BlueTooth™ Carrier Board CAB/BT1

User Manual

Content

1 Introduction

The BlueTooth™ technology is a standard for short-range wireless communications between different devices. This technology allows a variety of new applications which will enhance user convenience and productivity allowing seamless connectivity. Several systems of industry segments such as automotive, computing, consumer electronics, telecom and many others support this innovative technology. The SSV BlueTooth™ Carrier Board is a complete baseband/RF solution that allows you the quick and easy integration of BlueTooth™ technology outgoing from Handheld, PDA, Cell Phone or Laptop into embedded or standard devices. The BlueTooth™ Carrier Board follows the BlueTooth™ standard with all its included advantages like transmission security and noise immunity in the industrial environment area.

This document describes how to get started with the BlueTooth™ Carrier Board. For further information about the individual components of this product you may follow the links from our website at: *kwws=22z z z lgloqhwsf ljfrp*

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

1.1 Conventions used in this Document

Convention	Usage
#wddf#	Filenames, as well as Internet addresses such as www.ssv-embedded.de
italic	User inputs, command lines and pathnames
bold	New terms
`monospace text`	Program code

Table 1-1: Convention usage

1.2 Checklist

Compare the contents of your BlueTooth™ Carrier Board package with the standard checklist below. If any item is missing or appears to be damaged, please contact SSV Embedded Systems.

Standard Items

- BlueTooth™ Carrier Board
- DIL/NetPC ADNP/1520
- Null-Modem cable
- Power Supply
- Power Cable
- User Manual
- Support CD-ROM

Optional Items

- ISP Adapter

1.3 Main Features

Bluetooth Carrier Board

- QIL-128 Socket for one DIL/NetPC ADNP/1520
- 10BASE-T/100BASE-TX Ethernet Interface
- RS232 Serial Interface (COM1)
- In-System Programming Interface
- HF-Out Interface to connect an external antenna
- 4 LEDs
- 1 Reset Switch
- 5VDC Power Input Connector
- Size 109 x 100 mm

DIL/NetPC ADNP/1520

- AMD SC520 CPU with 133 MHz Clock Speed and FPU
- 32/64 MByte SDRAM Memory
- 16 MByte FLASH Memory
- 10/100Mbps Ethernet Interface
- Real Time Clock
- IDE Support
- Two 16C550 UART Serial Ports
- 20-bit General Purpose High-Speed Parallel I/O
- 7 Interrupt Inputs, 4 Chip Select Outputs
- In-System Programming Features
- 128-pin QIL-Connector
- 3.3 Volt Low Power Design, Single 3.3 VDC Supply
- Size 82 x 36 mm

2 Board Layout

The base component of the BlueTooth™ Carrier Board is the DIL/NetPC ADNP/1520. On the BlueTooth™ Carrier Board you find a QIL-128 socket (QIL = Quad In Line) to mount your ADNP/1520. By delivery the ADNP/1520 is already mounted onto the BlueTooth™ Carrier Board.

The BlueTooth™ Carrier Board provides all required basic hard- and software environment, which allows you the development of individual applications for your ADNP/1520. For an instant connection to your hardware the BlueTooth™ Carrier Board supports a serial COM1 interface, a 10/100Base-T Ethernet interface as well as a QIL-128 (QIL =Quad In Line) interface. Further you will find four LEDs, one reset switch and a HF-out interface for a easy connection to an external antenna of choice. The figure 2-1 shows the base components of the BlueTooth™ Carrier Board.

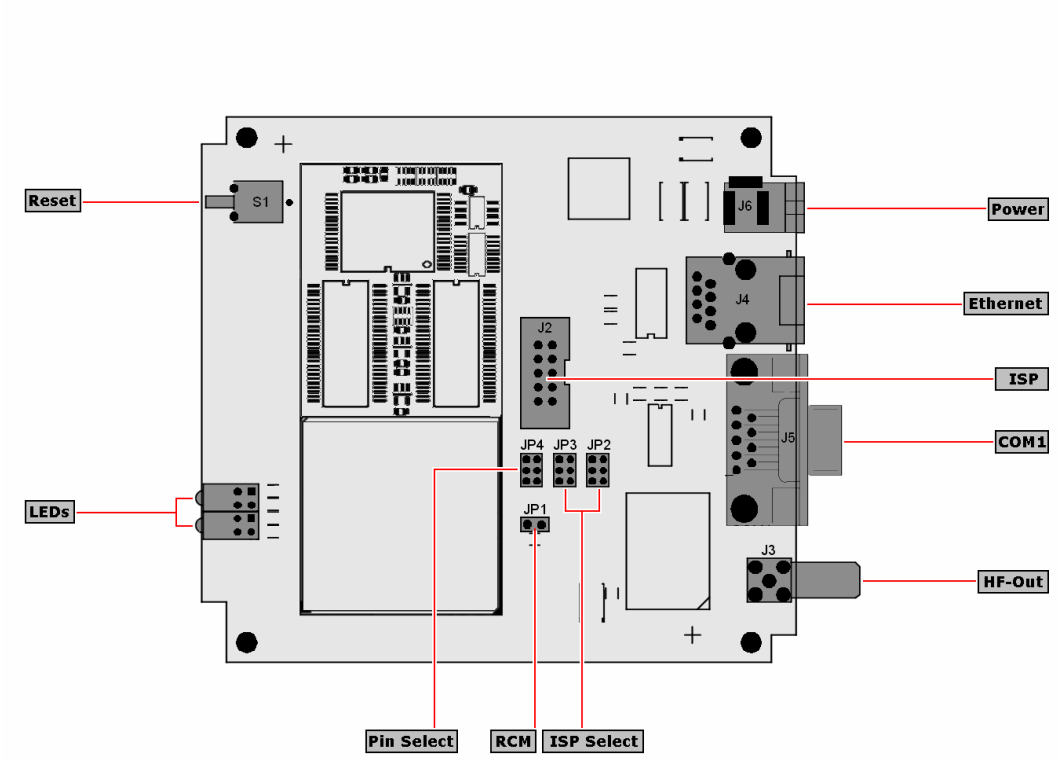


Figure 2-1: Components of the BlueTooth™ Carrier Board

3 Board Components

This chapter describes the most interesting components of the BlueTooth™ Carrier Board and gives a short overview about their respective functions.

3.1 Reset Button

Press the reset button down if the system hamg or you need to restart it. Pressing the reset button will only restart the ADNP/1520. To reset any connected devices turn off power from the system.

3.2 Power LED

This LED will light up when the Board is provided with the necessary operating voltage.

3.3 Ethernet LAN LED

These LED will flicker or light up to indicate the traffic on the Ethernet LAN port.

3.4 Base-Band-Activity LED

The Base-Band-Activity LED flickers or lights up if there is some traffic via the BlueTooth™ interface.

3.5 User LED

The BlueTooth™ Carrier Board is equipped with a single red User LED. The function of this LED is user definable. It can be used like desired.

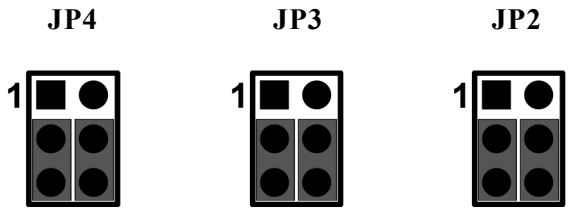
3.6 Serial Interface COM1

For an easy connection between the BlueTooth™ Carier Board and your development system you can use the serial interface on the BlueTooth™ Carrier Bord. A RS232 standard compliant Sub-D port with 9 pins realizes this interface. The exact layout is shown on table 2.

3.7 ISP Interface

The ADNP/1520 offers a second COM-interface. This interface is used to communicate with the onboard BlueTooth™ module. For a proper connection it is recommended to set the jumpers JP2-JP4 on the correct positions.

The figure below shows the settings to use the ISP interface for a correct BlueTooth™ connection.



Short pins 2-3
Short pins 5-6

3.8 10Base-T Ethernet Interface

The ANP/1520 is using a SMSC LAN91C111 chip that allows Ethernet connectivity with a speed up to 100Mbps. The RJ45 Ethernet interface on the BlueTooth™ Carrier Board is just a simple connection over a transformer to the QIL-128 interface pins, which are connected to the SMSC LAN controller on the ADNP/1520.

3.9 RCM Jumper (JP1)

Use this jumper to activate the RCM mode of the ADNP/1520. The RCM mode (Remote Console Mode) offers the possibility to control the ADNP/1520 via terminal program. To activate the RCM mode place a jumper cap on both pins of the RCM jumper, so that it is short. If you remove the jumper cap, or place the jumper cap on just one pin, the jumper is open and you are not able to use the RCM mode.When closed you will see some boot messages on the serial port COM1. If the RCM jumper is open, these messages are blocked.

Figure 3 shows the exact position of the RCM jumper onto the ADNP/1520.

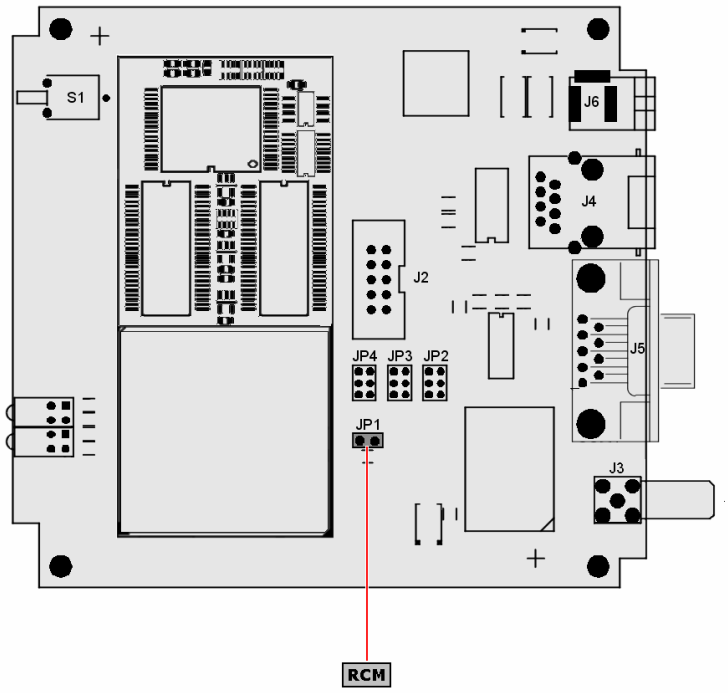


Figure 3-1: RCM Jumper

3.10 BlueTooth™ Module

The onboard BlueTooth™ module allows the connection between the ADNP/1520 and other devices via BlueTooth™. To use all features offered by the BlueTooth™ module it is necessary to connect a standard BlueTooth™-antenna to the BlueTooth™ Carrier Board. For this, any standard 2.4 GHz BlueTooth™-antenna with an impedance of 50 ohm and SMA connector (e.g. GigaAnt Titanis) can used to be connected with the HF-out connector J3.

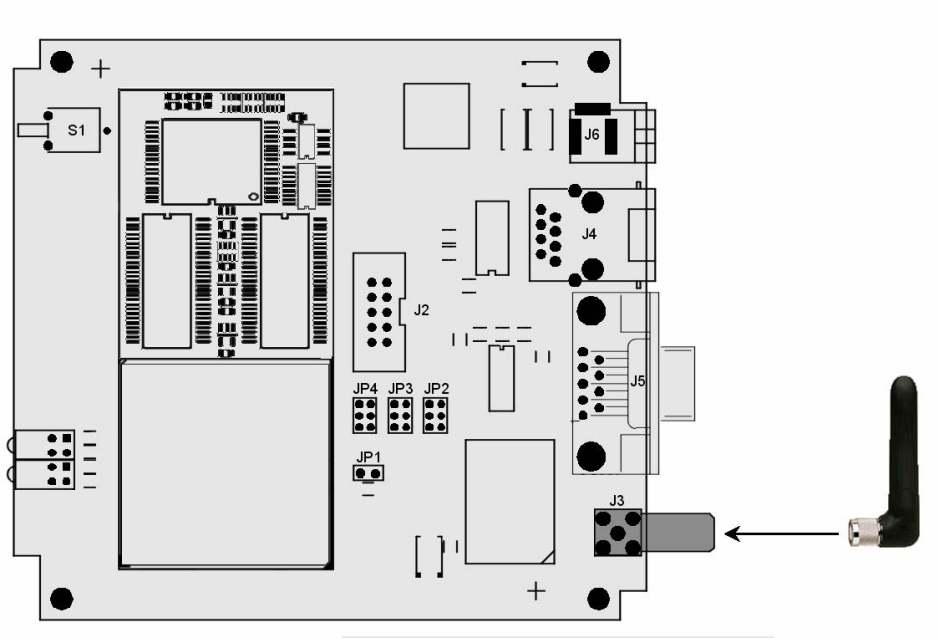


Figure 3-2: BlueTooth™-antenna connection

3.11 ISP Mode Switch (JP2-JP4)

Use the jumpers JP2-JP4 to activate the ISP-interface (**I**n-**S**ystem-**P**rogramming). With the ISP-interface it is possible to upgrade the firmware of the BlueTooth™ module.

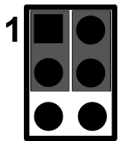
Caution: The ISP interface uses TTL levels. To connect it to a standard RS232 serial port a special adapter which converts the TTL level to standard RS232 level is necessary. This optional adapter can be delivered by request.

The different jumper settings allow to connect the signals necessary for data transfer either with the BlueTooth™ module or with some specific pins on the ADNP/1520.

3.11.1 Using the RXD/TXD Switch (JP2)

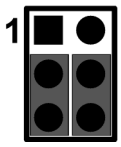
To use the In-System-Programming option on the BlueTooth™ Carrier Board jumper JP2 has to be set on the position like shown below. This will connect the RXD/TXD lines to the BlueTooth™ module.

Switch RXD/TXD to ISP



Short pins 1-2
Short pins 4-5

Switch RXD/TXD to ADNP/1520

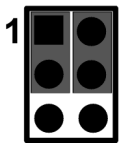


Short pins 2-3
Short pins 5-6

3.11.2 Using the RTS/CTS Switch (JP3)

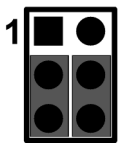
To use the In-System-Programming option on the BlueTooth™ Carrier Board the jumper JP3 has to be set on the position like shown below. This will connect the CTS/RTS lines to the BlueTooth™ module.

Switch RTS/CTS to ISP



Short pins 1-2
Short pins 4-5

Switch RTS/CTS to ADNP/1520

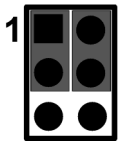


Short pins 2-3
Short pins 5-6

3.11.3 Using the Pin Select (JP4)

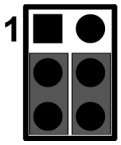
The pin select feature is intended for future use. When using the BlueTooth™ Carrier Board in combination with another DIL/NetPC than the ADNP/1520 it is possible to switch the CTS/RTS lines to port C (pins 19/20 on the QIL-socket) when needed. The control lines can be configured by setting the jumper JP4 as follows:

Switch CTS/RTS to Port C



Short pins 1-2
Short pins 4-5

Switch CTS/RTS to COM2



Short pins 2-3
Short pins 5-6

3.12 Mounting the DIL/NetPC

To mount the ADNP/1520 on the BlueTooth™ Carrier Board set it carefully on the QIL-128 socket onto the BlueTooth™ Carrier Board. Please note, that the ADNP/1520 is positioned in the right way like shown in figure 4. After that, push the ADNP/1520 down, so that the QIL-128 socket fixes it.

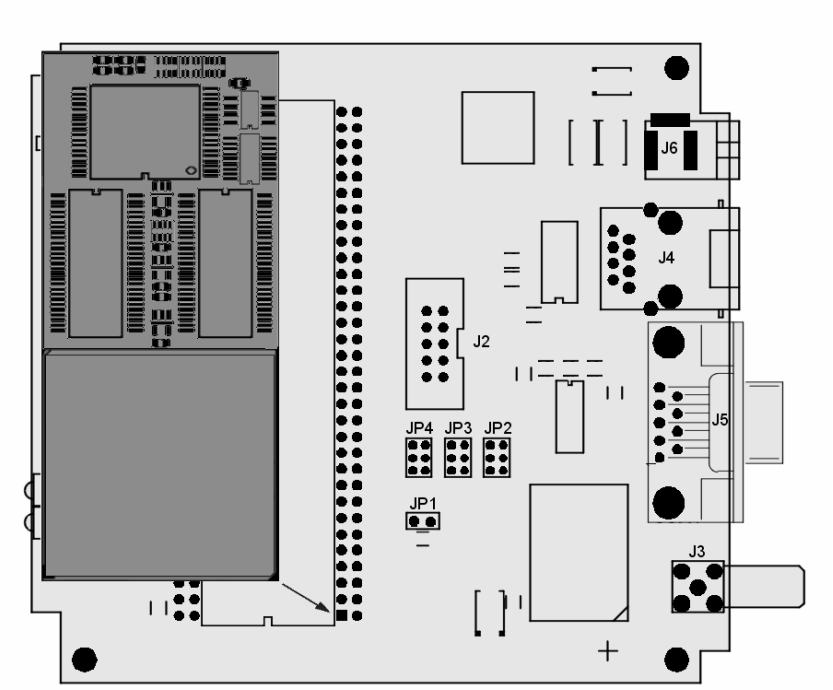


Figure 3-2: Position of the DIL/NetPC on the BlueTooth™ Carrier Board

4 Cable Connections

Before installing the necessary cable connections you should check the correct setting of the RCM jumper (see chapter 3.8). Normally this jumper is set by default. Before you can use your BlueTooth™ Carrier Board you need a further Desktop- or Notebook-PC that act as development system. This development system should run under MS-Windows or Linux in an ideal manner. This computer will act as your development system. Between the development system and the BlueTooth™ Carrier Board are two new connections required. At first the **RS232 Serial Link** and second the **Ethernet Link**. The PC will act as development system and as **Remote Console Monitor (RCM)** for the ADNP/1520 on the BlueTooth™ Carrier Board. Please make sure, that the RCM jumper on the ADNP/1520 is set correctly.

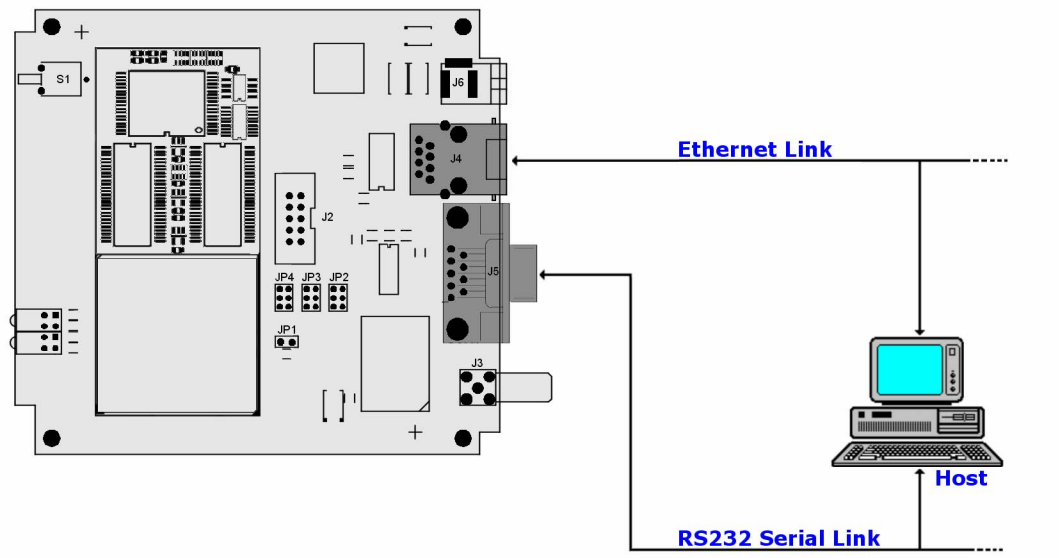


Figure 4-1: Overview about the required cable Connections

4.1 Serial Link

For the Serial Link, you need a Null-Modemcable. This cable comes along with your BlueTooth™ Carrier Board package. Please connect the BlueTooth™ Carrier Board with a COM port of your development system (for example COM1 or COM2) by using this cable.

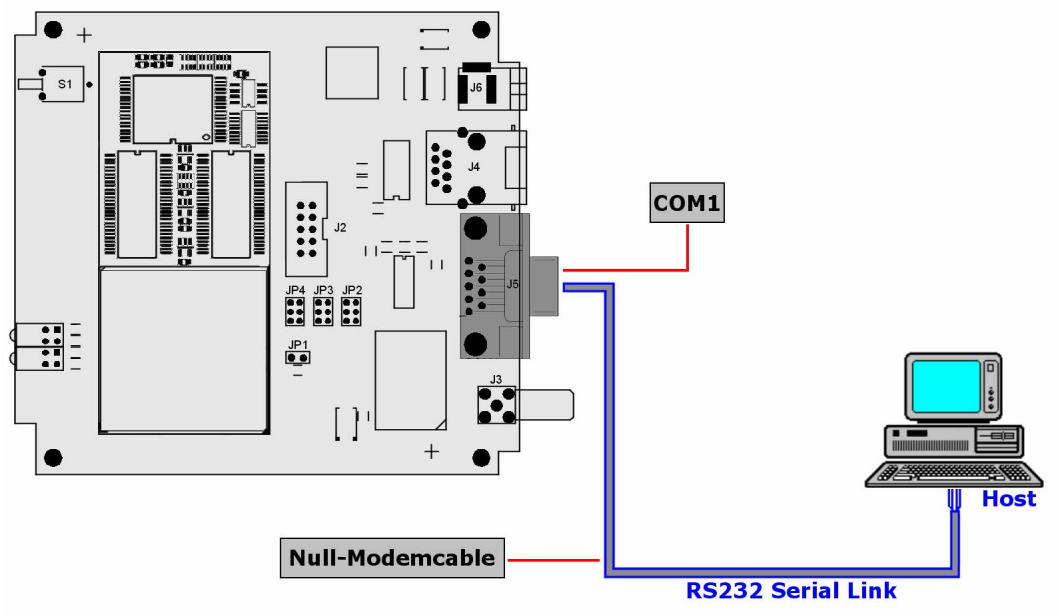


Figure 4-2: Serial Link Connection

4.2 Ethernet Link

The Ethernet Link requires two standard 10Base-T patch cables, one Hub or Switch and an Ethernet-LAN interface for your development system.

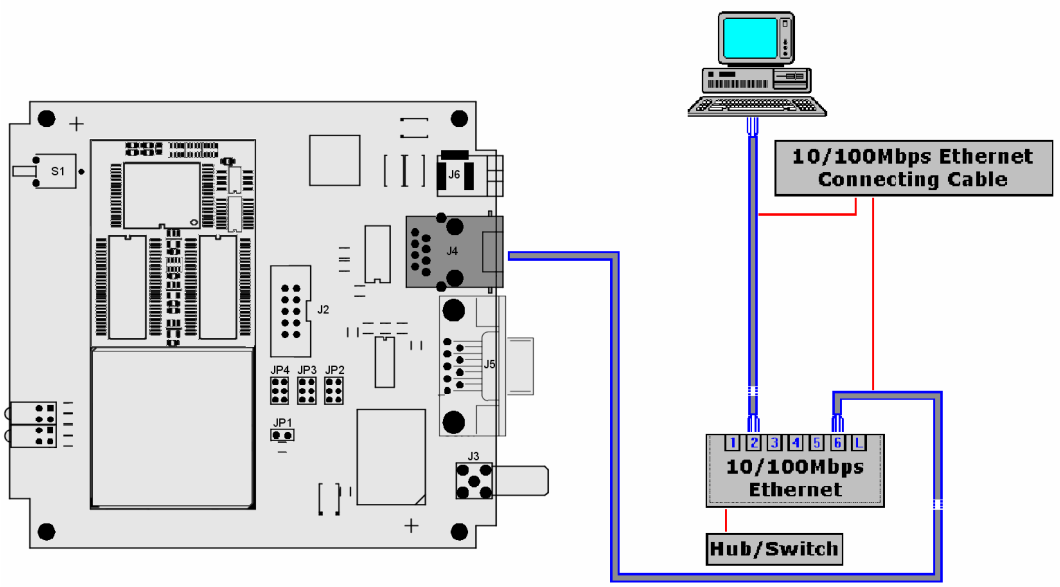


Figure 4-3: Ethernet Link Connection using a Hub/Switch

If you want to connect your development system directly to the BlueTooth™ Carrier Board place a crossover cable between this two systems like shown in the next figure.

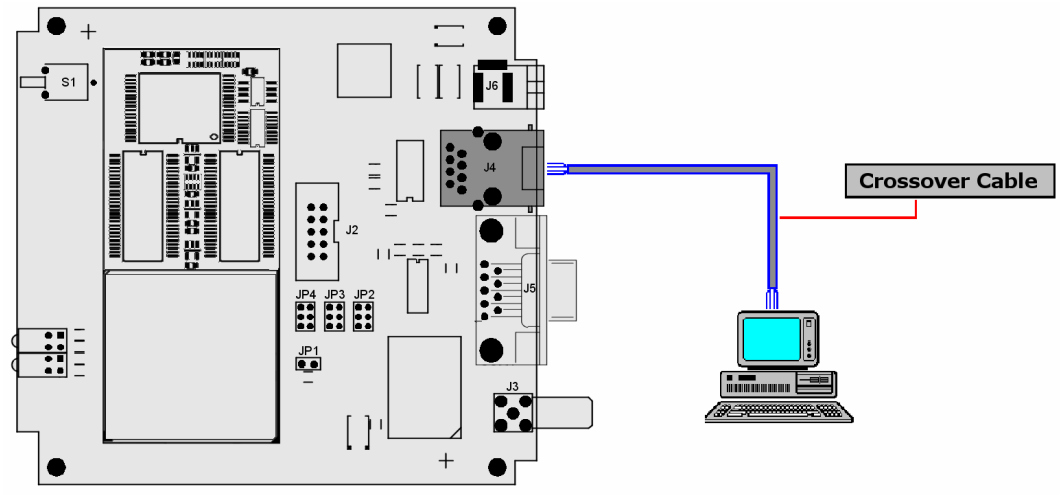


Figure 4-4: Ethernet Link Connection using a crossover cable

4.3 ISP Link

To provide the BlueTooth™ module with another firmware an special adapter is needed. This adapter converts the RS232 signal levels provided by the development system into TTL signal levels which are needed by the BlueTooth™ module on the Carrier Board. The figure below shows the necessary settings and connections to transfer data to the BlueTooth™ module via ISP Link.

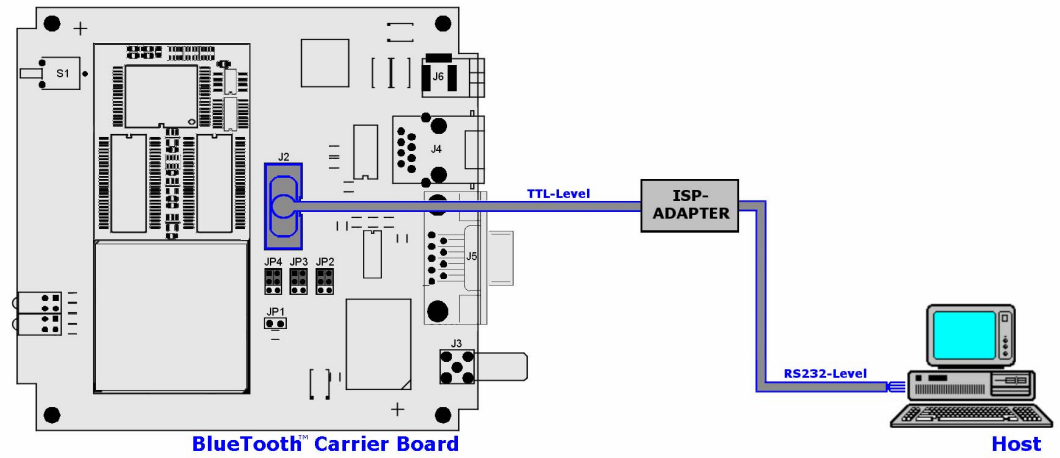


Figure 4-5: Data transfer via ISP Link

4.4 Power Supply

The BlueTooth™ Carrier Board needs a supply voltage of 5VDC to work. In your BlueTooth™ Carrier Board package you will find a plug-in power supply unit to provide the system with the necessary power.

Caution: Providing the Carrier Board with a voltage higher than the regular 5V DC ±10% could resolve in damaged board components.

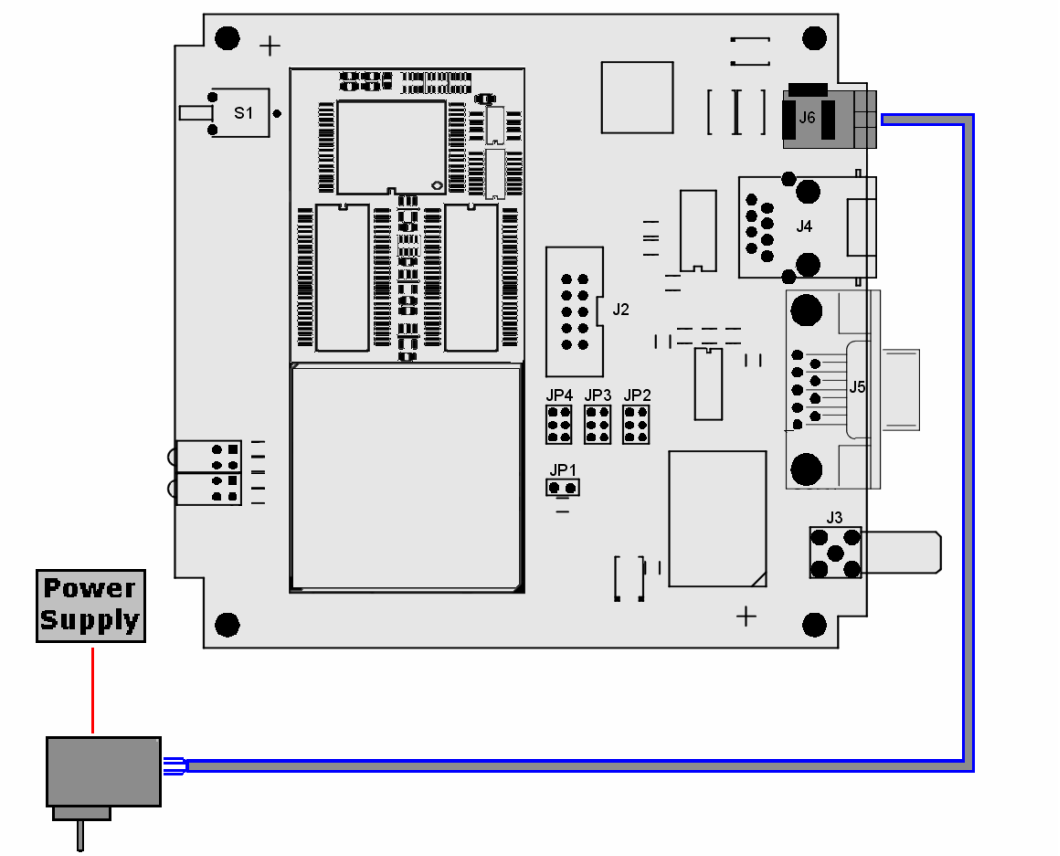


Figure 4-5: Power Supply Connection

After the successful connection of all cables between the BlueTooth™ Carrier Board and your development system, the system is ready to run.

5 Appendix

The Appendixes 1 to 4 give you more detailed information about the signals on the individual connectors. Table cells marked with NC indicate signals, which may be not connected.

Appendix 1: Pin Assignment – 128-pin QIL Connector (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	Ethernet Interface, TX+ Pin
31	TX-	LAN	Ethernet Interface, TX- Pin
32	GND	----	Ground

Table A1-1: ADNP/1520 Pinout – Pin 1 to 32

The PIO pins 1 to 20 are driven by an in-system programmable (ISP) high density PLD (ispMACH256 or similar). It is possible to change the function of these pins over the ADNP/1520 JTAG interface. Please contact our support staff for more information.

Appendix 1: Pin Assignment – 128-pin QIL Connector (2. Part)

Pin	Name	Group	Function
33	RX+	LAN	Ethernet Interface, RX+ Pin
34	RX-	LAN	Ethernet Interface, RX- Pin
35	RESOUT	RESET	Reset Output
36	VBAT	PSP	SC520 Real Time Clock Battery Input
37	CLKOUT	PSP	Clock Output (Default 1.8432 MHz)
38	TXD2	PSP	COM2 Serial Port, TXD Pin
39	RXD2	PSP	COM2 Serial Port, RXD Pin
40	INT5	PSP	Programmable Interrupt Input 5
41	INT4	PSP	Programmable Interrupt Input 4
42	INT3	PSP	Programmable Interrupt Input 3
43	INT2	PSP	Programmable Interrupt Input 2
44	INT1	PSP	Programmable Interrupt Input 1
45	CS4	PSP	Programmable Chip Select Output 4
46	CS3	PSP	Programmable Chip Select Output
47	CS2	PSP	Programmable Chip Select Output 2
48	CS1	PSP	Programmable Chip Select Output 1
49	IOCHRDY	PSP	I/O Channel Ready
50	IOR	PSP	I/O Read Signal, I/O Expansion Bus
51	IOW	PSP	I/O Write Signal, I/O Expansion Bus
52	SA3	PSP	System Expansion Bus, Address Bit 3
53	SA2	PSP	System Expansion Bus, Address Bit 2
54	SA1	PSP	System Expansion Bus, Address Bit 1
55	SA0	PSP	System Expansion Bus, Address Bit 0
56	SD7	PSP	System Expansion Bus, Data Bit 7
57	SD6	PSP	System Expansion Bus, Data Bit 6
58	SD5	PSP	System Expansion Bus, Data Bit 5
59	SD4	PSP	System Expansion Bus, Data Bit 4
60	SD3	PSP	System Expansion Bus, Data Bit 3
61	SD2	PSP	System Expansion Bus, Data Bit 2
62	SD1	PSP	System Expansion Bus, Data Bit 1
63	SD0	PSP	System Expansion Bus, Data Bit 0
64	Vcc	PSP	3.3 Volt Power Input

Table A1-2: ADNP/1520 Pinout – Pin 33 to 64

Appendix 1: Pin Assignment –128-pin QIL Connector (3. Part)

Pin	Name	Group	Function
65	SBHE	PSP	System Byte High Enable, Sys. Exp. Bus
66	IOCS16	PSP	I/O Chip Select 16, Sys. Expansion Bus
67	MEMCS16	PSP	Memory Chip Select 16, Sys. Exp. Bus
68	MEMW	PSP	Memory Write Signal, Sys. Expansion Bus
69	MEMR	PSP	Memory Read Signal, Sys. Expansion Bus
70	BALE	PSP	Bus Address Latch Enable, Sys. Exp. Bus
71	AEN	PSP	Address Enable Signal, Sys. Expansion Bus
72	Reserved	PSP	Reserved. Don't use
73	RCME	PSP	Remote Console Mode Enable
74	Reserved	PSP	Reserved. Don't use
75	Reserved	PSP	Reserved. Don't use
76	Reserved	PSP	Reserved. Don't use
77	Reserved	PSP	Reserved. Don't use
78	Reserved	PSP	Reserved. Don't use
79	Reserved	PSP	Reserved. Don't use
80	Reserved	PSP	Reserved. Don't use
81	Reserved	PSP	Reserved. Don't use
82	Reserved	PSP	Reserved. Don't use
83	Reserved	PSP	Reserved. Don't use
84	Reserved	PSP	Reserved. Don't use
85	INT6	PSP	Programmable Interrupt Input 6
86	INT7	PSP	Programmable Interrupt Input 7
87	IDERES	PSP	IDE Interface Reset Output
88	IDECS0	PSP	IDE Interface Chip Select 0
89	IDECS1	PSP	IDE Interface Chip Select 1
90	Reserved	PSP	Reserved. Don't use
91	Reserved	PSP	Reserved. Don't use
92	Reserved	PSP	Reserved. Don't use
93	Reserved	PSP	Reserved. Don't use
94	Reserved	PSP	Reserved. Don't use
95	Reserved	PSP	Reserved. Don't use
96	GND	---	Ground

Table A1-3: ADNP/1520 Pinout – Pin 65 to 96

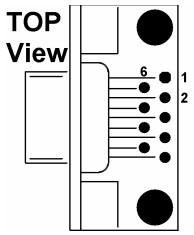
Appendix 1: Pin Assignment –128-pin QIL Connector (4. Part)

Pin	Name	Group	Function
97	LANLED	PSP	LAN Interface Activity LED
98	Reserved	PSP	Reserved. Don't use
99	RSTDRV	PSP	Reset Output, System Expansion Bus
100	SA23	PSP	System Expansion Bus, Address Bit 23
101	SA22	PSP	System Expansion Bus, Address Bit 22
102	SA21	PSP	System Expansion Bus, Address Bit 21
103	SA20	PSP	System Expansion Bus, Address Bit 20
104	SA19	PSP	System Expansion Bus, Address Bit 19
105	SA18	PSP	System Expansion Bus, Address Bit 18
106	SA17	PSP	System Expansion Bus, Address Bit 17
107	SA16	PSP	System Expansion Bus, Address Bit 16
108	SA15	PSP	System Expansion Bus, Address Bit 15
109	SA14	PSP	System Expansion Bus, Address Bit 14
110	SA13	PSP	System Expansion Bus, Address Bit 13
111	SA12	PSP	System Expansion Bus, Address Bit 12
112	SA11	PSP	System Expansion Bus, Address Bit 11
113	SA10	PSP	System Expansion Bus, Address Bit 10
114	SA9	PSP	System Expansion Bus, Address Bit 9
115	SA8	PSP	System Expansion Bus, Address Bit 8
116	SA7	PSP	System Expansion Bus, Address Bit 7
117	SA6	PSP	System Expansion Bus, Address Bit 6
118	SA5	PSP	System Expansion Bus, Address Bit 5
119	SA4	PSP	System Expansion Bus, Address Bit 4
120	SD15	PSP	System Expansion Bus, Data Bit 15
121	SD14	PSP	System Expansion Bus, Data Bit 14
122	SD13	PSP	System Expansion Bus, Data Bit 13
123	SD12	PSP	System Expansion Bus, Data Bit 12
124	SD11	PSP	System Expansion Bus, Data Bit 11
125	SD10	PSP	System Expansion Bus, Data Bit 10
126	SD9	PSP	System Expansion Bus, Data Bit 9
127	SD8	PSP	System Expansion Bus, Data Bit 8
128	Vcc	---	3.3 Volt Power Input

Table A1-4: Pin assignment ADNP/1520 pin 97 to 12

Appendix 2: Pin Assignment DNP/EVA2-SV4 Components

COM1 Connector



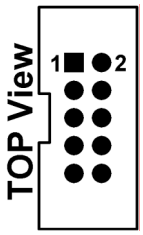
Pin	Signal
1	DCD
2	RXD
3	TXD
4	DTR
5	GND

Pin	Signal
6	DSR
7	RTS
8	CTS
9	RI

Table A2-1: Pinout COM1 Connector

Caution: All COM1-port signals are on RS232 level. There is no TTL level available on these ports. To use TTL level in combination with the BlueTooth™ Carrier Board you have to use a n external level shifter circuit.

ISP Connector



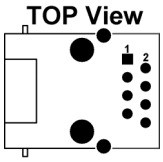
Pin	Signal
1	
2	RXD
3	TXD
4	
5	GND

Pin	Signal
6	
7	RTS
8	CTS
9	
10	Vcc

Table A2-2: Pinout ISP/COM2 Connector

Caution: All ISP-port signals are on TTL level. There is no RS232 level available on these ports. To use RS232 level in combination with the BlueTooth™ Carrier Board you have to use an external level shifter circuit.

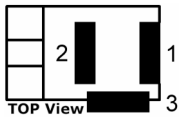
10/100 Mbps Ethernet Connector



Pin	Name	Signal
1	TX+	TXD+
2	TX-	TXD-
3	RX+	RXD+
4	NC	–
5	NC	–
6	RX-	RXD-
7	NC	–
8	NC	–
S1..2	Shield	–

Table A2-3: Pinout 10/100 Mbps Ethernet Connector

Power Connector



Pin	Name	Signal
1	Vcc	Power In
2	GND	Power-
3	GND	Power

Table A2-4: Pinout Power Connector

RCM Jumper

Jumper JP3	Function
open	Disable RCM mode for ADNP/1520
close	Enable RCM mode for ADNP/1520-

Table A2-5: RCM Jumper Settings

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Document History

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1.00	28.04.03	First Version	JNE