
| 8 | CRX1N | |
| 9 | CRX1N | Same signal as pin 8 |
| 10 | CRX1P | |
| 11 | CTX1N | |
| 12 | CTX1P | |

P8 – Video Connector

| Pin | Signal | Comments |
|-----|----------|--------------------------|
| 1 | 0 volts | Electrical ground |
| 2 | TS3 | Touchscreen Data |
| 3 | TS2 | Touchscreen Data |
| 4 | TS1 | Touchscreen Data |
| 5 | TS0 | Touchscreen Data |
| 6 | 0 volts | Electrical ground |
| 7 | CPWM2 | PWM Brightness Control 2 |
| 8 | CPWM1 | PWM Brightness Control 1 |
| 9 | 0 volts | Electrical ground |
| 10 | SDA/GP5 | I2C Data or GPIO 5 |
| 11 | SDCL/GP4 | I2C Clock or GPIO 4 |
| 12 | 0 volts | Electrical ground |
| 13 | CB0 | Blue 0 |
| 14 | CB1 | Blue 1 |
| 15 | CB2 | Blue 2 |
| 16 | CB3 | Blue 3 |
| 17 | CB4 | Blue 4 |
| 18 | CB5 | Blue 5 |
| 19 | CB6 | Blue 6 |
| 20 | CB7 | Blue 7 |
| 21 | 0 volts | Electrical ground |
| 22 | CG0 | Green 0 |
| 23 | CG1 | Green 1 |
| 24 | CG2 | Green 2 |
| 25 | CG3 | Green 3 |
| 26 | CG4 | Green 4 |
| 27 | CG5 | Green 5 |
| 28 | CG6 | Green 6 |
| 29 | CG7 | Green 7 |
| 30 | 0 volts | Electrical ground |
| 31 | CR0 | Red 0 |
| 32 | CR1 | Red 1 |
| 33 | CR2 | Red 2 |
| 34 | CR3 | Red 3 |
| 35 | CR4 | Red 4 |
| 36 | CR5 | Red 5 |
| 37 | CR6 | Red 6 |
| 38 | CR7 | Red 7 |
| 39 | 0 volts | Electrical ground |
| 40 | CFLM | First line Marker |
| 41 | CLP | Line Pulse |
| 42 | CDE | Display Enable |
| 43 | 0 volts | Electrical ground |
| 44 | CPCK | Pixel clock |
| 45 | ENPANL | Enable Panel |
| 46 | ENLITE | Enable Backlight |
| 47 | 0 volts | Electrical ground |
| 48 | NC | No Connection |
| 49 | VIN | Raw Power input |
| 50 | VIN | Raw Power input |

P12 – Expansion Connector

| Pin | Signal | Comments |
|-----|----------|------------------------------------|
| 1 | Data 7 | Data port bit 7 |
| 2 | 0 volts | Electrical ground |
| 3 | Data 6 | Data port bit 6 |
| 4 | RST# | Reset - Active Low |
| 5 | Data 5 | Data port bit 5 |
| 6 | WE# | Write Enable - Active Low |
| 7 | Data 4 | Data port bit 4 |
| 8 | OE# | Output Enable - Active low |
| 9 | Data 3 | Data port bit 3 |
| 10 | OBCS# | Chip Select - Active Low |
| 11 | Data 2 | Data port bit 2 |
| 12 | VIN | Raw Power input |
| 13 | Data 1 | Data port bit 1 |
| 14 | TRST# | JTAG Reset – Active Low |
| 15 | Data 0 | Data port bit 0 |
| 16 | TD1 | JTAG Signal |
| 17 | EWAIT# | Wait Signal – Pull Low to hold bus |
| 18 | TD0 | JTAG Signal |
| 19 | 0 volts | Electrical ground |
| 20 | TMS | JTAG Signal |
| 21 | ADDR21 | Address Line 21 |
| 22 | TCK | JTAG Signal |
| 23 | ADDR20 | Address Line 20 |
| 24 | 0 volts | Electrical ground |
| 25 | ADDR19 | Address Line 19 |
| 26 | VCC3 | +3.3 volts |
| 27 | ADDR18 | Address Line 18 |
| 28 | SDCL/GP4 | I2C Clock or GPIO 4 |
| 29 | ADDR17 | Address Line 17 |
| 30 | SDA/GP5 | I2C Data or GPIO 5 |
| 31 | ADDR16 | Address Line 16 |
| 32 | GP0 | GPIO 0 |
| 33 | ADDR15 | Address Line 15 |
| 34 | GP203 | GPIO 203 |
| 35 | ADDR14 | Address Line 14 |
| 36 | 0 volts | Electrical ground |
| 37 | ADDR13 | Address Line 13 |
| 38 | 14MHz | 14MHz Oscillator – Output from RE1 |
| 39 | ADDR12 | Address Line 12 |
| 40 | ADDR6 | Address Line 6 |
| 41 | ADDR11 | Address Line 11 |
| 42 | ADDR5 | Address Line 5 |
| 43 | ADDR10 | Address Line 10 |
| 44 | ADDR4 | Address Line 4 |
| 45 | ADDR9 | Address Line 9 |
| 46 | ADDR3 | Address Line 3 |
| 47 | ADDR8 | Address Line 8 |
| 48 | ADDR2 | Address Line 2 |
| 49 | ADDR7 | Address Line 7 |
| 50 | 0 volts | Electrical ground |

System Software

Operating Systems Supported

Windows CE 6.0

Linux

By Special Request:

QNX

VxWorks

General Purpose I/O

There are 12 General Purpose I/O lines available. These can be accessed via either a WORD or BIT write/read

GPIO signals 7, 8 and 9 are shared with the I2S bus and GPIO signals 10 and 11 are shared with the IR bus.

If I2S and/or IR are enabled (refer to [Peripheral Support](#) section for details of this) then these GPIO lines will not be available.

Due to the architecture, there are two considerations to be made when working with GPIO lines

1. GPIO lines 0 through 10 are accessed via one register, while GPIO line 11 is accessed via another register. This means that there may be some latency between GPIO 11 and the other GPIO lines
2. Accessing the GPIO lines individually (BIT Read/Write) will be faster than accessing them as a group (WORD Read/Write)

System Firmware

The system firmware is managed via a Configuration Utility on a PC connected to the RE1 by means of the USB B connector.

In order to establish the connection, the following is required

RE1:

1. RE1 running in Engineering Setup mode
2. USB B Connection of USB A/USB B cable
3. Power

Windows XP Control PC:

1. RE1 Windows WDF driver
2. RE1 Graphical User Interface
3. USB A Connection of USB A/USB B cable

Configuration utility

Step 1: Setting RE1 to Engineering Mode

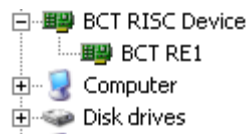
The RE1 is placed in Engineering Mode by briefly shorting pins 12 (Setup#) and 13 (Ground) on the [Utility Header P7](#) while applying power. **Note : The pins must only be shorted briefly during power on to enter engineering mode. Shorting pins 12 (Setup#) and 13 (Ground) for longer than 30 seconds will reset the RE1 back to its factory defaults.**

If the RE1 PCB is viewable, then confirmation that the unit is in Engineering Mode can be checked by the Green Power LED flashing.

Now connect the USB B cable end to the RE1

Step 2: Connect the USB Cable to the PC

Connect the USB A cable end to a free USB port on the PC. The RE1 should be recognised by the Operating System. To verify this, check that Device Manager as an entry as follows



If the Device has an exclamation mark against it, or if an unknown device appears in the Other Devices section as below, then re-install the WDF driver

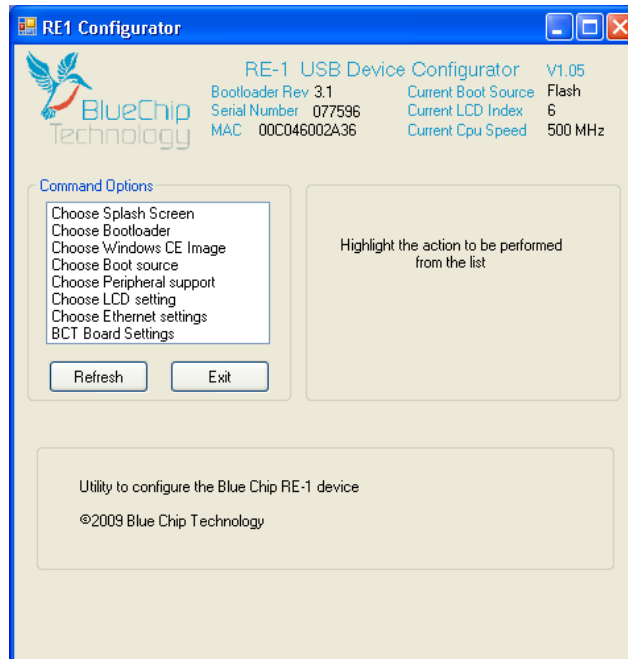


To re-install the driver, select Update Driver and when asked, point the install to the Windows WDF Driver folder. The Driver is available from the [Blue Chip Technology Website](#) and the driver CD/DVD provided.

Step 3: Run the Graphical Interface

Once the RE1 has been recognised by the Controller PC, the RE1 Graphical Interface can be run (RE1GUI.exe).

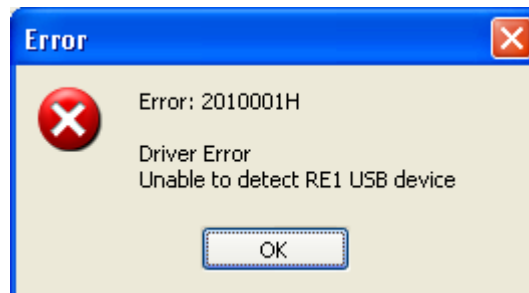
After a few moments, the following should be displayed on the PC



The Configurator Window shows the following details

- Bootloader Revision
- Unit Serial Number
- Unit MAC address
- CPU speed

If the following error appears when the RE1GUI program is run



Then this could be due to one the following

- RE1 is not in Engineering Setup Mode
- USB A/USB B cable not connecting properly or damaged
- The RE1 WDF driver has not installed correctly

To install the Graphical Interface run the setup.exe file available from the Blue Chip Website or the Driver Support DVD.

Configuration Settings

The following pages outline the Configuration Options available via the Graphical Interface Utility. Changes are applied immediately when the appropriate button is selected; for instance selecting “Set Peripherals” applies changes made to the Peripherals list. Selecting “Exit” closes the Graphical Interface

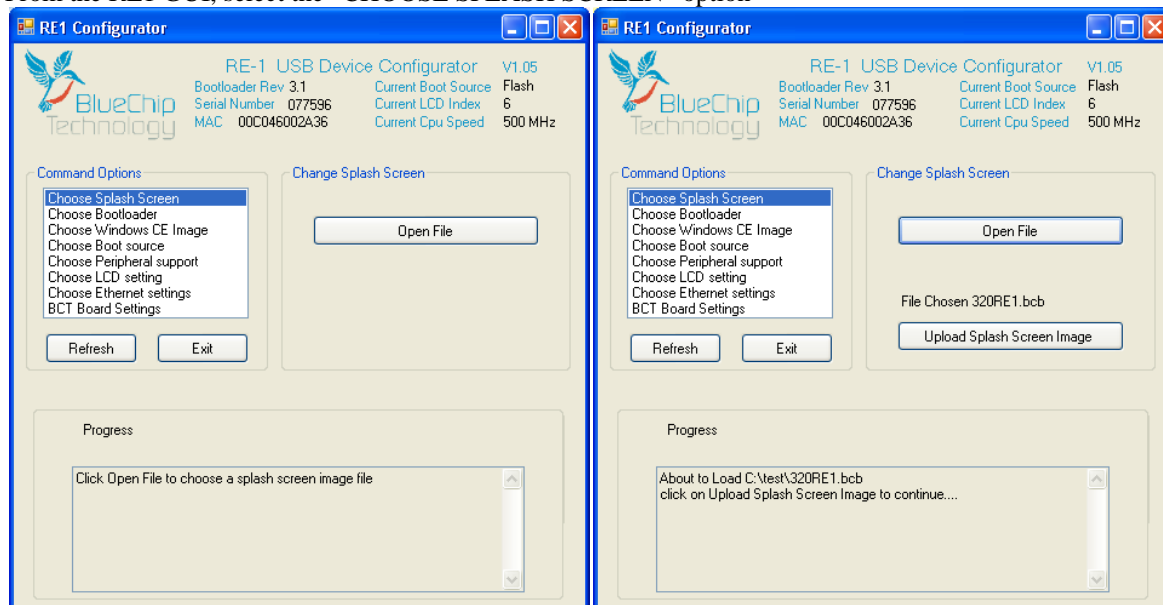
Splash Screen

The Splash Screen on the RE1 can be in either 8bpp or 24bpp bitmap format. The size of the Splash screen should be tailored to match the Panel type attached to the correct number of Pixels.

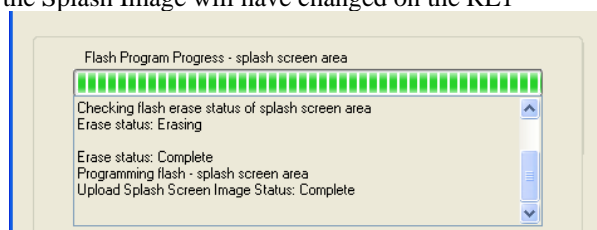
A utility SCONVERT is provided in order to convert the bitmap file into the correct format for the RE1. The first step is to create your intended splash screen in 8 or 24 bit bmp format, ensuring that the pixel size matches your chosen panel. Once you are satisfied with your image, use the sconvert tool to convert it for use as follows
 ..\sconvert splash.bmp

This will convert the file into splash.bcb format ready to be copied into the RE1

From the RE1 GUI, select the “CHOOSE SPLASH SCREEN” option



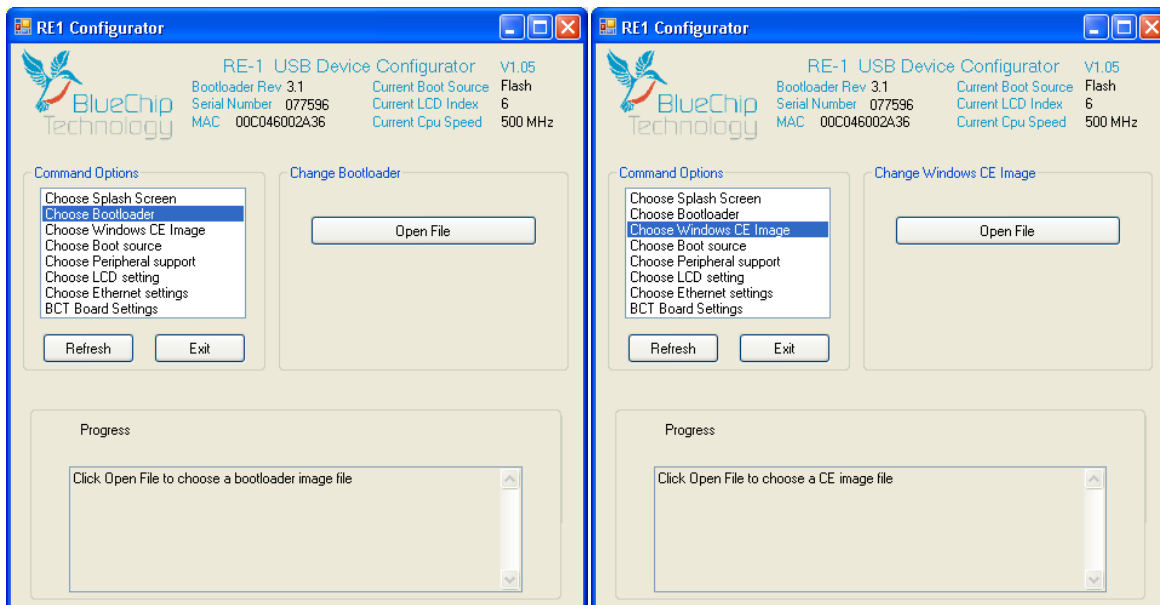
Selecting Open file will allow navigation to the folder containing your bcb image file(s). In this instance, the image 320RE1.bcb has been selected. Now select “Upload Splash Screen Image”. When complete the following message will be shown and the Splash Image will have changed on the RE1



Images and text can appear differently on different types and sizes of LCD panels, so if the Splash Image needs modifying slightly, then edit the original bitmap file, and repeat the above steps. In a few moments you can quickly see the result of any change, and achieving a suitable Splash Screen image should be a matter of minutes and not hours.

Bootloader and Windows CE Image

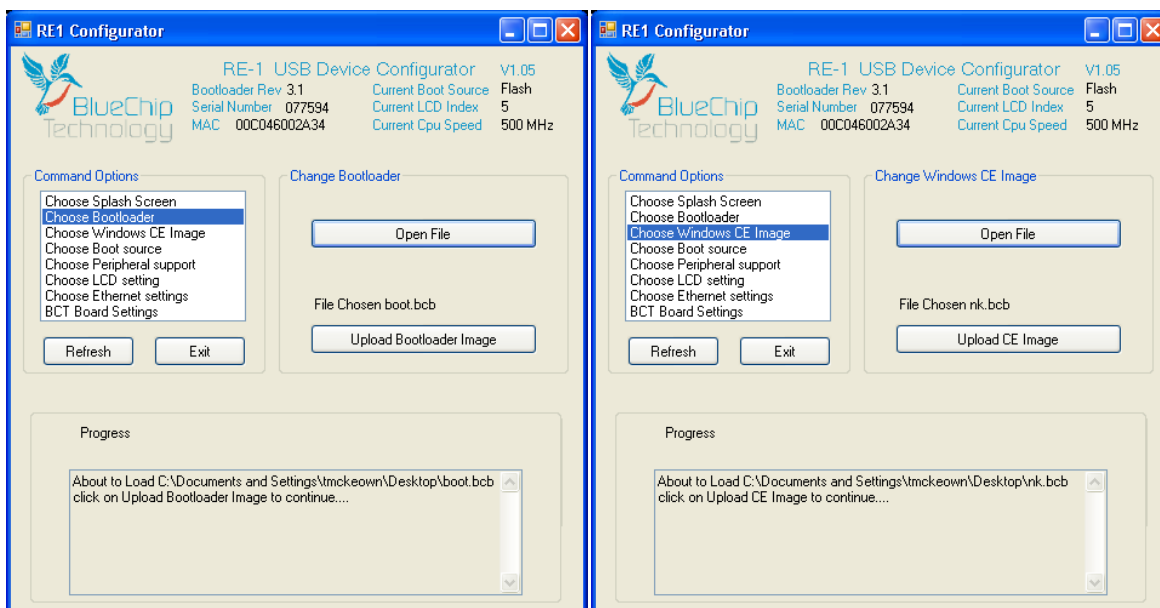
If either a new Bootloader or CE Image is required, then these can quickly be applied to the RE1 via the appropriate selection in the Graphical Interface.



Select Open File, then navigate to the folder containing the new file and select it

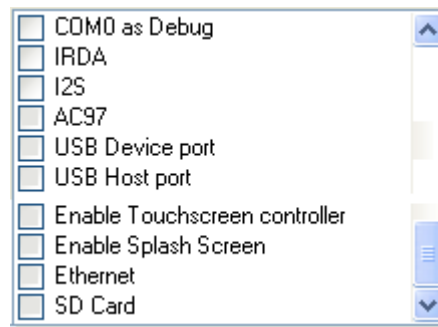
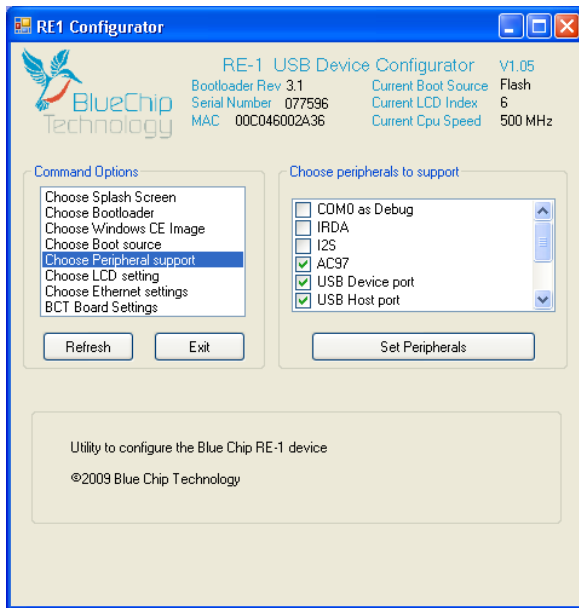
The Bootloader and CE Image file format supported is a .bcb file

When the relevant file is selected, select the appropriate upload button



Peripheral Support

The Interface allows for the Enabling or Disabling of individual hardware peripherals as below

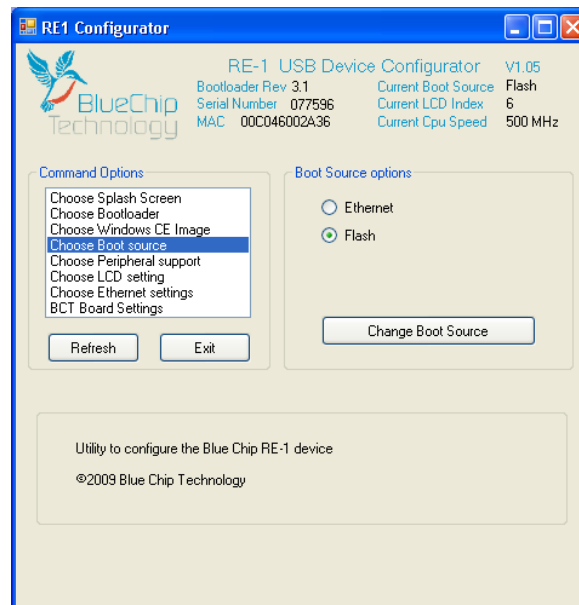


List of Peripheral Devices, with a Blank box indicating peripheral not enabled

To Enable an Item, place the Tick against the item, and then select “Set Peripherals”

Boot Source

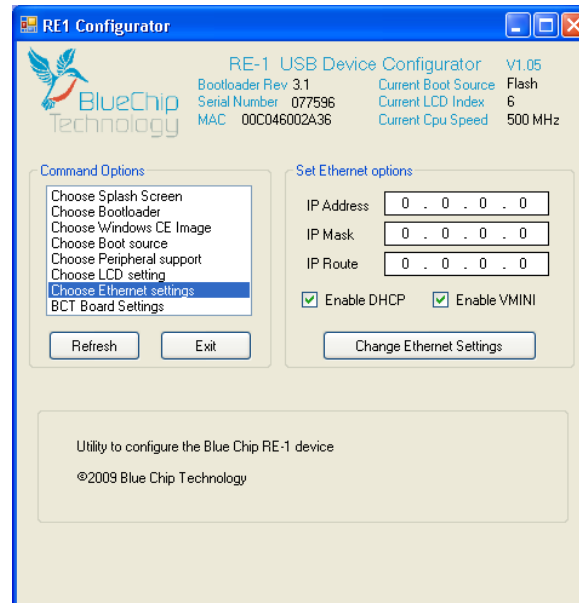
The RE1 has the option of being able to boot to Ethernet to aid Kernel Development. The default option is to boot to Flash.



Note: The Ethernet boot option is NOT PXE or RPL Boot

Ethernet Settings

The Graphical Interface allows the User to set the Ethernet device as a DHCP client or to enter a dedicated IP Address

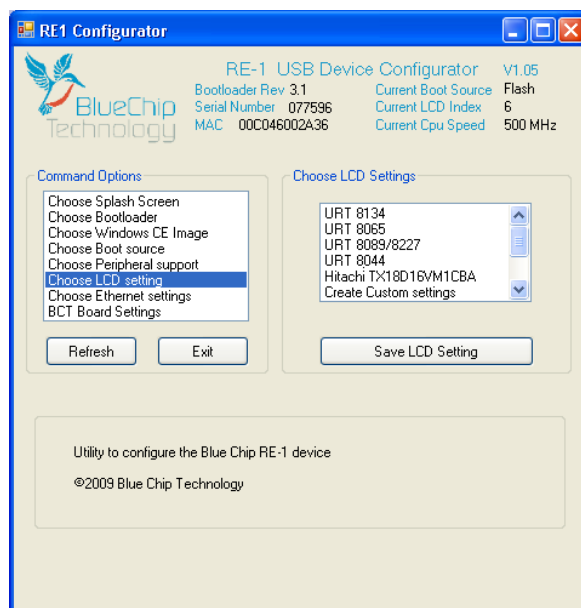


Once the required settings have been entered, select “Change Ethernet Settings” to process the changes.

Note: These settings relate to using Ethernet during kernel development.

LCD Settings

The RE1 Graphical Interface Utility allows the User to select an LCD from a provided list or the User can use the Utility to provide support for alternate LCD's.



After selecting the required LCD type and pressing “Save LCD Setting” the changes are made immediately to the BCT-RE1 so you can see the results of the change. If you have made a mistake and selected the incorrect type, you can rectify the change immediately.

The Panels shown for selection are those included in the Boot Loader, so if new Panels are required, then the Boot Loader will need to be changed to provide support. In order to change the Boot loader, the settings for the new Panel can be determined and confirmed using the Create Custom Setting selection

Create Custom LCD Settings

When “Create Custom Settings” is selected a separate Window appears which has 4 configuration pages. The pages are populated with the settings for the LCD panel currently selected.

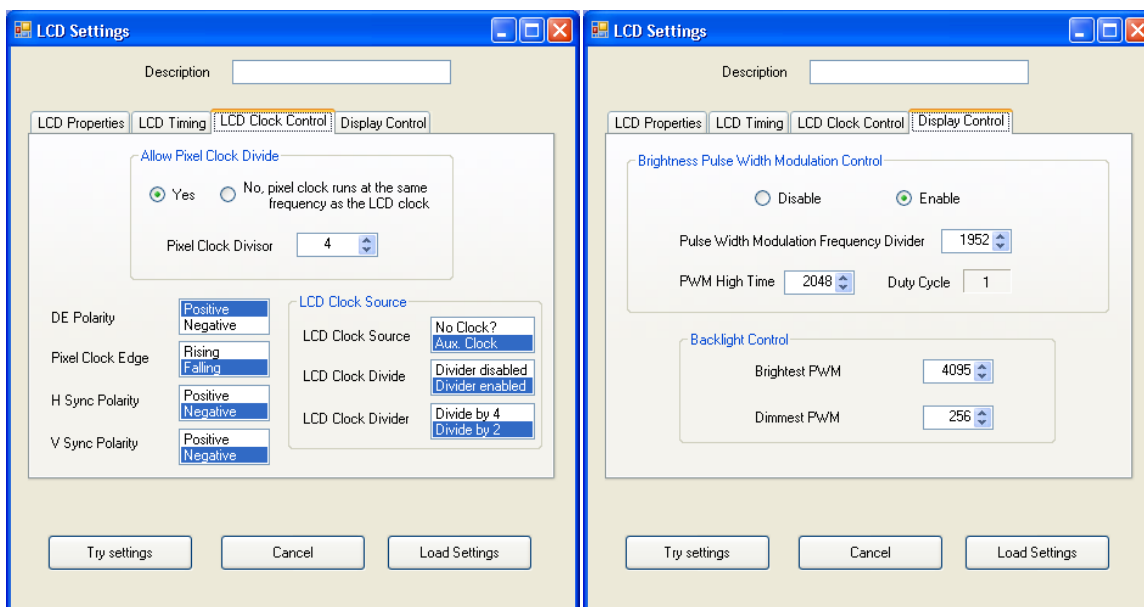
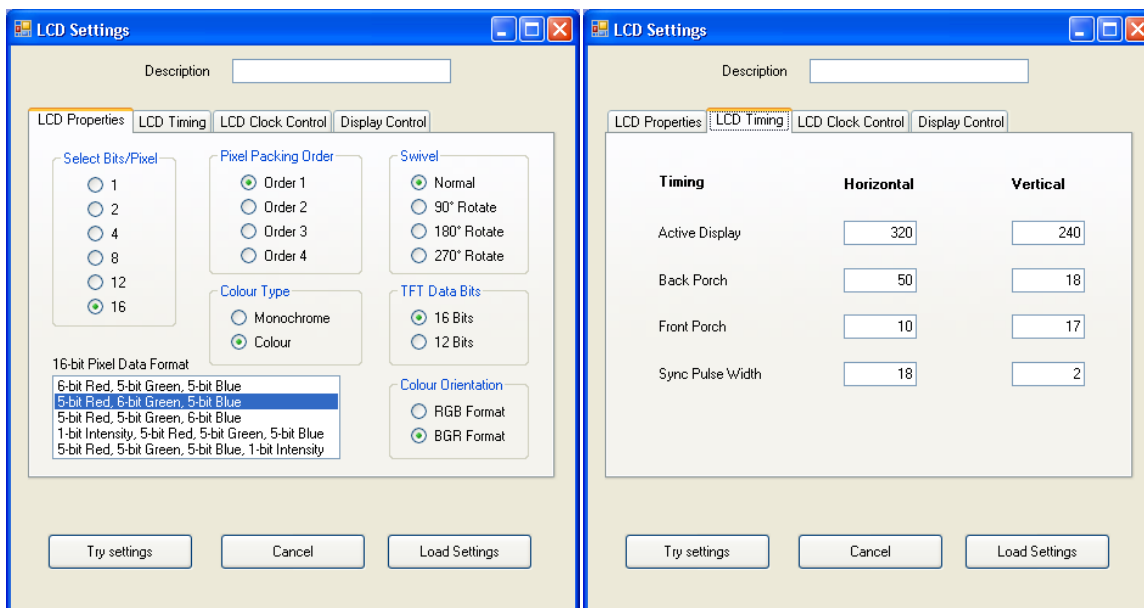
The first step would be to choose a Panel type similar to the new one, save the Panel type and power cycle back into Engineering mode. The Settings page should now be populated with closer settings.

By referring to the Data Sheet for the Panel, the settings pages should be easily populated with the correct data, so it once the pages have been populated, press the “Try Settings” tab on each page to see the results.

If the display is not quite correct, modify one setting at a time until the Panel display is as required.

Once the settings are correct, take a note of the settings on each page (or alternative take screen shot of each Settings page) and forward to Technical Services at Blue Chip Technology along with the Panel Description.

The New settings can then be integrated into a new Boot Loader file for use on other BCT-RE1 boards



Notes for Use:

Swivel

90° Rotation is not available on panel resolutions above 320 x 240

Pixel Packing Order

Refer to the following tables to select which Pixel Order to select for your panel

| PO = 00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|----|----|----|----|--|
| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | |
| bpp | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | p31 | p30 | p29 | p28 | p27 | p26 | p25 | p24 | p23 | p22 | p21 | p20 | p19 | p18 | p17 | p16 | p15 | p14 | p13 | p12 | p11 | p10 | p9 | p8 | p7 | p6 | p5 | p4 | p3 | p2 | p1 | p0 | |
| 2 | | p15 | | p14 | | p13 | | p12 | | p11 | | p10 | | p9 | | p8 | | p7 | | p6 | | p5 | | p4 | | p3 | | p2 | | p1 | | p0 | |
| 4 | p7 | | | | p6 | | | | p5 | | | | p4 | | | | p3 | | | | p2 | | | | p1 | | | | p0 | | | | |
| 8 | p3 | | | | | | | | p2 | | | | | | | | p1 | | | | | | | | p0 | | | | | | | | |
| 12 | p1 | | | | | | | | | | | | p0 | | | | | | | | | | | | | | | | | | | | |
| 16 | p1 | | | | | | | | | | | | | | | | p0 | | | | | | | | | | | | | | | | |

| PO = 01 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---------|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | |
| bpp | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | p0 | p1 | p2 | p3 | p4 | p5 | p6 | p7 | p8 | p9 | p10 | p11 | p12 | p13 | p14 | p15 | p16 | p17 | p18 | p19 | p20 | p21 | p22 | p23 | p24 | p25 | p26 | p27 | p28 | p29 | p30 | p31 | |
| 2 | p0 | | p1 | | p2 | | p3 | | p4 | | p5 | | p6 | | p7 | | p8 | | p9 | | p10 | | p11 | | p12 | | p13 | | p14 | | p15 | | |
| 4 | p0 | | | | p1 | | | | p2 | | | | p3 | | | | p4 | | | | p5 | | | | p6 | | | | p7 | | | | |
| 8 | p0 | | | | | | | | p1 | | | | | | | | p2 | | | | | | | | p3 | | | | | | | | |
| 12 | p0 | | | | | | | | | | | | p1 | | | | | | | | | | | | | | | | | | | | |
| 16 | p0 | | | | | | | | | | | | | | | | p1 | | | | | | | | | | | | | | | | |

| PO = 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|----|----|--|
| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | |
| bpp | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | p24 | p25 | p26 | p27 | p28 | p29 | p30 | p31 | p16 | p17 | p18 | p19 | p20 | p21 | p22 | p23 | p8 | p9 | p10 | p11 | p12 | p13 | p14 | p15 | p0 | p1 | p2 | p3 | p4 | p5 | p6 | p7 | |
| 2 | p12 | | p13 | | p14 | | p15 | | p8 | | p9 | | p10 | | p11 | | p4 | | p5 | | p6 | | p7 | | p0 | | p1 | | p2 | | p3 | | |
| 4 | p6 | | | | p7 | | | | p4 | | | | p5 | | | | p2 | | | | p3 | | | | p0 | | | | p1 | | | | |
| 8 | p3 | | | | | | | | p2 | | | | | | | | p1 | | | | | | | | p0 | | | | | | | | |
| 12 | p1 | | | | | | | | | | | | p0 | | | | | | | | | | | | | | | | | | | | |
| 16 | p1 | | | | | | | | | | | | | | | | p0 | | | | | | | | | | | | | | | | |

| PO = 11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---------|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| Bit | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | |
| bpp | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | p7 | p6 | p5 | p4 | p3 | p2 | p1 | p0 | p15 | p14 | p13 | p12 | p11 | p10 | p9 | p8 | p23 | p22 | p21 | p20 | p19 | p18 | p17 | p16 | p31 | p30 | p29 | p28 | p27 | p26 | p25 | p24 | |
| 2 | p3 | | p2 | | p1 | | p0 | | p7 | | p6 | | p5 | | p4 | | p11 | | p10 | | p9 | | p8 | | p15 | | p14 | | p13 | | p12 | | |
| 4 | p1 | | | | p0 | | | | p3 | | | | p2 | | | | p5 | | | | p4 | | | | p7 | | | | p6 | | | | |
| 8 | p0 | | | | | | | | p1 | | | | | | | | p3 | | | | | | | | p2 | | | | | | | | |
| 12 | p1 | | | | | | | | | | | | p0 | | | | | | | | | | | | | | | | | | | | |
| 16 | p1 | | | | | | | | | | | | | | | | p0 | | | | | | | | | | | | | | | | |

Restoring Factory Defaults

It is possible to restore an RE1 to its factory defaults using the following method.

1. Ensure the RE1 is powered off
2. Short pins 12 (Setup#) and 13 (Ground)
3. Power on the RE1
4. Wait until the green power LED flashes quickly (about twice per second) for about 3 seconds.
5. Remove the short from pins 12 (Setup#) and 13 (Ground)

Note: The pins must be shorted for about 30 seconds after power on before the factory defaults are restored.

If the operating system installed is Windows CE 6.0 and the hive registry is implemented, the hives will also be set back to their default state during a factory reset. See the “Windows CE 6.0 for RE1 User Guide” for further details.

Maintenance

The RE1 Computer should not require any regular maintenance.

On a regular basis the inside of the unit which houses the RE1 should be cleaned out to prevent dust build up which could eventually cause elevated temperatures around key devices and prevent efficient and reliable operation.

Amendment History

| Issue Level | Issue Date | Author | Amendment Details |
|-------------|------------|--------|---|
| 1.0 | 27/08/2008 | BH | First Release |
| 1.1 | 29/10/08 | TMCK | updated |
| 1.2a | 16/03/09 | TMCK | Updated with GUI details and some software explanations |
| 1.3 | 02/04/09 | DPR | Updated |

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* To use the Support email address requires the sender to be first registered on the Support Web site at

<http://support.bluechiptechnology.co.uk/>