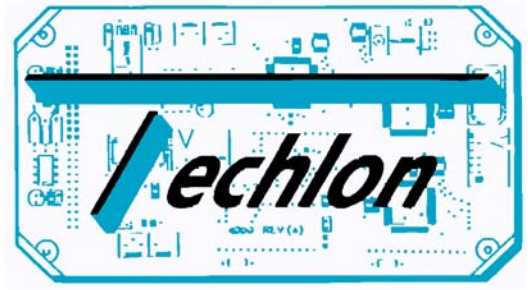

Simple.Sensible.Smart

TELN 1023 Rev. A
LonWorks™ Auto. 2 Channel Relay and Logic Node

Users Manual
January 2000

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Auto. 2 Channel Relay and Logic Node

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LonWorks™ Auto. 2 Channel Relay and Logic Node

INTRODUCTION

Techlon's LonWorks Auto. 2 Channel Relay and Logic Node (TELN 1023) allows you to switch multiple loads from a single source and use the Logic Binding Technology Developed by Techlon Instruments or either of the two Normally open/Normally closed relay poles.

The 2 Channel Relay and Logic Node is designed to switch on and off up to 2 loads. The TELN 1023 is designed to interface with an external keyboard. The keyboard is also a LonWorks device that networks with the TELN 1023.
The maximum load size 10A for each relay. The intended application for the TELN 1023 module is to turn on and off small loads such as (lights, small motors, warning signals, etc.) that need a Physical Logical OR condition. The other purpose is to incorporate the Network Logic Binding Technology Developed by Techlon Instruments Inc. intended to perform logical operation on Network Variables.

The unit contains a service and Reset switch and LED, 2 Manual Switches, 2 Load Level LED indicators, and a programmable Neuron chip, which controls the functions of the TELN 1023 Node and permits the network download of application code.

The TELN1023 is programmable and thus application code can be updated to desired specifications.

Contacts and Service representatives:

Susan Gabel – President	Warranty Information.
Brian Gabel - VP/Director of Engineering	Hardware Problems.
Kevin Miller - Senior Software Engineer	Software Problems.

Call 1-(610)682-9764 and ask to be connected to your party.

Specifications.

- 4K Ram
- Service Switch and reset switch with a LED for both service and WINK indicator LED to indicate location of TELN1023 Board
- 3K Programmable ROM on Neuron Chip for (application code and node configuration).

Dimensions

- 5.25”w x 4.0”h x 0.75” deep - metric 135 x 102 x 20mm
- Without connectors. 5.25”w x 3.0”h x 0.75 deep - metric 135 x 75 x 20mm
- With optional enclosures.

Transceiver Support

TELN 1023 Provides support for the following types of transceivers:

- 1.2M TPT
- 78K TPT
- RS-485
- 78K Free Topology (FTT-10)
- Direct-Drive (up to 90 feet)

DC Power Supply Information

The system can be powered by a 12Vdc, 1A source. A source of 12 volts is required to run the relays.

The logic circuits pulls 55mA of current. At idle the system pulls 55mA. During maximum load on logic the system pulls about 500mA.

Equipment

TechLon Provides:

- 1 TELN 1023 Auto. 2 Channel Relay and Logic Node mounted or unmounted in a aluminum enclosure. (Customized mountings are available.).

You must supply:

- Power source - 12volt DC, 1-ampere source.
- Cables 20 AWG.

Operation

Safety Warning

HAZARD OF SEVERE ELECTRICAL SHOCK OR BURN.
Remove power to unit before opening the cover.
Replace fuses only with approved automotive types rated for the loads connected to this device.

When the unit is first powered up, Service LED will flash once quickly. After approximately 1 second the board will have completed self-tests, and any changes to unit status will be indicated by the module's LED indicators:

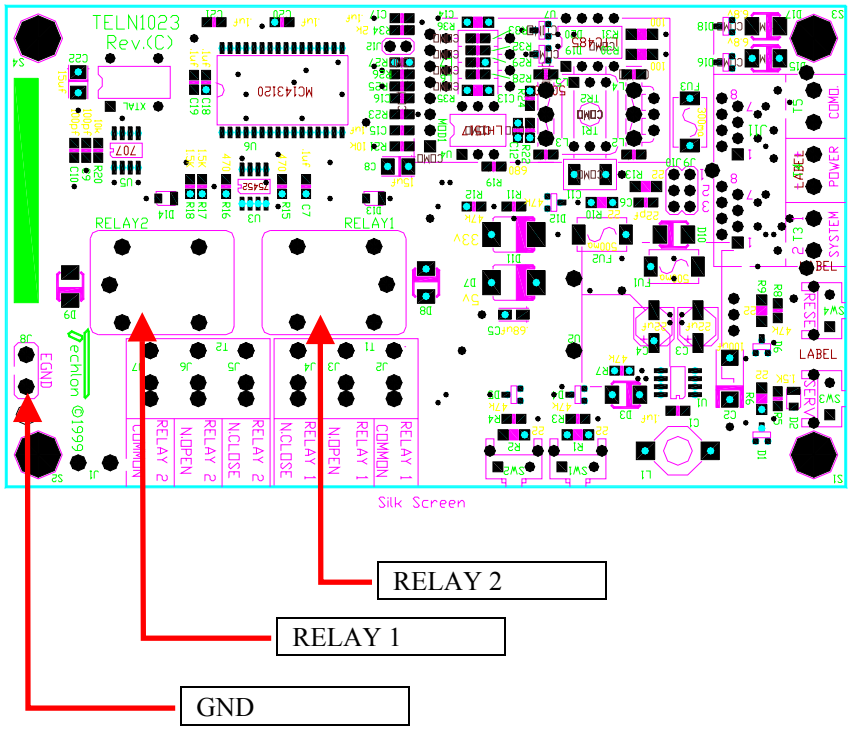
LED	ON	OFF	Flash
Service (yellow) Indicates the state of the module	Application-less (off-line) and unconfigured	On-line and Neuron application and network parameters configured	With application (on-line) but unconfigured. Or, board information is being downloaded to the network
Load (red) Indicates the state of each load	Load is ON	Load is OFF	NONE

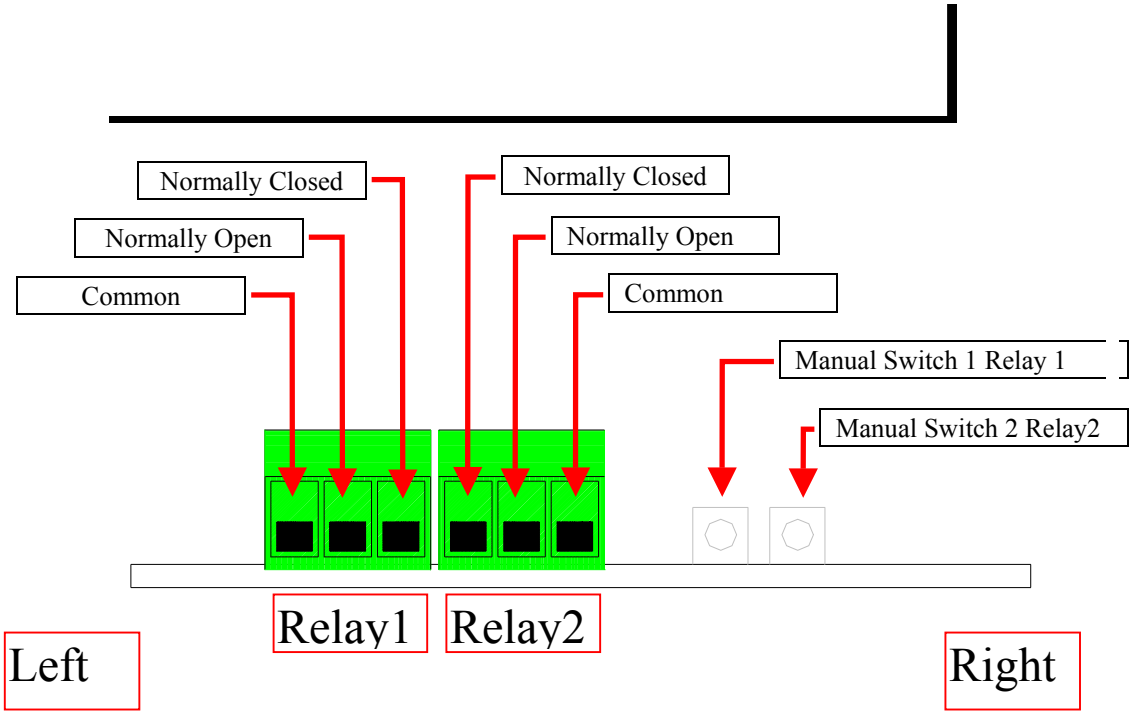
When the unit is operational, it uses the network default states to determine whether a relay is in an open or closed state. To monitor the system's status and activate the relays the system must be connected to either a networked keyboard or some other networked device.

Refer to figure 1 for the location of the following switches and LED's

1. The Service switch is used to initiate a network management message identifying the node(the system) to the network.
2. The Reset Switch is used to reset the board.
3. The yellow Service LED indicates the state of the node:
   ON Application-less(off-line) and unconfigured
   Flash With application (on-line) but unconfigured, or when board information is being downloaded to the network.
   OFF On-line and configured.
   The service led also indicates a reset with a quick flash upon start up after reset.
4. The red indicator LEDs:
   ON Indicates that a Relay is switched ON or Normally Open position.
   OFF Indicates that the Relays are all OFF or Normally Closed position.
   WINK This is a slow intermittent 1.0s pulse of 10 times it confirms the location of the board.

Top view of TELN1023
Figure 1.0





Front view of TELN1023 Connectors
Figure 2.0

The TELN1023 may be connected to 2 loads.
Warning the MAXIMUM LOAD must not exceed 16V with a 10A pull. If over loaded the relays could get damaged.
The wire gage and external fuse size should be chosen accordingly to the current drawn for each load
To wire the TELN1023 Auto. 2 Relay and Logic Node:
1. Refer to figure 2.0 for connector locations. Connect wires into connectors as needed following location and descriptions from figure 2.0
(MAINS should be connected at all times.)
To Connect the system to the network:
1. Connect the network inputs to COM1/2 on the Auto 2 Relay and Logic Node Board.
2. Using the provided Polling programs on MetraVision Enter into test setup for TELN1023.

- A. DBL Click on Icon TELN1023
- B. DBL Click on “REPLACE”
- C. When the network is ready to receive data press the Service switch. The Service LED flashes as data is downloaded to the neuron chip. The LED goes out when the transfer is complete.
- D. DBL Click on “WINK” it will indicate the location of the node.
- E. DBL Click on “TEST” Look at the transmission errors if more than 200 errors see “Trouble shooting”.

Your TELN1023 is installed and ready.

Load Wiring Diagram

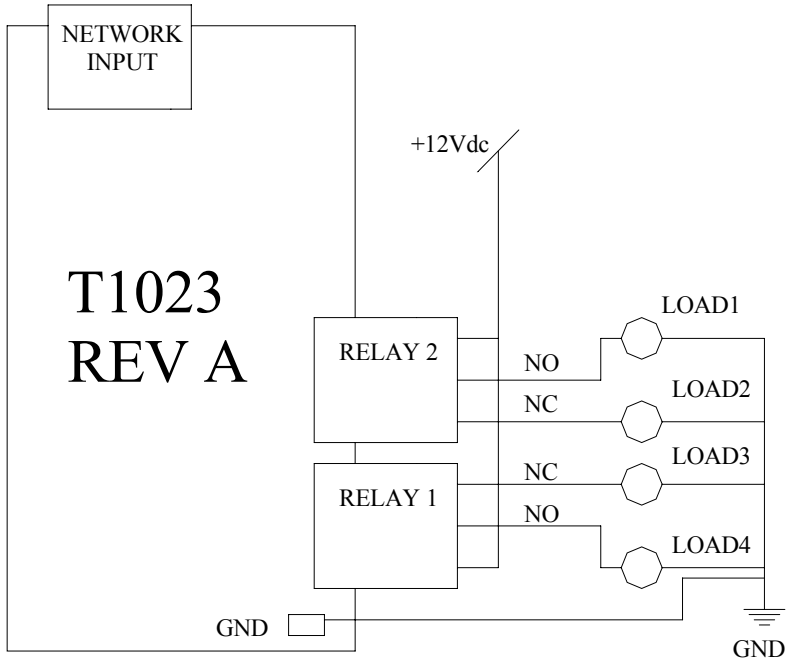


Figure 3.0 TELN 1023 Wiring Diagram

RJ45 Communication Wire Schematic

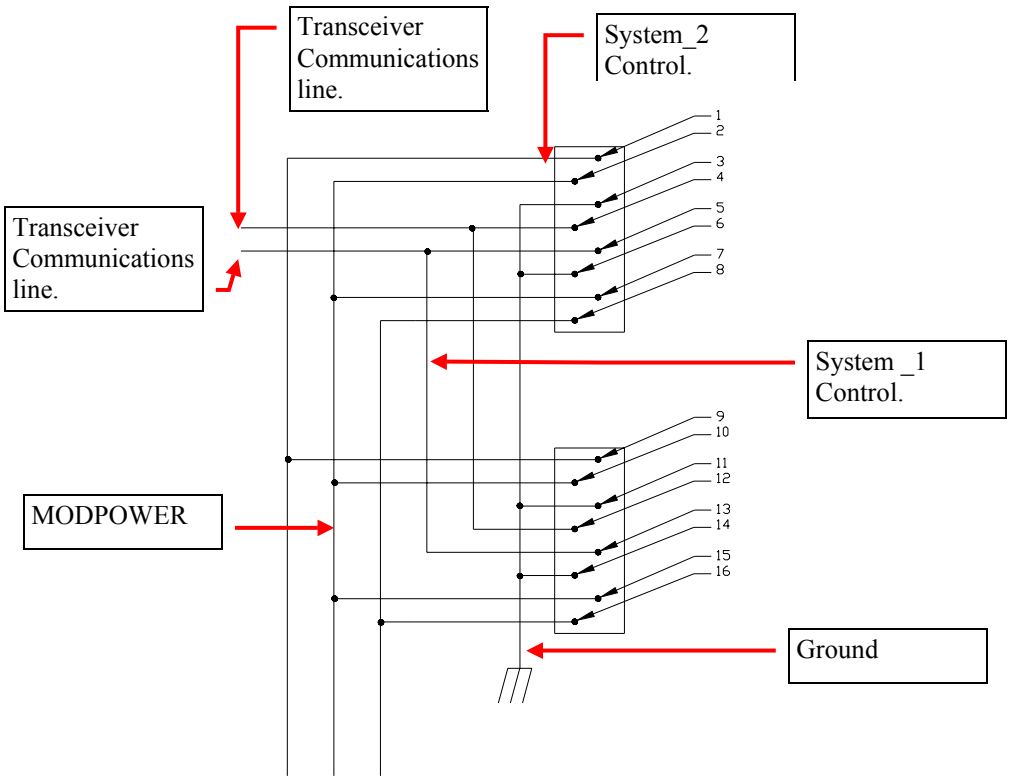


Figure 4.0 RJ45 Com. Connectors

MODPOWER- Secondary Power supply.[Pins 2,7,10,15]
System _1 Control.- Control for alternate power supply of System_1.[Pins 16,8]
System_2 Control.- Control for alternate power supply of System_2. [Pins 9,1]
Ground-System Ground [Pins 11,5,3,7]
Transceiver Communications line(1) -Twisted pair [Pins for TP1 are 12,4]
Transceiver Communications line(2) -Twisted pair [Pins for TP2 are 13,5]

Network

Though the TELN 1023 may be used as a standalone device or, connecting it as a member of an integrated peer to peer network, it will permit all the board's functions to be used and configured to their maximum benefit. This allows you to control outputs, read the status, check error tables, calibrate and scale analog values, and rebind control devices.
To install the device onto a network:

Module Installation into the Network

1. Check to make sure that the module's transceiver type is supported by the general Network arrangement (i.e., TP/XF-78). If not, a router module may be required.

2. Connect the ground wire to the lug on the board or the stud on the enclosure.

3. Connect the Power and Output wires as depicted in figure. 2.0. This will power the board and connect the loads to the Outputs.

4. Connect the telephone type cable [RJ45] from the Network.

5. With the Network Management tool attached to the Network, INSTALL the node. Click on INSTALL; then, when prompted, press the service button [next to the yellow LED] on the TELN 1023 board. At this time the network will be downloading application information to the node and the Yellow service LED will blink for the duration indicating the download is taking place. When the download is completed the LED will turn off. When the process is completed, click the WINK button. This will cause the service LED on the TELN 1023 board to blink for 10 seconds. Do a TEST for the TELN 1023 node (See table 1.0 for more information). When this is finished, click on the CLOSE button to return.

6. This board can now be used for its intended Network application.

Table 1.0 Test Results
Node TELN 1023 Test Results

Name:	Result:	Explanation:
General Information		
Neuron Chip Model:	The model number.	This returns the model number of the neuron chip used on the TELN 1023.
Software Version:	The firmware version number.	This gives a version number for the neuron firmware code.
Last Error logged:	This gives an Error Condition Code found in Appendix E:	The Last Error logged.
Last Reset Caused:	Either a Network or Hardware reset. A. Power Up. B. Watchdog Time-out. C. External. D. Software.	The reasons that the node reset.
Bypass:	Either: Yes or NO	This refers to the nodes ability to repetitively pass on network messages.
State:	Status of Node. A: On-line B: Off-line C: Unconfigured. D: Applicationless.	The states are defined as. A: On-line means all Normal and activated. B: Off-line means all Normal but not activated. C: Unconfigured means theNode is OK but it does not belong to a network. D. Applicationless could be either a normal or abnormal condition. This means that there is no Application code for the node or the application code is corrupted.
Lost messages:		
Network Layer:	The result will be a number of errors.	The node received a message that it was forced to discard before it was acted upon. The Network buffer was full.
Application layer:	The result will be a number of errors.	The node received a message but was forced to discard before it was acted upon. If the error occurs, the reason could be that there is either inadequate Application buffer space or the node is too busy.
Communications Problem:		
Transmission Errors	The result will be a number of errors.	These errors maybe due to a bad communications cable connection or some other nose.
Receive trasns full error:	The result will be a number of errors.	The receive message buffer is full. All messages cannot be received and are consequently lost.
Transaction Time-outs:	The result will be a number of errors.	The time limit set (time needed for a message to be sent and received by the node) has expired.

Network Variables

Input variables are for the following (see Appendix A for functional Input Network Variables):

- Disable control for access to changing load level.
- Load Level control
- Master Control for global change to load level.
- Sequencing Action
- Synchronization of load level outputs
- Logic input (group1-4)

Output variables are for the following (see Appendix B for Output Network Variables):

- Status of each load
- Status of module
- Sequence pass-through of each load
- Logic load Output
- Logic load Input Status(group1-4)

Input Configuration variables (Appendix C for configuration Input Network Variables):

- Logic Setup input for decoding
- Invert Output (Only Logic Outputs)
- Control Type for (master, disable, and flash)

Appendix A: Input Network Variables

The node uses the following input network variables. The network variables are ordered alphabetically by variable name, i.e., NI_*name*.

Input Network Variables	Variable Description and Content
NI_disable_ctrl Type: Level Continuous, SNVT_LEV_CON	Disable control input Controls access of all the outputs at once. NI_diable_ctrl is associated with Disable_Control (See network variable NI_control_type). 0= Disable off. Any other values disable On.
NI_dummy[] Type: Level Continuous, SNVT_LEV_CON	Dummy input variable to help in binding.
NI_load_level[] Type: Level Continuous, SNVT_LEV_CON	Directly sets each output. 0 = Off 100.0 = 100% = full On. Condition for each of the loads. Zero will turn the load off. Any other value will turn the load on to the percentage indicated. Offset 0 is associated with load 0. Offset 1 is associated with load 1. • • Offset 9 is associated with load 10.

NI_load_gr1[4] Type: Level Continuous, SNVT_LEV_CON	These variable inputs are the inputs to the logic gates. The inputs can be bound to a output equal to: 0.5 = **Green** - The load is energized and no load errors indicated. 1.5 = **Yellow** -The load is energized, but either the load voltage or the fuse voltage is low. 2.0 = **Blink Green** – The load is energized with a remote switch and the network. 3.0 = **Blink Yellow** - The load is energized, but the current was too low. 3.5 = **Flash Green** – The load is energized using either the on-board pushbutton or the manual switch. 4.5 = **Flash Yellow** - The load is energized, but there is an a/d error. 100.0 = **FULL ON** - This is a load level max input. These are interpreted as ON or GREEN states. The states of, 0.0 = **Off** - The load is not energized. 1.0 = **Red** - The load is not energized and either the load voltage or the fuse voltage was too high. 2.5 = **Blink Red** – The load is not energized, and the current was too high. 4.0 = **Flash Red** - The load is not energized and there was a high voltage error. These are interpreted as OFF. From Table_1, NI_load_gr1[0] represents VAR A, NI_load_gr1[1] represents VAR B etc., for the FIRST GROUP.

NI_load_gr2[4] Type: Level Continuous, SNVT_LEV_CON	These variable inputs are the Inputs to the logic gates. The inputs can be bound to a output equal to: 0.5 = **Green** - The load is energized and no load errors indicated. 1.5 = **Yellow** -The load is energized, but either the load voltage or the fuse voltage is low. 2.0 = **Blink Green** – The load is energized with a remote switch and the network. 3.0 = **Blink Yellow** - The load is energized, but the current was too low. 3.5 = **Flash Green** – The load is energized using either the on-board pushbutton or the manual switch. 4.5 = **Flash Yellow** - The load is energized, but there is an a/d error. 100.0 = **FULL ON** - This is a load level max input. These are interpreted as ON or GREEN states. The states of, 0.0 = **Off** - The load is not energized. 1.0 = **Red** - The load is not energized and either the load voltage or the fuse voltage was too high. 2.5 = **Blink Red** – The load is not energized, and the current was too high. 4.0 = **Flash Red** - The load is not energized and there was a high voltage error. These are interpreted as OFF. From Table_1, NI_load_gr2[0] represents VAR A, NI_load_gr2[1] represents VAR B etc., for the SECOND GROUP.

NI_load_gr3[4] Type: Level Continuous, SNVT_LEV_CON	These variable inputs are the inputs to the logic gates. The inputs can be bound to a output equal to: 0.5 = **Green** - The load is energized and no load errors indicated. 1.5 = **Yellow** -The load is energized, but either the load voltage or the fuse voltage is low. 2.0 = **Blink Green** – The load is energized with a remote switch and the network. 3.0 = **Blink Yellow** - The load is energized, but the current was too low. 3.5 = **Flash Green** – The load is energized using either the on-board pushbutton or the manual switch. 4.5 = **Flash Yellow** - The load is energized, but there is an a/d error. 100.0 = **FULL ON** - This is a load level max input. These are interpreted as ON or GREEN states. The states of, 0.0 = **Off** - The load is not energized. 1.0 = **Red** - The load is not energized and either the load voltage or the fuse voltage was too high. 2.5 = **Blink Red** – The load is not energized, and the current was too high. 4.0 = **Flash Red** - The load is not energized and there was a high voltage error. These are interpreted as OFF. From Table_1, NI_load_gr3[0] represents VAR A, NI_load_gr3[1] represents VAR B etc., for the THIRD GROUP.

NI_load_gr4[4] Type: Level Continuous, SNVT_LEV_CON	These variable inputs are the inputs to the logic gates. The inputs can be bound to a output equal to: 0.5 = **Green** - The load is energized and no load errors indicated. 1.5 = **Yellow** -The load is energized, but either the load voltage or the fuse voltage is low. 2.0 = **Blink Green** – The load is energized with a remote switch and the network. 3.0 = **Blink Yellow** - The load is energized, but the current was too low. 3.5 = **Flash Green** – The load is energized using either the on-board pushbutton or the manual switch. 4.5 = **Flash Yellow** - The load is energized, but there is an a/d error. 100.0 = **FULL ON** - This is a load level max input. These are interpreted as ON or GREEN states. The states of, 0.0 = **Off** - The load is not energized. 1.0 = **Red** - The load is not energized and either the load voltage or the fuse voltage was too high. 2.5 = **Blink Red** – The load is not energized, and the current was too high. 4.0 = **Flash Red** - The load is not energized and there was a high voltage error. These are interpreted as OFF. From Table_1, NI_load_gr4[0] represents VAR A, NI_load_gr4[1] represents VAR B etc., for the FOURTH GROUP.
NI_master_ctrl Type: Level Continuous, SNVT_LEV_CON	Master Control Input controls all the outputs at once. NI_master_ctrl is associated with Master_ Control (See network variables NI_control_type). 0= Off. Any other value load On.

NI_seq_in[] Type: Level Continuous, SNVT_LEV_CON	Sets the state of a load for a sequence action. 0 = Off. 100.0 = 100% = full On. For each load's input sequence level. A value of zero will turn off the associated load and start the sequence timer to turn off the next node connection. A non-zero value will turn the associated load on and start the sequence timer to send the sequence level to the next node connection. Offset 0 is associated with load 0. Offset 1 is associated with load 1. • Offset 9 is associated with load 10.
NI_sync Type: Level Continuous, SNVT_LEV_CON	Synchronizes the load outputs of flash controlled loads. The sync signal for the timer used by the flash controlled loads.

Appendix B: Output Network Variables

The system uses the following output standard network variable types (SNVT). SNVTs are ordered alphabetically by variable name, i.e., NO_*name*.

Output Network Variables	Variable Description and Content
NO_dummy[2] Type: Level Continuous, SNVT_LEV_CON	Dummy output variable to help in binding.
NO_load_status[ ] Type: Level Continuous, SNVT_LEV_CON	Determines the status of each load. The state of each of the node's loads is given by the load status states listed Below. Status States. 0.0 = **Off** - The load is not energized. 0.5 = **Green** - The load is energized and no load errors indicated. 1.0 = **Red** - The load is not energized and either the load voltage or the fuse voltage was too high. 1.5 = **Yellow** -The load is energized, but either the load voltage or the fuse voltage is low. 2.0 = **Blink Green** - The load is energized with a remote switch and the network. 2.5 = **Blink Red** - The load is not energized, and the current was too high. 3.0 = **Blink Yellow** - The load is energized, but the current was too low. 3.5 = **Flash Green** - The load is energized using either the on-board pushbutton or the manual switch. 4.0 = **Flash Red** - The load is not energized and there was a high voltage error. 4.5 = **Flash Yellow** - The load is energized, but there is an a/d error. Offset 0 is associated with load 0. Offset 1 is associated with load 1. • Offset 9 is associated with load 10.

NO_load_stat_gr1[4] Type: Level Continuous, SNVT_LEV_CON	This Variable gives the feedback for a load or a switch output bound to NI_load_gr1[4]. The status feedback is GREEN for an input status or value of: 0.5 = **Green** - The load is energized and no load errors indicated. 1.5 = **Yellow** -The load is energized, but either the load voltage or the fuse voltage is low. 2.0 = **Blink Green** - The load is energized with a remote switch and the network. 3.0 = **Blink Yellow** - The load is energized, but the current was too low. 3.5 = **Flash Green** - The load is energized using either the on-board pushbutton or the manual switch. 4.5 = **Flash Yellow** - The load is energized, but there is an a/d error. 100.0 = **FULL ON** - This is a load level max input. The status feedback will be an OFF for an input status or value of: 0.0 = **Off** - The load is not energized. 1.0 = **Red** - The load is not energized and either the load voltage or the fuse voltage was too high. 2.5 = **Blink Red** – The load is not energized, and the current was too high. 4.0 = **Flash Red** - The load is not energized and there was a high voltage error. NO_load_stat_gr1[0] should be used in conjunction with NI_load_gr1[0] etc.,. This is **"GROUP ONE"**.

NO_load_stat_gr2[4] Type: Level Continuous, SNVT_LEV_CON	This Variable gives the feedback for a load or a switch output bound to NI_load_gr2[4]. The status feedback is GREEN for an input status or value of: 0.5 = **Green** - The load is energized and no load errors indicated. 1.5 = **Yellow** -The load is energized, but either the load voltage or the fuse voltage is low. 2.0 = **Blink Green** – The load is energized with a remote switch and the network. 3.0 = **Blink Yellow** – The load is energized, but the current was too low. 3.5 = **Flash Green** – The load is energized using either the on-board pushbutton or the manual switch. 4.5 = **Flash Yellow** – The load is energized, but there is an a/d error. 100.0 = **FULL ON** - This is a load level max input. The status feedback will be an OFF for an input status or value of: 0.0 = **Off** - The load is not energized. 1.0 = **Red** - The load is not energized and either the load voltage or the fuse voltage was too high. 2.5 = **Blink Red** – The load is not energized, and the current was too high. 4.0 = **Flash Red** - The load is not energized and there was a high voltage error. NO_load_stat_gr2[0] should be used in conjunction with NI_load_gr2[0] etc.,. This is **"GROUP TWO".**

NO_load_stat_gr3[4] Type: Level Continuous, SNVT_LEV_CON	This Variable gives the feedback for a load or a switch output bound to NI_load_gr3[4]. The status feedback is GREEN for an input status or value of: 0.5 = **Green** – The load is energized and no load errors indicated. 1.5 = **Yellow** –The load is energized, but either the load voltage or the fuse voltage is low. 2.0 = **Blink Green** - The load is energized with a remote switch and the network. 3.0 = **Blink Yellow** - The load is energized, but the current was too low. 3.5 = **Flash Green** - The load is energized using either the on-board pushbutton or the manual switch. 4.5 = **Flash Yellow** - The load is energized, but there is an a/d error. 100.0 = **FULL ON** - This is a load level max input. The status feedback will be an OFF for an input status or value of: 0.0 = **Off** - The load is not energized. 1.0 = **Red** - The load is not energized and either the load voltage or the fuse voltage was too high. 2.5 = **Blink Red** – The load is not energized, and the current was too high. 4.0 = **Flash Red** - The load is not energized and there was a high voltage error. NO_load_stat_gr3[0] should be used in conjunction with NI_load_gr3[0] etc.,. This is **"GROUP THREE".**

NO_load_stat_gr4[4] Type: Level Continuous, SNVT_LEV_CON	This Variable gives the feedback for a load or a switch output bound to NI_load_gr4[4]. The status feedback is GREEN for an input status or value of: 0.5 = **Green** - The load is energized and no load errors indicated. 1.5 = **Yellow** -The load is energized, but either the load voltage or the fuse voltage is low. 2.0 = **Blink Green** - The load is energized with a remote switch and the network. 3.0 = **Blink Yellow** - The load is energized, but the current was too low. 3.5 = **Flash Green** - The load is energized using either the on-board pushbutton or the manual switch. 4.5 = **Flash Yellow** - The load is energized, but there is an a/d error. 100.0 = **FULL ON** - This is a load level max input. The status feedback will be an OFF for an input status or value of: 0.0 = **Off** - The load is not energized. 1.0 = **Red** - The load is not energized and either the load voltage or the fuse voltage was too high. 2.5 = **Blink Red** – The load is not energized, and the current was too high. 4.0 = **Flash Red** - The load is not energized and there was a high voltage error. NO_load_stat_gr4[0] should be used in conjunction with NI_load_gr4[0] etc.,. This is **"GROUP FOUR".**
NO_logic_output[4] Type: Level Continuous, SNVT_LEV_CON	The output is either (FULL_ON or OFF). NO_logic_output is the output for the logic combinations of the input variables from NI_load_gr1..4[4]. The offset for NO_logic_output[0] of "0" refers to GROUP 1, offset "1" refers to GROUP 2. etc.,.
NO_seq_out[] Type: Level Continuous, SNVT_LEV_CON	Sets the state of the next sequenced output by module. Sends cascade to the next module (~1/4 sec.) of each load's output sequence level. 0 = Off. 100.0 = 100% full On. After the load's sequence timer expires, the received sequence in level associated with that load, will be sent to the next node connection to control one of that node's loads. Offset 0 is associated with load 0. Offset 1 is associated with load 1. • Offset 9 is associated with load 10.

NO_status Type: Level Continuous, SNVT_LEV_CON	Indicates the board status. Combination of each load's status plus on-board self test. The node's status. This indicates the state of the node. Module Status States. 0.0 = **Off** - Board not energized. 0.5 = **Green** - Board is energized and no errors indicated. 1.0 = **Red** - Any supply voltage error, any high voltage or current error.

Appendix C: Configuration Input Network Variables

The module uses the following Configuration network variables. The network variables are ordered alphabetically by variable name, i.e., NI_*name*.

SNVT	Subdivisions	Variable Description and Content
NI_control_type[] Type: Level Continuous, SNVT_LEV_CON		This sets four control functions. A. Master_Control. B. Disable_Control. C. Remote_Control. D. Flash_Control.
	master_control	Controls all Outputs at once. The Master_Control function works in conjunction with NI_master_ctrl. It has three states. 0.0= No effect to NI_master_ctrl. 0.5= Off unconditionally. 1.0= Toggle present effect of NI_master_ctrl.
	disable_control	Controls disable input effect for each load. The Disable_ Control function works in conjunction with NI_disable_ctrl and NI_load_lev. It has three states. 0.0=No effect. 2.0=Disable Off. 4.0=Disable On.
	Flash_control	Gives Load ability to Flash on and off. It has four states. 0.0 =No effect. 32.0= 0.5 second on/off cont. flash 64.0= 1 second on/off cont. flash 96.0= 2 second on/off cont. flash

The NI_control_type[ ] sets four control variable types as mentioned above.
A. Master_Control.
B. Disable_Control.
D. Flash_Control .
The Master_Control controls the functions of loads. It controls their ON/OFF state.
The Disable_Control controls the functions of loads. The Disable_Control functions works in conjunction with NI_load_lev and NI_disable_crtl. Disable_Control can disable or enable NI_load_lev functions in conjunction with NI_disable_ctrl and control loads ability to change from an ON/OFF state.
The Flash_Control allows for a continuous ON/OFF power pulsation of 0.5s, 1.0s, or 1.5s. when load is On.
These Control types can be combined. The following is an example of a combination:
1.0= Master_Control ON.
4.0= Disable_Control ON.
32.0= Flash_Control for a 0.5 second ON/OFF continuous flash.
Thus 37.0 is the variable that sets the load to the above mentioned states.

NI_setup[4] Type: Count Event, SNVT_COUNT		This variable sets up the logic combinations. This is where the CODE VALUE is entered from Table_1 to give the desired combinational output. The "CODE VALUE" of ZERO gives a no response to any condition. Offset 0 refers to GROUP 1. Offset 1 refers to GROUP 2. Offset 2 refers to GROUP 3. Offset 3 refers to GROUP 4. This variable will keep the same setup value even when the board is reset or powered down.
NI_invert_output[4] Type: Count Event, SNVT_COUNT		This inverts the value of the NO_logic_output. A value of 1 inverts the output. A value of 0 has no effect. Offset 0 refers to GROUP 1. Offset 1 refers to GROUP 2. Offset 2 refers to GROUP 3. Offset 3 refers to GROUP 4. This variable will keep the same setup value even when the board is reset or powered down.

Appendix D: DRAWING_1 A Gate And Variable Depiction

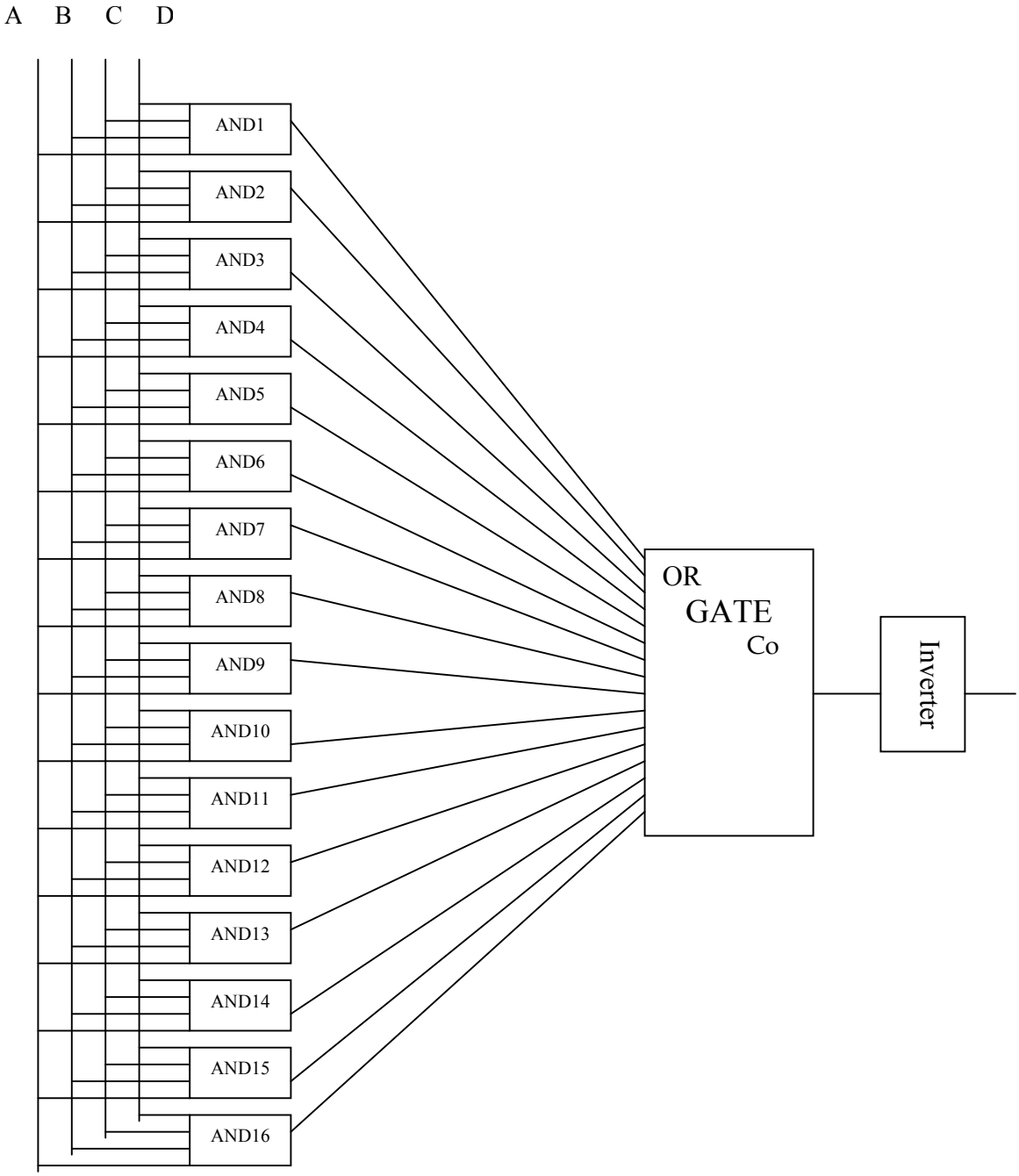


TABLE 1

The following is a table for each AND gate:

Table_1. AND GATES.

AND GATE #	VAR A	VAR B	VAR C	VAR D	WHEN VAR A,B,C AND D ARE TRUE	CODE VALUE
1	OFF	OFF	OFF	OFF	TRUE	1
2	OFF	OFF	OFF	ON	TRUE	2
3	OFF	OFF	ON	OFF	TRUE	4
4	OFF	OFF	ON	ON	TRUE	8
5	OFF	ON	OFF	OFF	TRUE	16
6	OFF	ON	OFF	ON	TRUE	32
7	OFF	ON	ON	OFF	TRUE	64
8	OFF	ON	ON	ON	TRUE	128
9	ON	OFF	OFF	OFF	TRUE	256
10	ON	OFF	OFF	ON	TRUE	512
11	ON	OFF	ON	OFF	TRUE	1024
12	ON	OFF	ON	ON	TRUE	2048
13	ON	ON	OFF	OFF	TRUE	4096
14	ON	ON	OFF	ON	TRUE	8192
15	ON	ON	ON	OFF	TRUE	16384
16	ON	ON	ON	ON	TRUE	32768

Each of the AND gates as depicted in the Table_1 and in DRAWING_1 represents an individual combination of 4,3 or 2 Variables. The input variables are A,B,C,and D for 4 variable combinations, B,C,D for 3 variable combinations and C and D for 2 variable combinations. When using 4 input variables use the black, blue and green parts of the Table_1 and all 16 gates. When using 3 input variables use the blue and green parts of the Table_1 only, and 8 AND gates. When using 2 input variables use the green part of the Table_1 only, and 4 AND gates.

The CODE VALUE is used in the following way. If you want the condition of the AND gate to be TRUE then use the CODE VALUE for that GATE# in the setup variable. If you want the conditions of multiple GATE#s to be TRUE, SUM the CODE VALUES and use the resulting number as your CODE VALUE in the setup variable.

The OR gate as depicted in DRAWING_1 combines all combinations that are TRUE into one output.

If the INVERTER is enabled it inverts the output.

The output is always defined as either (FULL_ON = 100.0) or (OFF = 0).

Appendix F: Master SNVT List

The following is a list of SNVT types used with TELN 1023.
SNVT types can be bound only with like SNVT types.

Name	Measurement	Range (Resolution)
SNVT_STR_ASC SNVT_LEV_CONT	ASCI CHAR LEVEL, CONTINUOUS	0..255 0..100% (0.5%)
SNVT_COUNT	COUNT, EVENT	0..65,535 COUNTS (1 COUNT)
SNVT_CONT_INC	COUNT	-32,768..32,767 COUNT (1 COUNT)
SNVT_STR_INT	INT'L CHAR SET. CHAR SET CODE. 16 BIT CHARS. TERMINATOR.	14 WIDE CHARTERS. 0..255 14 CHAR. 0x0000.

Appendix G: Network Maintenance Neuron Error Codes

no error	0
bad_event	129
nv_length_mismatch	130
nv_msg_too_short	131
eeprom_write_fail	132
bad_address_type	133
preemption_mode_timeout	134
already_preempted	135
sync_nv_update_lost	136
invalid_resp_alloc	137
invalid_domain	138
read_past_end_of_msg	139
write_past_end_of_msg	140
invalid_addr_table_index	141
incomplete_msg	142
nv_update_on_outupt_nv	143
no_msg_avail	144
illegal_send	145
unknown_PDU	146
invalid_nv_index	147
divide_by_zero	148
invalid_appl_error	149
memory_alloc_failure	150
write_past_end_of_net_buffer	151
appl_cs_error	152
cnfg_cs_error	153
invalid_xcvr_reg_addr	154
xcvr_reg_timeout	155
write_past_end_of_appl_buffer	156
io_ready	157
self_test_failed	158
subnet_router	159
Authentication_mismatch	160
self_inst_semaphore_set	161
read_write_semaphore_set	162
appl_signature_bad	163
router_firmware_version_mismatch	164
EEPROM recovery occured	166
triac clockedge +- not supported	167
checksum error over system	168
state byte semaphore	192-223

Appendix H: Trouble Shooting

Problem:	Suggested Solution:
Any Load (0) OR (1) will not Turn ON.	1. EXTERNAL FUSE blown. See figure. 1.0 and check the load to see if less than 10A. Replace Fuse.
	2. No Power to system. A. Cable not in correct place; compare with figure 2.0 for cable placement. B. Power not on; verify with voltmeter. C. Power supply insufficient: verify with voltmeter.
	3. Load does not work or is not connected. See figure 2.0 for wire locations.
	4.*** Neuron Unconfigured. Load application.
	5.* Neuron chip applicationless. Load application
External Switches turn On and Off their led indicators , but loads controlled over the network do not turn On and Off.	1. Check network binding. 2. Check communication cables.
Does not talk to Network.	1. Look to see if communication cables are connected. Connect unconnected cables.
	2. Check to see if board is powered. Power unpowered board.
	3.*** Unconfigured. Load application.
	4. Compare communication cables to figure 3.0 if cables are not the same, redo according to schematic.
Board has Power but does not work.	An internal fuse may be blown. You may have an over voltage or too large of a current pull. Verify with a meter.
For all other problem please consult your warranty contract or call the service representatives as listed.	

* Note *

* Using a third party Network management to Load a new application.

** Using a third party Network management tool Load scaling values for your application.

*** Using a third party Network management tool load your application to Configure the Neuron parameters.