

## BACnet RIB®

July, 16 2019

### Protocol Implementation Conformance Statement

Vendor Name: **Functional Devices, Inc.**  
Product Name: **BACnet RIB**  
Product Model Number: **RIBMNWLB-7-BC (also RIBTWLB-7-BC & RIBTWLB-7-BC-N4)**  
Applications Software Version: **1.7**  
Firmware Revision: **2.04**  
BACnet Protocol Revision: **12**

#### 1. Product Description

The BACnet RIB provides a software-implemented network interface between BACnet client devices and RIB control and monitoring points. Running on factory defaults, this device is commonly used as a Fan-Safety-Circuit that shuts down a circulating fan if any of up to 6 inputs go into alarm condition (typically Low-Temp Limit, Static Pressure, and Smoke Detector, etc., for example). The device will continue operating the function of Fan-Safety-Circuit if network is lost. The device can be used as a standard BACnet device with 2 BO relays and 7 BI by writing a False (0) to Proprietary Property 277001 in BO1.

#### 2. BACnet Standardized Device Profile (Annex L)

The BACdoor OEM Client-Server supports the B-ASC profile.

#### 3. BACnet Interoperability Building Blocks Supported (Annex K)

DS-RP-B, DS-RPM-B, DS-WP-B, DS-WPM-B, DM-DDB-B, DM-DOB-B, DM-DCC-B,  
DB-RD-B

#### 4. Segmentation Capability

Segmentation is not supported.

#### 5. Standard Object Types

No dynamic Creation or Deletion supported  
No proprietary object types supported

Standard Object Types Supported:

- **Binary Input**
- **Binary Output**
- **Binary Value**
- **Device**

## Object Details

|     | Property Identifier             | Property Datatype, description, etc.  | Properties Writable/Readable | Optional Properties Supported |
|-----|---------------------------------|---|------------------------------|-------------------------------|
| DEx | Object_Identifier               | default to DE277000   | W, R                         |                               |
|     | Object_Name                     | Up to 32 characters   | W, R                         |                               |
|     | Object_Type                     | DEVICE  | R                            |                               |
|     | System_Status                   | OPERATIONAL or NON_OPERATIONAL  | R                            |                               |
|     | Vendor_Name                     | "Functional Devices, Inc"   | R                            |                               |
|     | Vendor_Identifier               | 277   | R                            |                               |
|     | Model_Name                      | "RIBMNLB-7-BC" (or similar)   | R                            |                               |
|     | Firmware_Revision               | "2.04" (or similar)   | R                            |                               |
|     | Application_Software_Version    | "1.7" (or similar)  | R                            |                               |
|     | Description                     | Functional Devices BACnet RIB   | R                            | ✓                             |
|     | Protocol_Version                | 1   | R                            |                               |
|     | Protocol_Revision               | 12  | R                            |                               |
|     | Protocol_Services_Supported     | { readProperty, readPropertyMultiple, writeProperty, writePropertyMultiple, deviceCommunicationControl, reintitalizeDevice, who-Has, who-Is } | R                            |                               |
|     | Protocol_Object_Types_Supported | { BinaryInput, BinaryOutput, BinaryValue, Device }  | R                            |                               |
|     | Object_List                     | DEx, BI1, BI2, BI3, BI4, BI5, BI6, BI7, BI8, BO1, BO2, BV1  | R                            |                               |
|     | Max_APDU_Length_Accepted        | 480   | R                            |                               |
|     | Segmentation_Supported          | NONE  | R                            |                               |
|     | APDU_Timeout                    | 3000 default  | W, R                         |                               |
|     | Number_Of_APDU_Retries          | 0 default   | W, R                         |                               |
|     | Max_Master                      | 127 default   | W, R                         | ✓                             |
|     | Max_Info_Frames                 | 1   | R                            | ✓                             |
|     | Device_Address_Binding          | always empty  | R                            |                               |
|     | Database_Revision               | 1   | R                            |                               |

|     | Property Identifier  | Property Datatype, description, etc.  | Properties Writable/Readable | Optional Properties Supported | Proprietary Property # |
|-----|--|---|------------------------------|-------------------------------|------------------------|
| BO1 | Object_Identifier  | BO1   | R                            |                               |                        |
|     | Object_Name  | Up to 32 characters   | W, R                         |                               |                        |
|     | Object_Type  | Binary_Output   | R                            |                               |                        |
|     | Present_Value  | 0 or 1  | W, R                         |                               |                        |
|     | Status_Flags<br>(See DIP_SW_BO1 below)   | Always {0,0,0,0}  | R                            |                               |                        |
|     | Event_State  | Always NORMAL   | R                            |                               |                        |
|     | Reliability  | Always NO_FAULT_DETECTED  | R                            | ✓                             |                        |
|     | Out_Of_Service   | Always FALSE  | R                            |                               |                        |
|     | Polarity   | NORMAL or REVERSE   | W, R                         |                               |                        |
|     | Inactive_Text  | Up to 3 characters  | W, R                         | ✓                             |                        |
|     | Active_Text  | Up to 2 characters  | W, R                         | ✓                             |                        |
|     | Minimum_Off_Time   | 0-65535 seconds   | W, R                         | ✓                             |                        |
|     | Minimum_On_Time  | 0-65535 seconds   | W, R                         | ✓                             |                        |
|     | Priority_Array   | 16 slots (0, 1, NULL)   | R                            |                               |                        |
|     | Relinquish_Default   | 0 or 1  | W, R                         |                               |                        |
|     | AND_Function_Enable<br>(Proprietary Property)<br>(Set to 1 for Fan-Safety-Circuit) | Enable = 1, Disable = 0<br>(factory default to 1)<br>BI1-BI6 all true will set BO1 True | W, R                         |                               | 277001                 |
|     | AND_Output_Stat<br>(Proprietary Property)  | (Only active if AND_Output_Enable = 1)<br>All BI1-BI6 True = 1<br>Any BI1-BI6 False = 0 | R                            |                               | 277002                 |
|     | AND_Output_Priority<br>(Proprietary Property)                                      | (Only active if AND_Output_Enable = 1)<br>1-16 (factory default to 12)                  | W, R                         |                               | 277003                 |
|     | DIP_SW_BO1<br>(Proprietary Property)   | 1, 2, or 3 (Enum); On, Off, Auto  | R                            |                               | 277004                 |
|     | DIP_SW_Priority_BO1<br>(Proprietary Property)                                      | 1-16 (factory default to 8)   | W, R                         |                               | 277005                 |

|     | Property Identifier                           | Property Datatype, description, etc.                       | Properties Writable/Readable | Optional Properties Supported | Proprietary Property # |
|-----|---|--|------------------------------|-------------------------------|------------------------|
| BO2 | Object_Identifier                             | BO2  | R                            |                               |                        |
|     | Object_Name                                   | Up to 32 characters  | W, R                         |                               |                        |
|     | Object_Type                                   | Binary_Output  | R                            |                               |                        |
|     | Present_Value                                 | 0 or 1   | W, R                         |                               |                        |
|     | Status_Flags<br>(See DIP_SW_BO2 below)        | Always {0,0,0,0}   | R                            |                               |                        |
|     | Event_State                                   | Always NORMAL  | R                            |                               |                        |
|     | Reliability                                   | Always NO_FAULT_DETECTED                                   | R                            | ✓                             |                        |
|     | Out_Of_Service                                | Always FALSE   | R                            |                               |                        |
|     | Polarity                                      | NORMAL or REVERSE  | W, R                         |                               |                        |
|     | Inactive_Text                                 | Up to 3 characters   | W, R                         | ✓                             |                        |
|     | Active_Text                                   | Up to 2 characters   | W, R                         | ✓                             |                        |
|     | Minimum_Off_Time                              | 0-65535 seconds  | W, R                         | ✓                             |                        |
|     | Minimum_On_Time                               | 0-65535 seconds  | W, R                         | ✓                             |                        |
|     | Priority_Array                                | 16 slots (0, 1, NULL)                                      | R                            |                               |                        |
|     | Relinquish_Default                            | 0 or 1   | W, R                         |                               |                        |
|     | DIP_SW_BO2<br>(Proprietary Property)          | 1, 2, or 3 (Enum);<br>On, Off, Auto                        | R                            |                               | 277004                 |
|     | DIP_SW_Priority_BO2<br>(Proprietary Property) | 1-16 (factory default to 8)                                | W, R                         |                               | 277005                 |
|     | Bind_BI7<br>(Proprietary Property)            | 0 or 1, 0 = not bound, 1 = bound<br>(factory default to 1) | W, R                         |                               | 277006                 |
|     | Bind_BI7_Priority<br>(Proprietary Property)   | 1-16 (factory default to 12)                               | W, R                         |                               | 277007                 |

|     | Property Identifier                  | Property Datatype, description, etc.         | Properties Writable/Readable | Optional Properties Supported | Proprietary Property # |
|-----|--------------------------------------|--|------------------------------|-------------------------------|------------------------|
| BI1 | Object_Identifier                    | BI1  | R                            |                               |                        |
|     | Object_Name                          | Up to 32 characters                          | W, R                         |                               |                        |
|     | Object_Type                          | Binary_Input                                 | R                            |                               |                        |
|     | Present_Value                        | 0 or 1                                       | R                            |                               |                        |
|     | Status_Flags                         | { 0,0,0,0 } Normal or { 0,0,1,0 } Overridden | R                            |                               |                        |
|     | Event_State                          | Always NORMAL                                | R                            |                               |                        |
|     | Reliability                          | Always NO_FAULT_DETECTED                     | R                            | ✓                             |                        |
|     | Out_Of_Service                       | Always FALSE                                 | R                            |                               |                        |
|     | Polarity                             | NORMAL or REVERSE                            | W, R                         |                               |                        |
|     | Inactive_Text                        | Up to 3 characters                           | W, R                         | ✓                             |                        |
|     | Active_Text                          | Up to 2 characters                           | W, R                         | ✓                             |                        |
|     | Latch_Enabled (Proprietary Property) | True of False                                | R                            |                               | 277008                 |
|     | Input_Latched (Proprietary Property) | True of False                                | R                            |                               | 277009                 |

|     | Property Identifier                  | Property Datatype, description, etc.         | Properties Writable/Readable | Optional Properties Supported | Proprietary Property # |
|-----|--------------------------------------|--|------------------------------|-------------------------------|------------------------|
| BI2 | Object_Identifier                    | BI2  | R                            |                               |                        |
|     | Object_Name                          | Up to 32 characters                          | W, R                         |                               |                        |
|     | Object_Type                          | Binary_Input                                 | R                            |                               |                        |
|     | Present_Value                        | 0 or 1                                       | R                            |                               |                        |
|     | Status_Flags                         | { 0,0,0,0 } Normal or { 0,0,1,0 } Overridden | R                            |                               |                        |
|     | Event_State                          | Always NORMAL                                | R                            |                               |                        |
|     | Reliability                          | Always NO_FAULT_DETECTED                     | R                            | ✓                             |                        |
|     | Out_Of_Service                       | Always FALSE                                 | R                            |                               |                        |
|     | Polarity                             | NORMAL or REVERSE                            | W, R                         |                               |                        |
|     | Inactive_Text                        | Up to 3 characters                           | W, R                         | ✓                             |                        |
|     | Active_Text                          | Up to 2 characters                           | W, R                         | ✓                             |                        |
|     | Latch_Enabled (Proprietary Property) | True of False                                | R                            |                               | 277008                 |
|     | Input_Latched (Proprietary Property) | True of False                                | R                            |                               | 277009                 |

|     | Property Identifier                  | Property Datatype, description, etc.         | Properties Writable/Readable | Optional Properties Supported | Proprietary Property # |
|-----|--------------------------------------|--|------------------------------|-------------------------------|------------------------|
| BI3 | Object_Identifier                    | BI3  | R                            |                               |                        |
|     | Object_Name                          | Up to 32 characters                          | W, R                         |                               |                        |
|     | Object_Type                          | Binary_Input                                 | R                            |                               |                        |
|     | Present_Value                        | 0 or 1                                       | R                            |                               |                        |
|     | Status_Flags                         | { 0,0,0,0 } Normal or { 0,0,1,0 } Overridden | R                            |                               |                        |
|     | Event_State                          | Always NORMAL                                | R                            |                               |                        |
|     | Reliability                          | Always NO_FAULT_DETECTED                     | R                            | ✓                             |                        |
|     | Out_Of_Service                       | Always FALSE                                 | R                            |                               |                        |
|     | Polarity                             | NORMAL or REVERSE                            | W, R                         |                               |                        |
|     | Inactive_Text                        | Up to 3 characters                           | W, R                         | ✓                             |                        |
|     | Active_Text                          | Up to 2 characters                           | W, R                         | ✓                             |                        |
|     | Latch_Enabled (Proprietary Property) | True of False                                | R                            |                               | 277008                 |
|     | Input_Latched (Proprietary Property) | True of False                                | R                            |                               | 277009                 |

|     | Property Identifier                  | Property Datatype, description, etc.         | Properties Writable/Readable | Optional Properties Supported | Proprietary Property # |
|-----|--------------------------------------|--|------------------------------|-------------------------------|------------------------|
| BI4 | Object_Identifier                    | BI4  | R                            |                               |                        |
|     | Object_Name                          | Up to 32 characters                          | W, R                         |                               |                        |
|     | Object_Type                          | Binary_Input                                 | R                            |                               |                        |
|     | Present_Value                        | 0 or 1                                       | R                            |                               |                        |
|     | Status_Flags                         | { 0,0,0,0 } Normal or { 0,0,1,0 } Overridden | R                            |                               |                        |
|     | Event_State                          | Always NORMAL                                | R                            |                               |                        |
|     | Reliability                          | Always NO_FAULT_DETECTED                     | R                            | ✓                             |                        |
|     | Out_Of_Service                       | Always FALSE                                 | R                            |                               |                        |
|     | Polarity                             | NORMAL or REVERSE                            | W, R                         |                               |                        |
|     | Inactive_Text                        | Up to 3 characters                           | W, R                         | ✓                             |                        |
|     | Active_Text                          | Up to 2 characters                           | W, R                         | ✓                             |                        |
|     | Latch_Enabled (Proprietary Property) | True of False                                | R                            |                               | 277008                 |
|     | Input_Latched (Proprietary Property) | True of False                                | R                            |                               | 277009                 |

|     | Property Identifier                  | Property Datatype, description, etc.         | Properties Writable/Readable | Optional Properties Supported | Proprietary Property # |
|-----|--------------------------------------|--|------------------------------|-------------------------------|------------------------|
| BI5 | Object_Identifier                    | BI5  | R                            |                               |                        |
|     | Object_Name                          | Up to 32 characters                          | W, R                         |                               |                        |
|     | Object_Type                          | Binary_Input                                 | R                            |                               |                        |
|     | Present_Value                        | 0 or 1                                       | R                            |                               |                        |
|     | Status_Flags                         | { 0,0,0,0 } Normal or { 0,0,1,0 } Overridden | R                            |                               |                        |
|     | Event_State                          | Always NORMAL                                | R                            |                               |                        |
|     | Reliability                          | Always NO_FAULT_DETECTED                     | R                            | ✓                             |                        |
|     | Out_Of_Service                       | Always FALSE                                 | R                            |                               |                        |
|     | Polarity                             | NORMAL or REVERSE                            | W, R                         |                               |                        |
|     | Inactive_Text                        | Up to 3 characters                           | W, R                         | ✓                             |                        |
|     | Active_Text                          | Up to 2 characters                           | W, R                         | ✓                             |                        |
|     | Latch_Enabled (Proprietary Property) | True of False                                | R                            |                               | 277008                 |
|     | Input_Latched (Proprietary Property) | True of False                                | R                            |                               | 277009                 |

|     | Property Identifier                  | Property Datatype, description, etc.         | Properties Writable/Readable | Optional Properties Supported | Proprietary Property # |
|-----|--------------------------------------|--|------------------------------|-------------------------------|------------------------|
| BI6 | Object_Identifier                    | BI6  | R                            |                               |                        |
|     | Object_Name                          | Up to 32 characters                          | W, R                         |                               |                        |
|     | Object_Type                          | Binary_Input                                 | R                            |                               |                        |
|     | Present_Value                        | 0 or 1                                       | R                            |                               |                        |
|     | Status_Flags                         | { 0,0,0,0 } Normal or { 0,0,1,0 } Overridden | R                            |                               |                        |
|     | Event_State                          | Always NORMAL                                | R                            |                               |                        |
|     | Reliability                          | Always NO_FAULT_DETECTED                     | R                            | ✓                             |                        |
|     | Out_Of_Service                       | Always FALSE                                 | R                            |                               |                        |
|     | Polarity                             | NORMAL or REVERSE                            | W, R                         |                               |                        |
|     | Inactive_Text                        | Up to 3 characters                           | W, R                         | ✓                             |                        |
|     | Active_Text                          | Up to 2 characters                           | W, R                         | ✓                             |                        |
|     | Latch_Enabled (Proprietary Property) | True of False                                | R                            |                               | 277008                 |
|     | Input_Latched (Proprietary Property) | True of False                                | R                            |                               | 277009                 |

|     | Property Identifier | Property Datatype, description, etc. | Properties Writable/Readable | Optional Properties Supported |
|-----|---------------------|--------------------------------------|------------------------------|-------------------------------|
| BI7 | Object_Identifier   | BI7                                  | R                            |                               |
|     | Object_Name         | Up to 32 characters                  | W, R                         |                               |
|     | Object_Type         | Binary_Input                         | R                            |                               |
|     | Present_Value       | 0 or 1                               | R                            |                               |
|     | Status_Flags        | Always { 0,0,0,0 }                   | R                            |                               |
|     | Event_State         | Always NORMAL                        | R                            |                               |
|     | Reliability         | Always NO_FAULT_DETECTED             | R                            | ✓                             |
|     | Out_Of_Service      | Always FALSE                         | R                            |                               |
|     | Polarity            | NORMAL or REVERSE                    | W, R                         |                               |
|     | Inactive_Text       | Up to 3 characters                   | W, R                         | ✓                             |
|     | Active_Text         | Up to 2 characters                   | W, R                         | ✓                             |

|     | Property Identifier | Property Datatype, description, etc.  | Properties Writable/Readable | Optional Properties Supported |
|-----|---------------------|---|------------------------------|-------------------------------|
| BI8 | Object_Identifier   | BI8   | R                            |                               |
|     | Object_Name         | Up to 32 characters   | W, R                         |                               |
|     | Object_Type         | Binary_Input<br>(Not for General Purpose input, Hardware connected to Latch Reset Pushbutton) | R                            |                               |
|     | Present_Value       | 0 or 1  | R                            |                               |
|     | Status_Flags        | Always { 0,0,0,0 }  | R                            |                               |
|     | Event_State         | Always NORMAL   | R                            |                               |
|     | Reliability         | Always NO_FAULT_DETECTED  | R                            | ✓                             |
|     | Out_Of_Service      | Always FALSE  | R                            |                               |
|     | Polarity            | NORMAL or REVERSE   | W, R                         |                               |
|     | Inactive_Text       | Up to 3 characters  | W, R                         | ✓                             |
|     | Active_Text         | Up to 2 characters  | W, R                         | ✓                             |



|     | Property Identifier   | Property Datatype, description, etc.  | Properties Writable/Readable | Optional Properties Supported |
|-----|---|---|------------------------------|-------------------------------|
| BV1 | Object_Identifier   | BV1   | R                            |                               |
|     | Object_Name   | Up to 32 chars (default to "CLR Latches")   | W, R                         |                               |
|     | Object_Type   | Binary_Value  | R                            |                               |
|     | Present_Value (used in proprietary reset of latched inputs) | 0 or 1 (Setting to 1 clears latches on Binary Inputs) (see Proprietary Properties 277008, 277009) | W, R                         |                               |
|     | Status_Flags  | Always { 0,0,0,0 }  | R                            |                               |
|     | Event_State   | Always NORMAL   | R                            |                               |
|     | Reliability   | Always NO_FAULT_DETECTED  | R                            | ✓                             |
|     | Out_Of_Service  | Always FALSE  | R                            |                               |

## General Operation

RIBMNLB-7-BC (includes RIBTWLB-7-BC and RIBTWLB-7-BC-N4) operates as a Fan-Safety-Circuit by default from the factory and can function this way Stand-Alone if network is lost. However, Fan-Safety-Circuit function can be disabled, and RIB can be used as a standard BACnet RIB with 2 BO relays and 7 general-purpose BI. By default, Fan-Safety-Circuit mode sets up BI1-BI6 in an AND function where all BI1-BI6 must be closed before BO1 will close (may be less than all BI1-BI6 if any are overridden by DIP switches on device; BI1-BI6 True when closed unless polarity reversal used). Any of BI1-BI6 may also be set to be latching inputs by DIP switches, see Proprietary Properties 277008 and 277009. Enable and disable Fan-Safety-Circuit function by way of Proprietary Property AND\_Function\_Enable (No. 277001) in BO1. (Binding of BI7 to BO2 is usually used as part of Fan-Safety-Circuit function and it may be desirable to disable this too if not using Fan-Safety-Circuit function. See Proprietary Properties 277006, 277007.)

## Proprietary Properties descriptions

1. Proprietary Properties 277001, 277002, 277003 described

AND Function only active in Fan-Safety-Circuit mode. Fan-Safety-Circuit mode enabled by True (1) (factory default) in Proprietary Property AND\_Function\_Enable (No. 277001) in BO1. Read status of BO1 in this mode by way of Proprietary Property AND\_Output\_Stat (No. 277002) in BO1. If all BI1-BI6 are True, AND\_Output\_Stat = 1; if any BI1-BI6 are False, AND\_Output\_Stat = 0 (BI1-BI6 True when closed unless polarity reversal used). Priority Level of the AND function in BO1 Priority\_Array can be set by way of Proprietary Property AND\_Output\_Priority (No. 277003) in BO1 object. BO1 may be read to determine if an alarm has occurred on one of the alarm inputs on BI1-BI6 causing a shutdown, then individual BIs may be read to determine cause.

2. Proprietary Properties 277004, 277005 described

See 2 position DIP switches on device for BO1 and BO2 DIP switch override ON/OFF/AUTO. Status read by way of Proprietary Properties DIP\_SW\_BO1 and DIP\_SW\_BO2 (No. 277004) in BO1 and BO2; Enum 1 = ON, 2 = OFF, 3 = AUTO. Priority level of the DIP switch function in BO Priority\_Array can be set by way of Proprietary Properties DIP\_SW\_Priority\_BO1 and DIP\_SW\_Priority\_BO2 (No. 277005) in BO1 object and BO2 object.

3. Proprietary Properties 277006, 277007 described

Fan Current Status typically used in Fan-Safety-Circuit. BO2 is bound to BI7 such that when BI7 is closed, BO2 relay will activate (BO2 will deactivate when BI7 closed when BO2 Polarity is reversed; reversing BI7 Polarity only reverses BI7 Present Value). Binding can be enabled or disabled by way of Proprietary Property Bind\_BI7 (No. 277006) in BO2. Priority level of the Bind function in BO2 Priority\_Array can be set by way of Proprietary Property Bind\_BI7\_Priority (No. 277007) in BO2 object. Depending on the polarity set, the BO2 indicator will illuminate when BO2 is on and BI7 indicator will illuminate when BI7 is closed.

4. Proprietary Properties 277008, 277009 described

See 6 position BI Latch-Select DIP switches on device for selecting BI to be a latching input (Fan-Safety-Circuit mode only). Status of BI1-BI6 Latch-Select DIP switch setting, or if input has been closed and latched, can be read by way of Proprietary Properties Latch\_Enabled and Input\_Latched (Nos. 277008 and 277009) in respective BI1-BI6. All latched inputs will be reset by fixing the faulted input(s) and pressing the local pushbutton, power cycling the device, or by setting Present\_Value True (1) in Binary Value BV1 (automatically returns to 0 in preparation for future resets).

## 6. Data Link Layer Options

- BACnet/IP, (Annex J)
- ISO 8802-3, Ethernet (Clause 7)
- ANSI/ATA 878.1, 2.5 Mb. ARCNET (Clause 8)
- ANSI/ATA 878.1, RS-485 ARCNET (Clause 8), configurable baud rate to 156K
- MS/TP master (Clause 9): 9600, 19200, 38400, 57600, 76800, 115200 baud
- PTP (Clause 10)

## 7. Device Address Binding

Static binding is not supported.

## 8. Networking Options

The RIB is not a router.

Annex H, BACnet Tunneling Router over IP is not supported

BACnet/IP Broadcast Management Device (BBMD) is not supported

## 9. Character Sets Supported

- IBM/Microsoft DBCS
- JIS C 6226
- ISO 10646 (UCS4)
- ISO 10646 (UCS2)
- ISO 8859-1
- ISO 10646 (UTF-8)

## 10. Network Security Options

The RIB is a non-secure Device.