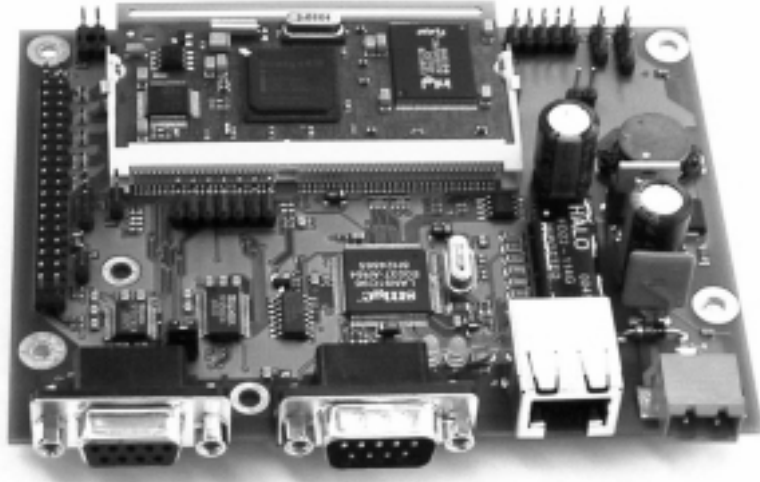


# Net\_Terminal

## Documentation 3.0



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### 1.0 Introduction

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The Net\_Terminal is an industrial terminal based on the Keith & Koep "Trizeps"<sup>1</sup> module. (see at <http://www.keith-koep.com/trizeps.html>).

The board offers the following features:

- 2 x RS232 interface (1 x DSUB9 male, 1 x DSUB female)
- Ethernet interface (SMSC LAN91C96)
- LCD-Connector (40-pin header, included touch interface) to connect with B/W or color DSTN, TFT
- USB target (external clamping diode, VCC necessary)
- IrDA (external IR components necessary)
- Audio interface (Microphone and speaker)
- Connector for additional UART or IrDA
- Capacity or external battery buffered Real Time Clock (RTC)
- Single power supply (10-24V)

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1. The Trizeps board is based on the Intel StrongARM SA-1110 Microprocessor - a highly integrated communications microcontroller that incorporates a 32-bit StrongARM Risc Processor core, system support logic, multiple communications channels, an LCD controller and general purpose I/O ports. The SA-1110 works very fast (150 Dhrystone 2.1 MIPS @ 133MHz or 235 Dhrystone 2.1 MIPS @ 206MHz) and needs very low power. Trizeps includes also the Philips UCB 1200 (a single chip, integrated mixed signal audio and telecom codec). The single channel audio codec is designed for direct connection of a microphone and a speaker. The incorporated analog to digital converter and the touch screen interface provides complete control and read-out of an 4 wire resistive touch screen. The Trizeps offers up to 16MByte Flash memory and up to 64 MByte SDRAM.

## 2.0 Preface

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### 2.1 Getting started

The Net\_Terminal is designed as a motherboard for Trizeps. The first part of this chapter gives a physical description of the board and the second part describes:

1. How to unpack the board and how to make a visual inspection.
2. How to power up the board for the first time.
3. How to connect the board to a host system.

#### 2.1.1 Physical description

The physical layout of the board is shown in Figure 1 on page 3 (You'll find details on the last page). The dimensions of the board are 120 x 90 mm (LxW).

There are a number of header blocks on the board that accept 2-pin jumpers, allowing the board to be configured in different ways. Due to further header blocks it is possible to connect an LCD-display with touch screen. A serial connection to a host system is possible by using one of the two RS232 interfaces. Furthermore the board contains an JTAG-interface for programming the Trizeps.

#### 2.1.2 Unpacking the board

The Net\_Terminal contains electronic components that are susceptible to electrostatic discharge (static electricity). To avoid electrostatic damage the board is supplied in an antistatic bag. When handling the card, risk of damage can be diminished by taking a few simple precautions:

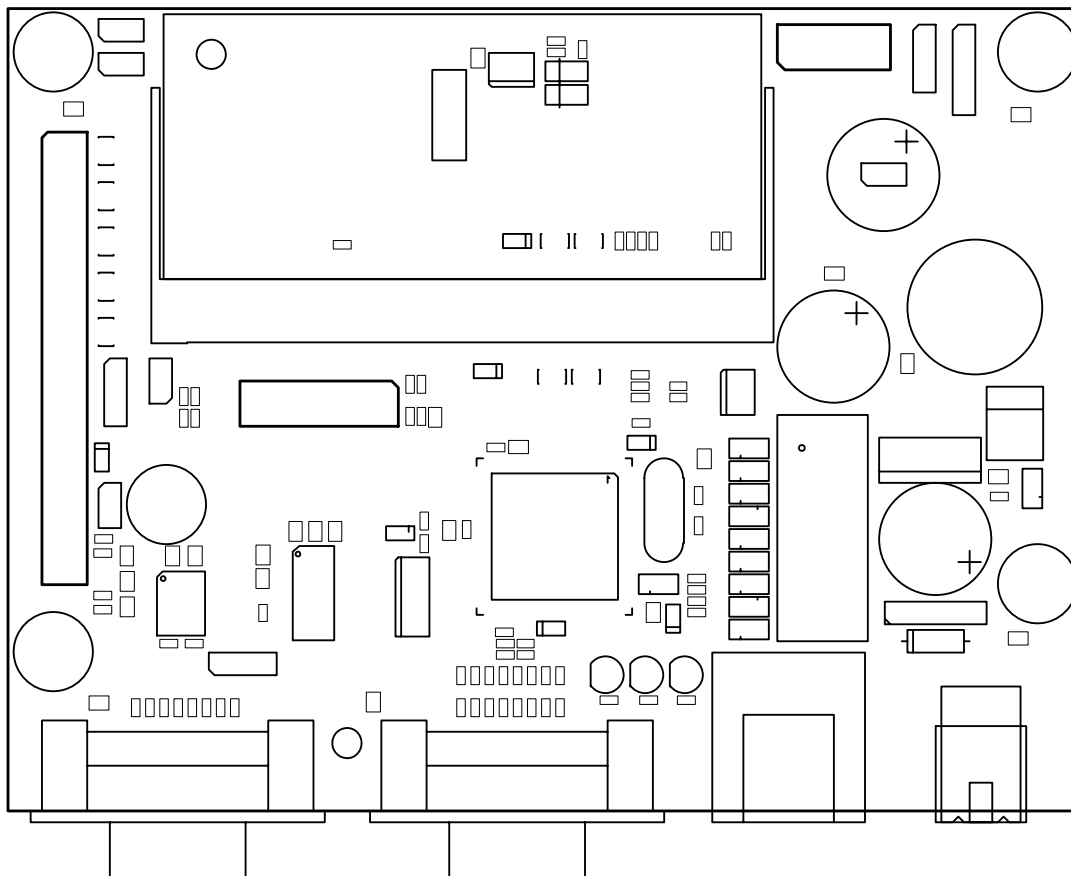
1. Do not remove the card from the bag unless you are working on an antistatic, grounded surface and wearing an grounded antistatic wrist strap.
2. Keep the antistatic bag the card was supplied in; if you remove the card from a system, store it in the bag.

Normally Net\_Terminal is supplied with a Trizeps in the SODIMM-socket. If the SODIMM is not fitted with Trizeps when you receive your board, follow the next instructions:

1. Slide the Trizeps into the socket taking account of the polarity mark. Do not touch the gold contacts. You can see that there is a polarization mark cut in the Trizeps; this ensures that the Trizeps is adjusted correctly. Put the Trizeps modul carefully at an angle of about 30 degrees into the socket.
2. Support the underside of the board and push the Trizeps down into the socket. It should click into its place with a gentle click.

Before you install and power up your Net\_Terminal, you should perform a short visual inspection:

1. Inspect the card for physical damage.
2. Ensure that each of the 2-pin jumpers is pushed down firmly onto its mounting posts. If you move any of the jumpers, refer to appendix A to ensure they are replaced correctly.

**FIGURE 1.** Physical layout of the Net\_Terminal**2.1.3 Powering up the first time**

Use Appendix A to ensure the jumpers are set appropriately. If you need more details on how to install the card or attach power supply, refer to appendix A, too.

**2.1.4 How to connect the board to a host system**

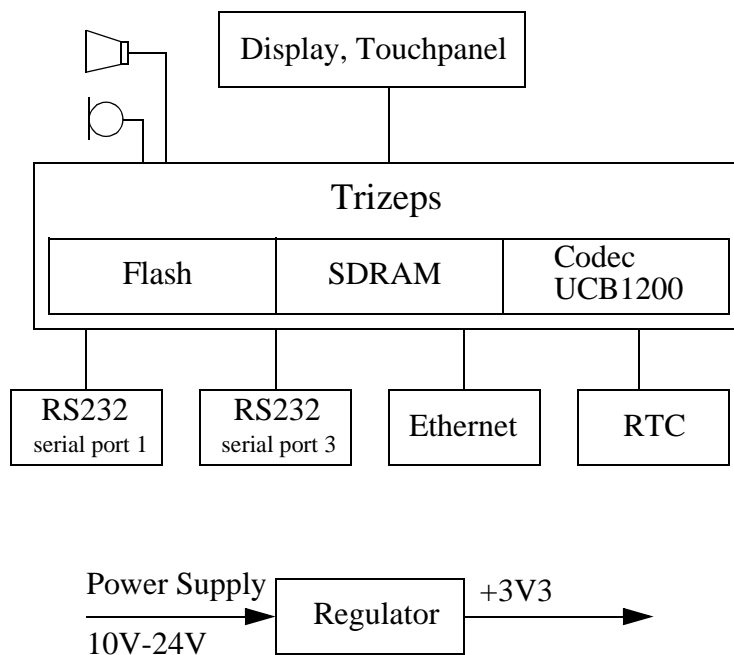
Use an RS232 null-modem cable to attach the serial interface on the board to an RS232 port on a terminal or terminal emulator. For example, you could connect it to a PC running Windows and use the Windows Terminal or Hyperterminal application. Configure the terminal to operate at 38 kbaud, 8-bit data, 1 stop bit, no parity, no flow control. If you need more details on choosing an appropriate cable, refer to appendix A.

### 3.0 Functional specification

This chapter describes each functional element on the Net\_Terminal board. In the next chapters you can find more detailed information about the board and some important hints for programming it. The block diagram on Figure 2 shows the interconnections of the major elements.

**FIGURE 2.**

Net\_Terminal block diagram

**Components of Net\_Terminal:**

1. Trizeps
2. Serial ports
3. Ethernet
4. Real Time Clock (RTC)
5. JTAG interface
6. Reset
7. Power Supply
8. Audio in/out
9. Display connector and 4 wire Touch Panel

#### 3.1 Trizeps

The Trizeps board is based on the Intel StrongARM SA-1110 Microprocessor - a highly integrated communications microcontroller that incorporates a 32-bit StrongARM Risc Processor core, system support logic, multiple communication channels, an LCD controller and general purpose I/O ports. Trizeps also contains the Philips UCB1200 codec, up to 64 MByte SDRAM and up to 16 MByte Flash. It

has an 144-pin interface and the dimension of a SODIMM. You'll find more information about Trizeps at <http://www.keith-koep.com/trizeps.html>

### 3.2 Serial Ports

The Net\_Terminal provides four kinds of serial ports:

- USB
- UART
- IrDA
- SPI

#### 3.2.1 Serial port 0 - USB Device Controller

Serial port 0 is an universal serial bus device controller (UDC) that supports three endpoints and can operate half-duplex at a baud rate of 12 Mbps (slave only, not a host or hub controller). The UDC is USB-compliant and supports all standard device requests issued by the host. The external pins dedicated to this interface are UDC+ and UDC-. The USB protocol uses differential signalling between the two pins for half-duplex data transmission. A 1.5 KOhm pull-up resistor is connected to the USB cable's D+ signal to pull the UDC+ pin high when not driven. This signifies the UDC is a high-speed, 12 Mbps device and provides the correct polarity for data transmission.

Serial port 0 is accessible by a SL1-4 (four pin header). However, the user should refer to the Universal Serial Bus Specification, Revision 1.0<sup>1</sup> for a full description of the USB protocol and its operation.

#### 3.2.2 Serial port 1 - UART

Serial port 1 is configured as an universal asynchronous receiver / transmitter (UART) serial controller. A Maxim MAX3223 RS232 transceiver is used to manage the level conversion and line interface. The device has a power saving automatic shutdown that powers down the chip if no valid RS232 levels are detected. The component may also be forced off by the FORCEON signal. Serial port 1 is accessible by the female serial port connector J3 (DSUB9F). The external pins dedicated to this interface are TXD1 and RXD1. Further GPIO 12 and 13 are used as hand-shake signals RTS and CTS.

#### 3.2.3 Serial port 2 - Infrared communications port

The infrared communications port (ICP) operates at half-duplex and provides direct connection to commercially available Infrared Data Association (IrDA) compliant LED transceivers. The ICP supports both the original IrDA standard with speeds up to 115.2 Kbps as well as the newer 4-Mbps standard. Both standards use different bit encoding techniques and serial packet formats. Low-speed IrDA transmission uses the Hewlett-Packard Serial Infrared standard (HP-SIR) for bit encoding and an UART as the serial engine; high-speed uses Four-Position Pulse Modulation (4PPM) and a specialized serial packet protocol developed expressly for IrDA transmission. Serial port 2 is accessible by a 4-pin header. The external pins dedicated to the ICP are TXD2 and RXD2.

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1. The latest revision of the Universal Serial Bus Specification Revision 1.0 can be accessed via the World Wide Web Internet side at: <http://www.teleport.com/~usb/>

### 3.2.4 Serial port 3 - UART

Serial port 3 is configured as an universal asynchronous receiver / transmitter (UART) serial controller. A Maxim MAX3243 RS232 transceiver is used to manage the level conversion and line interface. The device has a power saving automatic shutdown that powers down the chip if no valid RS232 levels are detected. The component may also be forced off by the FORCEON signal. Serial port 3 is accessible by the male serial port connector J9 (DSUB9M). This port provides RTS, CTS, DSR, DTR, DCD and RI modem signals to support a serial IO port PC synchronous application.

### 3.2.5 Serial port 4 - SSP

The synchronous serial port (SSP) of the SA-1110 is used to interface to a variety of analog-to-digital converters, audio and telecom codecs, memory chips, and keypad controllers as well as other miscellaneous serial devices. The SSP supports the National Microwire and Texas Instruments synchronous serial protocols as well as a subset of the Motorola serial peripheral interface (SPI) protocol. Serial port 4 controls full-duplex synchronous serial transfer between the SA-1110 and off-chip devices. The SSP functions as a master only and communicates to the off-chip slave device by driving a serial bit rate clock ranging from 7.2 KHz to 1.8432 MHz along with a frame synchronisation pulse to denote the start of each frame transfer, and supports any data format between 4 and 16 bits. The external pins dedicated to this interface are GPIO 10 to 13.

## 3.3 Ethernet

The Ethernet Controller (LAN91C96 SMSC) on the Net\_Terminal board supports the IEEE 802.3 (ANSI 8802-3) Ethernet Standards. It is connected to a 10 Base-T filter module. The Ethernet connector is of the type RJ45 and is named J1. The controller in the configuration of Net\_Terminal provides:

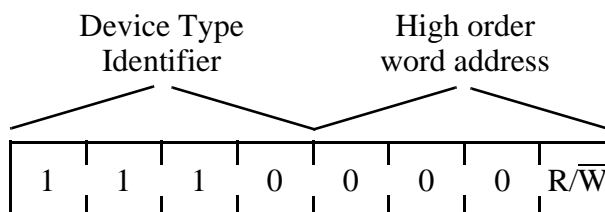
- 6K Bytes of ON-Chip RAM
- support of enhanced transmit queue management
- direct interface to ISA busses with no wait states
- fast access time (40ns)
- pipelined data path
- integrated 10Base-T Transceiver functions:
  - drivers and receivers
  - link integrity test
  - receive polarity detection and correction
- 10 Mbps Manchester Encoding/Decoding and clock recovery
- automatic retransmission, bad packet rejection and transmit padding
- optional configuration via serial EEPROM interface (jumperless)
- two direct driven LEDs for diagnostics (transmit/receive indication)

### 3.4 Real Time Clock (RTC)

The Net\_Terminal contains a Low-Power RTC from Philips, called PCF8593. The PCF8593 offers a serial interface and a software protocol allowing operation on a simple two wire bus with I<sup>2</sup>C\_CLK and I<sup>2</sup>C\_DATA. I<sup>2</sup>C\_CLK is connected via Pin GPIO26 and I<sup>2</sup>C\_DATA via Pin GPIO27 to SA-1110.

FIGURE 3.

The slave address of the RTC



Read address: A3

Write address: A2

The RTC is either supplied from the onboard GoldCap Capacitor or from an external battery.

### 3.5 JTAG

The SA-1110 contains a JTAG port that allows test access to the I/O pins of the device. The JTAG port is designed as a 10-pin header connector.

### 3.6 Reset

There are two sources of reset on the MT6N:

1. Power-on Reset
2. Reset from the watchdog timer

Power-on reset is generated automatically when power is applied to the board. It can also be initiated by a push button switch attached to a 2-pole 0.1-inch pitch connector on the board.

Resets generated by any of these methods are equivalent and indistinguishable.

### 3.7 Power Supply

The Power supply of MT6N is accessible by a 2-pin connector by Phoenix. Pin 1 is the positive one (10V - 24V) and Pin 2 is the negative one (Ground).

The power supply +3V3 is generated from Input Power with a DC-DC converter. The +3V3 are used by Trizeps, Ethernet, PCMCIA or CompactFlash cards, serial interfaces and so on.

### **3.8 Audio in / out**

The Trizeps board includes a single chip integrated mixed signal audio and telecom codec (Philips UCB 1200). Header on the Net\_Terminal give access to the speaker and microphone signals.

### **3.9 Display connector and 4 wire Touch Panel**

The SA-1110 on the Trizeps offers a LCD-controller. The audio and telecom codec (see „Audio in / out“ auf Seite 8) provides also a 4 wire touch screen interface. The relevant signals are accessible at a 40-pin header.

# Appendix A

## 4.0 Configuration guide

This appendix describes:

- The default configuration of Net\_Terminal
- The settings for all links and jumpers
- The pinouts of all connectors
- The cables required for connection to the board

The locations of all jumpers and connectors are shown in Figure 3.

### 4.1 Overview of all jumpers and connectors

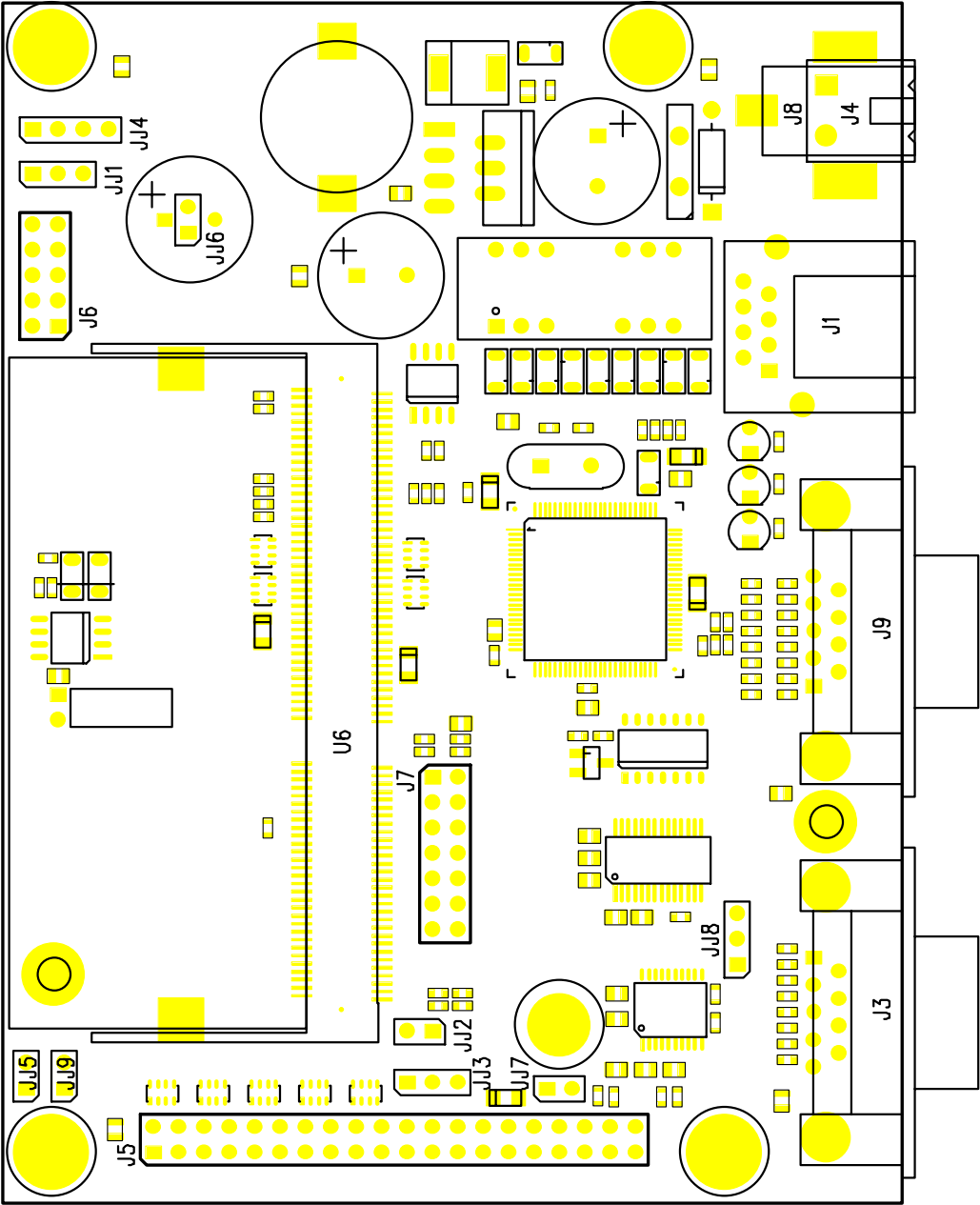
TABLE 1.

Overview of all jumpers and connectors

Name	Function	Type
J1	Ethernet	RJ45
J3	RS232	DSUB9 female
J4	Power Supply	MSTB 2,5/2-G (Phoenix)
J5	Display	Header SL2-40
J6	JTAG	Header SL2-10
J7	GPIO	Header SL2-14
J8	Power Supply	(optional)
J9	RS232	DSUB9 male
JJ1	IrDA	Header SL1-3
JJ2	Speaker	Header SL1-2
JJ3	Microphon	Header SL1-3
JJ4	USB	Header SL1-4
JJ5	Reset	Header SL1-2
JJ6	Battery	Header SL1-2
JJ7	On-switch	Header SL1-2
JJ8	Invalid (RS232)	Header SL1-3
JJ9	Angelboot	Header SL1-2
U6	Trizeps	SODIMM 144

The following chapters give a detailed description of the jumpers and connectors.

FIGURE 4. Jumper and connector location



#### 4.1.1 J1 - Ethernet connector

The Ethernet connector is an usually RJ45 connector with the following pin description (Table 2).

**TABLE 2.**

Pinout of the Ethernet connector

Pin	Signal	Description
1	TPETXP	Transmit differential output
2	TPETXN	Transmit differential output
3	TPERXP	Receive differential output
4	nc	not connected
5	nc	not connected
6	TPERXN	Receive differential output
7	nc	not connected
8	nc	not connected

#### 4.1.2 J3 - RS232 connector

The connector J3 is a female DSUB9 connector with the following pin description:

**Attention:** If you use SPI-signals you can't use RTS and CTS at this interface!

**TABLE 3.**

Pinout of the serial interface connector J3 (DB9 female)

Pin	Signal	Description
1	-	internally connected with pin 4 and pin 6
2	TXD1S_V24X	Serial Port Transmit Pin
3	RXD1S_V24X	Serial Port Receive Pin
4	-	internally connected with pin 1 and pin 6
5	Gnd	ground
6	-	internally connected with pin 1 and pin 4
7	CTS1_V24X	Clear to Send (GPIO 13 of SA-1110) <sup>a</sup>
8	RTS1_V24X	Request to Send (GPIO 12 of SA-1110) <sup>b</sup>
9	nc	not connected

a. GPIO13 either connected as serial signal or as Chip Select of SPI

b. GPIO12 either connected as serial signal or as Clock Signal of SPI

#### 4.1.3 J4 - Power Supply

Usually Net\_Terminal is supplied by connector J4 by Phoenix. The input voltage range is between 10V and 24V.

**TABLE 4.**

Pinout of the Power Supply connector J4 (MSTB 2,5/2-G)

Pin	Signal	Description
1	VIN	Input voltage (10V - 24V)
2	Gnd	Ground

#### 4.1.4 J5 - Display connector

It is not possible to connect an LCD-Display directly to the Net\_Terminal, but all the relevant connections are available on the 40-pin header. Table 5 describes the pins and their functions.

**TABLE 5.**

Pinout of the display connector J5 (40-pin Header)

Pin	Signal	Description
1	LDD00	LCD controller display data (Trizeps - SA-1110)
2	LDD01	LCD controller display data (Trizeps - SA-1110)
3	LDD02	LCD controller display data (Trizeps - SA-1110)
4	LDD03	LCD controller display data (Trizeps - SA-1110)
5	LDD04	LCD controller display data (Trizeps - SA-1110)
6	LDD05	LCD controller display data (Trizeps - SA-1110)
7	LDD06	LCD controller display data (Trizeps - SA-1110)
8	LDD07	LCD controller display data (Trizeps - SA-1110)
9	LDD08	LCD controller display data (GPIO 2 of Trizeps - SA-1110)
10	LDD09	LCD controller display data (GPIO 3 of Trizeps - SA-1110)
11	LDD10	LCD controller display data (GPIO 4 of Trizeps - SA-1110)
12	LDD11	LCD controller display data (GPIO 5 of Trizeps - SA-1110)
13	LDD12	LCD controller display data (GPIO 6 of Trizeps - SA-1110)
14	LDD13	LCD controller display data (GPIO 7 of Trizeps - SA-1110)
15	LDD14	LCD controller display data (GPIO 8 of Trizeps - SA-1110)
16	LDD15	LCD controller display data (GPIO 9 of Trizeps - SA-1110)
17	L_FCLK	LCD frame clock (Trizeps - SA-1110)
18	L_LCLK	LCD line clock (Trizeps - SA-1110)
19	L_PCLK	LCD pixel clock (Trizeps - SA-1110)
20	L_BIAS	LCD ac bias drive (Trizeps - SA-1110)
21	TSMX	negative X-plate touch screen (Trizeps - UCB 1200)
22	TSMY	negative Y-plate touch screen (Trizeps - UCB 1200)
23	TSPX	positive X-plate touch screen (Trizeps - UCB 1200)
24	TSPY	positive Y-plate touch screen (Trizeps - UCB 1200)

TABLE 5.

Pinout of the display connector J5 (40-pin Header)

Pin	Signal	Description
25	L_DISP	Display enable
26	nc	not connected
27	+3V3	Power supply
28	Gnd	Ground
29	nc	not connected
30	Gnd	Ground
31	VIN	Input voltage (10-24V)
32	GND	Ground
33	GND	Ground
34	GND	Ground
35	I2C_DATA	Data I <sup>2</sup> C Bus (GPIO 27 of Trizeps - SA-1110)
36	I2C_CLK	Clock I <sup>2</sup> C Bus (GPIO 26 of Trizeps - SA-1110)
37	IRQ_PIC	Interrupt of the PIC (optional)
38	nc	not connected
39	nc	not connected
40	VIN	Input voltage (10-24V)

#### 4.1.5 J6 - JTAG connector

The JTAG port can be used to program Flash memory on the Trizeps board. The pinning of the 10-pin header is shown below.

TABLE 6.

Pinout of the JTAG interface connector J6 (header 10)

Pin	Signal	Description
1	$\overline{\text{TRST}}$	Test interface reset
2	+3V3	Power Supply
3	TDI	JTAG test interface data input
4	+3V3	Power Supply
5	TDO	JTAG test interface data output
6	GND	Ground
7	TMS	JTAG test interface mode select
8	GND	Ground
9	TCK	JTAG test interface reference clock
10	GND	Ground

#### 4.1.6 J7 - SPI and ADC connector

This connector is usually used by Keith & Koep with a daughterboard that contains a memory card connected by serial peripheral interface (SPI) protocol. But it is also possible to measure voltage by one of the three ADC-lines. **Attention:** If CTS and RTS of serial port 1 are used, you can't use SPI\_CLK and SPI\_CS!

TABLE 7.

Pinout of the SPI and ADC connector J7 (14-pin header)

Pin	Signal	Description
1	+3V3	Power Supply
2	GPIO10_SPI_TXD	Transmit Data SPI
3	GPIO11_SPI_RXD	Receive Data SPI
4	GPIO12_SPI_CLK <sup>a</sup>	Clock pin SPI
5	GPIO13_SPI_CS <sup>b</sup>	Chip Select SPI
6	nc	not connected
7	nc	not connected
8	nc	not connected
9	nc	not connected
10	Gnd	Ground
11	AD_0	Analog Digital Converter pin 0 of UCB1200
12	AD_1	Analog Digital Converter pin 1 of UCB1200
13	AD_3	Analog Digital Converter pin 3 of UCB1200
14	Gnd	Ground

a. GPIO 12 of SA-1110 either connected as serial signal or as SPI\_CLK

b. GPIO 13 of SA-1110 either connected as serial signal or as SPI\_CS

#### 4.1.7 J8 - Power Supply (optional, if J4 didn't used)

(Alternate to J4)

TABLE 8.

Pinout of power supply connector J8

Pin	Signal	Description
1	VIN	Input voltage (10V-24V)
2	GND	Ground
3	GND	Ground

**4.1.8 J9 - RS232 connector**

The connector J9 is a male DSUB9 connector with the following pin description:

**TABLE 9.**

Pinout of the serial interface connector J9 (DB9 male)

Pin	Signal	Description
1	DCD3_V24X	Data Carrier Detect (GPIO 18 of SA-1110)
2	RXD3_V24X	Receive Data
3	TXD3_V24X	Transmit Data
4	DTR3_V24X	Data Terminal Ready (GPIO 16 of SA1110)
5	GND	Ground
6	DSR3_V24X	Data Set Ready (GPIO 17 of SA-1110)
7	RTS3_V24X	Request to Send (GPIO 14 of SA-1110)
8	RI3_V24X	Ring Indicator (GPIO 23 of SA-1110)
9	nc	not connected

**4.1.9 JJ1 - IrDA connector**

JJ1 is a 3-pin header with following pin description

**TABLE 10.**

Pinout of the IrDA connector JJ1

Pin	Signal	Description
1	TXD_2	transmit data
2	RXD_2	receive data
3	Gnd	Ground

**4.1.10 Speaker connector JJ2**

Pin	Signal	Description
1	SPKRP	Speaker positive signal
2	SPKRN	Speaker negative signal

**4.1.11 Microphone connector JJ3**

Pin	Signal	Description
1	MIC_OUT	Microphone output signal
2	MIC_GND	Microphone ground
3	GND	Ground

**4.1.12 Universal serial bus connector JJ4**

Pin	Signal	Description
1	+3V3	+3V3
2	TUDC-	bidirectional serial port (UDC Trizeps)
3	TUDC+	bidirectional serial port (UDC Trizeps)
4	GND	Ground

**4.1.13 Reset jumper JJ5**

For normal operation this jumper is left open. For resetting the board connect  $\overline{\text{RESIN}}$  to GND.

Pin	Signal	Description
1	GND	Ground
2	$\overline{\text{RESIN}}$	Reset in

**4.1.14 Battery connector JJ6**

The Real Time Clock uses a capacitor (GoldCap) for voltage storing. Optional it is possible to use a battery.

Pin	Signal	Description
1	Battery +	3V3
2	Battery -	0V

**4.1.15 On Switch connector JJ7**

Pin	Signal	Description
1	IRQ_PIC	Interrupt request
2	Pull up	Pull up to 3V3

**4.1.16 Trizeps connector U6**

In the following you'll find the pinout of the Trizeps-Socket.

Pin	Signal	Description
1	TSMY	negative Y-plate touch screen (UCB 1200)
2	TSMX	negative X-plate touch screen (UCB 1200)
3	TSPY	positive Y-plate touch screen (UCB 1200)
4	TSPX	positive X-plate touch screen (UCB 1200)
5	MIC_OUT	microphone input signal
6	nc	not connected
7	MIC_GND	microphone ground switch input
8	nc	not connected

Pin	Signal	Description
9	SPKRN	negative speaker output (UCB 1200)
10	nc	not connected
11	SPKRP	positive speaker output (UCB 1200)
12	nc	not connected
13	AD3	analog voltage input (UCB1200)
14	nc	not connected
15	AD1	analog voltage input (UCB1200)
16	AD0	analog voltage input (UCB1200)
17	GND	Ground
18	GND	Ground
19	TMS	JTAG test interface mode select (SA-1110)
20	TCK	JTAG test interface reference clock (SA-1110)
21	$\overline{\text{TRST}}$	test interface reset (SA-1110)
22	TDO	JTAG test interface data output (SA-1110)
23	$\overline{\text{RESET\_IN}}$	reset input (SA-1110)
24	TDI	JTAG test interface data input (SA-1110)
25	$\overline{\text{RESET\_OUT}}$	reset output (SA-1110)
26	L_BIAS	LCD ac bias drive
27	RXD_1S	serial port 1 receive pin (SDLC) (SA-1110)
28	nc	not connected
29	TXD_1S	serial port 1 transmit pin (SDLC) (SA-1110)
30	RXD_2	serial port 2 receive pin (IrDA) (SA-1110)
31	RXD_3	serial port 3 receive pin (UART) (SA-1110)
32	TXD_2	serial port 2 transmit pin (IrDA) (SA-1110)
33	TXD_3	serial port three transmit pin (UART) (SA-1110)
34	TUDC-	serial port zero bidirectional (UDC) (SA-1110)
35	+3V3	power supply
36	+3V3	power supply
37	I2C_DATA	data line I <sup>2</sup> C bus (SA-1110/GP27)
38	TUDC+	serial port zero bidirectional (UDC) (SA-1110)
39	ANGEL_BOOT	Start of angel boot (SA-1110/GP25)
40	I2C_CLK	clock line I <sup>2</sup> C bus (SA-1110/GP26)
41	RI_3	serial port 3 ring indicator (UART) (SA-1110)
42	-	10K pulled up
43	$\overline{\text{INVALID\_3}}$	interrupt RS232 (SA-1110/GP20)
44	FORCEON	Switch on/off RS232 (SA-1110/GP21)
45	DCD_3	serial port 3 data carrier detect (UART) (SA-1110)
46	$\overline{\text{IRQ\_SMC}}$	Interrupt Ethernet-Controller
47	DTR_3	serial port 3 data terminal ready (UART) (SA-1110)
48	DSR_3	serial port 3 data set ready (UART) (SA-1110)
49	RTS_3	serial port 3 request to send (UART) (SA-1110)

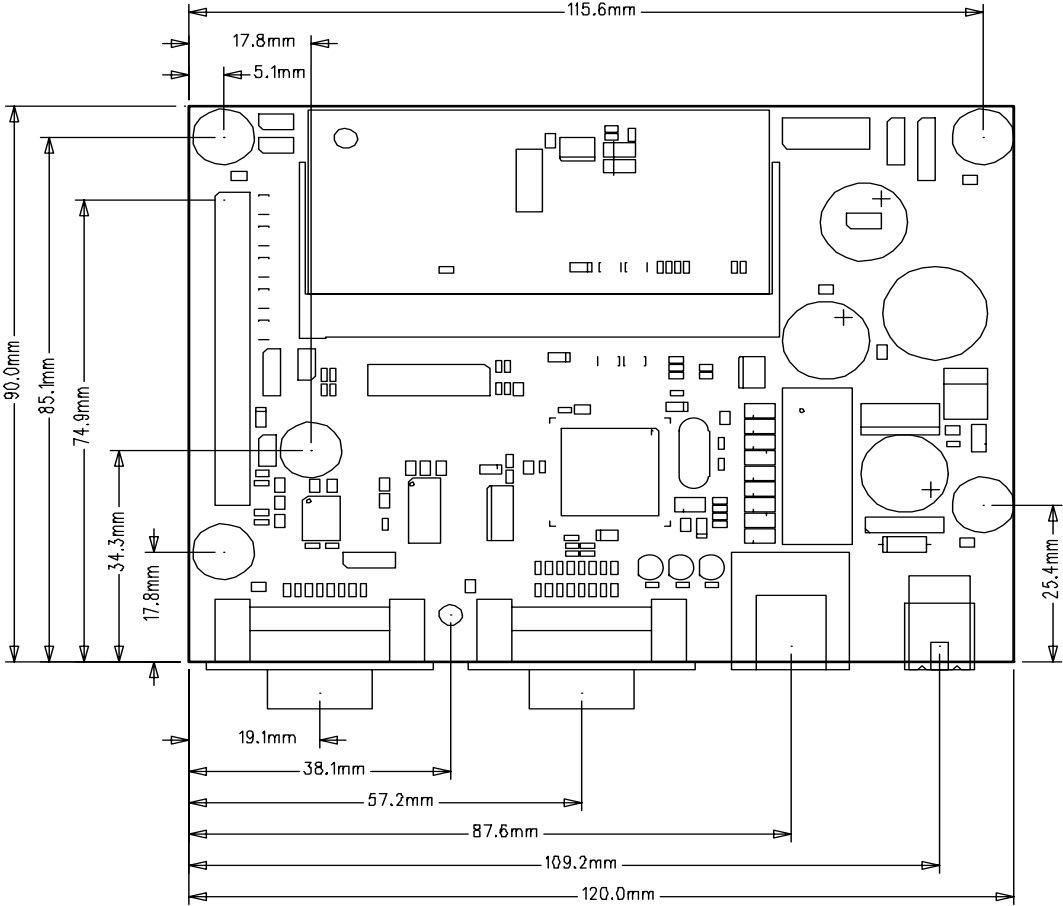
Pin	Signal	Description
50	CTS_3	serial port 3 clear to send (UART) (SA-1110)
51	GPIO12	general purpose I/O (SA-1110)
52	GPIO13	general purpose I/O (SA-1110)
53	SPI_TXD	serial port 4 transmit data (SA-1110)
54	SPI_RXD	serial port 4 receive data (SA-1110)
55	LDD14	LCD controller display data (SA-1110)
56	LDD15	LCD controller display data (SA-1110)
57	LDD12	LCD controller display data (SA-1110)
58	LDD13	LCD controller display data (SA-1110)
59	LDD10	LCD controller display data (SA-1110)
60	LDD11	LCD controller display data (SA-1110)
61	LDD08	LCD controller display data (SA-1110)
62	LDD09	LCD controller display data (SA-1110)
63	IRQ_PIC	Interrupt of PIC (optionally microcontroller)
64	L_DISP	Display enable
65	GND	Ground
66	GND	Ground
67	L_FCLK	LCD frame clock (SA-1110)
68	L_LCLK	LCD line clock (SA-1110)
69	L_PCLK	LCD pixel clock (SA-1110)
70	LDD06	LCD controller display data (SA-1110)
71	LDD07	LCD controller display data (SA-1110)
72	LDD04	LCD controller display data (SA-1110)
73	LDD05	LCD controller display data (SA-1110)
74	LDD02	LCD controller display data (SA-1110)
75	LDD03	LCD controller display data (SA-1110)
76	LDD00	LCD controller display data (SA-1110)
77	LDD01	LCD controller display data (SA-1110)
78	Gnd	Ground
79	nc	not connected
80	nc	not connected
81	nc	not connected
82	nc	not connected
83	nc	not connected
84	nc	not connected
85	nc	not connected
86	nc	not connected
87	nc	not connected
88	nc	not connected
89	+3V3	power supply
90	+3V3	power supply
91	D14	memory data (SA-1110)

Pin	Signal	Description
92	D15	memory data (SA-1110)
93	D12	memory data (SA-1110)
94	D13	memory data (SA-1110)
95	D10	memory data (SA-1110)
96	D11	memory data (SA-1110)
97	D08	memory data (SA-1110)
98	D09	memory data (SA-1110)
99	D06	memory data (SA-1110)
100	D07	memory data (SA-1110)
101	D04	memory data (SA-1110)
102	D05	memory data (SA-1110)
103	D02	memory data (SA-1110)
104	D03	memory data (SA-1110)
105	D00	memory data (SA-1110)
106	D01	memory data (SA-1110)
107	Gnd	ground
108	Gnd	ground
109	nc	not connected
110	$\overline{\text{WE}}$	memory write enable (SA-1110)
111	nc	not connected
112	$\overline{\text{OE}}$	memory output enable (SA-1110)
113	Gnd	ground
114	nc	not connected
115	nc	not connected
116	$\overline{\text{CS3}}$	Chip select
117	nc	not connected
118	nc	not connected
119	nc	not connected
120	nc	not connected
121	nc	not connected
122	A22	memory adress bus (SA-1110)
123	A21	memory adress bus (SA-1110)
124	nc	not connected
125	nc	not connected
126	nc	not connected
127	nc	not connected
128	nc	not connected
129	nc	not connected
130	nc	not connected
131	nc	not connected
132	nc	not connected
133	nc	not connected

Pin	Signal	Description
134	nc	not connected
135	nc	not connected
136	nc	not connected
137	nc	not connected
138	nc	not connected
139	nc	not connected
140	A04	memory adress bus (SA-1110)
141	A03	memory adress bus (SA-1110)
142	A02	memory adress bus (SA-1110)
143	A01	memory adress bus (SA-1110)
144	nc	not connected

You can get detailed information about the SODIMM-Socket in the internet (<http://www.amp.com>). Choose search - part number and enter the number 390113-1.

5.0 Dimensions of the Net\_Terminal Board



# Revision

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**Board: Net\_Terminal**

Revision	PCB number	Date	Changes
2.0	02_09_00	28.11.00	-----
3.0	03_05_01	05.10.01	Power Supply, Serial interfaces