RE1

Single Board Computer
User Guide

Document Reference: RE1 User Guide
Document Issue: 2.2

Contents

Copyright

Limitations of Liability

Trademarks

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 electrique 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

The BCT-RE1 has the capability to support a Lithium Battery to retain time when the unit is powered off. The battery can be either fitted via the Utility header or alternatively via an optional on-board battery holder.
Important: ensure that only one battery is fitted to the BCT-RE1

Functional Overview

The following block diagram shows the key components of the RE1
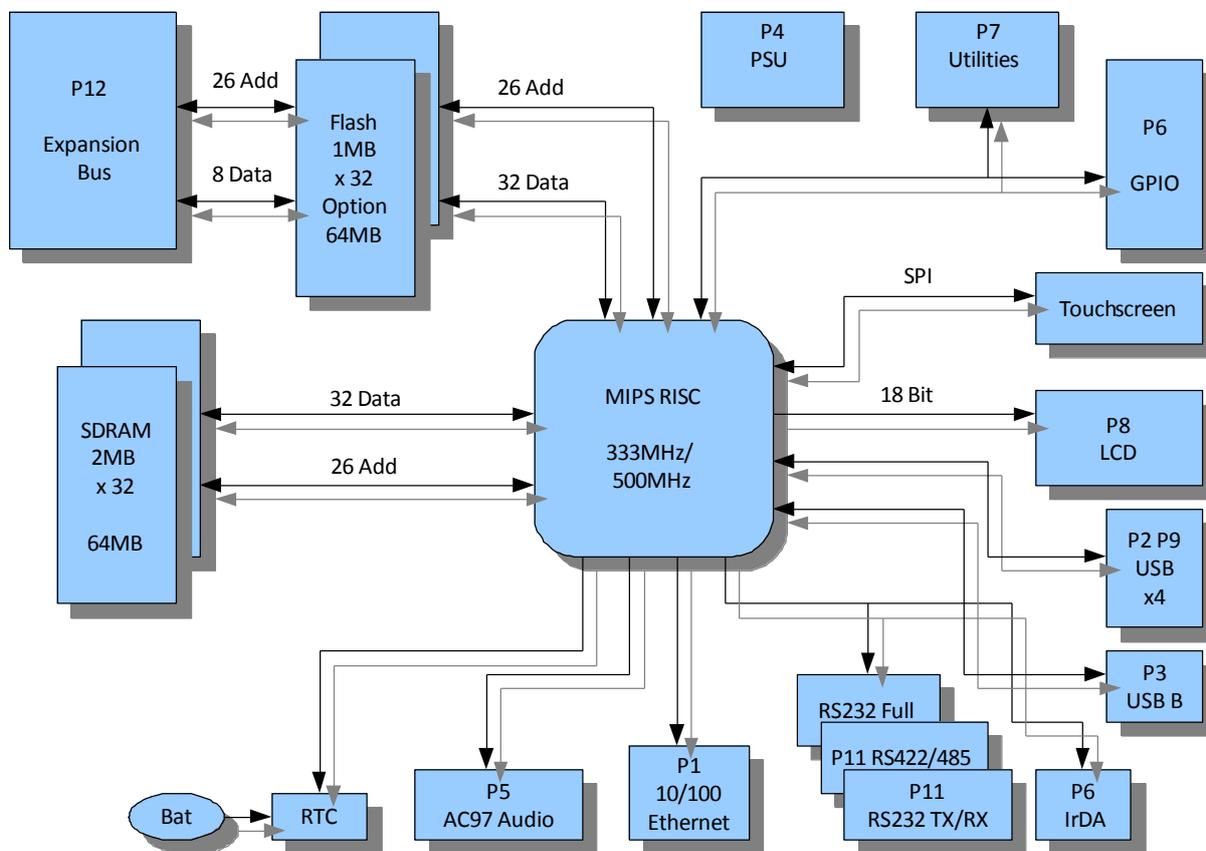
Specification

- 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 – 7 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 can be 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'expolosion et de mal personnel. Dans au cunes circonstances il est sous peu circuité, exposé aux températures au dessus de 100 degrés de centrigrade ou brûlé, immergé dans l'eau, rechargée ou dissassambled.

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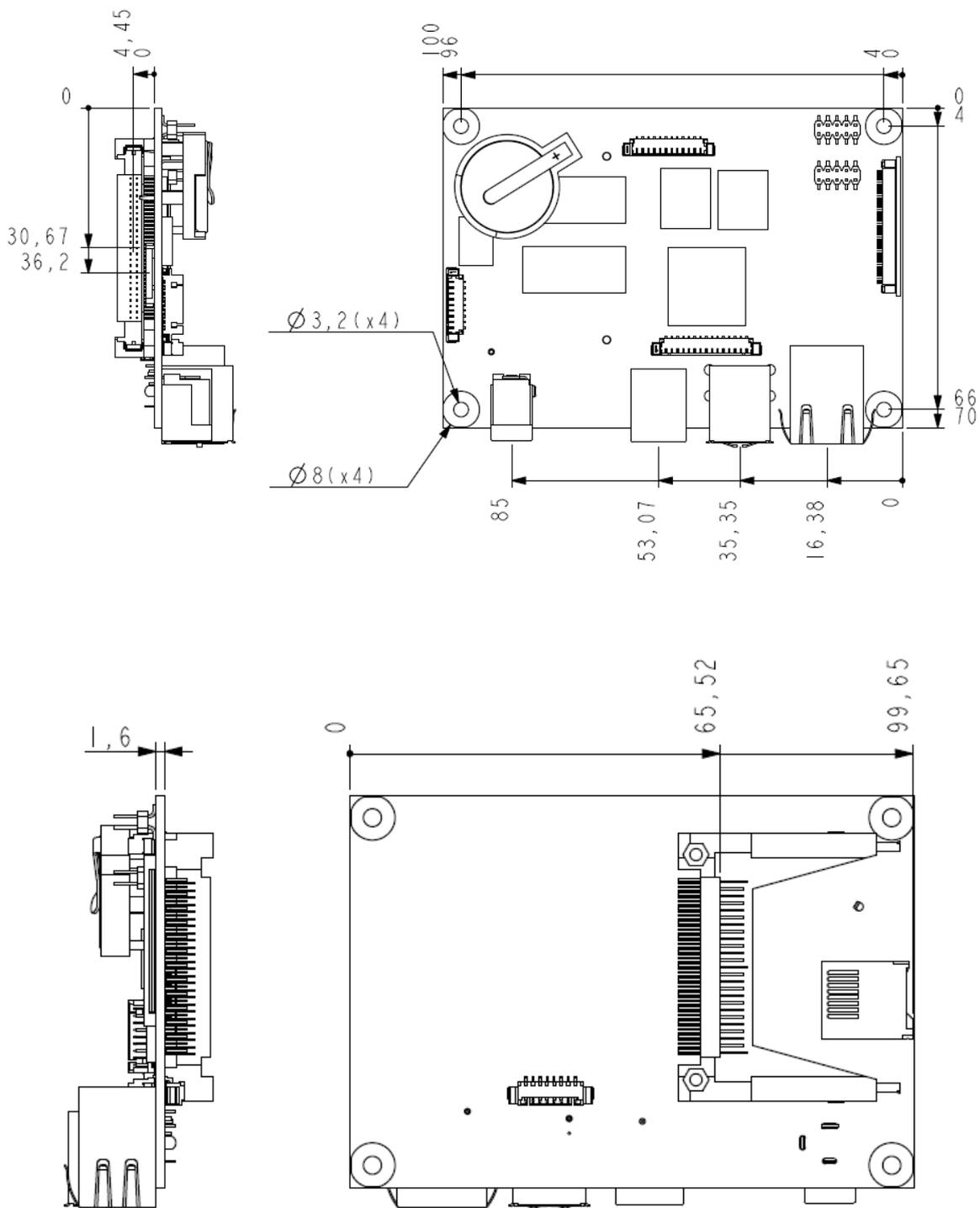
Board Clearance
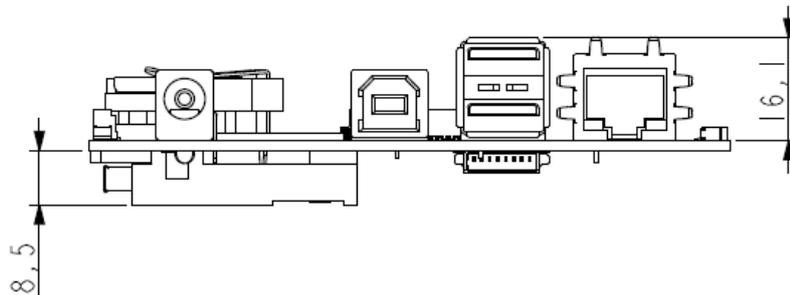
Connector Locations
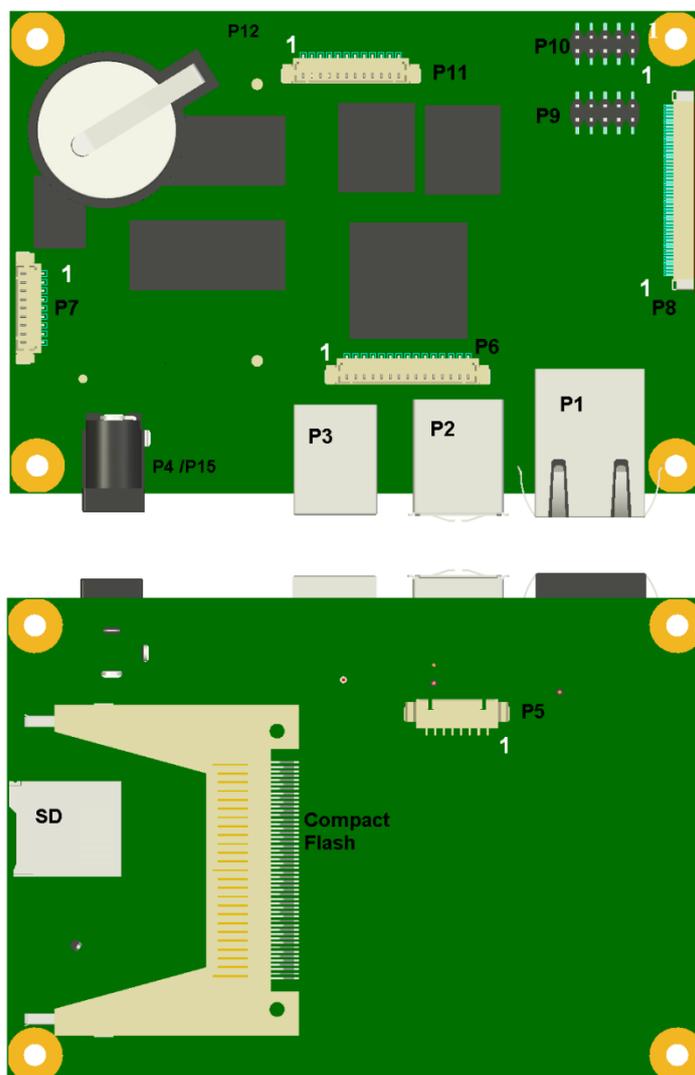
Connector	Description	Connector	Description
P1	RJ45 Ethernet	P2	USB-A x 2
P3	USB-B	P4 / P15	Power Input
P5	Audio	P6	GPIO / IR / I2S
P7	Utilities	P8	Video
P9	USB x 2	P10	RS232 (COM3)
P11	RS232 (COM2) and RS422/485(COM1)	P12	Expansion

Note: Not all connectors are fitted
COM2 also operates as the Debug port when enabled using the Configuration tool

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	D1-	USB 1 Data Negative
3	D1+	USB 1 Data Positive
4	Ground	Filtered Electrical ground
5	VBUS	+5 volts – Filtered & current limited
6	D2-	USB 2 Data Negative
7	D2+	USB 2 Data Positive
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
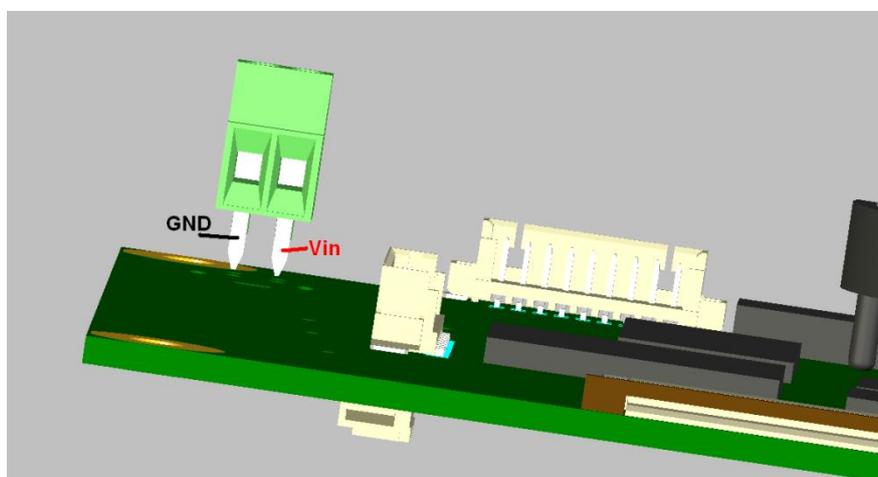
P5 – Audio Connector

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	+3.3 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 Negative
4	D-	USB 4 Data Negative
5	D+	USB 3 Data Positive
6	D+	USB 4 Data Positive
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	

COM2 is shared Debug/RS232 port
COM1 RS422/RS485 functionality changed with CE6 v1.02.00 Image. Prior to this image, the Transmit line was always enabled for operation in a point to point network, however with v1.02.00 and later, the operation has been changed for operation in a multi drop network and the Transmit Line is new only enabled when the DTR line is enabled. Refer to the CE 6 User guide for more details

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

For Windows CE based operating systems, 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/Windows 7 Control PC:
1.   RE1 Windows WDF driver
2.   RE1 Graphical User Interface
USB A Connection of USB A/USB B cable

For Linux OS, refer to the appropriate RE Linux user Guide for how to manage the system options

Configuration utility (for Windows CE versions only)

Step 1: Install the RE1 Configuration Utility

Copy the two RE1 setup files to your intended control PC and run the setup.exe file. The configuration utility is installed by default into the following directories

Windows XP and Windows 7:
C:\Program Files\Blue Chip Technology\RE1 Configuration Utility\USB Driver

Windows 7 64 Bit:
C:\Program Files (x86)\Blue Chip Technology\RE1 Configuration Utility\USB Driver

There are two further folders created in the "USB Driver" folder:
"x64" contains the 64 bit driver
"x86" contains the 32 bit driver

Step 2: 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 3: 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 go to Device manager and manually search for the correct driver

When asked, point the search field to the appropriate USB driver folder: x86 for a 32bit OS and x64 for a 64 bit OS.

Step 4: 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
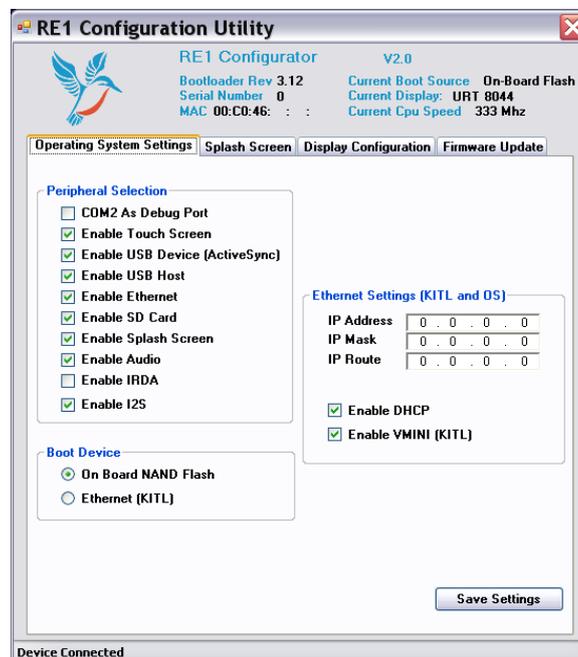
The Configurator Window shows the following details
- Bootloader Revision
- Unit Serial Number
- Unit MAC address
- CPU speed

If the following error appears when the RE1GUI program is run
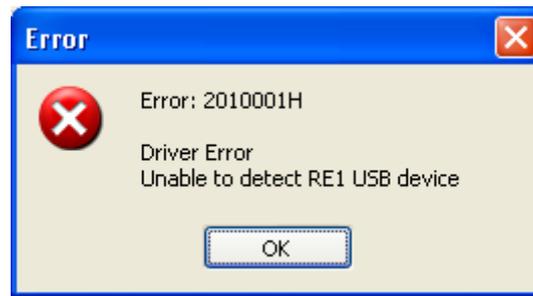
Then this could be due to one the following

- 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.

From the RE1 GUI, select the "CHOOSE SPLASH SCREEN" option
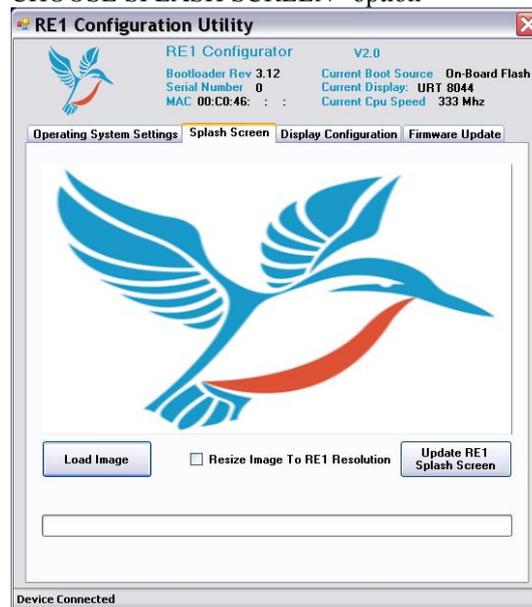
Selecting Load Image will allow navigation to the folder containing your image file(s). In this instance, the image bluebird.bmp has been selected. If your picture is not the same resolution as your screen size, then tick the "resize image" box. Now select "Upload RE1 Splash Screen Image". When complete the following message will be shown and the Splash Image will have changed on the RE1

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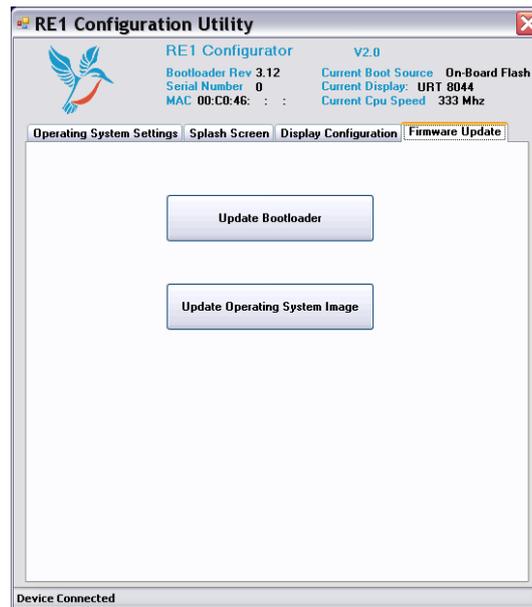
Select Open File, then navigate to the folder containing the new file and select it

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
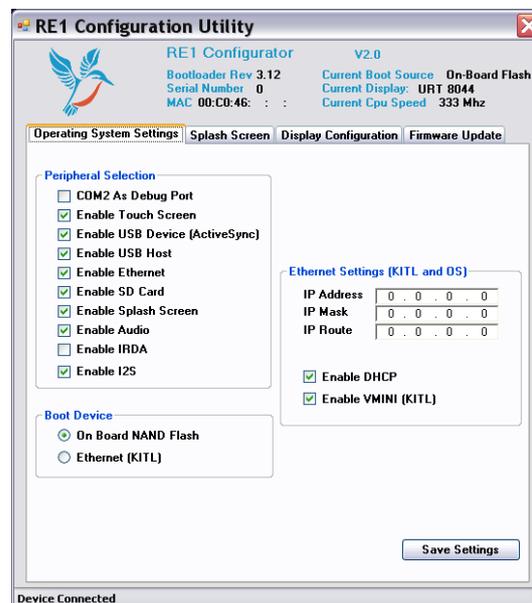
To Enable an Item, place the Tick against the item, and then select "Save Settings"
Note: "COM0 Debug port" actually translates via the physical port COM2

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

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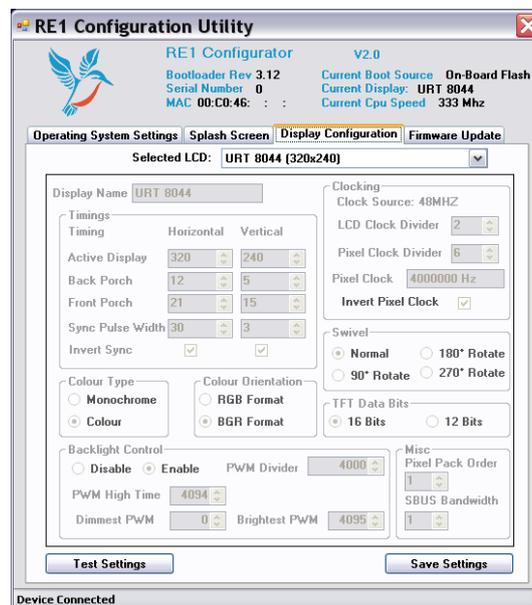
After selecting the required LCD type and pressing "Test Setting" the changes are made immediately to the BCT-RE1 so you can see the results of the change. If you have made a mistake and selected the incorrect type, you can rectify the change immediately.

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

From the drop down menu, select the panel closest to the size you want to use, and save its' settings.
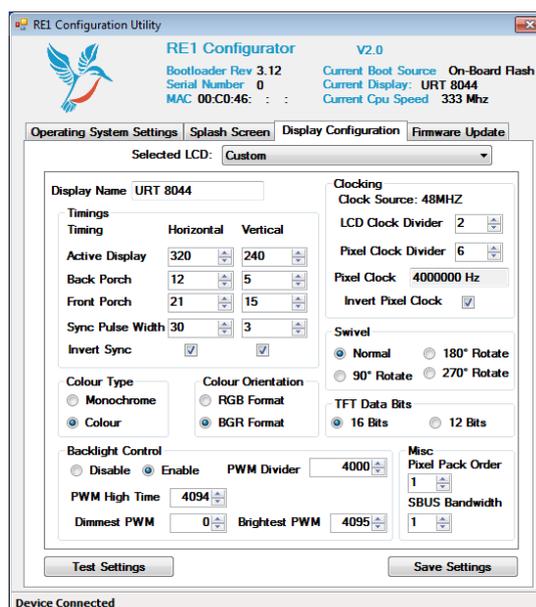
Next, select the "custom" panel. This allows the settings for the current panel to be changed.

Modify as required, selecting test settings on a regular basis to ensure that any setting changes are valid

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 RE1User Guide" for further details.

Maintenance

The RE1Computer 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
2.0	May 2012	TMCK	Updated to support new Configuration Utility
2.1	September 2012	TMCK	Corrected GPIO VCC
2.2	October 2012	TMCK	Corrected Pin markings on P9 and P10

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