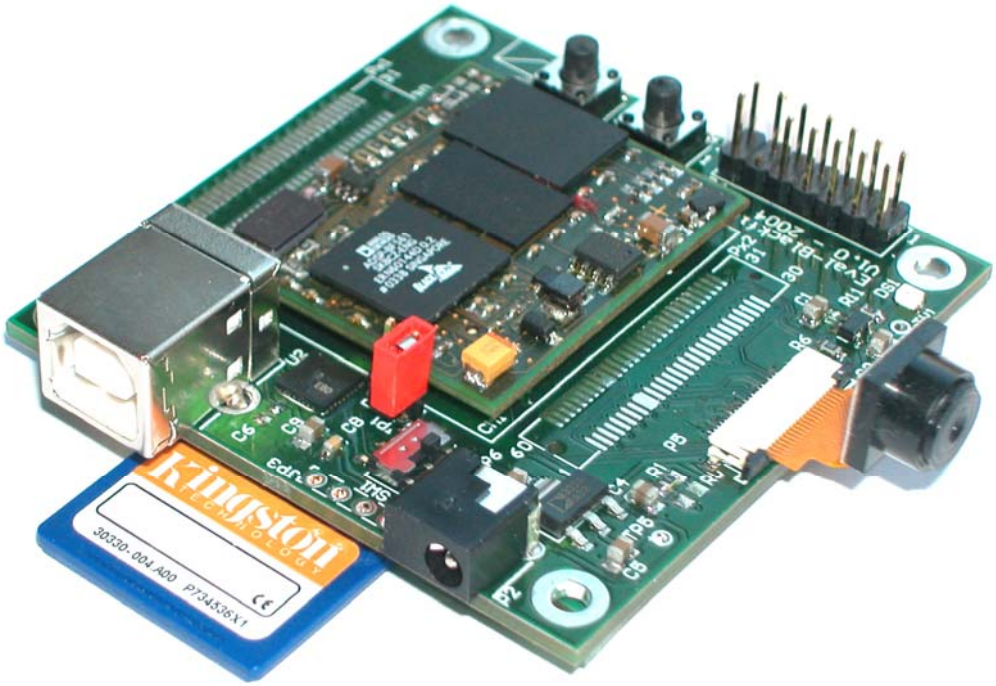
BLUE TECHNIX



Hardware User Manual

EVAL-BF5xx Board

* SD-Card and Camera Module are not included in the EVAL-BF5xx package.

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Maximum Power at Minimum Size

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Information
For further information on technology, delivery terms and conditions and prices please contact Bluetechnix (http://www.bluetechnix.at).

Warnings
Due to technical requirements components may contain dangerous substances.

The Core Boards and Development systems contain ESD (electrostatic discharge) sensitive devices. Electro-static charges readily accumulate on the human body and equipment and can discharge without detection. Permanent damage may occur on devices subjected to high-energy discharges. Proper ESD precautions are recommended to avoid performance degradation or loss of functionality. Unused core boards and development boards should be stored in the protective shipping package.

1 Introduction

The EVAL-BF5xx Board is a very low cost and lightweight evaluation platform for Bluetechnix core modules CM-BF533 and CM-BF561. The small baseboard has all hardware necessary to test the performance of the core modules including a high-speed serial port directly connectable to a computers USB port, a digital video camera interface and a SD-Card mass storage device socket.

1.1 Overview

The EVAL-BF5xx Board includes the following components:

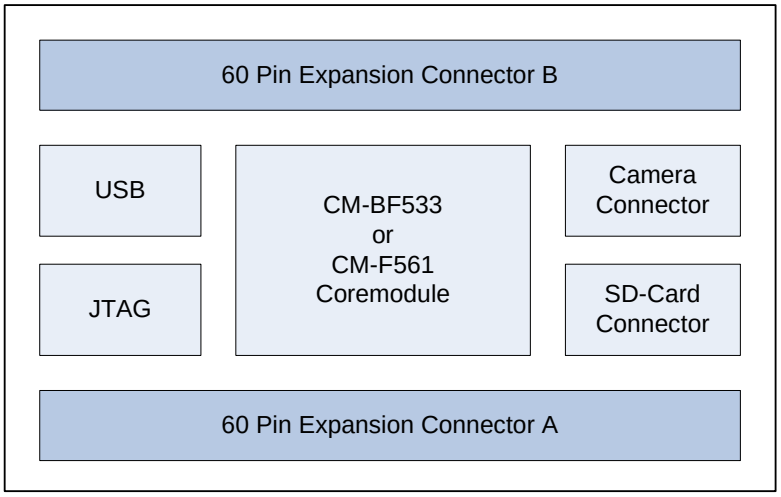

Figure 1-1: Overview of the EVAL-BF5xx Board

- **1 Coremodule Slot**
  - Supports the CM-BF533 as well as the CM-BF533 core modules
- **Camera Connector**
  - Supports the ITU-656 OmniVision Camera OV7648 available in the camera kit.
  - Camera drivers are supplemented in the camera kit.
- **USB**
  - Supports up to 915kbps UART-USB conversion.
  - Emulates a standard COM port on the computer.
- **JTAG**
  - JTAG-Plug that supports all analog Devices JTAG Emulators.

- **Expansion Connector 1**
  - SPORT 0
  - JTAG
  - UART
  - SPI
  - PPI-1 (Parallel Port Interface 1)
  - PFs (Programmable Flags)
- **Expansion Connector 2**
  - Data Bus
  - Address Bus
  - Memory Control Signals
  - PPI-2[1] (Parallel Port Interface 2)
  - Power Supply

The Camera Module as well as the SD-Card as shown on the cover page are not included in the EVAL-BF5xx Board.

For the Camera Module the *Kit-CAM-OV1* can be purchased from Bluetechnix.

1.2 Related Products

CM-BF533: Blackfin DSP Processor Module powered by Analog Devices single core BF533 processor. Up to 600MHz, 32MB RAM, 2MB Flash, 36x31mm, 120 pin expansion connector, BGA option.

CM-BF561: Blackfin DSP Processor Module powered by Analog Devices new dual core BF561 processor. Up to 2x 600MHz, 32MB RAM, 4MB Flash, 36x31mm, 120 pin expansion connector, BGA option.

DEV-Blackfin: Blackfin DSP Development board with two sockets for any combination of CM-BF533 and CM-BF561 core modules. Additional periphery is available, such as CF-Card, SD-Card, DP-Ram, Ethernet, USB host and device, multi-port JTAG and 2 connectors for a digital stereo camera system.

Kit-CAM-OV1: Camera Kit including one OmniVision OV7648 camera for the Blackfin core boards and the respective software driver

[1] Only available when using the CMBF561 Coremodule

2 Specification

2.1 Functional Specification

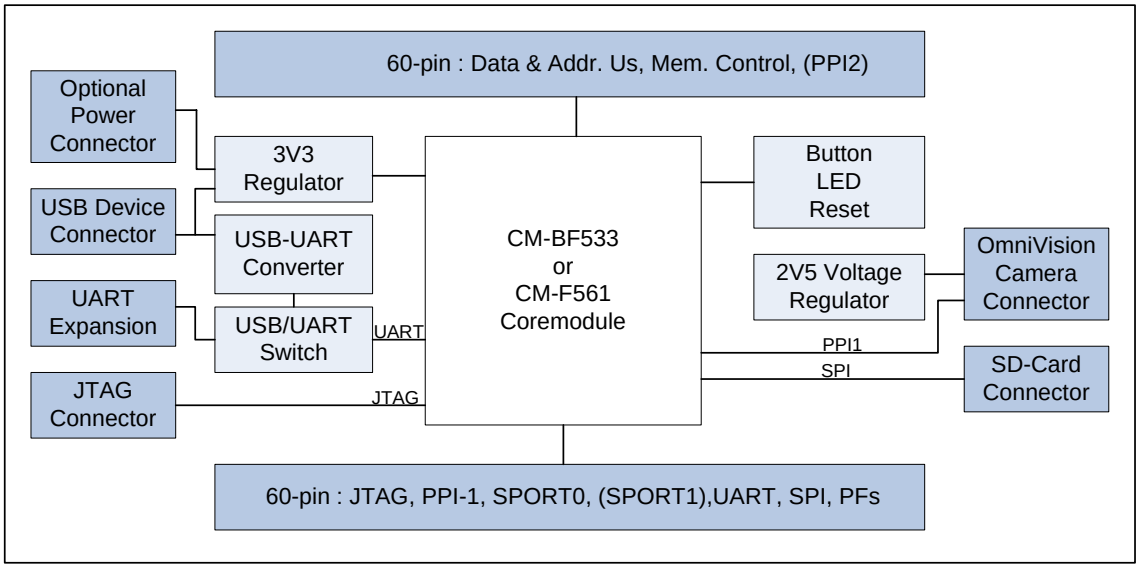

Figure 2-1: Detailed Block Diagram

Figure 2-1 shows a detailed block diagram of the EVAL-BF5xx Board.

From the *Power connector* or the *USB Device connector* power connects to a 1 Ampere linear voltage regulator that powers the coremodule.

The serial port of the coremodule can be routed directly to the *USB Port* (USB/UART Switch Position A towards the board edge) or to the *UART Expansion Pads* (USB/UART Switch Position B towards the coremodule).

The two *60-pin expansion connectors* bring al pins of the Coremodule (Section 2.2.3 and 2.2.4) directly on the expansion slot.

An *SD-Card connector* mounted at the bottom of the board allows making use of file IO Functions delivered with the Blacksheep Software. Blacksheep supports SD-Cards up to 512 MB and includes a FAT16 files systems as well as the most relevant File IO Functions.

Adding a Camera Kit to the EVAL-BF5xx Board allows connecting directly a high performance OmniVision Camera to the board via the OmniVision Camera connector.
Blacksheep Software fully supports drivers for the Camera Module.

2.2 Connectors, PCB Placement and PIN Assignment

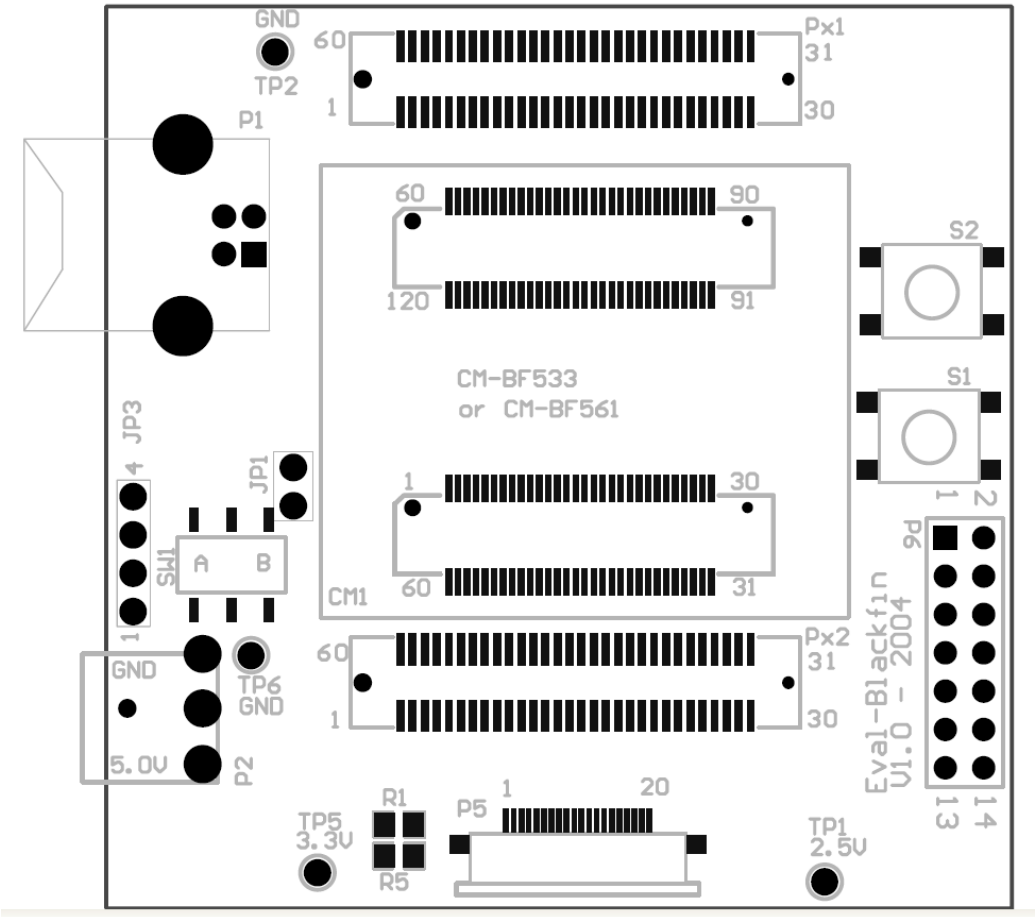

Figure 2-2: Connector PCB Placement

2.2.1 P1 – USB Connector

P1 is a standard USB-B Device Connector from which the board may draw its power of up to 500mA at most. Without extension board this is enough power to run a CM-BF561 board @ 600MHz including a SD-Card and the OmniVision Camera.

2.2.2 P2 – Power Connector

As a second power supply option, or if the 500mA provided by USB are not sufficient, P2 can be used as the main or as the secondary power connector. Both connectors P1 and P2 can be plugged into the evaluation board at the same time.

P2		
PIN Number	Signal	Description
1	GND	
2	NC	
3	+4V to +7V Input Supply	Preferable 5V

2.2.3 Px1 – Expansion Connector 1

Pin 1 through Pin 60 of Px1 is connected directly to Pin 61 through Pin 120 of any Coremodule (CM).

Part Baseboard	Manufacturer	Manufacturer ID
Px1,Px2	AMP	177983-2 (female) or 177984-2 (male)

PIN Px1	PIN CM	Signal	Signal type	PIN Px1	PIN CM	Signal	Signal type
1	61	ABE3	O	2	62	A3	O
3	63	A5	O	4	64	A7	O
5	65	A9	O	6	66	A11	O
7	67	A13	O	8	68	A15	O
9	69	PPI2C1	O	10	70	PPI2C2	O
11	71	PPI2D1	O	12	72	PPI2D3	-
13	73	PPI2D5	-	14	74	PPI2D7	-
15	75	PPI2D9	-	16	76	PPI2D11	I
17	77	PPI2D13	O	18	78	PPI2D15	O
19	79	GND	PWR	20	80	/AMS1	O
21	81	/AWE	O	22	82	NMI	I
23	83	D0	I/O	24	84	D2	I/O
25	85	D4	I/O	26	86	D6	I/O
27	87	D8	I/O	28	88	D10	I/O
29	89	D12	I/O	30	90	D14	I/O
31	91	D15	I/O	32	92	D13	I/O
33	93	D11	I/O	34	94	D9	I/O
35	95	D7	I/O	36	96	D5	I/O
37	97	D3	I/O	38	98	D1	I/O
39	99	/Reset	I	40	100	/AOE	O
41	101	/ARE	O	42	102	/AMS2	O
43	103	3V3	PWR	44	104	PPI2D14	I/O
45	105	PPI2D12	I/O	46	106	PPI2D10	I/O
47	107	PPI2D8	I/O	48	108	PPI2D6	I/O
49	109	PPI2D4	I/O	50	110	PPI2D2	I/O
51	111	PPI2D0	I/O	52	112	PPI2C3	I/O
53	113	PPI2C0	I/O	54	114	A14	O
55	115	A12	O	56	116	A10	O
57	117	A8	O	58	118	A6	O
59	119	A4	O	60	120	A2	O

Table 2-1: Connector Px1 pin assignment

2.2.4 Px2 – Expansion Connector 2

Pin 1 through Pin 60 of Px2 is connected directly to Pin 1 through Pin 60 of any Coremodule.

Part Baseboard	Manufacturer	Manufacturer ID
Px1,Px2	AMP	177983-2 (female) or 177984-2 (male)

PIN PIN Px1 = CM	Signal	Signal type	PIN PIN Px1 = CM	Signal	Signal type
1	RSCLK0	I/O	2	DR0PRI	I
3	TSCLK0	I/O	4	DT0PRI	O
5	PF11 (Clk_out)	I/O	6	PF9	I/O
7	PF7	I/O	8	PF5	I/O
9	Vin 3V3	PWR	10	Vin 3V3	PWR
11	PPI1D0	I/O	12	PPI1D2	I/O
13	PPI1D4	I/O	14	PPI1D6	I/O
15	PPI1D8	I/O	16	PPI1D10	I/O
17	PPI1D12	I/O	18	PPI1D14	I/O
19	PPI1SY3/PF3	I/O	20	PPI1SY1 / TMR1	I/O
21	PF3	I/O	22	PF1	I/O
23	RX	I	24	MOSI	I/O
25	SCK	I	26	ABE2	O
27	ARDY	I	28	TCK	I
29	TDI	I	30	TRST	I
31	EMU	I	32	TMS	O
33	TDO	O	34	AMS3	O
35	ABE1	O	36	ABE0	O
37	MISO	I/O	38	TX	O
39	PF0	I/O	40	PF2	I/O
41	PPI1CLK	I/O	42	PPI1SY2 / TMR2	I/O
43	PPI1D15	I/O	44	PPI1D13	I/O
45	PPI1D11	I/O	46	PPI1D9	I/O
47	PPI1D7	I/O	48	PPI1D5	I/O
49	PPI1D3	I/O	50	PPI1D1	I/O
51	GND	PWR	52	GND	PWR
53	PF4	I/O	54	PF6	I/O
55	PF8	I/O	56	PF10	I/O
57	DT0SEC	O	58	TFS0	I/O
59	DR0SEC	I	60	RFS0	I/O

Table 2-2: Connector Px2 pin assignment

GREY Shaded Connector PINS indicate difference to CM-BF533

2.2.5 P5 – Expansion OmniVision Camera Connector

PIN	Signal	Signal type	PIN PIN Px1 = CM	Signal	Signal type

1	GND	I/O	2	HREF (NC)	I
3	VSYNC (NC)	I/O	4	PWDN (PPID10)	O
5	PCLK (PPICLK)	I	6	2V5 VDD	I/O
7	3V3 DOVDD	PWR	8	SIO_D (PPID9)	I/O
9	CamClk (*)	I	10	SIO_C (PPID8)	I
11	D0	O	12	D1	O
13	D2	O	14	D3	O
15	GND	O	16	D4	O
17	D5	O	18	D6	O
19	D7	O	20	Reset (GND)	I

(*) Mount option R1/R5: Mount R1 for CM-BF533 clock source ; Mount R5 for CM-BF561 clock source

2.2.6 P6 – JTAG Connector

The JTAG connector is compliant to any Blackfin JTAG Emulator from Analog Devices.

2.2.7 SW1 – UART Switch

Move Sw1 to POSITION A to route the Coremodules RX and TX signals to USB

Move Sw1 to Position B to route the Coremodules RX and TX signals to JP3

2.2.8 JP1 - Power Supply Jumper

This jumper can be removed in order to insert an AMPERE METER for current measurement of the entire Coremodule.

2.2.9 JP3 – UART Solder Pads

JP3		
PIN Number	Signal	Description
1	TXD Blackfin	Output Coremodule
2	RXD Blackfin	Input Coremodule
3	GND	
4	3V3	Regulated Power

2.2.10 Buttons and LED

The Button S1 is the main Reset Button of the Coremodule.
The Button S2 is a general purpose input button connected to the **PF2 PIN** of the CM-BF533 or to the **PF3 PIN** of the CM-BF561.

The LED is Connected to the PPID15 (**PF3**) pin of the CM-BF533 or to the PPID15 (**PF47**) PIN of the CM-BF561

2.3 Mechanical Outline

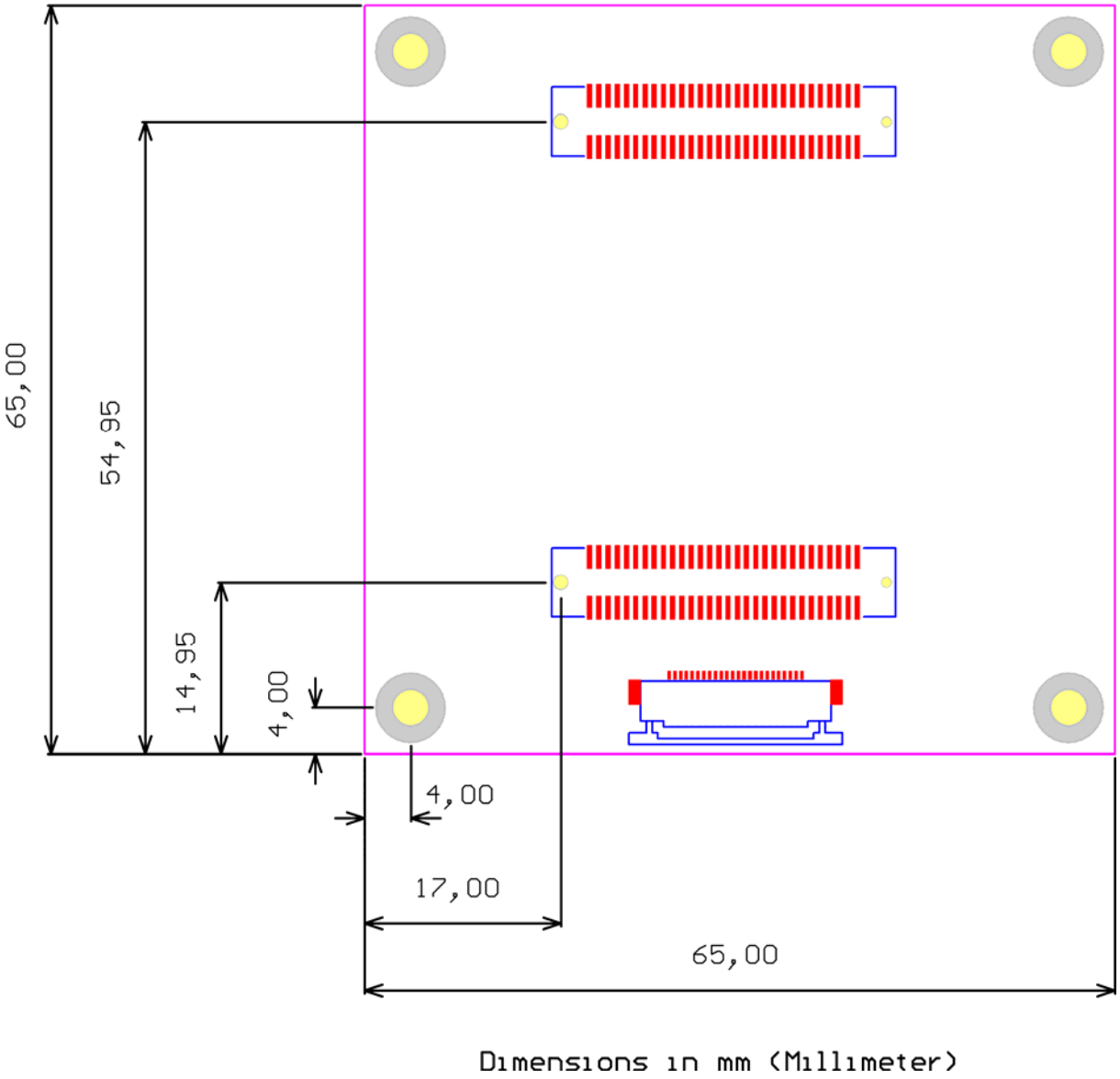

Figure 2-3: Mechanical Outline – Expansion Connector Placement

3 Known Bugs

4 Revision History

2005-02-08	Release Version No. 1.0

A List of Figures and Tables