Startinterface

Documentation for PicoCOM4/A5

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History

Date	V	Platform	A,M,R	Chapter	Description	Au
2009-07-20	1.3	PicoCOM2	M	*, 2.8	New document format. Description of J7 (COM1) corrected.	MK
2009-09-08	1.4	PicoCOM2	M	2.11	Signals of COM1 and COM3 corrected	MK
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2015-01-23	1.8	*	M	*	Remove PCOM2,3&5 because EOL, add PCOMA5	KW

V	Version
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About This Document

This document describes how to use the PicoCOM Start interface base board, which is designed for PicoCOM4 and PicoCOMA5. Differences in applying one of these boards are marked accordingly.
The complete schematic, that may serve as a reference for custom base boards is also available. The latest version of these documents can be found at http://www.fs-net.de in the documents downloads section.

Table of Contents

1 Delivery

Components delivered with the Start interface ensure the proper start up and ease the development with PicoCOM.

The delivered components are listed in Table 1.

Quantity	Component
1	PicoCOM-Start Interface
1	PicoCOM board (PicoCOM4/A5)
1	LCD
1	Display-Adapter incl. cable for touch panel LCD
1	LCD flex cable
1	Ethernet cable Cat 5
1	Null modem cable
1	USB Device cable
1	RS232 adapter cable

Table 1: Delivery components

2 Connectors

Figure 1 shows the base board with the position of the connectors without PicoCOM.

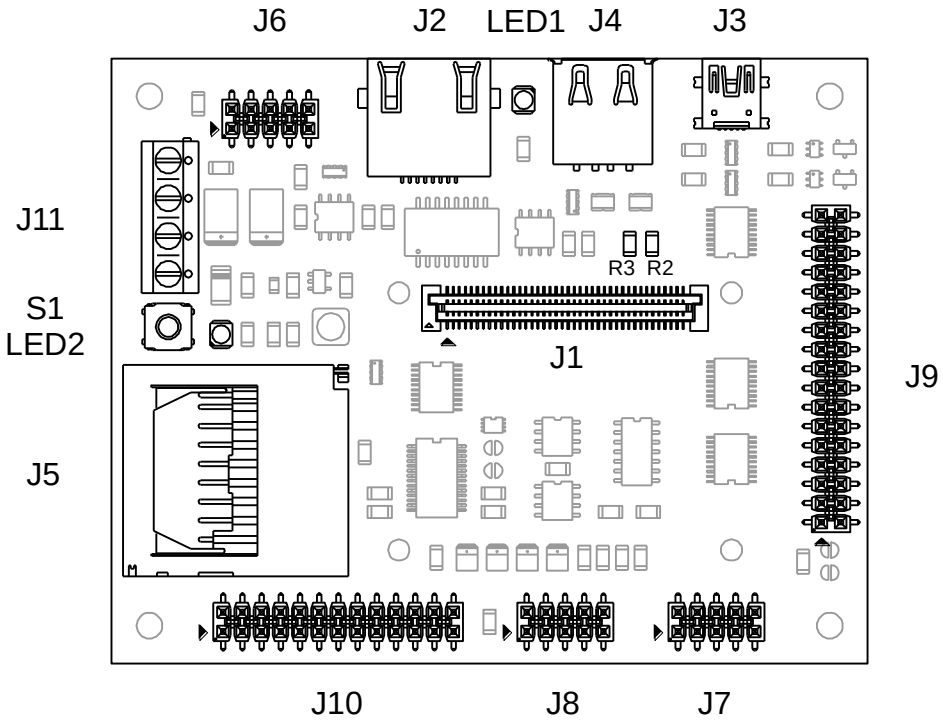

Figure 1: Start Interface connectors

2.1 Counting of Connectors

The strips of PicoCOM Start Interface have a grid dimension of 2,54mm. Pin 1 in each case is marked with a quadratic pad or with a triangle beside the pad, where required. The row within Pin 1 contains all odd Pins (1, 3, 5, 7, etc.), analog the row without Pin1 all even Pins (2, 4, 6, 8 etc.).

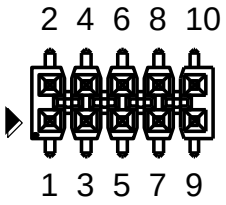

Figure 2: Way of counting for strips

2.2 J1 PicoCOM Slot

To connect the PicoCOM with the Start Interface a connector with 80 pins is used (Figure 1: J1). For reasons of secure mounting, the PicoCOM is fastened to the standoff bolts with M2,5 screws. Table 1 shows the pin assignment of the connector and the mapping from pins to the signals of the Start Interface.

J1				
Pin	**Signal**	**Default Interface**		**Starterkit interface**
		PicoCOM4	**PicoCOMA5**	
1	TX-	Ethernet TX-	Ethernet TX-	Ethernet TX-
2	RX-	Ethernet RX-	Ethernet RX-	Ethernet RX-
3	TX+	Ethernet TX+	Ethernet TX+	Ethernet TX+
4	RX+	Ethernet RX+	Ethernet RX+	Ethernet RX+
5	V33	+3.3V +-5% DC	+3.3V +-5% DC	+3.3V +-5% DC
6	V33	+3.3V +-5% DC	+3.3V +-5% DC	+3.3V +-5% DC
7	GND	Ground	Ground	Ground
8	GND	Ground	Ground	Ground
9	VBAT	+3..+3.6V DC (RTC backup battery)	+3..+3.6V DC (RTC backup battery)	+3..+3.6V DC (RTC backup battery)
10	nRES	Reset In	Reset In	Reset In
11	SHDN	---	---	Shutdown (active low)
12	WKUP	---	---	Wake Up
13	IO0	TxD2	TxD2	TxD2
14	IO1	RxD2	RxD2	RxD2
15	IO2	RTS2/TxD3	RTS2/TxD3	RTS2
16	IO3	CTS2/RxD3	CTS2/RxD3	CTS2
17	IO4	TxD1	TxD1	TxD1
18	IO5	RxD1	RxD1	RxD1
19	HDPA	USB Host 1 +	USB Host 1 +	USB Host 1 +
20	HDMA	USB Host 1 -	USB Host 1 -	USB Host 1 -
21	DDP	USB Device +	USB Device +	USB Device +
22	DDM	USB Device -	USB Device -	USB Device -
23	IO6	USB CNX (input)	USB CNX (input)	USB CNX (detection, input)
24	IO7		USB PWR (output)	USB PWR (power on, output)
25	GND	Ground	Ground	Ground
26	IO8	SPI MISO	SPI MISO	SPI MISO / IO8
27	IO9	SPI MOSI	SPI MOSI	SPI MOSI / IO9
28	IO10	SPI SPCK	SPI SPCK	SPI SPCK / IO10

29	IO11	SPI PCS0	SPI PCS0	SPI PCS0 / IO11
30	CAN-TX	CAN-TX	CAN-TX	CAN
31	CAN-RX	CAN-RX	CAN-RX	CAN
32	IO12	I2C SDA	I2C SDA	I2C SDA / IO12
33	IO13	I2C SCL	I2C SCL	I2C SCL / IO13
34	IO14 [1)]	SD DAT0	SD DAT0	SD DAT0
35	IO15 [1)]	SD DAT1	SD DAT1	SD DAT1
36	IO16 [1)]	SD DAT2	SD DAT2	SD DAT2
37	IO17 [1)]	SD DAT3	SD DAT3	SD DAT3
38	IO18 [1)]	SD CLK	SD CLK	SD CLK
39	IO19 [1)]	SD CMD	SD CMD	SD CMD
40	IO20	IRQ0	IRQ0	IO20
41	IO21	PWM/IO21	PWM/IO21	IO21
42	GND	Ground	Ground	Ground
43	IO22	LCD0 (R0)	LCD0 (R1)	LCD-R1
44	IO23	LCD1 (R1)	LCD1 (R2)	LCD-R2
45	IO24	LCD2 (R2)	LCD2 (R3)	LCD-R3
46	IO25	LCD3 (R3)	LCD3 (R4)	LCD-R4
47	IO26	LCD4 (R4)	LCD4 (R5)	LCD-R0 / LCD-R5
48	IO27	LCD5 (G0)	LCD5 (G0)	LCD-INT (see chapter 2.10.1)
49	IO28	LCD6 (G1)	LCD6 (G1)	LCD-G1
50	IO29	LCD7 (G2)	LCD7 (G2)	LCD-G2
51	IO30	LCD8 (G3)	LCD8 (G3)	LCD-G3
52	IO31	LCD9 (G4)	LCD9 (G4)	LCD-G4
53	IO32	LCD10 (G5)	LCD10 (G5)	LCD-G0 / LCD-G5
54	IO33	LCD11 (B0)	LCD11 (B1)	LCD-B1
55	IO34	LCD12 (B1)	LCD12 (B2)	LCD-B2
56	IO35	LCD13 (B2)	LCD13 (B3)	LCD-B3
57	IO36	LCD14 (B3)	LCD14 (B4)	LCD-B4
58	IO37	LCD15 (B4)	LCD15 (B5)	LCD-B0 / LCD-B5
59	IO38	LCDCLK	LCDCLK	LCD-SHIFT
60	IO39	LCDDEN	LCDDEN	LCD-M
61	GND	Ground	Ground	Ground
62	GND	Ground	Ground	Ground
63	IO40	LCDHSYNC	LCD16 (HSYNC/B0)	LCD-LINE
64	IO41	LCDVSYNC	LCD17 (VSYNC/R0)	LCD-FRAME
65	IO42	LCDCC (PWM)	LCDCC (PWM)	VEEK
66	IO43	LCDPOW	LCDPOW	LCD Power on
67	IO44 [1)]	CFLPOW	CFLPOW	CFL Power on

[1)] These pins carry internal signals and may toggle during boot.

68	IO45 [1)]	LCDENA	LCDENA	LCD Enable
69	IO46	RTS1	RTS1	IO46
70	ELED0	Ethernet LED	Ethernet LED	Ethernet LED
71	TSPX	Touch X+	Touch X+	TSPX
72	GND	Ground	Ground	Ground
73	GND	Ground	Ground	Ground
74	TSMX	Touch X-	Touch X-	TSMX
75	TSPY	Touch Y+	Touch Y+	TSPY
76	TSMY	Touch Y-	Touch Y-	TSMY
77	LOUT	Line Out Left	Line Out Left	Line Out Left
78	ROUT	Line Out Right	Line Out Right	Line Out Right
79	LIN	Line In Left	Line In Left	Line In Left
80	RIN	Line In Right	Line In Right	Line In Right

Table 2: Pin assignment PicoCOM

2.3 J2 Ethernet

The connection is established by the RJ45 plug (Figure 1: J2). Use the supplied cable to connect the PicoCOM to the Network. The link indicator (Figure 1: LED1) shows the status of the connection.

[1)] These pins carry internal signals and may toggle during boot.

2.4 J3 USB-Device

The USB device connector (Figure 1: J3) can be used for an ActiveSync connection to the PC with the Windows CE operating System.

This connection is used for file download and application development.
The boot loader uses the USB device connection for downloading the operating system.
The required cable is included in the starter kit.

PicoCOM4 and PicoCOMA5 need different setting for the USB voltage. R2 and R3 need to be set as shown:

	R2	R3
PicoCOM4 (3.3V)	300k	200k
PicoCOMA5 (5V)	-	0R

Table 3: USB Device configuration

If the starter kit was delivered with a PicoCOM the starter kit is already configured.

2.5 J4 USB-Host

The USB Host connector (Figure 1: J4) can be used with USB devices.

2.6 J5 SD-Card Slot

The SD-Card slot (Figure 1: J5) can be used with SD storage cards and SD-WLAN cards.

2.7 J6 RS232 Serial Interface COM2

Serial interface 2 (Figure 1: J6) is on a ten pin connector. Use the supplied adapter cable for connecting 9 pin SUB-D connectors. Table 4 shows the pin assignment for the connector.

PIN	Signal	Function
1	NC	-
2	NC	-
3	RxD2	Receive Data
4	RTS2	Request to Send
5	TxD2	Transmit Data
6	CTS2	Clear to Send
7	NC	-
8	NC	-
9	GND	Signal Ground
10	V_{CC}	+5V DC (100mA max.)

Table 4: Pin assignment COM2:

2.8 J7 RS232 Serial Interface COM1

Serial interface 1 (Figure 1: J7) is on a ten pin connector. Use the supplied adapter cable for connecting 9 pin SUB-D connectors. Table 5 shows the pin assignment for the connector. The boot loader sends its messages to this connector.

PIN	Signal	Function
1	NC	-
2	NC	-
3	RXD1	Receive Data
4	NC	-
5	TXD1	Transmit Data
6	NC	-
7	NC	-
8	NC	-
9	GND	Signal Ground
10	V_{CC}	+5V DC (100mA max.)

Table 5: Pin assignment COM1

2.9 J8 Audio / Touch

Audio in/out and Touch input (Figure 1: J8) is on a ten pin connector. Table 1 shows the pin assignment for the connector.

PIN	Signal	Function
1	LOUT	Line Out Left
2	ROUT	Line Out Right
3	LIN	Line In Left
4	RIN	Line In Right
5	GND	Signal Ground
6	GND	Signal Ground
7	TSPX	Touch X+
8	TSPY	Touch Y+
9	TSMX	Touch X-
10	TSMY	Touch Y-

Table 6: Pin assignment Audio/Touch

The touch interface is designed for 4 wire resistive touch panels.

2.10 J9 LCD Interface

The TFT LCD Interface (Figure 1: J9) is on a 34 pin connector.

PIN	Signal	Function	
		TFT 18Bit	TFT 18Bit (PicoCOMA5) *1
1	GND	Signal Ground	Signal Ground
2	LCD0	R1	R1
3	LCD4	R0	---
4	LCD10	G5	G5
5	LCD9	G4	G4
6	LCD8	G3	G3
7	LCD7	G2	G2
8	GND	Signal Ground	Signal Ground
9	LCD13	B3	B3
10	LCD12	B2	B2
11	LCD11	B1	B1
12	LCD15	B0	---
13	LCD6	G1	G1
14	LCD10	G0	G0
15	LCD15	B5	B5
16	LCD14	B4	B4
17	GND	Signal Ground	Signal Ground
18	VEEK	PWM dimming signal	PWM dimming signal
19	LCDCLK	DCLK (SHIFT)	DCLK (SHIFT)
20	VSYNC	VSYNC	R0
21	LCDDEN	DE	DE
22	HSYNC	HSYNC	B0
23	-	NC	NC
24	GND	Signal Ground	Signal Ground
25	VLCD	LCD Supply Voltage (+3,3V or +5V)	LCD Supply Voltage (+3,3V or +5V)
26	-	NC	NC
27	-		
28	GND	Signal Ground	Signal Ground
29	-	NC	NC
30	VCFL	Backlight Supply Voltage	Backlight Supply Voltage

PIN	Signal	Function	
		TFT 18Bit	TFT 18Bit (PicoCOMA5) [*1]
31	LCD1	R2	R2
32	LCD2	R3	R3
33	LCD3	R4	R4
34	LCD4	R5	R5

Table 7: Pin assignment LCD TFT

[*1]: This mode is currently restricted to PicoCOMA5. PicoCOMA5 is able to drive 18 data bits in case HSYNC and VSYNC is not needed. Current version of starter interface does not fully support this mode. Bit G0 of start interface is not connected to bit G0 of PicoCOMA5. Instead G0 is connected to G5. Customer has to modify schematic of start interface to get all 18 data bits.

2.10.1 Design notes relating to digital RGB interface

The PicoCOM start interface initially was designed for PicoCOM2 (EOL) which only features a 15-bit digital RGB interface. To be able to even connect a 18 color display, the highest color bits are associated with the lowest bit of the particular color.
In contrast to PicoCOM2 (EOL), PicoCOM3 (EOL) and PicoCOM4 feature a 16-bit RGB interface. This additional signal is available on LCD intensity pin (LCD5: J1 – Pin 48) and is used to be the lowest green bit (G0) by default.
For further information please refer to the start interface schematic and the hardware documentation of the appropriate board.

2.11 J10 I/O (CAN, SPI, I2C, I/O)

PIN	Signal	Signal alternate	Function
1	SHDN	-	Shutdown (active low)
2	WKUP	-	Wake Up
3	IO8	SPI MISO	IO8
4	IO9	SPI MOSI	IO9
5	IO10	SPI SPCK	IO10
6	IO11	SPI PCS0	IO11
7	IO32/LCD10	SPI PCS1	LCD10
8	IO33/LCD11	SPI PCS2	LCD11
9	IO12	I2C SDA	I2C SDA (*)
10	IO13	I2C SCL	I2C SCL (*)
11	IO20	IRQ0	IO20
12	IO21	-	IO21
13	IO46	RTS1	IO46
14	IO34	CTS1	LCD12
15	IO30	TxD3	LCD8
16	IO31	RxD3	LCD9
17	NC	-	Not connected
18	GND	GND	Signal Ground
19	GND	GND	Signal Ground
20	IO35	-	LCD13
21	IO36	-	LCD14
22	IO37	-	LCD15
23	GND	GND	Signal Ground
24	GND	GND	Signal Ground
25	CAN+	-	CAN+
26	CAN-	-	CAN-

Table 8: Pin assignment I/O connector

(*) For correct operation of the I2C-interface you must connect two pull up resistors (4,7kΩ / +3,3V) to the signal lines.

2.12 J11 Power Supply

PIN	Signal	Function
1	VCC	+5V DC ±5% / 1A
2	VCFL	0V … +12V / max. 0,5A (*)
3	VBAT	+3V Backup Battery
4	GND	Ground

Table 9: J14 Power Supply

(*) Supply voltage for LCD-backlight.

3 Status Indicators and Reset Button

3.1 Status Indicators

The PicoCOM base board has two LED status indicators (Figure 1: LED1 and LED2).

LED	Status	Function
1	RUN	Reset status indicator
2	ETH	Ethernet status indicator

Table 10: Status indicators PicoCOM base board

3.2 Reset Button

Pressing the reset button (Figure 1: S1) issues a reset to the PicoCOM.

4 Appendix

Important Notice

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Figures

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