

**Date:** Mai 10, 2017

**Vendor Name:** LOYTEC electronics GmbH

**Product Name:** L-INX Automation Server/L-ROC Room Controller/L-GATE Universal Gateway/L-IOB I/O Controller

**Product Model Number:** LINX-15X/20X/21X/22X, LINX2, LGATE-90X/95X, LROC-10X, LROC-40X, LIOB-58X, LIOB-AIR, LIP-ME20X

**Applications Software Version:** V6

**Firmware Revision:** 6.0

**BACnet Protocol Revision:** 135-2012 (1.12)

### **Product Description:**

This product implements a BACnet gateway and freely programmable BACnet controller. It comes in various models providing different levels of additional functions to the same BACnet protocol interface. The L-GATE models are limited to the BACnet gateway function. The L-INX and L-ROC models contain the additional controller logic that can be extended with L-IOB I/O modules. The L-IOB I/O controllers include built-in physical I/Os. The controller application is developed using an IEC-61131 or IEX-61499 compliant design tool. The L-ROC is a specialized room controller with flexible room assignment. Other protocols, I/Os and IEC logic variables are exposed as BACnet objects. There can be up to 1000 BACnet server objects. For visualization this product implements an embedded BACnet OPC server (XML-DA and UA). The device also implements BACnet Schedule, Calendar, Trend Log, and Notification Class objects. Alarming is based on intrinsic reporting. The device also implements client functions for simple objects, schedules, calendars, and alarms. The configuration of the device is accomplished by PC software. The product is equipped with a BACnet/IP and MS/TP interface. On the LINX-150, LINX-220, LROC-10X and LGATE-90X/95X models, they can be configured for alternate usage. The LINX-151/153/154, LROC-10X, and LINX-221 models contain a BACnet router between BACnet IP and MS/TP interfaces, slave proxy function, and a BBMD. The LGATE-90X/95X also contain the BBMD. All models allow mapping various protocols and physical I/O to BACnet objects and can act as a BACnet time master. The models LINX-20X/21X and LGATE-90X support only up to 750 objects. The LIP-ME20X contain the router, slave proxy and BBMD functionality only and have multiple MS/TP interfaces.

### **BACnet Standardized Device Profile (Annex L):**

BACnet Building Controller (B-BC)

Note, that this device is a gateway. The LINX-151/153/201/211/221, LINX2, LROC-10X, LIP-ME20X also is a router / BBMD / slave proxy. The LGATE-90X/95X, L-IOB also is a BBMD.

### **BACnet Interoperability Building Blocks Supported (Annex K):**

Data Sharing – ReadProperty-A (DS-RP-A)  
Data Sharing – ReadProperty-B (DS-RP-B)  
Data Sharing – ReadPropertyMultiple-A (DS-RPM-A)  
Data Sharing – ReadPropertyMultiple-B (DS-RPM-B)  
Data Sharing – WriteProperty-A (DS-WP-A)  
Data Sharing – WriteProperty-B (DS-WP-B)  
Data Sharing – WritePropertyMultiple-B (DS-WPM-B)  
Data Sharing – COV-A (DS-COV-A)  
Data Sharing – COV-B (DS-COV-B)  
Data Sharing – COVP-A (DS-COVP-A)  
Data Sharing – COVP-B (DS-COVP-B)  
Data Sharing – COV Unsolicited-B (DS-COVU-B)  
Alarm and Event – Notification Internal-B (AE-N-I-B)  
Alarm and Event – ACK-B (AE-ACK-B)  
Alarm and Event – Alarm Summary-B (AE-ASUM-B)  
Alarm and Event – Alarm Enrollment Summary-B (AE-ESUM-B)  
Alarm and Event – Alarm Information-B (AE-INFO-B)  
Scheduling – Internal-B (SCHED-I-B)  
Scheduling – External-B (SCHED-E-B)

Trending – Viewing and Modifying Trends Internal-B (T-VMT-I-B)  
Trending – Viewing and Modifying Trends External-B (T-VMT-E-B)  
Trending – Automated Trend Retrieval-B (T-ATR-B)  
Device Management – DynamicDeviceBinding-A (DM-DDB-A)  
Device Management – DynamicDeviceBinding-B (DM-DDB-B)  
Device Management – DynamicObjectBinding-B (DM-DOB-B)  
Device Management – TimeSynchronization-A (DM-TS-A)  
Device Management – TimeSynchronization-B (DM-TS-B)  
Device Management – UTCTimeSynchronization-A (DM-UTC-A)  
Device Management – UTCTimeSynchronization-B (DM-UTC-B)  
Device Management – Automatic Time Synchronization-A (DM-ATS-A)  
Device Management – DeviceCommunicationControl-B (DM-DCC-B)  
Device Management – ReinitializeDevice-B (DM-RD-B)  
Device Management – Backup and Restore (DM-BR-B)  
Device Management – List Manipulation-B (DM-LM-B)  
Device Management – Restart A (DM-R-A)  
Device Management – Restart B (DM-R-B)

**Segmentation Capability:**

Segmented requests supported, window size: 4  
Segmented responses supported, window size: 4

**Standard Object Types Supported:**

For all the objects below the following apply if not stated otherwise:

- 1) Does not support the CreateObject and DeleteObject service
- 2) Properties Object\_Name, Description support up to 64 characters
- 3) Includes the required properties as specified for the object class
- 4) All commandable objects support the Priority\_Array and Relinquish\_Default with 16 freely usable priorities
- 5) All analog, binary, multi-state objects support COV subscriptions
- 6) No additional writeable properties exist
- 7) No proprietary properties exist
- 8) No range restrictions exist
- 9) Analog, binary, and multi-state objects are limited to 1000 (750) objects in total

**Device Object**

*List of optional properties supported:*

Location, Description, Max\_Segments\_Accepted, APDU\_Segment\_Timeout, Max\_Master<sup>1</sup>, Max\_Info\_Frames<sup>1</sup>, Active\_COV\_Subscriptions, Configuration\_Files, Last\_Restore\_Time, Backup\_Failure\_Timeout, Local\_Time, Local\_Date, UTC\_Offset, Daylight\_Saving\_Status, Last\_Restart\_Reason, Time\_Of\_Device\_Restart, Restart\_Notification\_Recipients, Time\_Synchronization\_Recipients, UTC\_Time\_Synchronization\_Recipients, Time\_Synchronization\_Interval, Align\_Intervals, Interval\_Offset, Backup\_Preparation\_Time, Restore\_Preparation\_Time, Restore\_Completion\_Time, Backup\_And\_Restore\_State, Slave\_Proxy\_Enable<sup>2</sup>, Manual\_Slave\_Address\_Binding<sup>2</sup>, Auto\_Slave\_Discovery<sup>2</sup>, Slave\_Address\_Binding<sup>2</sup>

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<sup>1</sup> If device is operated with BACnet MS/TP enabled.

<sup>2</sup> Available on the LINX-151/153/201/211/221, LINX2, L-ROC, LIP-ME20X models only.

**Analog Input, Analog Output, Analog Value**

*List of optional properties supported (as applies):*

Description, Device\_Type, Reliability, Min\_Pres\_Value, Max\_Pres\_Value, Resolution, COV\_Increment, Time\_Delay, Notification\_Class, Low\_Limit, High\_Limit, Deadband, Limit\_Enable, Event\_Enable, Acked\_Transitions, Notify\_Type, Event\_Time\_Stamps, Event\_Message\_Texts

**Binary Input, Binary Output, Binary Value**

*List of optional properties supported (as applies):*

Description, Device\_Type, Reliability, Active\_Text, Inactive\_Text, Time\_Delay, Change\_Of\_State\_Time, Change\_Of\_State\_Count, Time\_Of\_State\_Count\_Reset, Elapsed\_Active\_Time, Time\_of\_Active\_Time\_Reset, Notification\_Class, Alarm\_Value, Feedback\_Value, Event\_Enable, Acked\_Transitions, Notify\_Type, Event\_Time\_Stamps, Event\_Message\_Texts

**Multi-State Input, Multi-state Output, Multi-State Value**

*List of optional properties supported (as applies):*

Description, Device\_Type, Reliability, State\_Text, Time\_Delay, Notification\_Class, Alarm\_Values, Fault\_Values, Feedback\_Values, Event\_Enable, Acked\_Transitions, Notify\_Type, Event\_Time\_Stamps, Event\_Message\_Texts

**Large Analog Value, Integer Value, Positive Integer Value**

*List of optional properties supported (as applies):*

Description, Out\_Of\_Service, Event\_State, Reliability, COV\_Increment, Time\_Delay, Notification\_Class, Low\_Limit, High\_Limit, Deadband, Limit\_Enable, Event\_Enable, Acked\_Transitions, Notify\_Type, Event\_Time\_Stamps, Event\_Message\_Texts

**CharacterString Value, OctetString Value**

*List of optional properties supported (as applies):*

Description, Out\_Of\_Service, Reliability

**Notification Class Object, Schedule Object, Calendar Object**

*List of optional properties supported (as applies):*

Description, Weekly\_Schedule, Exception\_Schedule

*Object limit:* 32 Notification Class, 100 Schedule, 25 Calendar objects.

**Trend Log Object**

*List of optional properties supported:*

Description, Start\_Time, Stop\_Time, Log\_DeviceObjectProperty, Log\_Interval, COV\_Resubscription\_Interval, Client\_COV\_Increment, Align\_Intervals, Interval\_Offset, Trigger, Notification\_Threshold, Records\_Since\_Notification, Last\_Notify\_Record, Notification\_Class, Event\_Enable, Acked\_Transitions, Notify\_Type, Event\_Time\_Stamps, Event\_Message\_Texts, Reliability

*Object limit:* 256 Trend Log objects. There is an aggregated limit of 4,000,000 log records over all Trend Log objects.

**Accumulator**

*List of optional properties supported:*

Description, Device\_Type, Reliability, Value\_Change\_Time, Value\_Before\_Change, Value\_Set

**Pulse Converter**

*List of optional properties supported:*

Description, Reliability, COV\_Increment, COV\_Period

**Loop**

*List of optional properties supported:*

Description, Reliability, COV\_Increment

**File Object**

*List of optional properties supported:*

Description

*Object limit:* 1 File object. This object is used for configuration backup and restore.

**Data Link Layer Options:**

- BACnet IP, (Annex J)
- BACnet IP, (Annex J), Foreign Device
- ISO 8802-3, Ethernet (Clause 7)
- MS/TP master (Clause 9), baud rate(s): 9600, 19200, 38400, 76800, 115200
- MS/TP slave (Clause 9), baud rate(s):
- Point-To-Point, EIA 232 (Clause 10), baud rate(s):
- Point-To-Point, modem, (Clause 10), baud rate(s):
- LonTalk, (Clause 11), medium:

**Device Address Binding:**

Static device address binding is supported.

**Networking Options:**

- Router, Clause 6 – MS/TP to BACnet/IP<sup>3</sup>
- Annex H, BACnet Tunneling Router over IP
- BACnet/IP Broadcast Management Device (BBMD)<sup>3</sup>
- Registrations by Foreign Devices<sup>3</sup>

**Character Sets Supported:**

The device is configurable for one of the following character sets at a time. It does not support them simultaneously.

- |   |   |  |
|---|---|--|
| <input checked="" type="checkbox"/> ANSI X3.4/UTF-8   | <input type="checkbox"/> IBM™/Microsoft™ DBCS | <input checked="" type="checkbox"/> ISO 8859-1 |
| <input checked="" type="checkbox"/> ISO 10646 (UCS-2) | <input type="checkbox"/> ISO 10646 (UCS-4)    | <input type="checkbox"/> JIS C 6226            |

**If this product is a communication gateway, describe the non-BACnet equipment/network(s) that the gateway supports:**

The device contains an embedded OPC server. The BACnet objects and properties are exposed to the OPC server. The BACnet server objects, client functions and OPC data tags are created by configuration software. By default, OPC data tags are named as their original BACnet objects. OPC tags can be organized in a hierarchy. Additional BACnet properties such as Description, Units, Max\_Pres\_Value, Min\_Pres\_Value, Resolution, Number\_Of\_States, and State\_Text are also reflected in the OPC data tags. Properties updated during run-time by the OPC server are Present\_Value, Status\_Flags, Reliability, Out\_Of\_Service. Trend Log, Schedule, Calendar and Notification Class Objects are exposed to the OPC server as a collection of OPC tags. Also, Modbus and M-Bus data points as well as L-IOB I/Os can be mapped to BACnet objects. On the LINX-15X, LROC-10X and LGATE-90X/95X models also CEA-709.1 data points (NVs and CPs) can be mapped to BACnet objects.

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<sup>3</sup> Available on the LINX-151/153/201/211/221, LINX2, LROC-10X, LIP-ME20X models only.

**Additional Information and Contact:**

Further Information, a detailed User Manual and firmware updates can be obtained from our website <http://www.loytec.com>.

For information and technical support please contact us at the following address:

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