



Vehicle HUB Grand/Giant Datasheet

ITxPT Sequoia labeled

VGC, Timeserver, ADR Navigation, WiFi, 5 port ethernet, 2x rs232, 2x rs485
2x canbus, audio, 8 input, 8 output, Dual sim for 3G/4G or 5G modem
Mechanical robust with anti vibration installation features

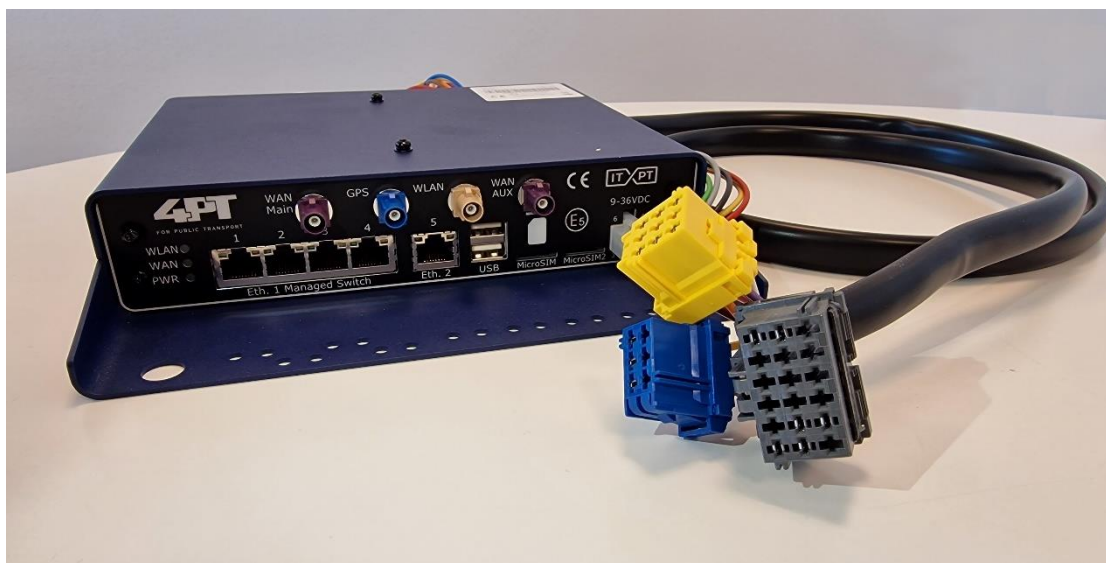




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1. Description

The Vehicle Grand/Giant HUB offers the hardware needed and software including cloud solution for all who want to make ITxPT systems fast and easy. The product is ITxPT labelled and has E5 10R06 approval, as well as UNECE R118 Annex 6. and 8.

The HUB family supports different modems from 4G cat4 /Cat6/Cat12 and are also ready for 5G sub 6 GHz.

The platform is independent and not tied to any purchase of software or systems. We call this *open-source hardware*.

We do supply drivers and OS for the Hub to function 100% incl. the ITxPT services, such as:

Module inventory
Time
GNSS Location
FMStoIP
VEHICLEtoIP
MQTT Broker

Other software functions are:

Routing, Bridging, Firewall, OpenVPN, Dedicated switch management. Open SDK for your own custom firmwares with support for most Linux features and drivers. Remote firmware updates for all internal devices and Cloud based support tools via API

The Vehicle Grand/Giant HUB can gather all input signals available and make them transparently accessible via UDP broadcast on IP interfaces, so data is shared between all the devices in the vehicle. Each of the added interfaces can be exposed via the ethernet either via LAN cable or via WI-FI as a transparent bidirectional IP interface, so communication forth and back between interfaces will be lifted as IP layer. The Vehicle Grand/Giant HUB will be able to replace several autonomous modules in public transport vehicles like computer, modem, GNSS, Gigabit ethernet switch, GPIO's, and FMS CAN, Timeserver and deliver all in a box – making installation, service and updates via networks and remote.

The Vehicle Grand/Giant HUB are designed for rough environments. It features, 4 anti-vibration rubber feet, a strong aluminum cabinet with plenty of ties for cables to secure no vibration in the connector joints.

An internal heater system secure starting in extreme cold environment down to -45°C with a time delay.

The build in microprocessor and sensors handles and reports the following information to the main system. Temperatures, the connected vehicle power, status on Ignition pin and status on battery low input pin.

The WiFi interface is well suited for connecting a driver terminal – in the form of a Tablet.

The 8 outputs are short circuit protected and secured with diodes for operating of relays.

The 8 inputs are all protected against overvoltage. The ignition and the battery low input ports are in addition to the 8 general inputs, and they are also protected but placed in the power connector for easy cable integration to ITxPT systems

The 2x RS485 and 2x CAN BUS are fully isolated to secure high reliability and easy integration to all LED-sign interfaces and the dual CAN BUS interfaces can harvest the data from the vehicle and do control of systems like heater systems or other equipment on the vehicle.

Dual RS232 and dual USB 2.0 is available.

AUDIO features for voice announcements are available.

The GPS system has option for u-blox M8L ADR GNSS module with 3D speed sensors, as well as wheel tick input (Odometer) and direction. It do work without wheel tick and direction support. This option are securing the best navigation performance available on the market- The system is 100% auto calibrated – and no limitation on the mounting of the Vehicle Grand/Giant HUB exist in relation to the sensors of the Navigation system.

The complete Vehicle Grand /Giant HUB is tested against the latest standards and are E5 10R06 Marked.

The standard used for test are EN301 489-1, EN301 489-3, EN301 489-52, EN55022: 2006, ISO16750-2 load dump and the ISO7637-2 conducted transient immunity.

Full UNECE R118 Annex 6. and 8. certified

Test report is available on request.

The Giant offers more CPU and more ethernet speed. Details on request.

2. Specification

Version	Date
CPU + memory	NXP I.MX6ULL-900MHz, 512MB RAM, 512MB SLC Flash, 4GB eMMC flash, RTC with Backup
Operational temperature	-20°C to +65°C (heater secure start even at -40°C degree)
Storage temperature	-40°C to +85°C
Input voltage range	+ 9V to +36V (Nom. 12-volt system and 24-volt system)
Standby power	< 100mW @ +24V
Digital inputs	8 inputs, +9V to + 36V, ESD Protected
Digital outputs	8 outputs made as open collector with 1A, 50V, Clamp diodes. Can be organized as 2 x 4 outputs with 5V, 12V or native battery. The individual outputs must not be shorted and the allowed power in total drawn from the 8 ports simultaneous is limited to 2,5 W in 5V or 12V mode and 4,8 Watt in native battery mode.
Digital output supplies	+5V/0.5A, +12V/0.4A, +24V/0.4A, Resettable fused
Analogue audio inputs	2 x analogue balanced audio inputs
Analogue audio outputs	2 x analogue balanced audio output with galvanic isolation
Microphone	1 x Microphone input single ended
Microphone switch	1 x Microphone switch input
Microphone switch supply	1 x +3,3 V weak pull-up
Digital audio	1 x Low Power Stereo Codec
Mini PCI Express slot	1 x Used for Modem – M.2 adapter for 5G available
Navigation expansion slot	1 x NEO-M8L ADR with 3D sensors and protected odometer input Wheel tick & direction Continuous navigation during signal loss. Support of active antenna and with extra filtering to reduce LTE noise GPS/QZSS, BeiDou, Galileo, GLONASS Realtime navigation up to 30 Hz rate
Ethernet	1 x LAN 10/100 Mbps ethernet (LAN 2)
Ethernet switch	4 LAN Ports 10/100/1000 Mbps MANAGED ethernet switch (LAN 1) WiFi IEEE802.11 b/g/n Bluetooth BT2.1+EDR, 4,1 LE
CAN	2 x CAN J1939 fully isolated (GND_ISO)
RS232	2 x RS232 (Selectable Ground (Chassis, GND_ISO, GND))
RS485	2 x RS485 fully isolated (Chassis, GND_ISO, GND)
USB	2 x USB 2.0
LEDs	Power, WAN, WLAN hotspot.

3. Connections

This section describes the connections of the HUB Grand/Giant. It contains detailed information about each connector on the following pages.

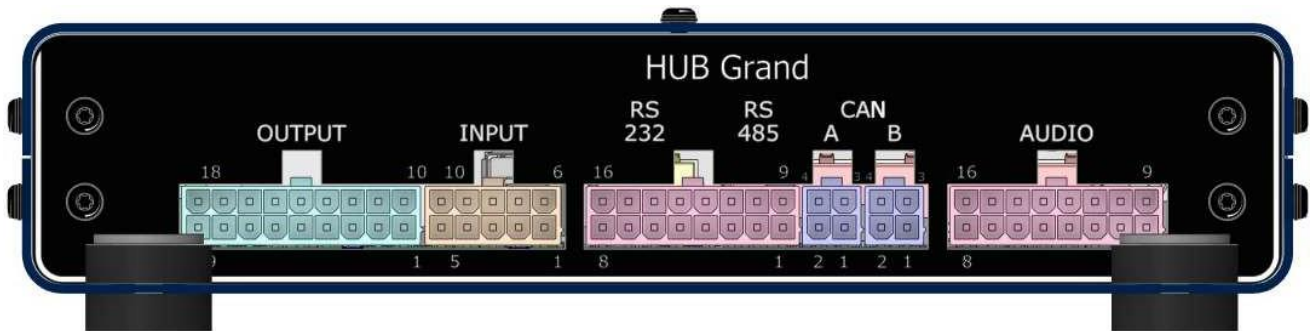


Figure 1 : Rear view of the HUB



Figure 2 : Front view of the HUB

3.1. Outputs

The outputs (Vo) are of the type open collector, which means that they behave like a switch that is either connected to ground or disconnected.

Output voltage and power are divided into two groups. Output power 1-4 and 5-8. Each group can supply either 5V, 12V or native battery, and combined deliver minimum 5 Watt. The desired voltage can be selected by moving a jumper on the HUB PCB.

Connector: Molex 39-30-0180, Mating housing for cable 39012185 both UL 94V-0, mating

Pin	Name	Description
1	Vop2	Output supply 2
2	Vop2	Output supply 2
3	Vop2	Output supply 2
4	Vop2	Output supply 2
5	GND	GND
6	Vop1	Output supply 1
7	Vop1	Output supply 1
8	Vop1	Output supply 1
9	Vop1	Output supply 1
10	Vo8	Output 8
11	Vo7	Output 7
12	Vo6	Output 6
13	Vo5	Output 5
14	Shield	Shield
15	Vo4	Output 4
16	Vo3	Output 3
17	Vo2	Output 2
18	Vo1	Output 1

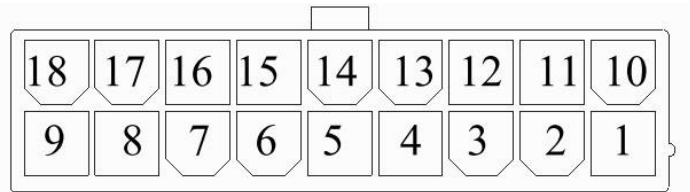


Figure 3 : Output connector

3.2. Inputs

The inputs are all ESD protected and can accept 0-36 Volt input and will deem its input signal as high if the voltage in is higher than 8 volt.

Connector: Molex 39-30-0100 Mating housing for cable 39012105 both UL 94V-0

Pin	Name	Description
1	GND	GND
2	Vi8	Input 8
3	Vi6	Input 7
4	Vi4	Input 6
5	Vi2	Input 5
6	Shield	Shield
7	Vi7	Input 4
8	Vi5	Input 3
9	Vi3	Input 2
10	Vi1	Input 1

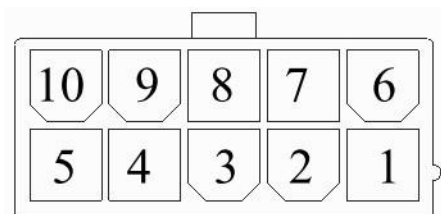


Figure 4 : Input connector

3.3. RS232 + RS485

There are 2x RS485 ports available and they are both overvoltage protected and isolated if pin 9 ground is selected in the cabling.

The 2x RS 232 has CLS and RTS signals and selectable ground.

Connector: Molex 39-30-0160, Mating housing for cable 39012165 both UL 94V-0

Pin	Name	Description
1	GND ISO	Ground isolated
2	RS485-2A	
3	RS485-2B	
4	RS232-CTS2	
5	RS232-RTS2	
6	RS232-RX2	
7	RS232-TX2	
8	Shield	Shield
9	GND ISO	Ground isolated
10	RS485-1A	
11	RS485-1B	
12	RS232-CTS1	
13	RS232-RTS1	
14	RS232-RX1	
15	RS232-TX1	
16	GND	GND

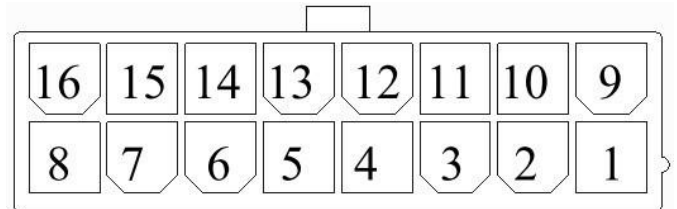


Figure 5 : RS232 & RS485 connector

3.4. CANA

Connector: Molex 39-30-0040 Mating housing for cable 39012045 both UL 94V-0

Pin	Name	Description
1	GND_ISO	Isolated GND
2	CAN A L	CAN A signal low
3	GND_ISO	Isolated GND
4	CAN A H	CAN A signal high

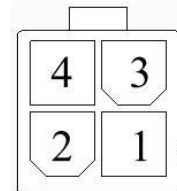


Figure 6 : CAN A connector

3.5. CANB

Connector: Molex 39-30-0040 Mating housing for cable 39012045 both UL 94V-0

Pin	Name	Description
1	GND_ISO	Isolated GND
2	CANBL	CANB signal low
3	GND_ISO	Isolated GND
4	CANBH	CANB signal high

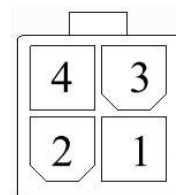


Figure 7 : CAN B connector

3.6. Audio

The HUB supports two channel balanced audio in and out and one microphone input with support for microphone switch.

Connector: Molex 39-30-0160 Mating housing for cable 39012165 both UL 94V-0

Pin	Name	Description
1	LO-	Balanced left out negative
2	LO+	Balanced left out positive
3	GND	GND
4	Shield	Shield
5	LINL-	Balanced line in left negative
6	LINL+	Balanced line in left positive
7	GND	GND
8	MIC SW	Microphone switch.
9	RO-	Balanced right out negative
10	RO+	Balanced right out positive
11	GND	GND
12	Shield	Shield
13	LINR-	Balanced line in right negative
14	LINR+	Balanced line in right positive
15	GND	GND
16	MIN IN+	Microphone input

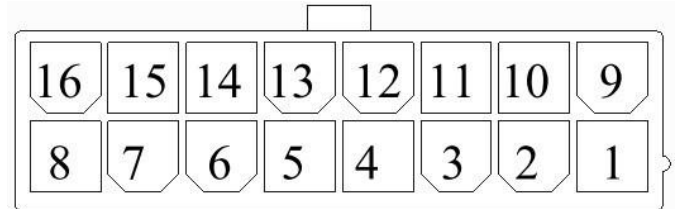


Figure 8 : Audio connector

3.7. Gigabit managed switch (LAN1)

4 port 10/100/1000 Gbit/s managed switch.
RJ45 connector

Pin	Name	Description
1	Port 1	Gigabit switch port 1
2	Port 2	Gigabit switch port 2
3	Port 3	Gigabit switch port 3
4	Port 4	Gigabit switch port 4

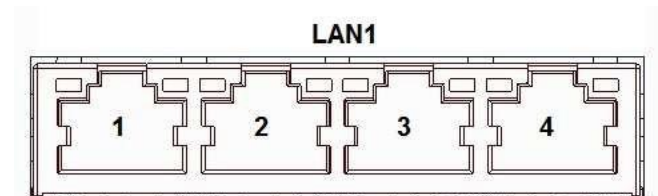


Figure 9 : Gigabit switch

3.8. Ethernet (LAN2)

Pin	Name	Description
1	Port 0	10/100 Mbit/s Ethernet port 0

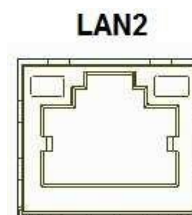


Figure 10 : Ethernet connector

3.9. USB 2.0

There are 2 x usb 2.0 ports

Pin	Name	Description
1	VCC	+5VDC 500mA max
2	D-	Data -
3	D+	Data +
4	GND	GND

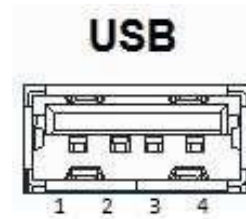


Figure 11 : USB port

3.10. Micro sim card

The HUB features 2 push/push micro sim card slot for 3FF SIMCARD.

Micro SIM



Figure 12 : Micro sim slot

3.11. Power in 9V-36V

Connector: Molex 39-30-0060 Mating housing for cable 39012165 both UL 94V-0

Pin	Name	Description
1	GND	Ground connection
2	BATT LOW	Input pin for ITxPT BATT LOW
3	PULSE	Input pin for pulses (Wheel tick)
4	PWR IN	9V-36V Power input
5	IGN	9V-36V Ignition input
6	DIRECTION	Input pin for direction

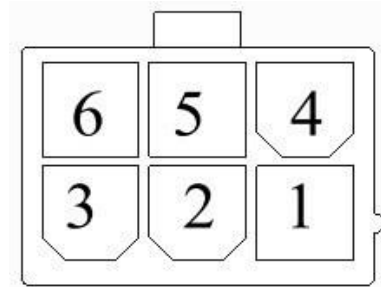


Figure 13 : Power input connector

3.12. Antenna connectors Fakra type

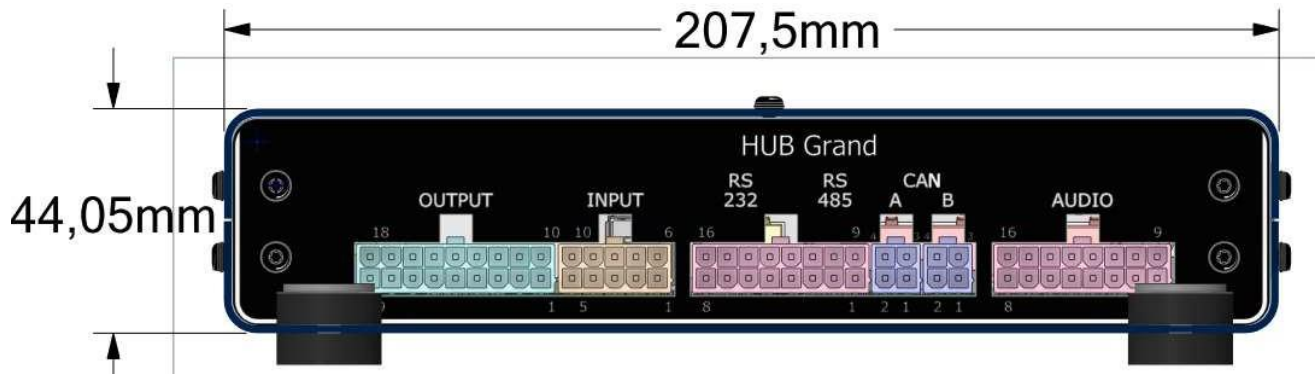
Name	Description
WAN Main	Main antenna modem
GPS	GNSS antenna
Wifi	Wifi antenna
WAN AUX	Auxiliary antenna modem



Figure 14 : Antenna connectors

4. Hardware dimensions

Rear view:

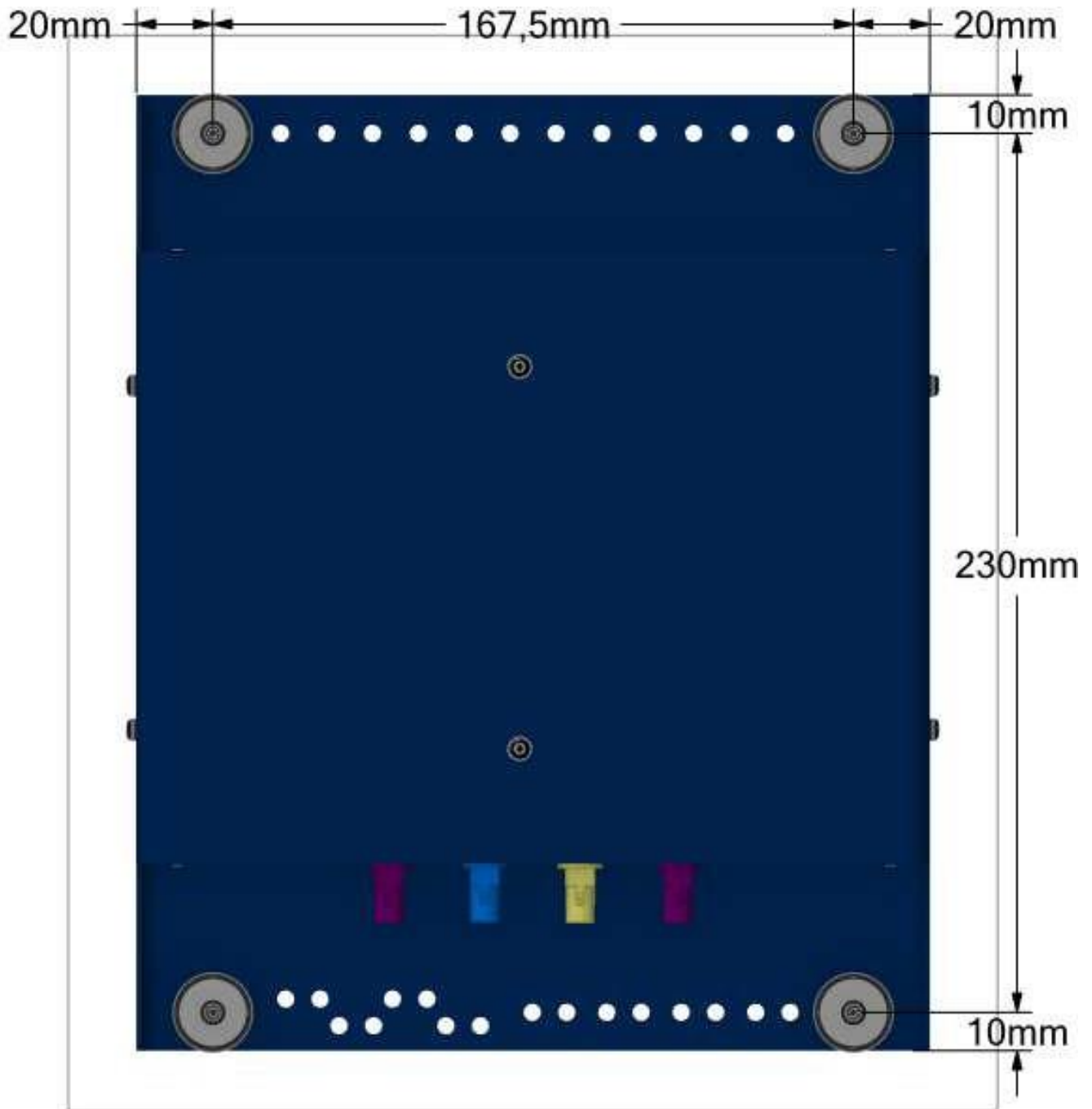


Side view:





Top view:



Contact information



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