TEC Minimal Operating Panel

TEC 0480

Operational Description

Table of Contents

1 Scope

The TEC1 Minimal systems are strictly display units which are integrated into customer devices, mainly fitness systems such as training bikes. The touchscreen display acts as interactive interface which can be used to begin the workout, create the ideal training program and monitor parameters such as heart rate, calories consumed and time.

The Minimal systems are attached to the customer units with screws and connectors which are located on the backside. An integrated WLAN module allows a wireless data exchange with a server.

The difference between Minimal Small and Minimal Big is size of the display unit, the functionality is identical.

This document is intended for the customer and describes the operating conditions relevant for the assembly of the TEC1 Minimal systems into the end unit.

1.1 Limitations

The software for the operation of the Minimal systems including all WLAN operations is specified by MSC. The customer software is only responsible for the operation of the user.

This module may only operate with the assembled on-board antenna. Operation with different antennas and antenna connectors is not allowed because this is not covered by a certification.

2 Hardware

2.1 Modules

The Minimal systems consist of the following parts:

1. Plastic frame (front)
2. Glass with serigraphy
3. 7" TFT display
4. 7-segment display (2x)
5. Electronic board
6. Metal frame (back)
7. Protection rear cover (plastic)

2.2 External Connectors

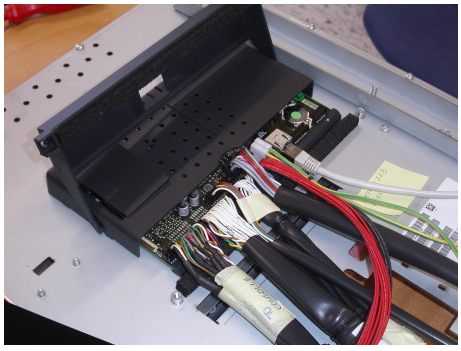


Foto DV1

Two different connector types are used to connect to the various harnesses of the machine:

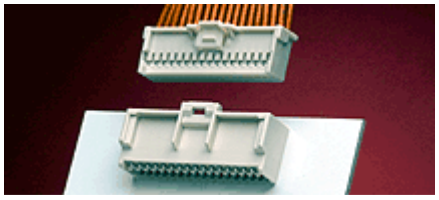
Molex: Micro Fit for power connector with AWG22 cabling

43045-xx15 (Header)
43025-xx08 (Receptacle Housing)
current per pin up to 5A

Molex: Milli Grid for signal connectors with AWG24 cabling

87331-xxxx (Header)
87831-xx51 (Crimp Housing)
current per pin up to 2A.

Molex iGrid



501645xxxx Pin Receptable
501646xxxx Housing
current per pin up to 2A.

2.2.1 Connector Power

Connector X1604, type: Molex: 43045-1624

PIN	Signal	Signal	PIN
1	IN_WAKEUP	VCC_12V0_IN	9
2	VCC_12V0_IN	VCC_12V0_IN	10
3	GND	GND	11
4	GND	gnd_shield	12
5	DRV_RX	DRV_TX	13
6	GND	VCC_12V0_IN	14
7	OUT_RETRIEVAL_OUT	IN_ALARM_CPU	15
8	KEY_STOP_OUT	OUT_SENSOR	16

2.2.2 Connector USB and SERIAL

Connector X1609, type: Molex: 501645-4020

PIN	Signal	Signal	PIN
1	OUT_FAN	GND	2
3	OUT_ENLED	GND	4
5	in_stop_key	VCC_5V0_POW	6
7	GND_SHIELD	GND_SHIELD	8
9	RFID_RTS#	RFID_CTS#	10
11	RFID_TX	RFID_RX	12
13	GND	VCC_12V0_RFID	14
15	GND	GND	16
17	Audio_CSAFE_L	Audio_CSAFE_R	18
19	CSAFE_RTS#	CSAFE_CTS#	20
21	CSAFE_TX	CSAFE_RX	22
23	GND	VCC_8V0	24
25	GND_SHIELD	GND_SHIELD	26
27	USB_CON_P3-	GND	28
29	USB_CON_P3+	VCC_USB_VBUS3	30
31	USB_CON_P2-	GND	32
33	USB_CON_P2+	VCC_USB_VBUS2	34
35	GND_SHIELD	GND_SHIELD	36
37	USB_CON_P4-	GND	38
39	USB_CON_P4+	VCC_USB_VBUS4	40

2.2.3 Connector CARDIO and Digital IO

Connector X1610, type: Molex: 501645-2420

PIN	Signal	Signal	PIN
1	VCC_5V0_EXT	VCC_5V0_EXT	2
3	in_keyrow0	in_keyrow0	4
5	in_keyrow1	in_keyrow1	6
7	in_keyrow2	in_keyrow2	8
9	in_keyrow3	in_keyrow3	10
11	in_keyrow4	in_keyrow4	12
13	out_joysx	out_joydx	14
15	GND	GND	16
17	GND_SHIELD	GND_SHIELD	18
19	GND	GND	20
21	in_cardio_ch0	in_cardio_ch1	22

23	VCC_5V0_cardio_0	VCC_5V0_cardio_1	24

2.2.4 Connector Keyboard

Connector X1606, type: CAB-1001-121-016
Pin-header RM2.54 one row 16 pins

PIN	Signal	Signal	PIN
1	OUT_KEYCOL0	OUT_KEYCOL1	2
3	OUT_KEYCOL1	IN_KEYROW0	4
5	IN_KEYROW1	IN_KEYROW2	6
7	IN_KEYROW3	IN_KEYROW4	8
9	GND_SHIELD	GND_SHIELD	10
11	OUT_KEYCOL3	OUT_KEYCOL4	12
13	OUT_KEYCOL5	IN_KEYROW5	14
15	IN_KEYROW6	IN_KEYROW7	16

2.2.5 Connector Audio and Video

Connector X1608, type: Molex: 501645-3220

PIN	Signal	Signal	PIN
1	VCC_12V0_IPOD_OUT	VCC_12V0_IPOD_OUT	2
3	GND	GND	4
5	IPOD_RX	IPOD_TX	6
7	IPOD_CTS	IPOD_RTS	8
9	GND_A_VID	IPOD_COMPOSITE	10
11	GND_A_VID	IPOD_CHROMINANCE	12
13	GND_A_VID	IPOD_LUMINANCE	14
15	GND_AUD	AUDIO_IPOD_IN_R	16
17	GND_AUD	AUDIO_IPOD_IN_L	18
19	GND_SHIELD	GND_SHIELD	20
21	AUDIO_MIC_IN	gnd_shield	22
23	GND_AUD	GND_AUD	24
25	AUDIO_HP_GND_(ANT_FM)	agnd_ext	26
27	JACK_DETECT	HPHONE_DETECT	28
29	GND_AUD	AUDIO_LINEOUT_L	30
31	GND_AUD	AUDIO_LINEOUT_R	32

2.2.6 Segment TFT Display 0 Connector (right side (speed)) X0505

FCI-SFV8R-1STE1LF(R.1), FFC RM0.5, 8pins

Segment TFT 0	PIN	type	comment
BL -	1	BL_SINK1	Backlight -
BL +	2	VCC_BACKLIGHT	Backlight +
nc	3		not connected
CS#	4	SPI_LCD_CS0#	chip select, active low
WR_CLK	5	SPI_LCD_CLK_L	clock, data are latched at rising clock
DATA	6	SPI_LCD_MOSI_L	serial data
VDD	7	VCC_3V3	Power Supply For Logic
VSS	8	GND	GND

2.2.7 Segment TFT Display 1 Connector (left side (gradient)) X0506

FCI-SFV8R-1STE1LF FFC RM0.5 8 pins

Segment TFT 0	PIN	type	comment
VSS	1	GND	GND
VDD	2	3V3DC 5%	Power Supply For Logic
DATA	3	serial data	serial data
WR_CLK	4	write clock	clock, data are latched at rising clock
CS#	5	chip select	chip select, active low
nc	6	n.a.	not connected
BL +	7	backlight +	Backlight +
BL -	8	backlight -	Backlight -

2.2.8 LAN Connector

Connector P1, type RJ45

LAN	Molex: 95540-2881	type	comment
GND_SHIELD	SH2	Shield	
GND_SHIELD	SH1	Shield	
termination	8	passive	
termination	7	passive	
LAN_CON_RX-	6	LAN	
termination	5	passive	
termination	4	passive	
LAN_CON_RX+	3	LAN	
LAN_CON_TX-	2	LAN	
LAN_CON_TX+	1	LAN	

2.2.9 Cardio ext. 0 Connector

Connector X 1301, type 87832-1220 (Molex)

Cardio ext. 0	PIN	type	comment
VCC_5V0_CARDIO_0	12	Power	
VCC_5V0_CARDIO_0	11	Power	
VCC_3V3	10	Power	
VCC_3V3	9	Power	
GND	8	Power	
GND	7	Power	
SLOT0_GPIO0	6	BIDIR LVCMOS3V3	
SLOT0_GPIO1	5	BIDIR LVCMOS3V3	
SLOT0_RTS/SPI_CLK	4	OUT, LVCMOS3V3 / OUT, LVCMOS3V3	
SLOT0_CTS/SPI_NCS	3	IN, LVCMOS3V3 / OUT, LVCMOS3V3	
SLOT0_TX/SPI_MOSI	2	OUT, LVCMOS3V3 / OUT, LVCMOS3V3	
SLOT0_RX/SPI_MISO	1	IN, LVCMOS3V3 / IN, LVCMOS3V3	

2.2.10 Cardio ext. 1 Connector

Connector X1302, type 87832-1620 (Molex)

Cardio ext. 1	PIN	type	comment
GND_SHIELD	16	Power	
GND_SHIELD	15	Power	
GND	14	Power	
GND	13	Power	
VCC_5V0_CARDIO_1	12	Power	
VCC_5V0_CARDIO_1	11	Power	
VCC_3V3	10	Power	
VCC_3V3	9	Power	

GND	8	Power	
GND	7	Power	
SLOT1_GPIO0	6	BIDIR LVCMOS3V3	
SLOT1_GPIO1	5	BIDIR LVCMOS3V3	
SLOT1_RTS/SPI_CLK	4	OUT, LVCMOS3V3 / OUT, LVCMOS3V3	
SLOT1_CTS/SPI_NCS	3	IN, LVCMOS3V3 / OUT, LVCMOS3V3	
SLOT1_TX/SPI_MOSI	2	OUT, LVCMOS3V3 / OUT, LVCMOS3V3	
SLOT1_RX/SPI_MISO	1	IN, LVCMOS3V3 / IN, LVCMOS3V3	

2.3 Internal Connectors

The following chapter lists the internal connectors of the MINIMAL unit, which are not visible outside. This chapter is for information only and needs not to be reviewed.

2.3.1 LCD TFT ConnectorX0503

Layout feasible for CHIMEI Display LW700AT9309 and AMPIRE AM800480STMQW-00H.
Omron XF2M-5015-1A

X0503 Pin #	Net Name
1	nc
2	nc
3	GND
4	nc
5	VCOM_DIS
6	nc
7	LCD_RST#
8	VCC_ANALOG_DIS
9	VCC_VGL
10	VCC_VGH
11	LCD_UD
12	LCD_LR
13	GND
14	LCD_VCLK
15	GND
16	LCD_VD16
17	LCD_VD17
18	LCD_VD18
19	LCD_VD19
20	LCD_VD20
21	LCD_VD21
22	LCD_VD22
23	LCD_VD23
24	LCD_VD08
25	LCD_VD09
26	LCD_VD10
27	LCD_VD11
28	LCD_VD12
29	LCD_VD13
30	LCD_VD14
31	LCD_VD15
32	LCD_VD00
33	LCD_VD01
34	LCD_VD02
35	LCD_VD03
36	LCD_VD04
37	LCD_VD05
38	LCD_VD06
39	LCD_VD07
40	LCD_HSYNC

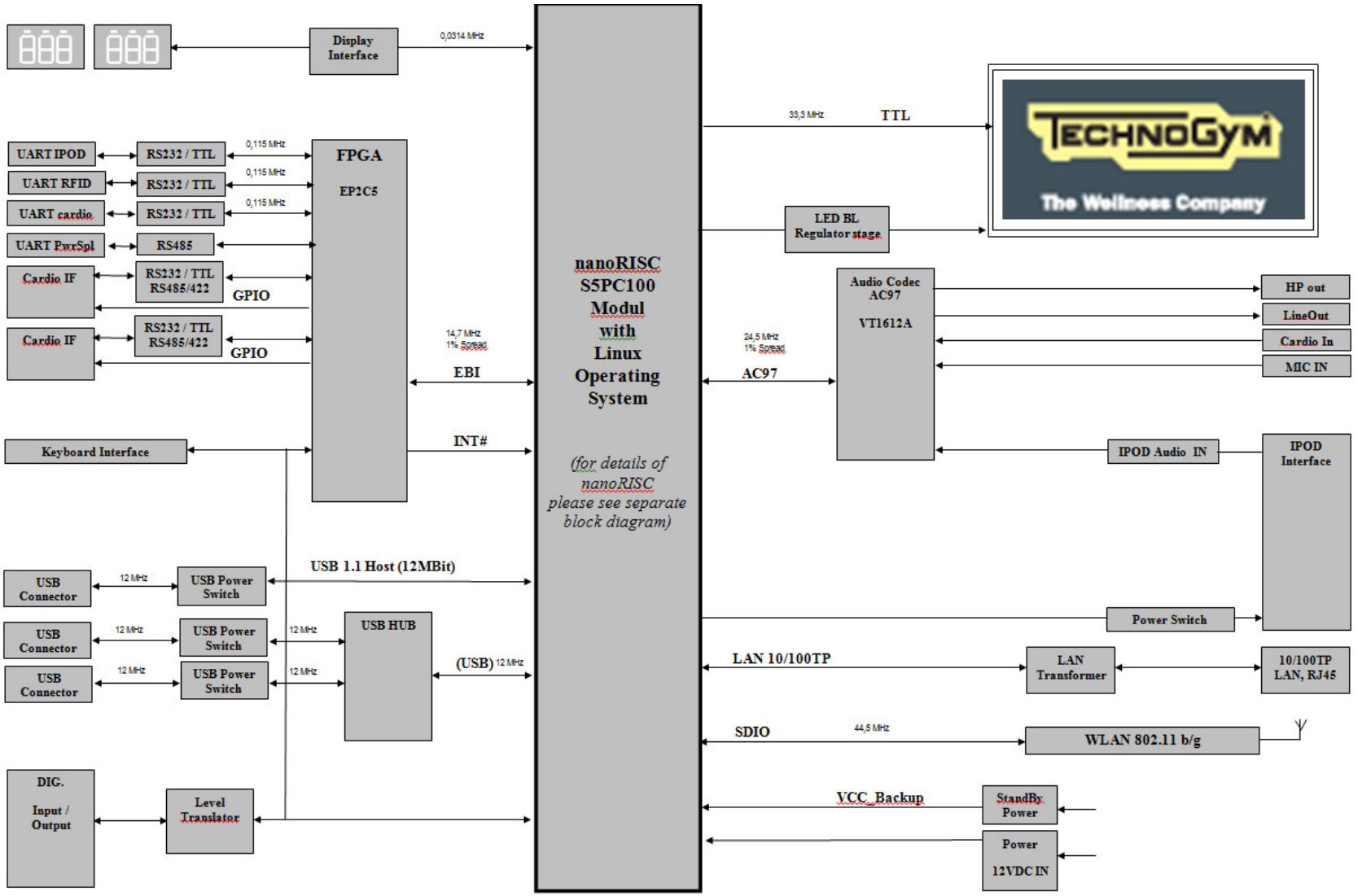
X0503 Pin #	Net Name
41	LCD_VSYNC
42	LCD_VDEN
43	DISP_DE_SYNC_MODE
44	VCC_3V3_DIS
45	VCOM_DIS
46	GND
47	GND_LED
48	GND_LED
49	VCC_LED
50	VCC_LED

2.1 WLAN Function

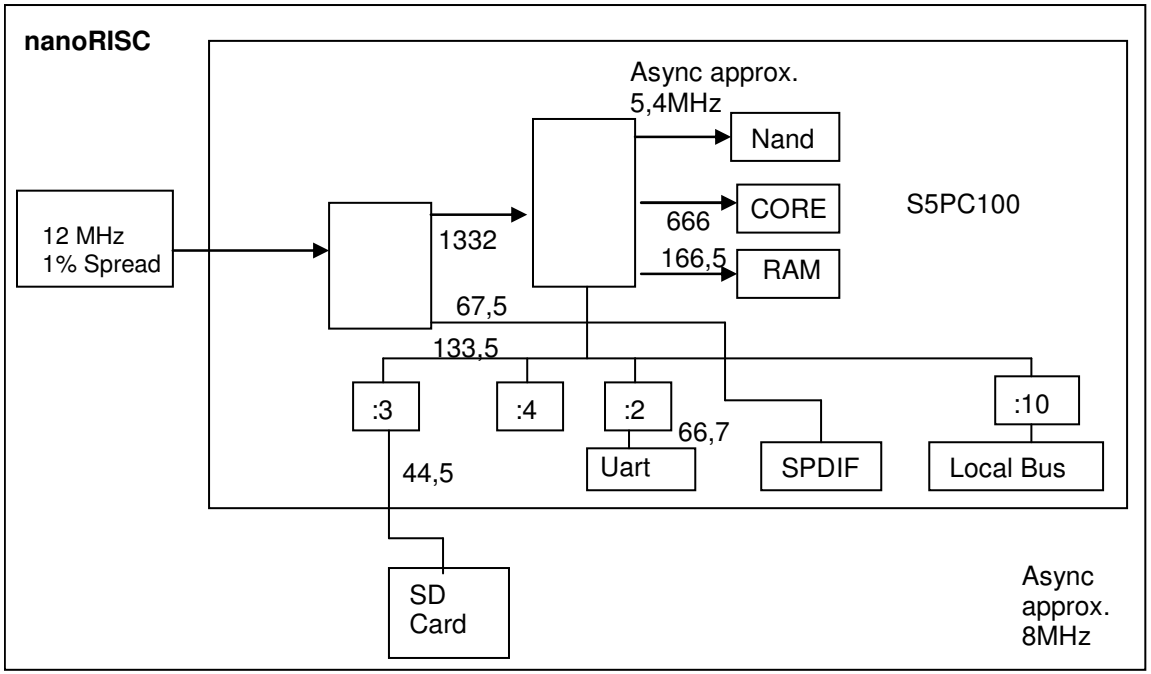
The WLAN part of the Minimal is in compliance with the IEEE 802.11b/g standard and operates in the 2.4 GHz frequency range.

All components of the WLAN are integrated in the Minimal baseboard.

2.2 Block Diagram



Details: Block Diagram nanoRISC



All Values in MHz

3 Software

3.1 Linux driver

The WLAN function placed on the Minimal baseboard is controlled by the following linux-driver:

- sd8xxxx (marvell driver)

When the driver detects the WLAN chip, first the firmware must be uploaded. The current version of firmware is 10.38.3.p66-26609.p58. The corresponding files (helper_sd.bin and sd8686.bin) must be situated in the filesystem in /lib/firmware/mrvl
When set up, linux will bring up a wlan-device. Now the standard-linux items can be used for communications.