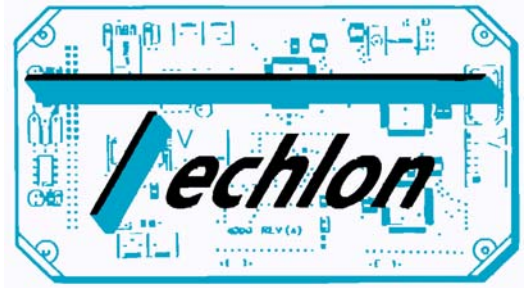

Simple.Sensible.Smart

TELN 1068
Automotive 8 Muxilon Node
Version 1.0

Users Manual
October 1998

Techlon Instruments, Inc
P.O. Box 127
Topton, PA 19562
(610)682-9764 (610)682-9765 FAX
E-mail: techlon@enter.net

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Automotive Muxilon Node

LonWorks™ Automotive Muxilon Node

INTRODUCTION

Techlon's Automotive Muxilon Node (Teln 1068) is designed with eight separate (+24Vdc) sink outputs, eight digital optocoupaled inputs and 4 internal supply source points . This module is primarily designed to control devices where direct switch input control or switch output control is advantageous, (i.e. lights, relays, switches and small motors). The module is supported with a service switch, service LED, and a 15-entry FIFO error array (See Figure 1.0) Each output is supported by local load fusing, led indicators and programmable output functions. Each digital input is optocoupled for added protection and has fully programmable functions.

A number of connector schemes are supported:

- Communication and logic power: dual RJ45 phone or .2" center to center terminal locks.
- Load supply: .2" center to center terminal block.
- Load output: .15" center to center terminal block.
- Switch input .15" center to center terminal block.
- Supply output .15" center to center terminal block.

The board is mounted on grounding standoffs. There is also a grounding connection to the board, on all Techlon Nodes a chassis ground stud on the outside of a module enclosure is standard.

Contacts and Service representatives:

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

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

Specifications.

- 2K Ram
- 512 Byte EEPROM on Neuron Chip for (Network Information).
- 32K EPROM for (application code).
- Voltage: Operating: 8V–18V DC; Max.: 7.5V–33V DC
  Expanded voltage available.
- Eight Outputs can support a load @1.250Max. A.
- Eight Digital inputs with a Max Voltage of + 24Vdc
- Max. Power for each load 30 Watts.
- Operating Temperature: -40° C to +85° C.
- Storage Temperature: -60° C to +100° C.

Dimensions

- Board Dimensions 5.25”w x 3.0” h x 1.0” deep.
- Package and different connector configurations available by request.

Transceiver Support

TELN 1068 Provides support for the following types of transceivers:

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

DC Power Supply Information

Module logic power can be drawn from the module’s communications cable. ***Note***: Although the communication cable supplies positive and chassis ground voltages for the board logic, you must supply a separate load return (chassis ground) for the use of the eight load outputs.

Module positive (+)load power is supplied to the node through a fused terminals T7 (marked “+” for Pos. Supply and “-“ for Neg. ground).

Equipment

Techlon Provides:

- 1 TELN 1068 Muxilon Node unmounted but can be mounted in a NEMA 1 packaging is supported by a 7.5”w x 5.75” h x 1.75”deep two-part irradiated aluminum chassis, with slots for mounting screws and an external 6-32 stud for chassis grounding. (other customized mountings are available.).

Must be supplied by customer:

- Power source: 12V DC, 150mA source for logic.

- Power cables.
- Communication cables.

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

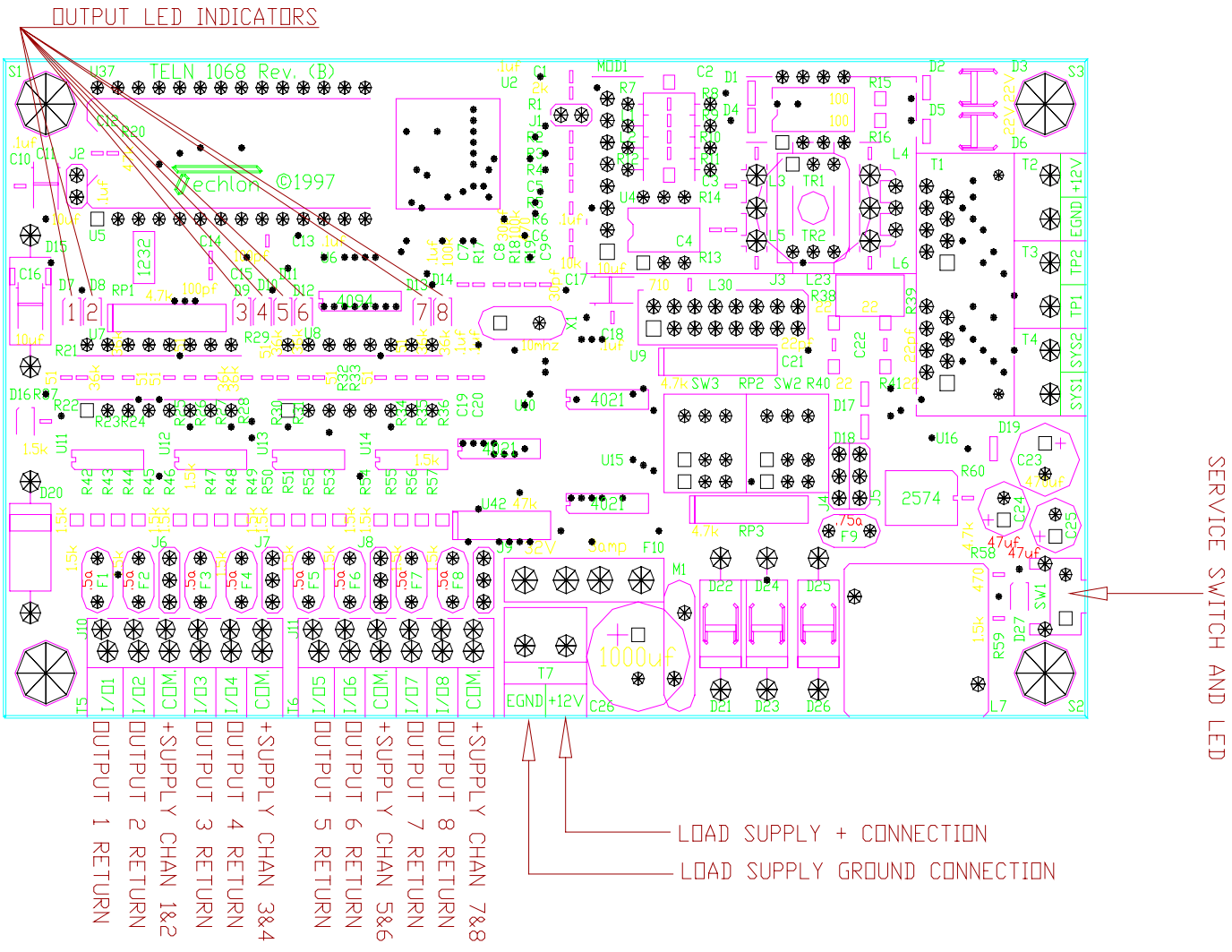
LED	ON	OFF	Flash
Service (yellow) Indicates the state of the module	Application-less (off-line) and unconfigured	On-line and Neuron application and network parameters configured	With application (on-line) but unconfigured. Or, board information is being downloaded to the network
Load (red) Indicates the state of each load	Load is ON or Switch is ON	Load is OFF or Switch is OFF	NA

The Service switch is used to initiate a network management message identifying the module to the network. The board can be reset by removing power from the board, this resets the system logic and forces all outputs to their OFF state.

- The input network variables are used for controlling the TELN 1068.
- The output network variables are used for status from the TELN 1068.
- The Configuration network variables are used for the configuration of the TELN 1068 .The Network Variables can be found in the following appendices.
- Appendix A: has a list of Input Network Variables.
- Appendix B: has a list of Output Network Variables.
- Appendix C: has a list of the Configuration Network Variables.

Board Layout

TELN 1068 Automotive Muxilon Node



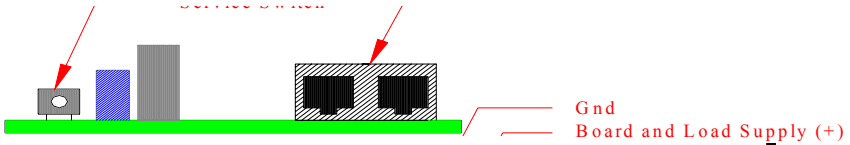
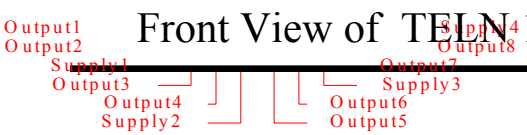


Figure 1.0 TELN 1068 Automotive Muxilon Node

Installation

Front View of TELN 1068 Connectors



Left

Figure 2.0 TELN 1068 Automotive Muxilon Node

Right

The TELN 1068 may be connected to 8 loads the locations are indicated in figure 2.0 and listed as output1 though 8.
Warning the MAXIMUM LOAD must not exceed +24Vdc with a 1.25A draw. If over loaded, the drivers could be damaged. The wire gauge and fuse size should be chosen accordingly to the current drawn for each load

The TELN 1068 may be used to read 8 digital inputs. The 8 digital inputs have the same physical locations as the load outputs see figure 2.0 they are labeled outputs1 though 8. The 8 digital outputs can be used in conjunction with a load to verify that the load was turned on or as a stand alone digital input. The Maximum voltage must not exceed +24Vdc.

The TELN 1068 has 4 supply points to either supply the loads with power or provide ground for the digital input switches. The supply can be either GND or (+)Supply depending on jumper locations: see figure 2.0 for supply locations and figure 3.0 for jumper information.

To wire the TELN 1068 Muxilon Node:
Refer to figure 2.0 for connector locations. Connect wires into connectors as needed following location and descriptions from figure 2.0 and figure 3.0.

Load Wiring Diagram

TELN 1068 Wiring Diagram

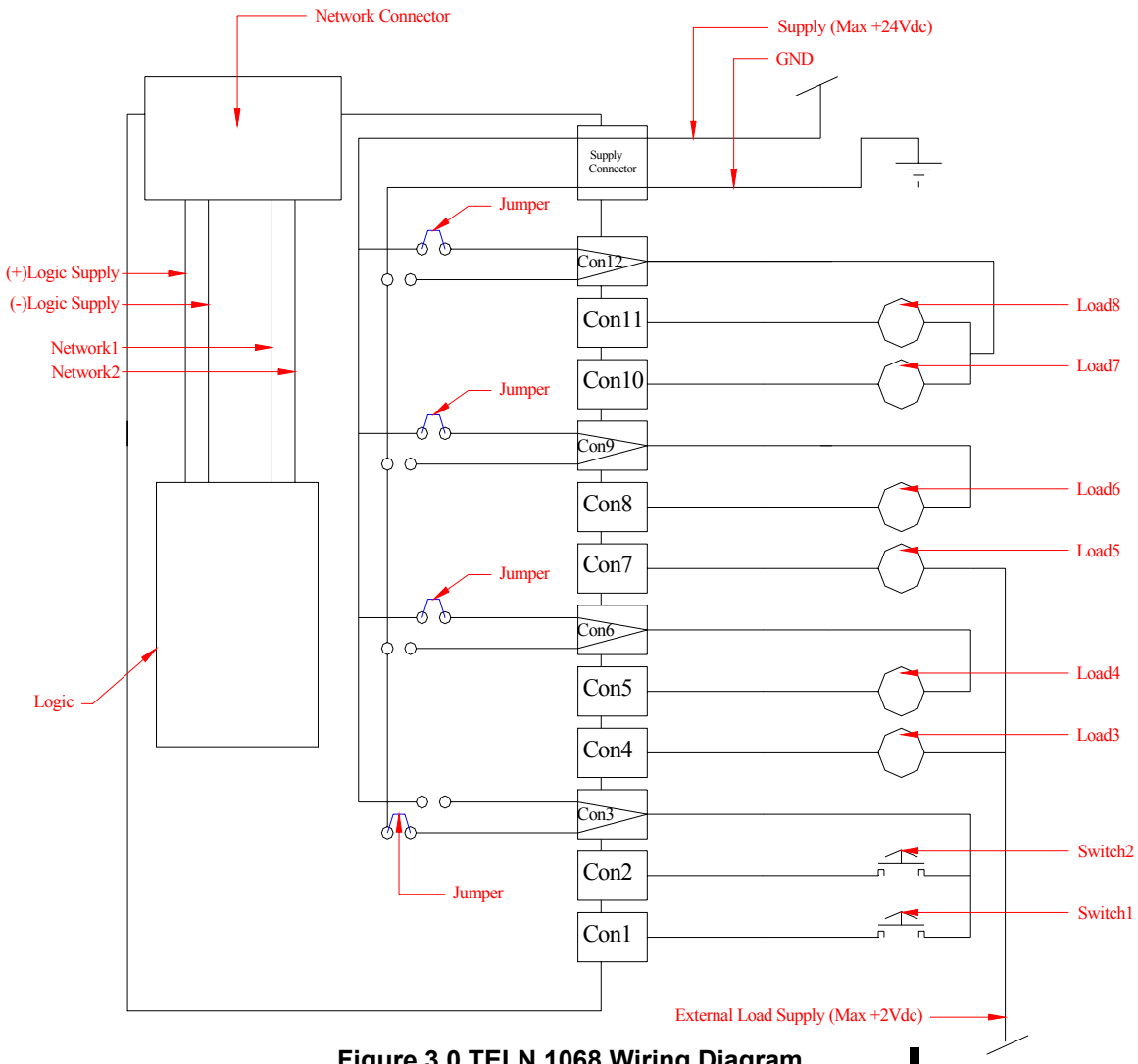


Figure 3.0 TELN 1068 Wiring Diagram

Wiring information for the TELN 1068 Muxilon Node.

1. The Network connector wired as shown in figure 4.0 supplies the logic power and the network twisted pare connections as depicted in figure 3.0.
2. Connectors 1,2,4,5,7,8,10, and 11 can be used as a sink for +24Vdc 1.25A loads or as digital switches. The digital switch function can be used in conjunction with the load functions thus turning on a switch when turning on a load or as a load monitoring system. Multiple configurations are depicted in figure 3.0.
3. The Main load Supply labeled “Supply Connector” must not exceed +24Vdc this is the onboard load supply.
4. The Load Supplies labeled Con3,6,9,and 12 can be jumpered as depicted in figure 3.0 to be either “GND” or “+Supply max 24Vdc” .

Communications Cable RJ45 Installation.

RJ45 Communication Wire Schematic

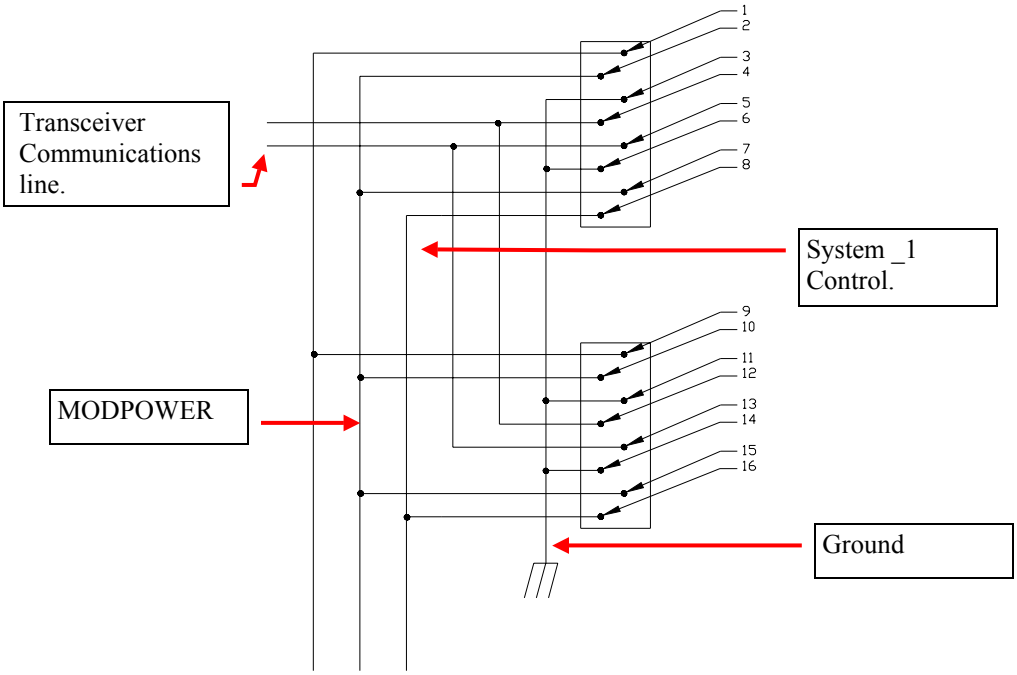


Figure 4.0 RJ45 Com. Connectors

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 1068 may be used as a standalone device, 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 or Input wires as depicted in figure. 2.0 . This will power the board and connect the loads to the Outputs or to the desired Inputs

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 1068 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 a small LED on the TELN 1068 board to blink for 10 seconds. Do a TEST for the TELN 1068 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 1068 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 1068.
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: Unconfiguared means all Normal but configuration variables not set. 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 did not understand.
Application layer:	The result will be a number of errors.	The node received a message but was confused by an application code error and did not know how to proceed with internal operations. If the error occurs the reason could be that there is either inadequate buffer space or the node is too busy.
Communications Problem:		
Transmission Errors	The result will be a number of errors.	These errors are due to a bad communications cable connection.
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

Dummy

Load Level

Master Control

Sequence In

Synchronize

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

Dummy

Error log

Load Status

Sequence Out

Status

Feedback

Configuration variables are for the following (see Appendix C for Configuration Network Variables)

Control Type

Sequence Level

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 assaciated with Disable_Control (See network variable NI_control_type). 0= Disable off. Any other value disable On.
NI_dummy[] Type: Level Continuous, SNVT_LEV_CON	Dummy input variable to help in binding.
NI_error_clear Type: Count, Event SNVT_COUNT	Clears the stored error list. Any non-zero value will clear all entries in the error list, including the new error flag (first byte of string).
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 1. Offset 1 is associated with load 2. Offset 2 is associated with load 3. Offset 3 is associated with load 4. Offset 4 is associated with load 5. Offset 5 is associated with load 6. Offset 6 is associated with load 7. Offset 7 is associated with load 8.
NI_master_ctrl Type: Level Continuous, SNVT_LEV_CON	Master Control Input controls all the outputs at once. NI_master_ctrl is accossated with Master_ Controle (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 1. Offset 1 is associated with load 2. Offset 2 is associated with load 3. Offset 3 is associated with load 4. Offset 4 is associated with load 5. Offset 5 is associated with load 6. Offset 6 is associated with load 7. Offset 7 is associated with load 8.
NI_sync Type: Level Continuous, SNVT_LEV_CON	Synchronizes the load outputs for 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	Subdivisions	Variable Description and Content
NO_dummy[] Type: Level Continuous, SNVT_LEV_CON		Dummy output variable to help in binding.
NO_error Type: Int'l char set, SNVT_STR_INT		The most recent 15 errors. Offset 0 contains the newest and offset 14 contains the oldest. As an error occurs, the oldest error is dropped, all the rest move down one offset, and the new error is loaded in offset 0. The error values are bit mapped. See Appendix E.
	wide_char[0]	Most recent errors.
	" "	Errors {1} though {13}.
	wide_char[14]	Oldest error.
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. 2.0 = **Blink Green** - The load is energized with a remote switch and the network. Offset 0 is associated with load 1. Offset 1 is associated with load 2. Offset 2 is associated with load 3. Offset 3 is associated with load 4. Offset 4 is associated with load 5. Offset 5 is associated with load 6. Offset 6 is associated with load 7. Offset 7 is associated with load 8.

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 1. Offset 1 is associated with load 2. Offset 2 is associated with load 3. Offset 3 is associated with load 4. Offset 4 is associated with load 5. Offset 5 is associated with load 6. Offset 6 is associated with load 7. Offset 7 is associated with load 8.
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.
NO_feedback Type: Level Continuous, SNVT_LEV_CON		This indicates the state of the digital Input. A value of zero indicates that the digital Input is low. A value of 200 (100%) indicates that the digital input is high.

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 conjuction with NI_master_ctrl. It has three states. 0.0= No effect to NI_master_ctrl. 0.5= Off unconditionaly. 1.0= Toggle present effect of NI_master_ctrl.
	disable_control	Controls disable input effect for each load. The Disable_ Control function works in conjuction with NI_disable_ctrl and NI_load_lev. It has three states. 0.0=No effect. 2.0=Disable Off. 4.0=Disable On.
	remote_contol	Controls the remote switch input for each load. It has three states. 0.0=No effect 8.0=Remote Switching Off 16.0=Remote Switching On 24.0=Remote Switching On with no error alam return for no cuurent draw.
	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.
C. Remotre_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 conjuction 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 the 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.

Appendix D: Master SNVT List

The following is a list of SNVT types used with TELN 1068. SNVT types can be bound only with like SNVT types.

Name	Measurement	Range (Resolution)
SNVT_LEV_CONT	LEVEL, CONTINUOUS	0..100% (0.5%)
SNVT_COUNT	COUNT, EVENT	0..65,535 COUNTS (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 E: 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 F: Trouble Shooting

Problem:	Suggested Solution:
Load (0), (1), (2), (3), (4),(5),(6),(7) or (8) will not Turn ON.	1. FUSE blown. See figure. 1.0 and check the load to see if less than 20A. 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 volt meter. C. Power supply insufficient: verify with volt meter.
	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
Digital Inputs (1),(2),(3),(4),(5),(6),(7) and (8) turn on led indicator but have no network effect	1. Check network bindings.
	2. Check communication cables.
	3. *Neuron chip is applicationless. Load applocation.
	4. No Power to system. A. Cable not in correct place; compare with figure 2.0 for cable placement. B. Power not on; verify with volt meter. C. Power supply insufficient: verify with volt meter.
	5.*** Neuron Unconfigured. Load application.
	6. Not properly wired refer to figure 3.0
Internal Supply Voltage Either GND and Not +24Vdc or it is Either +24Vdc and not GND.	1. The Jumpers need to be set. See figure 3.0
No Internal Supply Voltage	1. Fuse is blown
	2. Jumper not in place
	3. Check wiring diagram figure 3.0 for corect wire placement.
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.