

The 8507-BI-DP Bus Interface Module (BIM) provides the communications link between the PAC8000 series I/O modules and a PROFIBUS-DP host. High-speed acquisition of data from the modules and LAN operation speeds of up to 12 Mbaud allow the host to respond rapidly to changes in process conditions.

The BIM gathers data from the I/O modules and makes it available to the host upon request. It is a slave to the PROFIBUS master. As well as cyclic data exchange, which is required for reading input and writing output data, the BIM supports PROFIBUS Extended Diagnostics for status information.

The BIM(s) must be used with an 8701-CA-BI Redundant BIM Carrier, described on page 4.

Redundant BIMs can be used for critical applications. Each BIM in the redundant pair operates in parallel, continually checking status to enable the backup BIM to monitor the health of the primary BIM.

8507-BI-DP Bus Interface Module

For details on the installation and operation of the BIM, refer to the *PAC8000 I/O - PROFIBUS DP BIM Instruction Manual*, INM8507.

Features

- support for up to 24 I/O modules
- redundant operation
- extended diagnostics for module and channel status
- PROFIBUS network speeds of up to 12 Mbaud
- non-volatile memory for configuration
- configurable via PROFIBUS host
- HART Pass-through support to monitor/configure HART devices
- Configuration/Reset of IP address

Parameterization

The 8507-BI-DP supports parameterization from the PROFIBUS master. The configuration is created in a PROFIBUS configurator using details provided in a GSD file. This method is fast and enables a configuration to be built based upon “logical” modules which represent the physical modules. Modules are added one at a time to the configuration.

The configuration is passed from the PROFIBUS master to the BIM at the start of communication. If the system is stopped and re-started, or if the node goes through a cold start cycle, the configuration file is re-transmitted to the BIM.

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Standard and Extended Diagnostics

The PROFIBUS BIM supports Standard and Extended Diagnostics. While the Standard Diagnostics provide standard PROFIBUS status information, the Extended Diagnostics provide detailed information relating to the status of the BIM, the health of the modules and the status of I/O channels. Depending on the I/O module type, events such as high and low alarm, open circuit and line fault are detected.

Extended Diagnostic messages are generated on detection of any anomalies in I/O modules. Use of the diagnostic capability requires suitable support in the host application. For hosts unable to use diagnostic data in the control algorithm, it is possible to map the diagnostic data into the input dataframe.

Important Note: The equipment must be installed, operated, and maintained in accordance with the installation and control drawings approved by the Certification Agencies. These drawings, together with the Agency Certificates, are available for download from www.ge-ip.com.

PROFIBUS Bus Interface Module LED Indicators

Indicator	Off	On	Blinking
Power (green)	Power fail	Power OK	NA
Master (yellow)	Standby	Master	NA
Healthy (yellow)	Not healthy	Healthy	NA
Fault (red)	No fault	Permanent fault	NA
Failsafe (red)	Failsafe mode inactive	Failsafe mode active	NA
RedCom (yellow)	No redundancy communications received	Communications received through redundancy link	NA
Railbus (yellow)	No activity on railbus	NA	Railbus activity
Link (yellow)	A valid Ethernet link has not been established.	Valid Ethernet link between 8507-BI-DP and an external device has been established.	NA
LAN (yellow)	No Ethernet comms	NA	Ethernet comms
PROFIBUS (yellow)	No PROFIBUS comms	NA	PROFIBUS comms

PROFIBUS Bus Interface Module Specifications

PROFIBUS Interface																	
Protocol	PROFIBUS-DP (to EN-50170)																
Transmission rates	9.6, 19.2, 93.75, 187.5, 500 Kbaud 1.5, 6 and 12 Mbaud																
Maximum bus segment length (speed dependent) Table applies to cables with an impedance of 135–165Ω and a capacitance per unit length that does not exceed 30pF/m.	Speed (baud)																
	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>9.6K</td> <td>19.2K</td> <td>93.75K</td> <td>187.5K</td> <td>500K</td> <td>1.5M</td> <td>6M</td> <td>12M</td> </tr> <tr> <td>1200</td> <td>1200</td> <td>1200</td> <td>1000</td> <td>400</td> <td>200</td> <td>100</td> <td>100</td> </tr> </table>	9.6K	19.2K	93.75K	187.5K	500K	1.5M	6M	12M	1200	1200	1200	1000	400	200	100	100
	9.6K	19.2K	93.75K	187.5K	500K	1.5M	6M	12M									
1200	1200	1200	1000	400	200	100	100										
Length (meters)																	
Transmission standard	RS-485																
Isolation (PROFIBUS to Railbus to Power Supply)	500V																
Action on software malfunction	Modules go to failsafe.																
I/O and Diagnostic Data																	
Input data, including 2-byte Status word	240 bytes maximum																
Output data, including 2-byte Control word	240 bytes maximum																
Total Input plus Output data	480 bytes maximum																
Diagnostic Telegram length	<i>Option 1:</i> 61 bytes <i>Option 3:</i> 29 bytes <i>Option 2:</i> (default): 13 bytes <i>Option 4:</i> 110 bytes																
Address setting	Hardware setting on carrier																
System Power																	
Railbus (12V) current	420mA (typical) 520mA (maximum at -40°C)																
Mechanical																	
Module width	42mm																
Weight (approximate)	500g																
Hazardous Area Approvals																	
Location of Equipment	Same as Carrier. See page 4.																
Environmental Requirements																	
Temperature, humidity, vibration and shock.	Same as Carrier. See page 4.																

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8701-CA-BI Redundant BIM Carrier

For details on the installation and operation of the BIM Carrier, refer to the *PAC8000 I/O - PROFIBUS DP BIM Instruction Manual*, INM8507.

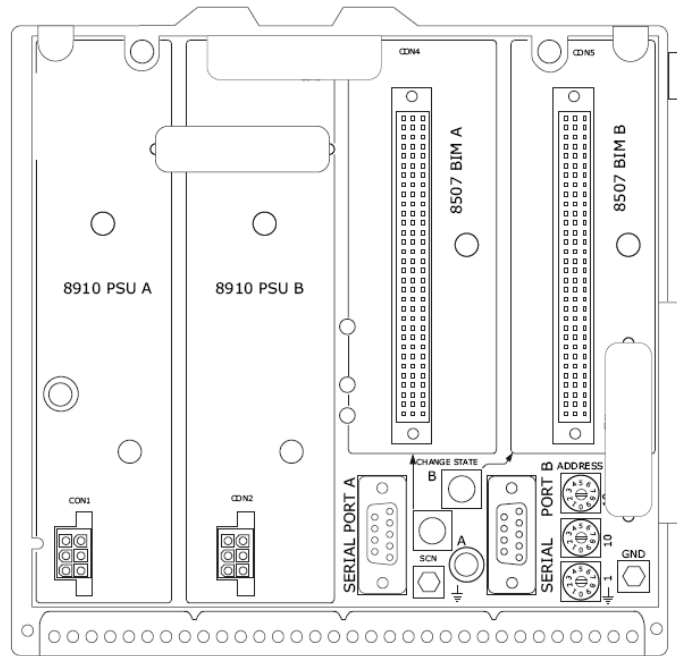
Features

- accommodates two Bus Interface Modules
- supports PROFIBUS-DP
- provides dual PROFIBUS network connections
- can be used with DIN rail or panel mounting

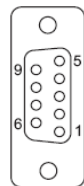
Carrier Specifications

Power Supplies (x2)	8910-PS-DC (obsolete) are supported. BQ2320-9R-EX power supplies are an alternative to the obsolete 8910-PS-DC power supply. BQ2320-9R-EX supplies are mounted external to the 8701-CA-BI carrier and require a separate mounting kit, BQ2320-ACC. For power supply connections, see page 6.
Hazardous Area Approvals	
Location of Node	Zone 2, IIC T4 hazardous area
Electrical	
Railbus connector	Male out
PROFIBUS LAN Serial Ports	9-pin, D-type (female) (x2)
Ground terminals	M4 screw terminal (x2)
External DC power supply (optional)	An 8-pin connector is provided at the top/rear of the carrier to connect a 12.0 VDC ($\pm 5\%$) power supply. This is an alternative to the carrier mounted PSU modules.
Power supply fail detection	PSU failures are reported to the BIM(s) via the carrier. External power fail signals can be input via the 8-pin connector. See "Power Supply Connections" on page 6.
Environmental Requirements	
Ambient temperature: Operating Storage	-40°C to 70°C -40°C to 85°C
Relative humidity	5 to 95% (non-condensing)
Vibration and shock	See <i>PAC8000 System Specification Data Sheet</i>
Materials	
Carrier moulding	Modified poly-phenylene oxide
Printed wiring board	Epoxy resin woven glass laminate
Mechanical	
Dimensions (overall) Weight (approximate)	178 (w) x 170 (d) x 68 (h) mm 450g
Mounting	Flat panel (two fasteners) or DIN rail
DIN rail types	"Top hat," 7.5 x 35 mm to EN 50022 .or 15 x 35 mm to EN 50022 or G-section, to EN 50035

Carrier Diagram



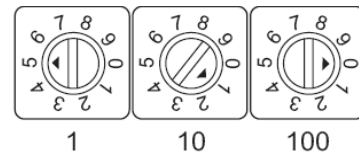
PROFIBUS-DP Network (Serial Port) Interfaces



Terminal	Function
Pin 1	Socket shroud
Pin 2	NC
Pin 3	RxD/TxD+
Pin 4	RTS+
Pin 5	GND (Bus Termination ground)
Pin 6	V _p
Pin 7	RTS+
Pin 8	RxD/TxD-
Pin 9	NC

PROFIBUS-DP Network Address Switches

Three rotary switches (1, 10 and 100) are provided to set the PROFIBUS Slave address.



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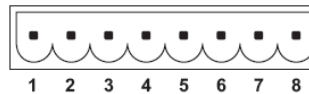
User Controls

Two “change state” buttons, one for each BIM, are provided on the carrier to enable the user to change the state of a BIM from Primary to Backup. The state change depends upon the BIM state before the button is pressed.

State before Pressing Change State Button	State after Pressing Change State Button
Primary (Momentary press)	Change to Backup if current backup BIM is healthy.
Backup (Momentary press)	No change in state.
Press more than 3 seconds and less than 8 seconds (Primary only)	Master IP Address is reset to 10.0.5.252 (Direct IP addresses will not be reset)

Power Supply Connections

External Power



Terminal	Function
1	Reserved. Connect jumper to pin 4 (+12V) to prevent the BIM from reporting a continuous power fail alarm.
2	0V input
3	External PSU power-fail input 1. 0V indicates the external supply is OK; an open circuit causes the BIM to report a power fail alarm. If an external power supply is not in use, connect jumper to pin 2 (0V) to prevent the BIM from reporting a continuous power fail alarm.
4	+12V input (PSU 1)
5	+12V input (PSU 2)
6	External PSU power-fail input 2. 0V indicates the external supply is OK; an open circuit causes the BIM to report a power fail alarm. If an external power supply is not in use, connect jumper to pin 7 (0V) to prevent the BIM from reporting a continuous power fail alarm.
7	0V input
8	2/1 power supply alarm defeat. If a Railbus isolator and 2/1 power supply (8922-RB-IS / 8920-PS-DC) are not in use, connect jumper to pin 7 (0V) to prevent the BIM from reporting a continuous power fail alarm.

Product Documentation

INM8507, PAC8000 I/O - PROFIBUS DP BIM Instruction Manual

PAC8000 System Specification Data Sheet

Release History

Hardware Versions	Software Versions	Comments
GE02 Rev. B	Primary firmware: 1.23 Boot firmware: 2.00 GSD file: 1.2	Implementation of digital signature for the firmware update.
GEF01 Rev. C	Primary firmware: 1.22 Boot firmware: 1.00 GSD file: 1.1	Update to include HART Pass-through support and Master IP reset functionality. Assign of IP address using Stand-alone IO configurator tool.
GEF01 Rev. C	Primary firmware: 1.21 Boot firmware: 1.00 GSD file: 1.1	Firmware version 1.21 resolves the issues listed in "Problems Resolved by Release 1.21" on page 9.
GEF01 Rev. C	Primary firmware: 1.20 Boot firmware: 1.00 GSD file: 1.0	Firmware version 1.20 adds support for field upgrades of firmware and resolves compatibility issues with 8123-PI-QU and 8223-PI-IS pulse input modules. For details, see "Problems Resolved" on page 9.
GEF01 Rev. B	Primary firmware: 1.10 Boot firmware: 1.00 GSD file: 1.0	Change in manufacturing location only. No change in functionality, performance or compatibility.

Important Product Information for this Release

This release resolves the incompatibility between the 8507-BI-DP bus interface module and the 8123-PI-QU/8223-PI-IS pulse input modules. The 8507-BI-DP module's firmware is updated to support these two modules; there is no change in hardware.

Updates

The 8507-BI-DP firmware can be upgraded to version 1.23 using the downloader utility, which is provided in the upgrade kit. An upgrade kit can be downloaded from <http://support.ge-ip.com>.

Upgrade kit: 82A1733-MS10-000-A4 (Version 1.23 firmware upgrade kit)
8507-BI-DP_GSD_File_GEF_0ADF_v1.2 (Version 1.2 GSD file)

Functional Compatibility

Subject	Description
Unsupported Modules	The 8507 PROFIBUS DP BIM does not support the 8129-IO-DC, 8132-AI-UN, 8133-HI-TX, 8140-DI-AC and 8142-DO-DC modules.
8127-DI-SE sequence of events functionality not supported	The 8127-DI-SE module can be used with the 8507 PROFIBUS DP BIM. However the BIM does not support the Sequence Of Events functionality.
64-slot address bus module carriers are not supported	The 8507 PROFIBUS DP BIM only supports 32-slot address bus module carriers. The 8709-CA-08 and 8729-CA-08 module carriers are not supported.
Module diagnostics do not work with Delta V	Delta V PROFIBUS masters do not report a module removal fault when a module is removed from the 8507-BI-DP's backplane. In this situation, all of the module's channel diagnostics report a bad channel status, which is the only indication provided that the module is not present.

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<i>Subject</i>	<i>Description</i>
The standalone I/O Configuration software does not support 8507-BI-DP for IO module configuration	The standalone I/O Configuration software does not support the 8507-BI-DP. The 8507-BI-DP can be configured only through the GSD file using a PROFIBUS master. The 8507-BI-DP cannot be configured on a per-channel basis.
Compatibility with GEF01 Rev. C and earlier	When using module GE02 Rev. B with earlier versions of modules in redundant configuration, earlier version modules start-up faster compared to GE02 Rev. B version. As a result, earlier version modules will always be master after start-up. It is recommended that both BIMs in a redundant configuration have revision GE02 Rev. B or higher firmware.

Problems Resolved by Release 1.23

<i>Subject</i>	<i>Description</i>
Support of HART Pass-through over Ethernet	The support for HART Pass-through over Ethernet is implemented as part of this release. The new firmware version 1.23 corrects this issue.

Restrictions and Open Issues

<i>Subject</i>	<i>Description</i>
The GSD file offers incorrect configuration options for Analog Input modules.	The 8507-BI-DP GSD file incorrectly provides the options of open circuit and short circuit detection for analog input modules 8101, 8103, 8119 and 8201. The default configuration setting ("off") for "O/C detection" and "S/C detection" parameters should not be changed when configuring these modules with the GSD file.
For 8123/8223 PI module, some of the configuration options given in 8507-BI-DP GSD file are not applicable.	For the Digital Output parameter of 8123/8223 PI module, only the options Not Used and Counter Preset Reached are applicable. Other configuration options should not be used while configuring the Digital Output parameter from the GSD file.

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Operational Notes

Subject	Description
8507 PROFIBUS DP BIM configuration	Configuration of the PROFIBUS network address is done via rotary switches on the carrier. Configuration is delivered to the PROFIBUS DP BIM over the PROFIBUS network from a PROFIBUS master (parameterization). A GSD file for the PROFIBUS BIM and supported modules is available for creating a configuration in a PROFIBUS configuration package. The GSD file can be downloaded from the support website. The PROFIBUS DP BIM cannot be configured using the standalone Workbench IO Configuration software.
PROFIBUS network speeds	The 8507 PROFIBUS DP BIM supports all speeds up to 12MBps.
Replacing an 8502 PROFIBUS DP BIM with an 8507 PROFIBUS DP BIM	<p>The following differences should be considered when replacing an 8502 PROFIBUS BIM with an 8507 PROFIBUS BIM.</p> <ul style="list-style-type: none"> ▪ The 8701-CA-BI carrier must be used with the 8507 PROFIBUS BIM. The carriers for the 8502 PROFIBUS BIM are not compatible with the 8507 PROFIBUS BIM. ▪ The parameterization data has changed slightly for the 8507 PROFIBUS BIM. A new GSD file is required to be used with PROFIBUS configuration software. ▪ The LEDs on the face of the 8507 PROFIBUS BIM have changed. See INM8507 for a description of the LEDs on the 8507 PROFIBUS BIM. ▪ The bits in the status word are significantly different between the 8502 and 8507 PROFIBUS BIMs. See INM8507 for a description of the status word on the 8507 PROFIBUS BIM. ▪ Bit 0 in the control word "Scan BIM" is not required to be sent to the 8507 PROFIBUS BIM. This bit is unused in the 8507. ▪ Bit 5 in the control word "15 bit analog data format" is not supported in the 8507 PROFIBUS BIM. ▪ Scaling of Temperature Input Data (including mV & ohms) is different in the 8507 PROFIBUS DP BIM. See INM8507 for a description of the operation. ▪ Parameterization over a PROFIBUS network does not allow independent channel configuration. All channels must be configured the same. An 8502 PROFIBUS DP BIM could be configured using the IO Configurator software. The IO Configurator software cannot be used with the 8507 PROFIBUS DP BIM.
Up to 24 modules supported	The 8507 PROFIBUS DP BIM supports a maximum of 24 modules.
PROFIBUS DPV1 not supported	The 8507 PROFIBUS DP BIM does not support PROFIBUS DPV1.

Subject	Description												
<p>HART data acquisition is not supported</p>	<p>The 8507 PROFIBUS DP BIM does not support HART data acquisition. HART data acquisition should not be used when configuring HART modules with the GSD file.</p> <p>If data acquisition for a HART module is configured, the input telegram will include extra data. The size of the input telegram will vary based on the configuration selected as follows:</p> <table border="1" data-bbox="716 426 1408 537"> <thead> <tr> <th>Configuration</th> <th>Input telegram Size</th> </tr> </thead> <tbody> <tr> <td>AI8 + n ch Hart status</td> <td>8 words + n words</td> </tr> <tr> <td>AI8 + n ch m Hart var</td> <td>8 words + n (1 + m x 2) words</td> </tr> </tbody> </table> <table border="1" data-bbox="716 564 1408 676"> <thead> <tr> <th>Configuration</th> <th>Input telegram Size</th> </tr> </thead> <tbody> <tr> <td>AO8 + n ch Hart status</td> <td>n words</td> </tr> <tr> <td>AO8 + n ch m Hart var</td> <td>n (1 + m x 2) words</td> </tr> </tbody> </table> <p>Where 'n' represents number of channels 'm' represents number of Hart variables.</p> <p>Channel LEDs on AI, AO modules will flash in the absence of HART signals.</p>	Configuration	Input telegram Size	AI8 + n ch Hart status	8 words + n words	AI8 + n ch m Hart var	8 words + n (1 + m x 2) words	Configuration	Input telegram Size	AO8 + n ch Hart status	n words	AO8 + n ch m Hart var	n (1 + m x 2) words
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AI8 + n ch m Hart var	8 words + n (1 + m x 2) words												
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AO8 + n ch Hart status	n words												
AO8 + n ch m Hart var	n (1 + m x 2) words												
<p>Latching on Digital Input module does not clear</p>	<p>The 8507 PROFIBUS DP BIM does not support latching for Digital Input modules. This functionality should not be enabled when configuring a Digital Input module with the GSD file.</p>												
<p>8507 PROFIBUS BIM and IO Module power-on states</p>	<p>When the BIM powers-on, the IO modules respond to IO data received over PROFIBUS, if the PROFIBUS network is in "Operate" mode and the master is actively sending IO data to the BIM when it powers-on. If the PROFIBUS network is disconnected or in "Clear" mode when the BIM powers-on, the BIM enters failsafe mode. The BIM remains in Failsafe mode until the "Exit Failsafe Mode" control bit (Control Word Bit 15) changes state from a zero to a one. Subsequently, the IO modules respond to any IO data received over PROFIBUS.</p> <p>Note: When the BIM is in failsafe mode, the IO modules also enter failsafe mode and adopt their failsafe state if the BIM's "Mod. Failsafe Timeout" parameter is set to a non-zero value. If this parameter is set to "disabled" (default setting) the IO modules respond to IO data received over PROFIBUS.</p>												
<p>8507-BI-DP transmits status word in big-endian format and reads control word in big-endian format.</p>	<p>The 8507 transmits the most significant byte of the status word first and the least significant byte last.</p> <p>While reading the control word, the 8507 treats the first byte of the control word as the most significant byte. The second byte is the least significant byte.</p>												
<p>In the 8101 analog input module, fail state settings are ignored for deactivated channels.</p>	<p>The 8507-BI-DP ignores the configured "Failstate" setting in the GSD file for channels that are configured as inactive. All inactive channels are forced to "hold last state".</p>												

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<i>Subject</i>	<i>Description</i>
Digital input data format for eight-input Digital modules	<p>When an eight-input Digital module is configured for counter operation, PROFIBUS presents the digital inputs as word data. The most significant byte contains the states of inputs 1–8 and the least significant byte contains all 0s.</p> <p>This behavior applies to the following modules:</p> <ul style="list-style-type: none"> 8109-DI-DC 8110-DI-DC 8111-DI-AC 8112-DI-AC 8113-DI-AC 8114-DI-AC 8220-DI-IS (8-input configuration)
Increase in start-up time after power cycle and firmware update	<p>The start-up time of 8507 Profibus BIM is approximately 15 seconds for firmware versions 1.23 (boot code 2.00) and higher.</p>
Invalid firmware update	<p>When invalid firmware is downloaded, the module's fault LED will blink for a period of 60 seconds. After the timeout of 60 seconds the module is reset and remains in firmware upgrade mode.</p> <p>To recover the module, download a valid firmware version.</p>