

TEST SET USER MANUAL

PE TS-103



**MONITORING & CONTROL SYSTEMS
HARDWARE & SOFTWARE**

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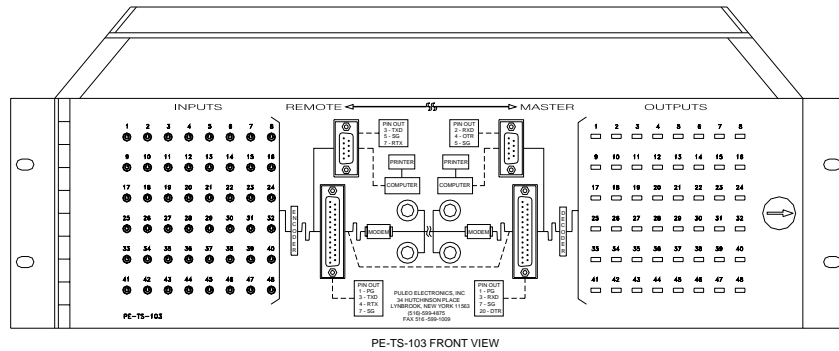
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General Description

This procedure describes the methods used to isolate a problem with a TDM system, using the TS-103 Test Set. It is designed to test the key components of the TMD system; Encoders, Decoders, and Modems.

The TS-103 Test Set is a complete TDM system in one self contained chassis. The left side of the chassis is set-up as a remote with convenient toggle switches to simulate alarms. The right side is set-up as a master with LEDS to display the decoded outputs. Connectors on the front and rear panels allow the test set to interface to the system under test. This allows for quick testing of systems in the field by swapping suspect equipment with known good equipment.

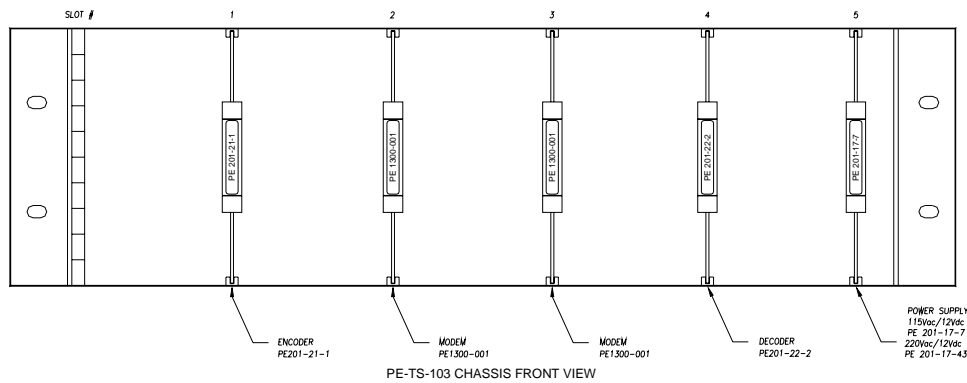


Since every TDM system is customized for a particular application, this procedure is meant as a guideline only. If you have special input/output wiring, optional input/output Relay Boards, parts of this procedure may not work.

TS-103 TEST SET CONFIGURATION AND VERIFICATION

The Test Set contains the following boards;

(1) Encoder : PE201-21-1	Simulates the remote site
(1) Modem: PE1300-001	
(1) Modem: PE1300-001	Simulates the master site
(1) Decoder: PE201-22-2	
(1) 115 Vac Power Supply	Powers the Test Set



SPECIFICATIONS

WEIGHT:	10 Pounds
CHASSIS SIZE:	17"W x 5 ¹ / ₄ "H x 12"D
OPERATING TEMPERATURE:	0 to +50 C°
COMMUNICATION OUTPUT OPTION:	DB9 & DB25 Port Modem line – Two Pair Banana Jacks (Red & Black)
INPUT SIGNAL OPTION:	48 Toggle Switches J1 AMP Connector & TB1 Screw Terminals
OUTPUT SIGNAL OPTION:	48 Front Panel LEDS J2 AMP Connector & TB2 Screw Terminals
POWER INPUT:	AC 115V OR 220V
ENCODER BOARD;	
SIZE OF P.C. BOARD:	4.5" X 6.5"
CARD EDGE FINGERS:	55-56 Spacing .125"
MAXIMUM CONTACT RESISTANCE:	1K ohm
INPUTS:	Up to 48 inputs, accepts dry contacts/open collector outputs or 5V logic, Selectable all Normally Open / Normally Closed
OUTPUTS:	Selectable RS232 / RS422, (1) RS232 output Flag pulled-up to 12V.
BAUD RATE:	300, 1200, 2400, 9600, 19,200 or 38,400.
CODE FORMAT:	Asynchronous, 1 start and stop bit, Selectable 7 data bits No Parity (7N1) or 7 data bits Even Parity (7E1)
PROTOCOL:	Puleo Encoder/Decoder – open source
CHAR DELAY TIME:	Selectable 1ms / 2.5 ms
REMOTE ACKNOWLEDGE:	Annunciator Ack triggered by Puleo NMS Alarm software
POWER REQUIREMENTS:	11 to 13 Vdc, 125 mA, 5% or better regulation
DECODER BOARD;	
SIZE OF P.C. BOARD:	4.5" X 6.5"
CARD EDGE FINGERS:	55-56 Spacing .125"
OUTPUTS:	48 open collector outputs, rated 85 Vdc max, 175 mA sink current. Optional Surge Suppression Line required for inductive loads
BAUD RATE:	300, 1200, 2400, 9600, 19,200 or 38,400.
CODE FORMAT:	Asynchronous, 1 start and stop bit, Selectable 7 data bits No Parity (7N1) or 7 data bits Even Parity (7E1)
PROTOCOL:	Puleo Encoder/Decoder – open source
DECODING TIME:	Based on received Encoder data rate.
SERIAL INPUT:	Selectable RS232 / RS422, RS232 output Flag pulled-up to 12V.
SECURITY:	On Loss of data or error, Selectable for • Freeze last known outputs • Reset all outputs to Off state after 2 seconds
WATCHDOG TIMER:	Attempts to restore lost PE 528 Ethernet connections.
REMOTE ACKNOWLEDGE:	Annunciator Ack triggered by Puleo NMS Alarm software.

MODEM BOARD;

SIZE OF P.C. BOARD: 4.5" X 6.5"
CARD EDGE FINGERS: 22-44 Spacing .156"
TRANSMIT (TX) LEVEL: -9dbm (Adjustable)
RECEIVE (RX) LEVEL: -14dbm (Adjustable)
BAUD RATE: 300 & 1200
COMMUNICATION OPTION: 2 or 4 wire / Half or Full Duplex

POWER SUPPLY BOARD;

SIZE OF P.C. BOARD: 4.5" X 6.5"
CARD EDGE FINGERS: 22-44 Spacing .156"
TOGGLE SWITCH: Off/On
INDICATOR: Red = DC Output
NOMINAL INPUT VOLTAGE: 115 VAC
INPUT OPERATING RANGE: 70 to 140 VAC
NOMINAL OUTPUT VOLTAGE: 12 VDC (Adjustable)
OUTPUT POWER: 100 Watts Max
REGULATION: 0.2% Max
RIPPLE/NOISE: 3% Max
PROTECTION: Overvoltage, Overcurrent,
Thermal

CARD EDGE FINGERS:

- 1 +12Vdc Output
- 3 Ground, Output

- 18 Chassis Ground
- 20 AC Input
- 22 AC Input

SYSTEM TROUBLESHOOTING

OVERVIEW

The best troubleshooting approach is to quickly determine if the problem is at the master or remote end of the system. This can quickly be determined by substituting the Test Set for the remote or master end. Once the problem is localized to the remote or master end the exact problem can be pinpointed using the test modes described below;

TEST SET TROUBLESHOOTING MODES

Shut power off to your TDM system and disconnect the communications cable to the devices.

1) Remote Simulator

For RS232 Communication

Connect the Test Set's left DB9 or DB25 connector to the master chassis corresponding DB9 or DB25 connector with a RS232 cable. If the chassis is a DTE device, a null modem adaptor may be required.

Using Modems Communication

Connect the Test Set's left banana jacks to the communication screw terminals of master end chassis.

Remove **right** side Modem and Decoder board from the Test Set. Power up the master chassis and Test Set.

One at a time, simulate alarm with the Test Set's toggle switches. Verify that the master end's annunciator or user's equipment responds.

2) Master Simulator

For RS232 Communication

Connect the Test Set's right DB9 or DB25 connector to the remote chassis corresponding DB9 or DB25 connector with a RS232 cable. If the chassis is a DTE device, a null modem adaptor may be required.

Using Modems Communication

Connect the Test Set's right banana jacks to the communication screw terminals of Remote end chassis.

Remove **left** side Modem and Decoder board from the Test Set. Power up the remote chassis and Test Set.

One at a time, simulate alarms at your Remote. Verify that the Test Set's LED's are responding to your Remote's alarms.

3) Contact Simulator

Remove Encoder board from Test Set.

Connect your Remote Encoder's input cable to J1 Encoder input on the rear of the Test Set.

One at a time set toggle switches up to simulate alarms. Verify that your master end's annunciator or user's equipment responds.

4) Load Simulator

Disconnect J3 ribbon cable from rear of Test Set. Connect the Decoder output from your TDM system to the J3 connector on Test Set. Simulate alarms from your TDM system and verify the corresponding LED's light on Test Set. If no response, connect black test point (Grd) on Power supply board from your TDM system to black test point on the Test Set's Power Supply board. Retest again.

5) Board Checker

Any suspect boards from your TDM system can be tested in the Test Set by substituting your boards in the appropriate slots.

Before installing suspect boards to the Test Set, check all the straps on the boards. If necessary reconfigure the straps. The straps setting refer to page 6,7 and 8. The Modem (PE1300-001) only supports Baud Rate 300 & 1200. This Test Set is designed for test 2 wire half duplex communication. For 4 wire full duplex modems, reconfigure them to 2 wire half duplex before testing.

Some TDM system does not use Modem (PE1300-001), remove the modem from the Test Set, and connect Null Modem adapter and RS232 cable or DB25 cable from the left to the right connectors (9-pin) or connectors (25-pin).

For design using Modem (PE1300-001) TDM system, just connect the red and black jumpers across the banana jacks of the front panel.

To starting test, power up the Test Set by turn power supply board toggle switch to the on (up) position. Switch Test Set's toggle switches one at a time and verify that corresponding output LED's is lit.

Finish the test. Remove the boards out and recheck the straps again, make sure they match actual TDM system.

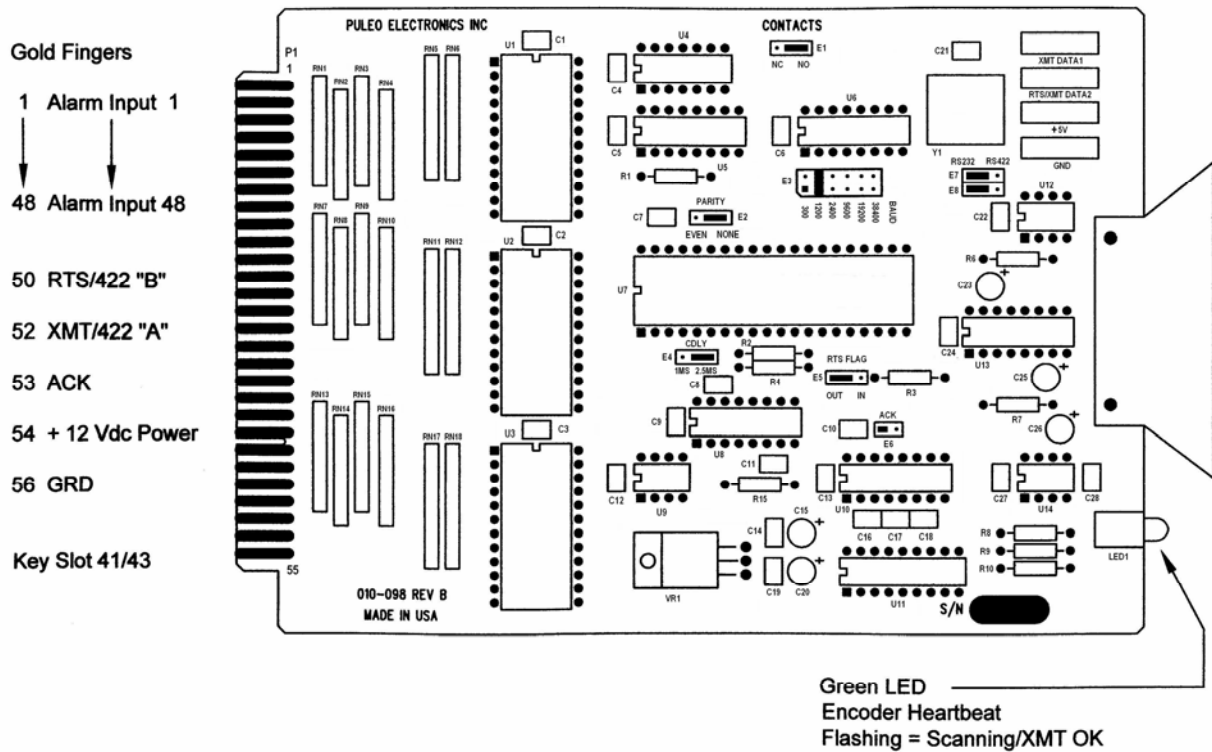
Caution:

Do not test your power supply board in the Test Set unless they are PE201-17-43 model.

If the Test Set shows your board(s) are bad, double check your input/output wiring. A wiring problem could damage the known good test board if you plug it into your system.

Appendix A - Encoder Tech Note

Encoder Board Layout PE-201-21-1



Strap Selections

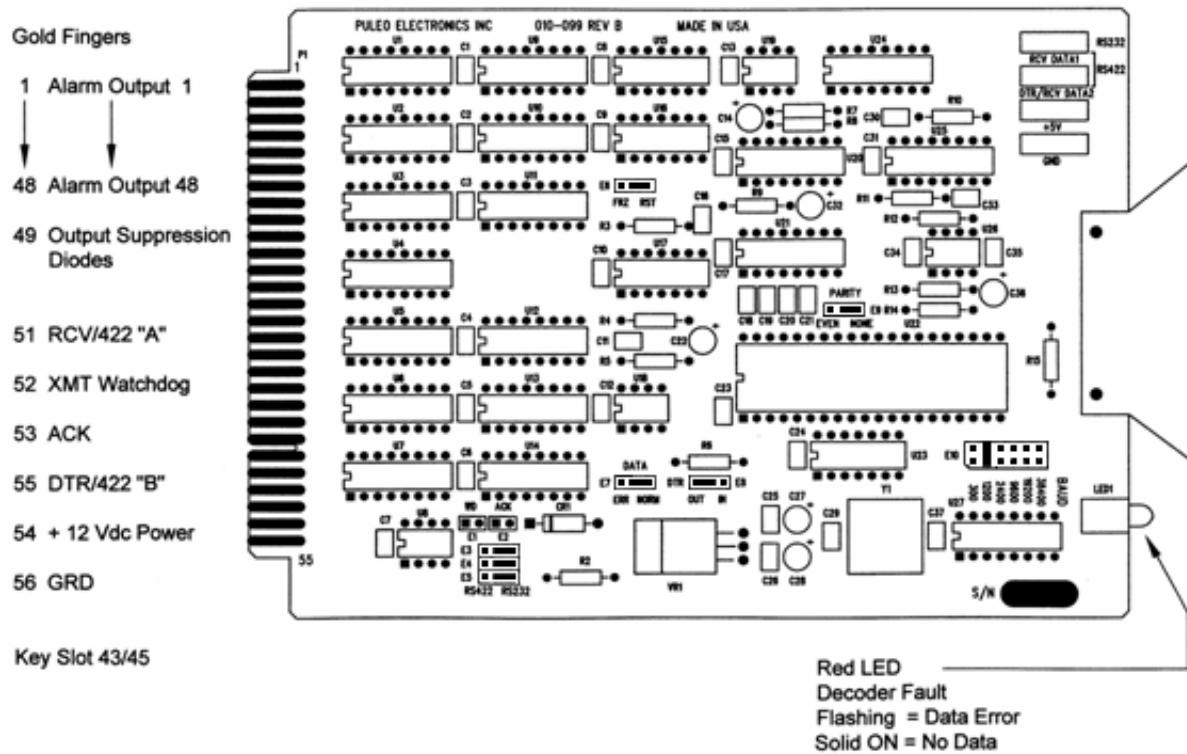
Note: All Straps shown in factory default positions.

E1 Contacts	- Sets all Contact inputs for <i>Normally Open</i> or <i>Normally Closed</i> operation
E2 Parity	- Sets Parity for <i>Even</i> or <i>None</i>
E3 Baud	- Sets Data transmission rate to 300, 1200, 2400, 9600, 19200 and 38400
E4 CDLY	- Sets intercharacter delay to 1ms or 2.5ms
E5 RTS Flag	- Sets flag at static 12V in <i>Out</i> position, acts as ACK trigger for Input position
E6 ACK	- Allows Computer to generate ACK output for Annunciators
E7 RSxxx	- Strap Pair sets Transmission type to <i>RS232</i> or <i>RS422</i>
E8 RSxxx	

1. Baud, Parity and Transmission type must match the Computer or Decoder receiving device.
2. Always start with the 2.5ms Character delay. After establishing communications with the receiving device the 1ms settings can be used if the receiving device is fast enough to maintain reliable communications.
3. Optional ACK can be used with Puleo NMS Alarm software to perform simultaneous Annunciator Acknowledge (RS232 mode only, See NMS manual for more information).
4. ACK feature not compatible with older Chassis, RS422 feature may not be compatible with some older Chassis.

Appendix B - Decoder Tech Note

Decoder Board Layout PE-201-22-2



Note: All Straps shown in factory default positions.

- E1 WD - XMT Watchdog restores lost PE 528 Ethernet Adapter connections
- E2 ACK - Allows Computer to generate ACK output for Puleo's Annunciator.
- E3 RSxxx - Straps sets Transmission type to RS232 or RS422
- E4 RSxxx
- E5 RSxxx
- E6 FRZ/RST - On loss of communications *Freezes* output data, or *Resets* outputs after 2 sec
- E7 DATA - Selects Output 48 for Normal Alarm Date or Fault Error
- E8 DTR Flag - Sets flag at static 12V in Out position, acts as ACK trigger for input position
- E9 Parity - Sets Parity for Even or None
- E10 Baud - Sets Data receive rate to 300, 1200, 2400, 9600, 19200 and 38400

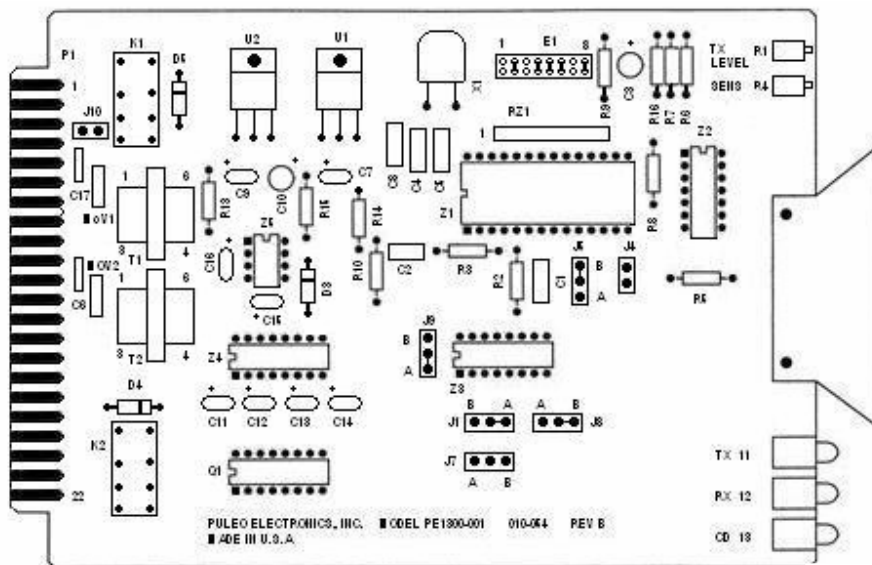
1. Baud, Parity and Transmission type must match the Computer or Encoder transmitting device.
2. Optional ACK can be used with Puleo NMS Alarm software to perform simultaneous Annunciator Acknowledge (RS232 mode only, See NMS manual for more information).
3. Optional WD not used with full duplex system (Encoder/Decoder)
4. ACK , WD feature not compatible with older Chassis, RS422 feature may not be compatible with some older Chassis.

Appendix C - Modem Tech Note

Modem Board Layout PE-1300-001

Gold Fingers

- 1 22
- 2 Grd
- 3 +12V
- 5, 6 Receive 4 Wire
- Mode Only



Note: Not all components installed, options exist.

Red Flashing-TX
 Amber Flashing-RX
 Green Steady- CD

Strap Selections

Note: All Straps shown in factory default positions.

CONFIGURE COMMUNICATIONS MODE BY POSITIONING JUMPER E1			
MODE	S1	S2	S3
4 WIRE	OFF	OFF	ON
2 WIRE	OFF	ON	OFF

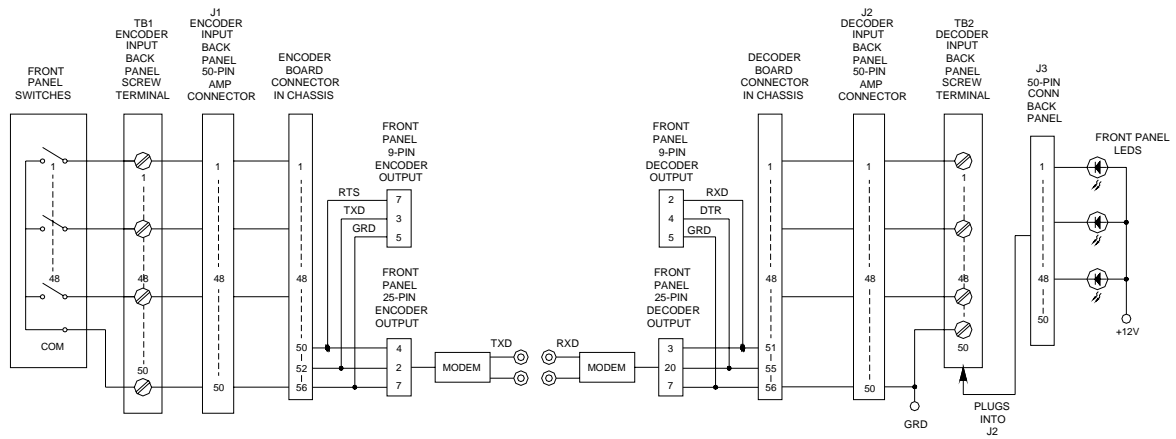
CONFIGURE BAUD RATE & DUPLEX BY POSITIONING JUMPER E1										
	REMOTE SITE					MASTER SITE				
	S4	S5	S6	S7	S8	S4	S5	S6	S7	S8
Half Duplex & 1200 Baud*	ON	ON	ON	OFF	ON	ON	ON	ON	OFF	ON
Full Duplex & 300 Baud	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF
Full Duplex & 1200 Baud**	OFF	ON	ON	OFF	ON	OFF	ON	ON	OFF	ON

* This setting also support Encoder and Decoder at 300 Baud Rate

** Full Duplex 1200 Baud only for 4 Wire application

The Modem Board allows the Encoder and Decoder boards to communicate with other sites using FSK communications. It supports several communication configurations over dedicated copper pairs or leased line. Up to 10 miles id possible using 24 AWG dedicated copper pairs. The distance is unlimited for lease line or connecting to T1 voice grade Muxes.

This Modem Board only supports 300 and 1200 Baud Rate, verify the Encoder (PE201-21-1) and Decoder (PE201-22-2) match the modem setting.



PE-TS-103 Block Diagram