

IBSS

Installation and Programming Manual

This Manual describes the IBSS InterBus-S Slave, its uses and set up.

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Introduction

The Niobrara IBSS (InterBus-S Slave) is a SY/MAX[®] compatible module that performs the function of Remote Bus Slave with I/O on an InterBus-S network. The IBSS interfaces with the SY/MAX PLC through the Square D SY/MAX register rack to provide access to the InterBus-S network through the backplane.

Communication with the InterBus-S devices is through isolated RS-485 InterBus-S Remote Bus connectors on the front panel of the module.

An external isolated 24VDC power supply may be used to provide uninterrupted IBS operation while the SY/MAX Rack is removed from service.

All data is stored in the IBSS in standard 16 bit SY/MAX compatible registers. The IBSS provides 4 words of Interbus-S Outputs and Inputs. The IBSS has 10 SY/MAX Rack Addressable registers which are divided into ranges for the IBS Outputs, IBSS Status, IBS Inputs, and IBSS Command. Table 1-1 displays this information.

Table 1-1 IBSS Register List

Register Range	Function	PLC Status in hex (Direction)
1	IBS Output Word 1	E000 (PLC Input)
2	IBS Output Word 2	E000 (PLC Input)
3	IBS Output Word 3	E000 (PLC Input)
4	IBS Output Word 4	E000 (PLC Input)
5	IBSS Status (See Table 3-2)	E000 (PLC Input)
6	IBS Input Word 1	A000 (PLC Output)
7	IBS Input Word 2	A000 (PLC Output)
8	IBS Input Word 3	A000 (PLC Output)
9	IBS Input Word 4	A000 (PLC Output)
10	IBSS Command	A000 (PLC Output)

Specifications

Module Specifications

Mounting Requirements

One register slot of a Square D Class 8030 Type CRK, DRK, GRK, HRK, or RRK I/O.

Current Draw on SY/MAX power supply

400mA @ 5VDC

Current Draw on external 24VDC power supply

80mA @ 24VDC while SY/MAX Power ON.

150mA @ 24VDC while SY/MAX Power OFF.

Operating Temperature

0 to 60 degrees C operating. -40 to 80 degrees C storage.

Humidity Rating

up to 90% noncondensing

Pressure Altitude

-200 to +10,000 feet MSL

InterBus-S Communication Ports

9 pin D-connectors, optically isolated RS-485 compatible. Fixed 500K baud InterBus-S protocol. Male Connector - Remote Bus IN, Female Connector - Remote Bus Out.

Indicator lights

3 LEDs: Green SY/MAX Rack Power, Green 24VDC power, Green RC, Green BA, and Red Error.

Physical Dimensions

Single width module.

Wt: 2.5 lb.

W: 1.5 in.

H: 12.8 in.

D: 6.6 in.

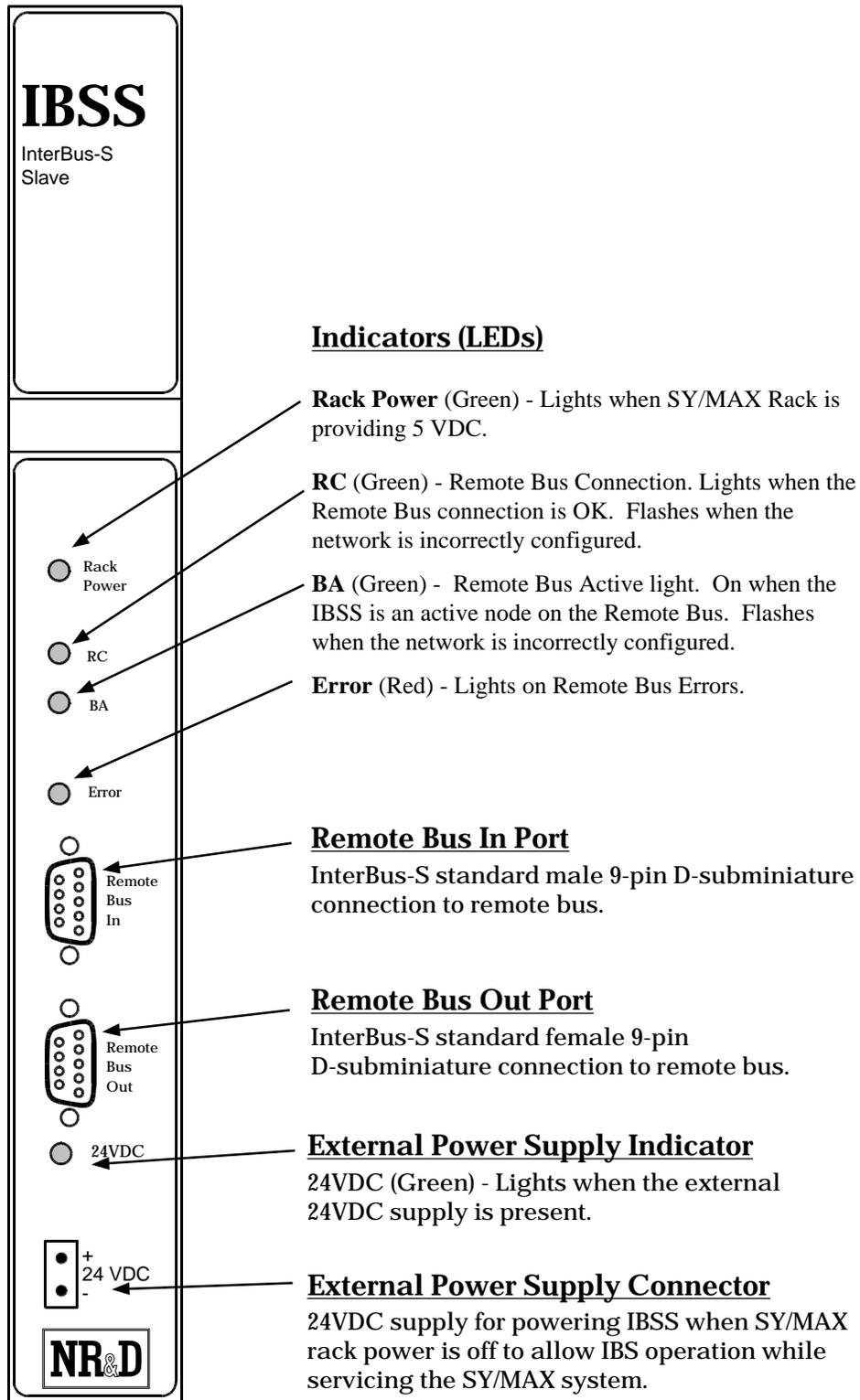


Figure 1-1 IBSS Front Panel

Warning

Do NOT install or remove the IBSS with power applied to the Rack. Turn OFF power at the power supply. Damage to the equipment may occur if the power is on during installation.

Module Installation

- 1 Remove power from the rack.
- 2 Mount the IBSS in an available slot in the register rack. Secure the screw at the bottom of the module.
- 3 Apply power to the rack. The green Rack Power light should illuminate and remain lit.

IBS installation

The IBSS connects to the InterBus-S network using its Remote Bus In port. The IBSS uses the 2 Twisted-Pair Remote Bus Wiring scheme and the pinout of its 9 pin port is compatible with Phoenix Contact products.. Connect to the previous Remote Bus device with a proper remote bus cable such as the Niobrara IR9D cable shown on page 17. For a complete IBS overview see the Phoenix Contact document: InterBus-S Instruction Manual IBS SYS INST UM E Order No.: 27 54 804. This document may be ordered from Phoenix Contact.

Downstream Remote Bus devices may be connected to the Remote Bus Out port of the IBSS with an IR9D cable.

If it is desired to have the IBS network continue to operate when the SY/MAX rack power is removed, connect a suitable 24VDC supply to the connector on the front of the IBSS. The green 24VDC light will be on when the external power is connected.

IBS Configuration

The IBS Master for the network requires the identity and width of each device on the network; the IBSS ID is 03 and the Module width is 4 words. The first 4 SY/MAX registers provide the IBS outputs (PLC Inputs). The 5th register provides status (PLC Input) of the IBSS. The 6th through 9th registers are the IBS Inputs (PLC Outputs). The 10th register (PLC Output) is a reserved command register for the IBSS and is currently not implemented.

InterBus-S Overview

The InterBus-S sensor/actuator network operates in a manner that is effectively a large shift register. The IBS Master keeps a table of registers that corresponds to all of the output bits on the InterBus-S network. The IBS Master also keeps a table that corresponds to all of the input bits on the IBS network. During a normal scan of the IBS network, the Master clocks output data to the network modules while the modules clock their input data to the Master. Each device on the IBS network checks the integrity of the data with CRC calculations between nodes. The data must pass all checks around the loop before it is allowed to be latched in the outputs or placed in the Master's input table.

This structure requires the Master and all of the modules on the IBS network to know the size of the network. This is accomplished by the Master issuing an ID cycle. The ID cycle information allows the Master to know the exact I/O module type and position on the bus. The Master keeps a table of the current bus layout and compares the current bus to a table that contains the intended bus layout. If the tables do not match, the Master will halt the IBS network.

The IBSS has a network ID of 03 and has a width of 4 words.

The IBS serial protocol is implemented in two formats: remote bus and local bus. Both of these bus types operate in the same manner for shifting the data but differ in transmission distance.

The remote bus operates at differential RS-485 levels for long distance communication of up to 1300 feet. Up to 32 remote bus devices may be connected to a single master. Only serial communication is passed through the remote bus cable. Each remote bus device is independently powered as no power passes through the remote bus. The IBSS is remote bus device.

The local bus is intended for localized areas of I/O. The local bus is limited to 8 modules with a maximum cable length of 32 feet. The communication ports of each local

bus device are powered by the remote bus terminal. The communication levels are TTL on the local bus.

Memory Configuration

The operation of the IBSS is fixed with four words of IBS outputs and four words of IBS inputs determined by the configuration in its memory. The IBSS's internal user-accessible memory is represented as SY/MAX processor equivalent registers. A list of available registers is shown in Table 3-1.

Table 3-1 IBSS Register List

Register Range	Function	PLC Status in hex (Direction)
1	IBS Output Word 1	E000 (PLC Input)
2	IBS Output Word 2	E000 (PLC Input)
3	IBS Output Word 3	E000 (PLC Input)
4	IBS Output Word 4	E000 (PLC Input)
5	IBSS Status (See Table 3-2)	E000 (PLC Input)
6	IBS Input Word 1	A000 (PLC Output)
7	IBS Input Word 2	A000 (PLC Output)
8	IBS Input Word 3	A000 (PLC Output)
9	IBS Input Word 4	A000 (PLC Output)
10	IBSS Command	A000 (PLC Output)

IBS Output Words 1 through 4

Registers 1 through 4 provide the IBS Output Words 1..4. These 16 bit registers are PLC Inputs and thus read only by the SY/MAX PLC. The data in these registers should only be considered valid when bit 1 of register 5 is set. The data in these registers is zeroed by the IBSS if the IBS network stops or if the unit is unplugged.

IBSS Status

Register 5 provides status bits concerning the operation of the IBSS. This register is a PLC input and thus read only to the SY/MAX PLC. Table provides the descriptions of each bit.

Table 3-2 IBSS Status Register Bits

Bit	Description
1	Set if IBS is active.
2..14	Reserved.
15	Set if 5V from SY/MAX Rack is present.
16	Set if external 24VDC is present.

IBS Input Words 1 through 4

Registers 6 through 9 provide the IBS Input Words 1..4. These 16 bit registers are PLC Outputs and may be written by the SY/MAX PLC. The data in these registers is zeroed when the PLC is halted, powered down, or set to disable outputs.

IBSS Command

Register 10 is reserved as a configuration register for the IBSS. This register is a PLC output and may be written by the SY/MAX PLC. At the present time, all data written to this register is ignored by the IBSS.

Connector Pinouts

InterBus-S Remote Bus IN port on IBSS (DE9P with 4-40 jack sockets)

- 1 DI+ receive data (noninverted) from Remote device to IBSS
- 2 DO+ transmit data (noninverted) from IBSS to Remote device
- 3 COM isolated from the SY/MAX gnd.
- 4 No Connection
- 5 No Connection
- 6 DI- receive data (inverted) from Remote device to IBSS
- 7 DO- transmit data (inverted) from IBSS to Remote device
- 8 No Connection
- 9 No Connection

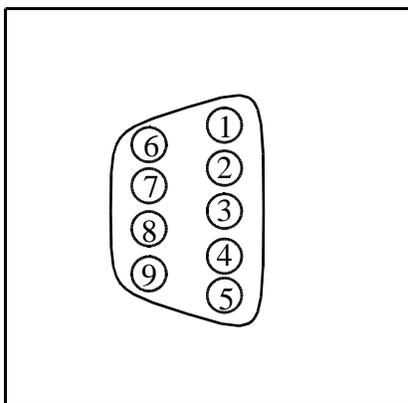


Figure 4-1 InterBus-S Remote Bus In Connector Pinout

InterBus-S Remote Bus Out port on IBSS (DE9S with 4-40 jack sockets)

- 1 DO+ transmit data (noninverted) from IBSS to next Remote device
- 2 DI+ receive data (noninverted) from next Remote device to IBSS
- 3 COM isolated from the SY/MAX gnd.
- 4 No Connection
- 5 Ground.
- 6 DO- transmit data (inverted) from IBSS to next Remote device
- 7 DI- receive data (inverted) from next Remote device to IBSS
- 8 No Connection
- 9 Remote Downstream Bus Cable Detect.

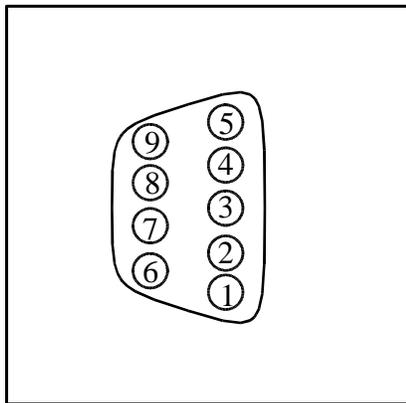


Figure 4-2 InterBus-S Remote Bus Out Connector Pinout

External 24VDC supply connector

The IBSS may be powered by an external 24VDC source. This source is isolated from the SY/MAX rack and will only power the Interbus-S portion of the IBSS. This connection will allow the IBS to continue to run even if the SY/MAX rack containing the IBSS is powered down. The green 24VDC light will be on when the external source is active.

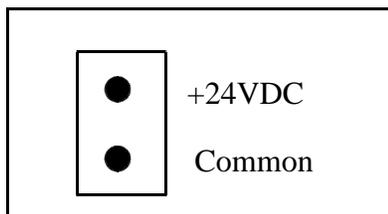


Figure 4-3 24VDC External Connector

The External Source should provide at least 150mA at 24VDC.

Recommended Cabling

InterBus-S Remote Network Cabling

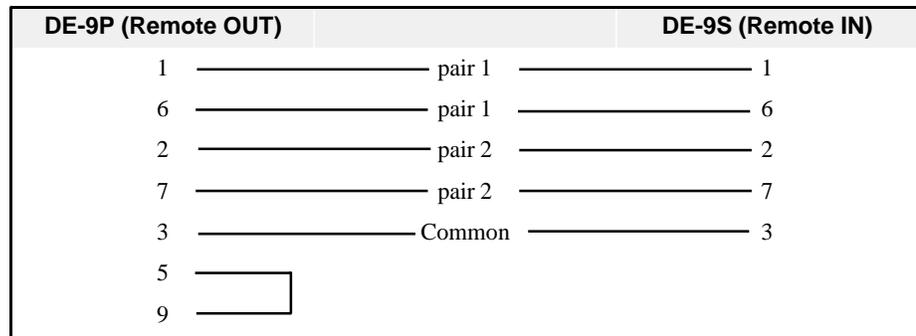


Figure 5-1 InterBus-S Remote Cable

This is a Niobrara IR9D cable.