



# Bridges NIC 42 User Guide

Silver Spring Networks  
555 Broadway Street  
Redwood City, CA 94063  
[www.silverspringnet.com](http://www.silverspringnet.com)



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Country	Email	Telephone	Hours
Australia	<a href="mailto:aus-support@silverspringnet.com">aus-support@silverspringnet.com</a>	1300 706 769	9:00 AM - 9:00 PM Australia Eastern Time
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# 1 About Bridges

A Silver Spring bridge provides high-performance, reliable, and secure DNP3 transport between remote terminal units (RTUs) and data centers. The Silver Spring Networks Bridge family includes Bridge 4.0, eBridges, and sBridges.

Bridges are manufactured to perform one of two roles: Master or Remote. A Master Bridge provides the connection or take-out point for the Remote Bridges to the SCADA system. The Remote Bridges connect to the RTUs to provide connectivity back to the Master.

For details and ordering information about these and other Silver Spring devices, refer to the *Silver Spring Networks Infrastructure Hardware Guide*.

## Related Documents

You can find all Silver Spring Networks product documentation at <https://springboard.silverspringnet.com> in the Documentation & Release Notes section.

You may also refer to the following documentation:

- *Bridge Configurator User Guide* v2.2 or higher for information on configuring the Bridge with the Bridge Configurator and a Field Service Unit (FSU)
- *Silver Spring Networks Infrastructure Hardware Guide* for site planning and ordering information
- *Distribution Automation Design and Implementation Guide* for general information on Bridge implementation

## Verifying the Packing List

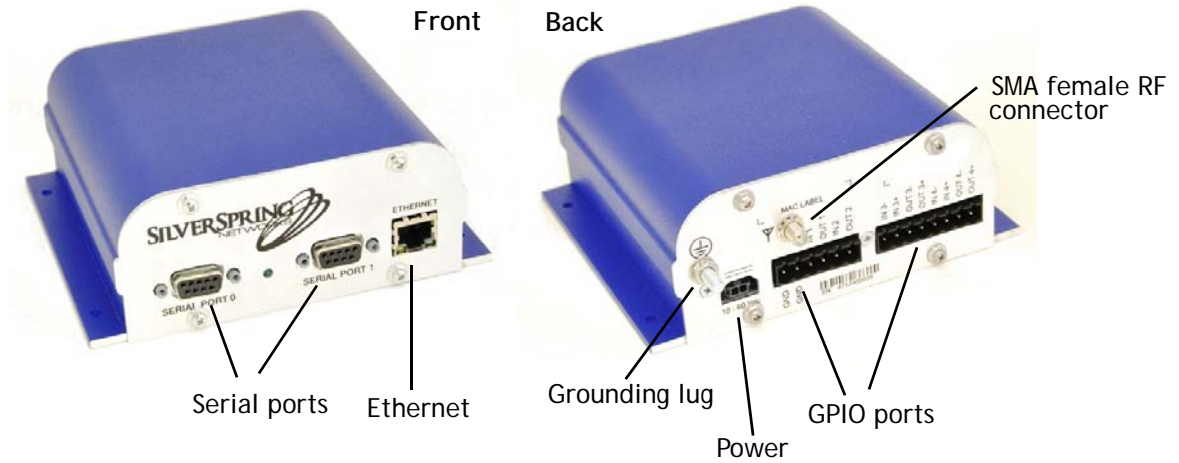
Make sure your Bridge assembly includes:

- Bridge components in a corrugated carton, including:
  - Bridge 4.0
  - Cable, power, radio
  - Cable Assembly, Type N, to SMA, 18-inch (45.72cm)
- (Optional) AC power adapter
- (Optional) External antenna system

## Bridge 4.0

The following figures show the interfaces for Bridge 4.0.

**Figure 1.** Bridge 4.0 front and back panels



## Specifications for Bridge 4.0

Bridge 4.0 hardware specifications are listed in [Table 1](#).

**Table 1.** Bridge 4.0 specifications

Feature	Description
<b>900-MHz Communications:</b>	
Data rate	100 - 300 Kbps
Frequencies	902-928 MHz North America 915-928 MHz Australia 902-907.5, 915-928 MHz Brazil 870-876 MHz Luxembourg & United Kingdom 870-873 MHz Portugal 921.5-928.5 MHz New Zealand
Spread Spectrum technology	FHSS
Transmitter output	30 dBm
Output impedance	50 ohms
Receiver sensitivity	-97 dBm for 1% PER
<b>2.4-GHz HAN Transceiver:</b>	
Frequency range	2.4 GHz, ISM Band
Data rate	100Kbps - 1Mbps FHSS, 250kbps DSSS
Spreading technique	DSSS, FHSS
MAC/Channels	802.15.4 - DSSS
Transmitter output	Output Power: 20-23dBm DSSS; 20-27dBm FHSS
Receiver sensitivity	-97 dBm for 1% PER
Power Draw TX	1.8 W typ. (2.0 W max.)

**Table 1.** Bridge 4.0 specifications *(Continued)*

Feature	Description
<b>Physical Interfaces:</b>	
Antenna connector	SMA, Female
NAN antenna	Omni antenna with gain not to exceed 3.6dBi on 2.4GHz and 6.0dBi on 900MHz
<b>Protocols/Security:</b>	
Addressing	Internet Protocol Version 6 (IPv6)
Security	Secure Hash Algorithm 256 bit (SHA-256) RSA-1024 and /or ECC-256
Encryption	AES-128 or AES-256
<b>Environmental:</b>	
Operating Temperature:	-40°C to +70°C (-40°F to +158°F)
Humidity:	0% to 95%, non-condensing
<b>Power</b>	
Voltage Range:	10-60 VDC, ~ 1A, 50 to 60Hz
Power Consumption	Idle      Maximum 2.9W,    9W
Receive Sensitivity	Receive sensitivity is -102 dBm @ 10 <sup>-6</sup> BER.
<b>Approvals:</b>	
FCC	Part 15.247
Industry Canada	RSS-210

## Assembling Bridge 4.0

To assemble Bridge 4.0:

1. Unpack all the components listed in [Verifying the Packing List](#).
2. Install the Bridge chassis in the selected weather-proof location.
  - a. Master Bridges are located as described in the *Silver Spring Networks Infrastructure Hardware Guide*.
  - b. A remote Bridge is typically located within the RTU enclosure to which it will be attached.
3. Connect an antenna to the SMA female connector.
  - a. If you are connecting the Bridge to the RTU's antenna, make that connection.



**CAUTION:** Do not operate Bridges (or any Silver Spring RF devices such as Relays or APs), without an antenna connected. Circuit damage can occur if the unit is powered and the antenna connector is not properly terminated.

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**Note:** For Distribution Automation deployments, a high gain antenna is recommended for use with all Bridges. We recommend using the 6dBi omnidirectional antenna (catalog number 201-000002).

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4. Connect the grounding wire to the grounding lug on the back of the Bridge and connect the wire to ground.
5. Connect the power to a suitable AC or DC outlet.
6. DC polarity on the Bridges is important. To ensure the proper polarity, the DC power cord plugs into the Bridge only one way. The red cable must then be connected to the positive, and the black cable must then be connected to the negative of the power source.
7. Configure the Bridge with Bridge Configurator v2.2 or higher and a Field Service Unit (FSU) (recommended).

## European Union Compliance

This section describes Silver Spring Networks' compliance with the EU R&TTE Directive.

The Access Point 1.5i uses a one Watt FHSS radio. Licenses have been issued as follows:

- Luxembourg

A license has been obtained from ILR (Institut Luxembourgeois de Regulation) to operate in Luxembourg in the 870-876 MHz band.

- United Kingdom

A license has been obtained from Ofcom to operate in UK in the 870-876 MHz band.

- Portugal

A license has been obtained from ANACOM to operate in Portugal in the 870-873 MHz band.

This device has been designed to operate with and certified for antennas that have a maximum gain of 6.0dBi on 900MHz and 3.6dBi on 2.4GHz. Antennas that have a gain greater than specified are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

Installation of all antenna radiating elements shall have a minimum separation distance of 20 cm from all persons and must not be co-located or operating in conjunction with any other transmitter.

## Declaration of Conformity with regard to the R&TTE Directive 1999/5/EC

This declaration is only valid for configurations (combinations of software, firmware, and hardware) provided and supported by Silver Spring Networks Inc. The use of software or firmware not provided and supported by Silver Spring Networks Inc. may result in the equipment no longer being compliant with the regulatory requirements.

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**Note:** The equipment is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

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The following standards were applied:

- EMC: EN 55022 (2010), EN 55024(2010), EN 61000-3-2 (2006)  
EN 61000-3-3 (2008), ETSI EN 301 489-3 v1.4.1
- Safety: EN 60950-1:2006, EN 60950-22:2006, BS-EN 62311 (2008)
- Radio: ETSI EN 300 220-1 v2.3.1 (2010-02), ETSI EN 300 220-2 v2.3.1 (2009-12),

The conformity assessment procedure referred to in Article 10 and detailed in Annex IV of Directive 1999/5/EC has been followed.

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**Note:** This equipment is intended to be used in Luxembourg, United Kingdom, and Portugal in conjunction with licenses. For more details, contact Silver Spring Networks Compliance.

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The product carries the CE Mark:



A copy of the Declaration of Conformity may be obtained with formal request to:

Silver Spring Networks, c/o Hardware Engineering  
555 Broadway Street  
Redwood City, CA 94063, USA

## Declaration of Conformity for RF Exposure

This system has been evaluated for RF exposure for Humans in reference to EN 62311(2008) Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz – 300 GHz). The minimum separation distance from the antenna to general bystander is 20cm (7.9 inches).

## Installation Note

Since Bridges do not have a power on/off switch for disconnecting AC power before servicing, AC power is provided through an AC mains disconnect switch or breaker. Therefore, the electrical installation of this product is under the control of the power utilities or their authorized subcontractors. Refer to their procedures for further instructions.

Only certain types of batteries can be used for battery replacements. Contact Silver Spring Networks for information about equivalent battery types that can be used for replacement.



## 2 FCC and Government Guidelines

### Silver Spring Networks NIC

**FCC ID: OWS-NIC42 IC: 5975A-NIC42 M/N: NIC42**

The NIC is **REQUIRED** to be professionally installed by a properly trained technician. Improper installation could void the user's authority to operate the equipment.

The device complies with Part 15 of the FCC rules, and with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions:

1. The device may not cause harmful interference.
2. The device must accept any interference received, including interference that may cause undesired operation.

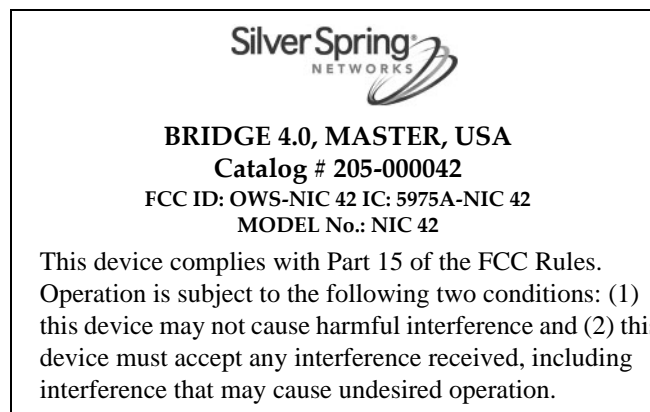
The antenna of this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

The device should be installed so that people will not come within 20 cm (8 in.) of the antenna.

This equipment has been tested and found to comply with Part 15 of the FCC Rules. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception (which can be determined by turning the equipment off and on), the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is disconnected.
- Consult the dealer or an experienced radio/TV technician for help.

**Figure 2.** Sample FCC ID label for NIC PCA





**CAUTION:** Changes or modifications not expressly approved by Silver Spring Networks could void the user's authority to operate the equipment.

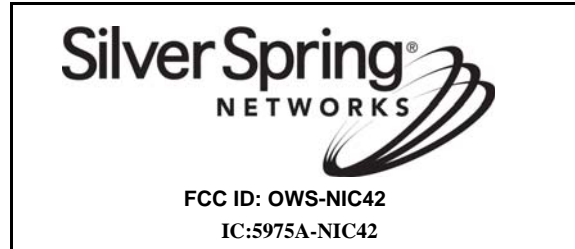
## FCC Guidelines for Devices Containing a Transmitter Module

The following is an extract from FCC PART 15 UNLICENSED MODULAR TRANSMITTER APPROVAL, DA 00-1407, Released: June 26, 2000, Section 6 describing labeling requirements for devices containing a modular transmitter.

Section 6. The modular transmitter must be labeled with its own FCC ID number, and, if the FCC ID is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains Transmitter Module FCC ID: XYZMODEL1" or "Contains FCC ID: XYZMODEL1." Any similar wording that expresses the same meaning may be used. The Grantee may either provide such a label, an example of which must be included in the application for equipment authorization, or, must provide adequate instructions along with the module which explain this requirement.

In the latter case, a copy of these instructions must be included in the application for equipment authorization.

**Figure 3.** Sample FCC ID label for devices containing a NIC



## Industry Canada Guidelines for Devices Containing a Transmitter Module

### For All Radio Transmitters

This radio transmitter 5975A-NIC42 has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

- Omnidirectional antenna, maximum gain of 6.0dBi on 900MHz and 3.6dBi on 2.4GHz

Le présent émetteur radio (identifier le dispositif par son numéro de certification ou son numéro de modèle s'il fait partie du matériel de catégorie I) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain

admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

- Antennenid omirectionnelle, 6.0dBi sur 900 MHz et 2,4 GHz sur 3.6dBi

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

## For Transmitters Not Requiring Licenses

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

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

## Safety Information



**WARNING:** Severe shock and explosion hazard! Touching energized parts can result in massive equipment damage, and severe injury or death. Short-circuiting energized parts will result in blinding flash and explosion. Opening and closing electrical circuits can also produce dangerous and explosive arc flashes. Involuntary muscular reactions associated with electrical shock may result in other injuries. Observe the following safety guidelines.

Careful planning of every job is essential. Nothing should be taken for granted. Do not take chances!

- Read and follow all approved policies and procedures provided by your employer associated with the procedures in this manual.
- The procedures in this manual must only be performed by qualified workers in accordance with local utility safety practices, utility requirements, and applicable OSHA and NFPA standards.

- The information contained in this document is intended to aid qualified personnel, and is not a replacement for the proper training required to make a person qualified.
- Silver Spring Networks assumes no liability for the customer's failure to follow these safety guidelines.

## General Electrical Safety

- Perform the procedures in this manual in accordance with applicable workplace standards established by the following agencies:
  - Occupational Safety and Health Act (OSHA).
  - The National Electrical Code published by the National Fire Protection Association (NFPA-70).
  - National Electrical Manufacturers Association (NEMA).
  - Electronics Industries Association (EIA).
  - Insulated Power Cable Engineers Association (IPCEA).
- American National Standards Institute (ANSI). Whenever possible, de-energize all circuits or equipment before working on them.
- Maintain a minimum clearance of 10 feet (3 meters) between line potential and all unqualified persons at all times.
- Keep unauthorized people out of the work area. Be especially cautious of children, who tend to be drawn to work activity.
- Determining if a circuit is OFF can be difficult in some instances. Check for circuit voltage with an appropriate voltmeter before working on equipment presumed to have been de-energized. Tiebreakers, double throw disconnect switches, automatic transfer switches and emergency generators can supply power through an alternate circuit or from another source.
- 120V current can be just as lethal as higher voltages because current flow through a body depends upon the body's resistance.
- Do not trust insulation and/or weatherproofing on a wire as protection from shock.
- Use electrically insulated tools. Inspect portable electrical equipment or tools for defects and remove any defective devices from service immediately. All portable electrical equipment must have Ground Fault Circuit Interrupter (GFCI) protection.
- Select the right tool for the job. Use tools properly. Keep tools in good working order.
- Make sure the work area is free of any flammable material. Flammable vapors can be ignited by an arc flash.
- Keep the work area clean and dry. Cluttered work areas cause accidents and injuries.
- Provide good lighting in the work area. You cannot work safely if you cannot see what you are doing.
- Report unsafe conditions or defective equipment to your immediate supervisor.

- Handle material carefully. Lift and carry properly.

## Personal Protective Equipment (PPE)

- Always wear Personal Protective Equipment (PPE), in accordance with OSHA and ANSI standards.
- Wear eye protection and electrically insulated gloves. Test gloves in accordance with ANSI standards before use. Do not use gloves that do not pass appropriate test procedures.
- Wear protective clothing such as long sleeve shirts and long pants made of flame resistant materials.
- Remove all jewelry.
- Do not pass any objects to or from other persons not protected by insulating platforms or tested, electrically insulated gloves.

## Fall Protection

When performing work at any elevation:

- Always use a fall protection system, in accordance with OSHA standards, whenever performing work at any elevation.
- Never use conductors, guy wires, pins, or cross-arm braces, etc. to support your weight.
- Whenever using aerial lift devices such as hoists, man-lifts, vehicle-mounted work platforms and overhead lifts, read and follow the manufacturer's guidelines for safe and proper operation.
- Use ladders and scaffolding only in accordance with the manufacturer's guidelines and/or according to OSHA standards.
- Only use ladders made of non-metallic, non-conductive material. They should be the proper size and type for the work intended. Inspect ladders for wear and breakage. Remove any oil, grease, or other slippery materials.
- Do not set the ladder at too steep or too shallow of an angle. A rule of thumb is to stand erect with your toes against the bottom rails of the ladder, with your arms extended straight out. If you can set your palms on top of the rung that is at eye level, the ladder should be at the proper angle. If a ladder angle label is provided, follow its recommendations.
- If the ladder is to remain in place for an extended period, secure it at the top. The support point at the top of the ladder should be at least 24 inches (60 centimeters) wide to maintain support in the event of sideways movement. For jobs of short duration, have a fellow worker support the ladder at the base.
- Evaluate all tasks to be performed from a ladder for potential fall hazards, such as complex tasks or situations that require leaning from the side of the ladder.
- The use of scaffolding or a work platform should be considered as an alternative solution in such cases.

## Shock Accident First Aid

- Do not touch the victim with your bare hands; use something non-conductive to separate the victim from the energy source.
- Call for emergency medical help immediately. Keep the victim lying down, warm, and comfortable until help arrives. Avoid moving the victim in case of injury to neck or back. Position an unconscious victim on a side to let fluids drain.
- Check the victim's breathing and heartbeat. If properly trained, apply mouth-to-mouth resuscitation and/or CPR if necessary.
- Remove constricting items from the victim, such as shoes, belts, jewelry, and tight collars; they could cut off circulation if the victim experiences swelling.
- Apply water or saline for a few minutes to any burns until the skin returns to normal temperature. Do not attempt to remove clothing that is stuck to a burn. If possible, elevate burned areas to reduce swelling.
- Make sure the victim receives professional medical attention, even if they feel fine. Electric shock can cause heart failure hours after the shock is received.