Transport SR

Cellular Routers

Wireless WAN
router / switch

Installation Guide

Disclaimer

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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 its life this product MUST NOT be mixed with other commercial waste for disposal. Check with the terms and conditions of your supplier for disposal information.

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Safety Notices

1) Please read all instructions before installing and powering the unit. You should keep these instructions in a safe place for future reference.

2) The Transport SR family uses a 12V DC/1.5A power supply. If the power supply shows signs of damage or malfunction, you should stop using it immediately - turn off the power at the mains and disconnect it from the power supply before contacting your supplier for a repair or replacement.

3) Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. Use only the accessories, attachments, and power supplies provided by the manufacturer – connecting non-approved antennas or power supplies may damage the unit, cause interference or create an electric shock hazard, and will void your warranty.

4) Do not attempt to repair the products; they contain no electronic components that can be serviced or replaced by the user. Any attempt to service or repair the unit by the user will void the product warranty.

5) The Transport SR is designed for indoor use only and should be used in an environment that is suitable for computers and other electronic equipment.

6) Ports that are capable of connecting to other apparatus are defined as SELV ports. To ensure conformity with IEC60950 ensure that these ports are only connected to ports of the same type on other apparatus.

Wireless Networks

The Transport SR series routers support both GSM and CDMA networks. GSM networks support the GPRS, EDGE, UMTS, HSDPA and HSUPA data transmission standards. CDMA networks support the IXRTT and EVDO data transmission standards. Throughout this manual these networks will be referred to as either GSM, CDMA, or simply 'wireless' networks.

The type of network supported by each model is summarized in the table below:

	Network					
Model	**GSM GPRS**	**GSM EDGE**	**WCDMA UMTS**	**WCDMA HSDPA**	**WCDMA HSUPA**	**CDMA EVDO1xRTT**
SR44-E	✓	✓				
SR44-H	✓	✓	✓	✓		
SR44-U	✓	✓	✓	✓	✓	
SR44-C						✓

Special Notes on Wireless Safety

Digi International products are designed to the highest standards of safety and international standards compliance for the markets in which they are sold. However, wireless based products contain radio devices which require specific consideration. Please take the time to read and understand the following guidance. Digi International assumes no liability for an end user's failure to comply with these precautions.

	Wireless routers incorporate a wireless radio module. Users should ensure that the antenna is positioned at least 1 metre away from themselves and other persons in normal operation. When in a hospital or other health care facility, observe the restrictions on the use of mobile phones. Do not use the router in areas where guidelines posted in sensitive areas instruct users to switch off mobile phones. Medical equipment may be sensitive to RF energy. The operation of cardiac pacemakers, other implanted medical equipment and hearing aids can be affected by interference from cellular terminals such as the wireless routers when placed close to the device. If in doubt about potential danger, contact the physician or the manufacturer of the device to verify that the equipment is properly shielded. Pacemaker patients are advised to keep the wireless router away from the pacemaker while it is on.
	Wireless routers must NOT be operated on aircraft. The operation of wireless appliances in an aircraft is forbidden to prevent interference with communications systems. Failure to observe these instructions may lead to the suspension or denial of cellular services to the offender, legal action, or both.
	As with any electrical equipment, you should not operate your wireless router in the presence of flammable gases, fumes or potentially explosive atmospheres. Radio devices should not be used anywhere that blasting operations are taking place.
	Wireless routers receive and transmit radio frequency energy while switched on. Remember that interference can occur if it is used close to TV sets, radios, computers or inadequately shielded equipment. Follow any special regulations and always switch off your wireless router wherever forbidden or when you suspect that it may cause interference or danger.
	SOS IMPORTANT! – Wireless routers operate using radio signals and cellular networks cannot be guaranteed to connect in all possible conditions. Therefore, you should never rely solely upon any wireless device for life critical communications.

Preface

This guide describes the installation procedure for the Digi Transport SR family. It is intended to provide sufficient information for you to be able to connect the unit to your terminal equipment and power supply. A complete reference guide to the software features that are available on the product is available separately in PDF format, and can be downloaded from the Digi International website (www.digi.com).

All models feature:

- 4 x 10/100Base-T Ethernet ports
- 2 x RS232 sync/async serial ports (25-way D)
- 2 x USB 2.0 host ports

Several combinations of wireless and PSTN connectivity are available depending on the model.

Note: *You will not be able to use the router for remote communication until you have subscribed to a suitable wireless network service.*

Package Contents

When you receive the router carefully unpack it and check the contents. These should include:

Item
System unit
12V power supply
Installation guide
2m CAT5 STP LAN cable (blue)
2m PSTN cable (Models with PSTN only)
Cellular antenna (may be sold separately)

If any item is missing or damaged, please contact your supplier. You should also make a record of any damage that may have occurred during shipping and report it to the carrier.

1 Introduction

The Transport SR and other models described in this guide are compact IP routers that facilitate the transmission of data over UMTS, HSDPA, EVDO, GPRS, EDGE and/or PSTN networks. All models incorporate a 4-port 10/100 Ethernet switch. Depending on the model, each unit also incorporates one or more WAN interfaces as follows:

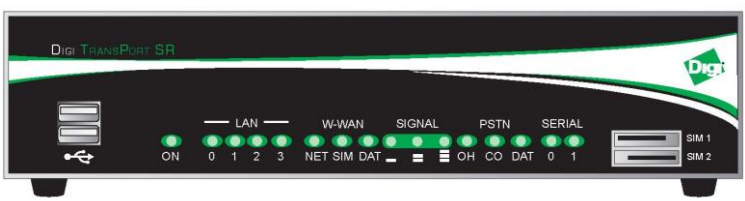
- SR44-E, H, U – wireless GPRS/EDGE/UMTS/HSDPA/HSUPA only
- SR44-C – wireless CDMA/IXRTT/EVDO only

The routers can be configured either by using commands entered at the serial port (much like a modem), or via the built-in Web interface. We recommend that you use the Web interface whenever possible.

In addition to many standard LAN and Internet protocols such as PPP, Transport SR series products provide a combination of powerful but easy to use configuration, management and diagnostic tools. This makes them simple and cost-effective solutions for migrating existing terminal or telemetry equipment, which use wired networks (PSTN, ISDN, etc.), to wireless operation.

1.1 Front Panel Features

The front panel of the unit incorporates the USB host connectors, a number of LED indicators depending on the model and the two SIM card-holders as shown in the following illustration (GSM models):



USB Host Connectors

The USB host connectors may be used to connect compatible USB client devices such as memory sticks, serial adapters, etc.

Status Indicators

The status indicators operate as follows:

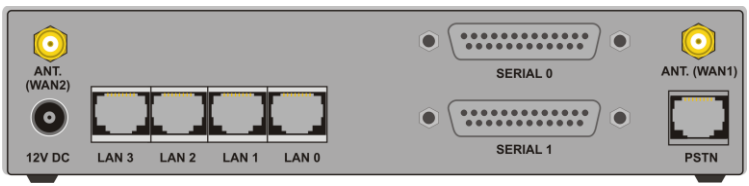
ON	Illuminates steady red when power is applied.
LAN 0, 1, 2, 3	Illuminate steady when there is a network connection to the associated LAN port and flash when data is transmitted or received.
W-WAN: NET, SIM, DAT	These indicators display the wireless WAN status as follows: **NET** – Illuminates green when a wireless network has been detected. **SIM** – Illuminates green when a valid SIM card is installed in the unit. **DAT** – Flashes green when data is being transmitted or received.
SIGNAL	The three indicators labelled SIGNAL illuminate to indicate the wireless signal strength as follows: None illuminated < -113 dBm (effectively no signal) 1 LED illuminated >= -112 dBm and <= -87dBm (weak) 2 LED's illuminated >= -86dBm and <= -71dBm (medium) 3 LED's illuminated >= -70dBm and <= -51dBm (strong)
PSTN: OH, CD, DAT	On the Transport SR models with a PSTN interface, these indicators operate as follows: **OH** – Illuminates green when the modem has gone off-hook. **CD** – Illuminates green when the unit has connected to a remote modem and asserted the Carrier Detect signal at the serial port. **DAT** – flashes green when the unit has connected to a remote modem and data is being transferred.
SERIAL: 0, 1	These indicators operate in one of two software configurable modes: Connection Mode: Illuminate steady if a terminal is connected to the serial port and the DTR signal is on. Flash when data is transmitted or received. DTR Mode: Flash when data is transmitted or received only.

SIM Card Sockets

The two sockets at the right side of the front panel are for the GSM SIM card(s) that you will receive from your service providers. Details of how to insert these correctly are given in section 2 below.

CDMA models do not require SIM cards and therefore do not have SIM card sockets.

Rear Panel Features



(SR44 shown with PSTN option)

The functions of these connectors are described in the following table:

12V DC	This socket is used to connect the unit to the power supply using the 12V DC power supply provided .
LAN 0, 1, 2, 3	The LAN sockets are used to connect the unit to 10/100-BaseT LANs using the 2-meter STP (Shielded Twisted Pair) cable supplied or a suitable alternative. These ports are auto-sensing for speed and wiring (straight-through or cross-over). To comply with EMC requirements they should not be used with non-STP cable.
W-WAN ANT. (main)	This SMA connector is used to fit the wireless antenna. The Transport SR-, E and H models are supplied with a single stub antenna which should be fitted to this connector. **Note:** Stub antennas are provided as standard but a range of suitable alternative for use in different applications may be purchased separately.
W-WAN ANT. (aux)	This SMA connector is used on the Transport SR44-U and C models to fit the second antenna supplied with the unit. The receiver supports “diversity” antenna capability to improve performance and are there supplied with two stub antennas. On models that do not support diversity antennas this connector will not be present.

SERIAL 0, 1	These DB 25 sockets provide synchronous/asynchronous RS232 serial ports which may be used to connect the router to compatible serial devices. To comply with EMC requirements it should not be used with a cable longer than 2 meters.
PSTN	This socket is used to connect the router to a PSTN line.

Reset Switch

This is located on the underside of the unit near the front. Pressing the switch gently with the tip of a pen or other suitable implement while the unit is powered will generate a hardware reset.

2 Installation

All of the products described in this guide are designed for indoor use (office or home). The system unit should be positioned on a smooth, level surface making sure that there is adequate ventilation. Do not expose it to extremes of heat or cold, strong magnetic fields or liquids.

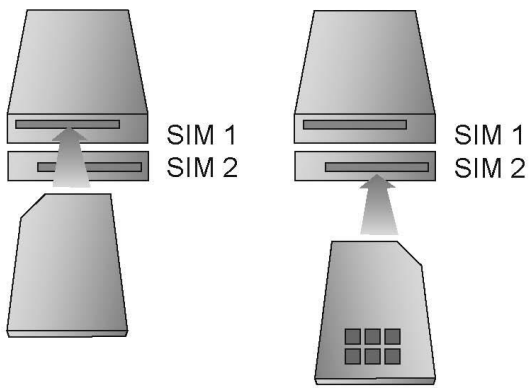
It is important to remember that these products are wireless devices just like a mobile phone, so they will only operate reliably over the wireless network if there is a good signal. For many applications the stub antenna provided will be suitable but in some circumstances it may be necessary to use a window-mounted or magnetically mounted antenna with an extended cable to allow the antenna itself to be positioned to provide the best possible signal reception. Digi International can supply a range of suitable antennas.

Step 1 - Installing the SIM card (GSM models only)

The router incorporates two separate SIM card holders so that if your application demands it, you may install SIM cards for two different networks. This means that one wireless service may be used as a back-up service in the event that the primary service fails in some way. By default, SIM 1 is the default SIM used for access to the primary network and SIM 2 is used for the back-up network.

Note: *SIM 1 and SIM 2 cannot be used to access two networks simultaneously.*

The SIM card(s) should be inserted into SIM cardholders at the right side of the front panel as illustrated below.



In both cases, the end of the SIM card with the chamfered corner should be inserted first. For SIM 1 the contacts should be face down. For SIM 2 the contacts should be face up.

Step 2 – Fitting the antenna

The router may be supplied with an antenna for use with wireless networks.

Attach the antenna onto the SMA connector on the rear panel of the router. DO NOT OVERTIGHTEN THE ANTENNA – IT SHOULD BE FINGER TIGHT ONLY.

Step 3 – Connecting the LAN cable

Plug one end of one of the supplied 2 metre CAT5 cable into the RJ45 socket labelled LAN 0. Plug the other end into the LAN socket on your PC or notebook.

Step 4 – Connecting the serial cable

For connection to a serial terminal device, connect a DB25 serial cable to the SERIAL connector on the rear of the unit. Connect the other end of the DB9 cable to the terminal.

Step 5 – Connecting the power supply

Plug the jack plug on the power supply into the socket labelled 12V DC. When power is first applied, the ON indicator will illuminate and the unit will initiate a series of diagnostic self-tests. During this process one or more of the other indicators, will flash to show that the unit is busy. When the flashing stops, the unit is ready to use.

The unit is now ready to be configured.

3 - Configuration

Once the router has been installed and powered up, the mobile interface needs to be configured to communicate to the Internet or Wireless WAN provided by your wireless carrier.

Note: *The default IP address for the LAN 0 port is 192.168.1.1, with subnet of 255.255.255.0. DHCP Server is enabled by default on the device, so make sure your host computer is setup to obtain IP addresses automatically.*

Alternatively, setting your PC's IP address to one on the same subnet (192.168.1.) will enable you to connect to the unit's Web interface.*

Step 1 – Connect to the Web Interface

Open a browser and connect to the Web interface by connecting to http://192.168.1.1

It is recommended to change the default username and password on the device.

Default Username: username

Default Password: password

This setting can be changed by going to:

Configuration -> Security -> Users -> User 0-9 -> User 1

Step 2 – Configuration Mobile Interface

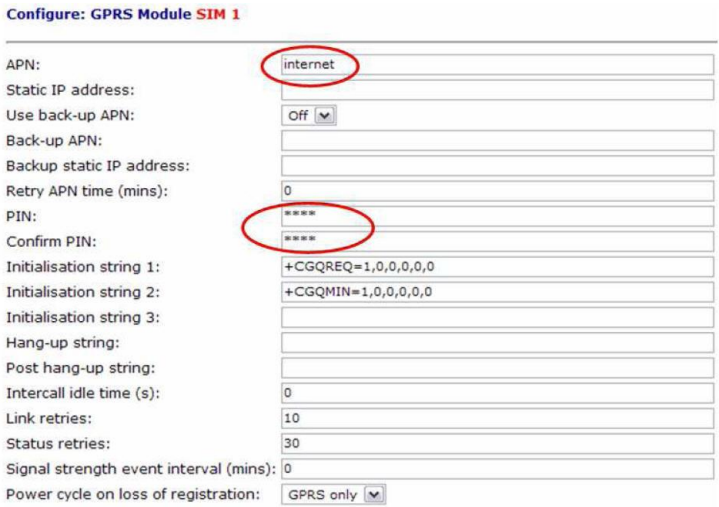
The method used to activate the device on a cellular network varies depending on whether the device is a GSM or CDMA device.

Transport SR44-E, H, U – GSM Devices

Configure the APN by going to:

Configuration -> Interfaces -> Mobile -> W-WAN Module -> SIM 1

Enter the APN of your mobile operator and SIM PIN if you have one. Click OK.



If the APN you are using does not require a PPP username and password, they you can skip this next step.

Configuration -> Interfaces -> PPP -> PPP 0-4 -> PPP 1 -> Standard

Enter the PPP username, password, and confirm password. Click OK.

Follow prompts to save the configuration to flash memory.

Transport SR44-C – CDMA Devices

Start the CDMA Provisioning by going to:

Configuration -> Interfaces -> Mobile -> W-WAN Module -> CDMA Provisioning

Select the proper carrier and start the provisioning script. Manual provisioning can be selected if you have been provided with the proper parameter from your carrier (MSN< MSID, SPC, etc.).

Follow prompts to save the configuration to flash memory.

Step 3 – Verify Cellular Connection

Verify the mobile connection is established and view the mobile IP address by going to:

Diagnostics -> Status -> PPP -> PPP 0-4 -> PPP 1 -> View

Name: Wireless

Option	Local	Remote
MRU	1500	1500
ACCM	0x0	0x0
VJ Compression	OFF	OFF
Link Active With Entity	ASY 7	
IP Address	10.94.78.128	
DNS Server IP Address	10.203.65.68	
Outgoing Call To	*98*1#	

Viewing the Event Log can also be used to view the connection status.

Diagnostics -> Event Log

Step 4 – Test Mobile Connection

Depending on the wireless plan being used, you should be able to perform a test to a remote host or browse the Internet. By default, the Digi Transport should have issued your workstation an IP address of 192.168.1.100 via DHCP. DHCP will pass the proper default gateway and DNS server information. Verify this on the workstation by using the "ipconfig" command. If the workstation does not obtain an IP address of 192.168.1.100 enter "ipconfig /renew" in your workstation's command window.

A simple test for most Internet connected plans is to open a browser and connect to a web site. For non-Internet connected plans consult your IT administrator and/or wireless carrier for a recommended host to test against. For example you may be able to ping a host or router within the carrier's network or on the corporate network to verify connectivity.

Step 5– Finish Device Configuration

For greater description on all the features and settings available on the device, there is a comprehensive Reference Guide available on the Digi Support website (www.digi.com).

Advanced Configuration:

- **VPN:** Configuration > VPN
- **Routing:** Configuration >Routing
- **Firewall:** Configuration > Security >Firewall
- **Users:** Configuration > Security > Users
- **Alarms:** Configuration > Alarms
- **VRRP:** Configuration > Interfaces > Eth x > Configure
- **Ethernet Port Mode:** Configuration > Interfaces > Eth x > Configure
- **Serial Port Mode:** Configuration > Serial > ASY Ports

4 General Specifications

Model numbers	SR44-H,E,U,C
Power supply	12V DC / 1.5A
Dimensions	W187 x D137 x H44 mm
Weight	0.76Kg
Operating temp. range	-20 to +50 degrees Celsius -4 to +122 degrees Fahrenheit
SR44-H - WAN interface	Category 12 (QPSK) 2100 MHz HSDPA (max 1.8Mbps downlink). Quad-band GSM 850/900/1800/1900 MHz EDGE (E-GPRS) multi-slot class 10 (max 236.8 kbps downlink), mobile station class B, modulation and coding scheme MCS1-9.
SR44-E	Quad-band GSM 850/900/1800/1900 MHz EDGE (E-GPRS) multi-slot class 10 (max 236.8 kbps downlink), mobile station class B, modulation and coding scheme MCS1-9 GPRS multi-slot class 10, mobile station class B, PBCCH support, coding schemes CS 1-4
SR44-U GSM/GPRS/EDGE/ UMTS/HSDPA/HSUPA modem	HSUPA mode: 2 Mbps Category 5 HSDPA 1.8: Categories 1-4, 11 and 12 HSDPA 3.6: Categories 5 and 6 HSDPA 7.2: Categories 7 and 8 UMTS: 384 Kbps downlink, 384 Kbps uplink MO 0301: 850/1900/2100 (Rx diversity) MHz MO 0302: 850 (Rx Diversity) / 1900 (Rx Diversity) / 2100 MHz Equalization and Rx Diversity at the same time Quad-band GSM 850/900/1800/1900 MHz EDGE (E-GPRS) multi-slot class 12 (max 236.8 kbps downlink), mobile station class B, modulation and coding scheme MCS1-9 GPRS multi-slot class 12, mobile station class B, PBCCH support, coding schemes CS 1-4

SR44-C CDMA 1 x EV-DO CDMA 1 x ATT	Dual Board 800 MHz Cellular / 1900 MHz PCs Supports Rx diversity in both 800 MHz and 1900 MHz 1 x EV-DO Revision A (IS-856-A) Forward link up to 31 Mbps Reverse link 1.8 Mbps 1 x EV-DO Revision O (IS-85L Forward link up to 2.4 Mbps Reverse link 153.6 Kbps 1 x RTT (IS-2000) Forward and reverse link speeds up to 153.6 Kbps
PSTN interface	14.4 kbps fax modem. V.92 compliant, backwards compatible with earlier protocols. V.44 data compression, v.42 LAPM and MNP 2-4 error correction.
USB ports	Three-port USB 2.0 Full-speed Host (OHCI) (12 Mbits per second maximum throughput)
Ethernet interface	10/100Base-T auto-sensing, auto-MDI/MDX (RJ45)
Serial interface	Sync/Async RS232 compatible via 25-way D socket