LONMARK OBJECT NODE CONTROLLER

Description

The LONC, LonMark Object Node Controller, acts as a gateway between the IQ system Building Management system and LonMark devices (e.g. sensors or valves connected to the LonWorks network). IQ system devices can communicate with a data array within the LONC; IQ and IQL controllers can use inter-controller communications, whereas supervisors can use text communications. The LONC transfers data between the array and other LonMark devices.

Features

- Acts as gateway between IQ system BMS and other LonMark devices
- Automatic reporting of network population
- Configuration to connect to LonMark devices
- Supports all Lon network variable types (SNVTs)
- Lon provides faster signalling rate
- Lon provides flexibility of two wire free topology
- Integration of IQ system network into existing Lon system
- EEPROM retains configured data during power fail (no battery required).

Physical

[Diagram of LONC components]

- Lon connector
- Board Lon connector
- Board supply connector
- Board earth point
- Ac supply connector
- Supply fuse
- Led connectors
- Led switches
- Address/baud switch
- 300 mm (11.81"
- 50 mm (1.97"
- Lon, Gateway LEDs
- Netb/lonc with covers removed
FUNCTIONALITY

APPLICATIONS

The LONC acts as a gateway between the IQ system network devices and the LonWorks bus (LonMark) devices.

Gateway

IQ system current loop network devices are connected to the LonWorks bus (Lon) via a LINC (Lon Internetwork Node Controller): see LINC Data Sheet for functionality. The LONC is connected to the Lon and acts as a gateway between IQ system devices and LonMark devices; it facilitates the transfer of values between the IQ system devices (controllers and supervisors) and the non IQ system devices on the Lon (e.g. sensors or actuators). The LONC communicates with IQ system supervisors via text communications, and with controllers via IC communications. It communicates with LonMark devices via Network Variables. The network variables conform to the SNVT (Standardised Network Variable Types). There are seven types of LONCs as described in the order code section. The type of LONC defines the classes of variables (known as SNVT families - e.g. integers or floating point numbers) it can support. The actual variable types (e.g. current, temperature, or day of the week) can the be set up by a Lon management tool to any variable type permitted within the SNVT family specification.

Communications

A supervisor may communicate with the LONC array by text communications; only read and writes of analogue values may be used [i.e. Ax(V)] where x = 1 to 48, 101 to 148. Only discrete values, or multiple discrete values may be used. Attribute Communications are not supported. A controller may communicate with the LONC via Inter-Controller Communications. The LONC has 48 off IC comms modules, one for each Lon analogue output node (A1 to A48), which can only send data to messages to Trend devices. Similarly the LONC can only receive data to messages set up in remote IQ controllers which can write into Lon analogue input nodes (A101 to A148). The LONC cannot send IC Communications to IQLs. It can receive IC Communications form IQLs, but not attribute communications.

LONCs, IQLs, and LINCs

LONCs: The LONC device address is set by its address switch. Its Lan number (default 1) is set up in its configuration mode. The address and Lan number can only be set in range 1,4 to 9, 11 to 119 as per normal. LONCs and IQLs with the same Lan number form a virtual Lan on Lon.

IQLs: The IQL range of controllers (LonMark terminal unit controllers) use the Lon as their communication network. They are small, fixed strategy controllers with limited configurability via terse text comms. IQ system current loop networked devices can communicate with the IQL module values and parameters either by text communications (in the case of supervisors) or by inter-controller communications (for controllers). IQLs can communicate with each other via inter-controller communications (IC Comms), and with other LonMark devices (e.g. Lon sensor) via Lon network variables (nvs). The IQL’s address and Lan number is set up in the factory during its production process on a rolling basis and is printed on the unit’s label; the addresses and Lan numbers are generated only in the range 11 to 119. An IQL will normally install satisfactorily without the need to change the IQL’s Lan number and address, but if needed they may be changed by terse text communications. IQLs and LONCs with the same Lan number form a virtual Lan on Lon.

LINCs: LINCs are used to provide an internetwork on Lon. The virtual Lan of IQLs and LONCs can connect to the internetwork, an hence communicate to an IQ system current loop network via a LINC . The LINC automatically takes address 126 on its Lan (like an INC) and its Lan number is set by its address switch. (Its Lan number should not be used by any other device on the Lon).

Analogue Array

The LONC holds the values being transferred in an analogue array, with nodes numbered A1 to A48, and A101 to A148. Nodes A1 to A48 store values being transferred to IQ system devices (LonMark actuator objects - from Lon sensors), whereas nodes A101 to A148 store values being transferred from IQ system devices (LonMark sensor objects - to Lon actuators). Each node can be set up by a Lon management tool to hold a particular type of SNVT as permitted by the SNVT family to which the node belongs (as defined by particular version of LONC).
FUNCTIONALITY (continued)

Virtual Lans and Internetwork on Lon

LONCs and IQLs will form a virtual Lan on Lon if they have the same Lan number. In order to all be on the same Lan, they must be on the same LonWorks subnet (i.e. all on the same side of a LonWorks router).

The lowest addressed IQL (or LONC) on a virtual Lan will act as a proxy INC and perform the INC functions necessary to communicate between the virtual Lan and the virtual internetwork. The virtual internetwork consists of one or more LINC s and the proxy INCs.

It is recommended that as far as possible LONCs should share their virtual Lan with IQLs, and an IQL be always used as the proxy INC (i.e. the lowest addressed device on a virtual Lan should be an IQL).

LINC s may be used to extend an internetwork across routers. It may be beneficial to have one or more LONCs separated by routers where high traffic levels are expected, as they can be bound to Lon devices on their own segment and IQ system current loop devices via a local LINC so as to localise traffic.

The diagram below shows a Lon with one LINC, two LONCs, and two IQLs.

The LONCs and IQLs form two virtual Lans connected to the virtual internetwork on Lon.

Trend Network on Lon - Rules

The maximum number of nodes allowed on an FTT Lon segment (i.e. between routers) is 64 (including any router nodes)

The recommended maximum number of nodes on a virtual Lan is 40

The recommended maximum number of values that can be displayed on a 963 schematics page is 30 points from 15 IQLs (or LONCs).

LonWorks Integration

In an IQ system only LonWorks system no Lon installation is required as the IQ system LonWorks products self-install. Installation onto a Lon network Management Tool is only necessary:

- if it is required to bind LonMark devices to the IQL strategy modules,
- if LINCs pre-version 3.23 straddle a router,
- if other devices on Lon have address conflicts with IQ system Lon devices
- if LONROUTERs are used on a system already installed on a Lon Management Tool.

Note that if one IQ system Lon device is installed on a Lon management Tool, all IQ system Lon devices must be installed.

If these rules apply, the LONC may self-install on Lon for initial testing but in order for gateway functionality to work i.e. make bindings between analogue array and LonMark devices, the LONC has to be installed onto a Lon network Management Tool. When this is done all other IQ system Lon devices must also be installed.
LONC Data Sheet

FUNCTIONALITY (continued)

HARDWARE

Packaging: The LONC can be provided boxed, or as a board version.

Boxed Version: The LONC can be supplied in an IP40 plastic enclosure with 6 cable entry grommets (2 in the rear, 2 in the top edge, 2 in the bottom edge), and two terminal covers which can be removed using a screwdriver. The box is 4 point mounting via M4 (No. 8) screws.

Board Version: The board version will fit inside certain IQ controllers. The controllers can be ordered pre-fitted with the node (e.g. IQ251/LONC/) or the node can be retrofitted by using the appropriate node fitting kit (KIT/NODE/IQ23x for IQ231/233, KIT/NODE/IQ241 for IQ241/242, KIT/NODE/IQ25x for IQ251). The board is 4 point mounting via 4 mm holes.

Power: The boxed version can be provided in 230 Vac or 24 Vac versions.

The board version requires 24 Vdc or 18 Vac (transformer isolated, or 18-0-18 Vac (transformer centre tapped).

Fusing: The boxed versions are protected by 20 mm time delay fuses. The 230 Vac version uses a 50 mA (T) fuse, and the 24 Vac version uses a 630 mA (T) fuse.

Network: The network features are not used by the LONC. These include connectors, Lan OK, RX indicators, bypass relays, and network alarm generation.

Address/Baud Rate Switch: The Lon device address on the local Lan (1, 4 to 9, 11 to 119) is set by the address/baud rate switch poles 1 to 7. The Lan number is set by default to 1, and can be changed in configuration mode.

Setting all the switch poles to zero for more than 6 seconds (or until both Gateway and Lon OK LEDs flash) with power applied will reset the unit in a similar way to a brand new ex-factory LONC. It will reset its parameters as follows:

Address:
Outstation address always from address switch
Own local Lan 1, Identifier "LONC+[type]" (see order code),
Local alarms address 0, Remote Lan 0
int/net alarms node 0, remote Lan 0, LonWorks managed No,
LonWorks node to address switch setting,
LonWorks subnet to 255-address switch setting,
LonWorks transceiver FTT-10, LonWorks domain 1,
LonWorks message code 64, LonWorks domain wide Yes
Router buffer size 146, Security code empty

Analogue (including snvt type): unaffected by reset

Intcon: unaffected by reset

User: PIN retained

The security code should be read before applying the reset and re-entered after otherwise the firmware will be locked out.

Network Bypass Relays: Not used by LONC.

RS232 Interface: There is no RS232 interface fitted to the LONC.

Service Button: This is used during the installation of the LONC into a Lon network Management Tool (LMT). During the installation process, the tool will request to be informed of the presence of the LONC; this is done by pressing the ‘service’ button. Pressing the button also generates an alarm message which would be forwarded by a LINC to its target alarm address (if set up) which identifies the originating LONC by means of its neuron ID.

Connectors: Two part connectors are used throughout to facilitate wiring.

Data Backup: The LONC uses EEPROM to hold configuration data. This is non-volatile to power failure without the need for a battery.
FUNCTIONALITY (continued)

FIRMWARE

Network Alarms

The LONC generates text alarms when there are changes to the network structure of its Lon port.

The following Lon virtual network alarms are sent (regardless of LONC address) if local alarms node and Remote lan (both in address module) are set up and are sent to the address defined by these parameters:

“LONC -Rem LAN From yyy on Lan xxx-
LON LAN Broken NKBK” - a break in Lan communications.
LON LAN Changed NKCH” - a node has gone from or been added to the Lan.
LON LAN OK NKOK”- Lan communications are restored.

The following Lon internetwork alarms are sent if the LONC is the lowest addressed node on its virtual Lan (proxy INC) and if both int/net alarms node and remoTe lan (both in address module) are set up and are sent to the address defined by these parameters:

“LONC - Int’wrk From yyy on Lan xxx-
LON lwrk Broken NKBK” - a break in internetwork communications.
LON lwrk Changed NKCH” - a node has gone from or been added to the internetwork.
LON lwrk OK NKOK”- internetwork communications are restored.

Configuration Mode

LONC Configuration

The LONC has a configuration mode similar to that used by IQ controllers (see IQ Configuration Manual); this is a built-in feature enabling configuration by any IQ system configuration tool. It has no local supervisor port, so can only be configured from the IQ system network via a LINC (including across the internetwork).

A LONC is addressed as device address (set by DIP switches) on its Lan number (default=1) set up in configuration mode.

If configuration mode is entered after an address switch zero reset or an engineers reset the following prompt is received:

Connecting to OS 4 Lan 1
LONC_24S_24A v5.12 30 Oct 98
neuron id 00:A0:40:27:54:00
gen:115
=?

This means that the LONC requires its security code to be entered to unlock the firmware. This can be obtained from Technical Support by quoting the neuron id and the gen (generator number) given in the prompt.

Once the correct code is entered the LONC will allow access to configuration mode.

The top configuration menu is shown below:

LONC
Analogue User address intcoN

Analogue

The analogue array has 16 nodes. Nodes A1 to A48 are inputs to the IQ system from Lon and nodes A101 to A148 use outputs from the IQ system to Lon

ANALOGUE 1
Value 0.00000 status 00000000
units pcnt
snvt family Integer
snvt type SNVT_switch

V-Value (read-write): Value of node. If associated with a SNVT_Switch variable the value of the node will be the value element of the SNVT switch.

status (read only): Status of node if the analogue node is associated with a SNVT_Switch network variable, the state of bit 5 of the status byte will be the status of the SNVT_Switch i.e. if status of SNVT_Switch is ON, status will display 00100000.

Note that if the value or status of an input node (i.e. in range A1 to A48) is written to by configuration mode or text comms, it will be overwritten by the next value from the Lon device to the input node.

units (read only): The units of the node. This is defined by the particular SNVT type being used.

snvt family (read only): This is the family of SNVTs to which this analogue node belongs according to the type of LONC being used.

snvt type (read only): This is the actual snvt type for the analogue node which is set to default for the particular type of LONC being used, but can be changed using a Lon Management Tool to a different SNVT type within the SNVT family for that type of LONC (see IQ system LonWorks Products Engineering Manual TE200292). If the node is not used for this version of LONC the SNVT type will be 'None'.

User

User
Pin:  1234

The LONC has a single programmable PIN number which will protect the LONC from unauthorised configuration mode changes. If a PIN is not set up the user can enter a PIN in range 0000 to 9999.

Once a PIN is set up, until the valid PIN is entered the User module display will show a blank PIN and a random generator number. If the PIN is forgotten, the user should contact Technical Support quoting the generator number, and the neuron chip id (see below); Technical Support will supply a default PIN.
**Address**

**ADDRESSES**

- **addr switch (read only):** This is the LONC device address from the address switch setting. If the setting is changed it may be set in the range 1, 4 to 9, 11 to 119, and must be unique on its own virtual Lan.

- **N - own local IaN (read/write):** This is the LONC virtual Lan number. If changed it may be set in the range 1, 4 to 9, 11 to 119 and be unique on the internetwork. When changed the user will be prompted that the LONC will reset following the exit from the address page as follows:

  **WARNING - X WILL WRITE CONFIG DATA, AND THEN RESET Q TO ABORT**

  Typing X will result in the following prompt and the a hardware reset

  Wait, Node will reset after ~6s

  Exit from Utility

  After the node has reset, it will re-initialize as a node with the new Lan number, and will appear in a Lan map after the initialisation period has elapsed.

- **D - iDentifier (read/write):** This is the first attribute and acts as an identifier for the LONC. It is up to 15 characters long.

- **local alarms:**
  - **A - Addr (read/write):** The destination device address for Trend local Lan alarms.
  - **R - Remote (read/write):** The destination Lan number for Trend local Lan alarms.

- **int/net alarms:**
  - **E - node (read/write):** The destination device address for alarms from the Lon internetwork
  - **T - remoTe lan (read/write):** The destination Lan number for alarms about the Lon internetwork.

**Note that alarm destination node addresses and Lan numbers must be in the valid range (1 to 119, excluding 2, 3, and 10). If either is set to zero the alarms are not transmitted.**

- **lonworks managed (read only):** The Lonworks managed flag displays No if the node is not installed in a Lon Management Tool.

  This means that the read only parameters (node, subnet, domain, domain wide) will be left at their last setting (e.g. defaults), and the read/write parameter (message code) will be left as last set up. When installed in the Lon Management Tool, the Lonworks managed flag changes to Yes, and the tool takes charge of all these parameters. Other than the message code, the other read/write parameters listed below can still be changed by configuration mode.

- **lonworks node (read only):** The node address on Lon. The Lon logical addressing structure of domain, subnet, and node is superimposed on the physical neuron address. The third level of addressing is the node. Each subnet can have up to 127 nodes but the recommendation is for a maximum of 40 nodes on a Lan and hence subnet. The Lon node address defaults to the IQ system network device address for LINCs, IQLs, and LONCs. During installation into a Lonworks Management Tool, the node address may be changed.

- **lonworks subnet (read only):** The subnet to which the node belongs. The second level of addressing on Lon is the subnet. Each domain can have up to 255 subnets. The virtual Lan maps directly onto the subnet; by default there is only one Lan per subnet, only one subnet per Lan.

  **Note that all members of a virtual Lan must be on the same subnet.**

- **lonworks domain wide (read only):** The Lonworks managed flag changes to Yes, and the tool takes charge of all these parameters. Other than the message code, the other read/write parameters listed below can still be changed by configuration mode.

- **M - lonworks Message code (read/write):** The message code for all IQ system messages on Lon. Note that it must be the same code for every IQ system device on Lon and must be different to the message code used by any other node on the Lon network.

  If there is a clash with an existing code the message code must be changed. The default is 64. When lonworks managed, the domain may be changed by the Lon Management Tool and cannot be changed by configuration mode.

- **B - router Buffer size (read/write):** The size of message frames sent on Lon. The default is 146 bytes. If routers separate LINCs and have a buffer size smaller than 146 bytes, the router buffer size should be set to the smallest buffer size (minimum = 66 bytes).
neuron id (read only): Unique number identifies neuron chip; also used in default PIN generation process.

LONC 24S.24A v5.12 30-Oct-98, code = 556 (read only): This is the identification string returned with the text comms request R(C). It gives identification as a LONC and firmware version and date. The code = xxxx gives the security code for this hardware which enables a field prom upgrade.

The IC Comms module display is shown below.

IQLs which enables a field prom upgrade.

LONCs only concerns itself with the following subset of text

The LONC has a basic text comms subset.

Replies to w comms with FNC v5.xx (type 9 device).

IC COMMS

A - Address: (read/write) This is the device address of the target controller. It can be in the range 1, 4 to 9, 11 to 119. Address zero inhibits the IC Comms being sent.

N - remote lan: (read/write) This is the Lan number of the target controller. It can be in the range 1, 4 to 9, 11 to 119. Address zero inhibits the IC Comms being sent.

I - Interval: (read/write) An IC comms is sent whenever the associated network variable is updated from Lon and are sent again every time this Interval expires since the last time it was sent (range 0 to 65535 ms, 0 selects 'send on change only'). The minimum transmission interval is 15 s (like IQs) so if zero is selected it will send every 15 s.

R - Remote: (read/write) This is the analogue node address in the target IQ to which the value is to be sent. It is in the range 1 to 255. Address 0 will inhibit comms.

Local: (read only) This is the local node address in the LONC from which the value is sent. The node address is tied to the same number as the IC Comms module number i.e. IC Comms module 1 is tied to node 1, and IC Comms module 48 is tied to node 48.

Identification

Replies to w comms with FNC v5.xx (type 9 device).

Text Communications

Comms Subset: The LONC has a basic text comms subset. LONCs will only support terse text comms. LONC only supports remote directed messages i.e. to a specific device address (non zero) on a specific Lan number (non zero). The LONC only concerns itself with the following subset of text comms:

[security code/] item selection (data part), *item selection (data part), ... (Any other elements will be ignored.)

security code

only required if User module set up in device (i.e. PIN)

item selection

Only item type identifier will be received (e.g. A1(V)), other forms of item selection will be discarded.

Note that digital byte comms, Bn(S), and digital bit comms Bn(Sx) are not supported by LONCs.

(data part)

list of actions required, using configuration letters

request single e.g. (V) value

or multiple e.g. ($,V,%) label, value, units

change use = e.g. (V=25.0) set value to 25.0

request/change mix not supported

e.g. ($,V,V=25.0,%,)

*Multiple items more than one item from selected device

(s) is OK e.g. A1($),A2($),A3($)

Parameters: The list below covers the parameters which can be used in text communications. They are described in the configuration section above, but any parameters not available in configuration mode, or differences in functionality are described below.

Analogue Array: Selected by Ax(…). Where x is 1 to 48 (values received from Lon), or 101 to 148, (values to send to Lon).

V - value (read/write): Value of the node

S - Status (read only): Status of the node

$ - SNVT name (read only): SNVT type

% - SNVT units (read only):

Address Module: Selected by R(…)

L - Local address (read/write)

D - Identifier (read/write)

A - local alarm reporting Address (read/write)

R - local alarm Reporting lan (read/write)

E - internetwork alarm reporting address (read/write)

T - internetwork alarm reporting lan (read/write)

I - lonworks transceiver (read/write)

I - lonworks managed (read only)

n - lonworks node (read only)

u - lonworks subnet (read only)

d - lonworks domain index (read only)

m - lonworks message code (read/write)

w - lonworks domain wide (read only)

t - lonworks retry time (read/write)

i - lonworks interpacket delay (read/write)

a - lonworks service class (read/write)

b - lonworks buffer size (read/write)

e - lonworks neuron ID (read only)

C - version string (read only)

g - generator (read only)

o - security code (read/write) The security code for this hardware which enables a field prom upgrade.

z - reset node flag (read/write) For use by IQ system engineers.

Inter Controller Communications: Selected by Nx(…). Where x is 1 to 48 (corresponding to analog nodes 1 to 48 - values received from Lon).

A - Address (read/write)

N - remote Lan (read/write)

I - Interval (read/write)

R - Remote (read/write)

L - Local (read only)
COMPATIBILITY

An ANC+ or XN28 on the internetwork must be firmware version 2.5 or later and an MNC on the internetwork must be firmware version 2.53 or later.

Note: Always repower LINC after changing autodialling node number table entries so that LINC may learn about the node changes.

Any IQ251 on the system must be firmware version 1.2V or later and an IQ241 must be firmware version 1.2M or later.

LINC v3.2 or later must be used with LONC v5.1 or later.

Because LONCs are installed on a Lon Management Tool, LINC and LNC2/LON must have tarp mode set to 'yes' (default).

INSTALLATION

If the LONC is supplied as a board, it must first be mounted in a suitable enclosure (e.g. certain IQ controllers, NETB). It is normally mounted on 4 pillars. The NETB/LONC must be mounted on a flat surface via 4 off M4 (No 8) screws and rawl plugs. For LONC/.../FTT and NETB/LONC/.../FTT/24, the unit is UL rated as 'UL916, accessory to enclose energy management equipment.

The LONC installation involves the following procedure:

- Fix the unit in position
- Route cables
- Connect Lonworks network
- Connect power supply (do not switch on)
- Connect earth (if not part of supply)
- Remove main cover
- Set network device address of LONC (by switch)
- Replace main cover
- Switch on unit
- Check LONC on Lon
- Commission IQ system current loop Lan system
- Configure LONC
- Install on Lon management Tool
- Bind nodes to Lon devices
- Install remaining IQ system Lon devices
- Test system
- Remove main cover
- Set IQ system network device address (addr switch)
- Replace main cover

A full description of installing the NETB/LONC is provided in the NETB/LONC Installation Instructions TG200048. Instructions for installing a LONC board only are provided in the LONC Installation Instructions TG103061.
CONNECTIONS

Boxed - NETB/LONC

LON - FTT (free topology)

* Terminate Lon bus at one end only

Star topology

Bus topology

Loop topology

Normal current loop Lan cable is not recommended. Do not use screened cable.

AC Supply

230 Vac

or

24 Vac

Supply

This apparatus must be earthed via power connector 'E' terminal

Maximum 64 nodes per Lon segment
Maximum 40 IQLs (and/or LONCs) per virtual Lan

Recommend terminate at LINC or Router

Polarity independent

Example:

LONTERMINATOR

LONROUTER

IQL

LONC

LINC
FIELD MAINTENANCE

The LONC requires virtually no routine maintenance, however replacement of the NETB/LONC fuse is explained in the NETB/LONC Installation Instructions TG200048.
PRODUCT CODE

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<th>TYPE</th>
<th>Description</th>
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<tr>
<td>NETB/LONC/[TYPE]/FTT/230</td>
<td>Boxed version of LONC requiring 230 Vac supply</td>
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<tr>
<td>NETB/LONC/[TYPE]/FTT/24</td>
<td>Boxed version of LONC requiring 24 Vac supply</td>
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<tr>
<td>LONC/[TYPE]/FTT</td>
<td>Board only</td>
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<tr>
<td>IQxx/LONC/[TYPE]/FTT</td>
<td>Board fitted inside IQxx controller</td>
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<table>
<thead>
<tr>
<th>[TYPE]</th>
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<tbody>
<tr>
<td>EN48A</td>
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<tr>
<td>IN48A</td>
<td>48 inputs of Int snvt family</td>
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<tr>
<td>FL48A</td>
<td>48 inputs of Float snvt family</td>
</tr>
<tr>
<td>EN48S</td>
<td>48 outputs of Enum snvt family</td>
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<td>IN48S</td>
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<td>FL48S</td>
<td>48 outputs of Float snvt family</td>
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<table>
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<th>GEN</th>
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<td>8 inputs of Enum</td>
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<tr>
<td></td>
<td>8 inputs of Int</td>
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<td>8 inputs of Float</td>
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<td>8 outputs of Enum</td>
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<td>8 outputs of Int</td>
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<tr>
<td></td>
<td>8 outputs of Float</td>
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</tbody>
</table>

Notes:

Inputs are inputs to IQ system
Outputs are outputs from IQ system
SNVT families are covered by IQ System Lonworks Products Engineering Guide, TE200292:
- Enum, Enumerated value (e.g. day of week);
- Int, 16 bit integer value, e.g. counts 0 to 65535 (some Int snvt types can cope with 1 or 2 decimal places - see Inst. Guide);
- Float, Floating point number

DISPOSAL

COSHH ASSESSMENT FOR DISPOSAL OF NODE CONTROLLER. No parts affected.

RECYCLING.

All plastic and metal parts are recyclable. The printed circuit board may be sent to any PCB recovery contractor to recover some of the components for any metals such as gold and silver.
SPECIFICATION

Electrical

Supply

<table>
<thead>
<tr>
<th>Board</th>
<th>24 Vdc ±15% at 250 mA</th>
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<tbody>
<tr>
<td>NETB</td>
<td>18-0-18 Vac ±15% (transformer centre tapped) 50 or 60 Hz 20 VA</td>
</tr>
<tr>
<td></td>
<td>18 Vac ±15% (transformer isolated) 50 or 60 Hz 20 VA</td>
</tr>
<tr>
<td></td>
<td>(board must be earthed via ¼&quot; Fast-on)</td>
</tr>
</tbody>
</table>

Netb:

- 230 Vac -15%/+10%, 50 or 60 Hz, 6 VA |
- 24 Vac -15%/+10%, 50 or 60 Hz, 6 VA (unit must be earthed via earth terminal)

Fusing

- NETB/230: 50 mA(T) 20 mm fuse
- NETB/24: 630 mA(T) 20 mm fuse

Data Backup:

- No battery needed, configuration data stored in non-volatile memory

IQ system Lan address:

- Selectable by board switches - set to be unique on virtual network in range 1, 4 to 9, 11 to 119

LAN number:

- (Default=1). Can be configured in configuration mode or by terse text comms - set to be unique on internetwork. 116 nodes addressable (1 to 119, excluding addresses 2,3, and 10).

Lon:

- FTT (Free Topology), 78 k baud, transformer isolated. Single termination (RC network).
- Can also use LPT10 (Loop Powered free Topology).

Lon FTT distance:

- Maximum bus length and node to node distance depend on cable type (see table below).

---

### Cable

<table>
<thead>
<tr>
<th>Cable</th>
<th>Max bus length</th>
<th>Max node to node</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belden 85102</td>
<td>500 m (545 yds)</td>
<td>500 m (545 yds)</td>
</tr>
<tr>
<td>Trend TP/10/16/HF/500 (Belden 8471)</td>
<td>500 m (545 yds)</td>
<td>400 m (430 yds)</td>
</tr>
<tr>
<td>UL Level IV, 22 AWG</td>
<td>500 m (545 yds)</td>
<td>400 m (430 yds)</td>
</tr>
<tr>
<td>JY(SI) Y2 x 2 x 0.8</td>
<td>500 m (545 yds)</td>
<td>320 m (350 yds)</td>
</tr>
<tr>
<td>TIA568A Cat. 5, 24 AWG</td>
<td>450 m (490 yds)</td>
<td>250 m (270 yds)</td>
</tr>
</tbody>
</table>

Note that this does not include cable recommended for the current loop Lan.

If used with LPT10 (powered bus), cable lengths differ - see "Link Power Transceiver User's Guide (078-0105-01C)".

Inputs/Outputs:

- I/O types broadly set up by board option (snvt families) - see order codes section
- Types within family (snvt types) separately configured by Lon network management tool.

Inputs:

- 48 inputs maximum, either enumerated, integer or floating point

Outputs:

- 48 outputs maximum, either enumerated, integer or floating point

---

Environmental

- EMC Emissions: EN50081-1
- EMC immunity: EN50082
- Electrical Safety: IEC 730-1
- UL: (LONC/.../FTT or NETB/LONC/.../FTT/24 only) The unit is UL rated as 'UL916, accessory to enclosed energy management equipment'.

Ambient limits:

- Storage: -10 °C (14 °F) to 50 °C (122 °F)
- Operating: 0 °C (32 °F) to 45 °C (113 °F)
- Humidity: 0 to 95 %RH non-condensing

Protection:

- NETB: IP40

Indicators:

- Lon OK: ON if LONC successfully communicating over Lon.
- Gateway: (Lon OK) Flashes ON when data is passed between Lon Mark devices and Trend system.

Version:

- Firmware: V 5.12
- Board: AM102370 Issue 1

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