Hardware

Documentation

Version 1.18
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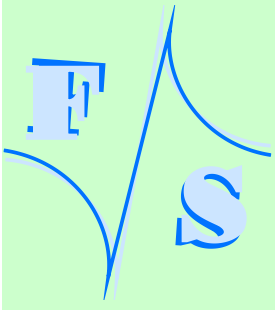

PicoCOM4.2

History

Date	V	Platform	A,M,R	Chapter	Description	Au
2011-01-31	1.0	PicoCOM4	M	*	New document	WK
2011-03-22	1.1	PicoCOM4	A	4	Remove I2C pullups from picoCOM, add note for pullups on baseboard because backward compatibility to PicoCOM2	WK
2011-04-11	1.11	PicoCOM4	A	4	Add limitation for SPI/CAN for PCB 1.1	WK
2011-04-11	1.12	PicoCOM4	A	4	Correct limitation for SPI/CAN for PCB 1.1	WK
2011-05-20	1.13	PicoCOM4	A	4	Add 15 bit LCD pin assignment, add COM3 for PCB 1.2	WK
2011-05-23	1.13	PicoCOM4	A	6	Add power consumption	WK
2011-05-25	1.14	PicoCOM4	A,M	3,4	add GPIO capatibility, add pullup information, clarify SPI is not GPIO	WK
2011-09-20	1.15	PicoCOM4	A	4	Add 18bit LCD pin assignment, recommend voltage supervisor	WK
	1.15	PicoCOM4	M	6	USB device HighSpeed support	MK
	1.15	PicoCOM4	M	6	Add optional 3th serial	WK
2012-02-09	1.16	PicoCOM4	M	6	Serial port renaming	HF
2012-06-14	1.17	PicoCOM4	A	3	Add note for SPI/CAN	WK
2021-01-25	1.18	PicoCOM4	A	6	Change of Flash to 128MB	KU

V	Version
A,M,R	Added, Modified, Removed
Au	Author

1. Table of Contents

2. Technical Data Connectors

The PicoCOM is equipped with a
TycoElectronics 5177984-3 (8 pin, 0.8mm)
Connector from ‘0.8mm Free Height (FH) Connectors’ series.

Matching connectors are:

5mm stacking height:	TycoElectronics	5177983-3
9mm stacking height:	TycoElectronics	5-5179009-3
13mm stacking height:	TycoElectronics	5-5179010-3

3. Connectors

Counting of the connector pins

The connector plug of PicoCOM4 will be treated as follows.

Pin 1 is marked on chapter 5 Dimensions PicoCOM4.2. The row with pin1 contains all odd-numbered pins (1, 3, 5, 7 etc.), and corresponding to this, the row without pin 1 contains all even-numbered pins (2, 4, 6, 8 etc.).

IO-Pin limitations

PicoCOM4 is equipped with 47 pins that can be used as digital-IO. Most of these pins are multiplexed, so you have to make sure that these pins are used for one purpose only. For example, if you intend to use IO0 to IO3 you have to make sure that the COM2 is disabled.

Additionally there are some IO-Pins which are used internally and whose primary function can't be disabled completely. These pins may carry active signals while the device is booting, which must be kept in mind when connecting external hardware. For example even if you want to use IO14 to IO19 in your application these pins are configured for SD/MMC usage for a short period of time by the boot program to enable booting from SD-Card. Pins that could toggle during boot are tagged in the following table.

Connector J1

		J1		
Pin	**Signal**	**PU/PD on module**	**Default Interface**	**Starter-Kit Interface**
1	LAN_TX-		Ethernet TX-	Ethernet TX-
2	LAN_RX-		Ethernet RX-	Ethernet RX-
3	LAN_TX+		Ethernet TX+	Ethernet TX+
4	LAN_RX+		Ethernet RX+	Ethernet RX+
5	V33		+3.3V +-5% DC	+3.3V +-5% DC
6	V33		+3.3V +-5% DC	+3.3V +-5% DC
7	GND		Ground	Ground
8	GND		Ground	Ground
9	VBAT		+3..+3.6V DC (RTC backup battery)	+3..+3.6V DC (RTC backup battery)
10	nRES		Reset In (open drain)	Reset In (open drain)
11	IO47 [2)]		IO47	IO47/ COM1 CTS
12	IO48 [2)]		IO48	IO48
13	IO0 [2)]		IO0	TxD2
14	IO1 [2)]		IO1	RxD2
15	IO2 [2)]		IO2	RTS2/ TxD3
16	IO3 [2)]		IO3	CTS2/ RxD3
17	IO4 [1)]		COM1 TXD	TxD1
18	IO5 [1)]		COM1 RXD	RxD1
19	HDPA	PD 15k	USB Host 1 +	USB Host 1 +
20	HDMA	PD 15k	USB Host 1 -	USB Host 1 -
21	DDP		USB Device +	USB Device +
22	DDM		USB Device -	USB Device -
23	IO6		USB CNX (input)	USB CNX (detection, input)

		J1		
Pin	**Signal**	**PU/PD on module**	**Default Interface**	**Starter-Kit Interface**
24	IO7		USB PWR (output)	USB PWR (output)
25	GND		Ground	Ground
26	IO8 [1) 4)]		SPI MISO	SPI MISO
27	IO9 [1) 4)]		SPI MOSI	SPI MOSI
28	IO10 [1) 4)]		SPI SPCK	SPI SPCK
29	IO11 [1) 4)]		SPI PCS0	SPI PCS0
30	CAN_TX		CAN_TX	CAN_TX
31	CAN_RX		CAN_RX	CAN_RX
32	IO12 [2)]		I2C SDA	I2C SDA
33	IO13 [2)]		I2C SCL	I2C SCL
34	IO14 [1) 2)]	PU 10k	SD DAT0	SD DAT0
35	IO15 [1) 2)]	PU 10k	SD DAT1	SD DAT1
36	IO16 [1) 2)]	PU 10k	SD DAT2	SD DAT2
37	IO17 [1) 2)]	PU 10k	SD DAT3	SD DAT3
38	IO18 [1) 2)]		SD CLK	SD CLK
39	IO19 [1) 2)]	PU 10k	SD CMD	SD CMD
40	IO20 [2)]		IRQ0	IRQ0
41	IO21 [2)]		IO21	IO21
42	GND		Ground	Ground
43	IO22 [3)]		LCD0 (R0)	LCD-R0
44	IO23 [3)]		LCD1 (R1)	LCD-R1
45	IO24 [3)]		LCD2 (R2)	LCD-R2
46	IO25 [3)]		LCD3 (R3)	LCD-R3
47	IO26 [3)]		LCD4 (R4)	LCD-R4

		J1		
Pin	**Signal**	**PU/PD on module**	**Default Interface**	**Starter-Kit Interface**
48	IO27 3)		LCD5 (G0)	LCD-G0
49	IO28 3)		LCD6 (G1)	LCD-G1
50	IO29 3)		LCD7 (G2)	LCD-G2
51	IO30 3)		LCD8 (G3)	LCD-G3
52	IO31 3)		LCD9 (G4)	LCD-G4
53	IO32 3)		LCD10 (G5)	LCD-G5
54	IO33 3)		LCD11 (B0)	LCD-B0
55	IO34 3)		LCD12 (B1)	LCD-B1
56	IO35 3)		LCD13 (B2)	LCD-B2
57	IO36 3)		LCD14 (B3)	LCD-B3
58	IO37 3)		LCD15 (B4)	LCD-B4
59	IO38 3)		LCDCLK	LCD-SHIFT
60	IO39 3)		LCDDEN	LCD-M
61	GND		Ground	Ground
62	GND		Ground	Ground
63	IO40 3)		LCDHSYNC	LCD-LINE
64	IO41 3)		LCDVSYNC	LCD-FRAME
65	IO42 2)		LCDCC (PWM)	VEEK
66	IO43 2)		LCDPOW	LCD Power on
67	IO44 2)		FLPOW	CFL Power on
68	IO45 2)		LCDENA	LCD Enable
69	IO46 2)		COM1 RTS	COM1 RTS
70	ELED0		Ethernet LED	Ethernet LED
71	TSPX		Touch X+	TSPX
72	GND		Ground	Ground
73	GND		Ground	Ground

		J1		
Pin	**Signal**	**PU/PD on module**	**Default Interface**	**Starter-Kit Interface**
74	TSMX		Touch X-	TSMX
75	TSPY		Touch Y+	TSPY
76	TSMY		Touch Y-	TSMY
77	LOUT		Line Out Left	Line Out Left
78	ROUT		Line Out Right	Line Out Right
79	LIN		Line In Left	Line In Left
80	RIN		Line In Right	Line In Right

Table 1: J1 - main connector

[1)] These IO-Pins are active signals during boot.

[2)] These IO-Pins can be reconfigure as GPIO

[3)] If display is not used these IO-Pins can be reconfigure as GPIO all together

[4)] GPIO functionality only possible on custom version w/o CAN. If CAN is mounted only SPI available.

All digital signals do have 3.3V logic compliant level.

4. Interface and signal description

LCD-Connection

All signals are working with 3.3V logic pegel. For all LCD signals we strictly recommend serial resistors nearby the module connector to reduce EMI.

Pin assignment list TFT

TFT				
Pin (80 Pin, J1)	**Signal**	**18 bit**	**16 bit**	**15 bit**
43	LCD0	R1	R0(LSB)	R0(LSB)
44	LCD1	R2	R1	R1
45	LCD2	R3	R2	R2
46	LCD3	R4	R3	R3
47	LCD4	R5(MSB), R0(LSB)	R4(MSB)	R4(MSB)
48	LCD5	G0(LSB)	G0(LSB)	---
49	LCD6	G1	G1	G0(LSB)
50	LCD7	G2	G2	G1
51	LCD8	G3	G3	G2
52	LCD9	G4	G4	G3
53	LCD10	G5(MSB)	G5(MSB)	G4(MSB)
54	LCD11	B1	B0(LSB)	B0(LSB)
55	LCD12	B2	B1	B1
56	LCD13	B3	B2	B2
57	LCD14	B4	B3	B3
58	LCD15	B5(MSB), B0(LSB)	B4(MSB)	B4(MSB)
59	LCDCLK	DCLK	DCLK	DCLK
63	LCDHSYNC	HSYNC	HSYNC	HSYNC
64	LCDVSYN	VSYNC	VSYNC	VSYNC
60	LCDDEN	DE	DE	DE
68	LCDENA	---	---	---
65	LCDCC	PWM CFL	PWM CFL	PWM CFL
66	LCDPOW	LCD Power On (active low)	LCD Power On (active low)	LCD Power On (active low)
67	CFLPOW	CFL Power On (active low)	CFL Power On (active low)	CFL Power On (active low)

Table 2: LCD Pins – TFT

Ethernet connection

Ethernet TX+/- and LAN RX+/- are 100 ±20% Ohm differential pairs to a 1:1/1:1 transformer. We recommend a connector with integrated transformer in short distance (less then 1 inch = 25.4 mm) to the module connector. The RX pair should have a 0.1 inch min. distance to TX pair to avoid crosstalk. The intra pair mismatch of each differential pair should be <10 mil (0.254mm).

LED signal is able to drive a 3.3V powered LED with 5mA directly to GND.

If ethernet is not used please leave signals unconnected.

Serial port

Both serial ports are provide with 3.3V TTL signals. This signals are not 5V compliant. Please use a transceiver with 3.3V power supply.

Alternative third COM port is available starting with product version 1.20.

If you don't need the serial port this pins can be used optional as GPIOs.

USB Host

The 90 Ohm differential pair of USB signals doesn't need any termination. For external ports EMV protection is required nearby the USB connector.

With the USB_PWR signal you could switch on the USB power on your current limiting IC.

The usb.org webpage provides "High Speed USB Platform Design Guidelines" with highly recommended informations for a proper working USB design.

If the USB port is not used please leave open.

USB device

The 90 Ohm differential pair of USB signals don't need any termination. For external ports ESD and EMV protection is required nearby the USB connector.

The USB_CNX signal does detect a connected host by detecting the voltage. This signal is 3.3V tolerant. So please use a voltage divider by connecting the 5V from USB device connector.

If the USB device port is not used please leave open.

SPI

The module supports a HS SPI (Serial Peripheral Interface) with a chip select. Signals are 3.3V compliant and do have pullups on module.

SPI signals are buffered and shared with the on module CAN controller, so they are not available as GPIO.

! Limitation: by hardware issue SPI and CAN can not used together on the same application with PCB V1.11. This issue will be fixed on newer versions.

There is a baseboard workaround to use SPI and CAN together. Please contact your technical support.

I2C

The module supports a I2C interface. Signals are 3.3V compliant and don't have pullups on module. So please add 2.2 kOhm pullups to 3.3V on baseboard. 5V devices on baseboard need a level shifter.

CAN

The chip does provide the CAN bus transmit and receive 3.3V TTL signal without any termination.

Needs a 3.3V transceiver like SN65HVD230 to the CAN bus. If not used, add a 100k pullup to VCC on the CAN_RX signal to avoid floating.

! Limitation: by hardware issue CAN and SPI can not used together on the same application with PCB V1.11. This issue will be fixed on newer versions.

There is a baseboard workaround to use SPI and CAN together. Please contact your technical support.

SDcard

The interface is supporting a SD card channel. For specificiation and licensing please refer the website of the SD Association http://www.sdcard.org. Pullups are integrated on the module. Card detection and write protection are not supported by the PicoCOM standard.

Unused signals should be left unconnected.

Signals can be optional used as GPIO.

Touch

The integrated resistive touch controller will support 4 wire analog resistive touch panels woithout any additional circuit.

Optional this signals can be used as analog input.

Audio I/F

The onboard soundcodec does support a stereo analog input and a stereo analog output for 1Vpp audio signals. This signals needs serial capacitors.

IO/ IRQ

Multiple purpose pins with 3.3V logic signal level.

nRES

Reset input to drive with open drain or open collector 3.3V compliant. We recommend to pull low this pin with a VCC voltage supervisor on power up with the powergood signal from power supply or using a voltage supervisor.

5. Dimensions PicoCOM4.2

Board thickness:	1.6 mm ±10%
Max. Height of parts on top side:	3.0 mm
Max. Height of parts on bottom side (without connectors):	2.0 mm
Pin pitch of connector:	0.8 mm
Mounting hole diameter	2.8 mm

Mounting holes are isolated from signal ground

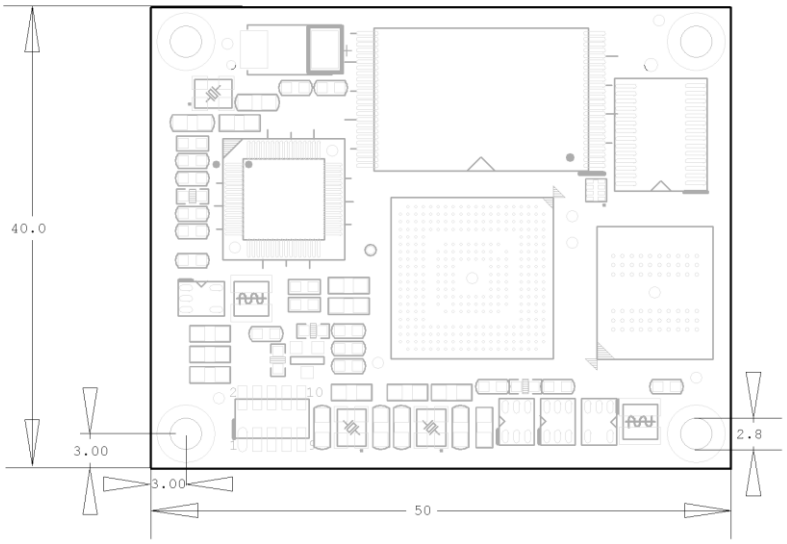

Figure 1: Top view

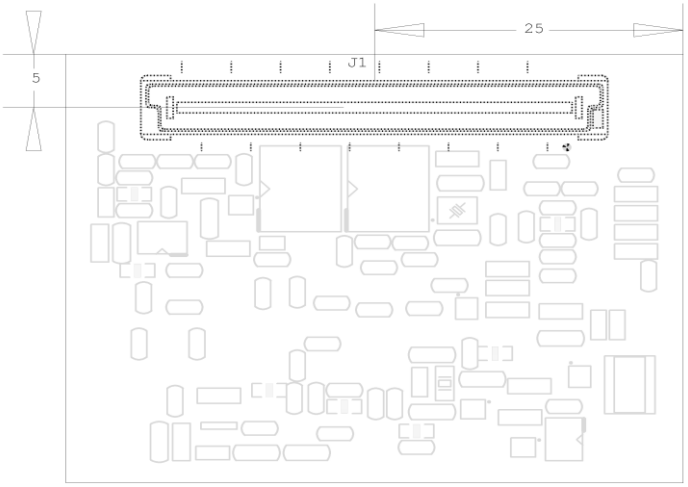

Figure 2: Bottom view

6. Technical Data PicoCOM4.2

Power Supply:	+3.3V DC / ±5%
Current Consumption:	max. 370 mA (summary of all chips on module w/o SD card, LCD, USB, backplane logic & transceiver) Capacitor charge current on switchon: 1.5 A
Current consumption RTC battery @ 20°C:	typ. 3 µA, max. 20 µA
Inputs/Outputs:	max. 48 I/O (alternative with interfaces allocated)
Interfaces:	1x Ethernet 10/100Mbit 2x Serial (optional 3x; RS232/RS485 with 3,3V-level) 1x USB1.0 Host 1x USB2.0 Device HS (High Speed 480Mbit/s) 1x I2C 1x SPI (optional) 1x CAN2.0 1x SD-Card-Slot (external) 1x Audio (Line in/out, analogue) 1x 4 wire touch input, resistive (alternative 4 analogue input)
LCD-interface:	TFT up to 800x480 pixel, 65536 colours
RAM:	64 MByte mDDR SDRAM
Flash:	128 MByte Flash
CPU:	Samsung S3C2416 400MHz
Operating Temperature:	0°C ... +70°C (optional –25°C … +85°C)
Dimensions:	40 x 50 x 10 mm (l x w x h)
Weight:	50 gr.

7. Appendix

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