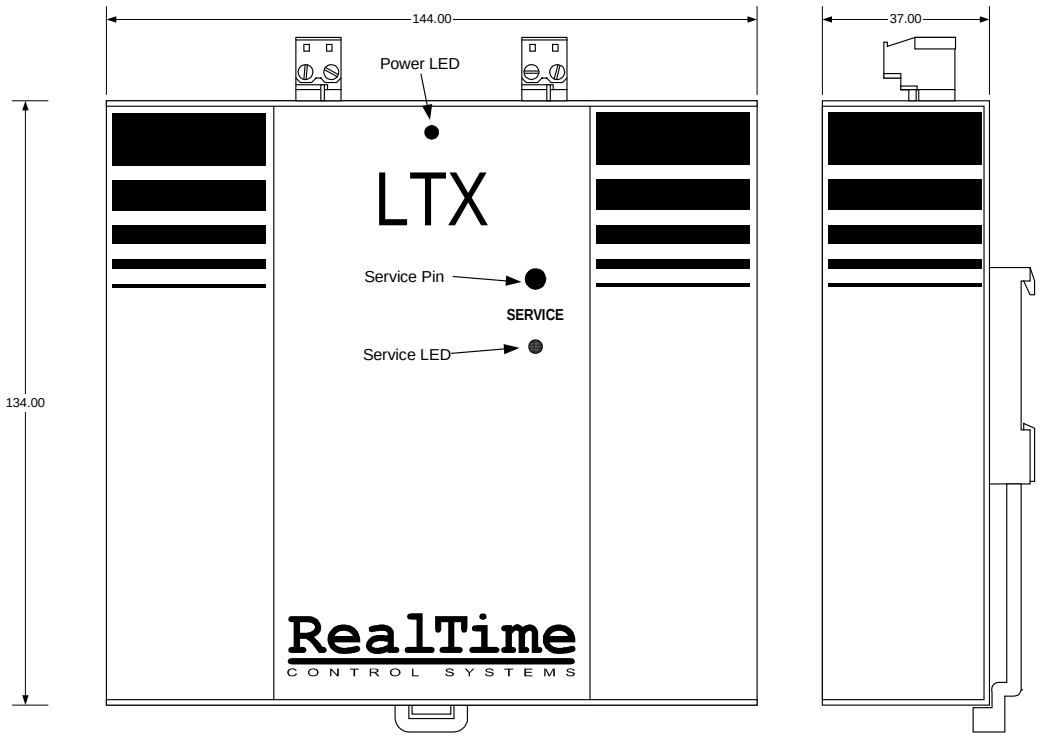
# RealTime CONTROL SYSTEMS LTX-25/A1 Datasheet


**LTX-25**
**Trend to LonWorks Interface**

**Description**

The RealTime LTX-25 range of BMS to LonWorks interfaces are provide the ability to transfer data between Trend BMS controllers and LonWorks in the form of SNVTs (Standard Network Variable Types) and UNVTs (User Network Variable Types). Data can be exchanged in both directions so that Trend controllers can be used to control and monitor LonWorks devices, and visa verca. A number of different variants of the LTX-25 exist to satisfy different needs, some variants being specificly designed for certain applications, and some variants being generic LonWorks gateways with different combinations of network variables.




**Dimensions (mm)**

LTX-25/A1 Iss1.00

# 1 Introduction

## 1.1 LTX-25 Features

- Provides a platform for interfacing Trend BMS and LonWorks
- Offers multiple variants for different combinations of network variables
- Offers fast track updates for low latency requirements

## 1.2 Description

The RealTime LTX-25 range of BMS to LonWorks interfaces are provide the ability to transfer data between Trend BMS controllers and LonWorks in the form of SNVTs (Standard Network Variable Types) and UNVTs (User Network Variable Types). Data can be exchanged in both directions so that Trend controllers can be used to control and monitor LonWorks devices, and visa verca. A number of different variants of the LTX-25 exist to satisfy different needs, some variants being specificly designed for certain applications, and some variants being generic LonWorks gateways with different combinations of network variables. If you cannot find the specific combination of NVs or you have a specific application RealTime offers fast turnaround development of alternative build variants to satisfy your needs.

This datasheet documents the LTX-25/A1 variant, and *Application Specific Variant* designed for the control and monitoring of multiple lighting circuits, based on DALI or other networked lighting control protocols. The LTX-25 offers 16 zones of SNVT_switch network variable outputs, each individually set from analogue node values within the Trend outstation the LTX is connected to. Up to 16 DALI controllers each with 16 DALI groups can be monitored for lamp failure using SNVT_state inputs, and the corresponding lamp failure count fed back to the BMS for alarm reporting.

# 2 Engineering Command Summary

## Addressing

**Remote Outstation Address**

| | | |
|---|---|---|
| **Command :** | R(M) addRess(reMote address) | |
| **Config Parameter:** UCPTRemoteOS | | *range*{0,127},*default*{0} |

Defines the outstation address of the remote BMS outstation where the control values for each of the control zones are located. This outstation must be on the same LAN as the LTX. The default value for R(M) is zero, which prevents the LTX from updating any of the zones control values.

**Outstation PIN Number**

| | | |
|---|---|---|
| **Command :** | R(P) addRess(Pin number) | |
| **Config Parameter:** UCPTPINNumber | | *range*{0,10000},*default*{10000} |

If the remote outstation has PIN protection it is necessary to configure the LTX with the PIN code if any readback data are written back to the outstation. Configure the LTX PIN access

using R(P=x) where x is the 4 digit PIN number. The PIN provided must be at least level 95 to allow data to be written into the outstation. The default value is R(P=10000), meaning PIN access is disabled.

**Local Address and Lan**

| | | |
|---|---|---|
| **Command :** | R(L,N) | addRess(Local address, local laN) |

The local address is defined by the controller that to which the LTX is attached and is automatically detected.

**Device Identifier**

| | | |
|---|---|---|
| **Command :** | R(D) | addRess(iDentifier) |
| **Config Parameter:** SCPTlocation | | *string(0..15 chars)* |

The identifier is a 15 character text identifier that can consist of upper and lower case characters, numbers, spaces and punctuation excluding inverted commas. The identifier is used in alarm transmissions should be set to identify the device and its function. The identifier is written by placing inverted commas around the string e.g. R(D="abcd").

**Send Heartbeat**

| | | |
|---|---|---|
| **Command :** | R(h) | addRess(**h**eartbeat) |
| **Config Parameter:** SCPTmaxSendTime | | *range*{0, 6553.5},*default*{15.0} |

The heartbeat defines the maximum length of time between updates send to bound output network variables, even if the output value is unchanged. The SCPT is stored in values to a resolution of a tenth of a second, values in text comms and written and displayed to the nearest second. A value of zero disables the heartbeat and prevents any NV updates except on change events. It is recommended that heartbeats are always used in order to ensure a robust operating solution, and that all devices use some form of timeout on heartbeat failure on inputs (e.g. with SCPTmaxRcvTime).

**Outstation Poll Rate**

| | | |
|---|---|---|
| **Command :** | R(p) | addRess(**p**ollrate) |
| **Config Parameter:** UCPTPollRate | | *range*{0, 65535},*default*{1000} |

The poll rate defines the frequency that the LTX reads data from the attached outstation. The value is in milliseconds. The value of zero disables polling. It is not recommended that values below 500ms are used. The poll rate defines the time between updates, with multiple groups of data being read from the outstation then overall cycle update time will be a multiple of the poll rate.

**Poll Timeout Period**

| | | |
|---|---|---|
| **Command :** | R(t) | addRess(poll **t**imeout seconds) |
| **Config Parameter:** UCPTPollTimeoutSecs | | *range*{0, 65535},*default*{300} |

The poll timeout period defines the period in seconds where no response is received from the outstation before a timeout occurs and the LTX enters comms fail mode. A value of zero disables the timeout functionality. When a comms fail occurs the network variable outputs are assigned default values which remain until the communications with the outstation is restored.

For demonstration and testing purposes a value of a few seconds can be set. In operation the timeout period should be a minimum of several minutes. The LTX communicates with the associated outstation using text comms, when the outstation is in config these comms are blocked and so the LTX will enter default conditions if the outstation remains in config for longer than the timeout period.

**Priority Ratio**

| | |
|---|---|
| **Command :** R(r) addRess(priority**r**atio) | |
| **Config Parameter:** UCPTPriorityRatio | *range*{0, 255},*default*{1} |

Controls the ratio between updates of priority and non-priority groups. A value of 1 means that there is one priority update for every non-priority update. A value of *n* means that there are *n* priority updates for every non-priority update. A value of zero disables priority updates.

# Feedback Offset Indexes

**Switchover Zone**

| | |
|---|---|
| **Command :** F(L) oFfset(Lamp fail readback) | |
| **Config Parameter:** UCPTPriorityRatio | *range*{0, 512},*default*{0} |

Defines the offset into the analog array in the remote outstation where the lamp fail count will be written if the value is non-zero. The lamp fail count is a value that indicates the number of zones of failed ballasts or lamps. The value corresponds to the total number of '1's over all of the nviState inputs. If no failures are reported a value of zero is written. The value is updated to the outstation every minute.

# Zone Control

**Zone Remote Analogue Array Offset**

| | |
|---|---|
| **Command :** Zx(R) Zone x(Remote offset) where x=1 to 4 | |
| **Config Parameter:** UCPTArrayOffset(x) | *range*{0, 512},*default*{0} |

The remote offset defines the location of the control values for Zone x. Each zone corresponds to four consecutive values in the analog array beginning at the location defined by Zx(R). Each four values are mapped to four consecutive network variable outputs *nvoSwitch*[].

**Zone Priority**

| | |
|---|---|
| **Command :** Zx(P) Zone x(Priority) where x=1 to 16 | |
| **Config Parameter:** UCPTPriorityBits | *range*{0, 65535},*default*{0} |

Each polled zone defined by the Zone Remote offsets can be set as a priority or non-priority zone in order to increase the responsiveness of certain zone updates. Setting the value to a 1 sets this zone as a priority zone.

**Zone Alarm Summary**

| |
|---|
| **Command :** Zx(A) Zone x(Alarms) where x=1 to 16 |

The alarm summary is a read-only command that returns the value of the 16 state bits in each *nviState*[]. In a lighting control application each of these inputs is bound to the lamp fail output of a DALI controller and each bit corresponds to one control zone within the DALI controller. Examining these values allows failures reported by the Lamp Fail readback count to be pin-pointed to a particular controller.

## Analogue Array

### Analogue Value

| | | |
|---|---|---|
| **Command :** | Ax(V) | Analogue(Value) where x=1 to 80 |

The LTX-25 contains a simple analogue array containing the data read from the BMS. The first 16 analogue nodes map to the nvoSwitch output network variables so that A1(V) maps to nvoSwitch[0], A2(V) maps to nvoSwitch[1] etc.

| | Z1 | Z2 | Z3 | Z4 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **R** | A1 | A5 | A9 | A13 | | | | | | | | | | | | |
| **R+1** | A2 | A6 | A10 | A14 | | | | | | | | | | | | |
| **R+2** | A3 | A7 | A11 | A15 | | | | | | | | | | | | |
| **R+3** | A4 | A8 | A12 | A16 | | | | | | | | | | | | |

The values contained within the analogue array are exactly the values read from the BMS and are not range limited. The analogue array can be view to ensure the data is being read from the outstation correctly.

For commissioning purposes the engineer can also manually set the values of the network variables by directly setting values in the analogue array (e.g. A1(V=50) will set nvoSwitch[0] to 50%. To achieve this it is necessary to disable polled updates of this value, either by setting the R(M) or Zx(R) to zero to stop polled updates for this analogue node.

**Note**: Analog node to SNVT_switch mapping is achieved by assigning the analogue node value to the network variable *.value* in the range 0.0% to 100.0% to a resolution of 0.5%. The digital part of the network variable is assigned such that *.state=0* if the analogue node value is zero, otherwise it *.state=1.*

## LTX Commands

A number of commands are available for performing various diagnostic operations via text commands. The basic format of the commands is "#(command)".

### Reset Command

| | | |
|---|---|---|
| **Command :** | #(R=1) | #(Reset) |

Causes the LTX to perform a software reset as if the device were re-powered. The command requires that #(R=1) is entered rather than simply #(R) to reduce the chance of a reset occurring due to mistyping.

### Wink Command

| | | |
|---|---|---|
| **Command :** | #(W) | #(Wink) |

Causes the yellow service LED on the front of the LTX to blink several times. Useful for identifying a specific device if several are in use.

### Send Service Pin Message Command

| | | |
|---|---|---|
| **Command :** | #(S) | #(Service pin) |

The same as pressing the Service Pin on the front of the LTX when installing the device in a LonWorks engineering tool. Useful if the LTX is physically inaccessible.

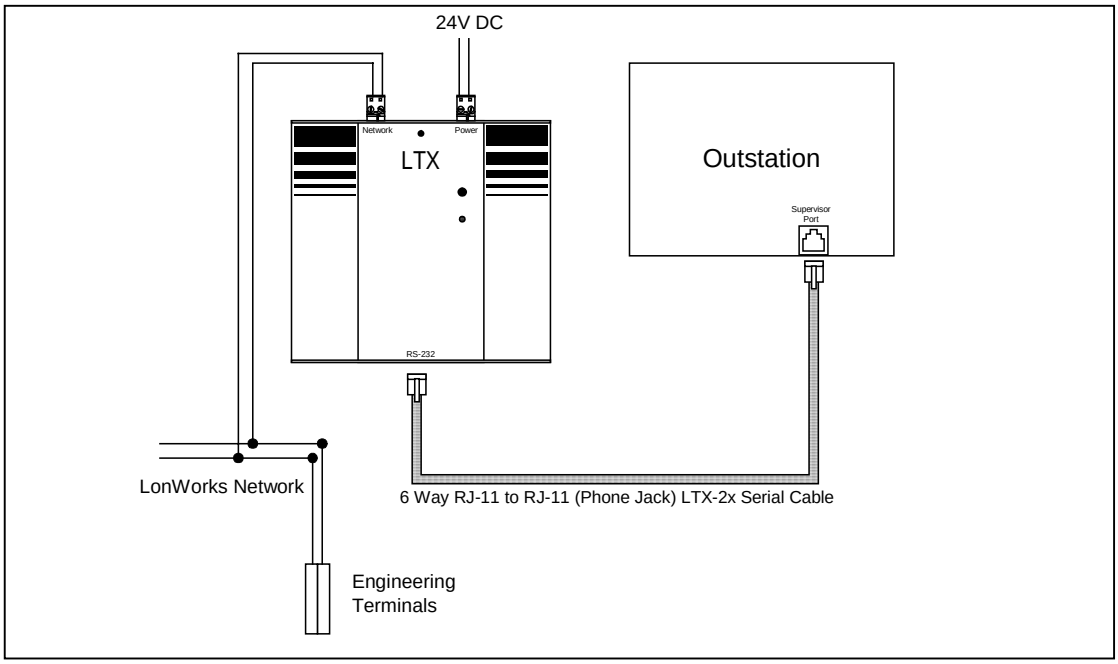
# 3 LonWorks Engineering

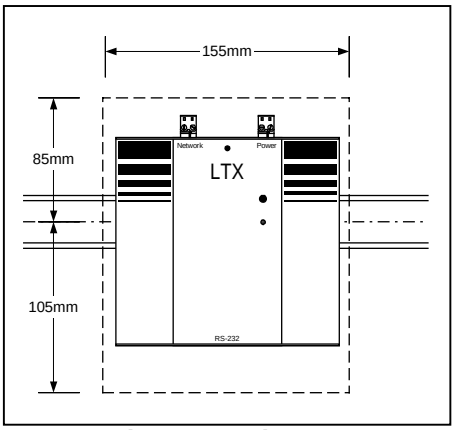
## 3.1 Functional Profile

The LTX-VCI functional profile is shown above. The following table gives a summary for each network variable.

| NV Index | Name | In/Out | Type | Description |
|---|---|---|---|---|
| 0 | nviCommandLine | In | SNVT_string | Lon side Text comm interface |
| 1 | nvoCommandLine | Out | SNVT_string | Lon side Text comm interface |
| 2 | nvi00Request | In | SNVT_obj_request | Defined by Lonmark |
| 3 | nvo00Status | Out | SNVT_obj_status | Defined by Lonmark |
| 4 | nvoFileDirectory | Out | SNVT_address | File pointer to configuration data |
| 5-20 | nvoSwitch[16] | Out | SNVT_switch | Switch outputs |
| 21-36 | nviState[16] | In | SNVT_state | State inputs |

# 4 Installation Instructions




The LTX-25 is connected as shown in the above diagram.

1) Mount the LTX-25 on a standard symmetric DIN rail. A clearance of 85mm above and 105mm below the DIN rail centreline should be allowed and 155mm horizontal clearance. See the figure to the right.

2) Connect the LTX-25 Power connector (black) to a 1.5VA 24Vdc supply. The connection is polarity independent. **Note that the power supply should not be isolated, 0V should be connected to ground**. Do not power the device up.

3) Install the LonWorks network between the LTX-25 connector labelled 'Network' (orange or green) and the LG1 terminals labelled 'A-B LonWorks' using unshielded twisted pair; the connection is polarity independent. Multiple devices can be daisy-chained.

4) Daisy-chain the LonWorks connection from the LTX-25 to a pair of screw-terminals mounted on the DIN rail adjacent to the LTX-25. This is for engineering purposes and allows easy access to the network.

5) Daisy chain a network terminator to the LonWorks network if specified.

6) Connect the supplied grey RJ-11 to RJ-11 cable between the LTX-25 port labelled 'RS-232' and the outstation supervisor port.

# 5 Technical Specification

### Electrical

| | |
|---|---|
| **Supply** | 24V DC unisolated |
| **Power** | 1.5VA |
| **Processor** | Echelon 3150 |
| **Clock Speed** | 10 MHz |
| **External Memory** | 32kb PROM, 24kb SRAM |
| **LON Network** | FTT-10A Transceiver, Free topology network |

### Mechanical

| | |
|---|---|
| **Dimensions** | H138 x W146 x D38 without DIN clip<br>H144 x W146 x D48 with DIN clip |
| **Mounting** | Quick release standard DIN rail |
| **Clearance around DIN rail** | Minimum 85mm above and 105mm below DIN rail centreline |
| **Casing Material** | Casing – Powder coated 18 gauge steel to RAL 3020 |
| **Weight** | 250g |
| Power and LON **Connectors** | Two part rising clamp 0.5mm" to 2.5mm" cross sectional area cable |
| **RS-232 Connector** | RJ-11 Socket |

### Environmental

| | |
|---|---|
| Temperature | |
| Storage | -10oC to 50oC |
| Operation | 0oC to 50oC |
| **Humidity** | 0-90% RH non-condensing |
| **Protection** | IP30 |
| **EMC Emissions** | EN50081-1 |
| **EMC Immunity** | EN50082-1 |

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