

RS353x Router

Installation Manual

Copyright© bintec Dm679-I Version 1.4 09/2019 bintec elmeg

Legal Notice

Warranty

This publication is subject to change.

bintec elmeg offers no warranty whatsoever for information contained in this manual.

bintec elmeg is not liable for any direct, indirect, collateral, consequential or any other damage connected to the delivery, supply or use of this manual.

Table of Contents

I	Related Documents.	1
Chapter 1	About this Guide	2
1.1	Supported devices	2
1.2	Who should read this manual?	2
1.3	When should this manual be read?	2
1.4	What is in this manual?	2
1.5	What is not in this manual?	2
1.6	How is the information organized?	2
1.7	Technical support.	2
Chapter 2	RS353x Devices	4
2.1	Description	4
2.2	Characteristics	5
2.2.1	Power supply	5
2.2.2	Hardware monitoring	5
Chapter 3	Components and Power Supply	6
3.1	Components	6
3.1.1	Front panel	6
3.1.2	Rear panel.	8
3.1.3	Side panels	9
3.1.4	Underside panel	10
3.2	Installation	10
3.2.1	Installation in a rack.	10
3.2.2	Standalone	11
3.2.3	Wall mounting	11
3.2.4	Kensington lock	11
3.3	Plug-in Modules	11
3.3.1	Installation	12
3.3.2	Uninstall	12
3.4	Power source	12
3.4.1	External power source.	12
3.5	RESET button	13
3.5.1	Rebooting the device	13
3.5.2	Default configuration	13

3.6	Connecting the data.	13
3.6.1	4-port Ethernet switch	13
3.6.2	WAN connection	14
3.6.3	ISDN-BRI connection	14
3.6.4	xDSL connection	14
3.6.5	WWAN antenna connection (cell connector)	15
3.6.6	Wireless LAN antenna connection (Wi-Fi connectors)	16
3.6.7	Connecting a 3G USB device (USB connector)	16
3.6.8	Connecting for configuration	17
3.7	Installing the SIM card.	17
Chapter 4	Compliance	19
4.1	Manufacturer information	19
4.2	Safety warnings	19
4.3	WEEE information	21
4.4	REACH	21
4.5	EC declaration of conformity	22
4.6	CE marking	22
4.7	National restrictions	23
4.8	Operating frequency	23
Appendix A	Technical Information.	24
A.1	Troubleshooting	24
A.2	Updating the software	24
A.3	Connecting to the device	25
A.3.1	Connecting using the local console (console connector)	25
A.4	Licenses.	25
A.5	Connectors	25
A.5.1	LAN connector (switch)	26
A.5.2	WAN connector	26
A.5.3	ISDN BRI S0 connector	26
A.5.4	WWAN connector (female)	27
A.5.5	WLAN connector (male)	27
A.5.6	USB connector	27
A.5.7	Configuration connector	27
A.5.8	DSL connector	28
A.5.9	Power supply connector	28
A.6	Technical specifications	28
A.6.1	Hardware architecture	28

A.6.2	LAN interface	28
A.6.3	WAN interface	29
A.6.4	ISDN BRI interface	29
A.6.5	Wireless WAN interface	29
A.6.6	Wireless LAN interface	30
A.6.7	USB interface	31
A.6.8	Configuration interface	31
A.6.9	DSL interface	31
A.6.10	Power supply	31
A.6.11	Dimensions and weight	31
A.6.12	Environmental specifications	31
Appendix B	Radio Information.	32
B.1	Radio WWAN specifications	32
B.2	WIFI specifications	33

I Related Documents

bintec Dm748-I Software Updating

Chapter 1 About this Guide

This installation guide for the **RS353x** router, contains information on how to correctly install this device in a working environment.

1.1 Supported devices

The information provided in this installation guide only applies to the **RS353x**.

1.2 Who should read this manual?

This manual should be read by the support personnel who need to configure, maintain and monitor the device.

1.3 When should this manual be read?

Read this guide as soon as you are ready to familiarize yourself with the device and its components.

This manual will help you understand your new device in greater depth.

1.4 What is in this manual?

This installation guide contains the following information:

- A description of the features available in the **RS353x** router.
- Technical specifications.
- Power supply requirements.
- Elements that can be connected when the router is operating.
- How to install and uninstall the modules and power sources.
- A description of the device LEDs and connectors.
- Troubleshooting.

1.5 What is not in this manual?

This manual does not contain information relative to the device software or its configuration. For information on how to configure this device, please see the relevant protocol manuals found in the bintec website: <http://www.bintec-elmeg.com>

1.6 How is the information organized?

Each chapter focuses on a specific part of the hardware and its components. All descriptive and technical specifications, together with information on a component, can be found in the relevant chapter.

1.7 Technical support

bintec elmeg offers a technical support service. Device software can be upgraded on a regular basis for maintenance purposes and for new features.

Contact information:

Web: <http://www.bintec-elmeg.com>

Tel. N°: +49 - 911 - 9673 0

Fax: +49 - 911 - 688 0725

Email: support@bintec-elmeg.com

Chapter 2 RS353x Devices

2.1 Description

The **RS353x Router** is a powerful Gigabit Ethernet router predominately used in SMEs to provide connectivity to branch locations and home offices.

The **RS353x** delivers advanced security, flexibility, and exceptional performance across a wide range of applications.

The **RS353x Router** provides five Gigabit Ethernet ports that can be independently configured to be used in a LAN, WAN, or DMZ.

There are different **RS353x** variants:

- RS353j: Includes a BRI interface.
- RS353jv: Includes a BRI interface and VDSL.
- RS353jw: Includes a BRI interface and WIFI.
- RS353jvw: Includes a BRI interface, VDSL and WIFI.
- RS353j-4G: Includes a BRI interface and LTE.
- RS353jw-4G: Includes a BRI interface, WIFI and LTE/GPS.
- RS353jvw-4G: Includes a BRI interface, VDSL, WIFI and LTE.
- RS353a: BRI interface NOT available.
- RS353aw: BRI interface NOT available. WIFI included.
- RS353awv-4G: BRI interface NOT available. WIFI, VDSL and LTE included.

The **RS353jw, RS353jvw, RS353jw-4G, RS353jvw-4G, RS353aw, and RS353awv-4G** Devices have a dual-band wireless module that operates at 2.4 and 5 GHz. This module supports 802.11 a/b/g/n wireless standards. The MIMO 2x2 technology allows for maximum raw data rates of up to 300 Mbps. Furthermore, **RS353j-4G, RS353jw-4G, RS353jvw-4G, RS353awv-4G** Devices are equipped with an integrated LTE(4G) module that supports LTE at speeds of up to 100 Mbps for downloads and up to 50 Mbps for uploads, in addition to UMTS (3G+) and HSPA+.

They also include a 19-inch rack-mount conversion bracket that enables installation into 19-inch server racks. Rack mounting is further simplified by the device's height (equivalent to one rack unit) and the integrated power supply.

The following figure shows a typical scenario for **RS353x** operation:

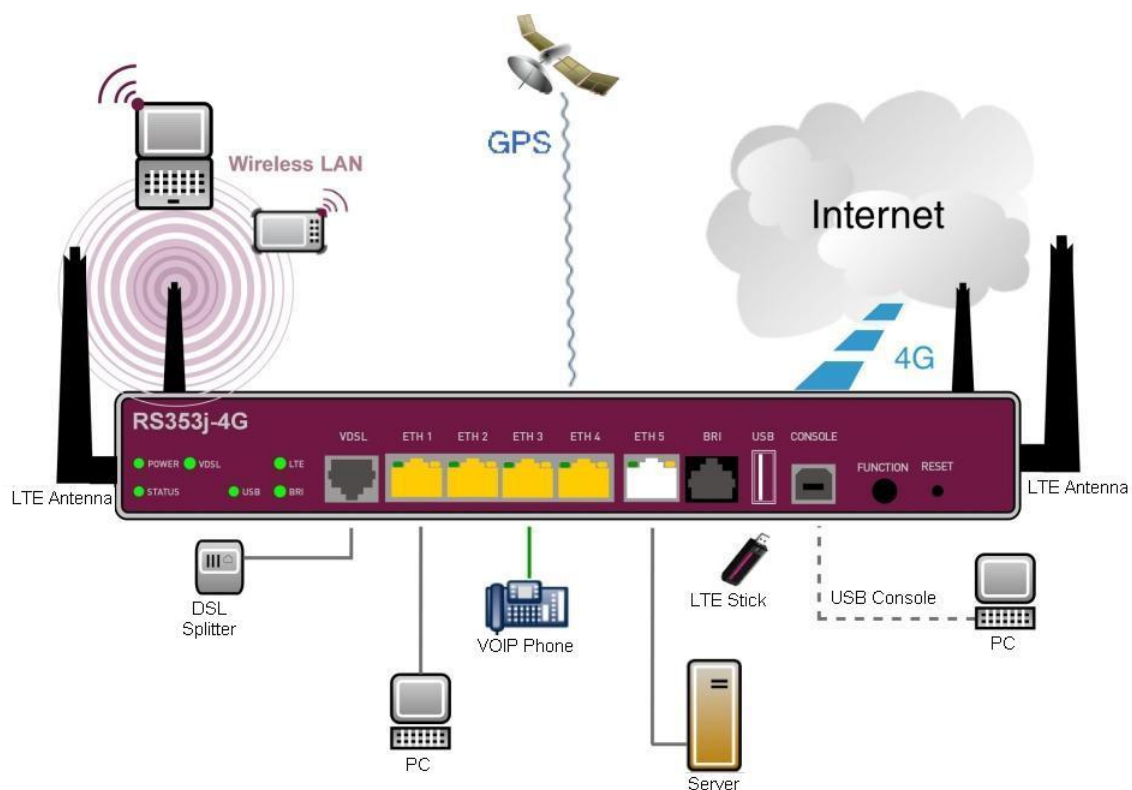


Fig. 1: Scenario

2.2 Characteristics

2.2.1 Power supply

For further information on the different **RS353x** power supplies, please see [Components and Power Supply](#) on page 6, [Power source](#) on page 12.

2.2.2 Hardware monitoring

The LEDs on the front panel are used to monitor the hardware in the **RS353x**. These LEDs provide visual information on the state of the device and reference the condition of the hardware components, indicating whether there is connectivity, data flow, etc.

For further information on the LEDs panel, please see [Components](#) on page 6.

Chapter 3 Components and Power Supply

The following chapter provides detailed information on the chassis of the **RS353x** and its components. This information includes:

- Components.
- Information on assembly.
- Installing and uninstalling modules.
- Power supply.
- FUNCTION button.
- RESET button.
- Data connection.
- SIM card installation.

3.1 Components

3.1.1 Front panel

The following figures show the front panel of each "a/j" family:

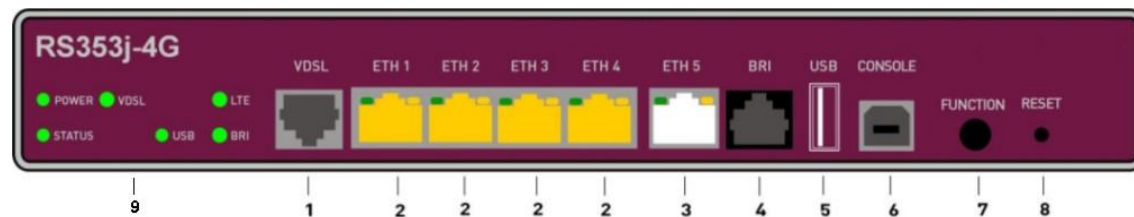


Fig. 2: Front Panel, RS353j-4G

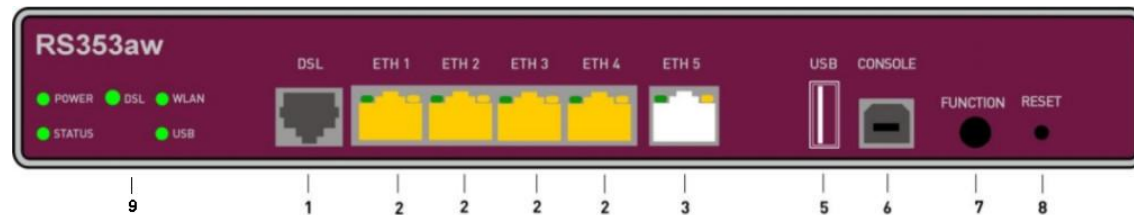


Fig. 3: Front Panel, RS353aw

The front panel components are as follows:

Front panel components

Item	Description
1	xDSL. DSL connector.
2	ETH1 to ETH4. 4-port Gigabyte Ethernet Switch.
3	ETH5. WAN Gigabyte Ethernet.
4	BRI connection (only RS353j family).
5	USB. Slot where you can insert a 3G USB modem.
6	Console. USB connector providing access to the device's local console for configuration and monitoring purposes.

7	FUNCTION. WPS (Wireless Protected Setup) button. This allows for easy and secure configuration of the WiFi network parameters.
8	RESET. Reset button. For further information on how the reset button works, please see RESET button on page 13.
9	LEDs panel.

The LED panel provides information on the status of the components (whether they are active or not) and on network activity.



Fig. 4: LEDs panel
LEDs

LED	Color	Description
POWER	Green	Off -> power supply is not connected. On -> power supply is connected.
STATUS	Green	Off -> system off. On -> software is running. Blinking -> see Default configuration on page 13.
xDSL	Green	Off -> interface down. On -> interface up and connection established. Blinking -> data activity.
WLAN	Green	WLAN status LED. Only found in RS353jw, RS353jvw, RS353jw-4G, RS353jvw-4G, RS353aw, and RS353awv-4G Devices This LED provides status information about the WLAN interface: Off -> interface down. On-> interface up. Blinking -> activity/maintenance.
USB	Green	USB status LED. When an external dongle is used, this LED provides status information: Off -> device interface not detected or unavailable. On-> connected. Blinking -> connection data activity.

LTE	Green	<p>LTE status LED. Only found in RS353j-4G, RS353jw-4G, RS353jwv-4G, RS353awv-4G Devices</p> <p>When an external dongle is used, this LED provides status information:</p> <p>Off -> interface down.</p> <p>On-> interface up and connection established.</p> <p>Blinking -> connection data activity.</p>
BRI	Green	<p>Off -> interface down.</p> <p>On -> a B-channel is active.</p> <p>Blinking -> both B-channels are active.</p>

In addition to the LEDs described in the previous table, the front panel also has LEDs linked to the Switch Gigabit Ethernet interfaces and the WAN Gigabit Ethernet interface.



Fig. 5: ETH leds

Switch and WAN LED indicators

LED	Description
Yellow	<p>OFF -> Interface is either unavailable, not installed or not registered.</p> <p>ON -> Connected to 10 M:</p> <ul style="list-style-type: none"> - Steady: Not transferring data. - Blinking: Transferring data.
Yellow + Green	<p>OFF -> Interface is either unavailable, not installed or not registered.</p> <p>ON -> Connected to 100 M:</p> <ul style="list-style-type: none"> - Steady: Not transferring data. - Blinking: Transferring data.
Green	<p>OFF -> Interface is either unavailable, not installed or not registered.</p> <p>ON -> Connected to 1000 M:</p> <ul style="list-style-type: none"> - Steady: Not transferring data. - Blinking: Transferring data.

3.1.2 Rear panel

The following figure shows the rear panel. Here you will find the majority of the **RS353x** router connectors.



Fig. 6: Rear panel RS353

The following table provides information on each connector, as well as a description:

Rear panel components

Item	Description
1	ON/OFF switch and power cable connection.
2	WLAN ANT1 and ANT2 antenna connectors. Only RS353jw , RS353jvw , RS353jw-4G , RS353jvw-4G , RS353aw , and RS353awv-4G Devices
3	GPS antenna connector. Only RS353j-4G , RS353jw-4G , RS353jvw-4G , RS353awv-4G Devices
4	LTE MAIN-AUX antenna connectors. Only RS353j-4G , RS353jw-4G , RS353jvw-4G , RS353awv-4G Devices See Section 3.1.3.

3.1.3 Side panels

Two 3G/4G (LTE) antenna connectors are located on the side panels:

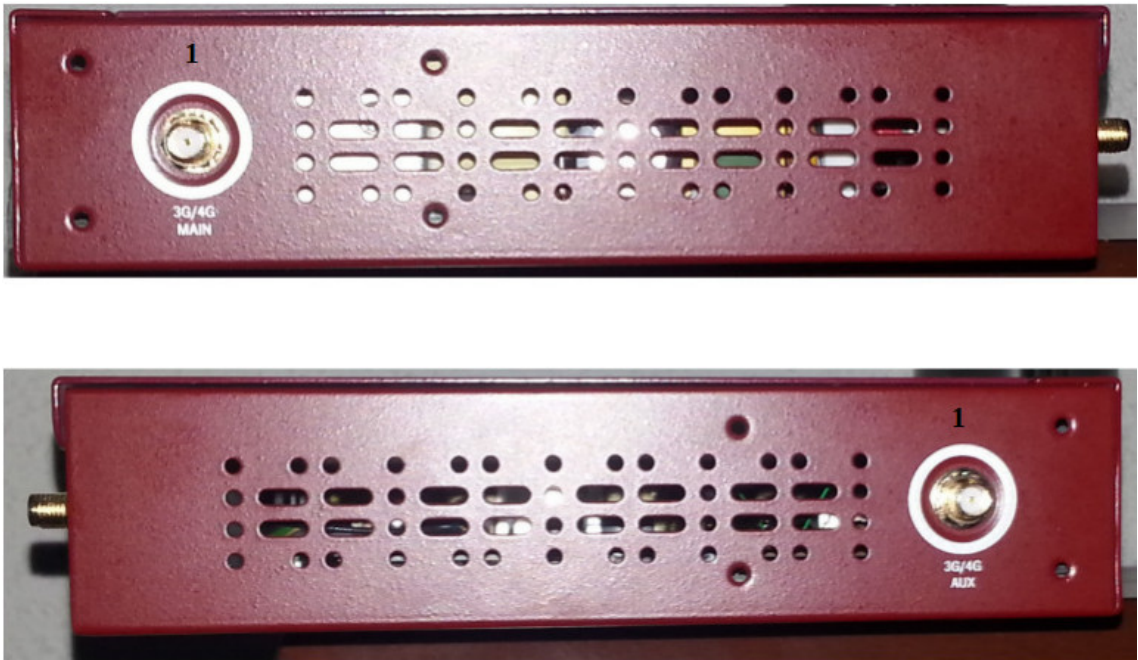


Fig. 7: Left and right side panels

The connectors are as follows:

Side panel connectors

Item	Description
1	LTE MAIN-AUX. Connections for the LTE/UMTS antenna. Only RS353j-4G , RS353jw-4G , RS353jvw-4G , RS353awv-4G Devices

3.1.4 Underside panel

The following elements are located on the underside panel:

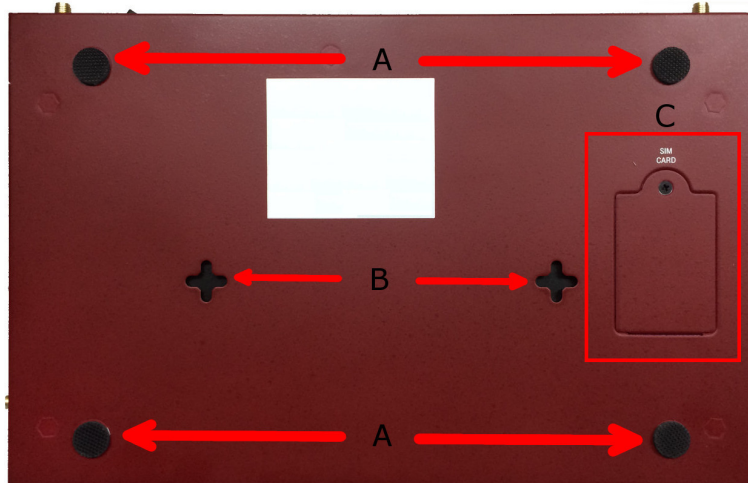


Fig. 8: Underside panel

Underside panel components

Item	Description
A	Rubber feet.
B	Holes for wall mounting.
C	Internal module SIM tray.

3.2 Installation

3.2.1 Installation in a rack

The **RS353x** can be installed in a 19" rack. The necessary strips and screws are provided by default:



Fig. 9: Strips and screws

Both strips are attached to the device through 8 screws (4 on each side) as shown in the figure:

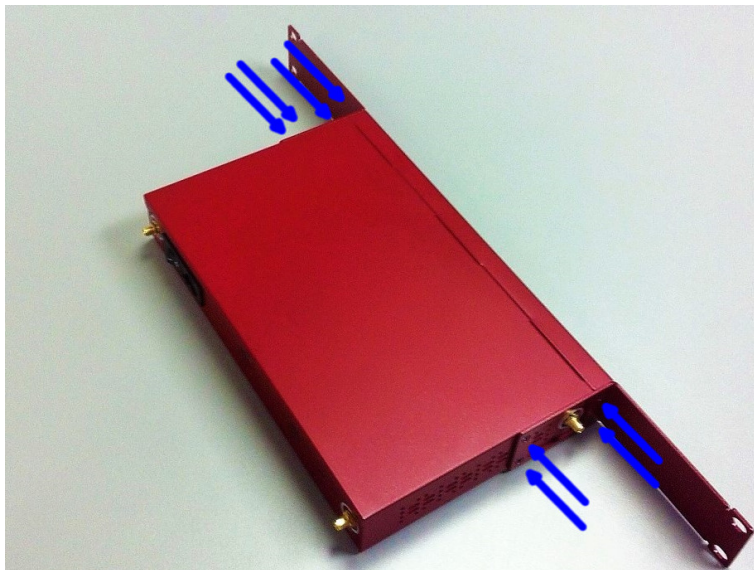


Fig. 10: Anchor bolts for a rack

3.2.2 Standalone

RS353x can be placed as standalone on a flat, stable surface. The adhesive rubber feet must be stuck to the underside panel to prevent the router from sliding.

Make sure there is enough space around the router (for ventilation purposes) and check that the power cord and data cables can reach it.

3.2.3 Wall mounting

To attach the **RS353x** series on the wall, use the tabs on the back side of the housing.



Warning

The screws must go into wall studs (wood) or wall anchors suitable for the type of wall. Screws into dry-wall are not strong enough to support the router.

- (1) Install the two wall studs horizontally and separately in a wall or any other vertical surface.



Warning

If you mount the router on drywall, use hollow-wall anchors (8mm - 5/16 inch) to secure the screws. If the screws are not properly anchored, the strain of the cables connected to the router's back panel could pull the router from the wall.

- (2) Place the router on the wall and secure it using the screws (3.5x30).

3.2.4 Kensington lock

The **RS353x** devices offer the possibility of using a Kensington lock to secure them.

The required notch is located on the rear side of the housing.

3.3 Plug-in Modules

Presently, only a 3G USB modem can be inserted into the device. To view the list of supported modems, please visit the following website: <http://www.bintec-elmeg.com>.

3.3.1 Installation

Simply insert the USB in the appropriate slot on the front panel, as shown in the following figure:

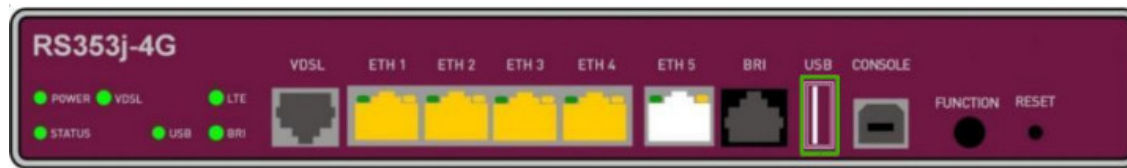


Fig. 11: USB modem insertion slot

3.3.2 Uninstall

To remove the device, simply pull it out of the slot where it was inserted. We recommend switching off the equipment before removing the USB device.

3.4 Power source

The **RS353x** is powered through an internal AC/DC source and has one power input.



Warning

The equipment must be used with the power supply provided by the manufacturer.

Workplace conditions. Main characteristics

- Avoid humid and/or dusty locations.
- Direct exposure to sunlight and other heat sources should be avoided. The device should not be placed amongst papers, magazines or other elements that could hinder natural air circulation.
- The device should not be placed very close to strong electromagnetic fields (such as speakers, engines, etc.).
- Knocks and/or strong vibrations should be avoided during transport, operation and storage.



Warning

The electric current in power cables, telephone lines and communication cables is dangerous. To prevent electric shocks, before installing, handling or opening the equipment covers, connect and disconnect the cables following the steps set forth in [Connecting](#) on page 13 and [Disconnecting](#) on page 13.

3.4.1 External power source

To connect the power supply to the device, please follow the steps set out in [Connecting](#) on page 13.

To avoid electric shocks, residual current circulation and other unwanted effects that affect communications, the following is recommended:



Warning

All interconnected communication devices should be plugged into THE SAME GROUNDED POWER OUTLET, which should at the same time be of good quality (lower than 10 ohms).

We recommend connecting all data devices to the same power source regardless of whether the workplace is provided with an uninterrupted power supply (UPS), a regulated supply or is independent of other power supplies (such as lighting, etc.). This will help to avoid malfunctions and premature aging of the drivers and other components.

3.4.1.1 Connecting

- Ensure that the on/off power supply switch is in the OFF position (0).
- Connect all data cables.
- Connect the power supply to the device.
- Set the device's on/off power supply switch in the ON position (1).

3.4.1.2 Disconnecting

- Set the on/off power supply switch in the OFF position (0).
- Disconnect the power supply from the device.
- Disconnect the data cables.

3.5 RESET button

The different RESET button features are described below:



Fig. 12: RESET button

3.5.1 Rebooting the device

Once the device is operating normally, pressing the RESET button will make it restart.

3.5.2 Default configuration

The RST button allows you to boot the device with its default configuration. Please follow these steps:

- With the device switched off, press and hold the RESET button down while you turn on the router using the ON/OFF switch (1).
- The POWER LED (green) will light up and STATUS LED will begin to blink. It will carry on blinking for 10 seconds.
- To boot the device with the default configuration, let go of the RESET button while the STATUS LED is still blinking (i.e., before the 10-second period expires).



Note

Some devices leave the factory with customized settings. This personalization can mean your router's default configuration is different from the one shown above.

3.6 Connecting the data

The **RS353x** has the following data connections.

3.6.1 4-port Ethernet switch

The **RS353x** incorporates an 4-port 10/100/1000 Base-T Switch with automatic MDIX to connect to a local area network (LAN).

Please pay careful attention to the labeling to avoid confusing this switch with other port types:



Fig. 13: LAN switch PORTS



Note

During booting and in BIOS mode, only the ETH 1 connector is available.

3.6.2 WAN connection

The **RS353x** has one 10/100/1000 Base-T Ethernet interface for WAN connection. This interface is totally independent from the switch and is treated as just another interface.

Please pay careful attention to the labeling to avoid confusing these ports with other port types:



Fig. 14: WAN connector



Note

During booting and in BIOS mode, the WAN connectors do not work.

3.6.3 ISDN-BRI connection

The **RS353x** has an ISDN S0 BRI interface. The connection is made via an RJ45 connector.

Please pay careful attention to the labeling to avoid confusing these ports with other port types:

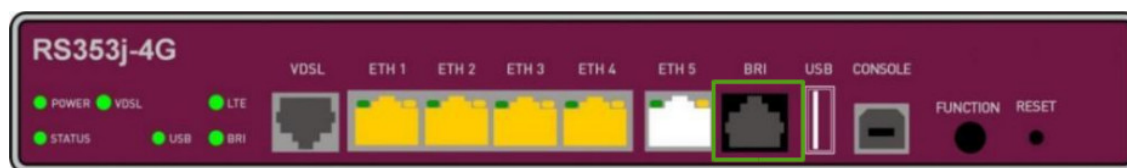


Fig. 15: ISDN-BRI connector



Note

For the *isdn-bri* interface to work, the router needs the corresponding software license.

3.6.4 xDSL connection

The **RS353x** has an xDSL interface to connect to a VSDL/ADSL network. The connector used is RJ45, but only the two inner pins are used for data transmission and reception.

Please pay careful attention to the labeling to avoid confusing these ports with other port types:



Fig. 16: xDSL connector

3.6.5 WWAN antenna connection (cell connector)

The **RS353x** has two connectors for WWAN antennas. To assemble and dismantle the antennas, simply screw them into the connectors labeled 3G/4G (located on the router's left and right panels).



Note

This connector is only available on **RS353j-4G, RS353jw-4G, RS353jwv-4G, RS353awv-4G** Devices

Installing these antennas in the **RS353x** is essential to improve the quality of the signal received and transmitted by the cellular model.



Note

To achieve high-quality performance, the router should always have the WWAN antennas installed.

For the *cellular* interface to work, the router needs the corresponding software license.

Some cellular telephony technologies use the antenna diversity technique to improve the quality of the signal received (HSUPA, CDMA EV-DO, etc.). The **RS353x** incorporates several WWAN connectors for this.

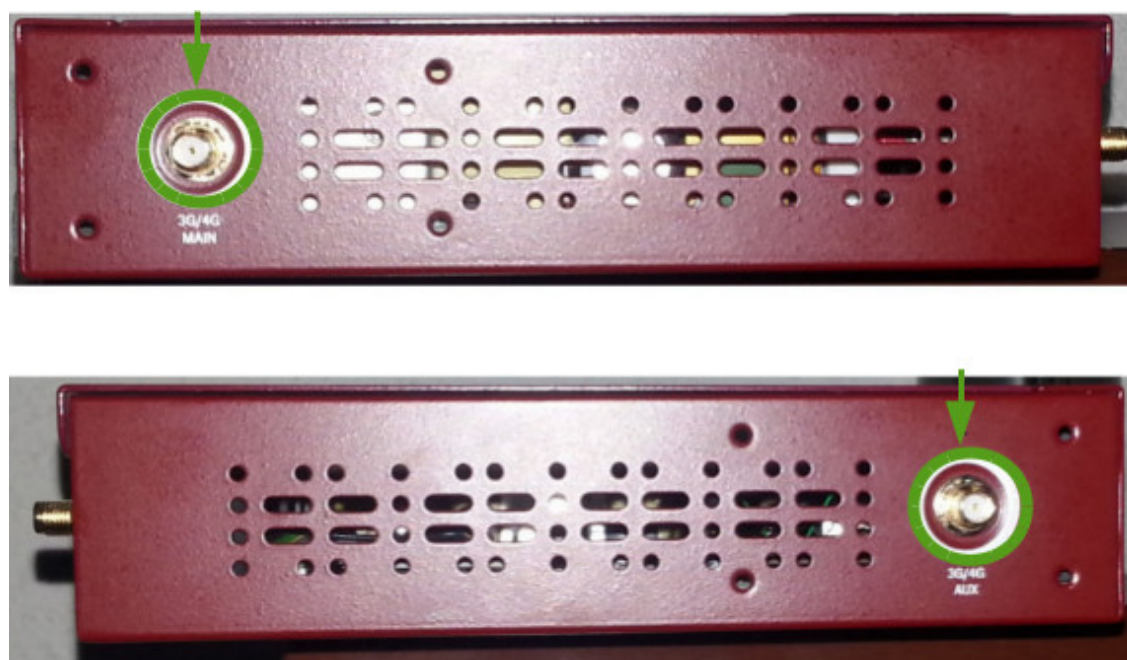


Fig. 17: 3G/4G MAIN antenna and 3G/4G AUX antenna

When the Main and Aux antennas are connected through extension cords instead of being screwed directly into the router, the minimum distance between the two of them must be 7 cm. The maximum recommended distance is 25 cm.

To achieve optimum performance, the radio frequency accessories installed (antennas and cables) should be those recommended by bintec.

bintec has a series of accessories (90° mount antennas, antennas for outdoor installation, antennas for ceiling installation, extension cables, etc) that enable installation in different locations.

3.6.5.1 Placing the antenna

The orientation of the antenna and its location with respect to other wireless devices and radiation sources (such as communication devices, personal computers, etc.) can influence the performance of the device.

Antennas transmit and receive radio signals. Their performance is also affected by environmental factors (such as the distance between the device and the base station), physical obstacles and other interferences due to radio frequencies (RF).

For optimum coverage, carry out the following instructions:

- Whenever possible, place the antenna where there are no physical obstacles. Obstacles between the antenna and the base station degrade the wireless signal. Place the antenna above ground level facing the nearest base station.
- Density of materials also affects antennas. Place them away from any type of wall, metal screens, mirrors, etc.
- Do not place the antenna near columns, which may throw shadows and reduce the coverage area.
- Keep the antenna away from metal pipes such as those used for heating, air-conditioning, etc.
- Please bear in mind that other wireless devices such as telephones, microwaves, etc., can temporarily interfere with the quality of the radio signal.
- We do not recommend installing antennas near, or between, racks containing communication devices, computers, etc. Use an extension cable and place the device outside.

The following recommendations are applicable to all wireless devices:

- Do not touch or move the antenna while the device is transmitting or receiving.
- When the antenna is transmitting, do not touch any equipment that contains devices that radiate very close to, or touching, any exposed part of the body (particularly face and eyes).
- Do not install the device in areas where the atmosphere is potentially explosive.
- Wireless devices can cause interferences in other devices. Do not use the device in areas where medical equipment is installed.
- To ensure the R&TTE 1999/5/EC directive is complied with, the device must be at least 15 cm away from a person's body when operating.

3.6.6 Wireless LAN antenna connection (Wi-Fi connectors)

The **RS353x** (only **RS353jw**, **RS353jvw**, **RS353jw-4G**, **RS353jvw-4G**, **RS353aw**, and **RS353awv-4G** Devices) has two RF antenna connectors for an external antenna to improve the quality of the signal received and transmitted by the Wireless LAN module.

These modules are internal and can be activated by purchasing the corresponding software license. To assemble and dismantle the antennas provided with the device, just screw them into the connectors labeled **WLAN**. They are located on the rear and side panels of the router.

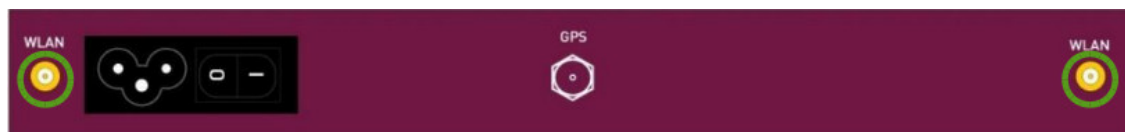


Fig. 18: WLAN Antennas

3.6.7 Connecting a 3G USB device (USB connector)

The **RS353x** has a USB HOST 2.0 Type A connector interface. It allows 3G USB modems to be connected. The interface can be activated by purchasing the corresponding software license.



Fig. 19: 3G USB Connector

3.6.8 Connecting for configuration

The **RS353x** has a USB Type B female connector on the front panel (labeled CONSOLE) that provides access to the device's local console

For further information, please see [Connecting to the device](#) on page 25.



Fig. 20: CONSOLE Connector

3.7 Installing the SIM card

The **RS353x** (only **RS353j-4G**, **RS353jw-4G**, **RS353jwv-4G**, **RS353awv-4G** Devices) is equipped with a Wireless WAN interface that may need a SIM card to operate. Some carriers in certain countries provide services (CDMA) that do not require SIM cards.

The **RS353x** is equipped with a SIM tray located on the bottom of the router, as shown in the following figure:

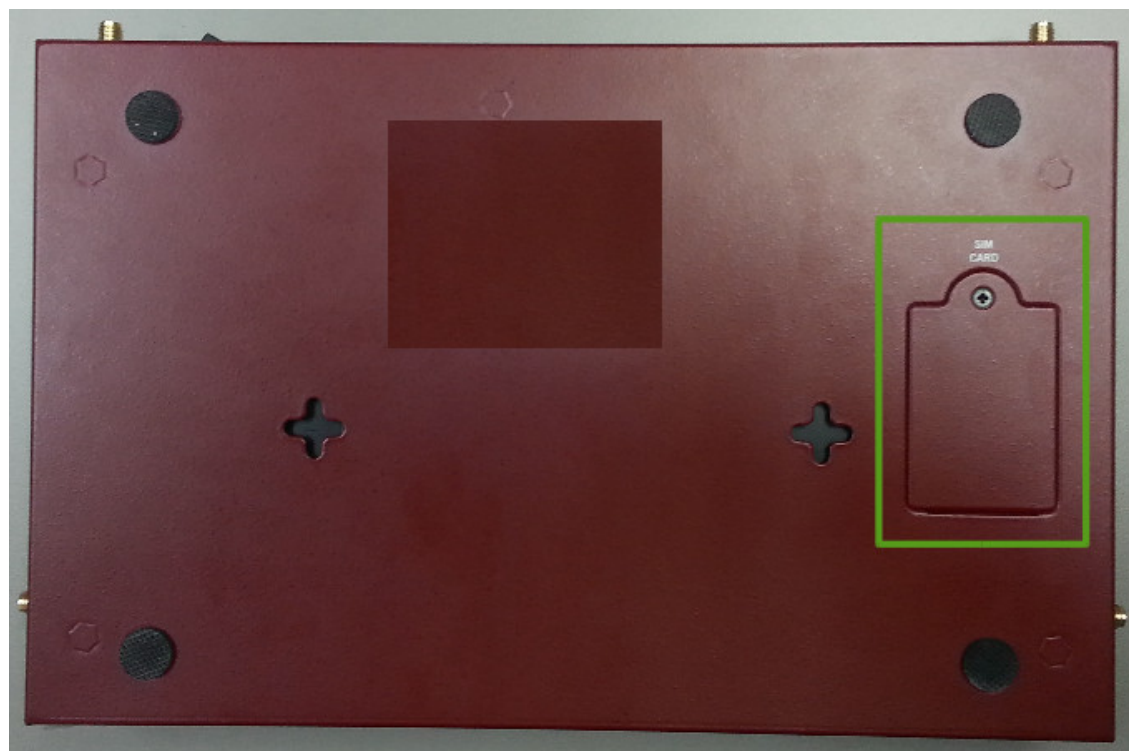


Fig. 21: SIM tray



Warning

This device is compatible with 1.8 V and 3 V SIMs. Do not install SIMs that do not support these voltages.

**Warning**

Never install the SIM cards when the device is switched on.

Always disconnect the device from the main power supply before installing the SIM cards.

Always disconnect the device before removing the housing to access the trays.

When inserting the SIM cards, please protect yourself against electrostatic discharges (ESD).

Do not touch the SIM card connectors.

To insert the SIM card in the SIM slot in the tray, proceed as follows:

- (1) Use a Philips PH1 screwdriver to loosen the screw of the card slot cover found on the bottom of the device and remove the cover. Push the card lock in the direction of the "open" arrow and lift the card slot slightly.
- (2) Make sure that that contacts on the SIM card are facing downwards.
- (3) Push the SIM card into the card slot so that the beveled edge of the card is facing upwards.
- (4) Close the card slot. Press the card slot downwards again.
- (5) Push the card lock in the direction of the "lock" arrow. You will hear a click as the card locks into place.

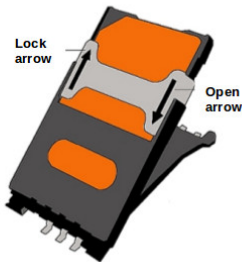




Fig. 22: Inserting the SIM in the slot




Chapter 4 Compliance



4.1 Manufacturer information

<i>Brand</i>	bintec
<i>Manufacturer</i>	bintec elmeg
<i>Country</i>	Germany
<i>Postal Address</i>	Suedwestpark 94 90449 Nuremberg Germany
<i>International Phone</i>	+49 - 911 - 9673 0


4.2 Safety warnings

	<p>The electric current in power cables and communication cables is dangerous. To prevent electric shocks, before installing, handling or opening the equipment covers, connect and disconnect the cables following the steps set forth in Connecting on page 13 and Disconnecting on page 13.</p>
	<p>Der elektrische Strom in Strom-, Telefon- und Datenkabeln ist gefährlich. Um Elektroschocks zu vermeiden, trennen Sie vor der Installation, der Bedienung oder dem Öffnen des Geräts die Kabel wie in den Abschnitten Verbinden und Trennen beschrieben.</p>
	<p>La tensión eléctrica de los cables de alimentación es peligrosa. Para evitar descargas, antes de instalar, mover o abrir las cubiertas de este equipo, conecte y desconecte los cables siguiendo el orden que se detalla en los apartados "Conectar" y "Desconectar".</p>
	<p>All interconnected communication devices should be plugged to THE SAME GROUNDED POWER OUTLET, which should, at the same time, be of good quality (lower than 10 ohms).</p> <p>It is highly recommended that all data devices be connected to the same power source regardless of whether the workplace is provided with an uninterrupted power supply (UPS), a regulated supply or is independent of other power supplies (such as lighting, etc.). This will help prevent malfunctions and premature aging of the drivers and other components.</p>
	<p>Alle miteinander verbundenen Kommunikationsgeräte sollten mit der gleichen geerdeten Stromversorgung verbunden werden. Diese sollte von hoher Qualität sein (niedriger als 10 Ohm).</p> <p>Unabhängig davon, ob der Arbeitsplatz über eine unterbrechungsfreie Stromversorgung (UPS) oder eine geregelte Versorgung verfügt oder unabhängig von der weiteren Installation (z. B. Licht) ist – es wird dringend empfohlen, alle Geräte an die gleiche Spannungsversorgung anzuschließen. Dies beugt Problemen im Betrieb sowie Problemen der vorzeitigen Alterung von Komponenten vor.</p>
	<p>Todos los equipos de comunicaciones interconectados deberán estar unidos a UNA MISMA TOMA DE TIERRA de buena calidad (inferior a 10 ohmios).</p> <p>Si la instalación está dotada de un Sistema de Alimentación Ininterrumpida (SAI),</p>

	<p>alimentación estabilizada, o bien es independiente del resto (alumbrado, etc.), conecte todos los equipos de comunicaciones a la misma fuente de alimentación. De esta forma se evitarán problemas de funcionamiento y envejecimiento prematuro de drivers y demás componentes.</p>
	<p>Never install the SIM cards when the device is switched on.</p> <p>Always disconnect the device from the main power supply before installing the SIM cards.</p> <p>Always disconnect the device before removing the casing to access the trays.</p> <p>When inserting the SIM cards, please protect yourself against electrostatic discharges (ESD).</p> <p>Do not touch the SIM card connectors.</p>
	<p>Installieren Sie keine SIM-Karten, solange das Gerät eingeschaltet ist.</p> <p>Trennen Sie das Gerät immer von der Stromversorgung, bevor Sie eine SIM-Karte installieren.</p> <p>Trennen Sie das Gerät immer von der Stromversorgung, bevor Sie das Gehäuse für einen Zugang zu den SIM-Halterungen öffnen.</p> <p>Schützen Sie sich gegen elektrostatische Entladung (ESD), wenn Sie eine SIM-Karte installieren.</p> <p>Berühren Sie die SIM-Karten-Kontakte nicht.</p>
	<p>No instale nunca las tarjetas SIM con el equipo encendido.</p> <p>Desconecte siempre el equipo de la red antes de instalar las tarjetas SIM.</p> <p>Desconecte siempre el equipo antes de desmontar la carcasa para acceder a las bandejas.</p> <p>Al insertar las tarjetas SIM, protéjase contra descargas electroestáticas (ESD).</p> <p>No toque los conectores de las tarjetas SIM.</p>
	<p>The equipment is intended to be installed by Service Personnel and only handled by qualified personnel. If not, the device may be damaged and malfunction.</p>
	<p>Das Gerät ist für eine Montage durch Servicepersonal ausgelegt und darf nur von qualifiziertem Personal gehandhabt werden. Andernfalls kann es zur Beschädigung des Geräts und zu Fehlfunktionen kommen</p>
	<p>El equipo está diseñado para ser instalado por personal del servicio técnico y su manejo debe realizarlo personal cualificado. De lo contrario, el equipo puede resultar dañado y quedar inservible.</p>
	<p>The equipment must be used with the power supply provided by the manufacturer.</p>
	<p>Das Gerät muss mit dem vom Hersteller gelieferten Netzteil betrieben werden.</p>
	<p>El equipo debe ser usado con la fuente de alimentación proporcionada por el fabricante.</p>

	The screws must go into wall studs (wood) or wall anchors suitable for the type of wall. Screws into drywall are not strong enough to mount the router.
	Die Schrauben müssen in einen Dübel oder Wandanker geschraubt werden, der für die jeweilige Art der Wand geeignet ist. Schrauben in einer Trockenbauwand sind nicht stabil genug, um den Router zu halten.
	Los tornillos deben ir atornillados en un taco de pared (de madera) o del tipo adecuado según la clase de pared. Los tornillos que se montan directamente en los paneles de yeso no son lo bastante resistentes para soportar el router.
	If you install the screws in drywall, use hollow-wall anchors (8 mm – 5/16 inch) to secure the screws. If the screws are not properly anchored, the strain of the cables connected to the router's back panel could pull the router from the wall.
	Wenn Sie die Schrauben in eine Trockenbauwand schrauben wollen, verwenden Sie Hohlraumdübel (8 mm – 5/16 Zoll), um die Schrauben zu sichern. Wenn die Schrauben nicht angemessen verankert sind, kann Zug auf die Verkabelung an der Rückseite des Routers diesen aus der Wand reißen.
	Si instala los tornillos en paneles de yeso, utilice tacos de pared hueca (8 mm - 5/16 pulgadas) para fijar los tornillos. Si los tornillos no están bien anclados, la tensión de los cables conectados al panel posterior del router podría hacer que el router se cayera de la pared.

4.3 WEEE information

	<p>The crossed-out wheeled bin symbol indicates that the device must be disposed of separately from normal domestic waste at the end of its useful service life. Please use an appropriate waste disposal facility.</p> <p>Das auf dem Gerät befindliche Symbol mit dem durchgekreuzten Müllcontainer bedeutet, dass das Gerät am Ende der Nutzungsdauer bei den hierfür vorgesehenen Entsorgungsstellen getrennt vom normalen Hausmüll zu entsorgen ist.</p> <p>El símbolo del contenedor con la cruz, que se encuentra en el aparato, significa que cuando el equipo haya llegado al final de su vida útil, deberá ser llevado a los centros de recogida previstos, y que su tratamiento debe estar separado del de los residuos urbanos.</p>
---	---

4.4 REACH

In compliance with the REACH Candidate List, the delivered product and product packaging do not contain chemical substances above a concentration limit of 0.1% weight by weight (w/w). This declaration will be updated whenever any changes occur or other chemical substances are added to the REACH Candidate List. Information is currently provided to consumers upon request.

4.5 EC declaration of conformity

English (EN)	<p>Hereby, bintec elmeg declares that radio equipment RS353x complies with:</p> <p>Directive 2014/53/EU (RED) or</p> <p>Directive 2014/30/EU (EMC)</p> <p>Directive 2014/35/EU (LVD)</p> <p>Directive 2009/125/EC (ErP)</p> <p>Directive 2011/65/EU (RoHS)</p> <p>of the European Parliament and of the Council.</p>
German (DE) Deutsch	<p>Hiermit erklärt bintec elmeg die Übereinstimmung des Geräts RS353x mit:</p> <p>Richtlinie 2014/53/EU (RED) oder</p> <p>Richtlinie 2014/30/EU (EMC)</p> <p>Richtlinie 2014/35/EU (LVD)</p> <p>Richtlinie 2009/125/EG (ErP)</p> <p>Richtlinie 2011/65/EU (RoHS)</p> <p>des Europäischen Parlaments.</p>
Spanish (ES) Español	<p>Por la presente, bintec elmeg declara que el tipo de equipo radioeléctrico RS353x es conforme con:</p> <p>Directiva 2014/53/UE (RED) o</p> <p>Directiva 2014/30/UE (EMC)</p> <p>Directiva 2014/35/UE (LVD)</p> <p>Directiva 2009/125/CE (ErP)</p> <p>Directiva 2011/65/UE (RoHS)</p> <p>del Parlamento Europeo y del Consejo.</p>



Note

- Directive 2014/53/EU (RED) replaces Directive 1999/5/EC (R&TTE) on 13th June 2016.
- Directive 2014/30/EU (EMC) replaces Directive 2004/108/EC (EMC) on 20th April 2016.
- Directive 2014/35/EU (LVD) replaces Directive 2006/95/EC (LVD) on 20th April 2016.

The EC declaration of conformity and additional product documentation can be accessed here: <http://www.bintec-elmeg.com>

4.6 CE marking

This equipment is in conformity with the CE procedures and marking.



4.7 National restrictions

In accordance with Article 10 of 2014/53/EU, we inform you that national restrictions and requirements may apply when it comes to authorization. These can evolve with time. bintec elmeg recommends that you check with local authorities as to the latest status of national regulations.

This product is supplied with antennas in order to fulfill local regulations. Do not choose other antennas. To comply with power limits and RF exposure requirements, the antennas used for this transmitter must be installed in such a way that they are always separated from nearby persons by a minimum distance of, at least, 25 cm.

4.8 Operating frequency

To find out more about the operating frequencies working in the device, see [WIFI specifications](#) on page 33 and appendix [Radio WWAN specifications](#) on page 32.

Appendix A Technical Information

A.1 Troubleshooting

The following table can help you solve problems when installing the device. If you cannot solve the issue, contact your dealer for more information.

Symptom	Solution
None of the LEDs light up on the router.	Check the power supply to the router (power source, ON/OFF switch, main power outlet).
You have forgotten the router's access password.	Ignore the configuration through the RESET button (as explained in the relevant section).
None of the <i>LAN Switch</i> Port LEDs light up.	Check the Ethernet cable and the connection to the network.
The <i>DSL</i> LED never lights up in green.	If the device has an xDSL interface available, check the connection to the network or to the splitter and make sure that the telephone line you have connected supports xDSL service.
The <i>LTE</i> LED never lights up in green (only RS353j-4G).	Check the SIM card installation and configuration (PIN number). Check the appropriate license is available for use.
The <i>BRI</i> LED never lights up in green (only RS353j family).	Check the Ethernet cable and the connection to the network. Check the appropriate license is available for use.
The <i>Wi-Fi</i> LED never lights up in green (only RS353jw/aw).	Check the router configuration and that of the remote station(s). Check the appropriate license is available for use.
The <i>USB</i> LED never lights up in green.	Check that the device inserted in the USB connector is supported by the router. Please check the bintec website http://www.bintec-elmeg.com for a list of supported 3G USB modems. Check the appropriate license is available for use.

A.2 Updating the software

The **RS353x** can be updated to new releases. Please contact your distributor for further details on new releases.

There are several ways to update a bintec router. For further information, please see manual: "bintec *Dm748-I Software Updating*".

The software required to update bintec routers is supplied in a format known as **distribution**. This consists of a single file containing all the files needed to update your device, as well as in-depth information on the contents of the files.

A.3 Connecting to the device

A.3.1 Connecting using the local console (console connector)

The **RS353x** has a USB Type B female connector on the front panel, known as **Console**, which provides access to the device's local console.



Fig. 24: **Console Connector**

To configure this, connect the CONSOLE port to your PC using the the USB connector cable, supplied with the device.



Note

The configuration for the terminal must be:

- Speed: 115200 bps.
- Eight data bits.
- One stop bit.
- No parity bit.
- No type of flow control.

A.4 Licenses

The **RS353x** router family offers a series of licenses among which the following stand out:

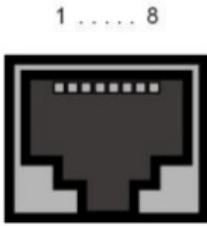
DPI: Activation license for the DPI feature.

Hardware encryption: Activation license for the hardware encryption.

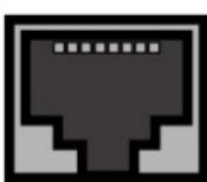
VDSL: For non "v" devices, VDSL can be optionally activated through a software license.

A.5 Connectors

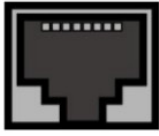
A.5.1 LAN connector (switch)

RJ45 LAN	RJ45 PIN	FE Signals	GE Signals
	1	BI-DA+	BI-DA+
	2	BI-DA-	BI-DA-
	3	BI-DB+	BI-DB+
	4	--	BI-DC+
	5	--	BI-DC-
	6	BI-DB-	BI-DB-
	7	--	BI-DD+
	8	--	BI-DD-

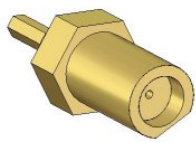
A.5.2 WAN connector

RJ45 WAN	RJ45 PIN	FE Signals	GE Signals
	1	BI-DA+	BI-DA+
	2	BI-DA-	BI-DA-
	3	BI-DB+	BI-DB+
	4	--	BI-DC+
	5	--	BI-DC-
	6	BI-DB-	BI-DB-
	7	--	BI-DD+
	8	--	BI-DD-

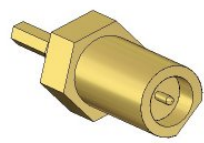
A.5.3 ISDN BRI S0 connector

RJ45 BRI	RJ45 PIN	ISDN
	1	--
	2	--
	3	TX+(output)
	4	RX+(input)
	5	RX-(input)
	6	TX-(output)
	7	--
	8	--

A.5.4 WWAN connector (female)

SMA Female	PIN	ANT
	Internal	RF in/out
	External	GND


A.5.5 WLAN connector (male)

SMA-RP Female	PIN	ANT
	Internal	RF in/out
	External	GND

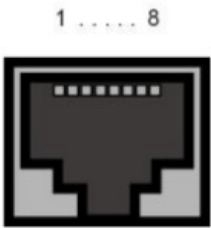
A.5.6 USB connector

USB Type A	PIN	USB
	1	VCC
	2	DATA-
	3	DATA+
	4	GND
	Shell	Shield

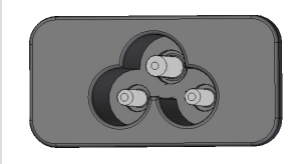
A.5.7 Configuration connector

USB Type B	PIN	USB
	1	Vbus
	2	D-
	3	D+
	4	GND
	Shell	Shield

A.5.8 DSL connector

RJ45 DSL	PIN	DSL
	1	--
	2	--
	3	--
	4	line
	5	line
	6	--
	7	--
	8	--

A.5.9 Power supply connector

IEC C9	PIN
	L
	Earth
	N

A.6 Technical specifications

A.6.1 Hardware architecture

PROCESSORS	Lantiq VRX288.
MEMORY	128 Mbyte in RAM.
STORAGE UNIT	FLASH Memory (32 Mbytes).

A.6.2 LAN interface

PROTOCOLS	Ethernet (802.3).
PORTS	4 port Switch managed with Auto MDIX, autosensing.
SPEED	10/100/1000 Mbps (Base-T).
CONNECTOR	RJ45 female.

A.6.3 WAN interface

STANDARDS	Ethernet (802.3).
SPEED	10/100/1000 Mbps (Base-T).
CONNECTOR	RJ45 female.

A.6.4 ISDN BRI interface

STANDARDS	Basic 2B+D.
SPEED	2 x 64 Kbps (B channels).
CONNECTOR	RJ45 female.

A.6.5 Wireless WAN interface

WWAN Standard/Bands	<p>MC7304:</p> <ul style="list-style-type: none"> • LTE: <ul style="list-style-type: none"> • FDD: B1, B3, B7, B8, B20 • WCDMA: B1, B2, B5, B8 • GSM/GPRS/EDGE: Quad Band <p>EC25-E:</p> <ul style="list-style-type: none"> • LTE: <ul style="list-style-type: none"> • FDD: B1, B3, B5, B7, B8, B20 • TDD: B38, B40, B41 • WCDMA: B1, B5, B8 • GSM/GPRS/EDGE: 900/1800 MHz
Speed (DL/UL)	<p>MC7304:</p> <ul style="list-style-type: none"> • LTE Cat 3: 100Mbps/50Mbps • HSPA+ Cat 24/6: 42Mbps/5.76Mbps • EDGE: 236Kbps <p>EC25-E:</p> <ul style="list-style-type: none"> • LTE Cat 4. <ul style="list-style-type: none"> • FDD: 150Mbps/50Mbps • TDD: 130Mbps/35Mbps • HSPA+ Cat 24/6: 42Mbps/5.76Mbps • EDGE: 236Kbps
CONNECTOR	Two SMA female connectors.
SIM Slots	4 Mini-SIM (2FF) ISO/IEC 7810:2003, ID-000 (1.8V / 3V)

A.6.6 Wireless LAN interface

WLAN standards	802.11n (Mimo 2x2); 802.11b; 802.11g; 802.11a; 802.11h.
Frequency bands 2.4 GHz indoor/outdoor (EU)	2.4 GHz Indoor/Outdoor (2412-2472 MHz) max. 100 mW EIRP. The permitted transmission power may vary in countries outside the EC.
Frequency bands 5 GHz indoor (EU)	5 GHz indoor (5150-5350 MHz) max. 200 mW EIRP allowed. The permitted transmission power may vary in other countries.
Frequency bands 5 GHz outdoor (EU)	5 GHz outdoor (5470-5725 MHz) max. 200 mW EIRP allowed. The permitted transmission power may vary in other countries.
WLAN modes	2.4 GHz operation: 802.11b only; 802.11g only, 802.11b/g/n mixed; 802.11b/g/n mixed long; 802.11b/g/b mixed short; 802.11b/g/n; 802.11g/n; 802.11n only; 5 GHz Operation: 802.11a only; 802.11a/n; 802.11n only.
Automatic Rate Selection (ARS)	Automatic usage of the optimized data rate.
Data rates for 802.11b,g (2.4GHz)	11, 5.5, 2 and 1 Mbps (DSSS modulation). 54, 48, 36, 24, 18, 12, 9 and 6 Mbps (OFDM modulation).
Data rates for 802.11a,h (5 GHz)	54, 48, 36, 24, 18, 12, 9 and 6 Mbps (OFDM modulation).
Data rates for 802.11n, Long Guard (800ns), 20 MHz	MSC0 6,5 Mbps; MSC1 13 Mbps; MCS2 19,5 Mbps; MCS3 26 Mbps; MCS4 39 Mbps; MSC5 52 Mbps; MCS6 58,5 Mbps; MCS7 65 Mbps; MCS8 13 Mbps; MCS9 26 Mbps; MCS10 39 Mbps; MCS11 52 Mbps; MCS12 78 Mbps; MCS13 104 Mbps; MCS14 117 Mbps; MCS15 130 Mbps.
Data rates for 802.11n, Short Guard (400ns), 20 MHz	MSC0 7,2 Mbps; MSC1 14,4 Mbps; MCS2 21,7 Mbps; MCS3 28,9 Mbps; MCS4 43,3 Mbps; MSC5 57,8 Mbps; MCS6 121,5 Mbps; MCS7 135 Mbps; MCS8 27 Mbps; MCS9 54 Mbps; MCS10 81 Mbps; MCS11 108 Mbps; MCS12 162 Mbps; MCS13 216 Mbps; MCS14 243 Mbps; MCS15 270 Mbps.
Data rates for 802.11n, Long Guard (800ns), 40 MHz	MSC0 13,5 Mbps; MSC1 27 Mbps; MCS2 40,5 Mbps; MCS3 54 Mbps; MCS4 81 Mbps; MSC5 108 Mbps; MCS6 121,5 Mbps; MCS7 135 Mbps; MCS8 27 Mbps; MCS9 54 Mbps; MCS10 81 Mbps; MCS11 108 Mbps; MCS12 162 Mbps; MCS13 216 Mbps; MCS14 243 Mbps; MCS15 270 Mbps.
Data rates for 802.11n, Short Guard (400ns), 40 MHz	MSC0 15 Mbps; MSC1 30 Mbps; MCS2 45 Mbps; MCS3 60 Mbps; MCS4 90 Mbps; MSC5 120 Mbps; MCS6 135 Mbps; MCS7 150 Mbps; MCS8 30 Mbps; MCS9 60 Mbps; MCS10 90 Mbps; MCS11 120 Mbps; MCS12 180 Mbps; MCS13 240 Mbps; MCS14 270 Mbps; MCS15 300 Mbps.
Output power limitation (without antenna gain)	Adjustable in the following steps: 5, 8, 11, 14, 16 dBm and maximum. Maximal power varies depending on data rate, frequency band and country setting.
Bandwidth (802.11n)	20/40 MHz (bundling two adjoining 20 MHz channels into one 40 MHz channel).

A.6.7 USB interface

3G/4G USB MODEMS	Please visit the bintec website http://www.bintec-elmeg.com for a list of supported 3G USB modems.
SPEED	The interface complies with the USB 2.0 (480 Mbps) standard; the end speed depends on the 3G USB modem used.
CONNECTOR	USB Type A.

A.6.8 Configuration interface

LOCAL TERMINAL	USB series 115200-8-N-1 without flow control.
CONNECTOR	USB Type B female on the device front panel.

A.6.9 DSL interface

STANDARD	Please see the manual on DSL.
SPEED	Please see the manual on DSL.
CONNECTOR	RJ45 female.

A.6.10 Power supply

INPUT VOLTAGE	110 - 240 VAC
FREQUENCY	50 - 60 Hz
INPUT CURRENT	0.7 A
CONNNECTOR	IEC C6

A.6.11 Dimensions and weight

TYPE	Metallic housing with optional mounting in a 19-inch rack (bracket option).
LENGTH x WIDTH x HEIGHT	265mm x 170mm x 40mm.
WEIGHT	1.4 kg.

A.6.12 Environmental specifications

TEMPERATURE	OPERATING NORMALLY: 0 °C to 40 °C. STORED: -25 °C to 70 °C.
RELATIVE HUMIDITY	On: 10 % to 95 %.

Appendix B Radio Information

B.1 Radio WWAN specifications

LTE/WCDMA/GSM connectivity is provided by different WWAN modules. The exact module installed will depend on your particular router model.

This product is supplied with antennas. To comply with the regulations, do not choose other antennas.

Technology: LTE. MC7304 specifications.

Bands	Frequencies	Radiated Transmit Power
Band 1	Tx: 1920–1980 MHz	+23 dBm \pm 1 dBm
	Rx: 2110–2170 MHz	
Band 3	Tx: 1710–1785 MHz	+23 dBm \pm 1 dBm
	Rx: 1805–1880 MHz	
Band 7	Tx: 2500–2570 MHz	+21 dBm \pm 1 dBm
	Rx: 2620–2690 MHz	
Band 20	Tx: 832–862 MHz	+23 dBm \pm 1 dBm
	Rx: 791–821 MHz	

Technology: LTE. EC25-E specifications.

Bands	Frequencies	Conducted Transmit Power
Band 1	Tx: 1920-1980 MHz	+23 dBm \pm 2 dB
	Rx: 2110-2170 MHz	
Band 3	Tx: 1710–1785 MHz	+23 dBm \pm 2 dB
	Rx: 1805–1880 MHz	
Band 7	Tx: 2500–2570 MHz	+23 dBm \pm 2 dB
	Rx: 2620–2690 MHz	
Band 20	Tx: 832–862 MHz	+23 dBm \pm 1 dB
	Rx: 791–821 MHz	

Technology: UMTS(WCDMA)/ HSDPA/ HSUPA/ HSPA+/ DC-HSPA+.. MC7304 Specifications

Bands	Frequencies	Radiated Transmit Power
Band 1	Tx: 1920-1980 MHz	+23 dBm \pm 1 dBm
	Rx: 2110-2170 MHz	
Band 8	Tx: 880–915 MHz	+23 dBm \pm 1 dBm
	Rx: 925–960 MHz	

Technology: UMTS(WCDMA)/ HSDPA/ HSUPA/ HSPA+/ DC-HSPA+. EC25-E specifications.

Bands	Frequencies	Conducted Transmit Power
Band 1	Tx: 1920-1980 MHz Rx: 2110-2170 MHz	+24 dBm +1/-3 dB
Band 8	Tx: 880-915 MHz Rx: 925-960 MHz	+24 dBm +1/-3 dB

Technology: GSM / GPRS / EDGE. MC7304 Specifications

Bands	Frequencies	Radiated Transmit Power
EGSM 900 (900 MHz)	Tx: 880-915 MHz Rx: 925-960 MHz	+32 dBm \pm 1 dBm
DCS 1800 (1800 MHz)	Tx: 1710-1785 MHz Rx: 1805-1880 MHz	+29 dBm \pm 1 dBm

Technology: GSM / GPRS / EDGE. EC25-E specifications.

Bands	Frequencies	Conducted Transmit Power
EGSM 900 (900 MHz)	Tx: 880-915 MHz Rx: 925-960 MHz	+33 dBm \pm 2 dB +27 dBm \pm 3 dB (8-PSK)
DCS 1800 (1800 MHz)	Tx: 1710-1785 MHz Rx: 1805-1880 MHz	+30 dBm \pm 2 dB +26 dBm \pm 3 dB (8-PSK)

B.2 WIFI specifications

Wi-Fi Radio communications are in conformity with the 802.11a/b/g/n standards.

This product is supplied with antennas. To comply with the regulations, do not use other antennas.

Frequency Range	802.11b/g/n @ 2.4 GHz 2400-2483.5 MHz 802.11a/n (HT40) @ 5 GHz 5150-5250 MHz 2550-5350 MHz 5470-5725 MHz
Operating	802.11b/g/n (HT20) @ 2.4 GHz 13 Channels 802.11n (HT40) @ 2.4 GHz 9 Channels 802.11a @ 5 GHz

	16 Channels 802.11n (HT40) @ 5 GHz 8 Channels
TX power @ 2,4 GHz 802.11n 40MHz (HT40)	MCS0/8 19 dBm; MCS1/9 19 dBm; MCS2/10 19 dBm; MCS3/11 19 dBm; MCS4/12 19 dBm; MCS5/13 19 dBm; MCS6/14 19 dBm; MCS7/15 19 dBm.
Receiver Sensitivity @ 2.4 GHz 802.11n 40 MHz (HT40)	MCS0 -92 dBm; MCS1 -91 dBm; MCS2 -89 dBm; MCS3 -86 dBm; MCS4 -82 dBm; MCS5 -79 dBm; MCS6 -77 dBm; MCS7 -75 dBm; MCS8 -91 dBm; MCS9 -91 dBm; MCS10 -89 dBm; MCS11 -85 dBm; MCS12 -82 dBm; MCS13 -78 dBm; MCS14 -77 dBm; MCS15 -74 dBm.
Receiver Sensitivity @ 5 GHz 802.11n 40 MHz (HT40)	MCS0 -91 dBm; MCS1 -89 dBm; MCS2 -87 dBm; MCS3 -84 dBm; MCS4 -81 dBm; MCS5 -78 dBm; MCS6 -76 dBm; MCS7 -74 dBm; MCS8 -90 dBm; MCS9 -89 dBm; MCS10 -87 dBm; MCS11 -83 dBm; MCS12 -80 dBm; MCS13 -77 dBm; MCS14 -75 dBm; MCS15 -73 dBm.
Receiver Sensitivity @ 5 GHz 802.11a/h	6 Mbps -95 dBm; 9 Mbps -94 dBm; 12 Mbps -93 dBm; 18 Mbps -90 dBm; 24 Mbps -88 dBm; 36 Mbps -84 dBm; 48 Mbps -82 dBm; 54 Mbps -81 dBm.
TX power @ 2,4 GHz 801.11b/g	1 Mbps 19 dBm; 2 Mbps 19 dBm; 5,5 Mbps 19 dBm; 11 Mbps 19 dBm; 6 Mbps 19 dBm; 9 Mbps 19 dBm; 12 Mbps 19 dBm; 18 Mbps 19 dBm; 24 Mbps 19 dBm; 36 Mbps 19 dBm; 48 Mbps 19 dBm; 54 Mbps 19 dBm.
TX power @ 2,4 GHz 802.11n 20MHz (HT20)	MCS0/8 19 dBm; MCS1/9 19 dBm; MCS2/10 19 dBm; MCS3/11 19 dBm; MCS4/12 19 dBm; MCS5/13 19 dBm; MCS6/14 19 dBm; MCS7/15 19 dBm.
Receiver Sensitivity @ 2.4 GHz 802.11b/g	1 Mbps -92 dBm; 2 Mbps -92 dBm; 5,5 Mbps -92 dBm; 11 Mbps -92 dBm; 6 Mbps -95 dBm; 9 Mbps -95 dBm; 12 Mbps -94 dBm; 18 Mbps -92 dBm; 24 Mbps -90 dBm; 36 Mbps -85 dBm; 48 Mbps -83 dBm; 54 Mbps -80 dBm
TX power @ 5 GHz 802.11n 40MHz (HT40)	MCS0/8 19 dBm; MCS1/9 19 dBm; MCS2/10 19 dBm; MCS3/11 19 dBm; MCS4/12 19 dBm; MCS5/13 18 dBm; MCS6/14 17 dBm; MCS7/15 17 dBm.
TX power @ 5 GHz 802.11n 20MHz (HT20)	MCS0/8 23 dBm; MCS1/9 23 dBm; MCS2/10 22 dBm; MCS3/11 21 dBm; MCS4/12 20 dBm; MCS5/13 19 dBm; MCS6/14 18 dBm; MCS7/15 18 dBm.
TX power @ 5 GHz 801.11a/h	MCS0 -95 dBm; MCS1 -94 dBm; MCS2 -92 dBm; MCS3 -88 dBm; MCS4 -85 dBm; MCS5 -81 dBm; MCS6 -80 dBm; MCS7 -78 dBm; MCS8 -95 dBm; MCS9 -94 dBm; MCS10 -91 dBm; MCS11 -87 dBm; MCS12 -84 dBm; MCS13 -81 dBm; MCS14 -79 dBm; MCS15 -77 dBm.
Receiver Sensitivity @ 2.4 GHz 802.11n 20 MHz	MCS0 -95 dBm; MCS1 -94 dBm; MCS2 -92 dBm; MCS3 -88 dBm; MCS4 -85 dBm; MCS5 -81 dBm; MCS6 -80 dBm; MCS7 -78 dBm; MCS8 -95 dBm; MCS9 -94 dBm; MCS10 -91 dBm; MCS11 -87 dBm; MCS12 -84 dBm; MCS13 -81 dBm; MCS14 -79 dBm; MCS15 -77 dBm.
Receiver Sensitivity @ 5 GHz 802.11n 20 MHz (HT20)	MCS0 -96 dBm; MCS1 -93 dBm; MCS2 -91 dBm; MCS3 -88 dBm; MCS4 -85 dBm; MCS5 -81 dBm; MCS6 -79 dBm; MCS7 -77 dBm; MCS8 -94 dBm; MCS9 -92 dBm; MCS10 -90 dBm; MCS11 -87 dBm; MCS12 -84 dBm; MCS13 -80 dBm; MCS14 -78 dBm; MCS15 -76 dBm.