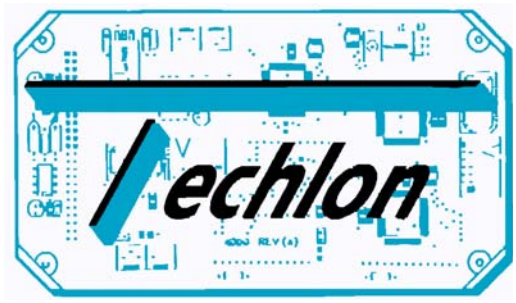


Simple.Sensible.Smart

TELN 1018
Automotive Four Channel Input Node
Version 1.0

Users Manual
January 1999

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

CONTENTS

TELN 1018
Automotive Four Channel Input Node

LonWorks™ TELN 1018
Automotive Four Channel Input Node

INTRODUCTION

Techlon's Automotive Four Channel Input Node (TELN 1018) is designed as a four digital switch input with open cable detection.

- Input signal : .15″ center to center terminal block.
- Communication and logic power: dual RJ45 phone or .2″ center to center terminal locks.

Contacts and Service Representatives:

Susan Gabel - President	Service 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
- 2K EEPROM on Neuron Chip for (Network Information).
- Voltage: Operating: 8V–18V DC; Max. 7.5V–33V DC
  Expanded voltage available.
- Operating Temperature: -40° C to +85° C.
- Storage Temperature: -60° C to +100° C.

Dimensions

- Board Dimensions 5.0”w x 2.0” h x 3/4” deep.
- NEMA 1 packaging is supported by a $5\frac{9}{16}$”w x $3\frac{1}{2}$” h x $1\frac{1}{4}$” deep two-part irradiated aluminum chassis, with slots for mounting screws and an external 6-32 stud for chassis grounding.

Transceiver Support

TELN 1022 Provides support for the following types of transceivers:

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

DC Power Supply Information

The recommended power supply is from 12 to 15 Vdc.

Equipment

Techlon Provides:

- 1 TELN 1018 4-Channel Input module unmounted or mounted in a NEMA 1 packaging supported by a 2.5”w x 5.5” 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 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, Service LED will flash once quickly. After approximately 1 second the board will have completed self-tests, and the module's LED indicators will indicate any changes to unit status:

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

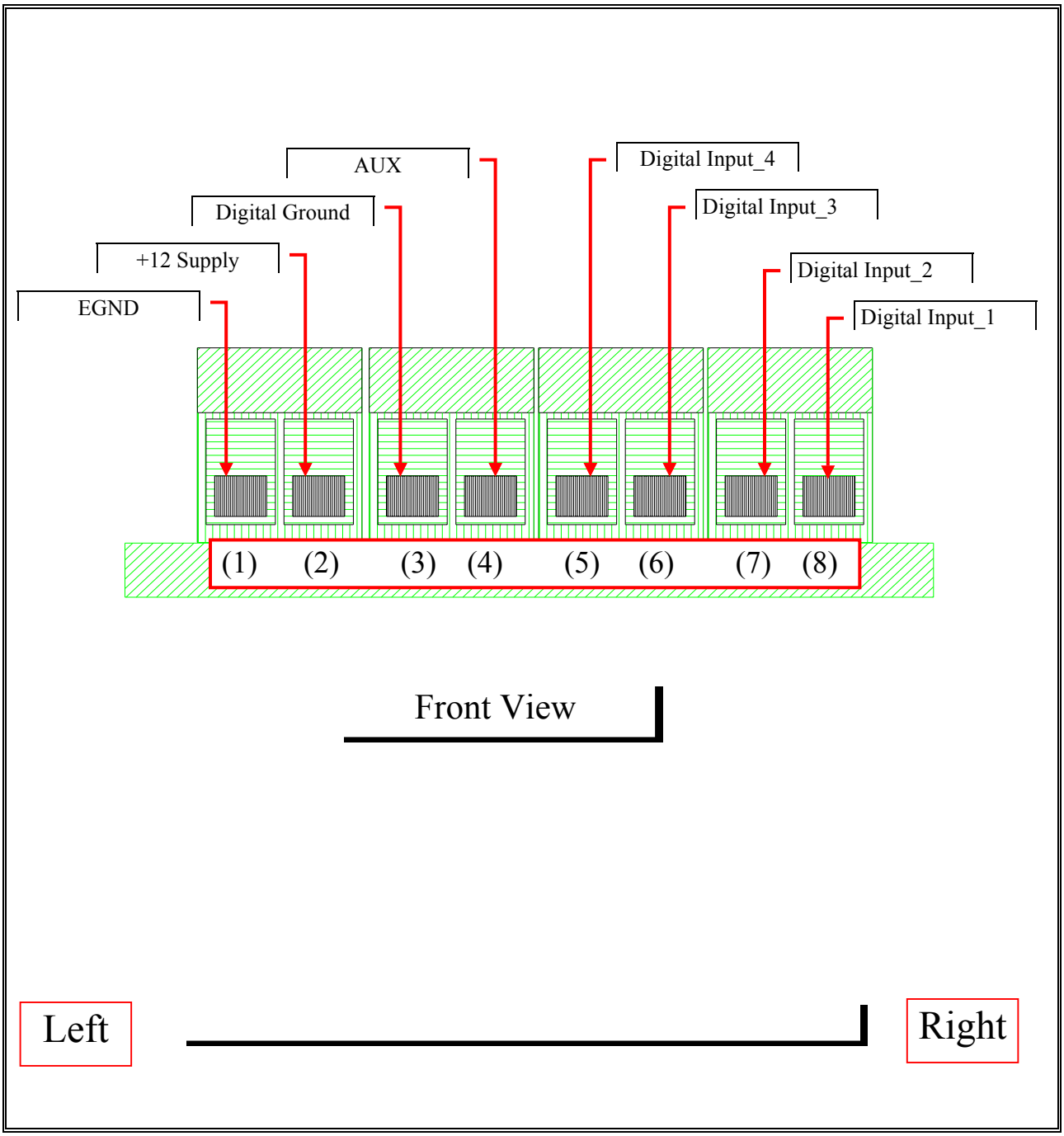
The Service switch is used to initiate a network management message identifying the module to the network. The Reset switch resets system logic and forces all outputs to there OFF state. The input network variables are used for controlling the TELN 1018.

- The output network variables are used for status from the TELN 1018.
- The Configuration network variables are used for the configuration of the TELN 1018

The Network Variables can be found in the following appendices.

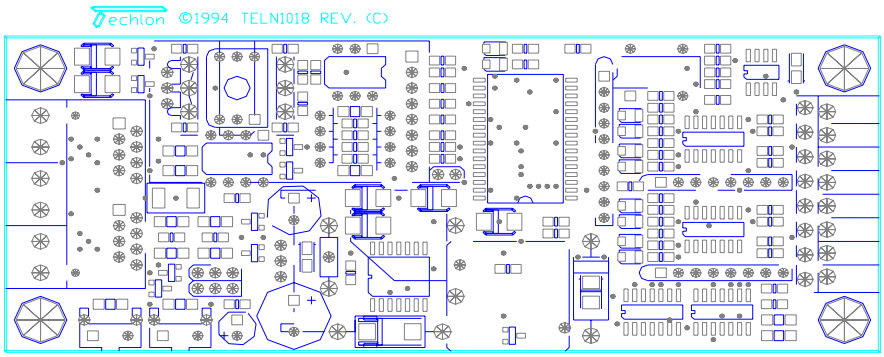
- Appendix A: has a list of Input Network Variables.
- Appendix B: has a list of Output Network Variables.
- Appendix C: has a list of the Configuration Network Variables.

Installation



Board Layout

T1018 Figure 2.0



T1018 Automotive Four channel Input Node Board Layout

Communication Cable RJ45.

RJ45 Communication Wire Schematic

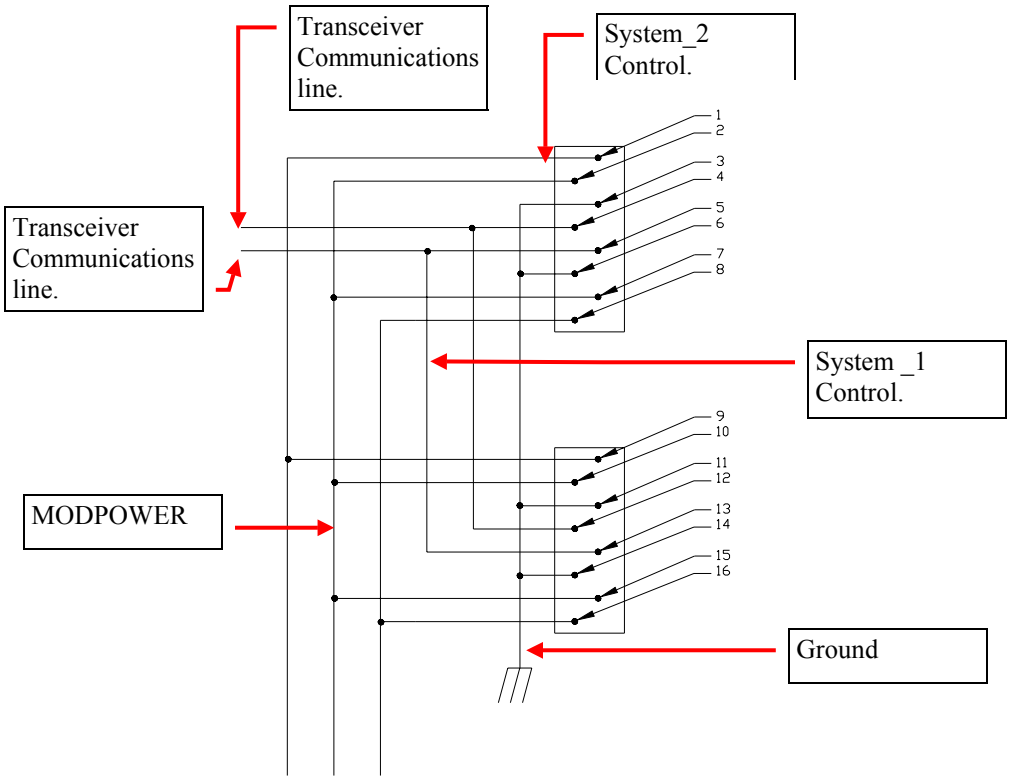


Figure 6.0 RJ45 Com. Connectors

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 1018 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 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 1018 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 a small LED on the TELN 1018 board to blink for 10 seconds. Do a TEST of the TELN 1018 node (See table 1.0 for more information).

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

Table 1.0 Test Results
Node TELN 1022 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 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 F:	The last error that occurred.
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 all 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 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):

AC heater enable

DC low power heater enable

DC high power heater enable

Water Heater enable

Load status by heating Zone location

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

Status of each Thermostat

Status of AC heater enable

Status of DC low heater enable

Status of DC high heater enable

Status of Water heater enable

Status of thermostats

Load Level output for each ZONE

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_ac_heat Type: Level Continuous, SNVT_lev_cont	Network Input For The Ac Heater Control Sets the heater type for an AC heater. State: ON or OFF
NI_dc_heat Type: Level Continuous, SNVT_lev_cont	Network Input For The Dc Heater Control Sets the heater type for a low power DC heater. State: ON or OFF
NI_high_heat Type: Level Continuous, SNVT_lev_cont	Network Input For The High Heat Control Sets the heater type for High Heat for a DC heater. State: ON or OFF
NI_load_status[ ] Type: Level Continuous, SNVT_lev_cont	Network Input For The State Of Each Of The Load Statuses The status are 0 = Off 100.0 = 100% = full On. Load Statuses Are As Follows. Offset [0] = Zone 1, Low Dc Heat Offset [1] = Zone 1, High Dc Heat Offset [2] = Zone 1, Ac Heat Offset [3] = Zone 2, Low Dc Heat Offset [4] = Zone 2, High Dc Heat Offset [5] = Zone 2, Ac Heat Offset [6] = Zone 3, Low Dc Heat Offset [7] = Zone 3, High Dc Heat Offset [8] = Zone 3, Ac Heat Offset [9] = Zone 4, Low Dc Heat Offset [10] = Zone 4, High Dc Heat Offset [11] = Zone 4, Ac Heat Offset [12] = Dc Heater Offset [13] = Dc Circulator □
NI_water_heat Type: Level Continuous, SNVT_lev_cont	Network Input For The Water Heat Control Sets the heater type for Water Heater. State: ON or OFF

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_ac_status; Type: Level Continuous, SNVT_lev_cont		Network Output For The Ac Heater Status Sends out a status for the Ac Heater: **OFF** = The AC heater is not enabled **GREEN** = The ac Heater is enabled
NO_dc_status; Type: Level Continuous, SNVT_lev_cont		Network Output For The Dc Heater Status Sends out a status for the DC Heater: **OFF** = The AC heater is not enabled **GREEN** = The ac Heater is enabled
NO_high_status; Type: Level Continuous, SNVT_lev_cont		Network Output For The High Heat Status Sends out a status for the DC Heater: **OFF** = The AC heater is not enabled **GREEN** = The ac Heater is enabled

NO_load_level[ ]; Type: Level Continuous, SNVT_lev_cont		Network Output For The Load Levels For Each Of The Loads Directly sets each output. 0 = Off 100.0 = 100% = full On. Load Outputs Are As Follows Offset [0] = Zone 1, Low Dc Heat Offset [1] = Zone 1, High Dc Heat Offset [2] = Zone 1, Ac Heat Offset [3] = Zone 2, Low Dc Heat Offset [4] = Zone 2, High Dc Heat Offset [5] = Zone 2, Ac Heat Offset [6] = Zone 3, Low Dc Heat Offset [7] = Zone 3, High Dc Heat Offset [8] = Zone 3, Ac Heat Offset [9] = Zone 4, Low Dc Heat Offset [10] = Zone 4, High Dc Heat Offset [11] = Zone 4, Ac Heat Offset [12] = Dc Heater Offset [13] = Dc Circulator
NO_thermostat[4]; Type: Level Continuous, SNVT_lev_cont		Network Output For The Thermostat Status The status for each connected thermostat. Offset [0] = Thermostat 1 Offset [1] = Thermostat 2 Offset [2] = Thermostat 3 Offset [3] = Thermostat 4 The status codes are as follow **OFF** = Off **GREEN** = On **RED** = Open line or thermostat not connected.
NO_water_status; Type: Level Continuous, SNVT_lev_cont		Network Output For The Water Heat Status Sends out a status for the DC Heater: **OFF** = The AC heater is not enabled **GREEN** = The ac Heater is enabled

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_setup = 0xbf Type: Level Continuous, SNVT_lev_cont		Network Input To Set The Type Of Heat In Each Zone Bits 0 & 1 = Zone 1, Bits 2 & 3 = Zone 2, Bits 4 & 5 = Zone 3, Bits 6 & 7 = Zone 4 First Bit (0,2,4,6) 0 = No Dc Heat 1 = Dc Heat Second Bit (1,3,5,7) 0 = No Ac Heat 1 = Ac Heat **Defaults** Zones 1,2,3 = Dc Heat Zone 1,2,3,4 = Ac Heat

Appendix D: Master SNVT List

The following is a list of SNVT types used with TELN 1022.
SNVT types can be bound only with like SNVT types.

Name	Measurement	Range (Resolution)
SNVT_LEV_CONT	LEVEL, CONTINUOUS	0..100% (0.5%)

Appendix F: 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 occurred	166
triac clockedge +- not supported	167
checksum error over system	168
state byte semaphore	192-223

Trouble Shooting

Problem:	Suggested Solution:
LED's do not light.	1. No Power to system. A. Cable not in correct place; compare with figure 1.0 for cable placement. B. Power not on; verify with voltmeter. C. Power supply insufficient: verify with voltmeter.
	2. The polarized LED's are in backwards.
	3. Switches do not work or are not connected correctly . See figure 7.0 for further detail on Tester.
	4. Neuron unconfigured. Load application. See Figure 5.0 for details.
	5. Neuron chip applicationless. Load application. See Figure 5.0 for details.
Switches do not work.	1. Resistors in tester not connected thus showing unconditionally open.
	2. Switch broken.
	3.Neuron Applicationless. Load application.
	4. Supply voltage incorrect. Use voltmeter and compare.
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. See Figure 5.0 for details.
	3. Unconfigured. Load application.
	4. Compare communication cables to figure 6.0 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. Verify with a meter.
For all other problem please consult your warranty contract or call the service representatives as listed.	

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 1018.
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 F:	The last error that occurred.
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 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 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 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.

RJ45 Communication Wire Schematic

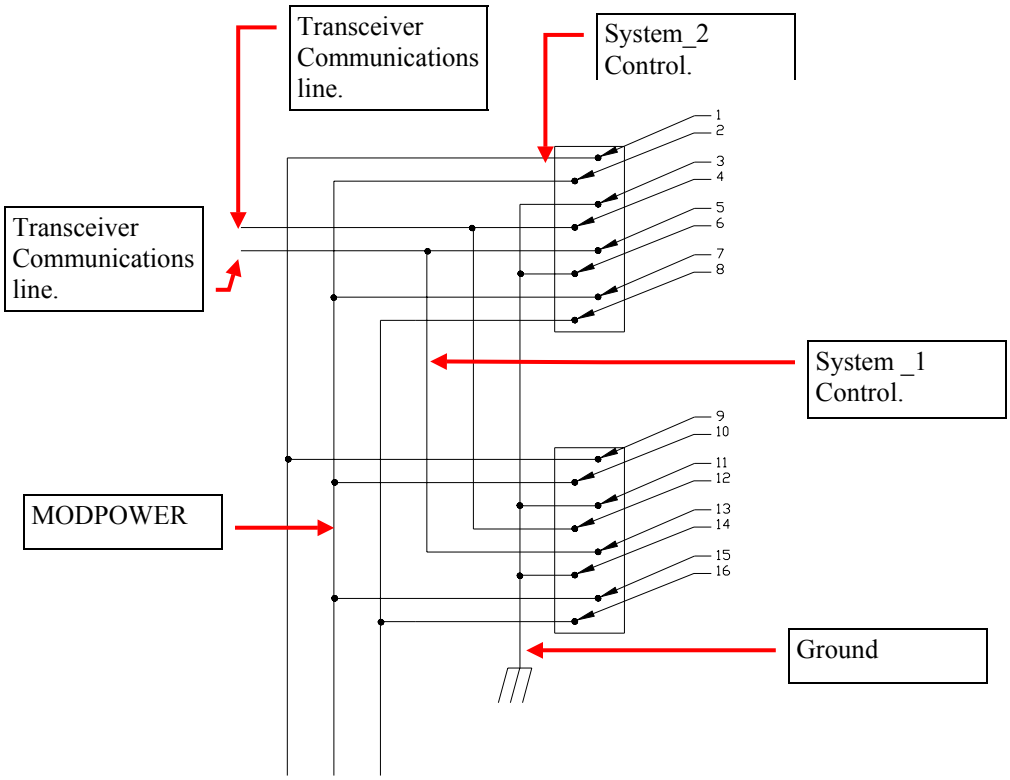


Figure 6.0 RJ45 Com. Connectors

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]