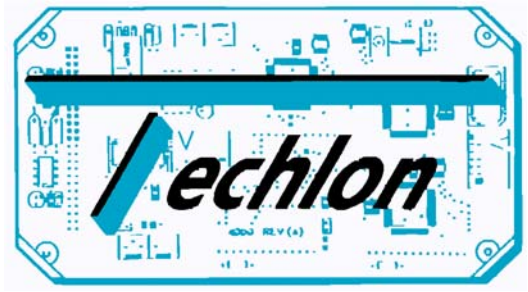

Simple.Sensible.Smart

TELN 1265/1020
Automotive Analog Switch Node
Version 1.0

Users Manual
January 1998

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INTRODUCTION

Techlon's Automotive Analog Switch Node (TELN 1265/1020) is designed to monitor and indicate 10 switch status's. This TELN 1265/1020 module is primarily designed to support a 10 key Analog keypad. The Automotive Analog Switch Node is particular advantageous in interfacing with other TELN Lonworks devices to provide switching control in (i.e. light dimming, fans, and other lighting control). The module is supported with a reset switch, service switch and service LED, internal self test, local set-point, switch state indication and programmable output function.

A number of connector schemes are supported:

- Communication and logic power: dual RJ45 phone or .2" center to center terminal locks.
- Center to center 0.1" Insulation Displacement Ribbon Headers or 0.1" center to center discreet wiring headers.

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

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.

- 2K Ram
- 512 Byte EEPROM on Neuron Chip for (Network Information).
- Voltage: Operating: 8V–18V DC; Max.: 7.5V–33V DC;
  Expanded voltage available.
- 10 Analog Switch outputs.
- 10 Switch inputs with status indicators.
- Max. Power: 6 Watts.
- Operating Temperature: -40° C to +85° C
- Storage Temperature: -60° C to +100° C

Dimensions

- Board Dimensions 6.25”w x 2.25” h x 1.25” deep
- NEMA 1 packaging is supported by a 7.25”w x 3.75” 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 package and connector configurations available by request

Transceiver Support

TELN 1265/1020 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 is supplied through the communication cable the supply provides positive and chassis ground voltages for the board logic and additional switch indicator LEDs.

Equipment

Techlon Provides:
- 1 TELN 1265/1020 Automotive Analog Switch Node unmounted or mounted in a NEMA 1 packaging supported by a 7.25”w x 3.75” h x 1.75”deep two-part irradiated aluminum chassis, with slots for mounting screws and an external 6-32 stud for chassis grounding. (Customized mountings are available.).

Must be supplied by customer:
- Power source: 12V DC, 500mA source for node logic.
- 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, Service LED will flash once quickly. After approximately 1 second the board will have completed self tests (All indicator LEDs on keypad will light up, first Red, then Green, then Off.) 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 has fault. Fuse may need to be changed.

The Service switch is used to initiate a network management message identifying the module to the network. The Reset switch resets system logic and forces all outputs to their OFF state.

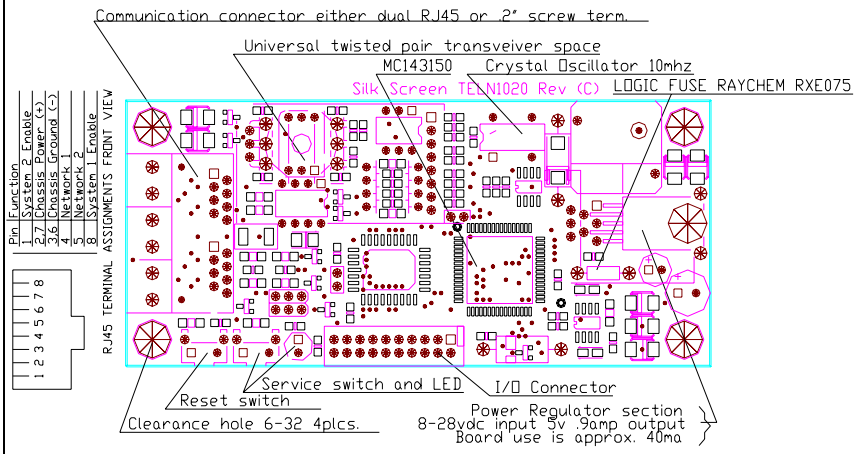
- The input network variables are used for controlling the TELN 1265/1020
- The output network variables are used for status from the TELN 1265/1020
- The Configuration network variables are used for the configuration of the TELN 1265/1020.

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 1020 Board



TELN 1265 Board

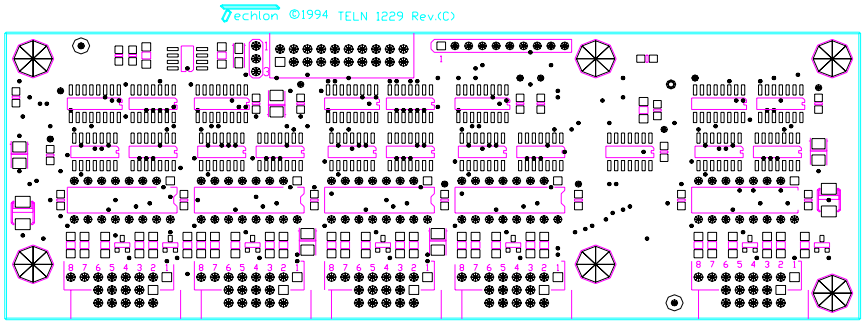


Figure 1.0 TELN 1265/1020 Automotive Anolog Switch Node

Installation

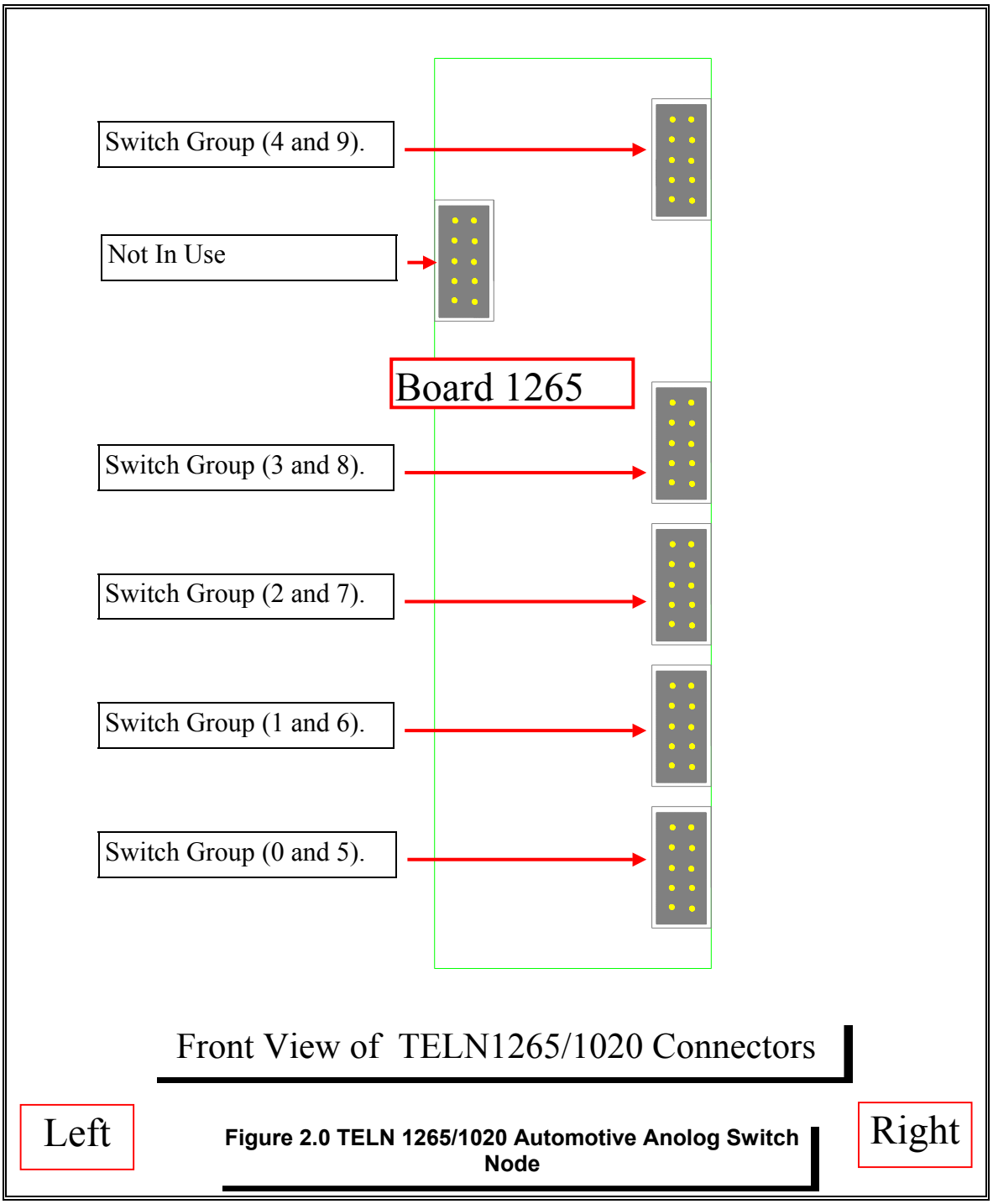


Figure 2.0 TELN 1265/1020 Automotive Anolog Switch Node

The TELN 1265/1020 may be connected to a standard 10 switch array.
To wire the TELN 1029/1020 Automotive Analog Switch Node:
1. Refer to figure 2.0 for connector locations. Connect wires into connectors as needed following location and descriptions from figure 2.0
2. Refer to figure 3.0 for wiring the switch group array and indicator lights.

Communications Cable RJ45 Installation.

RJ45 Communication Wire Schematic

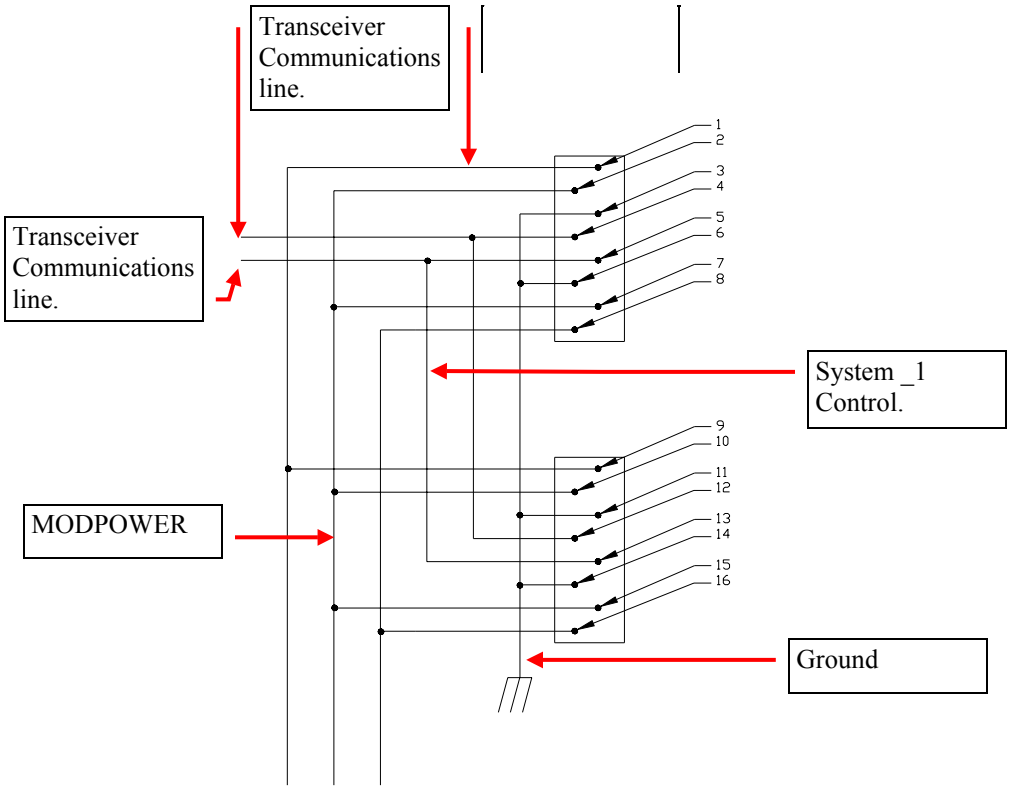


Figure 4.0 RJ45 Com. Connectors

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 1265/1020 may be used as a stand alone 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, 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 telephone type cable [RJ45] from the Network. This will be your network interface and power supply.

4. 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 1265/1020 board. At this time the network will be downloading application information to the node 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 2 indicator LEDs on the keypad provided for TELN 1265/1020 to blink for 10 seconds. Do a TEST of the TELN 1265/1020 node (See table 1.0 for more information).

5. This board can now be used for it's intended Network application.

Table 1.0 Test Results

Node TELN 1265/1020 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 1022.
Software Version:	The software version number.	This gives a version number for the application 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. Reset switch. 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 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 are due to a bad communications cable connection.
Receive trans. 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 and Appendix C for configuration Input Network Variables):

Back Light Color for the color of back lighting.

Back Light for the brightness of the back lighting.

Delay Time for the time delay of a switch action.

Led determines the led state.

On Color Determines the displayed led color for the on and error status conditions.

Switch Type for various possible switching actions.

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

Back Light Status for the Back Lighting.

Status of module.

Switch Status On/Off.

Appendix A: Input Network Variables

The module 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_backlight Type: Level Continuous, SNVT_LEV_CON	Determines the backlight brightness. The intensity level to set the backlight brightness ranges from: 0 to 100%. Full brightness. 0 = off.
NI_dummy[] Type: Level Continuous, SNVT_LEV_CON	Dummy input variable to help in binding.
NI_error_clear Type: Count 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_led[] Type: Level Continuous, SNVT_LEV_CON	Determines the state of each led. The possible led 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 push-button 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 led 0. Offset 1 is associated with led 1. Offset 2 is associated with led 2. Offset 3 is associated with led 3. Offset 4 is associated with led 4. Offset 5 is associated with led 5. Offset 6 is associated with led 6. Offset 7 is associated with led 7. Offset 8 is associated with led 8. Offset 9 is associated with led 9. Offset 10 is the condition of the second output associated with a Sequence Dual Output or Alternate Dual Output switch type.

Appendix B: Output Network Variables

The module uses the following output network variables they are ordered alphabetically by variable name, i.e., NO_*name*.

Output Network Variables	Subdivisions	Variable Description and Content
NO_bklite_status Type: Level Continuous, SNVT_LEV_CON		Back Light Status States: 0.0 = **Off** - The load is not energized. 0.5 = **Green** - The load is energized and no load errors indicated.
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_raw_reading[] Type: Int'l char set, SNVT_STR_INT		This shows each A/D readings in raw counts.Offset [0..11] are the Switch reading. Offset[12] is the Internal zero reading.
	wide_char[0]	Offset[0] for raw a/d reading on S1
	wide_char[1]	Offset[1] for raw a/d reading on S2
	wide_char[2]	Offset[2] for raw a/d reading on S3
	wide_char[3]	Offset[3] for raw a/d reading on S4
	wide_char[4]	Offset[4] for raw a/d reading on S5
	wide_char[5]	Offset[5] for raw a/d reading on S6
	wide_char[6]	Offset[6] for raw a/d reading on S7
	wide_char[7]	Offset[7] for raw a/d reading on S8
	wide_char[8]	Offset[8] for raw a/d reading on S9
	wide_char[9]	Offset[9] for raw a/d reading on S10
	wide_char[10]	Offset[10] for raw a/d reading on S11
	wide_char[11]	Offset[11] for raw a/d reading on S12
	wide_char[12]	Offset[12] for raw a/d internal zero reading

NO_status Type: Level Continuous, SNVT_LEV_CON		Indicates the board status. Module Status States. 0.0 = **Off** - Board not energized. 0.5 = **Green** - Board is energized and no errors indicated.
NO_Switch Type: Level Continuous, SNVT_LEV_CON		Indicates the state of each switch's status. 0.0 = 0% Switch off. 100.0= 100% Switch on. Offset 0 is associated with switch 0. Offset 1 is associated with switch 1. Offset 2 is associated with switch 2. Offset 3 is associated with switch 3. Offset 4 is associated with switch 4. Offset 5 is associated with switch 5. Offset 6 is associated with switch 6. Offset 7 is associated with switch 7. Offset 8 is associated with switch 8. Offset 9 is associated with switch 9. Offset 10 is the second output associated with a sequence dual output or alternate dual output switch type. Default = MAX_SWITCHES

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	Variable Description and Content
NI_back_color Type: Level Continuous, SNVT_LEV_CON	Determines the color of the backlight backlighting. This is the color the backlighting is when the backlight is turned on. The four possible colors are: 0.0 = Backlight is unconditionally off. 0.5 = Green. 1.0 = Red. 1.5 = Yellow. Default 0.5=Green.
NI_delay_time[] Type: Count, SNVT_COUNT	Variable delay timers are used for switch types: Delay_on (13-14.5). Delay_off (18-19.5). Delay_on_off (23-24.5). Timed_on (28-29.5). Four programmable times (seconds) that are used for the key types. Time 1 is used for key types 13, 18, and 23. Time 2 is used for key types 13.5, 18.5, and 23.5. Time 3 is used for key types 14, 19, and 24. Time 4 is used for key types 14.5, 19.5, and 24.5. Range is from 0 to 65535 seconds. Offset 0 is associated with time 1. Offset 1 is associated with time 2. Offset 2 is associated with time 3. Offset 3 is associated with time 4.
NI_on_color Type: Level Continuous, SNVT_LEV_CON	Determines the displayed led color for the on and error status conditions. 0.5 = Green is on, red is off. 1.0 = Red is on, green is off. Default 1.0 = Red.

NI_switch_type[ ] Type: Character SNVT_CHAR_ASCII	Switch types configuration declarations: 0-MOMENTARY 1-ALTERNATE 2-OLD_DELAY_ON 3-OLD_DELAY_OFF 4-OLD_DELAY_BOTH 5-STEP_UP 6-STEP_DOWN 7-ALT_CONTROL 8-DIM_UP_HALF (NOT SUPPORTED) 9-DIM_DOWN_HALF (NOT SUPPORTED) 10-SEQ_DUAL_OUT 11-ALT_DUAL_OUT 12-MOM_TOGGLE (UP FORWARD, MIDDLE OFF, DOWN BACKWARDS) 13-ALT_TOGGLE (SAME AS ABOVE, BUT HELD) 14-DIM_OFF_TOGGLE (UP FASTER, MIDDLE NO CHANGE,DOWN SLOWER AND OFF AND ON CAPABILITY) 15-DIM_TOGGLE (UP FASTER, MIDDLE NO CHANGE, DOWN SLOWER) 16-POT_UP (HIGHER RESISTANCE - FASTER) 17-POT_DOWN (HIGHER RESISTANCE - SLOWER) 20-MIN_DELAY_ON 30-MIN_DELAY_OFF 40-MIN_DELAY_BOTH 50-TIMED_ON 60-SWITCH_LIMIT Offset 0 is associated with switch 0. Offset 1 is associated with switch 1. Offset 2 is associated with switch 2. Offset 3 is associated with switch 3. Offset 4 is associated with switch 4. Offset 5 is associated with switch 5. Offset 6 is associated with switch 6. Offset 7 is associated with switch 7. Offset 8 is associated with switch 8. Offset 9 is associated with switch 9. Default = MAX_KEYS

Appendix D: Master SNVT List

The following is a list of SNVT types used with TELN 1265. SNVT types can be bound only with like SNVT types.

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

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: Switch Wiring Diagrams

Appendix G: Trouble Shooting

Problem:	Suggested Solution:
Keypad does not light during self test. Keys do not light when pressed.	1. FUSE blown. See figure. 1.0 and check for shorts to the keypad. The Fuse may need to be replaced
	2. No Power to system. A. Cable not in correct place; compare with figure 2.0 for cable placement, figure 3.0 for wiring schematic and figure 4.0 for communication and power supply. B. Power not on; verify with volt meter. C. Power supply insufficient: verify with volt meter.
	3. Keypad does not work or is not connected. See figure 2.0 for wire locations.
	4.*** Neuron Unconfigured. Load Configuration.
	5.* Neuron chip applicationless. Replace Node.
All keys indicate yellow led status and nothing responds.	This indicates low voltage supply. Voltage less than 8V.
Key pressed but no return status other than a **Flashing Red.**	1. This indicates that the key has been pressed but no return status given. Check to see if bound.
	2. Does not talk to network.
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 configuration.
	4. Compare communication cables to figure 4.0 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 draw. 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 to load your application to Configure the Neuron parameters.