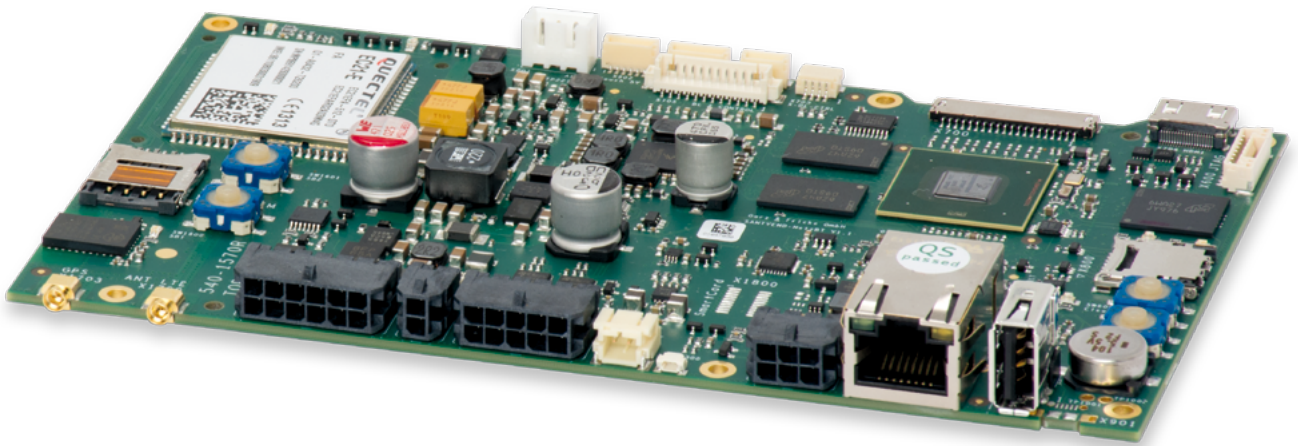# SANTVEND core
Arm® Cortex®-A9 Single Board Computer

Vending / IOT platform with 3G / 4G modem and MDB interfaces.

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	10.02.2017	CG	Initial Release
V 2	12.09.2019	CG	Change address
V 3	17.12.2021	bmy	SECO CI Update 2022

Online support on edge.seco.com

Table of Contents

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 „D-1 Warranty hints"**
> ► **Annex „D-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.   GSM - Module / SIM Card

- ► It is the responsibility of the user to enforce the country regulation and the specific environment regulation. Do not insert or remove the SIM when the product is powered.
- ► Every module has to be equipped with a proper antenna with specific characteristics. The antenna has to be installed with care in order to avoid any interference with other electronic devices and has to guarantee a minimum distance from the body (20 cm).
- ► It must be assumed that a safe operation is no longer possible, in case
  Switch off your wireless device when in hospitals, clinics or other health care facilities. These requests are designed to prevent possible interference with sentitive medical equipment.
- ► Your cellular terminal or mobile contains a transmitter and receiver. When it is ON , it receives and transmits radio frequency energy. RF interference can occur if it is used close to TV set, radio, computer or other electric equipment.
- ► In locations with potencially explosive atmospheres, obey all posted signs to turn off wireless devices such as your phone or other cellular terminals. Areas with potentially explosive atmospheres include fuelling areas, below decks on boats, fuel or chemical transfer or storage facilities, areas where the air contains chemicals or particles such as grain, dust or metal powders, etc.

III. 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.

IV. 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

3. Product Introduction

This document is applicable for hardware revisions 1.0 or later of the SANTVEND series.

Please find the hardware version grid in **„Annex A: Hardware Revision Information"**:
SANTVEND is an Embedded System to be used as human machine interface (HMI) in various applications. Please refer to **Annex „D-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.
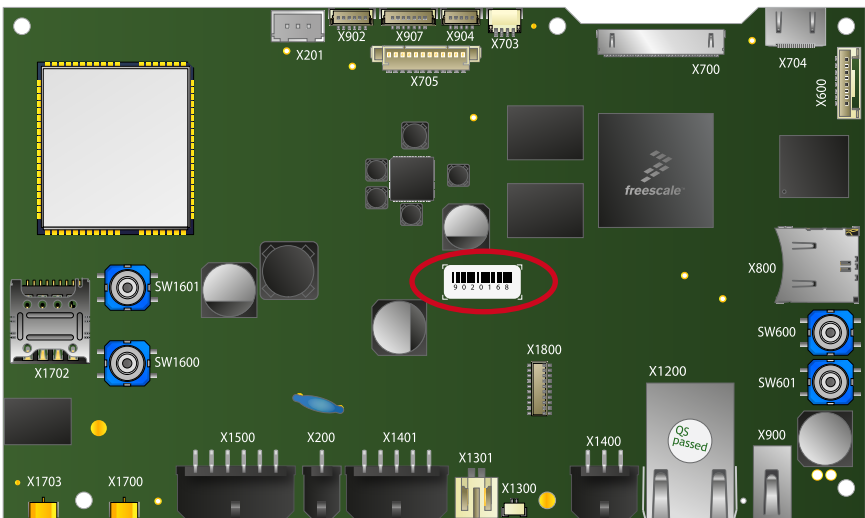
code defines the serial number
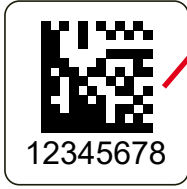
3.2   Related Documents and Online Support

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

OPERATING SYSTEMS

Linux Yocto Rocko	 https://bit.ly/3G5Dq1e	Contains information about Linux BSP with development environment Linux Embedded System Yocto (Codename: Jethro, Version 3.0) includes first information about the bootloader Flash-N-Go

4. Technical Data

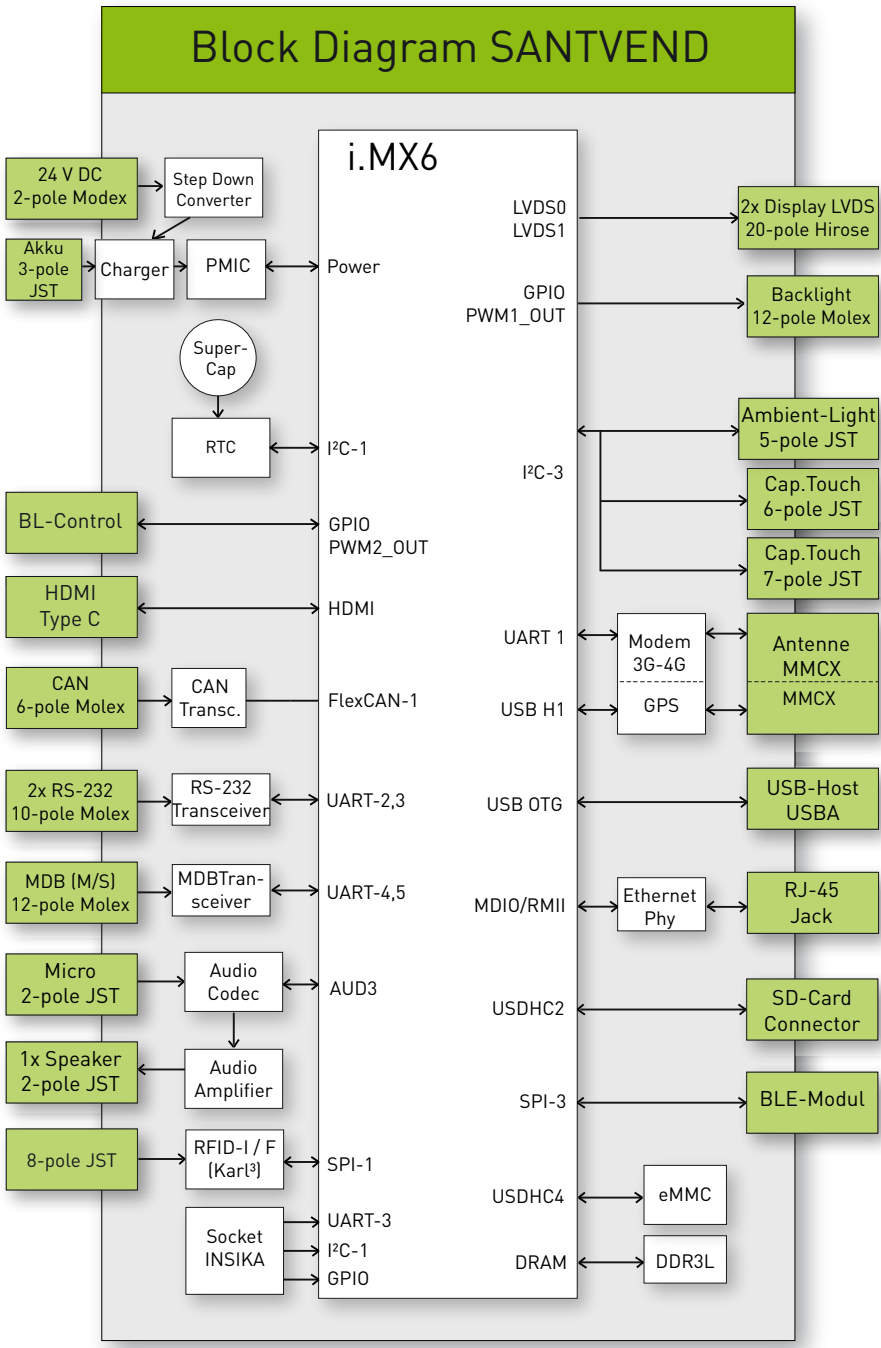| CPU	x2
CPU Type	i.MX6Dual
Core Class	Arm® Cortex®-A9
Core Clock	1 GHz
Features	NEON for SIMD media acceleration and VFP operations; Multi-format HD 1080p video decoder and HD 720p video encoder hardware engine; L1 cache, 32 KB for instruction, 32 KB for data; 1 MB L2 cache
	512 KB L2 cache
HW Accelerators	Open VG 1.1
RTC	Accuracy: +/- 30 ppm at 25°C
Super Cap	Buffer for 24h
Memory	
eMMC Flash	4 GB MLC eMMC
RAM Standard	2 GB 32 bit DDR3L
Micro SD Card Slot	4 bit MMC/SDIO/SD/SDHC
Operating Systems	
Supported OS	Linux Yocto
Communication Interfaces	
Network	1x 10/100 Mbit/s Ethernet (RJ-45)
USB 2.0	1x 480 Mbit/s Type A (Host)
CAN Fieldbus	1x CAN (ISO/DIS 11898)
MDB	1x Master, 1x Slave
Modem	3G / 4G, GPS (optional); Micro Sim Socket
RS-232	1x RS-232 (RX/TX/CTS/RTS) and 1x RX, TX
Synchronous Serial Interfaces	SPI up to 2 chip selects; Pinning for RFID-I / F (Karl³)
BLE Modul (Option)	Single Mode BLE V 4.0 Slave
INSIKA (Option)	Socket for optional Smart-Card Interface (Plug In)
Misc.	2x Service Button
Video	
Video output	HDMI 1.4 Type C Connector; + On / Off, PWM 2nd Backlight control con.
Audio	
Speaker output	1x speaker (connector), 1.5 W RMS (8Ω)
Micro IN	1x microphone connector
Display and Touch	
Display Interface	Dual Channel 24bpp LVDS
Sensor	Ambient-Light-Sensor (external via I²C)
Touch Interface	PCAP I²C
Backlight Interface	+12 V, +5V, on/off, PWM
Device Dimensions	
W x H x D	160 x 18 x 95 mm; PCB 160 x 95 mm
Weight	115 g
Power Supply	
Supply Voltage	Nom. 24 V DC / max. 10 to 42 V DC
Consumption	Typ. 3.0 W; max. tbd.
Li-Ion-Akku	3.7 V / 2.0 to 4.0 Ah for Modem and Backup-Power
Charge Controller	Internal
Typical Environmental Conditions	
Storage Temp.	-20 to +70 °C without Li-Ion-Akku
Operating Temp.	0 to +40 °C (normal operation) -20 to +60 °C without charge Li-Ion-Akku
Humidity	5 to 90 % RH
Max. Operating Altitude ty	3.000 m
Max. Storage/Transit Altitude	10.000 m
Noise Level [db(A)] @ 1m	<<40 (fanless design)
Lifetime	
MTBF	≥ 50.000 h

4.1 Block Diagram

Block Diagram SANTVEND

i.MX6

Left side	i.MX6 signal
24 V DC 2-pole Modex → Step Down Converter	Power
Akku 3-pole JST → Charger → PMIC	
Super-Cap → RTC	I²C-1
BL-Control	GPIO PWM2_OUT
HDMI Type C	HDMI
CAN 6-pole Molex → CAN Transc.	FlexCAN-1
2x RS-232 10-pole Molex → RS-232 Transceiver	UART-2,3
MDB (M/S) 12-pole Molex → MDBTransceiver	UART-4,5
Micro 2-pole JST → Audio Codec	AUD3
1x Speaker 2-pole JST → Audio Amplifier	
8-pole JST → RFID-I / F (Karl³)	SPI-1
Socket INSIKA	UART-3, I²C-1, GPIO

i.MX6 signal	Right side
LVDS0 LVDS1	2x Display LVDS 20-pole Hirose
GPIO PWM1_OUT	Backlight 12-pole Molex
I²C-3	Ambient-Light 5-pole JST
	Cap.Touch 6-pole JST
	Cap.Touch 7-pole JST
UART 1 → Modem 3G-4G	Antenne MMCX / MMCX
USB H1 → GPS	
USB OTG	USB-Host USBA
MDIO/RMII → Ethernet Phy	RJ-45 Jack
USDHC2	SD-Card Connector
SPI-3	BLE-Modul
USDHC4 → eMMC	
DRAM → DDR3L	

4.2   Technical Drawing

Missing dimensions according to 3D CAD files

4.3   PCB Design and Pin Assembly

As this manual describes a core version, the internal and external interfaces will be mentioned in the following chapter.
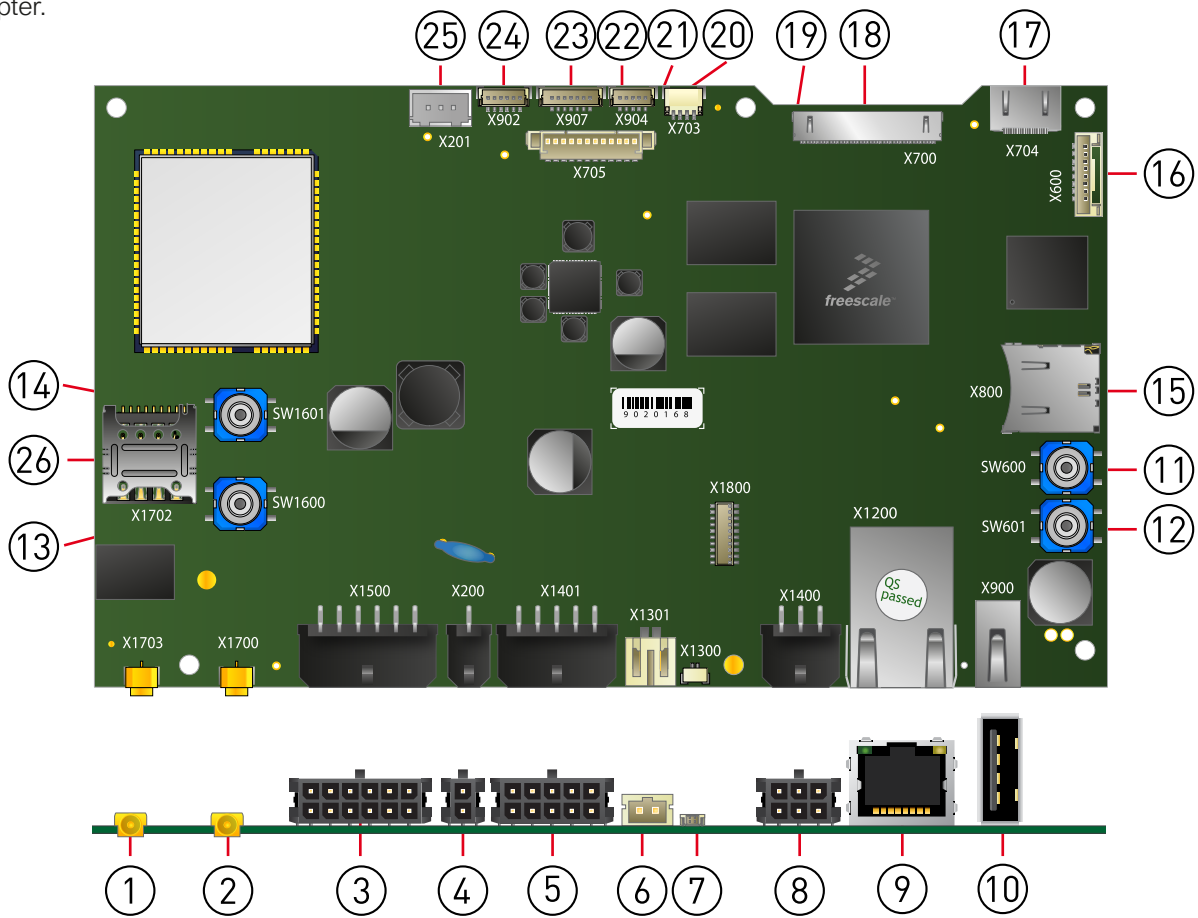
(Exemplary Illustration front side. The illustration shows the fully equipped SANTVEND Quadcore light. It shows no heatsink to provide a better overview.)

Pos.	Description
1	GPS (X1703)
2	GSM (X1700)
3	MDB (X1500)
4	Power (X200)
5	RS-232 (X1401)
6	Speaker (X1301)
7	Microphone (X1300)
8	CAN (X1400)
9	Ethernet (X1200)
10	USB - Host (X900)
11	Boot Select (SW600)
12	Reset (SW601)
13	Service 1 (SW1600)

Pos.	Description
14	Service 2 (SW1601)
15	Micro SD card reader (X800)
16	JTAG - Debug Interface (X600)
17	HDMI (X704)
18	LVDS 1 (X700)
19	INSIKA (X1800)
20	2nd BL-CTRL (X703)
21	Backlight & PWM (X705)
22	Ambient Light Sensor (X904)
23	Touch, 3.3 Vcc (X907)
24	Touch, 5.0 Vcc (X902)
25	Li - Ion - Akku (X201)
26	Micro SIM - Card (X1702)
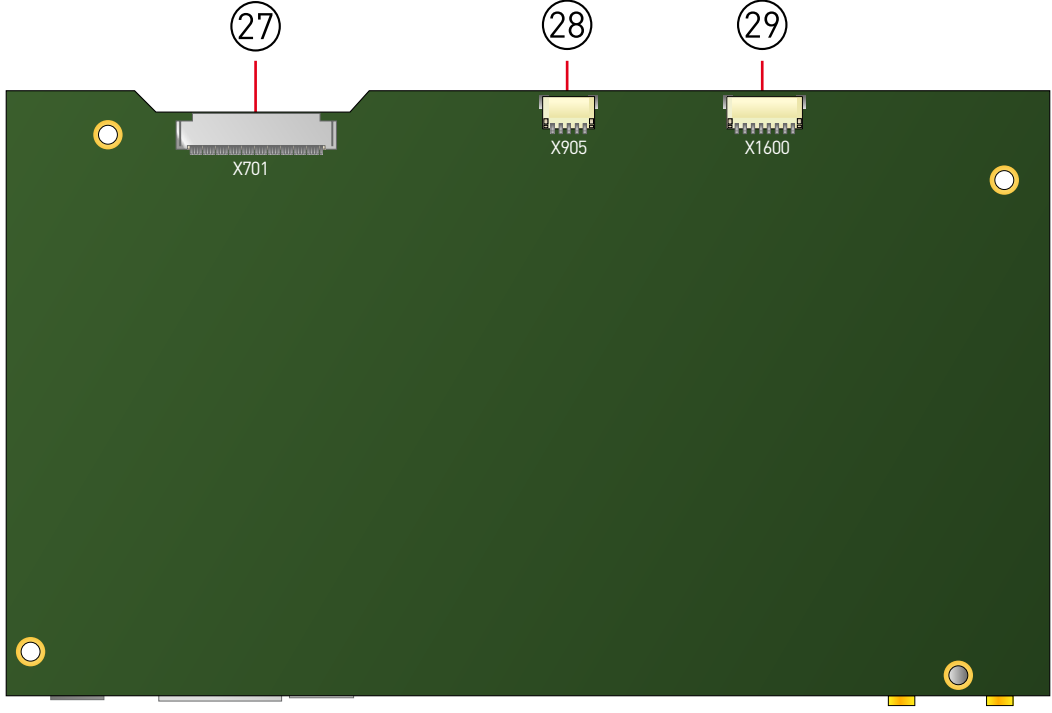
(Exemplary Illustration back side)

Pos.	Description
27	LVDS 2 (X701)
28	Ambient - Light - Sensor (X905)
29	SPI (X1600)

5. Installation and Start Up

The content of this document is limited to explain the device connectors and how to access SANTVEND 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

USB Accessory
Memory stick,
mouse

RS-232 (Serial)
Debug-PC /
Periphery

Ethernet (TCP/IP) via
cross over cable or switch
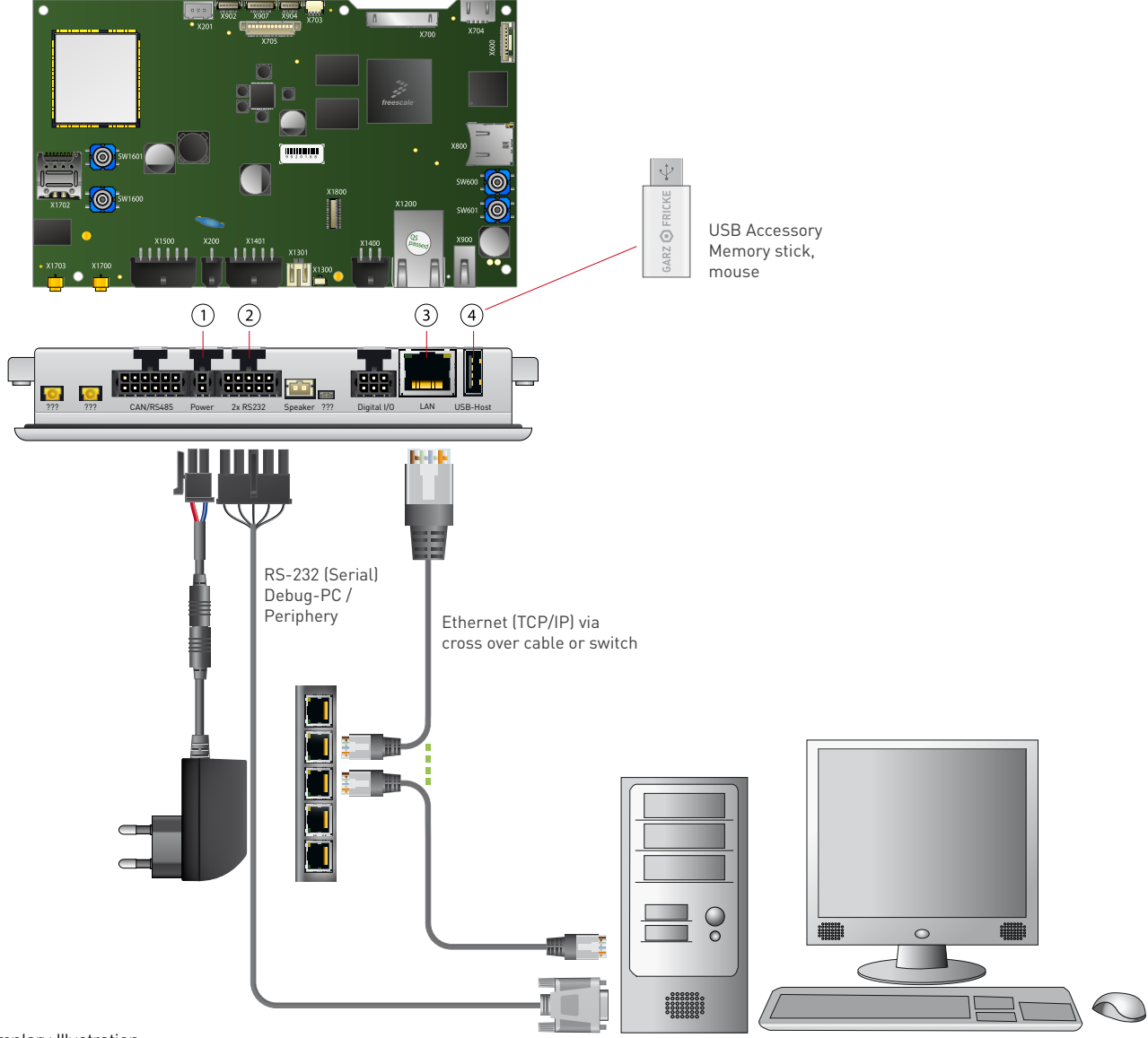
Exemplary Illustration

Pos.	Description
1	DC in
2	RS-232
3	Ethernet
4	USB-Host
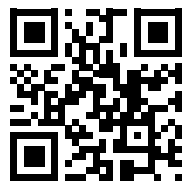
6. Internal and External Interfaces

6.1 Antenna GPS (X1703)

Pin	Name	Description	Level
Center	RF-IN	50 Ohm; Feeding active GPS antenna	+3,3V
Shield	GND		

Header: MMCX_SMD_EdgeMount 090°

6.2 Antenna GSM (X1700)

Pin	Name	Description	Level
Center	RF-I/O	50 Ohm; GSM antenna	
Shield	GND		

Header: MMCX_SMD_EdgeMount 090°

Application Notes

The usage of a Quad Band Antenna (850/900/1800/1900), VSWR: ≤ 2.0 is recommended
For cabled aerials, the cable length should not exceed 3 m (dedicated cable type RG174)
For larger cable length not exceeding 30 m, the usage of a special low loss cable is essential.
Additional cable adapters are needed to contact the low loss cable properly.

Outdoor aerials have to be designed and grounded according to DIN EN 60728-11
The grounding of the antenna is not obliged, when the antenna is installed
more than 2 m below the roof edge and
less than 1.5 m away from the building
For installation in countries outside Germany, please ensure to act in accordance with the local
restrictions and regulations!

6.3   MDB (X1500)
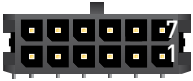
Pin	Name	Description	Level
1	VCC_MDB-S	Eingang VCC (complete system)	12-24 VDC
2	GND	Common GND	GND
3	WakeUp-MDB-S	WakeUp-IO (In/Open Collector)	5V
4	TX-MDB-S	OUT TX MDB Slave	5V
5	RX-MDB-S	IN RX MDB Slave	5V
6	GND	Common GND	GND
7	VCC_MDB-M	Ausgang VCC MDB Master	12-24 VDC
8	GND	Common GND	GND
9	WakeUp-MDB-M	WakeUp-IO (In/Open Collector)	5V
10	RX-MDB-M	IN RX MDB Master	5V
11	TX-MDB-M	OUT TX MDB Master	5V
12	GND	Common GND	GND

Header: Type 43045-1200 / 12 pol. Molex MicroFit 090°
Plug: 43025-1200 12 pol. Molex MicroFit
                 crimp contact Molex 43030-0007

6.4   Power (X200)

Pin	Name	Description	Level
1	GND	Common GND	GND
2	Power In	Eingang VCC (complete system)	Nom. 12 to 24 V DC

Header: Molex 43045-0200 Micro-Fit 2p
Plug: Molex 43025-0200 Micro-Fit 2p,
               crimp contact Molex 43030-0007

Caution:
Power supplies connected to this device must be compliant to the requirements of
"limited power sources" (LPS) to prevent the end-user from danger in case of a fault.

6.5 Li - Ion - Akku (X201)
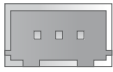
Pin	Name	Description	Level
1	GND	Common GND	GND
2	NTC	10K NTC	3.3 V
3	V Li Ion Akku	Plus Li-Ion-Akku	4.2 V

Header: Type: B3B-XH-A / 3pol. JST-XH, THT 180°
Plug: XHP-3 / 3pol. JST-XH
             crimp contact SXH-001T-P0.6 (22-28 AWG Tin)

Recommendation for an suitable Li-Ion-Accumulator

Electrical characteristics	
Nominal voltage	3,7 V
Nominal capacity (minimum requirement)	2 Ah
Initial Internal Impedance	Less than 100mΩ
NTC	10KOhm 10% @25°C

Operating conditions	
Operating Temperature	Charge : 0 .. +40 °C Discharge : -20 .. +60 °C
Charge System	Constant current: 0,2 .. 1,0 C Constant voltage: 4,2 V
Maximum continuous discharge current	1,0 .. 2,0 C
Pulse discharge current	2,0 .. 4.0 C

Safety Requirements	
Protection Circuit	See schematic, wiring diagram
Over Voltage Cut OFF	4.3 V
Under Voltage Cut OFF	2.25 V
Overload Cut OFF (Short circuit protection)	Reversible fuse
NTC	Built in (10K)

Approval & Conformity	UL, CE

Schematic, wiring diagramm

Lithium Ion Battery Pack

P1
3
XHP-3
2
1

Plus
Temp_Sense
Minus (GND)

Protection Ciruit
Polyfuse
NTC

18
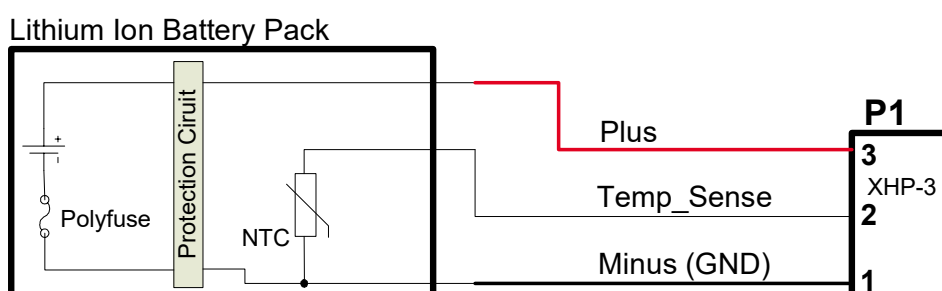
6.6   RS-232 (X1401)
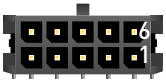
Pin	Name	Description	Level
1	GND	Common GND	GND
2	RS232-1_TX	RS232-1_TX	V.28
3	RS232-1_RX	RS232-1_RX	V.28
4	RS232-1_RTS	RS232-1_RTS	V.28
5	RS232-1_CTS	RS232-1_CTS	V.28
6	GND	Common GND	GND
7	RS232-2_TX	RS232-2_TX [1]	V.28
8	RS232-2_RX	RS232-2_RX [1]	V.28
9	MISC_WU	WakeUp-IO (In/Open Collector)	5 V
10	GND	Common GND	GND

Header: Type 43045-1000 / 10pol. Molex MicroFit 090°
Plug: 43025-1000 / 10 pol. Molex MicroFit
               crimp contact Molex 43030-0007

[1] Note: Not available if INSIKA-Interface populated.

6.7   Speaker (X1301)

Pin	Name	Description	Level
1	Speaker+	OUT D-Class-Amp.	5 V
2	Speaker-	OUT D-Class-Amp.	5 V

Header: Type S2B-PH-SM3-TB / 2pol. RM2.0mm; JST PH-Serie 090°
Plug: Type PHR-2 / 2pol. RM2.0mm; JST PH-Serie
               crimp contact JST SPH-002T-P0.5L

6.8   Microphone (X1300)

Pin	Name	Description	Level
1	GND	Common GND	GND
2	MIC_IN	MIC & MIC_BIAS	3.3 V

Header: Type SM02B-SURS-TF / 2pol. RM 0.8mm; JST SUR-Serie 090°
Plug: Type 02SUR-32S / 2pol. RM 0.8mm; JST SUR-Serie
               (2 Position Rectangular Receptacle Connector IDC Tin 32 AWG)

6.9 CAN (X1400)
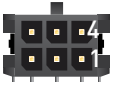
Pin	Name	Description	Level
1	GND	Common GND	GND
2	CAN1_H	Signal CAN High	5 V
3	CAN1_L	Signal CAN Low	5 V
4	WakeUp-CAN	WakeUp-IO (In/Open Collector)	5 V
5	Term_CAN1_H	Termination CAN High	5 V
6	Term_CAN1_L	Termination CAN Low	5 V

Header: Type 43045-0600 / 6pol. Molex MicroFit 090°
Plug: 43025-0600 / 6 pol. Molex MicroFit
              crimp contact Molex 43030-0007

6.10   Ethernet (X1200)

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

Header: Type Shinetech_SHRJ-1104D5005 / Ethernet 100MBit, RJ45 090°

Green LED (link) is default off and turns on when link is detected.

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

6.11 USB - Host (X900)

Pin	Name	Description	Level
1	USB_HS_VBUS	Power supply, max. 300mA	+5 V
2	USB_HS_DN	Data minus (D-)	
3	USB_HS_DP	Data plus (D+)	
4	GND	Common GND	GND

Header: Type MOLEX 673298020 / USB-A-Short 090°

6.12 Push - Buttons (SW600), (SW601), (SW1600), (SW1601)

Ref.	Name	Funktion
SW600	Boot Select	Select Boot Mode
SW601	Reset	Reset ALL, Reboot
SW1601	Service 1	RFU
SW1600	Service 2	RFU

6.13   JTAG - Debug Interface (X600)

Pin	Name	Description	Level
1	JTAG_TCK		3.3 V
2	GND		GND
3	JTAG_TDO		3.3 V
4	JTAG_MOD		3.3 V
5	JTAG_TMS		3.3 V
6	JTAG_TDI		3.3 V
7	JTAG_TRST_B		3.3 V
8	J_SRST_B		3.3 V

Header: Type: BM08B-GHS-TBT / 8pol. JST-GH, 180°
Plug: Plug: Type GHR-08V-S / 8pol. JST-GH
                  crimp contact: Type SSHL-002T-P0.2

6.14   HDMI (X704)

Pin	Name	Description	Level
1	TMDS Data2 Shield	Common GND	GND
2	TMDS Data2+	Differential Output	
3	TMDS Data2-	Differential Output	
4	TMDS Data1 Shield	Common GND	GND
5	TMDS Data1+	Differential Output	
6	TMDS Data1-	Differential Output	
7	TMDS Data0 Shield	Common GND	GND
8	TMDS Data0+	Differential Output	
9	TMDS Data0-	Differential Output	
10	TMDS Clock Shield	Common GND	GND
11	TMDS Clock+	Differential Output	
12	TMDS Clock-	Differential Output	
13	DDC/CEC Ground	Common GND	GND
14	CEC		3.3 V
15	SCL		5 V
16	SDA		5 V
17	Reaserved	Not connected	n/a
18	+5 V Power	AUX Supply max. 55 mA	+ 5 V
19	Hot Plug Detect		3.3 V

Header: Type: WERI PART NO: 685 119 136 923 / MINI-HDMI (Type C), 090°

6.15   LVDS 0 (X700) LVDS 1 (X701)

X700

Pin	Name	Description	Level
1	VCC	VCC Display Logik max. 1A	+3.3 V
2	VCC		+3.3 V
3	GND	Common GND	GND
4	GND	Common GND	GND
5	LVDS0_TX0_N	Differential Output	LVDS
6	LVDS0_TX0_P	Differential Output	LVDS
7	GND	Common GND	GND
8	LVDS0_TX1_N	Differential Output	LVDS
9	LVDS0_TX1_P	Differential Output	LVDS
10	GND	Common GND	GND
11	LVDS0_TX2_N	Differential Output	LVDS
12	LVDS0_TX2_P	Differential Output	LVDS
13	GND	Common GND	GND
14	LVDS0_TXCLK_N	Differential Clock	LVDS
15	LVDS0_TXCLK_P	Differential Clock	LVDS
16	GND	Common GND	GND
17	LVDS0_TX3_N	Differential Output	LVDS
18	LVDS0_TX3_P	Differential Output	LVDS
19	GND	Common GND	GND
20	SEL6_8	Digital Output	3.3 V

Header: HIROSE DF19G-20P-1H / 20pol. LVDS, 090°
Plug: HIROSE DF19G-20S-1C

X701

Pin	Name	Description	Level
1	VCC	VCC Display Logik max. 1A	+3.3 V
2	VCC		+3.3 V
3	I2C3 SDA	I²C3 Data	3.3 V PU 1K
4	GND	Common GND	GND
5	LVDS1_TX0_N	Differential Output	LVDS
6	LVDS1_TX0_P	Differential Output	LVDS
7	GND	Common GND	GND
8	LVDS1_TX1_N	Differential Output	LVDS
9	LVDS1_TX1_P	Differential Output	LVDS
10	GND	Common GND	GND
11	LVDS1_TX2_N	Differential Output	LVDS
12	LVDS1_TX2_P	Differential Output	LVDS
13	GND	Common GND	GND
14	LVDS1_TXCLK_N	Differential Clock	LVDS
15	LVDS1_TXCLK_P	Differential Clock	LVDS
16	GND	Common GND	GND
17	LVDS0_TX3_N	Differential Output	LVDS
18	LVDS0_TX3_P	Differential Output	LVDS
19	GND	Common GND	GND
20	I2C3 SCL	I²C3 Clock	3.3 V PU 1K

Header: HIROSE DF19G-20P-1H / 20pol. LVDS, 090°
Plug: HIROSE DF19G-20S-1C
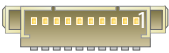
6.16   2nd BL-CTRL (X703)

Pin	Name	Description	Level
1	GND	Common GND	GND
2	X-LOGIC_ON	On / Off VCC Logik, external Display	5 V
3	X-BL_PWM	PWM Dimming Backlight, external Display	5 V
4	X-BL_ON	On / Off Backlight, external Display	5 V

Header: Type SM04B-SRSS-TB / 4pol. RM1.0mm; JST SH-Serie 090°
Plug: Type SHR-04V-S / 4pol. RM1.0mm; JST SH-Serie
                crimp contact SSH-003T-P0.2

6.17   Backlight & PWM (X705)

Pin	Name	Description	Level
1	12 V	Supply Backlight or Display-Logik max. 1 A	+12 V
2	12 V		
3	12 V		
4	5 V	Supply Display-Logik max. 1,5 A	+5 V
5	5 V		
6	GND	Common GND	GND
7	GND	Common GND	GND
8	GND	Common GND	GND
9	PWM	Typ. 250Hz 16 Bit	3.3 V
10	PWM 5 V	Driven by Signal of Pin 9	5 V
11	BL_ON	Digital Output	3.3 V
12	BL_ON 5 V	Driven by Signal of Pin 11	5 V

Header: Molex 53398-1271 / 12 pol.
Plug: Molex 51021-1200
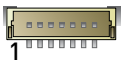   crimp contact 50079-8000 (26-28 AWG Tin)

6.18   Ambient Light Sensor (X904)

Pin	Name	Description	Level
1	VDD	VCC für Light-Sensor	+3.3 V
2	I2C3_SDA	IO Daten I²C	3.3 V
3	I2C3_SCL	IN Clock I²C	3.3 V
4	GND	Common GND	GND
5		RFU - nc	

Header: Type BM05B-SRSS-TB / 5pol. RM1.0mm; JST SH-Serie 180°
Plug: Type SHR-05V-S / 5pol. RM1.0mm; JST SH-Serie
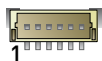   crimp contact SSH-003T-P0.2

6.19   Touch, 3.3 Vcc (X907)

Pin	Name	Description	Level
1	nc	Not connected	n/a
2	CTouch SDA	IO Daten I²C (I²C3_SDA)	3.3 V PU 1K
3	CTouch SCL	IN Clock I²C (I²C3_SCL)	3.3 V PU 1K
4	GND	Common GND	GND
5	CTouch RST	Reset to Touch Controller	3.3 V
6	CTouch INT	INT from Touch Controller	3.3 V
7	VDD Not connected	VCC für Touch Panel	+3.3 V

Header: Type BM07B-SRSS-TB / 7pol. RM1.0mm; JST SH-Serie 180°
Plug: Type SHR-07V-S / 7pol. RM1.0mm; JST SH-Serie
               crimp contact SSH-003T-P0.2

6.20   Touch, 5.0 Vcc (X902)

Pin	Name	Description	Level
1	CTouch VDD	VCC für Touch Panel	+5 V
2	CTouch SDA	IO Daten I²C (I²C3_SDA)	3.3 V PU 1K
3	CTouch SCL	IN Clock I²C (I²C3_SCL)	3.3 V PU 1K
4	GND	Common GND	GND
5	CTouch RST	Reset to Touch Controller	3.3 V
6	CTouch INT	INT from Touch Controller	3.3 V

Header: Type BM06B-SRSS-TB / 6pol. RM1.0mm; JST SH-Serie 180°
Plug: Type SHR-06V-S / 6pol. RM1.0mm; JST SH-Serie
               crimp contact SSH-003T-P0.2

6.21 INSIKA (X1800) optional reserved for Internal Use

Pin	Name	Description	Level
1	5P0	VCC max. 100mA	+5 V
2	SC_BASE_CLK_X	Driven Clock CLKO2	3.3 V
3	5P0	VCC max. 100mA	+5 V
4	GND	Common GND	GND
5	GND	Common GND	GND
6	SC_RX_X	Driven UART3_TXD	3.3 V
7	GND	Common GND	GND
8	SC_TX_X	IN UART3_RXD	3.3 V
9	3P3	VCC max. 500mA	+3.3 V
10	SC_RST_X	GPIO	3.3 V
11	3P3	VCC max. 500mA	+3.3 V
12	SC_SIG_ENA#_X	GPIO	3.3 V
13	GND	Common GND	GND
14	SC_VCC5V_ENA_X	GPIO	3.3 V
15	1P8	VCC max. 100mA	+1.8 V
16	SC_VCC3V_ENA_X	GPIO	3.3 V
17	I2C1_SCL	I²C1_SCL	3.3 V
18	SC_SEL_X	GPIO	3.3 V
19	I2C1_SDA	I²C1_SDA	3.3 V
20	AUX_IO1_X	GPIO	3.3 V

Header: Molex 53307-2071 / 2x10pol. RM0.8mm, 180°
Plug: Molex 52465-2071 / 2x10pol. RM0.8mm, 180°

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
SANTVEND core x2	tbd.	SANTVEND - NetzBT V1.1

Hardware Revision	Marking on PCB
V1.1	SANTVEND - NetzBT V1.1

Annex B: Assembly Options

B-1   WIFI / Bluetooth

Some appliances require a wireless network connection. To be more flexible with regard to future WiFi standards and regulations, we decided not to assemble this functionality directly onto the
single-board-computer. We recommend an external USB or miniPCIe solution. Drivers for both versions will be included in the related operating systems. Please contact the support for information about supported modules.

Annex C: Guidelines and Standards

C-1   RoHS Declaration

Devices comply with the requirements of Directive 2011/65/EU of the European Parliament and of the Council of 8th June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

C-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.

C-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 6.13)
▶ 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.

C-4   SECO Northern Europe Comformity 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 not 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.

Annex D: Common Documentation

D-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

D-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 E: 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

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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
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