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6000 Series Routers

DSL2/2+/2++
Wireless GSM/GPRS/EDGE/UMTS/HSDPA/HSUPA
ISDN
PSTN
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 minimise 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 with the terms and conditions of your supplier for disposal information.

Sarian Systems WEEE Registration number: WEE/JB0053TQ

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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 DR6400 series use a 12V DC/1.5A power supply (mains adapter). If the mains adapter shows signs of damage or malfunction, you should stop using it immediately – turn off the power at the mains and disconnect it from the mains 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) These products are 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.

Note on Wireless Networks

The wireless networks supported by the DR6400 series routers fall into two categories: GSM networks and 3G networks. GSM networks support the GPRS and EDGE data transmission standards whilst 3G networks support 3G (UMTS), HSDPA and HSUPA. Throughout this manual these networks will be referred to as either GSM or 3G networks, or simply as 'wireless' networks. The type of network supported depends on which wireless option is purchased, either GSM or 3G.

Preface

This guide describes the installation procedure for DR6400 series products. 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 that can be downloaded from the Digi International website (www.digi.com).

The DR6400 features:

♦   4-port 10/100Base-T Ethernet switch
♦   1, 2 or 6 RS232 serial ports (depending on model)
♦   2 x USB 2.0 host ports
♦   ADSL2/2+/2++
♦   3G/HSDPA/HSUPA or GPRS/EDGE wireless options
♦   ISDN BRI or PSTN options

Special Notes on GSM/3G 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, GSM 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 aerial 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	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.

Package Contents

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

Item	Model		
	DR6410	DR6420	DR6460
12V mains adapter	✔	✔	✔
Installation guide	✔	✔	✔
CAT5 STP LAN cable	✔	✔	✔
DSL cable	✔	✔	✔

Depending on the model you have ordered other items may be included. 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 DR6400 series IP routers facilitate the transmission of data over DSL, ISDN, PSTN or wireless GSM/3G networks.

The DR6400 provides an ADSL/2/2+/2++ interface along with a 4-port 10/100 Ethernet switch. Optional features include GPRS/EDGE or 3G/HSDPA wireless capability and ISDN BRI or PSTN network connectivity.

The wireless network types and data rates supported depend on the option purchased.

GPRS (General Packet Radio System) is an IP-based data transmission service that runs over GSM wireless networks. It is an "always-on" protocol which means that once the router has "attached" to the network, data can be transmitted and received on demand, i.e. it is not necessary to make a call first.

EDGE is an enhanced version of GPRS which offers increased data transfer rates.

UMTS and HSDPA are the 3rd generation (3G) of GSM wireless networks, and as such have much higher data transmission rates.

GPRS/EDGE routing is ideal for applications that are characterised by frequent transmission of relatively small amounts of data, e.g. ATMs (cash-dispenser), remote monitoring and data collection (telemetry) and credit/debt card authorisation.

UMTS/HSDPA routing is ideal for larger amounts of data or for situations where the speed of data transfer is critical. Typical applications include backup for broadband wireline services, video transmission, etc.

HSUPA routing is available as an optional upgrade on the DR6400. HSUPA is able to provide a much greater amount of upstream bandwidth than HSDPA. In addition, the downstream bandwidth is increased too. This makes HSUPA ideal for live broadcast quality video transmissions.

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, DR series products provide a combination of powerful but easy to use configuration, management and diagnostic tools. This makes it a simple and cost-effective solution for migrating existing terminal or telemetry equipment from older networks to DSL broadband.

1.1 Front Panel Features

The front panel of the unit incorporates a number of LED indicators depending on the model, as shown in the following illustration (DR6410):

USB Host Connectors

The USB host connectors may be used to connect compatible USB 2.0 client devices such as memory sticks, serial adapters, etc. Note that the total current available to power USB devices is collectively 0.5A (i.e. for both ports).

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/received.
DTE	Illuminates steady if a terminal is connected to the serial port and the DTR signal is on. Flashes when data is transmitted/received.
DSL	Constant red - no DSL is detected. Quick red flash - DSL is detected and unit is trying to train up to the DSL signal. Constant green - DSL is active. Flashing green - Data is being transferred.
W-WAN	**NET** - Illuminates steady when a wireless network has been detected. **SIM** - Illuminates steady when a valid SIM card is installed in the unit. **DAT** - Flashes to indicate that data is being transferred over the wireless network.
SIGNAL	The three indicators labelled SIGNAL illuminate to indicate the GSM signal strength as follows: None illuminated < -113 dBm (effectively no signal) 1 LED illuminated >= -112 dBm and <= -87 dBm (weak) 2 LED's illuminated >= -86 dBm and <= -71 dBm (medium) 3 LED's illuminated >= -70 dBm and <= -51 dBm (strong)

ISDN: D, B1 & B2	**D** – Illuminates green when the unit is connected to an ISDN network and the D-channel signalling layer is active. **B1** – Illuminates green when ISDN B-channel 1 is active and flashes when data is being transmitted/received over this channel. **B2** – Illuminates green when ISDN B-channel 2 is active and flashes when data is being transmitted/received over this channel.
PSTN: OH, CD, DAT	**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.

SIM Card Sockets (wireless option)

The two sockets at the left side of the front panel are for the GSM/3G SIM card(s) that you will receive from your service providers when you subscribe to a wireless data service. Details of how to insert these correctly are given in section 2 below.

Rear Panel Features

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

12V DC	This jack socket is used to connect the unit to the power supply using the 12V DC mains adapter.
LAN 0, 1, 2, 3	The LAN sockets are used to connect the unit to 10/100-BaseT LANs using the 2-metre 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.

GSM/3G ANTENNA	This SMA connector is used to fit the wireless antenna supplied with the unit. A range of alternative antennas are available for purchase separately.
SERIAL	Port 0 & 1 - 25-way D socket provides an asynchronous RS2322 serial port which may be used to connect the router to a compatible serial device. Port 2, 3, 4, 5 - RJ45 asynchronous serial ports (6460 only)
ISDN/PSTN	This RJ45 socket, labelled ISDN or PSTN as appropriate, is used to connect the unit to the ISDN or PSTN line as necessary.
DSL	This RJ12 socket is used to connect the unit to an ADSL line socket.

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 will generate a hardware reset.

2   Installation

The DR6400 series products are designed for indoor use (office or home). The router should be positioned on a smooth, level surface making sure that there is adequate ventilation. Do not expose the router 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 GSM network if there is a good signal. For many applications the stub aerial provided will be suitable but in some circumstances it may be necessary to use a window-mounted or magnetically mounted aerial with an extended cable to allow the aerial itself to be positioned to provide the best possible signal reception. Digi International can supply a range of suitable aerials.

Safety notice

A separation distance of at least 20cm should be maintained at all times between the GSM/3G antenna (if used) and personnel using the unit.

Important Note

If you are going to be using the Sar/OS Connection Wizard to configure the unit's Ethernet port and also connect it to your GSM/3G network, skip this section and proceed to Configuration.

**Step 1 - Installing the SIM card(s) (wireless option)**

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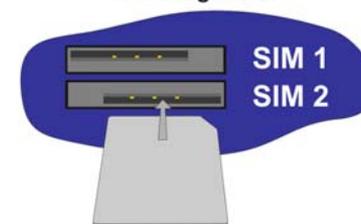
Note:
SIM 1 and SIM 2 cannot be used to access two networks simultaneously.

The SIM card(s) should be inserted into SIM cardholders on the right of the front panel as illustrated below.
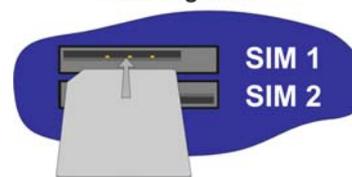
In both cases, the end of the SIM card with the chamfered corner should be inserted first. For SIM 1 the contacts should be face down. For SIM 2 the contacts should be face up.

Step 2 – Fitting the wireless antenna (if applicable)

The router is supplied with a "stub" antenna suitable for with the model you have ordered. Alternatively you may have ordered a different type of antenna separately. In either case this should be screwed onto the SMA aerial connector on the rear of the unit.

If the HSUPA option is purchased, 2 antennas will be supplied, both must be attached to the router. These antennas must not be replaced with external antennas as the spacing between the two antennas is critical.

Step 3 – Connecting the LAN cable

Plug one end of one of the supplied 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, the DR6410 and DR6420 use standard 25-way "D" sockets. A suitable cable will be required to connect your terminal device(s) to these ports. The DR6460 has 6 serial ports which are presented as RJ45 connectors. A range of suitable cables and adapters are available from Digi International for connecting terminal devices to these ports.

Step 5 – Connecting the ADSL cable

Plug one end of the supplied cable, or a suitable alternative, into the RJ12 socket labelled ADSL. Plug the other end into the ADSL line socket.

Step 6 – Connecting to the ISDN line (if applicable)

Plug one end the supplied CAT5 cable into the RJ45 socket labelled ISDN. Plug the other end into the ISDN service outlet.

Step 7 – Connecting to the PSTN line (if applicable)

Plug one end of the supplied PSTN cable into the RJ45 socket labelled PSTN. Plug the other end into the PSTN wall socket.

Step 8 – Connecting the power supply

Plug the jack plug on the mains adapter into the socket labelled 12V DC BEFORE connecting the power adapter to the mains supply and applying power. 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 unit has been installed and powered up, you must now configure it so that it can communicate with your network and the Internet.

The easiest way to configure the unit is to use the Sar/OS Connection Wizard, available from the Digi International website. The Sar/OS Connection Wizard will take you step-by-step through the process of configuring your router. Using the wizard means that you will not have to change the IP address of your PC. Rather, you will be able to change the IP address of the router to match the subnet your PC is already on.

Note: The default IP address for the LAN 0 port is 192.168.0.99, with a default Class C subnet mask (255.255.255.0). Setting your PC's IP address to one on the same subnet (192.168.0.*) will enable you to connect to the unit's Web interface. You will then be able to configure the unit manually without using the Sar/OS Connection Wizard. Further details of manual configuration can be found in the Digi International Sar/OS Reference guide.

Step 1 – Install the Connection Wizard

Download the connection wizard from the Digi website and install the software on your PC.

Step 2 – Run the Wizard

Once the wizard has been installed on your PC, run it from the Windows Start menu.

Step 3 – Decide which configuration method to use

Choose to either configure the unit's Ethernet port only, or configure the unit's Ethernet port and at the same time connect it to your wireless network.

If you choose to configure the unit's Ethernet port only, you must have completed all the installation steps listed in the previous section.

Step 4 – Configure the unit

Follow the on-screen instructions to configure the unit according to the method you have chosen. Once complete you will be able to browse to the unit and configure it using your web browser.

4 General Specifications

Model numbers	82-DR6410-00A (DR6410 router with no options) 82-DR6410-0IA (DR6410 router ISDN only) 82-DR6410-0PA (DR6410 router PSTN only) 82-DR6410-E0A (DR6410 router EDGE only) 82-DR6410-EIA (DR6410 router EDGE + ISDN) 82-DR6410-EPA (DR6410 router EDGE + PSTN) 82-DR6410-H0A (DR6410 router HSDPA only) 82-DR6410-HIA (DR6410 router HSDPA + ISDN) 82-DR6410-HPA (DR6410 router HSDPA + PSTN) 82-DR6420-00A (DR6420 router with no options) 82-DR6420-0IA (DR6420 router ISDN only) 82-DR6420-0PA (DR6420 router PSTN only) 82-DR6420-E0A (DR6420 router EDGE only) 82-DR6420-EIA (DR6420 router EDGE + ISDN) 82-DR6420-EPA (DR6420 router EDGE + PSTN) 82-DR6420-H0A (DR6420 router HSDPA only) 82-DR6420-HIA (DR6420 router HSDPA + ISDN) 82-DR6420-HPA (DR6420 router HSDPA + PSTN) 82-DR6460-00A (DR6460 router with no options) 82-DR6460-0IA (DR6460 router with ISDN only) 82-DR6460-0PA (DR6460 router PSTN only) 82-DR6460-E0A (DR6460 router EDGE only) 82-DR6460-EIA (DR6460 router EDGE with ISDN) 82-DR6460-EPA (DR6460 router EDGE + PSTN) 82-DR6460-H0A (DR6460 router HSDPA only) 82-DR6460-HIA (DR6460 router HSDPA + ISDN) 82-DR6460-HPA (DR6460 router HSDPA + PSTN)
Power supply	12V DC / 1.5A
Dimensions	DR6410 - W236 x D146 x H29 mm DR6420 / DR6460 - W236 x D146 x H42 mm
Weight	0.8Kg – 1.1Kg dependant on model and options installed
Operating temp. range	-20 to +55 degree Celsius

ADSL modem	ADSL Full rate ANSI T1.413 Issue 2, G.dmt and G.lite ITU-T G.992.3 and G.992.1 ADSL2 G.992.3 and G.992.4 ADSL2+ G.992.5 ADSL2++ Quad spectrum downstream and double upstream Annex A and B Supports PPPoA, PPPoE, Bridged/Routed Ethernet over ATM, IP over ATM. Maximum downstream rate 50Mbps, maximum upstream rate 3Mbps dependant on exchange.
GSM/GPRS/EDGE modem	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 12, mobile station class B, PBCCH support, coding schemes CS 1-4
GSM/GPRS/EDGE/ UMTS/HSDPA/HSUPA modem	Category 5 2Mb HSUPA 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 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 GPRS multi-slot class 12, mobile station class B, PBCCH support, coding schemes CS 1-4
ISDN modem	Full duplex 2B+D S/T interface transceiver (according to ITU-T I.430). LAPB and LAPD support. Non-auto mode, transparent mode, extended transparent mode.
PSTN modem	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	2 x 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 Async serial port via RJ45 socket (DR6460 only)

Declaration of Conformity for R&TTE Directive

We: Digi International.
                        Beacon House,
                        Riverside Business Park,
                        Ilkley, West Yorkshire,
                        LS29 8JZ
                        ENGLAND

declare under our sole responsibility that the following product(s):

Models: DR6410, DR6420, DR6460 (Annex A)

                        DR6410, DR6420, DR6460 (Annex B)

Part numbers:

DR6410	DR6420	DR6460
82-DR6410-XYZ	82-DR6420-XYZ	82-DR6460-XYZ

```
where X =
    0 = No Wireless WAN fitted
    E = EDGE
    H = HSDPA
    U = HSUPA
    C = CDMA

where Y =
    0 = No WAN option fitted
    I = ISDN
    P = PSTN

where Z =
    A = Annex A
    B = Annex B
```

conform to the relevant harmonised standards:

                        IEC60950-1: 2005 Second Edition / EN60950-1:2006
                        EN301489-07: v1.2.1 (2002-08)
                        EN55022 1998, EN55024: 1998+A1:2001
                        EN301511: v9.0.2

following the provisions of Council Directive 1999/5/EC on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity.

Name: D. Ellison

Position: Director

Signature:

Date: 31st March 2009

                        on behalf of Digi International.