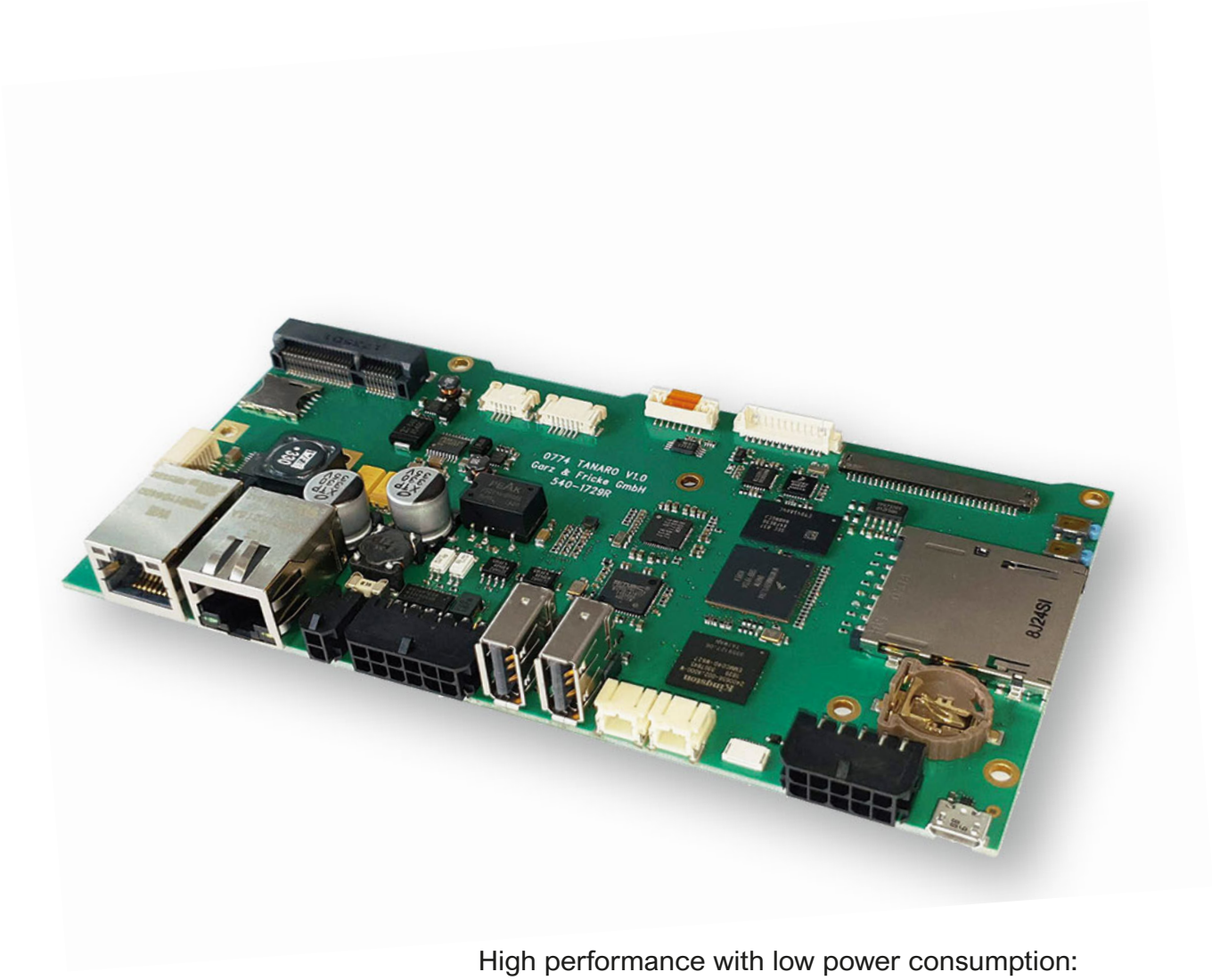
TANARO core

Arm® Cortex®-A53 Single Board Computer



High performance with low power consumption:
Designed for demanding industrial performance requirements and
AV applications with integrated wireless connectivity

Product Manual

Document Revision History

The information in this document is subject to change without prior notice in order to improve reliability, design and function and does not represent a commitment on the part of the manufacturer.

Revision	Date	Author	Description
V 1	19.09.2021	CG	Initial Release
V 2	17.12.2021	bmy	SECO CI Update 2022
V 3	31.01.2022	MH	Text extension chapter IV. Approvals & weight correction of the power supply in the technical data

Table of Contents

* alternative assembly upon request

1. Introduction

Thank you very much for purchasing a SECO Northern Europe product. Our products are dedicated to professional use and therefore we suppose extended technical knowledge and practice in working with such products.

The information in this manual is subject to technical changes, particularly as a result of continuous product upgrades. Thus this manual only reflects the technical status of the products at the time of printing. Before design-in the device into your or your customer's product, please verify that this document and the therein described specification is the latest revision and matches to the PCB version. We highly recommend contacting our technical sales team prior to any activity of that kind.

The attached documentation does not entail any guarantee on the part of SECO Northern Europe GmbH with respect to technical processes described in the manual or any product characteristics set out in the manual. We do not accept any liability for any printing errors or other inaccuracies in the manual unless it can be proven that we are aware of such errors or inaccuracies or that we are unaware of these as a result of gross negligence and
SECO Northern Europe has failed to eliminate these errors or inaccuracies for this reason.
SECO Northern Europe GmbH expressly informs that this manual only contains a general description of technical processes and instructions which may not be applicable in every individual case. In cases of doubt, please contact our technical sales team.

In no event, SECO Northern Europe is liable for any direct, indirect, special, incidental or consequential damages arising out of use or resulting from non-compliancy of therein conditions and precautions, even if advised of the possibility of such damages.

Before using a device covered by this document, please carefully read

- **Annex „C-1 Warranty hints“**
- **Annex „C-2 Field of Application“**

Embedded systems are complex and sensitive electronic products. Please act carefully and ensure that only qualified personnel will handle and use the device at the stage of development. In the event of damage to the device caused by failure to observe the hints in this manual and on the device (especially the safety instructions), SECO Northern Europe shall not be required to honour the warranty even during the warranty period and shall be exempted from the statutory accident liability obligation. Attempting to repair or modify the product also voids all warranty claims.

2. Safety Hints

Please read this section carefully and observe the instructions for your own safety and correct use of the device. Observe the warnings and instructions on the device and in the manual. SECO Northern Europe embedded systems have been built and tested by us and left the company in a perfectly safe condition.In order to maintain this condition and ensure safe operation, the user must observe the instructions and warnings contained in this manual.

I. General Handling

- Don't drop or strike the unit: The PCB, display and/or other parts might be damaged.
- Keep away from water and other liquids, the unit is not protected against.
- Operate the unit under electrical and environmental conditions according to the technical specification.
- The electrical installations in the room must correspond to the requirements of the local (country-specific) regulations.
- Take care that there are no cables, particularly power cables, in areas where persons can trip over them.
- Do not place the device in direct sunlight, near heat sources or in a damp place.
- All plugs on the connection cables must be screwed or locked to the housing.
- Repairs may only be carried out by qualified specialist personnel authorized by SECO Northern Europe GmbH or their local distributors.
- Maintenance or repair on the open device may only be carried out by qualified personnel authorized by SECO Northern Europe GmbH which is aware of with the associated dangers.

II. Electricity

- The embedded systems may only be opened in accordance with the description in this user's manual for
  - replacing of the (rechargeable, where applicable) lithium battery and/or
  - configuration of interfaces, where applicable
- These procedures have to be carried-out only by qualified specialist personnel.
- When accessing internal components the device must be switched off and disconnected from the power source.
- When purchased core or basic versions without protecting back cover, don't touch the PCB directly with your fingers. Especially these products need to be handled very carefully.
- Don't operate or handle the unit without typical ESD protection measures, such as ground earthing.
- Operate the unit according to the technical specification only.

III. Damage or Permanent Malfunction

- It must be assumed that a safe operation is no longer possible, in case
  -the device has visible damage or
  -the display is dark or shows strange pattern for longer period
  -the device doesn't react after a reset
- In these cases the device must be shut down and secured against further use

IV. Approvals

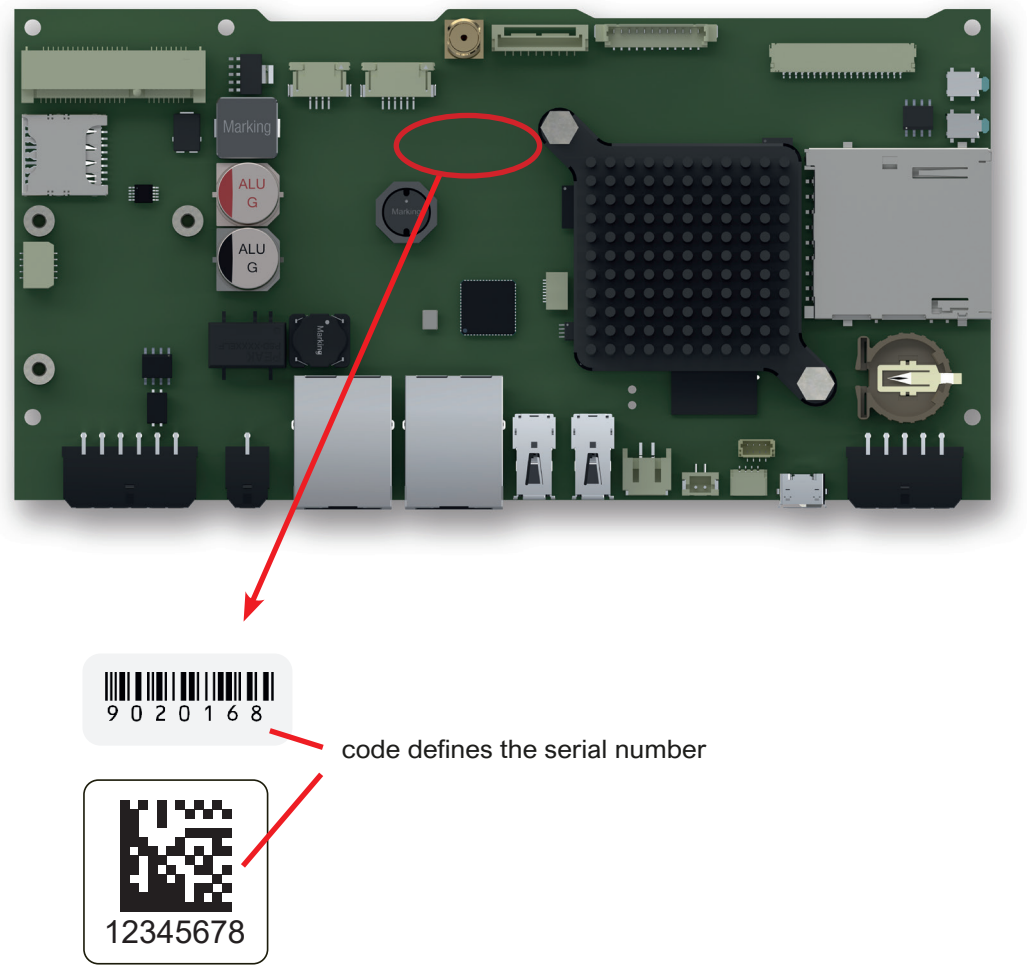
- The TANARO may be equipped with a certified transmitting module. Please check for your application what country specific approvals you have to run through with your end-device before you are allowed to sell it on the market and what markings you need to attach.
- Only antennas with a maximum gain of up to 4,07 dBi may be connected to the integrated WLAN/ Bluetooth module WG221BL(-S) to be compliant with the RED Directive.
- Cables connected to any USB port shall have a length of not more than 3 meters. Contact our support, if you need to use a longer cable.

3. Product Introduction

This document is applicable for hardware revisions 1.1 or later of the TANARO series.
Please find the hardware version grid in **„Annex A: Hardware Revision Information“**:
TANARO is an Embedded System to be used as human machine interface (HMI) in various applications. Please refer to **Annex „C-2 Field of Application“** for further information. The system is equipped with a large number of industrial interfaces. A wide variety of options is available as well.

3.1 Type Plate and Device Information

For service and later identification of the device, the type plate contains important information.



3.2 Related Documents and Online Support

This document contains operating system specific information. The following additional documentations are available:

OPERATING SYSTEMS

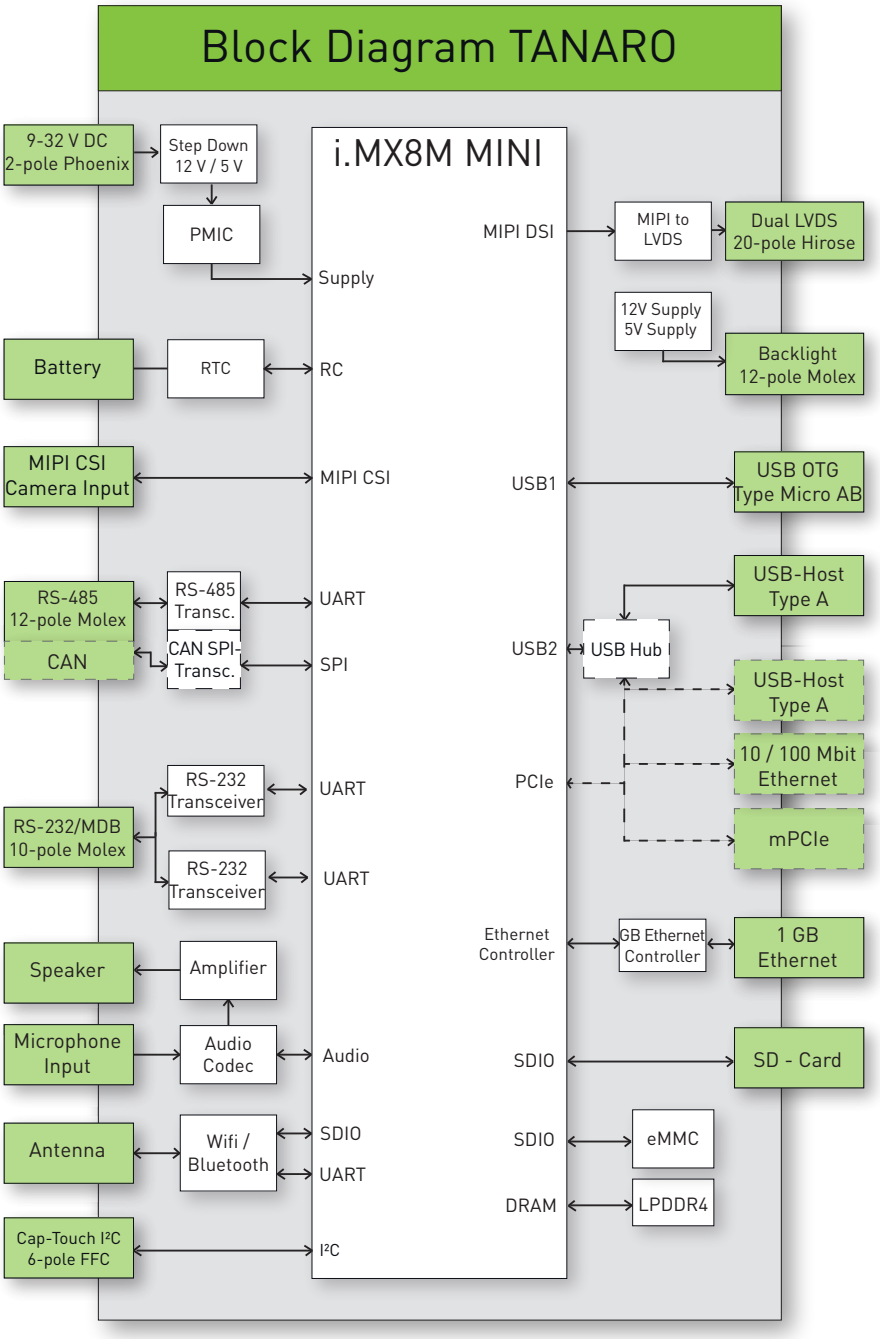
Linux Yocto Dunfell	https://bit.ly/3y3xEuB	Contains information about Linux BSP with development environment Linux Embedded System Yocto (Codename: Dunfell, Version X) includes first information about the bootloader Flash-N-Go

4. Technical Data

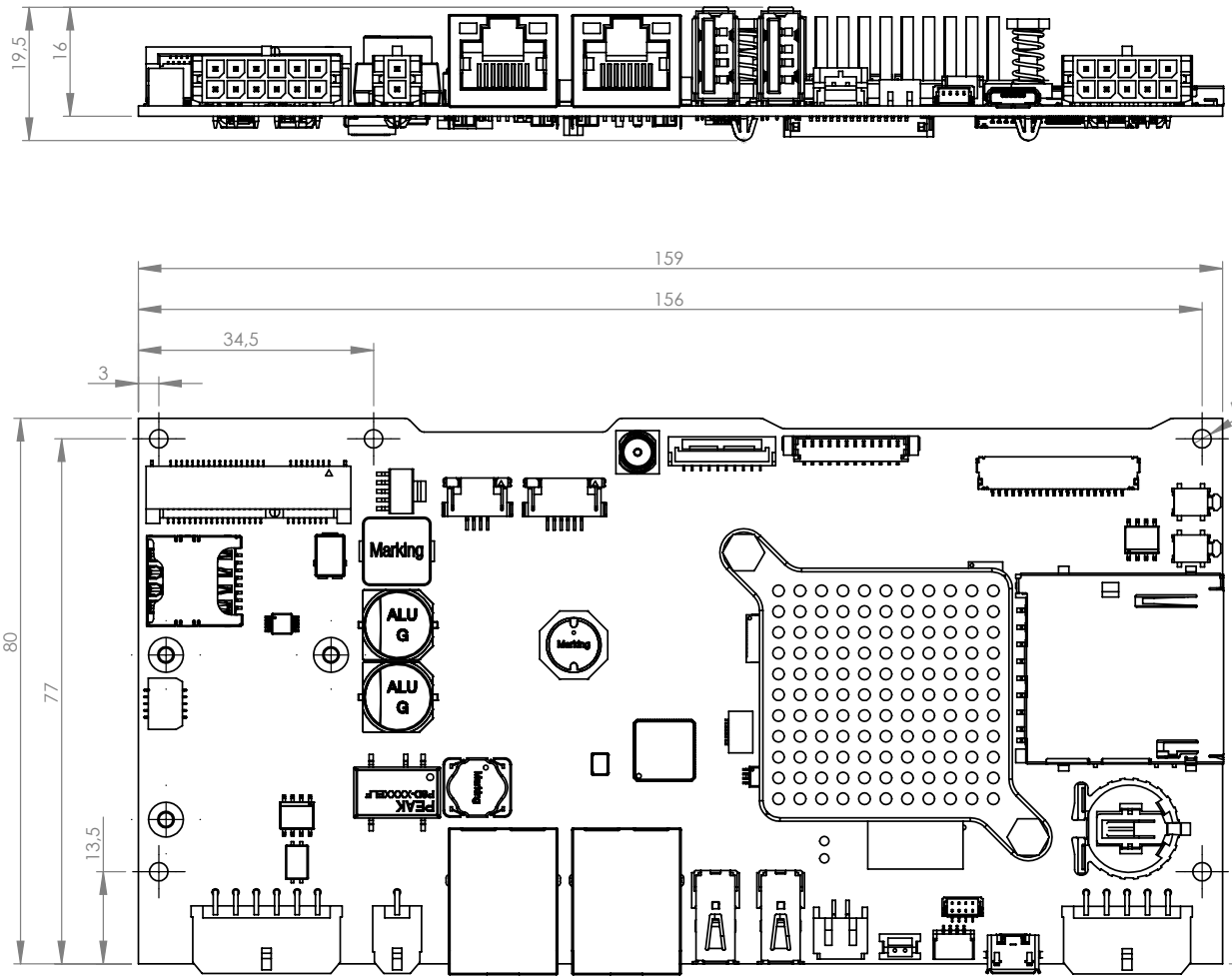
CPU	S	M
CPU Type	i.MX8M Mini Quad	
Core Class	Arm® Cortex®-A53	
Core Clock	1,8 GHz	
Features	Media Processing Engine (MPE) with NEON technology for SIMD: Floating Point Unit (FPU) Support of 64-bit Arm®v8-A architecture A53: 32 KB L1 cache for instruction and 32 KB for data M4: 16 KB L1 cache for instruction and 16 KB for data	
	512 KB unified L2 cache	
HW Accelerators	3D GPU GC NanoUltra(OpenGL ES 2.0) 2D GPU GC320, 1080p60 H265, VP9 decoder, 1080p60 H264, VP8 decoder, 1080p60 AVC/H.264 encoder, VP8 encoder	
RTC	+/-1,5 ppm at 0 - 50°C	+/-30 ppm at 25°C
Secure Element	A71CH	
PCB Temperature Sensor	+/-2°C at -25 - 100°C	
Memory		
eMMC Flash	4 GB MLC eMMC	
RAM Standard	1 GB 32 bit LPDDR4	
SD Card Slot	4 bit MMC/SDIO/SD/SDHC	
Operating Systems		
Supported OS	Linux Dunfell	
Communication Interfaces		
Network	1x 10/100/1000 Mbps Ethernet (RJ-45) 1x 10/100 Mbps (RJ-45)	1x 10/100/1000 Mbps Ethernet (RJ-45)
USB 2.0	2x 480 Mbit/s Host (Type A) 1x 480 Mbit/s OTG (Type Micro-AB) [1]	1x 480 Mbit/s Host (Type A) 1x 480 Mbit/s OTG (Type Micro-AB) 1
CAN Fieldbus / RS-485	1x CAN (ISO/DIS 11898) + 1x RS-485 galvanic isolated	1x RS-485
RS-232	2x RS-232 (RX/TX/CTS/RTS)	
	MDB [2] /1x MDB (Master / Slave optional) [3] instead of 2nd external RS-232	N/A
Synchronous Serial Interfaces	I²C	
Wireless Communication		
Wireless	WLAN 802.11 b/g/n; Bluetooth 4.2; Antenna: External	
Camera		
Camera Input	MIPI CSI (2 Data Lanes)	
Audio Internal	1x speaker connector parallel to external output	
Audio Input	Microphone Input; PDM Input, for MEMS Microphones	
Display and Touch		
Display Interface	Dual Channel 24bpp LVDS	
Touch Interface	PCAP I²C	
Backlight Interface	+12 V, +5V, on/off, PWM	
Device Dimensions		
W x H x D	159.0 x 18.0 x 80.0 mm	
Weight	200g	
Power Supply		
Supply Voltage	9 - 32 V	
Consumption	Typ. 4.7W; max. 27.6 W	
Internal Backup Battery (RTC)	Type: 3 V Lithium Battery Type CR1220: Lifetime (RTC only): Approximately 8 years, depending on application	
Typical Environmental Conditions		
Storage Temp.	-20 to +70 °C	
Operating Temp.	0 to +65 °C: G&F Demo running only, 0 to +60°C: G&F Demo running, all interfaces active, CPU load <= 30%, 0 to +60°C: glmark2-es2-wayland running only (GPU full load), tbd: CPU full load	
Humidity	5 to 90 % RH	
Noise Level [db(A)] @ 1m	<<40 (fanless design)	
Lifetime		
MTBF	tbd.	
Expansion Slot		
PCIe	PCIe Mini connector (for half and full size cards)	

[1] Mechanically the Micro-USB interface has not been designed for frequent contact operations. Please use an adapter cable with a strain relief.
[2] Option
[3] The selection of a variant eliminates the other.

4.1 Block Diagram SBC



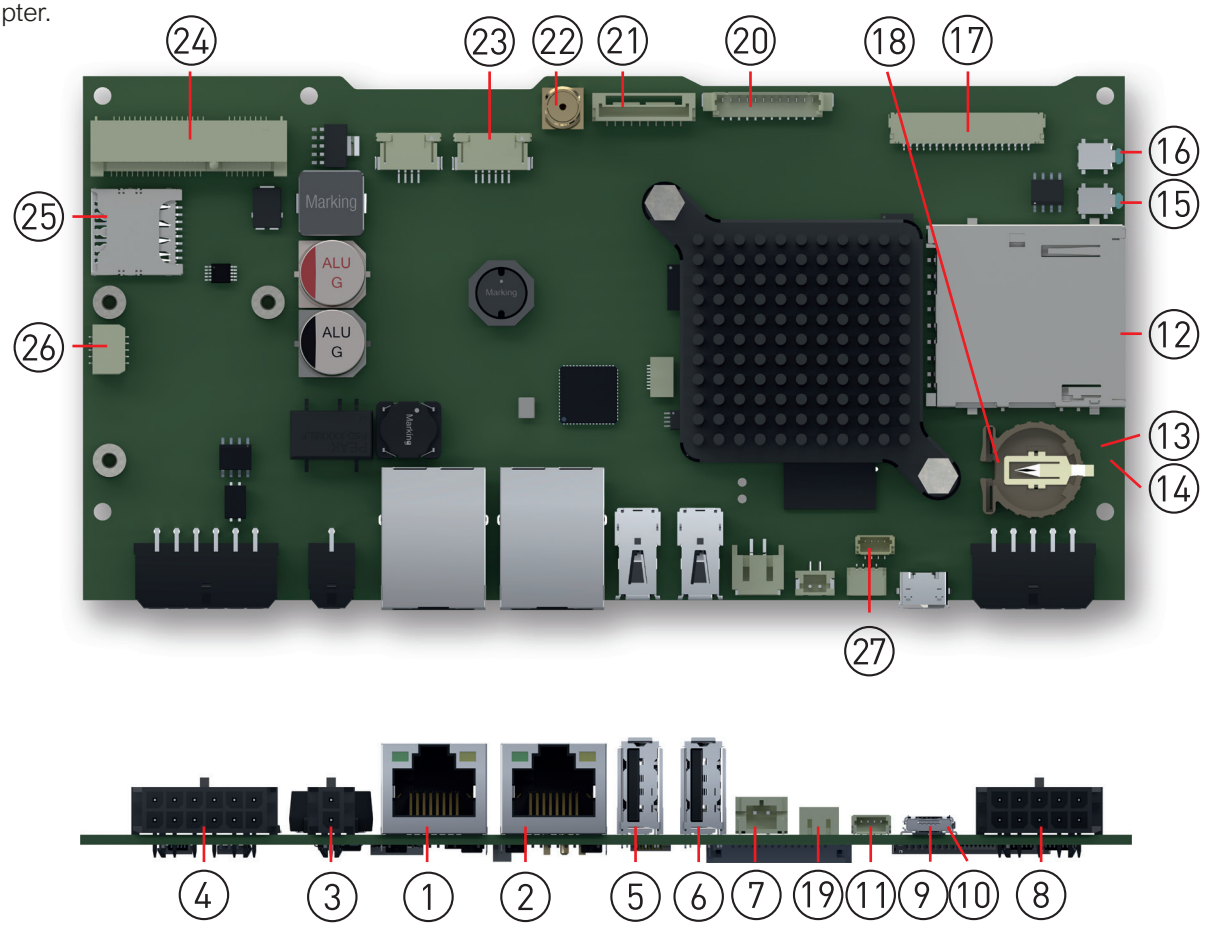
4.2 Technical Drawing



Missing dimensions according to 3D CAD files

4.3 Connectors

As this manual describes a core version, the internal and external interfaces will be mentioned in the following chapter.

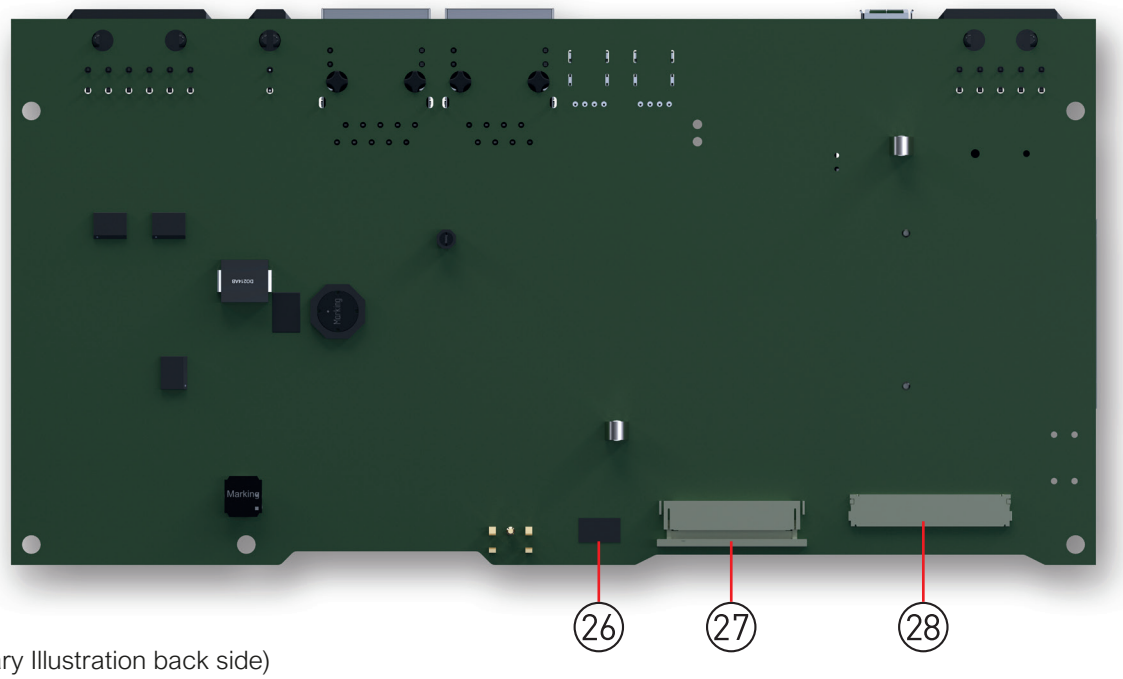


(Exemplary Illustration front side. The illustration shows the fully equipped TANARO Quadcore.

Pos.	Description
1	Ethernet U16 (Gigabit)
2	Ethernet J20 (10/100 MBit)
3	Power (J9)
4	CAN/RS-485/UART Interface (J12) Optional with galvanic isolation
5	USB Host 1 (J7)
6	USB Host 2 (J6)
7	Speaker (J19)
8	RS-232/MDB (J10)
9	USB OTG (J5)
10	USB Host 3 (J13)(optional)
11	Microphone (J25)
12	SD - card slot (J11)
13	Power LED (D36) not illustrated

Pos.	Description
14	Status LED (D22) not illustrated
15	Boot - Select Swich (SW2)[1]
16	Reset Switch (SW1)
17	Display LVDS (J13, J14 [bottom]); 1st LVDS Channel
18	Battery (BAT1)
19	Speaker internal (J18)
20	Display Backlight (J15)
21	JTAG Debug Interface (J401, J2 [bottom])
22	WLAN/Bluetooth Antenna (J27)
23	Capacitive Touch (J16)
24	PCIe Half Mini connector (U20)
25	SIM connector(U21); (Micro Sim Size)
26	Sound/GPIO/I2C (J21)
27	Microphone (J22)

[1] For the function of this switch please refer in the future to the Flash N Go User Manual.



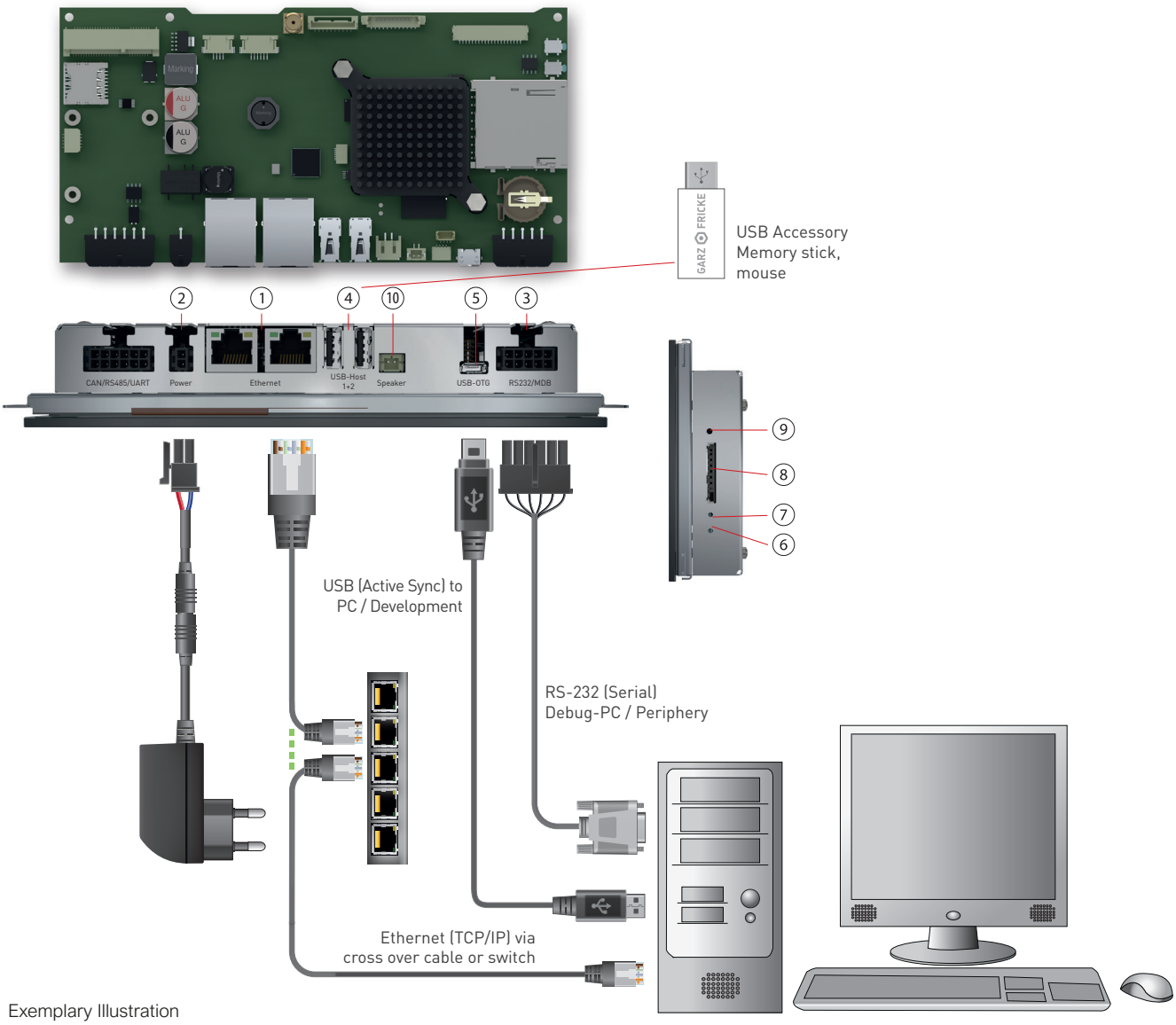
(Exemplary Illustration back side)

Pos.	Description
26	JTAG Debug Interface (J2, J401 [top])
27	Camera (J8)
28	Display LVDS (J14, J13 [top]); 2nd LVDS Channel

5. Installation and Start Up

The content of this document is limited to explain the device connectors and how to access TANARO via FTP over your local area network (LAN) within a few seconds. For advanced hardware specifications and software support, please refer to chapter **„3.2 Related Documents and Online Support“**

5.1 Connection Scheme



Exemplary Illustration

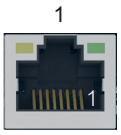
Pos.	Description
1	Ethernet
2	DC in
3	RS-232
4	USB-HOST 1+2
5	USB OTG / HOST

Pos.	Description
6	Reset sw
7	Bootselect sw
8	SD card slot
9	Power LED
10	Speaker

http://support.garz-fricke.com/projects/Tanaro/

6. Internal and External Interfaces

6.1 Gigabit Ethernet (U16)



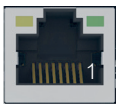
Pin	Name	Description	Information
1	TX+/TD0+		Rx/Tx might be swapped (Auto-MDIX) +/- might be swapped (Autom. polarity correction)
2	TX-/TD0-		
3	RX+/TD1+		
4	TD2+		
5	TD2-		
6	RX-/TD1-		
7	TD3+		
8	TD3-		

Header: RJ45

LED on the left (link) is default off and turns on when link is detected.
Color mapping:
green = 1 Gbit data transfer speed
yellow = 100 Mbit data transfer speed
off = 10 Mbit data transfer speed

LED on the right (act) flashes during sending / receiving packets.

6.2 10/100 Mbps Ethernet (J20); Optional



Pin	Name	Description	Information
1	Tx+		Rx/Tx might be swapped (Auto-MDIX) +/- might be swapped (Autom. polarity correction)
2	TX-		
3	RX+		
4	SPARE 1	Power Supply	
5			
6	RX-		
7	SPARE 2	Power Supply	
8			

Header: RJ45

Yellow LED on the left (act) flashes during sending / receiving packets.

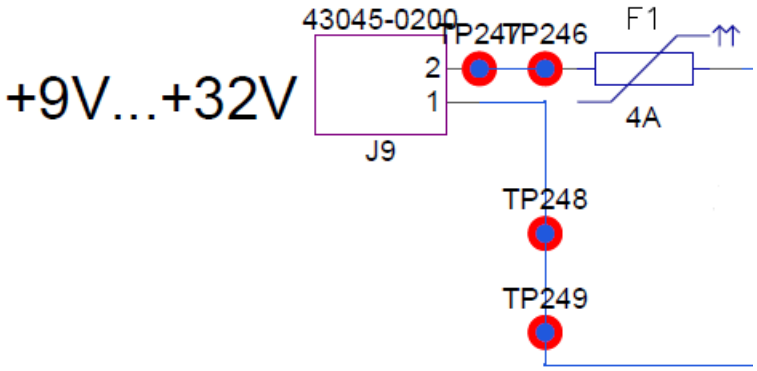
LED on the right (link) is default off and turns on when link is detected.
Color mapping:
green = 100 Mbit data transfer speed
off = 10 Mbit data transfer speed.

6.3 Power (J9)

Pin	Name	Description	Level
1	GND	DC Ground	0 V
2	Vcc_In	DC Input voltage	Nom. 9 to 32 V DC

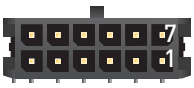
Header: Molex 43045-0200 Micro-Fit 2p
Plug: Molex 43025-0200 Micro-Fit 2p,
crimp contact Molex 43030-0007
Shielding with 6,3 mm male spade terminal connector.

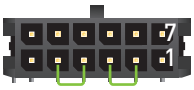
Caution:
Power supplies connected to this device must comply with the requirements of "limited power sources" (LPS) according to IEC 60950-1 or PS2 and ES1 according to IEC 62368-1, respectively, to prevent the end-user from danger in case of a fault.



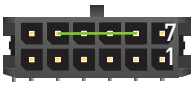
6.4 CAN/RS-485 Interface (J12)

This connector can be configured to your needs in following combinations:
CAN/RS-485; 2x RS-485; CAN/UART

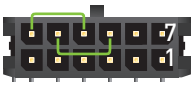




CAN1 Termination



RS485 Termination

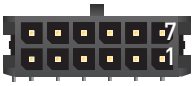


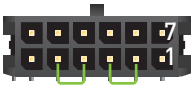
RS485 Half-Duplex

Pin	Name	Description	Level	
1	GND_CAN_RS485	Ground for CAN and RS485 group		
2	CAN1_TERM	To enable CAN1-Termination, bridge with CAN1_H		
3	CAN1_H	CAN bus 1 high	-24	+24 V
4	CAN1_L	CAN bus 1 low	-24	+24 V
5	CAN1_TERM	To enable CAN1-Termination, bridge with CAN1_L		
6	RS485_2_TERM	n.a.		
7	GND_CAN_RS485	Ground for CAN and RS485 group		
8	RS485_1_TERM	To enable RS485-Termination: bridge with RS485_A		
9	RS485_Y	TX+	-7	+12 V
10	RS485_Z	TX-	-7	+12 V
11	RS485_A	RX+, to enable Half-Duplex: bridge with RS485_Y		
12	RS485_B	RX- ,to enable Half-Duplex: bridge with RS485_Z		

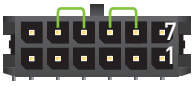
Header: Molex 43045-1200 Micro-Fit 12p
Plug: Molex 43025-1200 Micro-Fit 12p, crimp contact Molex 43030-0007
Shielding with 6,3 mm male spade terminal connector

CAN/UART *





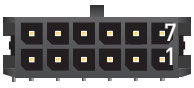
CAN1 Termination

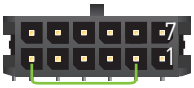


CAN2 Termination

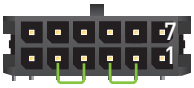
Pin	Name	Description	Level
1-5, 8		Identical to standard	
6	RS485_2_TERM	n.a.	
7	GND_CAN_RS485	Ground for CAN group	
9	UART2_TXD	UART Transmit	+3,3 V
10	UART2_RXD	UART Receive	+3,3 V
11	UART2_RTS	UART Request to send	+3,3 V
12	UART2_CTS	UART Clear to send	+3,3 V

RS-485/RS-485 *





RS485_2 Termination



RS485_2 Half Duplex

Pin	Name	Description	Level
1	GND_CAN_RS485	Ground for CAN and RS485 group	
2	RS-485_2_A	TX+	
3	RS-485_2_Y	RX+, to enable Half-Duplex: bridge with RS_485_2_A	
4	RS-485_2_Z	RX-, to enable Half-Duplex: bridge with RS_485_2_B	
5	RS-485_2_B	TX-	
6	RS-485_2_TERM	To enable RS-485_2-Termination: bridge with RS-485_2_A	
7	GND_CAN_RS485	Ground for CAN and RS485 group	
8-12		identical to standard	

* alternative assembly upon request

6.5 USB Host 1 (J7)

Pin	Name	Description	Level
1	USB_H1_VBUS	Power supply	+5 V DC max 500mA [1]
2	USB_H1_DN	Data minus (D-)	
3	USB_H1_DP	Data plus (D+)	
4	GND	Ground	

Header: USB Type A

6.6 USB Host 2 (J6)

Pin	Name	Description	Level
1	USB_H2_VBUS	Power supply	+5 V DC max 500mA [1]
2	USB_H2_DN	Data minus (D-)	
3	USB_H2_DP	Data plus (D+)	
4	GND	Ground	

Header: USB Type A

6.7 USB Host 4 (J24, internal [not illustrated])

Pin	Name	Description	Level
1	USB_H4_VBUS	Power supply	+5 V DC max 500mA [1]
2	USB_H4_DN	Data minus (D-)	
3	USB_H4_DP	Data plus (D+)	
4	GND	Ground	

Header: Amtek 1254MR-04GW-U

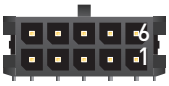
6.8 Speaker (J19)

Pin	Name	Description	Level
1	Speaker +	Parallel to X10	3.5W RMS 8 Ohm
2	Speaker -		

Header: JST S2B-PH-SM3-TB
Plug: ST PHR-2 with crimp contacts SPH-002GW-P0.5L-ND

[1] Please ensure at full current consumption that other switched power outputs (USB, Keypad, Microphone) do not draw more than 100mA.

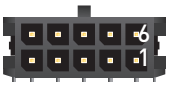
6.9 RS-232/RS-232 (J10)



Pin	Name	Description	Level
1	GND	Ground	
2	RS232_TXD1	Port#1: Transmit data (Output)	
3	RS232_RXD1	Port#1: Receive data (Input)	
4	RS232_RTS1	Port#1: Request-to-send (Output)	
5	RS232_CTS1	Port#1: Clear-to-send (Input)	
6	GND	Ground	
7	RS232_TXD2	Port#2: Transmit data (Output)	
8	RS232_RXD2	Port#2: Receive data (Input)	
9	RS232_RTS2	Port#2: Request-to-send (Output)	
10	RS232_CTS2	Port#2: Clear-to-send (Input)	

Header: Molex 43045-1000 Micro-Fit 10p
Plug: Molex 43025-1000 Micro-Fit 10p,
crimp contact Molex 43030-0007
Shielding with 6,3 mm male spade terminal connector

RS-232/MDB *



Pin	Name	Description	Level
1-6		Identical to standard	
7	MDB_TXD	MDB: Transmit data (Output)	
8	MDB_RXD	MDB: Receive data (Input)	
9	MDB_WakeUp	MDB: WakeUp Signal (Output)	
10		internally connected with 470kR to pin 9	

* alternative assembly upon request

6.10 USB OTG (J5)

Pin	Name	Description	Level
1	USB1_VBUS	Power supply	+5 V DC max 500mA [1]
2	USB1_DN	Data minus (D-)	
3	USB1_DP	Data plus (D+)	
4	USB1_ID	Device ID	
5	GND	Ground	

Header: Micro-USB Type AB

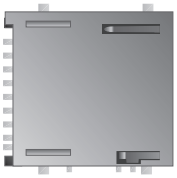
6.11 USB OTG Host (J3)

Alternative option: USB OTG interface with USB A receptacle

Pin	Name	Description	Level
1	USB1_VBUS	Power supply	+5 V DC max 500mA [1]
2	USB1_DN	Data minus (D-)	
3	USB1_DP	Data plus (D+)	
4	GND	Ground	

Header: USB Type A

6.12 SD Card Slot (U23)



Pin	Name	Description	Level
1	DAT3		
2	CMD	Pullup	3.3 V
3	GND		
4	VDD		3.3 V
5	CLK		
6	GND		
7	DAT0		
8	DAT1		
9	DAT2		

[1] At full current consumption you must ensure that other switched power outputs (USB, Keypad) do not draw more than 100mA at the same time.

6.13 Power LED (D36)

Should be green if the device is powered up.

6.14 Status LED (D22)

Should blink when device is active

6.15 Bootselect Switch (SW2)

Push during a power on sequence to boot into the secondary OS.

6.16 Reset Switch (SW1)

Push for a power on reset.

6.17 Display LVDS (J13, J14)

J13

Pin	Name	Description	Level
1	VCC	max. 1.500 mA	3.3 V +- 3%
2	VCC		3.3 V +- 3%
3	GND		
4	GND		
5	LVDS0_TX0_N	Differential Output	See table LVDS
6	LVDS0_TX0_P		
7	GND		
8	LVDS0_TX1_N	Differential Output	See table LVDS
9	LVDS0_TX1_P		
10	GND		
11	LVDS0_TX2_N	Differential Output	See table LVDS
12	LVDS0_TX2_P		
13	GND		
14	LVDS0_TXCLK_N	Differential Clock	See table LVDS
15	LVDS0_TXCLK_P		
16	GND		
17	LVDS0_TX3_N	Differential Output	See table LVDS
18	LVDS0_TX3_P		
19	GND		
20	GPO	Digital Output	3.3 V

Header: HIROSE DF19G-20P-1H
Plug: HIROSE DF19G-20S-1C

J14

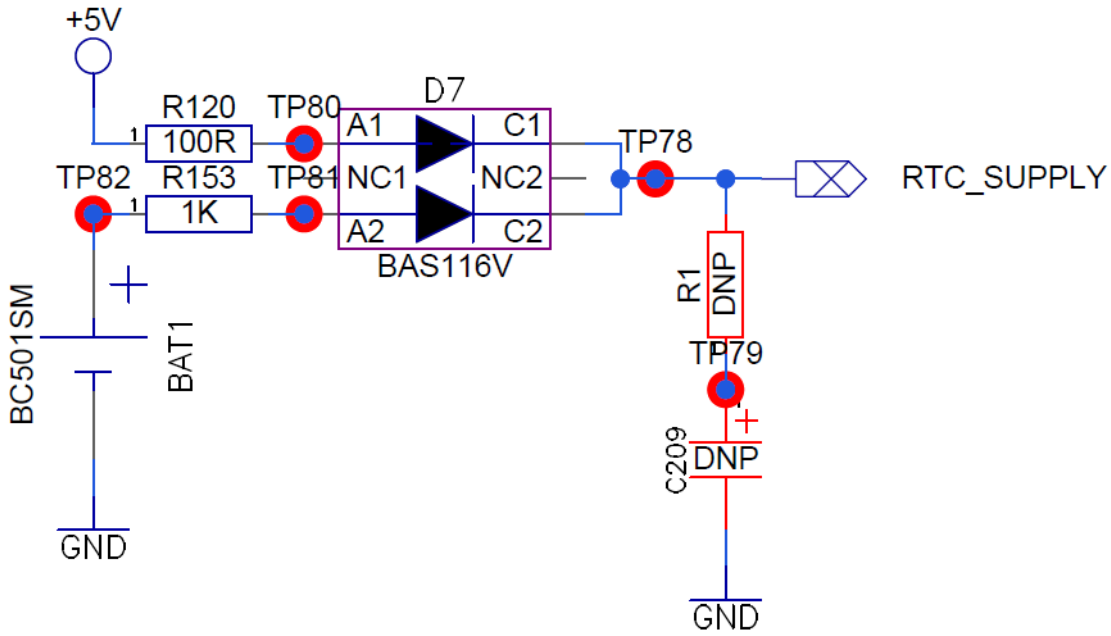
Pin	Name	Description	Level
1	VCC	max. 1.500 mA	3.3 V +- 3%
2	VCC		3.3 V +- 3%
3	I2C2 SDA	Daten	3.3 V , 4.7 kOhm
4	GND	Ground	
5	LVDS1_TX0_N	Differential Output	See table LVDS
6	LVDS1_TX0_P		
7	GND	Ground	
8	LVDS1_TX1_N	Differential Output	See table LVDS
9	LVDS1_TX1_P		
10	GND	Ground	
11	LVDS1_TX2_N	Differential Output	See table LVDS
12	LVDS1_TX2_P		
13	GND	Ground	
14	LVDS1_TXCLK_N	Differential Clock	See table LVDS
15	LVDS1_TXCLK_P		
16	GND	Ground	
17	LVDS0_TX3_N	Differential Output	See table LVDS
18	LVDS0_TX3_P		
19	GND	Ground	
20	I2C2 SCL	Clock	3.3 V , Pullup 4.7 kOhm

Header: HIROSE DF19G-20P-1H
Plug: HIROSE DF19G-20S-1C

6.18 Battery-Holder (BAT1)

Pin	Name	Description	Level
1	VCC	Supply	3 V
2	GND	Ground	

Header: AUK BH19VWG-R5H-H
Battery: CR1220

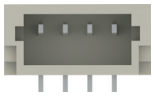


6.19 Speaker Internal (J18)

Pin	Name	Description	Level
1	Speaker +	Parallel to J19	3.5W RMS 8 Ohm
2	Speaker -		

Header: JST B2B-ZR-SM4-TF
Plug: ZHR-2 with crimp contacts SZH-003T-P0.5

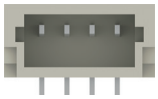
6.20 Microphone [Internal] (J22)



Pin	Name	Description	Level
1	VDD_MIC	500mA (can be switched on/off by software)	+3,3V
2	PDM_CLK	PDM Clock	+3,3V
	PDM_DATA	PDM Data	+3,3V
	GND		

Header: JST BM04B-SRSS-TB
Plug: SHR-04V-S with crimp contacts SSH-003T-P0.2-H

6.21 Microphone (J25)



Pin	Name	Description	Level
1	VDD_MIC	500mA (can be switched on/off by software)	+3,3V
2	PDM_CLK	PDM Clock	+3,3V
	PDM_DATA	PDM Data	+3,3V
	GND		

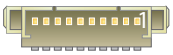
Header: JST BM04B-SRSS-TB
Plug: SHR-04V-S with crimp contacts SSH-003T-P0.2-H

6.22 WLAN/Bluetooth Antenna (J27)

Pin	Name	Description	Level
1	SIGNAL	50 Ohm	
2	GND		

Header: SMA
Plug: SMA

6.23 Backlight (J15)



Pin	Name	Description	Level
1	12 V	Supply; only for X1 Supply >12.5V	12V +-2% max 3 A
2	12 V		
3	12 V		
4	5 V	Supply	5V +-3% max 3 A
5	5 V		
6	GND	Ground	
7	GND	Ground	
8	GND	Ground	
9	PWM	Typ. 250Hz 16 Bit	3.3 V
10	PWM 5 V	Driven by Signal of Pin 9	5 V
11	Enable	Digital Output	3.3 V
12	Enable 5 V	Driven by Signal of Pin 11	5 V

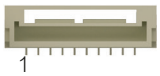
Header: Molex 53398-1271
Plug: Molex 51021-1200

6.25 JTAG - Debug Interface (J401)

Pin	Name	Description	Level
1	JTAG_TCK		+3,3V
2	GND		
3	JTAG_TDO		+3,3V
4	JTAG_MOD		+3,3V
5	JTAG_TMS		+3,3V
6	JTAG_TDI		+3,3V
7	/JTAG_TRST	Active low	+3,3V; 10 kOhm pulldown internally
8	/JTAG_RESET	Active low	+3,3V
9	BOOT_MODE0		+3,3V
10	BOOT_MODE1		+3,3V

Housing: JST BM10B-GHS-TBT

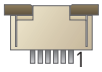
6.26 JTAG - Debug Interface (J2)



Pin	Name	Description	Level
1	3.3V		
2	GND		
3	JTAG_TMS		+3,3V
4	/JTAG_TRST	Active low	+3,3V; 10 kOhm pulldown internally
5	JTAG_TCK		+3,3V
6	JTAG_TDO		+3,3V
7	JTAG_TDI		+3,3V
8	/JTAG_RESET	Active low	+3,3V

Housing: JST 08FHJ-SM1-TB

6.27 Capacitive Touch (J16)



Pin	Name	Description	Level
1	5 V (Alternative; 3.3V)	Supply	5 V max 300mA
2	I²C SDA		3.3 V, 4.7 kOhm pullup internally
3	I²C SCL		3.3 V, 4.7 kOhm pullup internally
4	GND	Ground	
5	Reset#	Digital Output	3.3V; 1 kOhm pulldown internally
6	Int#	Digital Input	3.3V; 1 kOhm pullup internally

Header: Molex 52207_0660_FFC_6x1mm_TOP
Cable: FFC/FPC

6.28 Camera [Internal] (J8)

Pin	Name	Description	Level
1	GND		
2	MIPI_CSI_D0_N		
3	MIPI_CSI_D0_P		
4	GND		
5	MIPI_CSI_D1_N		
6	MIPI_CSI_D1_P		
7	GND		
8	MIPI_CSI_CLK_N		
9	MIPI_CSI_CLK_P		
10	GND		
11	CSI_PWDN		
12	CSI_RESET#		
13	I2C1_SCL		+3.3V, 4.7 kOhm pullup internally
14	I2C1_SDA		+3.3V, 4.7 kOhm pullup internally
15	VCC		+3.3V

Header: Molex 52271-1579
Cable: FFC/FPC

6.29 PCIe Half Mini Connector (XU20)

Pin	Name	Description	Level
1	WAKE#	PCIE Wake	
2	3.3V	Supply	3.3 V
3	Reserved	not connected	
4	GND	Ground	
5	Reserved	not connected	
6	1.5V	Supply	1.5 V
7	CLKREQ#	not connected	
8	UIM_PWR	SIM Card Interface	
9	GND	Ground	
10	UIM_DATA	SIM Card Interface	
11	REFCLK-	PCIE Clock	
12	UIM_CLK	SIM Card Interface	
13	REFCLK+	PCIE Clock	
14	UIM_RESET	SIM Card Interface	
15	GND	Ground	
16	UIM_VPP	SIM Card Interface	
17	Reserved	not connected	
18	GND	Ground	
19	Reserved	not connected	
20	W_Disable#	PCIE Disable	
21	GND	Ground	
22	PERST#	PCIE Perst	
23	PERn0	PCIE Data receive	
24	3.3Vaux	Supply	3.3 V
25	PERp0	PCIE Data receive	
26	GND	Ground	
27	GND	Ground	
28	1.5V	Supply	1.5 V
29	GND	Ground	
30	SMB_CLK	not connected	
31	PETn0	PCIE Data send	
32	SMB_DATA	not connected	
33	PETp0	PCIE Data send	
34	GND	Ground	
35	GND	Ground	
36	USB_D-	USB Data	
37	GND	Ground	
38	USB_D+	USB Data	
39	3.3Vaux	Supply	3.3 V
40	GND	Ground	
41	3.3Vaux	Supply	3.3 V
42	LED_WWAN#	LED red	
43	GND	Ground	
44	LED_WLAN#	LED green	
45	Reserved	not connected	
46	LED_WPAN#	LED yellow	
47	Reserved	not connected	
48	1.5V	Supply	1.5 V
49	Reserved	not connected	
50	GND	Ground	
51	Reserved	not connected	
52	3.3Vaux	Supply	3.3 V

Header: Mini PCIe socket

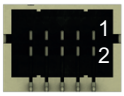
6.31 SIM connector (U21)

Pin	Name	Description	Level
1	PWR	Supply	
2	Reset	Reset	
3	Clk	Clock	
4	RFU2	not connected	
5	GND	Ground	
6	VPP	Supply	
7	I/O	Data	
8	RFU1	not connected	
9	Detect	not connected	

Header: Micro SIM socket

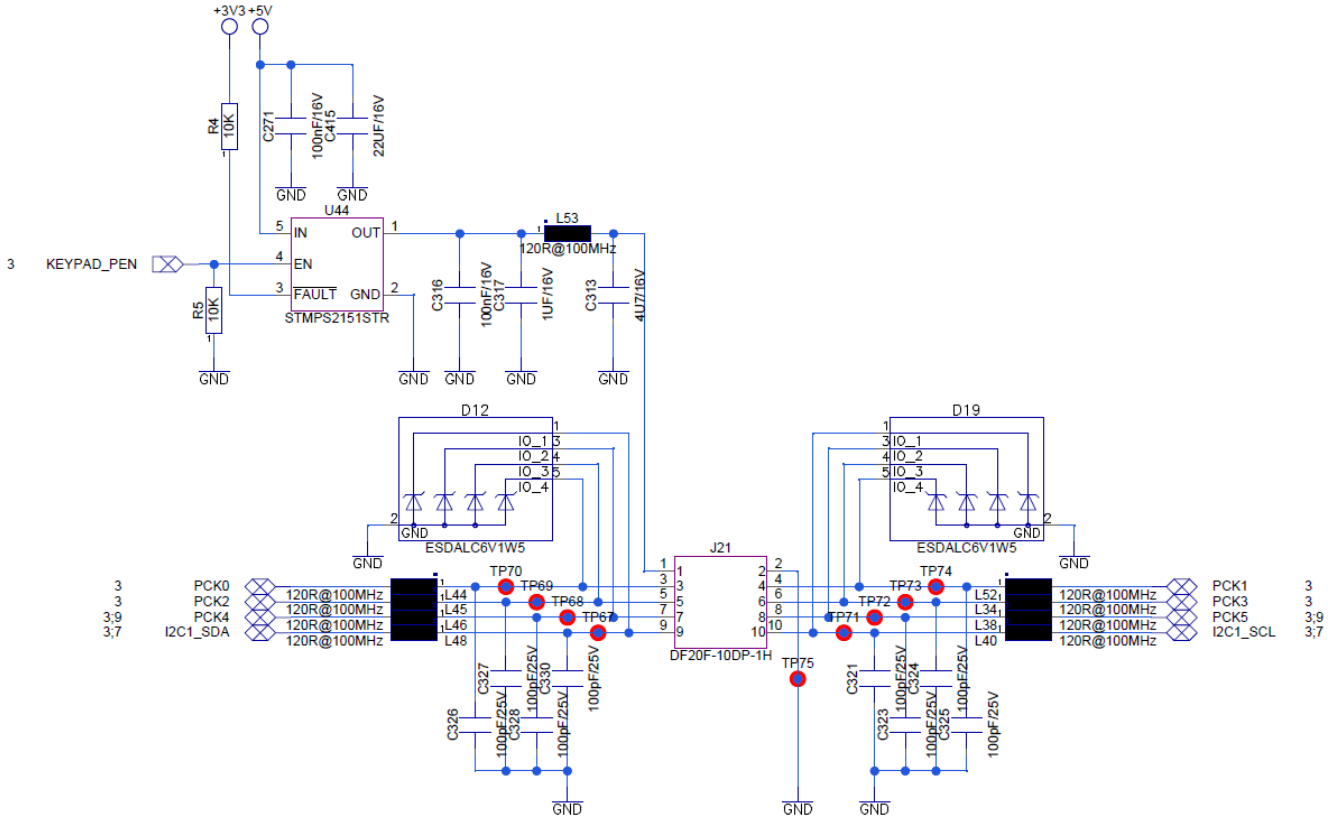
6.32 GPIO (J21)*

Audio/GPIO/I²C, multiplexed



Pin	Name	Description Default Mode	Description Mode 1	Level
1	5V_Out	500 mA (can be switched on/off by software) [2]		5.0 V
2	GND	Ground	Ground	GND
3	PCK0	SAI3_TXC	GPIO5_IO00	3.3 V
4	PCK1	SAI3_TXD	GPIO5_IO01	
5	PCK2	SAI3_RXFS	GPIO4_IO28	
6	PCK3	SPDIF_TX	GPIO5_IO03	
7	PCK4	SAI1_RXFS	GPIO4_IO00	
8	PCK5	SAI1_RXC	GPIO4_IO01	
9	I2C1_SDA	I²C SDA [1]	GPIO5_IO15	
10	I2C1_SCL	I²C SCL [1]	GPIO5_IO14	

Header: Hirose DF20F-10DP-1H, side entry, RM = 1,00 mm
Plug: Hirose DF20A-10DS-1C, crimp contact 30AWG: DF20F-3032SCFA



[1] Pull-Ups of about 4.7kOhm to 3.3V existing on I²C signals.

[2] At full current consumption you must ensure that other switched power outputs (USB, Keypad) do not draw more than 100mA at the same time.

7. Battery

7.1 Battery Specifications

The internal baseboard is equipped with a Primary Lithium battery (type CR1220), which has a typical lifetime of 8 years.

Type	SECO Northern Europe Article Number
Battery type CR1220	010-0091R
Battery type CR1220	010-0059R

Manufacturer	Model
Alpha 3 Manufacturing Ltd.	YOBCR1220
Varta	CR1220

One of these brands must be installed.

Danger of explosion when replaced with wrong type of battery.
Replace the battery only with a Lithium battery that has the same or equivalent type recommended by SECO Northern Europe GmbH.

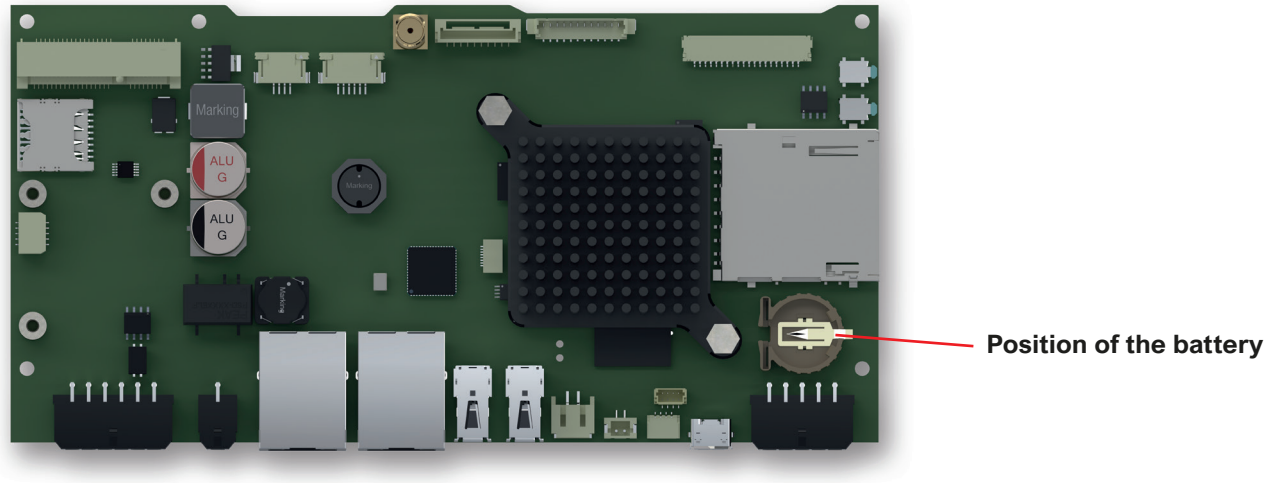
Do not dispose of used CMOS batteries in domestic waste.
Dispose of the battery according to the local regulations dealing with the disposal of these special materials (e. g. to the collecting points for disposal of batteries).

7.2 Replacement of the Internal Battery

The internal battery is placed as per figure below.
The device shall be handled by authorized and skilled personnel only.

Danger of electric hazard! First before removing battery, please make sure that the unit is completely disconnected from any power supply, direct or indirect.
Furthermore take care about the socket and connectors. Especially the micro USB connector might be damaged easily.

TANARO core



7.3 Supercap

Instead of using a battery to hold date and time of the integrated real-time-clock, a 220mF supercap can be assembled upon request. Data will be held for a few hours, only.

Annex A: Hardware Revision Information

This document is applicable for all products listed below. Please note that customized variants might possibly not support all features listed herein. Additional features are documented in specific attachments.

Platform	Article Number	Marking on PCB
TANARO core S	900-4475R	0774 TANARO V1.1
TANARO core M	tbd	0774 TANARO V1.1

Hardware Revision	Marking on PCB
V1.1	0774 TANARO V1.1

Annex B: Guidelines and Standards

B-1 RoHS Declaration

Devices comply with the requirements of Directive 2011/65/EU and addition 2015/863/EU of the European Parliament and of the Council of 8th June 2011 (addition from 31st March 2015) on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

B-2 Supplier Declaration – Directive EG 1907/2006 REACH

SECO Northern Europe is manufacturer of electronic products, thus - in the sense of REACH - we are so called „downstream users“. The products we supply to you are solely non-chemical products (goods). Moreover and under normal and reasonably foreseeable circumstances of application, the goods supplied to you shall not release any substance. For that, SECO Northern Europe is neither obligatory for registration nor for the creation of material safety data sheet (MSDS).
From state of knowledge today our products contain no substances of very high concern from the current SVHC candidate list of the European Chemicals Agency in percentage >0,1.
We will immediately inform you in correspondence to REACH-Article 33 if any substance of content >0,1 percentage in our goods will be classified alarming by the ECHA. Based on the current status, however, we do not expect such an incidence.

B-3 UL Certification

Customers of SECO Northern Europe are attending on different markets. These markets are subjected to different UL certifications. Therefore SECO Northern Europe have no UL certification for their products.
To obtain UL certifications the product is designed to respect the following constraints:

- All electronic printed circuit boards are conform to UL standard
- Battery schematics meets the requirements of UL standard (please refer to chapter **„6.18 Battery-Holder (BAT1)“**
- All wirings are designed with UL components
- The selected components on the markets are UL (List of UL relevant components is available at SECO Northern Europe (on request))

SECO Northern Europe do not guarantee to obtain UL certifications.

B-4 SECO Northern Europe Conformity Statement

SECO Northern Europe GmbH develops and distributes reliable, Arm®-based embedded solutions.
We offer various solutions from computer-on-modules (COM) to single-board computers (SBC) and fully-assembled human machine interface (HMI) with pre-installed operating system, display and housing.

These solutions are offered exclusively as OEM products. They do not include any application software that is intended for the end user. Therefore, we do not make any EU declarations of conformity in the name of SECO Northern Europe GmbH and do not provide the products with the CE mark.

Our customers provide the products with application software and build them into an end-user device as part of an industrial production process. They identify themselves as a manufacturer by affixing a license plate with their company or brand name.

We are happy to assist our customers when they compile the necessary technical documentation for the EU Declaration of Conformity of the complete device. We provide e.g. Supplier declarations or RoHS certifications, issue EMC testing results and carry out safety / radio / SAR tests, etc.

B-5 Approvals

The TANARO may be equipped with the transmitter module SKYLAB WG221BL(-S).

European Union regulatory compliance

The TANARO series modules comply with the regulatory standards EN 300 328 and
EN 301 489-1/-17. We declare that the human exposure of these modules is below the SAR limits specified in the EU recommendations 1999/519/EC.

IMPORTANT: The 'CE' marking must be affixed to a visible location on the OEM product, where this module is installed in, and has to be labeled in accordance to R&TTE Directive 1999/5/EC.

FCC compliance

This device complies with Part 15 of the FCC Rules11. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) This device must accept any interference received, including interference that may cause undesired operation.
Any changes or modifications not expressly approved bySECO Northern Europe GmbH could void the user's authority to operate the equipment.
The internal / external antenna(s) used for this module must provide a separation distance of at least 2 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.
The outside of final products containing the TANARO module must display in a user accessible area alabel referring to the enclosed module. This exterior label can use wording such as the following12:
"Contains Transmitter Module FCC ID: tbd" or "Contains FCC ID: tbd".

Approved Antenna:

Radio approval is in progress, antenna specification for WLAN/Bluetooth will be published after completion.

Annex C: Common Documentation

C-1 Warranty hints

SECO Northern Europe embedded systems are subject to manufacturer's warranty as long as the products are handled with adequate care and caution and in accordance to this manual.
The period of guarantee starts from the date of shipment
The products are warranted against defects in material, quality and functionality within the warranty period.
During this period, the repair of the products is free of charge.
SECO Northern Europe will decide for repair or replacement at their own discretion.
If the product has been returned with or without prior notice and no failure or malfunction can be detected or the failure or malfunction is caused by inappropriate handling or the device has been returned after expiry of warranty period, SECO Northern Europe reserve the right to charge the user for repair or replacement.

The warranty does not cover defects caused by improper or inadequate installation, maintenance or handling by the user, unauthorized modification or misuse, operation outside the specification a non-compliance of this manual. In case of doubt, please contact the technical sales team prior to intended activity.
The warranty does also not cover any defects or damages of other equipment connected to the SECO Northern Europe product, faulty or not.
For warranty or repair service, please contact the technical sales team.

support.north@seco.com
rma.north@seco.com

C-2 Field of Application

The products covered by this document are designed and manufactured for the following applications (I). If you intend to use these products in applications as quoted in (II) we highly recommend a personal contact with our consultants and/or technical sales team.

(I) Recommended application areas for SECO Northern Europe embedded systems

Even for these applications, we recommend to get in contact with our technical sales team. We offer a wide range of support, even at an early stage of evaluation and/or design-in phase.

- Vending machines and gastronomy devices
- Industrial controllers and HMI systems
- Home automation and facility management
- Audiovisual equipment
- Instrumentation and measuring equipment

(II) Restricted application areas, prior consultation is mandatory to identify and meet the individual regulatory requirements

- Gas leak detectors
- Rescue and security equipment
- Safety devices
- Control and safety devices for airplanes, trains, automobiles and other transportation equipment
- Traffic control systems
- Control equipment for nuclear power industry
- Medical equipment related to life support etc.
- Gasoline stations and oil raffineries

Annex D: Technical Support

Before contacting the SECO Northern Europe support team, please try to help yourself by the means of this manual or any other documentation provided by SECO Northern Europe or the related websites.
If this does not help at all, please feel free to contact us.
Our technicans and engineers will be glad to support you. Please note that beyond the support hours included the Starter Kit, various support packages are available. To keep the pure product cost at a reasonable level, we have to charge support and consulting services per effort.

Shipping Address:

SECO Northern Europe GmbH
Schlachthofstrasse 20
21079 Hamburg
Germany

Support Contact:

Phone: +49 (0) 40 / 791 899-200
Fax: +49 (0) 40 / 791 899-39
E-Mail: support.north@seco.com
URL: north.seco.com

Annex E: General Information

Trademarks and service marks
Names and logos in this document may be trademarks of their respective companies.
In some cases descriptions for copyrighted products are not explicitly indicated as such. The absence of the trademark (™) and copyright (©) symbols does not imply that a product is not protected. Additionally, registered patents and trademarks are similarly not expressly indicated.

Drawings
All drawings, which are shown in this manual are schematic drawings.
For exact technical drawings please refer to our sales team or product manager
All other product or service names are the property of their respective owners.