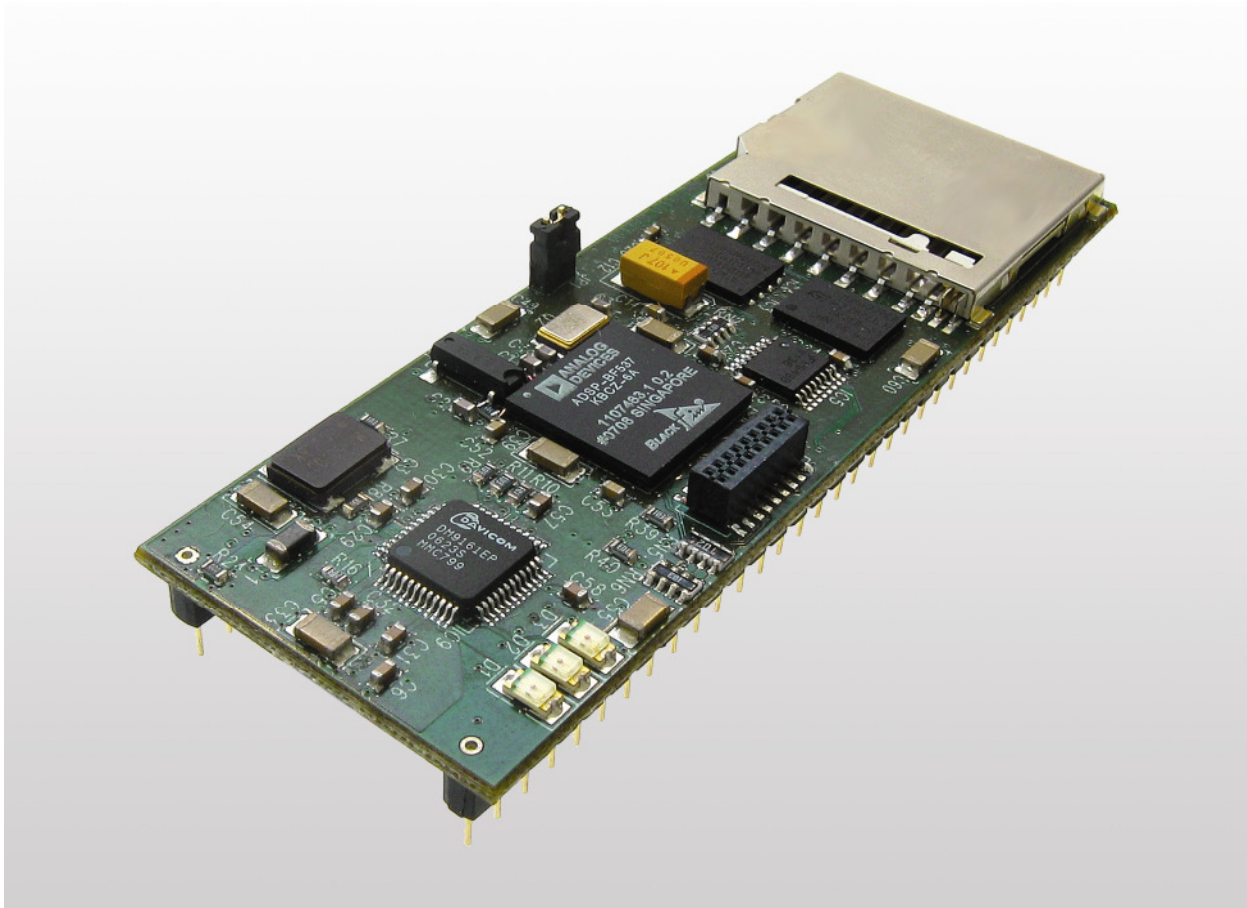


DIL/NetPC DNP/5370

Board Revision 1.0

Hardware Reference



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1 INTRODUCTION

This document describes the hardware components of the DIL/NetPC DNP/5370. For further information about the individual components of this product you may follow the links from our website at <http://www.dilnetpc.com>. Our website contains a lot of technical information, which will be updated in regular periods.

1.1 Safety Guidelines

Please read the following safety guidelines carefully! In case of property or personal damage by not paying attention to this document and/or by incorrect handling, we do not assume liability. In such cases any warranty claim expires.



ATTENTION: Observe precautions for handling – electrostatic sensitive device!

- Discharge yourself before you work with the device, e.g. by touching a heater of metal, to avoid damages.
- Stay grounded while working with the device to avoid damage through electrostatic discharge.

1.2 Conventions

Convention	Usage
bold	Important terms
<i>italic</i>	Filenames, user inputs and command lines
monospace	Pathnames, internet addresses and program code

Table 1: Conventions used in this Document

1.3 Block Diagram

This document describes the hardware components of the DIL/NetPC DNP/5370. For further information about the individual components of this product you may follow the links from our website at <http://www.dilnetpc.com>.

Our website contains a lot of technical information, which will be updated in regular periods.

Figure 1 shows the block diagram of this powerful 32-bit embedded Linux single board computer. The main component is the Analog Devices BF537 32-bit Blackfin MCU @ 600 MHz clock speed.

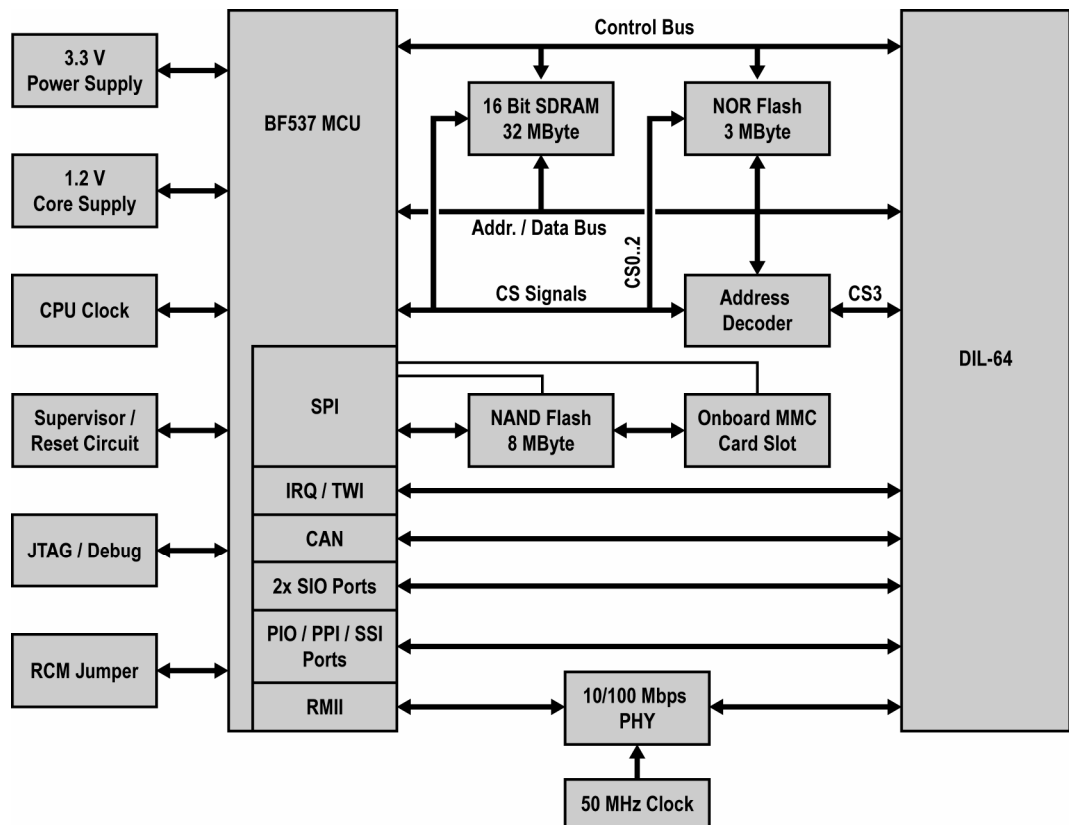


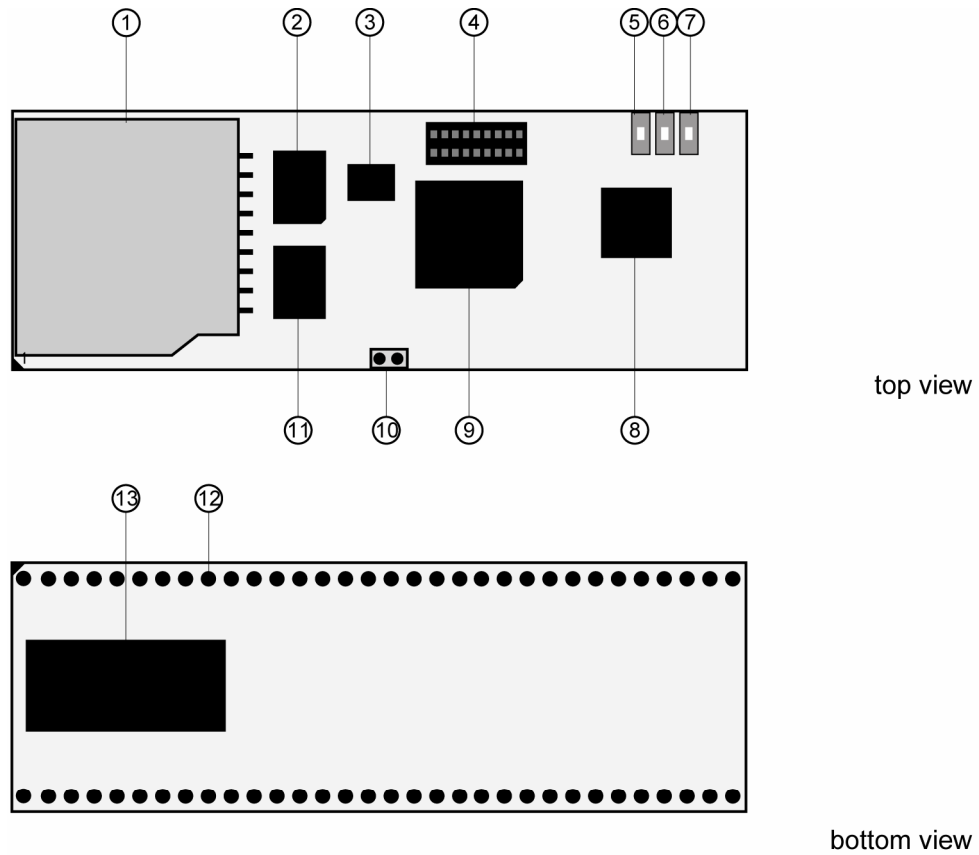
Figure 1: Block diagram of DIL/NetPC DNP/5370

The DIL/NetPC DNP/5370 is a ready-to-run embedded networking device for data logger and embedded Voice-over-IP (eVoIP) applications. The use of the DNP/5370 allows you to realize a substantial time and costs saving over chip-based approaches.

1.4 Features and Technical Data

- Analog Devices BF537 32-bit Blackfin MCU @ 600 MHz
- 32 MByte 32-bit SDRAM memory @ 120 MHz bus speed
- 3 MByte NOR Flash memory for O/S boot image
- 8 MByte NAND Flash memory for O/S R/W access
- 1 x SD/MMC card slot with preinstalled 128 MByte MMC
- 1 x 10/100 Mbps Ethernet LAN interface
- 1 x SSI (Synchronous Serial Interface)
- 1 x TWI (Two-wire Interface) with I2C support
- 1 x CAN (Controller Area Network) 2.0b interface
- 2 x UART-based serial ports (one with all handshakes)
- 20-bit general purpose high-speed parallel I/O
- 8-bit I/O expansion bus
- 3 interrupt inputs, 2 chip select outputs
- Programmable watchdog timer
- 3 x LED for LAN status and traffic
- JTAG IEEE 1149.1 test interface
- In-system programming features
- 64-pin JEDEC DIL-64 connector, 2.54 mm centers
- 3.3 V low power design, supply voltage 3.3 VDC ($\pm 5\%$)
- Supply current 350 mA typ. @ 600 MHz (600 mA max.)
- 0 °C to +70 °C operating temperature
- Size 82 mm x 29 mm without SD/MMC
- Preinstalled μ Clinux O/S with kernel version 2.6.16
- RoHS conform

2 BOARD LAYOUT



- | | |
|----------------------------------|-----------------------------------|
| ① J3 - SD/MMC card slot | ⑧ IC9 - Ethernet PHY |
| ② IC3 - 3 MByte NOR Flash memory | ⑨ IC1 - Analog Devices BF537 MCU |
| ③ IC5 - Chip select decoder | ⑩ JP1 - RCM jumper |
| ④ J2 - JTAG/Debug interface | ⑪ IC4 - 8 MByte NAND Flash memory |
| ⑤ D3 - LAN link activity LED | ⑫ J1 - DIL-64 connector |
| ⑥ D2 - LAN 100 Mbps LED | ⑬ IC2 - SDRAM memory |
| ⑦ D1 - LAN collision LED | |

Figure 2: Board layout DIL/NetPC DNP/5370

3 PINOUTS

3.1 DIL-64 Connector – J1 (1. Part)

Pin	Name	Group	Function
1	PA0	PIO	Parallel I/O, Port A, Bit 0
2	PA1	PIO	Parallel I/O, Port A, Bit 1
3	PA2	PIO	Parallel I/O, Port A, Bit 2
4	PA3	PIO	Parallel I/O, Port A, Bit 3
5	PA4	PIO	Parallel I/O, Port A, Bit 4
6	PA5	PIO	Parallel I/O, Port A, Bit 5
7	PA6	PIO	Parallel I/O, Port A, Bit 6
8	PA7	PIO	Parallel I/O, Port A, Bit 7
9	PB0	PIO	Parallel I/O, Port B, Bit 0
10	PB1	PIO	Parallel I/O, Port B, Bit 1
11	PB2	PIO	Parallel I/O, Port B, Bit 2
12	PB3	PIO	Parallel I/O, Port B, Bit 3
13	PB4	PIO	Parallel I/O, Port B, Bit 4
14	PB5	PIO	Parallel I/O, Port B, Bit 5
15	PB6	PIO	Parallel I/O, Port B, Bit 6
16	PB7	PIO	Parallel I/O, Port B, Bit 7
17	PC0	PIO	Parallel I/O, Port C, Bit 0
18	PC1	PIO	Parallel I/O, Port C, Bit 1
19	PC2	PIO	Parallel I/O, Port C, Bit 2
20	PC3	PIO	Parallel I/O, Port C, Bit 3
21	RXD1	SIO	COM1 Serial Port, RXD Pin
22	TXD1	SIO	COM1 Serial Port, TXD Pin
23	CTS1	SIO	COM1 Serial Port, CTS Pin
24	RTS1	SIO	COM1 Serial Port, RTS Pin
25	DCD1	SIO	COM1 Serial Port, DCD Pin
26	DSR1	SIO	COM1 Serial Port, DSR Pin
27	DTR1	SIO	COM1 Serial Port, DTR Pin
28	RI1	SIO	COM1 Serial Port, RI Pin
29	RESIN	RESET	RESET Input
30	TX+	LAN	10BASE-T/100BASE-TX Ethernet Interface, TX+ Pin
31	TX-	LAN	10BASE-T/100BASE-TX Ethernet Interface, TX- Pin
32	GND	---	Ground

Table 2: Pinout DIL-64 connector – pin 1 to 32

3.2 DIL-64 Connector – J1 (2. Part)

Pin	Name	Group	Function
33	RX+	LAN	10BASE-T/100BASE-TX Ethernet Interface, RX+ Pin
34	RX-	LAN	10BASE-T/100BASE-TX Ethernet Interface, RX- Pin
35	RESOUT	RESET	RESET Output
36	VBAT	PSP*	Real Time Clock Battery Input
37	CLKOUT	PSP*	Clock Output
38	TXD2	PSP*	COM2 Serial Port, TXD Pin
39	RXD2	PSP*	COM2 Serial Port, RXD Pin
40	CANRX	PSP*	CAN Interface, RX Pin
41	CANTX	PSP*	CAN Interface, TX Pin
42	INT3	PSP*	Interrupt Input 3
43	INT2	PSP*	Interrupt Input 2
44	INT1	PSP*	Interrupt Input 1
45	SDA	PSP*	TWI/I2C Interface, Serial Data Line
46	SCL	PSP*	TWI/I2C Interface, Serial Clock Line
47	CS2	PSP*	Chip Select Output 2. Physical Address Range 0x2034.0000-0x2037.FFFF
48	CS1	PSP*	Chip Select Output 1. Physical Address Range 0x2030.0000-0x2033.FFFF
49	RDY	PSP*	External Ready Input
50	RD	PSP*	Read Signal, Expansion Bus
51	WR	PSP*	Write Signal, Expansion Bus
52	SA3	PSP*	Expansion Bus, Address Bit 3
53	SA2	PSP*	Expansion Bus, Address Bit 2
54	SA1	PSP*	Expansion Bus, Address Bit 1
55	SA0	PSP*	Expansion Bus, Address Bit 0
56	SD7	PSP*	Expansion Bus, Data Bit 7
57	SD6	PSP*	Expansion Bus, Data Bit 6
58	SD5	PSP*	Expansion Bus, Data Bit 5
59	SD4	PSP*	Expansion Bus, Data Bit 4
60	SD3	PSP*	Expansion Bus, Data Bit 3
61	SD2	PSP*	Expansion Bus, Data Bit 2
62	SD1	PSP*	Expansion Bus, Data Bit 1
63	SD0	PSP*	Expansion Bus, Data Bit 0
64	VCC	---	3.3 Volt Power Input

Table 3: Pinout DIL-64 connector – pin 33 to 64

* **Please note:** Some pins are called "Product Specific Pins (PSP)". Other members of the DIL/NetPC family will differ with these pins from the DNP/5370. All other pins will have the same primary functions.

3.3 JTAG Connector – J2

Pin	Name	Function
1	VCC	Power (3.3 VDC I/O Voltage)
2	GND	Ground
3	WDDIS#	Watchdog Disable
4	TMS	Test Mode Select
5	RESET#	Reset
6	TRST#	Test Reset
7	TDI	Test Data In
8	TCK	Test Clock
9	---	Reserved
10	TDO	Test Data Out
11	---	Reserved
12	---	Reserved
13	---	Reserved
14	---	Reserved
15	---	Reserved
16	---	Reserved
17	---	Reserved
18	VCC	Power (3.3 VDC I/O Voltage)

Table 4: Pinout JTAG connector



3.4 JTAG Interface

The JTAG signals of the DNP/5370 connector J2 are directly connected to the JTAG TAP controller of the BF537 MCU.

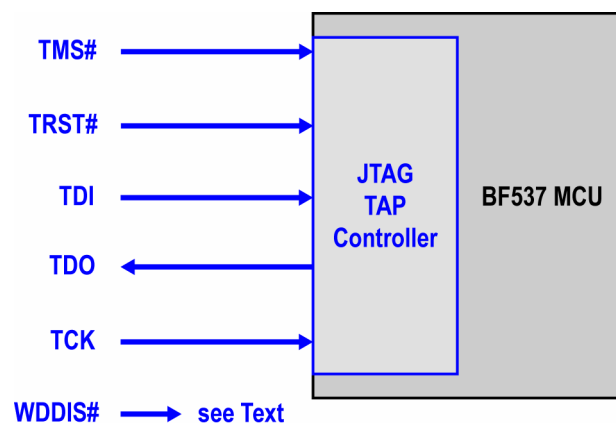


Figure 3: DNP/5370 JTAG interface

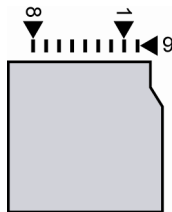
The WDDIS# input disables the on-board watchdog. This is necessary to access the 3 MByte NOR Flash chip over JTAG programming tools.

3.1 SD/MMC Card Slot – J3

Please note: The SD/MMC card slot is driven in SPI mode.

Pin	Name	Function
1	MCDA3	Multimedia Card A Data 3
2	MCCDA	Multimedia Card A Command
3	GND	Ground
4	VCC	3.3 VDC
5	MCCK	Multimedia Card Clock
6	GND	Ground
7	MCDA0	Multimedia Card A Data 0
8	MCDA1	Multimedia Card A Data 1
9	MCDA2	Multimedia Card A Data 2

Table 5: Pinout SD/MMC card slot



3.5 RCM Jumper – JP1

The **RCM (Remote Console Mode)** offers the possibility to control the DNP/5370 via a terminal emulation program over the UART-based serial port COM1.

Please note: The default setting of the RCM jumper is set. If you set the RCM jumper you will be able to update the Linux system on the DNP/5370 over COM1.

To disable RCM remove the jumper cap of the RCM jumper. This frees UART based serial port COM1 for application usage.

RCM jumper	Function
Not set	Disable Remote Console Mode
Set (default)	Enable Remote Console Mode

Table 6: RCM jumper settings

4 MEMORY MAP

Physical Address Range	Description	Access Format
0x0000.0000-0x1FFF.FFFF	32 Mbyte SDRAM Memory	16-bit R/W
0x2000.0000-0x202F.FFFF	3 Mbyte NOR FLASH Memory	16-bit R/W
0x2030.0000-0x2033.FFFF	Chip Select Signal CS1	8-bit R/W
0x2034.0000-0x2037.FFFF	Chip Select Signal CS2	8-bit R/W
0x2038.0000-0x203B.FFFF	Chip Select Signal CS3*	8-bit R/W
0x203C.0000-0x203F.FFFF	Chip Select Signal CS4*	8-bit R/W
0xFFC0.0000-0xFFDF.FFFF	BF537 Internal System Registers	32-bit R/W

Table 7: Memory map of DNP/5370

* **Please note:** The chip select signals CS3 and CS4 are a factory option. They are available on request for the pins 45 and 46 of the DNP/5370.

5 MECHANICAL DIMENSIONS

All length dimensions have a tolerance of 0.5 mm.

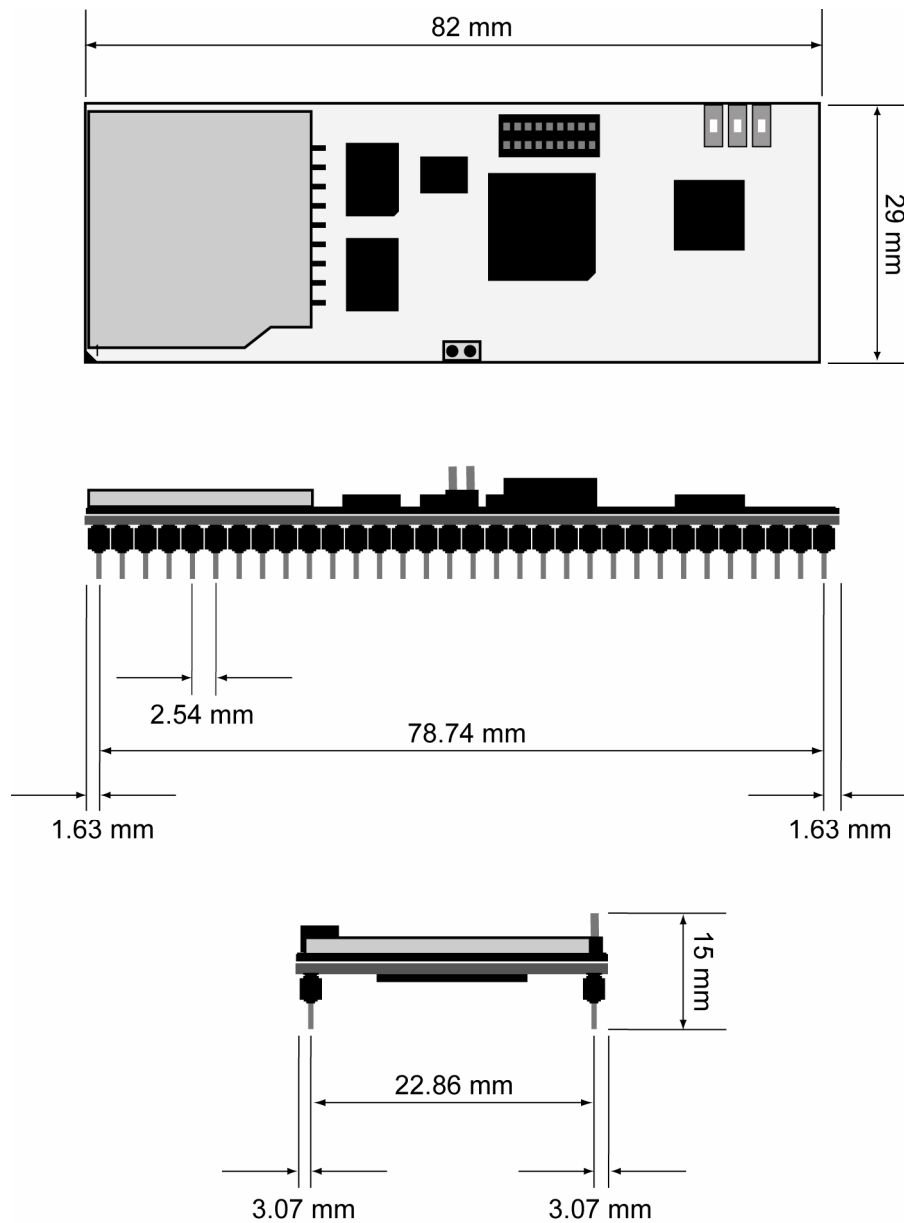


Figure 4: Mechanical dimensions of DIL/NetPC DNP/5370

6 HELPFUL LITERATURE

- Evaluation Board DNP/EVA13 hardware reference manual
 - First Steps Starter Kit DNP/SK28
 - Analog Devices BF537 MCU data sheet
 - Analog Devices BF537 MCU hardware reference manual
 - Analog Devices BF537 MCU software reference manual
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DOCUMENT HISTORY

Revision	Date	Remarks	Name
1.0	2008-16-01	first version	WBU

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