PXL-500 RS-485 Network Test
Reference Document

This network test is designed to help diagnose RS-485 communication network problems. It identifies controllers that are not communicating, and then helps determine if the fault lies in the RS-485 communication wiring to the controller or if it is a damaged RS-485 driver IC (U1 - typically caused by a power surge such as a lightning strike). You should have an RS-485 Network IC kit (Keri P/N 05375-001) on hand when performing this test.

1.0 Testing an RS-485 Communication Network

From *Doors*, perform a system status test from the Setup > System > Controller Status pull-down menu option. Verify the list of controllers displayed in *Doors* versus your physical list of controllers and their addresses. Note any differences between the two lists.

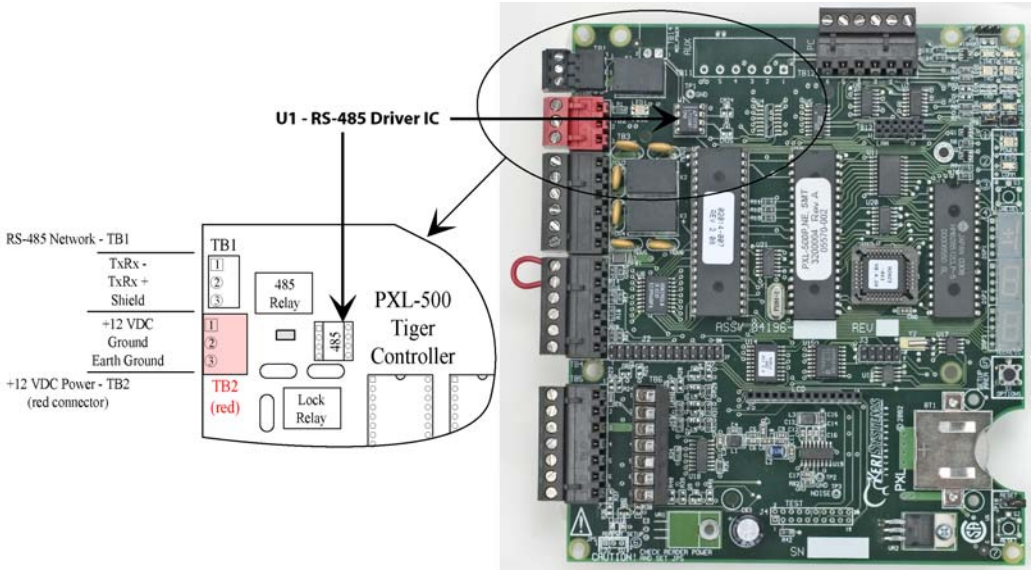

Figure 1: TB1, TB2, U1

1.1 Single Controller Fault

If only **ONE** unit from your physical list does not appear in the *Doors* list:

1. Locate the controller not found in the *Doors* list.
2. Verify the daisy-chain wiring for the –TxRx line and +TxRx line is installed correctly and wire has been metered for continuity and shorting to ground.
3. Verify the controller is receiving +12 VDC at the controller.
4. Verify the controller address is correct.
5. If wiring, voltage, and address are all correct, replace the unit and retest the system.

1.2 Multiple Controller Fault

If **more than one** controller from the physical list does not appear in the *Doors* list:

1. Note the addresses for the controllers not found in the *Doors* list.
2. Locate the first controller not found in the *Doors* list.
3. Verify the daisy-chain wiring for the –TxRx line and +TxRx line is installed correctly.
4. Verify the controller is receiving +12 VDC at the controller.
5. Verify the controller address is correct.
6. If wiring, voltage, and address are all correct, remove power from the controller.
7. Remove the TB1/RS-485 connector from the controller. For the following steps, refer to Figure 1 on page 1.
8. Using a DVM, measure the resistance from TB1-pin 1 (–Tx/Rx line) to TB2-pin 2 (Ground). Check for resistance.
9. Using a DVM, measure the resistance from TB1-pin 2 (+Tx/Rx line) to TB2-pin 2 (Ground). Check for resistance.
10. If there is a dead short or resistance close to a dead short, remove the UI chip (PXL-500s only) and repeat the test. If the short remains, replace the controller panel. If the short is open, replace the UI chip.

NOTE: A controller with an internal short on the RS-485 communication line can affect multiple units on the communication line, taking them offline. You must proceed through the list, one unit at a time, until the faulty controller is found. If the RS-485 line experienced a voltage surge, such as a lightning strike, several units may have been damaged.

1.3 Additional Testing

If the RS-485 metering test fails to yield any helpful results, there are additional methods that may be employed to locate panels experiencing connection issues.

1.3.1 Trial and Error Method

Due to the nature of the RS-485 protocol, communication issues can be tricky and deceiving. If a site has ten PXL-500s and that site has experienced a power issue, such as a lightning strike, the entire network will have to be checked. For instance: PXLs addressed #1, #2, #3, #6, and #9 may appear online in the controller status window of *Doors* after a status is performed and all other PXLs may appear as offline. This can be deceiving because one or more of the panels that appear as online may still be the problem. This is why trial and error works best in most situations.

1.3.2 Daisy-Chain Topology

Another medthod to try, in a strait daisy-chain topology, to unplug the RS-485 plug (TB1) from panels #6 through #10 so that only panels #1 through #5 are connected to the RS-485 network. This will essentially break the network in half. If #1 through #5 come online after performing a new controller status, add panels back to the RS-485 network one at a time by plugging TB1 back in. Perform a new controller status each time a panel has been added back to the RS-485 network until the offending panel or panels are found.

1.3.3 Peripherals Test

If no offending panels are found using either of the above methods, remove all peripherals from all of the panels (such as, readers, locks, RTE or motion sensors, door contacts, alarms, etc.) and try the test again. Be sure to label terminal blocks so they can be plugged back in later to the correct terminal block.

Run all panels on battery backup power, if possible, making sure the battery is at +12vDC. If all panels come online after performing a new controller status in *Doors*, plug in one peripheral at a time. Perform a new controller status following the re-attachment of each peripheral until the offending peripheral is found.

1.3.4 T-Tap and Star Topologies

These configurations are much more complicated to troubleshoot because an RS-485 network map has to be created if one does not already exist. This map is needed to locate the panels to make it possible to know in which order each panel is to be removed from the RS-485 network. For instance: in a star topology there might be three legs of the RS-485 wire running off of the master controller to other controllers. Remove these legs and test one leg at a time to find out if one leg of the RS-485 network is dragging down the others. The idea is to use the map along with the trial and error method to find the offending panel(s).

2.0 Contact Keri Systems

Keri USA	Keri UK, Ireland, Europe
2305 Bering Drive San Jose, CA 95131	Unit 17 Park Farm Industrial Estate Ermine Street Buntingford Herts SG9 9AZ UK
Telephone: (800) 260-5265 (408) 435-8400	Telephone: + 44 (0) 870 444 7234
Fax: (408) 435-7163	Fax:+ 44 (0) 1763 274 106
Web: www.kerisys.com	Web:www.kerisystems.co.uk
E-mail: sales@kerisys.com techsupport@kerisys.com	E-mail:sales@kerisystems.co.uk tech-support@kerisystems.co.uk

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