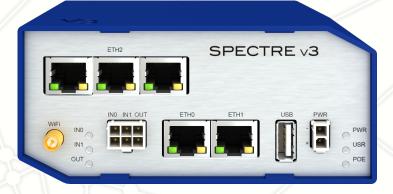# B+B SmartWorx®

ENABLING CONNECTED INTELLIGENCE

Industrial router
SPECTRE v3 ERT

USER'S MANUAL

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This device complies with part 15 of the FCC Rules. 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.

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following 2 conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Used Symbols

⚠ *Danger* – important notice, which may have an influence on the user's safety or the function of the device.

❗ *Attention* – notice on possible problems, which can arise in specific cases.

ⓘ *Information, notice* – information, which contains useful advice or special interest.

GPL License

Source codes under GPL license are available free of charge by sending an email to:

info@conel.cz.

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1. Safety Instruction

Please, observe the following instructions:

- The router must be used in compliance with all applicable international and national laws and in compliance with any special restrictions regulating the utilization of the router in prescribed applications and environments.

- To prevent possible injury to health and damage to appliances and to ensure that all the relevant provisions have been complied with, use only the original accessories. Unauthorised modifications or utilization of accessories that have not been approved may result in damage to the router and in a breach of applicable regulations. Unauthorized modifications or utilization of accessories that have not been approved may result in the termination of the validity of the guarantee.

- The router can not be opened.

- It must not be exceeded by the maximum voltage 60 V DC power connector on the router.

- Do not expose the router to extreme ambient conditions. Protect the router against dust, moisture and high temperature.

- The router should not be used at petrol stations of flammable and explosive materials. We remind the users of the duty to observe the restrictions concerning the utilization of radio devices at petrol stations, in chemical plants, or in the course of blasting works in which explosives are used.

- Switch off the router when travelling by plane. Utilization of the router in a plane may endanger the operation of the plane or interfere with the mobile telephone network, and may be unlawful. Failure to observe these instructions may result in the suspension or cancellation of telephone services for the respective client, or, it may result in legal sanctions; it may also result in both eventualities.

- When using the router in the close proximity of personal medical devices, such as cardiac pacemakers or hearing aids, you must proceed with heightened caution.

- If it is in the proximity of TV sets, radio receivers and personal computers, the telephone may cause interference.

- It is recommended that you should create an appropriate copy or backup of all the important settings that are stored in the memory of the device.

2. Product Disposal Instructions

The WEEE (Waste Electrical and Electronic Equipment: 2002/96/EC) directive has been introduced to ensure that electrical/electronic products are recycled using the best available recovery techniques to minimize the impact on the environment. This product contains high quality materials and components which can be recycled. At the end of it's life this product MUST NOT be mixed with other commercial waste for disposal. Check the terms and conditions of your supplier for disposal information.

3. Router Description

Industrial router SPECTRE v3 ERT is an ideal device for the realization of a secure connection of two local area networks (LANs). Interconnection is carried out using two ETHERNET 10/100 interfaces and secure tunnel (IPSec, OpenVPN, L2TP).

The other equally important ways to use this router is to connect any device with RS232, RS485 or I/O interface to the local network (LAN). For this purpose, SPECTRE v3 ERT is equipped with two ETHERNET 10/100 ports and other interfaces based on the version of the router chosen by the user.

As a standard, this router is equipped with two ETHERNET 10/100 ports, one USB 2.0 Host port, two binary inputs and one output (I/O connector). An integral part of the router is also a memory card reader placed on the rear panel. This reader allows SPECTRE v3 ERT to operate with microSD cards and increase storage space of the router up to 64 GB (32 GB in case of SDHC cards). The router can be equipped with WiFi module on customer's request, however it is not possible to order it and add to the router later. The router can be equipped with PoE PD (Power over Ethernet – powered device) to power the router via Ethernet, or PoE PSE (power source equipment) to power other devices by the router. Richer range of interfaces is available in versions containing three switched Ethernets. SPECTRE v3 ERT is supplied either in a plastic or metal casing, based on the requirements of the customer.

For configuration of the industrial router is available web interface protected by password. Web interface provides (after logging in) detailed statistics about the router activities, signal strength, detailed system log etc. This device supports the creation of VPN tunnels using technologies IPSec, OpenVPN and L2TP for secure communications. There are also supported functions such as DHCP, NAT, NAT-T, DynDNS, NTP, VRRP, control by SMS, backup primary connection and many other functions.

Other diagnostic functions ensuring continuous communication include hardware watchdog which monitors the status of the router. Using a special window (start up script window) you may insert Linux scripts for various actions. For some applications is crucial the possibility to create several different configurations for one router. These configurations can be switched as necessary (for example using SMS, binary input status, etc.). SPECTRE v3 ERT routers may automatically upgrade configuration and firmware from server. This allows mass reconfiguration of many routers in one time.

For further facilitating of workikg with routers can be used any additional software, e.g. R-SeeNet for permanent traffic monitoring of routers.

Examples of possible applications

- mobile office
- fleet management
- security system
- telematic
- telemetric
- remote monitoring
- vending and dispatcher machines

4. Contents of Package

Basic delivered set of router includes:

- router,

- power supply,

- crossover UTP cable,

- 2.4 GHz WiFi antenna (**only for version with WiFi**),

- loose power and I/O connector (+8 pins[1]),

- clip for the DIN rail,

- paper start guide.

Figure 1: Contents of package

---

[1]These pins are designed for cables with a diameter from 0.2 to 0.8 mm^2

5. Router Design

5.1 Router versions

SPECTRE v3 ERT router is supplied in the following versions (see table below). All versions are available in plastic or metal box according to customer requirements. All versions are available with PoE PD (Power over Ethernet – powered device) so you can power the router from both ETH0 and ETH1 interfaces, or with PoE PSE (power source equipment) so you can power other devices by the router.

Router versions	BIN	BOUT	USB	SD	ETH	WiFi
Basic version	2 x	1 x	1 x	1 x	2 x	
Basic version with WiFi	2 x	1 x	1 x	1 x	2 x	1 x
Version with SWITCH	2 x	1 x	1 x	1 x	5 x	
Version with SWITCH & WiFi	2 x	1 x	1 x	1 x	5 x	1 x

Table 1: Router versions
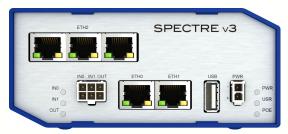
Figure 2: Version SWITCH (plastic)

Figure 4: Version SWITCH (metal)
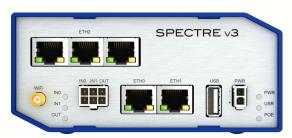
Figure 3: Version SWITCH and WiFi (plastic)

Figure 5: Version SWITCH and WiFi (metal)

5.2 Delivery identification

Trade name	Type name	Other
SPECTRE v3 ERT	SPECTRE-v3-ERT	Router in a plastic or metal box

Table 2: Delivery identification

Figure 6: Label example

5.3 Ordering codes

Ordering codes overview is shown in the table below.

Name	Order code	Features – interfaces
SPECTRE v3 ERT set	SR3000x1yz*	5x ETH, 1x USB, 2x BI, 1x BO, 1x microSD reader
SPECTRE v3 ERT set	SR3001x1yz*	5x ETH, 1x USB, 2x BI, 1x BO, 1x microSD reader, WiFi

Table 3: Ordering codes overview

> * Replace the letters "x", "y" and "z" with one of the following values:

Letter "x" – Power over Ethernet (PoE)

Power over Ethernet (PoE)	Number "x" in code
Version without PoE	0
PoE PSE – Power Source Equipment – powers other devices	8
PoE PD – Powered Device – can be powered via Ethernet	9

Table 4: Power over Ethernet

Letter "y" – type of router box

Type of box	Number "y" in code
Plastic	1
Metal	2

Table 5: Type of router box

Letter "z" – type of connector on the power supply

Type of power supply	Number "z" in code
Europe	1
UK & Ireland	2
Australia	3
North America	4

Table 6: Type of power supply

Examples of complete order code:

Order code	Features – interfaces	Box	Power supply
SR30000111	5x ETH, 1x USB, 2x BI, 1x BO, 1x microSD reader	plastic	Europe
SR30009122	5x ETH, 1x USB, 2x BI, 1x BO, 1x microSD reader, PoE PD	metal	UK & Ireland
SR30018113	5x ETH, 1x USB, 2x BI, 1x BO, 1x microSD reader, WiFi, PoE PSE	plastic	Australia

Table 7: Examples of order code

5.4 Basic dimensions of router box
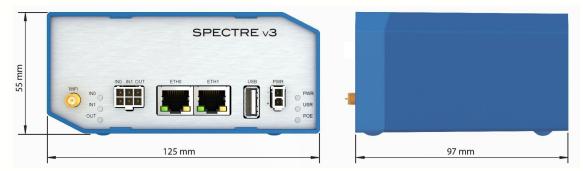
Figure 7: Basic dimensions of router box

5.5 Mechanical dimensions and mounting recommendations

Mounting recommendations:

- possibility to be put on a work surface,
- DIN rail EN 60715 with included clip CPD3 (or CKD2 for metal version).

For the most of applications with a built-in router in a switch board it is possible to recognize two kinds of environments:

- no public and industry environment of low voltage with high interference,
- public environment of low voltage without high interference.

For both of these environments it is possible to mount router to a switch board, the following there is no need to have examination immunity or issues in connection with EMC according to EN 60439-1 ed.2:00 + A1:04.

For compliance of EN 60439-1 ed.2:00 + A1:04 specification it is necessary to observe next assembly of the router to the switch – board:

- For every cables we recommend to bind the bunch, we recommend for this use:
  - Length of the bunch (combination of power supply and data cables) can be maximum 1.5 m. If the length of data cables exceeds 1.5 m or in the event of, the cable leads towards the switch – board. We recommend installing over – voltage protectors (surge suppressors).
  - With data cables they mustn't carry cables with reticular tension ∼ 230 V/50 Hz.

- Sufficient space must be left before individual connectors for handling of cables,

- For correct function of the router we recommend to use in the switch-board earth-bonding distribution frame for grounding of power supply of router, data cables and antenna.

5.6   Removing from the DIN rail

DIN holder is suitable for DIN rail according to EN 60715 standard only. Default position of CPD3 holder (or CKD2 holder for metal version), which is used for mounting the router on a DIN rail, is shown in the following figure:

Figure 8: Default position of DIN holder

For removing from the DIN rail it is necessary to lightly push upward the router so that the top part of the CPD3 holder (or CKD2 for metal version) hitched to the DIN rail get out of this rail and then fold out the top part of the router away from the DIN rail.
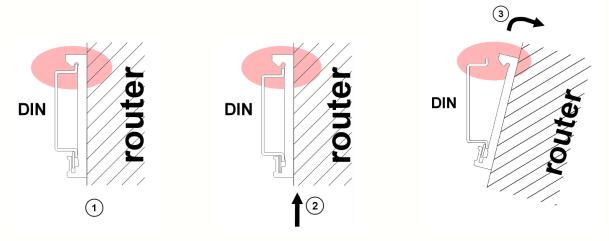
Figure 9: Removing from the DIN rail

5.7 Description of the rear panel

The rear panel contains only one holder for SD card (*SD*) and *RST* button used to restore default configuration and reboot the router.

5.8 Description of the front panel

On the front panel is the following:

Caption	Connector	Description
PWR	2-pin	Connector for the power supply
ETH0	RJ45	Connector for connection into the computer network, PoE (only on PoE PSE or PoE PD versions)
ETH1	RJ45	Connector for connection into the computer network, PoE (only on PoE PSE or PoE PD versions)
WiFi	R-SMA	Connector for WiFi antenna (**only for versions with WiFi module!**)
USB	USB-A 2.0 Host	Connector for connection of USB devices to the router. Supports devices with PL-2303 and FTDI USB/RS232 converters.
I/O	6-pin	Connector for connection of the binary inputs and output

Table 8: Front panel description
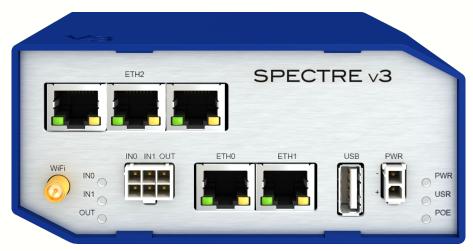
Figure 10: SPECTRE v3 ERT front panel

5.8.1 Status indication

About router status inform nine LED indicators on the front panel. Each ETH port has two additional LEDs that provide information about port status.

Caption	Color	State	Description
PWR	Green	Blinking On Fast blinking	Router is ready Starting of the router Updating firmware
USR	Yellow	—	Function of this LED diode can be selected by user
POE	Yellow Green	On Blinking On Blinking Off	PSE: insufficient power supply via PWR connector PSE: overload (device takes much power)/short circuit* PoE PD versions: The voltage present in ETH port PSE: correct power supply via PWR connector PSE: The device is powered via one of the ETH ports PD: The voltage not present in ETH port PSE: disabled (not enabled on any of ETH ports)
IN0	Green	On	Binary input no. 0 is active
IN1	Green	On	Binary input no. 1 is active
OUT	Yellow	On	Binary output is active
ETH0 ETH1	Green	On Off	Selected 100 Mbit/s Selected 10 Mbit/s
ETH0 ETH1	Yellow	On Blinking Off	The network cable is connected Data transmission The network cable is not connected

Table 9: Status indication

* Additionaly it can indicate a device without PoE support connected on the other side of the cable. In this case the indication is caused by low impedance (lesser than 500 Ω) of this device without PoE support. You can solve this by disabling the PoE PSE feature on the proper ETH port in the router's Web interface, see *Configuration manual for v3 routers* [2].

5.8.2 Power connector PWR

Panel socket 2-pin.

Pin number	Signal mark	Description
1	GND(-)	Negative pole of DC supply voltage
2	VCC(+)	Positive pole of DC supply voltage (+10 to +60 V DC)

<div align="center">Table 10: Connection of power connector</div>

<div align="center">Figure 11: Power connector</div>

Power supply for router must be between +10 V to +60 V DC supply. Protection against reversed polarity without signaling is built into the router.

SPECTRE v3 ERT can be put into low power mode using a special command. Then it can be awakened for example by an activity on binary input or using an internal timer.

Circuit example:
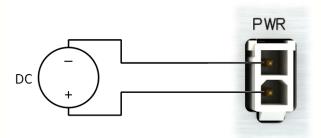
<div align="center">Figure 12: Connection of power supply</div>

> **Note for PoE:** See Chapter 5.8.6 for information on how PoE versions of the router impact the power supply usage. The power supply for PoE PSE router has to meet the specific requirements.

5.8.3 Antenna connector WiFi

If the router is equipped with WiFi module on the customer's request, appropriate antenna is connected to the reverse SMA connector (*WiFi*).

The extarnal antenna is connected by screwing this antenna to the reverse SMA connector on the front panel of the router (see figure below).

Figure 13: Antenna connector

5.8.4 MicroSD card reader

The microSD card reader is placed on the rear panel of the router (there is only a single slot). This card reader allows the router to operate with memory cards microSD. Technical specifications are stated in the table below.

Technical specifications of microSD card		
Supported technologies		SDHC, SDXC
Supported capacity	SDHC	up to 32 GB
	SDXC	from 32 GB to 64 GB
Supported microSD card filesystems		vfat, ext3

Table 11: Technical specifications of microSD card

Changing the microSD card:

- Use the flat end of a spudger, or your fingernail, to press the microSD card slightly deeper into its slot until you hear a click.

- After the click, release the card and it will pop out of its slot.

- Remove the microSD card and push any other microSD card into the slot until it clicks in place.

Figure 14: SD card

5.8.5 Ethernet Ports (ETH0 and ETH1)

Panel socket RJ45.

Pin	Signal mark	Description	Data flow direction
1	TXD+	Transmit Data – positive pole	Input/Output
2	TXD-	Transmit Data – negative pole	Input/Output
3	RXD+	Receive Data – positive pole	Input/Output
4	DC+	PoE power + (if PoE is equipped)	
5	DC+	PoE power + (if PoE is equipped)	
6	RXD-	Receive Data – negative pole	Input/Output
7	DC-	PoE power - (if PoE is equipped)	
8	DC-	PoE power - (if PoE is equipped)	

Table 12: Connection of Ethernet connector

Figure 15: Ethernet connector

Ethernet cable plug into the RJ45 connector labeled as ETH0 or ETH1 (see figure below).
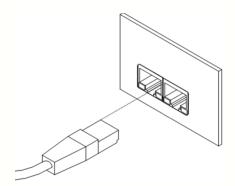
Figure 16: Connection of ethernet cable

The insulation strength of Ethernet ports from each other and from the rest of the router (grounding) is dependent on the router version:

Router Version	Insul. Strength from Router	Insul. Strength between Ports
Without PoE	1.5 kV	1.5 kV
PoE PD	1.5 kV	none
PoE PSE	none	none

Table 13: Insulation strength of Ethernet ports

15

5.8.6 Power over Ethernet (PoE)

On the routers with PoE, The PoE+ standard IEEE 802.3at-2009 and PoE standard IEEE 802.3af-2003 are supported in both Ethernet ports (ETH0, ETH1). PoE PD version enables the router being powered over Ethernet by another PoE PSE device. PoE PSE version enables the router to power other devices over Ethernet.

PoE PD
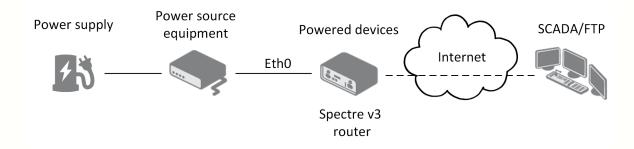
Figure 17: PoE PD usage

The PoE PD parameters can be found in Chapter 7.5. The POE LED on the front panel of the router turns on with the green light on the voltage present in an Ethernet port so the user knows the router can be PoE powered. You can still power the router with this connector even if the router is powered with PoE (in PoE PD version), but the input voltage have to be higher than 15 V DC. If the input voltage is lower than 15 V DC and the PoE voltage is present (PoE LED green on), the router will be still powered from Ethernet connector via PoE.

Note: you can not power the router via SWITCH version ETH2 connectors. The PoE PD is available on the ETH0 and ETH1 ports only.

PoE PSE

> ⚠️ Power supply used with the PoE PSE router has to provide the voltage from 44 to 57 V and the output power has to be at least 60 W for full PoE+ use (Class 4) in both Ethernet ports.

The PoE PSE parameters can be found in Chapter 7.5. The state of PoE is indicated by the POE LED on the front panel of the router, see Chap. 5.8.1. The sufficient voltage (44 to 57 V) and power available is indicated by the green light. Yellow color of POE LED indicates unsufficient power or voltage on PWR connector. When a device is powered from the router, the POE LED is blinking green. Yellow blinking is for overload (the powered device takes too much power) or short circuit (incorrect wiring of the cable or the device without PoE support).

You can enable or disable the PoE PSE feature separately on ETH0 and ETH1 ports via the Web interface of the router. It can be found in the *LAN* configuration (*Primary* for ETH0, *Secondary* for ETH1). When PoE PSE enabled, you can find the current, voltage, power and
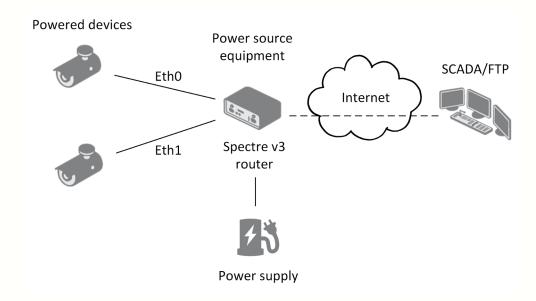
Figure 18: PoE PSE usage

power class information on *General* page of router's Web interface. See *Configuration manual for v3 routers* [2]. Via SSH or in scripts you can use the Shell command `pse`.

5.8.7 USB Port

Panel socket USB-A.

Pin	Signal mark	Description	Data flow direction
1	+5 V	Positive pole of 5 V DC supply voltage, 0.5 A	
2	USB data -	USB data signal – negative pole	Input/Output
3	USB data +	USB data signal – positive pole	Input/Output
4	GND	Negative pole of DC supply voltage	

Table 14: Connection of USB connector

Figure 19: USB connector

5.8.8 I/O Port

Panel socket 6-pin.

Pin	Signal mark	Description
1	IN0	Binary input 0
2	IN0	Binary input 0
3	IN1	Binary input 1
4	IN1	Binary input 1
5	OUT	Binary output
6	OUT	Binary output

Table 15: Connection of I/O port
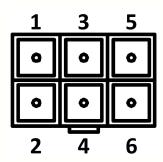
Figure 20: I/O connector

I/O user Interface is designed for processing of binary input and control (setting) binary output. Binary output is open in the default configuration. Insulation strength is 1.5 kV. The pins are isolated from each other with the same strength.

The input circuits are bipolar and allow connection as needed with common plus or minus (according to connection of an external voltage).

Binary inputs

- Characteristics of inputs:

logical 0 / 1*	Voltage	Current	Web interface status
log. 1 max	3 V	0.4 mA	Off
log. 0 min	5 V	0.7 mA	On
log. 0 type	12 V	2 mA	On
log. 0 max	60 V	7 mA	On

Table 16: Characteristics of inputs

* The binary input status in the Shell returned via `io get bin0` or `io get bin1`.

- Binary inputs connection with example:

Figure 21: Binary inputs connection

Binary output

- Binary output parameters:

    - 60 V AC / 300 mA
    - 60 V DC / 300 mA

- Current of binary output is limited by a resettable fuse (300 mA).

- Binary output connection with example:
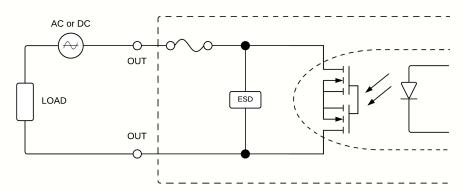
Figure 22: Binary output connection

5.8.9   Reset

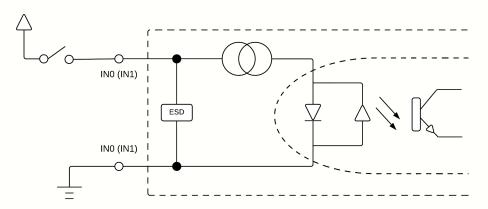When *PWR* LED starts flashing on the front panel, it is possible to restore the default configuration of the router by pressing the *RST* button on the rear panel. After pressing this button the default configuration is restored and then router reboots (green LED will be on).

For pressing the *RST* button could be used a narrow screwdriver.
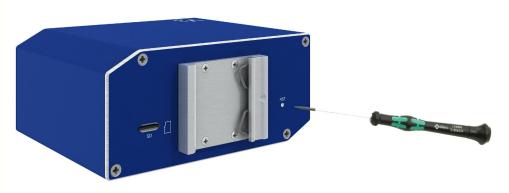
Figure 23: Router reset

We recommend backing up configuration of the router (see *Configuration manual*) because reset of the router sets the configuration to the default state.

It is important to distinguish between reset and reboot the router.

Action	Router behavior	Invoking events
Reboot	Turn off and then turn on router	Disconnect and connect the power, Press the *Reboot* button in the web configuration
Reset	Restore default configuration and reboot the router	Press *RST* button

Table 17: Description of reset and restart router

5.9 Interfaces description

Besides the basic version of SPECTRE v3 ERT router there are available versions with one of the following interfaces:

- SWITCH interface

5.9.1 SWITCH interface

Three LAN ports of SWITCH interface for v3 routers (RJ45 connectors for connecting Ethernet devices) act as a typical switch device. This means that the router reads Ethernet frames (data packets on an Ethernet link) from any port on SWITCH interface and transmits them on other ports of the SWITCH interface. Each port can transmit frames independently on the other ports. State indication is provided on every connector. Power supply is provided internally. Router in this version complies with the standards and temperature ranges declared in Chap. 7.1 except for the lower maximum operating temperature which is +70 °C.
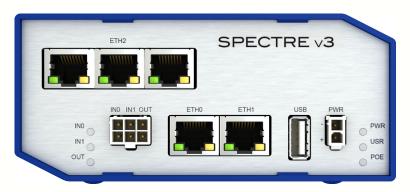
Figure 24: Version with SWITCH board

State indication of the interface:

Description of indication		
Green LED	On	Selected 100 Mbit/s
	Off	Selected 10 Mbit/s
Yellow LED	On	The network cable is connected
	Blinking	Data transmission
	Off	The network cable is not connected

Table 18: State indication of the SWITCH interface

Technical specification of Ethernet IEEE 802.3:

Ethernet interface, IEEE 802.3 standard	
Maximum data rate	100 Mbps
Max. total cable length (300 Bd, 200 nF/km)	100 m

Table 19: SWITCH interface parameters

6. First Use

6.1 Connecting the router before first use

Before putting the router into operation it is necessary to connect all components which are required to run your applications.

⚠️ The router can not operate without connected power supply.
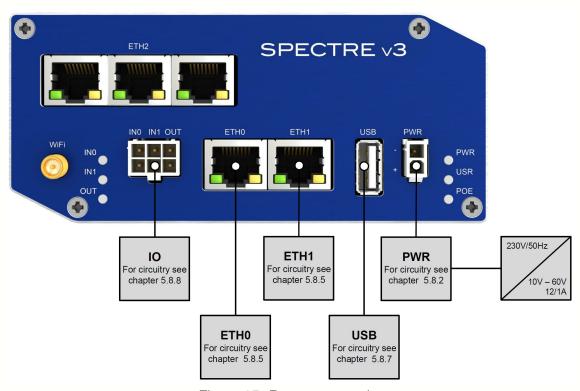
Figure 25: Router connection

6.2 Start

The router is put into operation when the power supply is connected to this router. By default, the router will automatically start to log on to the default APN. DHCP server will start to assign addresses for devices on the Ethernet port ETH0. Router behavior can be changed via the web interface. This is described in detail in the *Configuration manual*.

6.3 Configuration

6.3.1 Configuration over web browser

For status monitoring, configuration and administration of the router is available a web interface which can be accessed by entering the IP address of the router into the web browser. The default IP address of the router is 192.168.1.1. **Attention, it is necessary to use HTTPS protocol for secure communication over a network!**

Figure 26: Entering the IP address of the router

Configuration may be performed only by the user "root" with default password "root".

Figure 27: Entering login information

After successfully entering login information user gains access to the router via his internet browser.

Figure 28: Router web interface

A detailed description of the router settings via the Web interface can be found in the document *Configuration manual for v3 routers*.

7. Technical Parameters

7.1 Basic parameters

SPECTRE v3 LTE		
Temperature range	Operating Storage	-40 °C to +80 °C -40 °C to +85 °C
Cold start		-40 °C
Humidity	Operating Storage	0 to 95 % relative humidity non condensing 0 to 95 % relative humidity non condensing
Altitude	Operating	2000 m / 70 kPa
Degree of protection		IP30
Supply voltage		10 to 60 V DC
Consumption	Idle Average Peak Sleep mode	2 W 3.3 W 4.5 W 10 mW
Dimensions		55 x 97 x 125 mm (DIN 35 mm, EN 60715)
Weight	Plastic box Metal box	approximately 211 g (depends on interface) approximately 327 g (depends on interface)
Antenna connectors		Reverse SMA – 50 Ohm (only for versions with WiFi module)
User interface	2x ETH USB I/O	Ethernet (10/100 Mbit/s) USB 2.0 6-pin panel socket

Table 20: Basic parameters

The router complies with standards*	
Telecom and emission	ETSI EN 300 328 v1.8.1 EN 55022 ed. 3
EMC	ETSI EN 301 489-1 v1.9.2 EN 61000-6-2
Safety	EN 60950-1:06 ed.2 + A11:2009 + A1:2010 + A12:2011 + AC:2011 + A2:2013 EN 62311:2008

Table 21: Normy a předpisy, jimž router vyhovuje

* See the *Declaration of Conformity* for the full list of standards. It can be downloaded from www.conel.com.

7.2 Type tests and environmental conditions

Phenomena	Test	Description	Test levels
ESD	EN 61000-4-2	Enclosure contact Enclosure air	± 6 kV (crit. A) ± 8 kV (crit. A)
RF field AM modulated	IEC 61000-4-3	Enclosure	20 V/m (crit. A) (80 – 2700 MHz)
Fast transient	EN 61000-4-4	Signal ports Power ports Ethernet ports	± 2 kV (crit. A) ± 2 kV (crit. A) ± 2 kV (crit. A)
Surge	EN 61000-4-5	Ethernet ports Power ports I/O ports	± 2 kV (crit. B), shielded cabel ± 0,5 kV (crit. B) ± 1 kV, L to L (crit. A) ± 2 kV, L to GND (crit. A)
RF conducted	EN 61000-4-6	All ports	10 V/m (crit. A) (0,15 – 80 MHz)
Radiated emission	EN 55022	Enclosure	Class B
Conducted emission	EN 55022	DC power ports Ethernet ports	Class B Class B
Power frequency magnetic field	EN 61000-4-8	Enclosure	160 A/m (crit. A)
Dry heat	EN 60068-2-2	+75 °C [1], 40 % rel. humidity	
Cold	EN 60068-2-1	-40 °C [1]	
EMC/Immunity for industrial environments	ČSN EN 61000-6-2 ed.3	Generic standards	Frequency range 0 Hz to 400 GHz are covered

Table 22: Type tests and environmental conditions

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[1] The temperatures are given for basic version of the router. For example, if the router is equipped with WiFi module, values are slightly worse.

7.3 Technical parameters of WiFi

WiFi	
Antenna connector	R-SMA – 50 Ohms
Supported WiFi band	2.4 GHz, 5 Ghz
Standards	802.11a, 802.11b, 802.11g, 802.11n
2.4 GHz supported channels	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14
5 GHz supported channels	36, 40, 44, 48, 52, 56, 60, 64, 149, 153, 157, 161, 165
Type of device	Access point, station
Max. clients in AP mode	10
Wi-Fi TX Output Power	17,3 dBm
Wi-Fi RX Sensitivity	-96,3 dBm

Table 23: Technical parameters of WiFi

7.4 Technical parameters of I/O port

- Characteristics of inputs:

logical 0 / 1*	Voltage	Current	Web interface status
log. 1 max	3 V	0.4 mA	Off
log. 0 min	5 V	0.7 mA	On
log. 0 type	12 V	2 mA	On
log. 0 max	60 V	7 mA	On

Table 24: Characteristics of inputs

* The binary input status in the Shell returned via `io get bin0` or `io get bin1`.

- Binary output parameters:

  - 60 V AC / 300 mA
  - 60 V DC / 300 mA

7.5   Technical Parameters of Power over Ethernet (PoE)

Standards IEEE 802.3at-2009 (PoE+) and IEEE 802.3af-2003 (PoE) supported. Cabling needed is Category 5, up to 12.5 Ω. It is possible to use a passive PoE injector.

PoE PD: parameters for opposite PSE	
Input voltage range	42.5 – 57 V
Power available	25.50 W
Maximum current	600 mA

Table 25: PoE PD: parameters for opposite PSE

PoE PSE parameters	
Power supply needed	44 – 57 V, 60 W
Power available	2x 25.50 W (ETH0, ETH1)

Table 26: PoE PSE parameters

7.6   Other technical parameters

Other technical parameters	
CPU power	2 DMIPS per MHz
Flash memory	256 MB
RAM	512 MB
M-RAM	128 kB

Table 27: Other technical parameters

8. Recommended Literature

[1] Conel: **Start guide**,
[2] Conel: **Configuration manual for v3 routers**.

9. Troubleshooting

> If you can not connect to the router from your PC, your network card may be configured the way it is not possible to connect to the router. Take one or more of the following steps to solve the problem:
>
> - Select the communication rate 10 MB/s in the properties of your network card.
> - Connect the router to the PC via Switch.
> - Connect the router to the PC, start the router first and then start the PC after the router's initialization.

9.1 FAQ

✍ **I have NAT enabled. My equipment is not connecting to the network.**

- *The device's gateway has to be configured as the router.*

✍ **I can't access the Web server over NAT.**

- *The remote HTTP access of the router has to be disabled, the default server address has to be your web server and the gateway of the web server has to be the IP of the router.*

✍ **Ethernet connection fails or isn't establishing.**

- *It is possible to turn auto negotiation off and set a rate and duplex manually on the Ethernet interface of the router.*

✍ **DynDNS doesn't function.**

- *With private APN this is not functional.*
- *If the same IP address is recorded in your canonic name as dynamically assigned address, it means that the operator is using NAT or firewall.*
- *Verify NAT using ping to the static server address.*
- *Verify Firewall accessing remotely to the router's Web interface.*
- *The operator may not provide the address of DNS server and without DNS server's adress it is impossible to connect to the dyndns.org server. There will be these messages in the system log:*
  - *DynDNS daemon started*
  - *Error resolving hostname: no such file or directory*
  - *Connect to DynDNS server failed*

✍ **L2TP or IPSec isn't establishing.**

- *Check the system log for error messages.*

✍ **I switched the router to offline mode by SMS message, but the router is in online mode after restart.**

- *SMS messages do not change the router configuration. They remain in effect only until the router is restarted.*

✍ **FTP doesn't function.**

- *Router doesn't support active FTP mode. It supports passive mode only.*

10. Customers Support

You can find current information about this product on our website:

<div align="center">

`www.conel.com`

</div>

Upkeep-advices:

- The SIM-card must be handled carefully as with a credit card. Don't bend, don't scratch on this and do not expose to static electricity.

- During cleaning of the router do not use aggressive chemicals, solvents and abrasive cleaners!

Conel Company hereby declares that the router narrated in this user's guide fits all basic demands of directive 1999/5/EC (R&TTE).

Router fits values of coefficient SAR defined by association ICNIRP and values of "About protection of health before non-ionized radiation".

CE Declaration of conformity was issued and it is possible to find it on the Conel website (`http://www.conel.com/download`) [1] or at producer.

10.1   Customer Support for NAM

Up to date product information is on the website:

<div align="center">

www.bb-smartworx.com

</div>

For Technical Support:

<div align="center">

Call 815-433-5100

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[1]Please, use the following login information: Username – ConelFreeDownload, Password – coneldownload.