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BIS Z-GW-001-DNT

Subnet16™ DeviceNet Gateway

INSTALLATION GUIDE

This document provides instructions and information designed to assist users in the hardware setup of the Subnet16™ DeviceNet Gateway. For configuration details see the Gateway Manual.

The BIS Z-GW-001-DNT is designed to connect RFID applications to a DeviceNet network. The Gateway is a DeviceNet Slave node which connects to a DeviceNet Master (Host PC or PLC) through a DeviceNet-compatible network cable and is also powered through this network.

It supports Subnet16™ Multidrop bus architecture, a subnetwork of up to sixteen Balluff RFID processor stations, through an RS485 interface connection. The Subnet16™ network is powered separately.

A USB port is used for establishing a direct serial connection with a host computer for the purpose of configuring the Gateway through the Dashboard Configuration Tool program.

TECHNICAL DATA

ELECTRICAL FEATURES	
Power Supply	12 - 30 Vdc
DC Input Current max.	200 mA - 100 mA
Communication Interfaces: Host RFID Multidrop Readers Configuration	 DeviceNet Subnet16™ (uses RS485 physical layer) USB 2.0
Baud Rate (kbps)	125 (default), 250, 500
ENVIRONMENTAL FEATURES	
Operating Temperature	-20°to +50 ℃ (-4°to +122 ℉)
Storage Temperature	-20°to +70 ℃ (-4°to +158 ℉)
Humidity max.	90% non condensing
Vibration Resistance EN 60068-2-6	14 mm @ 2 to 10 Hz; 1.5 mm @ 13 to 55 Hz; 2 g @ 70 to 200 Hz; 2 hours on each axis
Shock Resistance EN 60068-2-27	30 g; 11 ms; 3 shocks on each axis
Protection Class EN 60529	IP30
PHYSICAL FEATURES	
Dimensions	112 x 107 x 32 mm (4.4 x 4.2 x 1.3 in)
Weight	256 g (9 oz)
USER INTERFACE	
LED Indicators	Power On, Subnet16™ Bus, DeviceNet, Configuration Error

GENERAL VIEW

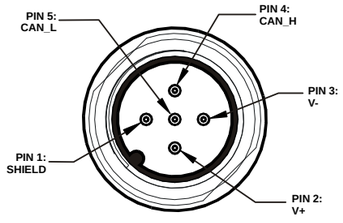


LED INDICATORS

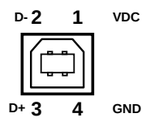
green	**POWER**	The POWER LED is ON whenever power is applied to the Gateway through the DeviceNet connector.
amber	Subnet16™ **BUS**	The BUS LED will flash ON and OFF to indicate that data is being transmitted between the Gateway and one or more RFID controllers on the Subnet16™ network.
green/red	**DEVICENET**	**SOLID GREEN:** Gateway is operational, online AND a connection is established. **FLASHING GREEN:** Gateway is operational and online, but with no established I/O connections (idle on the network) or Gateway is online and needs commissioning. **FLASHING RED:** Recoverable fault detected and/or the Gateway's I/O connection timed out. **SOLID RED:** Unrecoverable fault detected (for example, a duplicate node address was encountered rendering Gateway unable to communicate).
red	**ERROR**	The Error LED is solid red when a Gateway configuration error has occurred, i.e. an invalid or unrecognized command. This LED will be cleared when a valid command is sent.

CONNECTIVITY

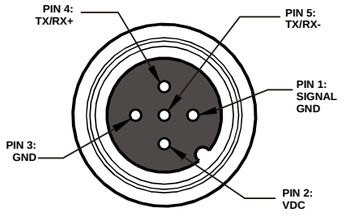
DeviceNet
M12 5-pin Male Connector
(DeviceNet and Gateway Power Supply)



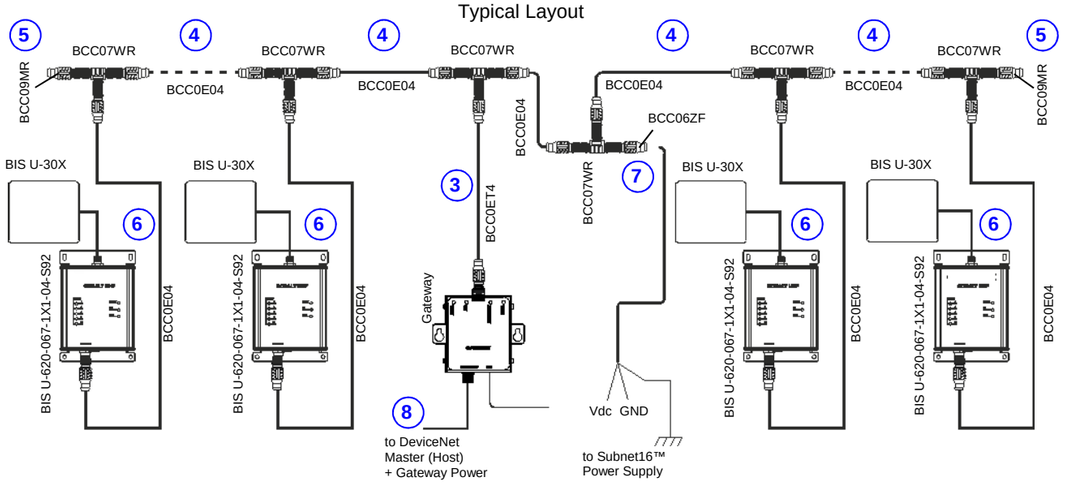
USB Configuration
USB Type B Female Connector



Subnet16™
M12 5-pin Female Connector
(Data and Subnet16™ Power Supply)



Typical Layout



See the Gateway Manual for a complete list of accessories including alternative cables and connectors.

HARDWARE REQUIREMENTS

The following components are required for a complete Subnet16™ RFID system:

- One Subnet16™ DeviceNet Gateway Interface Module
- One ControlLogix PLC or other DeviceNet-capable host
- One to 16 processors (*BIS M-41x, BIS M-62x or BIS U-62x-Series Processors - **RS485 models***)
- Adequate length cabling, connectors and terminators
- A suitable power supply capable of providing sufficient power to the Gateway via DeviceNet network cabling
- A suitable power supply capable of providing sufficient power to the RFID controllers via Subnet16™ network cabling
- Balluff RFID data carrier or labels: BIS M-1xx or BIS U-1xx

INSTALLATION GUIDELINES

- Do not route cables near unshielded cables or near wiring carrying high voltage or high current. Cross cables at perpendicular intersections and avoid routing cables near motors and solenoids.
- Review the power requirements of your RFID network and provide a suitable power supply.
- Avoid mounting the controller near sources of EMI (electro-magnetic interference) or near devices that generate high ESD (electro-static discharge) levels. Always use adequate ESD prevention measures to dissipate potentially high voltages.
- If electrical interference is encountered (as indicated by a significant reduction in read/write performance), relocate the controller to an area free from potential sources of interference.
- Perform a test phase by constructing a small scale, independent network that includes only the essential devices required to test your RFID application (use Balluff approved Subnet16™ cables and accessories).

INSTALLATION

The numbered steps in the following procedure are also indicated in the Subnet16™ network example layout shown in the figure.

1. **Preliminary Notes**: Read this document in its entirety and note the *Installation Guidelines* above**.**
2. **Mounting**: Mount the Gateway to your chosen location using two M5 (#10) screws, lock washers and nuts. The Gateway may be mounted in any orientation, but should be aligned in such a manner that the LED indicators can be seen during operation.
3. **Gateway Connection**: Attach one end of a 5-pin, male-to-male, M12, ThinNet drop cable (***P/N: BCC0ET4***) to the 5-pin, female, M12 connector on the Gateway. Connect the other end of this 5-pin, male-to-male, M12, ThinNet drop cable to the 5-pin, female, M12 connector on a ***ThinNet to ThinNet Drop-T Connector*** (as per your network and RFID application requirements).
4. **Trunk Wiring**: Attach one end of a male-to-female trunk cable to each mating connector on the Drop-T Connector. Continue connecting trunk cables and Drop-T connectors as needed.

   Note: trunk length should not exceed 300 m for ThickNet and 20 m for ThinNet.
5. **Termination Resistors**: For ThinNet Networks: Connect a Terminating Resistor (***P/N: BCC9MR, male)*** to the first and last Drop-T Connector on the trunk line.

(over)

6. **RFID Controller Connection**: Connect the male end of a 5-pin, male-to-female, ThinNet drop cable to the female end on your Drop-T connector(s). Attach the remaining female end of the ThinNet drop cable to the 5-pin, male, M12 connector on a ***BIS U***, ***BIS M-6xx*** or ***BIS M-41x (RS485 models)***. Repeat ***Step 5*** for each RFID controller you plan to install.

   Note: maximum drop cable length is 2 m.

Subnet16™ Power Supply Wiring: For ThinNet Networks: Using a 5-pin, female, M12, ThinNet connector (***P/N: BCC06ZF***), make a power cable and connect it to your power supply (SHIELD wire connected to Earth). Attach the female, ThinNet end to the 5-pin, male, ThinNet end on a Drop-T connector (***P/N: BCC07WR).***

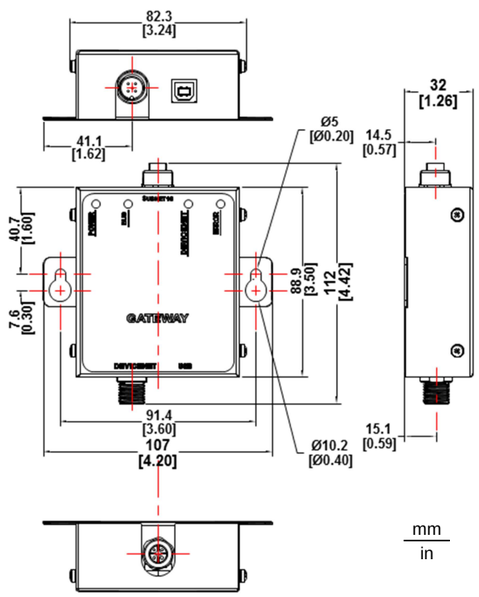
7. **Gateway Power and Host Connection**: Connect the Gateway to the DeviceNet network via a DeviceNet-compatible interface cable. The Gateway must be powered through pins V+ and V- of the DeviceNet connector.
8. **Power On**: Turn both power supplies ON. The POWER LED on the Gateway will remain lit while power is applied to the unit through the DeviceNet connector.
9. **Automatically Configure Subset16™ Node IDs**: At this point all controllers are powered and should have Node IDs set to 00, (all controller Node LEDs = OFF), and Subnet16™ baudrate = 9600 (factory defaults).
   - **a.** Place the RFID Controller Configuration Tag in front of an RFID Controller (the controller's RF Activity LED blinks once indicating the tag has been read), and wait for the Gateway to assign a valid Node ID to it. The controller's Node LEDs now indicate a valid Node ID. Remove the Configuration Tag from the controller.
   - **b.** Repeat this step for each node in the Subnet16™ network (one controller at a time). The first is Node ID 1, then 2 and so on up to 16 (binary).

The Subnet16™ network is now configured with the default values and can communicate with the DeviceNet Gateway which in turn communicates with the DeviceNet Master.

BIS Z-GW-001-DNT DEVICENET FACTORY DEFAULTS:
Node Address: 63; Baud Rate: 125 kbps

For further information or for application specific configuration using the Dashboard Configuration Tool program, see the Gateway Manual.

DIMENSIONS



POWER REQUIREMENTS

The DeviceNet Gateway requires an electrical supply voltage of 12 to 30 Vdc. It is powered through the DeviceNet network connector.

In addition, each RFID controller connected to the Gateway via the Subnet16™ network will also require power. This network is powered separately. Use a regulated power supply that is capable of delivering the requirements listed in the Technical Features.

NOTE *Power is applied directly to the Subnet16™ Network trunk and distributed through drop cables to the RFID controllers. By positioning the power supply near the middle of the network, you can limit voltage drop at the ends, (see example layouts).*

The following information is provided to assist you in determining the power requirements of your RFID application.

System Current Consumption

NOTE *The current consumption values of each product are given in the Technical Features paragraph of the relative Installation manual and refer to the min and max input voltage range. These values already include an adequate safety margin. The consumption values given in the following examples have been interpolated for an input voltage of 24 Vdc.*

Max Gateway Current: 200 mA @ 12 Vdc (133 mA @ 24 Vdc).

Max Processor Current: 366 mA @ 24 Vdc for BIS M-6xx-Series, 87 mA @ 24 Vdc for BIS M-41X-Series, etc. (refer to Processor 's spec).

Calculating Subnet16™ System Current Consumption:

Subnet16™ System Current Consumption = (Max Controller Current x Number of Controllers)

Example
A Subnet16™ network powered at 24 Vdc is composed of a BIS Z-GW-001-DNT connecting eight BIS M-41X-485 Processor s.

Subnet16™ System Current Consumption = (0.087 A X 8)] = 0.696 A

Cable Voltage Drop

In addition, each RFID controller on the Subnet will experience a certain amount of voltage drop depending on the length of the cable.

Cable Resistance per Meter

- ThinNet = **0.058** ohms per meter per wire
- ThickNet = **0.0105** ohms per meter per wire

Calculating Voltage Drop

Voltage Drop = (Max Controller Current x Number of Controllers) x (Cable Resistance per Meter per Wire [1] x Cable length in Meters)

Example
A Subnet16™ network is composed of a BIS Z-GW-001-DNT connecting eight BIS M-41X-485 Processors (87 mA each @ 24 Vdc). A total of 20 meters of ThinNet cables are used to connect the devices, which have Cable Resistance = 0.058 Ohms per meter per wire. The network power is 24 Vdc. [2]

Voltage Drop = (0.087 A x 8 controllers) x [(0.058 x 2) x 20 meters] = 1.61 Vdc

24 Vdc - 1.61 = 22.39 Vdc at controller number 8

[1] The resistance calculation must include both wires (Vdc and GND).

[2] This example assumes the power supply is placed at the end of the network, therefore controller #8 is the worst case. By placing the power supply in the middle of the network the voltage drop at the ends is reduced.

It is recommended that the voltage drop calculation be conducted on the RFID controller that is farthest from the Gateway, as it will experience the greatest voltage drop.

Max Supported Trunk and Drop Cable Lengths

- ThickNet trunk length up to 300 m.
- ThinNet trunk length up to 20 m.
- ThinNet drop cable length up to 2 m.

Current Rating for Cables

The maximum current rating for the Subnet16™ network using Balluff cables and accessories (BCCxxxx), is **4.0 A**.

COMPLIANCE

This product is intended to be installed by Qualified Personnel only.

This product must not be used in explosive environments.

See the Subnet16™ Gateway Manual for the Declaration of Conformity.

Power Supply

This device is intended to be supplied by a UL Listed or CSA Certified Power Unit with «Class 2» or LPS power source.

CE Compliance

Warning: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

CE

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