BLUE TECHNIX

Hardware User Manual

CM-BF537 V3.x

...maximum performance at minimum space

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Information

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

Warning

Due to technical requirements components may contain dangerous substances.

Blackfin® Core Modules

TCM-BF518-C-C-Q25S32F2 (TCM-BF518)

The Tiny Core Module TCM-BF518 is powered by Analog Devices' single core ADSP-BF518 processor; up to 400MHz, 32MB SDRAM, up to 8MB flash. The 2x60 pin expansion connectors are backwards compatible with other Core Modules.

ACM-BF525C-C-C-Q25S64F4N1024

The Core Module ACM-BF525C is optimized for audio applications and performance. It is based on the high performance ADSPBF525Cfrom Analog Devices. It addresses 64MByte SDRAM via its 16bit wide SDRAM bus, has an onboard NOR-flash of 4MByte and a NAND-flash with 1024MByte.

CM-BF527-C-C-Q50S32F8 (CM-BF527)

The Core Module CM-BF527 is powered by Analog Devices' single core ADSP-BF527 processor; key features are USB OTG 2.0 and Ethernet. The 2x60 pin expansion connectors are backwards compatible with other Core Modules.

CM-BF533-C-C-Q25S32F2 (CM-BF533)

The Core Module CM-BF533 is powered by Analog Devices' single core ADSP-BF533 processor; up to 600MHz, 32MB SDRAM, 2MB flash, 2x60 pin expansion connectors at a size of 36.5x31.5mm.

TCM-BF537-C-I-Q25S32F8 (TCM-BF537)

The Tiny Core Module TCM-BF537 is powered by Analog Devices' single core ADSP-BF537 processor; up to 500MHz, 32MB SDRAM, 8MB flash, a size of 28x28mm, 2x60 pin expansion connectors, Ball Grid Array or Border Pads for reflow soldering, industrial temperature range -40°C to +85°C.

CM-BF537-C-C-Q25S32F4 (CM-BF537E)

The Core Module CM-BF537 is powered by Analog Devices' single core ADSP-BF537 processor; up to 600MHz, 32MB SDRAM, 4MB flash, integrated TP10/100 Ethernet physical transceiver, 2x60 pin expansion connectors at a size of 36.5x31.5mm.

CM-BF537-C-C-Q30S32F4-U (CM-BF537U)

The Core Module CM-BF537 is powered by Analog Devices' single core ADSP-BF537 processor; up to 600MHz, 32MB SDRAM, 4MB flash, integrated USB 2.0 Device, 2x60 pin expansion connectors at a size of 36.5x31.5mm.

CM-BF548-C-C-Q25S64F8 (CM-BF548)

The Core Module CM-BF548 is characterized by its numerous peripheral interfaces, its performance in combination with its high speed memory interface (DDR). Key features are 533MHz, 64MB DDR SD-RAM (266MHz), and 8MB flash.

CM-BF561-C-C-Q25S64F8 (CM-BF561)

The Core Module CM-BF561 is powered by Analog Devices' dual core ADSP-BF561 processor; up to 2x 600MHz, 64MB SDRAM, 8MB flash, 2x60 pin expansion connectors at a size of 36.5x31.5mm.

eCM-BF561-C-C-Q25S128F32 (eCM-BF561)

The Core Module CM-BF561 is powered by Analog Devices' dual core ADSP-BF561 processor; up to 2x 600MHz, 128MB SDRAM, 8MB flash, 2x100 pin expansion connectors and a size of 44x33mm.

Core Module naming information

The idea is to put more Core Module specific technical information into the product name. New Core Module names will have following technical information covered in their names.

- Product Family,

- CPU-Type,

- Connection-Type,

- Operating Temperature Range,

- Crystal Frequency [MHz],

- RAM [MB],

- Flash [MB],

- External Controllers

-
    o Special and/or
    o Former name

That expands of course the name but allows the customer to get the most important Core Module specific information at the first sight. Have a look at the example below to get an idea of the new Core Module names.

Example CM-BF537-C-C-Q25S32F4 (CM-BF537E)

```
            CM -  BF537  - C - C -  Q25   S32   F4 -     -      (CM-BF537E)
```

Product Family
CM = Core Module
SBC = Single Board Computer

CPU-Type
Equals the name of CPU

Connection-Type
A = BGA
B = Border pad
C = Connector
S = Special

Operating Temperature Range
A = Automotive   (-40° to +125°)
C = Commercial   (0° to +70°)
I = Industry   (-40° to +85°)

Crystal Frequency
Notation: QXX[MHz]

Former name

Special
Custom Core Modules or specials
uC = uclinux

Extra controllers mounted
E = Ethernet
U = USB

Flash [MB]
F = NOR Flash [MB]
N = NAND Flash [MB]

RAM
S = SDRAM [MB]

Blackfin® Development Boards

ADEV-BF52xC

Feature rich, low cost embedded audio development platform which supports Audio Core Modules (ACM). The form factor of the ADEV-BF52xC allows easy integration of the board into OEM products. Dedicated interfaces such as USB2.0, Line In/Out, headphone out and an onboard silicon microphone turn the ADEV-BF52xC into a full-featured development platform for most embedded audio applications in commercial areas.

DEV-BF5xxDA-Lite

Get ready to program and debug Bluetechnix Core Modules with this tiny development platform including an USB-Based Debug Agent. The DEV-BF5xxDA-Lite is a low cost starter development system including a VDSP++ Evaluation Software License.

DEV-BF548-Lite

Low-cost development board with a socket for Bluetechnix' CM-BF548 Core Module. Additional interfaces are available, e.g. an SD-Card, USB and Ethernet.

DEV-BF548DA-Lite

Get ready to program and debug Bluetechnix CM-BF548 Core Module with this tiny development platform including an USB-Based Debug Agent. The DEV-BF548DA-Lite is a low-cost starter development system including a VDSP++ Evaluation Software License.

eDEV-BF5xx

Feature rich, low cost rapid development platform which provides all interfaces on dedicated connectors and has all Core Module pins routed to solder pads which easily can be accessed by the developers. The eDEV-BF5xx supports the latest debugging interface from Analog Devices - ADI-SADA (Analog Devices Stand Alone Debug Agent).

EVAL-BF5xx

Tiny, low cost embedded platform which supports Bluetechnix powerful Blackfin® based Core Modules. The form factor (75x75mm) of the EVAL-BF5xx allows easy integration of the board into OEM products. Dedicated interfaces such as USB2.0, SD-card slot, CAN interface connectors and of course Ethernet, turn the EVAL-BF5xx into a full-featured evaluation platform for most embedded applications.

Extender boards

Extender boards (EXT-BF5xx) are expanding the development and evaluation boards by several interfaces and functionalities. Targeted application areas are: audio/video processing, security and surveillance, Ethernet access, positioning, automation and control, experimental development and measuring.

Note! Bluetechnix is offering tailored board developments as well.

1 Introduction

The Core-Module CM-BF537 is characterized by its field of application, performance and configuration possibility. The module integrates processor, RAM, flash, external peripheral controllers and power supply at a size of 31.5x36.5mm! It is based at the high performance ADSP-BF537 from Analog Devices. The Core-Module is designed for commercial and industrial usage (depending on temperature range). It addresses up to 64MByte SDRAM via its 16bit wide SDRAM bus, has an onboard NOR-flash of 4MByte and offers a CAN interface. In addition there is an extra Ethernet physical transceiver (10/100Mbit) onboard.

1.1 Overview

The current hardware version (see Version Information) of Core Module CM-BF537-C-C-Q25S32F4 (CM-BF537E) consists of the following components. Parts of mounting options of CM-BF537 are listed in addition.
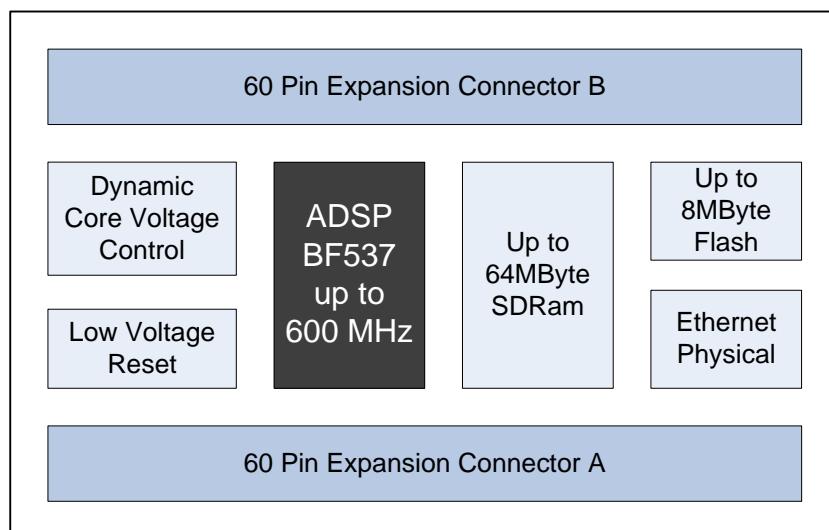
Figure 1-1: Main components of the CM-BF537 Core Module

- **Analog Devices Blackfin Processor BF537**
  - Industrial version (see chapter 8.1)
    - ADSP-BF537SBBCZ-5A (-40° - 85°C)

  - Commercial version (see chapter 8.1)
    - ADSP-BF537SKBCZ-6AV (0° - 70°C)

- **SDRAM**
  - 32MByte SDRAM Version (see chapter 8.1)
    - SDRAM Clock up to 133MHz
    - MT48LC16M16A2BG-7 (16Mx16, 256Mbit at 3.3 V)

  - 64MByte SDRAM Version(see chapter 8.1)
    - SDRAM Clock up to 143MHz
    - IS42S16320B-7BL (8M x16x4, 512Mbit at 3.3 V)

- **4 MByte of Addressable Flash**
  - PF48F2000P0ZBQ0 (4Mx16 32Mbit at 3.3 V; default only 4MByte addressable)

o   Additional flash memory can be connected through the expansion board as parallel flash using asynchronous chip select lines or as an SPI flash.

- **Ethernet Physical Transceiver**
  o   Micrel KSZ8041NLI

- **Low Voltage Reset Circuit**
  o   Resets module if power supply goes below 2.93 V for at least 140 ms

- **Dynamic Core Voltage Control**
  o   Core voltage is adjustable by setting software registers on the Blackfin processor
  o   Core voltage range: 0.8 – 1.32V

- **Expansion Connector A**
  o   Data Bus
  o   Address Bus
  o   Control Signals
  o   Power Supply
  o   Ethernet Pins

- **Expansion Connector B**
  o   SPORT0
  o   JTAG
  o   UART0/UART1
  o   CAN
  o   TWI (I^2C compatible)
  o   SPI
  o   PPI (Parallel Port Interface)
  o   GPIO's

1.2   Key Features

- The CM-BF537 is very compact and measures only 36.5x31.5mm
- Allows quick prototyping of product that comes very close to the final design
- Reduces development costs, faster time to market
- Very cost effective for small and medium volumes

1.3   Applications

- Robotics
- Video security
- Video surveillance
- Industrial distributed control
- Industrial factory automation
- Remote monitoring devices
- Point-of-sale terminals
- VoIP
- Biometrics/security
- Instrumentation
- Medical appliances
- Consumer appliances

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2 General Description

2.1 Functional Description
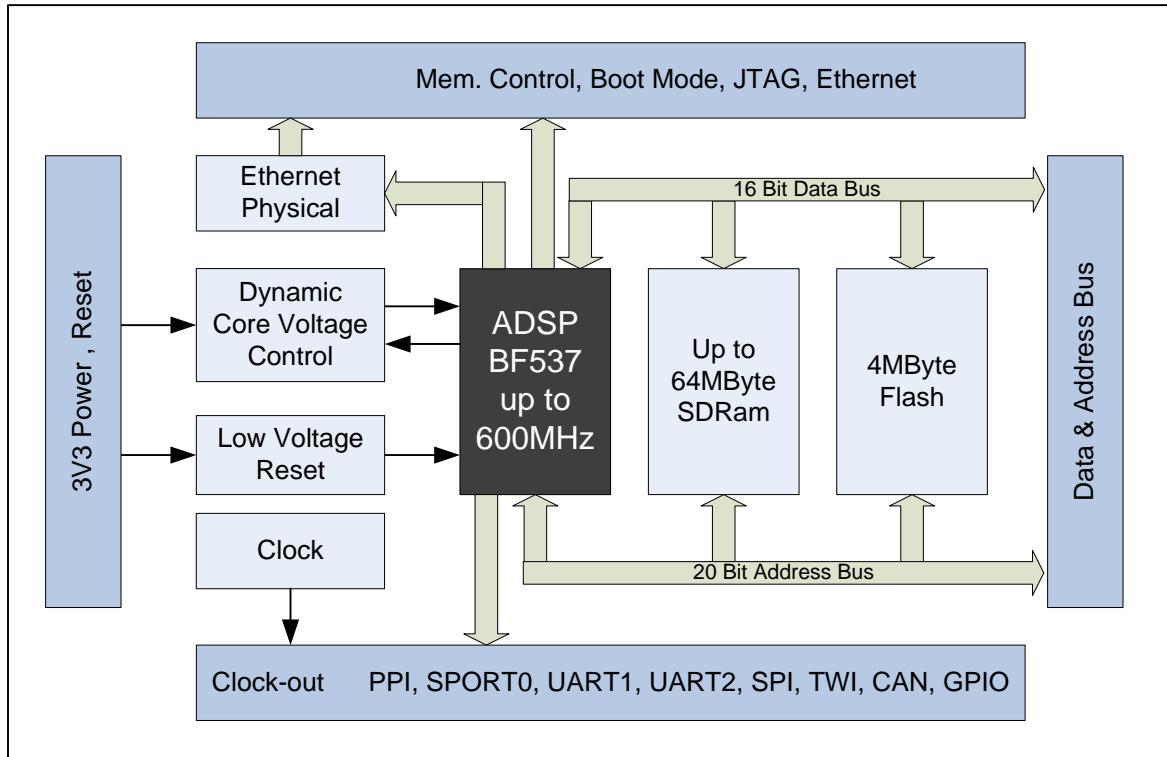
Figure 2-1: Detailed block diagram

Figure 2-1 shows a detailed block diagram of the CM-BF537. Other than the SDRAM control pins the CM-BF537 has all other pins of the Blackfin processor on its two main 60 pin connectors.

A special feature of the Core Module CM-BF537 is the on-board physical Ethernet transceiver from Micrel (KSZ8041NLI).

Dynamic voltage control allows reducing power consumption to a minimum adjusting the core voltage and the clock frequency dynamically in accordance to the required processing power. A low voltage reset circuit guarantees a power on reset and resets the system when the input voltage drops below 2.93V.

2.2 Boot Mode

By default the boot mode = 000 (BMODE2 = low, BMODE1 = low, BMODE0 = low). All BMODE pins have internal pull down resistors.

Connect BMODE0 to Vcc and leave BMODE1, BMODE2 pins open for boot mode 001 equals to 8 or 16 bit PROM/FLASH boot mode, this is the default boot mode of BLACKSheep® OS. See Blackfin Datasheets or Eval/DevBoard manuals for more details.

2.3 Memory Map

2.3.1 Core Module Memory

Memory Type	Start Address	End Address	Size	Comment
FLASH Bank0 (PF4 Flag low)	0x20000000	0x201FFFFF	2MB	1/8 of 16MB Micron Flash, PF48F3000P0ZBQ
FLASH Bank1 (PF4 Flag high)	0x20000000	0x201FFFFF	2MB	1/8 of 16MB Micron Flash, PF48F3000P0ZBQ
FLASH Bank2 (PF5 Flag low)*	0x20000000	0x201FFFFF	2MB	1/8 of 16MB Micron Flash, PF48F3000P0ZBQ
FLASH Bank3 (PF5 Flag high)*	0x20000000	0x201FFFFF	2MB	1/8 of 16MB Micron Flash, PF48F3000P0ZBQ
SD-RAM$_{32}$	0x00000000	0x01FFFFFF	32MB	16Bit Bus, Micron MT48LC16M16A2FG
SD-RAM$_{64}$	0x00000000	0x1FFFFFFF	64MB	16Bit Bus, ISSI IS42S16320B-7BL

Table 2-1: Memory map

The maximum amount of addressable memory by a single asynchronous memory bank is 2MByte. In order to be able to use more than 2MByte on a single bank 2 GPIOs are used to select which 2MB section of flash is active in the memory window of the Blackfin processor. This frees up the remaining banks for the user.

The maximum amount of memory addressable by the processor is 8MByte.

*) PF5 is routed by default to the connector of the Core Module. Nevertheless this pin can be used to select bank2/3 of the flash memory. To realize this, the 0Ω resistor R18 must be removed and a 0Ω resistor R19 must be soldered to the Core Module. In this case PF5 is routed to the flash memory instead to the connector!
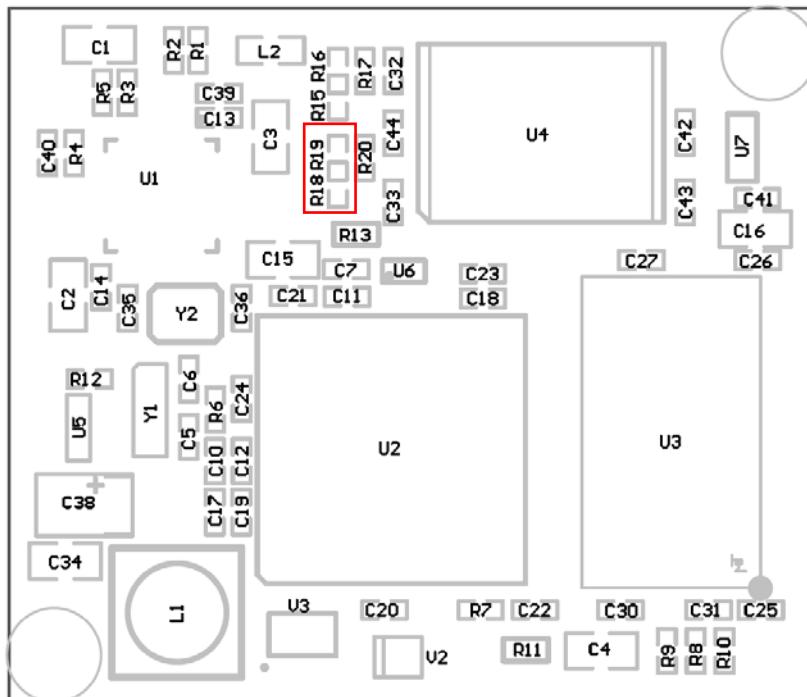
Figure 2-2: Assembly drawing top view

2.3.2 Externally Addressable Memory (on connector)

The Blackfins External Bus Interface (EBI) allows connecting devices via an asynchronous memory interface.

AMS Line	Start Address	End Address	Max. Size
nAMS2	0x20200000	0x202FFFFF	1MB
nAMS3	0x20300000	0x203FFFFF	1MB

Table 2-2: Externally addressable memory

3 Specifications

3.1 Electrical Specifications

3.1.1 Operating Conditions

Symbol	Parameter	Min	Typical	Max	Unit
V_{IN}	Input supply voltage	3.0	3.3	3.6	V
I_{3V3}[3]	3.3V current	-	350	-	mA
V_{OH}	High level output voltage	2.8	-	-	V
V_{OL}	Low level output voltage	-	-	0.5	V
I_{IH}	IO input current	-	-	10	µA
I_{OZ}	Three state leakage current	-	-	10	µA
$I_{DEEPSLEEP}$	V_{IN} current in deep sleep mode	-	16	-	mA
I_{SLEEP}	V_{IN} current in sleep mode	-	19.5	-	mA
I_{IDLE}	V_{IN} current in idle mode	-	24	-	mA
I_{TYP}	V_{IN} current in with core running at 400 MHz	-	138	-	mA
$I_{HIBERNATE}$[1]	V_{IN} current in hibernate state at 400 MHz	-	-	70	mA
I_{RTC}	V_{RTC} current	-	20	-	µA
f_{CCLK}[2]	Core clock frequency	-	-	600	MHz

Table 3-1: Electrical characteristics

[1] V_{DDINT}=1.10V @ T_J=25°C

[2] Commercial grade

[3] Average load @ 25°C ambient temperature

3.1.2 Maximum Ratings

Stressing the device above the rating listed in the absolute maximum ratings table may cause permanent damage to the device. These are stress ratings only. Operation of the device at these or any other conditions greater than those indicated in the operating sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Symbol	Parameter	Min	Max	Unit
V_{IO}	Input or output voltage	-0.5	3.6	V
V_{IN}	Input supply voltage	3.0	5.5	V
I_{OH}/I_{OL}	Current per pin	0	10	mA
T_{AMB}	Ambient temperature	-40	85	°C
T_{STO}	Storage temperature	-55	150	°C
T_{SLD}	Solder temperature for 10 seconds		260	°C
φ_{AMB}	Relative ambient humidity		90	%

Table 3-2: Absolute maximum ratings

3.1.3 ESD Sensitivity

ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

4 Connector Description

4.1 Connector X1

Pin No.	Signal Name	Type	Function
1	RSCLK0 / TACLK2	I/O	
2	DR0PRI / TACLK4	I	
3	TSCLK0 / TACLK1	I/O	
4	DT0PRI / SSEL2	O	
5	CLKBUF	O	25MHz buffered clock output
6	SDA	I/O	
7	PF4 / TMR5 / SSEL6: MO1* NC: MO2, MO3*	I/O	
8	PF5 / TMR4 / SSEL5: MO1, MO2* NC: MO3*	I/O	
9	Vin 3V3	PWR	3V3 +-10% 500mA peak for supply
10	Vin 3V3	PWR	3V3 +-10% 500mA peak for supply
11	PG0 / PPI1D0	I/O	
12	PG2 / PPI1D2	I/O	
13	PG4 / PPI1D4	I/O	
14	PG6 / PPI1D6	I/O	
15	PG8 / PPI1D8 / DR1SEC	I/O	
16	PG10 / PPI1D10 / RSCLK1	I/O	
17	PG12 / PPI1D12 / DR1PRI	I/O	
18	PG14 / PPI1D14 / TFS1	I/O	
19	PPI1SY3 / PF7 / TMR2	I/O	
20	PPI1SY1 / PF9 / TMR0	I/O	
21	PPI1SY1 / PF9 / TMR0	I/O	
22	PF3 / Rx1 / TMR6 / TACI6	I/O	
23	PF1 / DMAR1 / TACI1 / Rx0	I/O	
24	PF11 / MOSI	I/O	
25	PF13 / SCK	I/O	
26	BMODE0	I - 10k pull down	
27	GND	PWR	
28	TCK	I - 10k pull up	
29	TDI	I - 10k pull up	
30	TRST	I - 4k7 pull down	
31	EMU	O	
32	TMS	I - 10k pull up	
33	TDO	O	
34	BMODE2	I - 10k pull down	
35	N.C.	-	NC
36	BMODE1	I - 10k pull down	
37	PF12 / MISO	I/O	
38	PF0 / DMAR0 / Tx0	I/O	
39	PF14 / SPI_SS	I/O	
40	PF2 / Tx1 / TMR7	I/O	
41	PPI1Clk / PF15 / TMRCLK	I/O	
42	PPI1Sy2 / PF8 / TMR1	I/O	
43	PG15 / PPI1D15 / DT1PRI	I/O	
44	PG13 / PPI1D13 / TSCLK1	I/O	
45	PG11 / PPI1D11 / RFS1	I/O	

Pin No.	Signal Name	Type	Function
46	PG9 / PPI1D9 / DT1SEC	I/O	
47	PG7 / PPI1D7	I/O	
48	PG5 / PPI1D5	I/O	
49	PG3 / PPI1D3	I/O	
50	PG1 / PPI1D1	I/O	
51	GND	PWR	
52	GND	PWR	
53	PF5 / TMR4 / SSEL5: MO1, MO2* NC: MO3*	I/O	
54	PF6 / TMR3 / SSEL4	I/O	
55	PF10 / SSEL1	I/O	
56	SCL	I/O	
57	DT0SEC / SSEL7 / CANTx	O	
58	TFS0 / SSEL3	I/O	
59	DR0SEC / TACI0 /	I	
60	RFS0 / TACLK3	I/O	

Table 4-1: Connector description X1

* For mount option details see chapter 8.1.

Note 1: Pin 8 and 53 as well as pin 20 and 21 are identical.

Note 2: Please mind the mounted pull up and pull down resistors on the Core Module.

4.2 Connector X2

Pin No.	Signal Name	Type	Function
61	A1	O	Address Bus
62	A3	O	Address Bus
63	A5	O	Address Bus
64	A7	O	Address Bus
65	A9	O	Address Bus
66	A11	O	Address Bus
67	A13	O	Address Bus
68	A15	O	Address Bus
69	A17	O	Address Bus
70	A19	O	Address Bus
71	ABE1/SDQM1	O	
72	LED_ACT	O	Indicates Ethernet activity
73	GND	-	AGND use as GND for Ethernet
74	RX+	I – 47R pull up to 3V3	Ethernet receive +
75	RX-	I – 47R pull up to 3V3	Ethernet receive -
76	ADRY	I - 10k pull up	
77	BG	O	
78	CLK_OUT	O	CLKOUT Pin of Blackfin
79	GND	PWR	
80	AMS3	O	
81	AWE	O	
82	NMI	I - 10k pull up	
83	D0	I/O	Data Bus
84	D2	I/O	Data Bus
85	D4	I/O	Data Bus

Pin No.	Signal Name	Type	Function
86	D6	I/O	Data Bus
87	D8	I/O	Data Bus
88	D10	I/O	Data Bus
89	D12	I/O	Data Bus
90	D14	I/O	Data Bus
91	D15	I/O	Data Bus
92	D13	I/O	Data Bus
93	D11	I/O	Data Bus
94	D9	I/O	Data Bus
95	D7	I/O	Data Bus
96	D5	I/O	Data Bus
97	D3	I/O	Data Bus
98	D1	I/O	Data Bus
99	RESET	I – see chapter 5.2	
100	AOE	O	
101	ARE	O	
102	AMS2	O	
103	VDD-RTC	PWR	
104	BGH	O	
105	BR	I - 10k pull up	
106	VA33	PWR	Ethernet transformer voltage reference
107	TX-	O - 47R pull up to 3V3	Ethernet transmit -
108	TX+	O - 47R pull up to 3V3	Ethernet transmit +
109	NC		
110	LED_SPEED	O	Full duplex LED, High = Full duplex active, Low = inactive
111	ABE0/SDQM0	O	
112	A18	O	Address Bus
113	A16	O	Address Bus
114	A14	O	Address Bus
115	A12	O	Address Bus
116	A10	O	Address Bus
117	A8	O	Address Bus
118	A6	O	Address Bus
119	A4	O	Address Bus
120	A2	O	Address Bus

Table 4-2: Connector description X2

Note: Please mind the mounted pull up and pull down resistors on the Core Module.

5 Application Information

5.1 Supply Voltage Decoupling

For a better stability we recommend to add a 100nF capacitor for each power supply pin and a 47uF tantalum capacitor to the V_{IN} voltage rail next to the module.

5.2 Reset circuit

The reset of the flash and the processor are connected to a power monitoring IC. The output can be used as power on reset for external devices, see Figure 5-1.
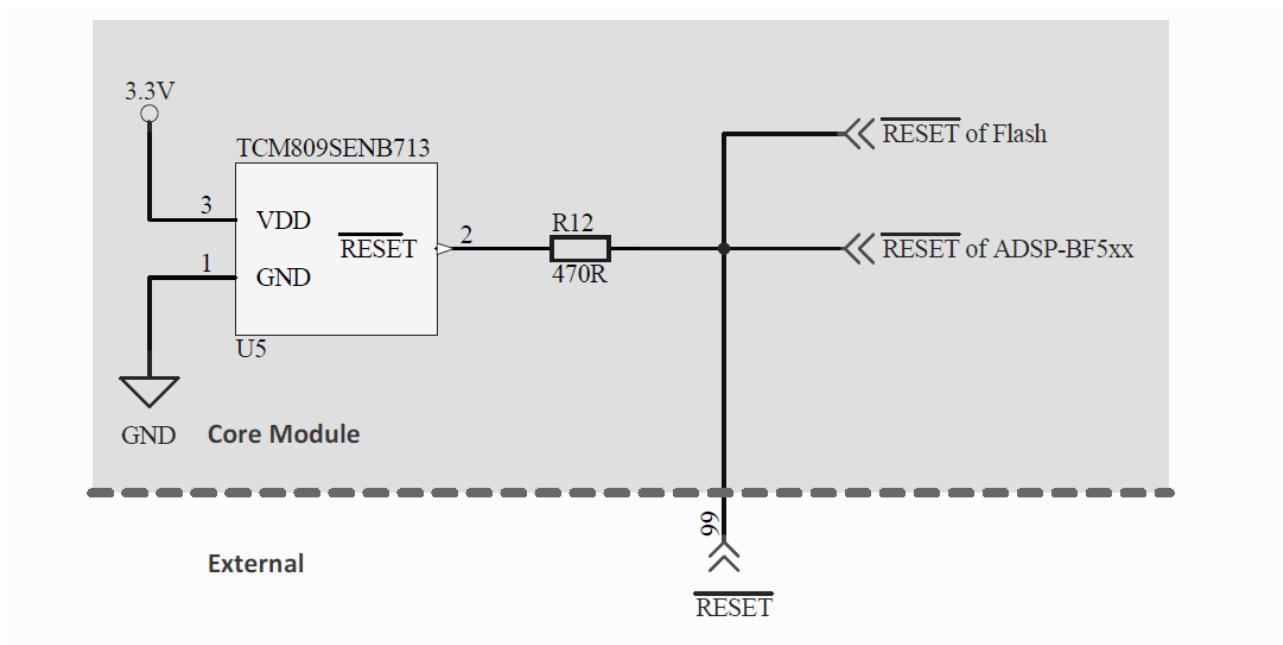

Figure 5-1: Schematic of reset circuit on the Core Module

5.3 Application Example Schematics

5.3.1 RJ45 schematic
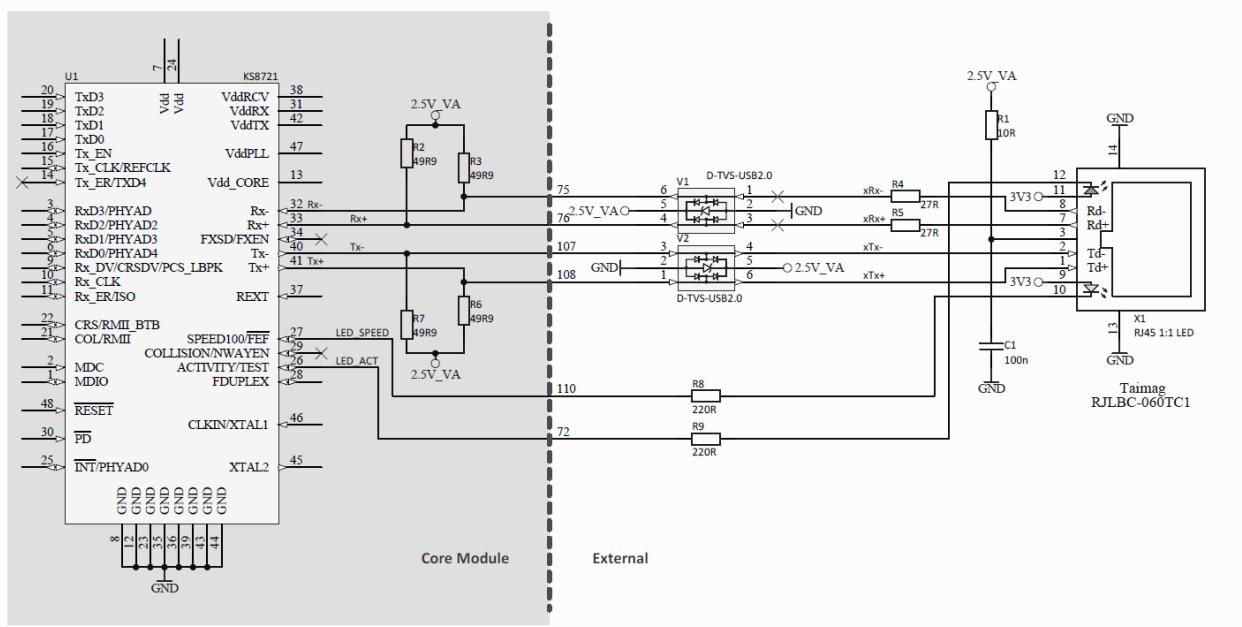
Figure 5-2: Schematic for RJ45 Connection

Designator	Value	Type	Description	Quantity
X1		RJLBC-060TC1	RJ45 with transformer 1:1	1
C1	10uF		Capacitor	1
R8, R9	220R		Resistor	2
V1, V2		USBLC6-2P6	TSV-Diode	2

Table 5-1: Parts List RJ45

5.4 Sample Schematic

In this minimum configuration the CM-BF537 is used as a high performance network connected processor module.
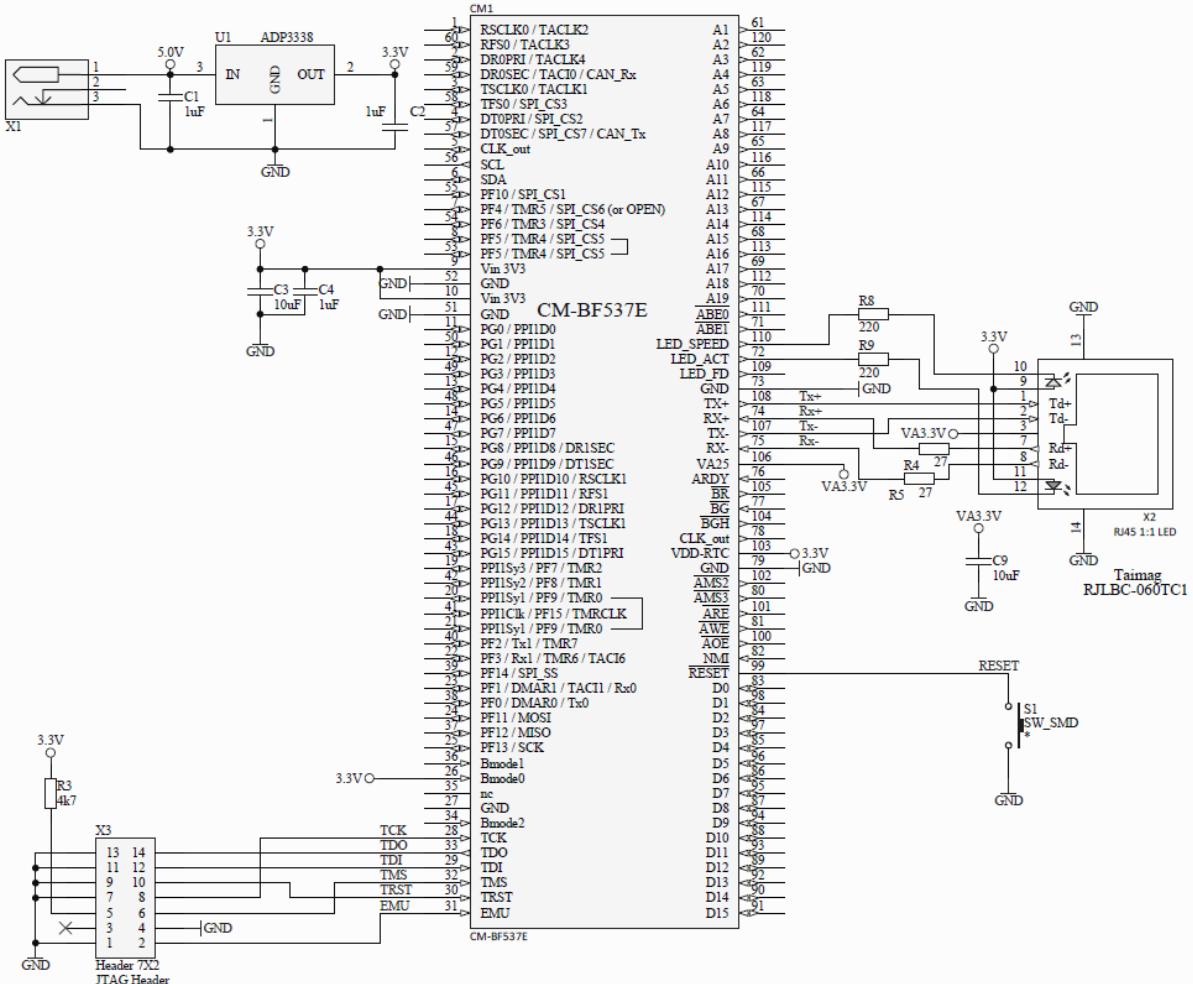
Figure 5-3: Configuration with Ethernet and JTAG Connector

Designator	Value	Type	Description	Quantity
C1, C2, C4	1uF		Capacitor	3
C3, C5	10uF		Capacitor	1
CM1			CM-BF537	1
X1		DC-8	Power connector DC-8	1
X2		RJLBC-060TC1	RJ45 with transformer	1
X3			Header, 7-Pin, dual row	1
R3	4k7		Resistor	1
R8, R9	220R		Resistor	2
S1			Switch	1
U1		ADP3338	Low dropout regulator	1

Table 5-2: Bill of Material of sample circuit

5.5 Stand-alone Ethernet based MPEG webcam

The CM-BF537 module can be used as a stand-alone module for a camera system requiring only power supply and the direct attachment of a compatible video camera. An extender board including a camera is available at Bluetechnix (EXT-BF5xx-CAM).
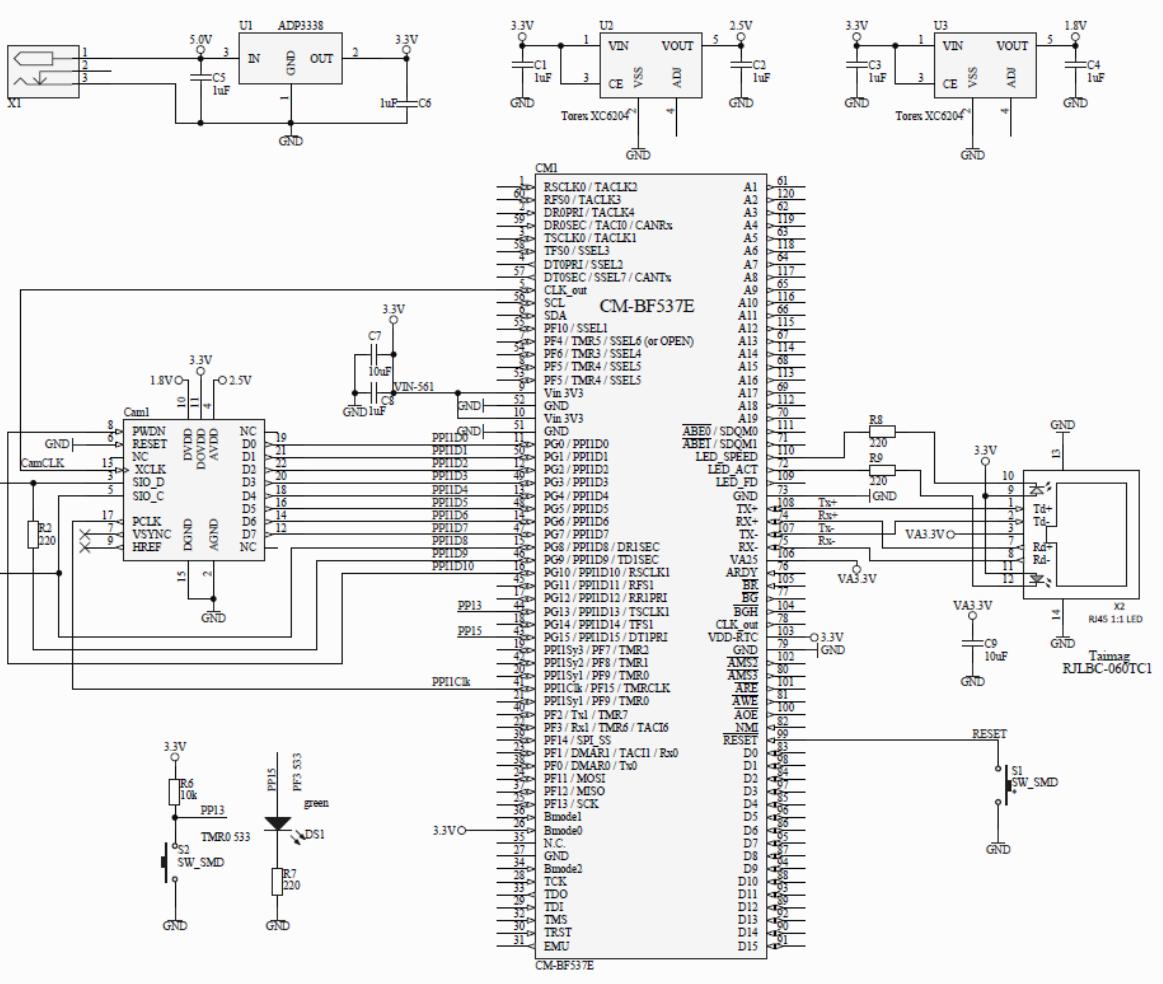
Figure 5-4: Stand-alone Ethernet based MPEG webcam

Designator	Value	Type	Description	Quantity
C3, C4, C5, C6, C8	1uF		Capacitor	6
C7, C9	10uF		Capacitor	1
Cam1		OV7660FSx	Camera module	1
CM1			CM-BF537	1
DS1	green		SMD LED	1
X1		DC-8	Power connector DC-8	1
X2		HFJ11-2250E	RJ45 with transformer	1
R1,R3	10k		Resistor	3
R7, R8, R9	220R		Resistor	2
S1, S2			Switch	1
U1		ADP3338	Low dropout regulator	1
U2		XC6204B252MR	XC6204 high speed LDO	1
U3		XC6204B182MR	XC6204 high speed LDO	1

Table 5-3: Bill of Materials of a Stand-alone Ethernet based MPEG Webcam

Have a look at our DEV-BF5xxDA-lite schematics, which can be found at
http://www.bluetechnix.com/goto/dev-bf5xxda-lite to get application examples.

6 Mechanical Outline

6.1 Top View

Figure 6-1 shows the bottom view of the CM-BF537. All dimensions are given in millimeters.
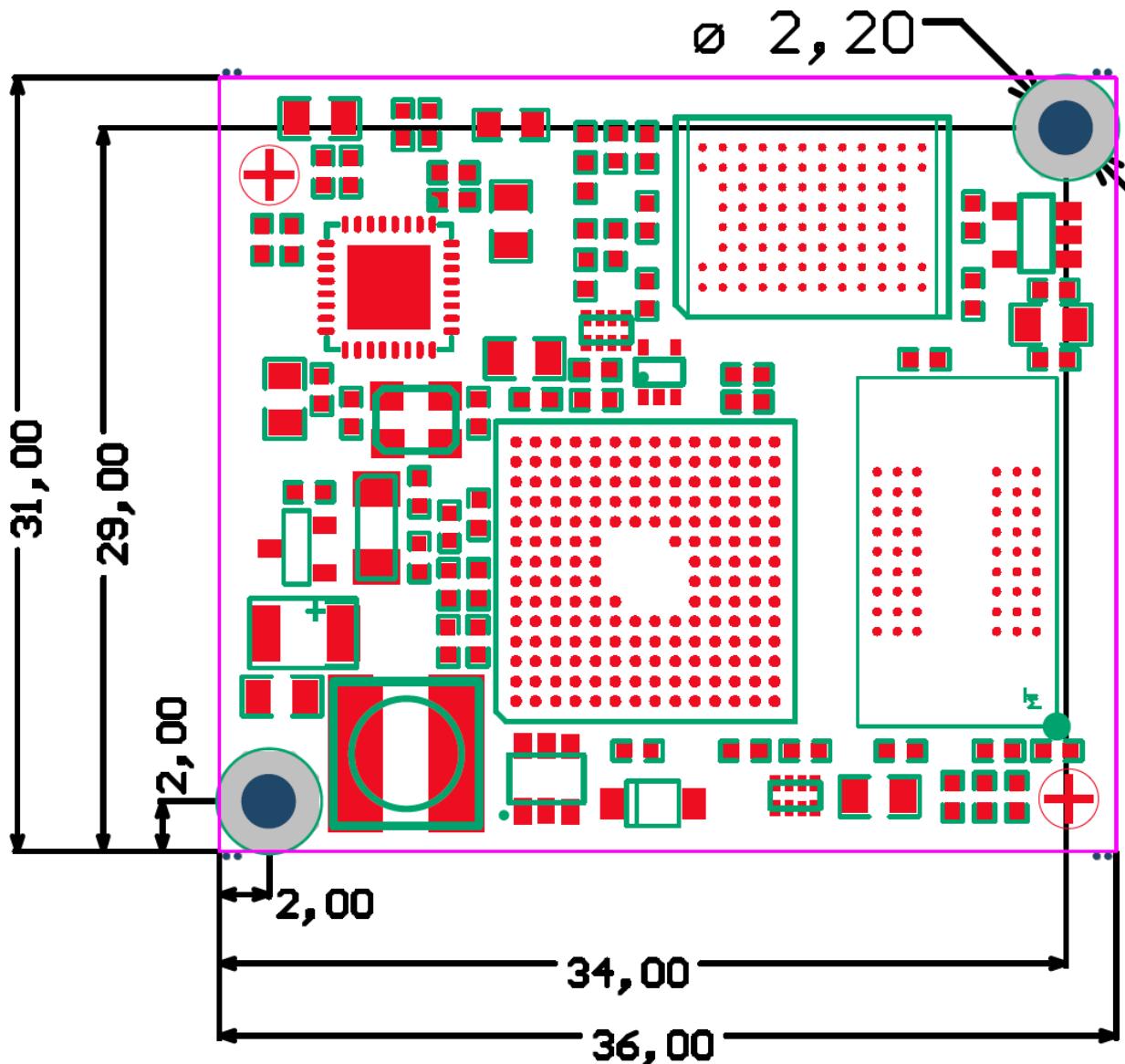

Figure 6-1: Mechanical outline (top view)

6.2 Bottom View

Figure 6-2 shows the bottom view of the CM-BF537. All dimensions are given in millimeters.
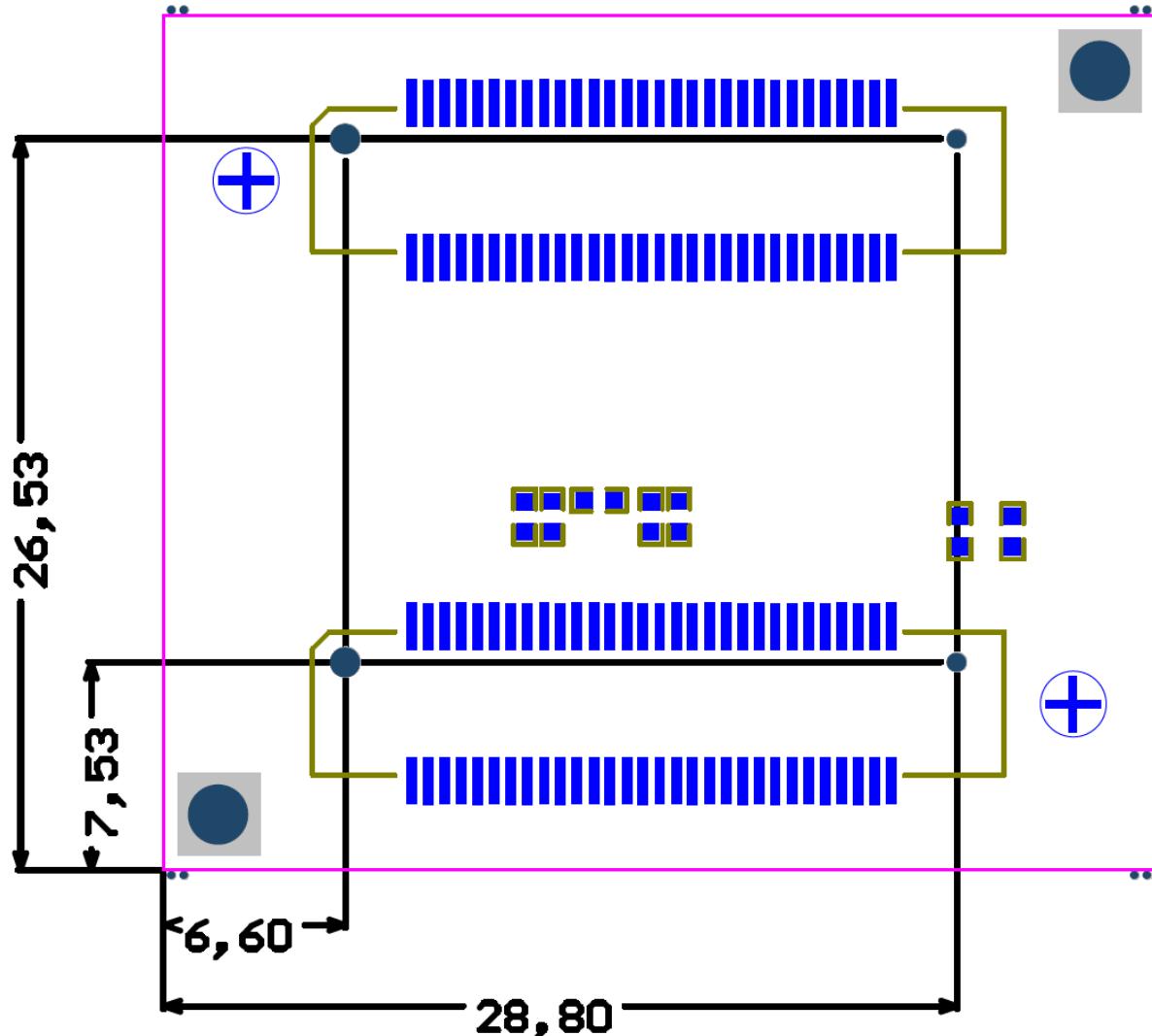
Figure 6-2: Mechanical outline and Bottom Connectors (Top View)

6.3 Side View

Figure 6-3 shows the side view of the CM-BF537. All dimensions are given in millimeters.
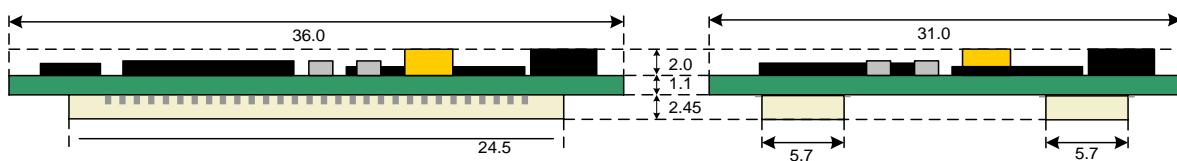
Figure 6-3: Side view with mounted connectors

The total minimum mounting height including receptacle at the motherboard is 6.1mm.

6.4 Footprint
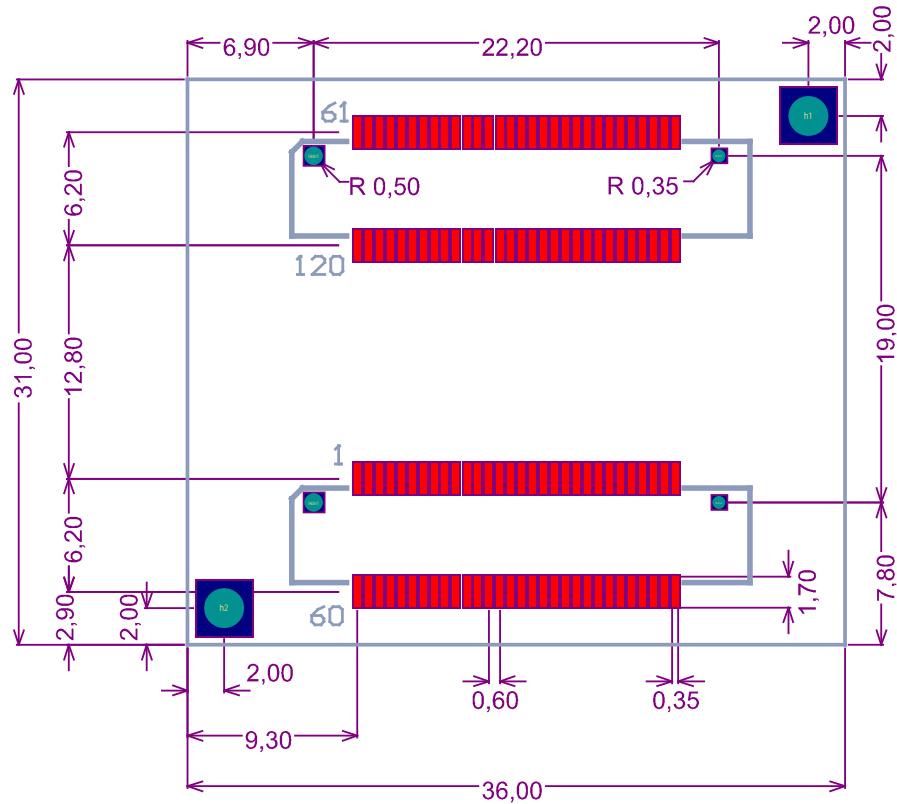
Figure 6-4: Recommended footprint for the Core Module (top view)

The footprint of the CM-BF537 is available on request. The used connectors can be found in Table 6-1. For detailed dimensions of the connectors please see the datasheet from the manufacturer's website.

6.5 Connectors

The Core Module features a Hirose 0.6mm pitch connectors. The base board has to use the complementary connector.

Board	Designator	Manufacturer	Manufacturer Part No.
Core Module	X1, X2	Hirose	FX8-60P-SV
Base board	X1, X2	Hirose	FX8-60S-SV

Table 6-1: Core Module connector types

7 Support

7.1 General Support

General support for products can be found at Bluetechnix' support site https://support.bluetechnix.at/wiki

7.2 Board Support Packages

Board support packages and software downloads are for registered customers only https://support.bluetechnix.at/software/

7.3 Blackfin® Software Support

7.3.1 BLACKSheep® OS

BLACKSheep® OS stands for a powerfully and multithreaded real-time operating system (RTOS) originally designed for digital signal processing application development on Analog Devices Blackfin® embedded processors. This high-performance OS is based on the reliable and stable real-time VDK kernel from Analog Devices that comes with VDSP++ IDE. Of course BLACKSheep® OS is fully supported by all Bluetechnix Core-Modules and development hardware.

7.3.2 LabVIEW

You can get LabVIEW embedded support for Bluetechnix Core Modules by Schmid-Engineering AG http://www.schmid-engineering.ch.

7.3.3 uClinux

You can get uClinux support (boot loader and uClinux) for Bluetechnix Core Modules at http://blackfin.uClinux.org.

7.4 Blackfin® Design Services

Based on more than seven years of experience with Blackfin, Bluetechnix offers development assistance as well as custom design services and software development.

7.4.1 Upcoming Products and Software Releases

Keep up to date with all product changes, releases and software updates of Bluetechnix at http://www.bluetechnix.com.

8 Ordering Information
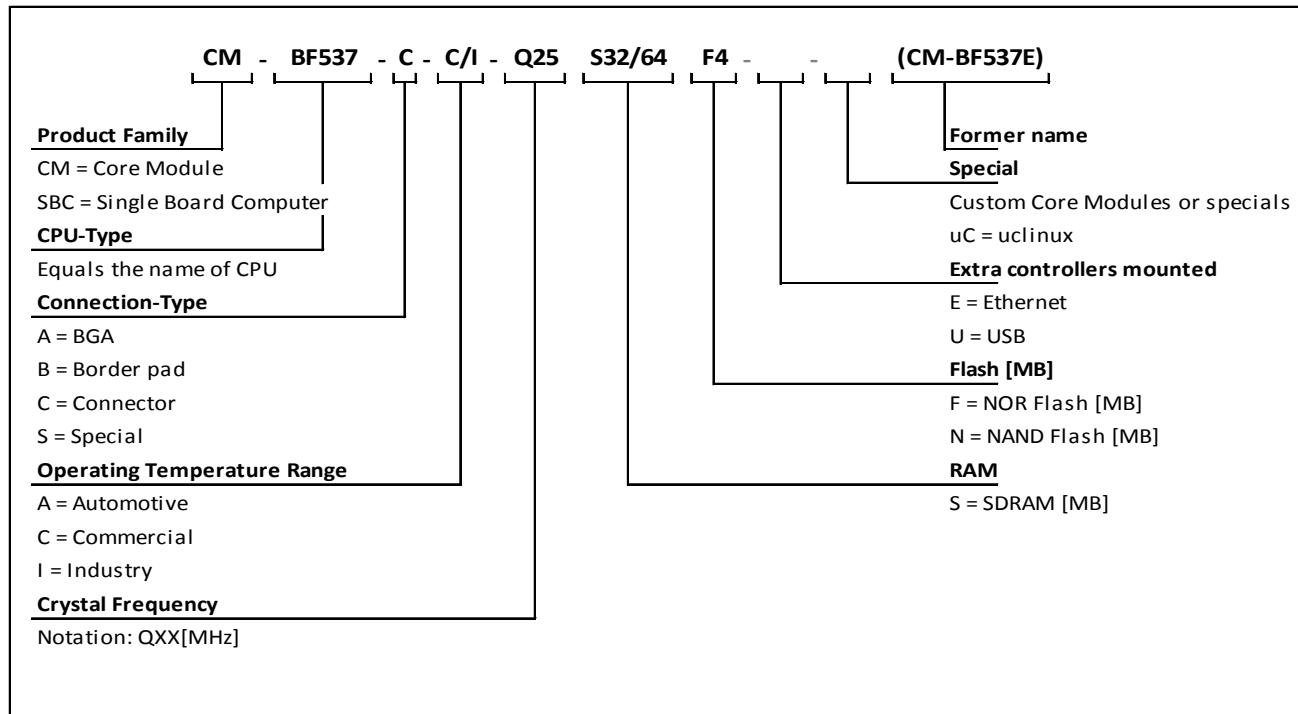
8.1 Predefined mounting options for CM-BF537

Article Number	Name	Temperature Range
100-1221-3	CM-BF537-C-C-Q25S32F4 (CM-BF537E)	Commercial
100-1229-3	CM-BF537-C-I-Q25S32F4 (CM-BF537E-I)	Industrial
100-1273-3	CM-BF537-C-C-Q25S64F4 (CM-BF537E-64SD)	Commercial

Table 8-1: Ordering information

NOTE: Custom Core Modules are available on request! Please contact Bluetechnix (office@bluetechnix.com) if you are interested in custom Core Modules.

The mount options of the Core Module CM-BF537 are shown in Table 8-2.

Mount Option	Flash	Comment
MO1	2MB	PF4 available on pin 7 on connector X1
MO2	4MB	default
MO3	8MB	PF5 not available on connector X1

Table 8-2: Mount options

9 Dependability

9.1 MTBF

Please keep in mind that a part stress analysis would be the only way to obtain significant failure rate results, because MTBF numbers just represent a statistical approximation of how long a set of devices should last before failure. Nevertheless, we can calculate an MTBF of the Core Module using the bill of material. We take all the components into account. The PCB and solder connections are excluded from this estimation. For test conditions we assume an ambient temperature of 30°C of all Core Module components except the Blackfin® processor (80°C) and the memories (70°C). We use the MTBF Calculator from ALD (http://www.aldservice.com/) and use the reliability prediction MIL-217F2 Part Stress standard.

This method resulted in a MTBF of 439232 hours for the CM-BF537E.

10 Product History

10.1 Version Information

10.1.1 CM-BF537-C-C-Q25S32F4 (CM-BF537E)

Version	Component	Type
3.0.1	Processor	ADSP-BF537KBCZ-6AV (Rev 0.3)
	RAM	MT48LC16M16A2BG-75IT:D
	Flash	PF48F2000P0ZBQ0
	ETH-Physical	KSZ8041
3.0.2	Processor	ADSP-BF537KBCZ-6AV (Rev 0.3)
	RAM	IS42S16160D-7BL
	Flash	PF48F2000P0ZBQ0
	ETH-Physical	KSZ8041
3.0.3	Processor	ADSP-BF537KBCZ-6AV (Rev 0.3)
	RAM	IS42S16160D-7BL
	Flash	PF48F3000P0ZBQ0A
	ETH-Physical	KSZ8041
3.2.1	Processor	ADSP-BF537KBCZ-6AV (Rev 0.3)
	RAM	MT48LC16M16A2BG-75IT:D
	Flash	PF48F3000P0ZBQE
	ETH-Physical	KSZ8041

Table 10-1: Overview CM-BF537-C-C-Q25S32F4 product changes

10.1.2 CM-BF537-C-I-Q25S32F4 (CM-BF537E-I)

Version	Component	Type
3.0.1	Processor	ADSP-BF537BBCZ-5A (Rev 0.2)
	RAM	MT48LC16M16A2BG-75IT:D
	Flash	PF48F2000P0ZBQ0
	ETH-Physical	KSZ8041
3.0.2	Processor	ADSP-BF537BBCZ-5A (Rev 0.3)
	RAM	MT48LC16M16A2BG-75IT:D
	Flash	PF48F2000P0ZBQ0
	ETH-Physical	KSZ8041
3.2.1	Processor	ADSP-BF537BBCZ-5A (Rev 0.3)
	RAM	MT48LC16M16A2BG-75IT:D
	Flash	PF48F3000P0ZBQE
	ETH-Physical	KSZ8041

Table 10-2: Overview CM-BF537-C-I-Q25S32F4 product changes

10.1.3 CM-BF537-C-C-Q25S64F4 (CM-BF537E-64SD)

Version	Component	Type
3.2.1	Processor	ADSP-BF537KBCZ-6AV (Rev 0.3)
	RAM	IS42S16320B-7BL
	Flash	PF48F3000P0ZBQE
		KSZ8041

Table 10-3: Overview CM-BF537-C-C-Q25S64F4 product changes

10.2 Anomalies

Version	Date	Description
3.2	2011 04 27	No anomalies reported yet.
3.0	2010 10 12	No anomalies reported yet.

Table 10-4: Overview product anomalies

11 Document Revision History

Version	Date	Document Revision
9	2012 05 24	Description of Pin 78 and Pin 5 of Core Module corrected
8	2012 02 07	Dependability added Memory table update, description for PF5 added
7	2011 11 14	Pin out and connector description corrected
6	2011 10 18	Table 3-1: Electrical characteristics update
5	2011 09 06	Pin out and connector description corrected
4	2011 04 27	Updated HUM to current design. Added industrial version and 64MByte version to this HUM.
3	2010-02-02	Redesign of Manual
2	2009-11-05	Picture 3-7, 6-1, 6-2, Table 6-1, 6-2 updated
1	2009-08-31	First release V1.0 of the document copied from CM-BF537 V1.2 and updated to Revision 3.0

Table 11-1: Revision history

12 List of Abbreviations

Abbreviation	Description
ADI	Analog Devices Inc.
AI	Analog Input
AMS	Asynchronous Memory Select
AO	Analog Output
CM	Core Module
DC	Direct Current
DSP	Digital Signal Processor
eCM	Enhanced Core Module
EBI	External Bus Interface
ESD	Electrostatic Discharge
GPIO	General Purpose Input Output
I	Input
I²C	Inter-Integrated Circuit
I/O	Input/Output
ISM	Image Sensor Module
LDO	Low Drop-Out regulator
MTBF	Mean Time Between Failure
NC	Not Connected
NFC	NAND Flash Controller
O	Output
OS	Operating System
PPI	Parallel Peripheral Interface
PWR	Power
RTOS	Real-Time Operating System
RFU	Reserved for Future Use
SADA	Stand Alone Debug Agent
SD	Secure Digital
SoC	System on Chip
SPI	Serial Peripheral Interface
SPM	Speech Processing Module
SPORT	Serial Port
TFT	Thin-Film Transistor
TISM	Tiny Image Sensor Module
TSC	Touch Screen Controller
UART	Universal Asynchronous Receiver Transmitter
USB	Universal Serial Bus
USBOTG	USB On The Go
ZIF	Zero Insertion Force

Table 12-1: List of abbreviations

A   List of Figures and Tables

Figures

Tables