



QD1010b

USB to RS-485 Communications Converter

Description

The QD1010b is a USB to RS-485 communications converter used to allow TCS Basys Controls controllers to communicate with a PC.

Material List

- QD1010b communications converter
- RJ11 flat, 3' long, 6 conductor cord, (phone cable)
- 120 Ω termination resistors (2 included, 1 onboard)
- USB cable (A Male to B Male), 6' length

General Use

The QD1010b is used to connect with a computer running windows with TCS Insight installed or QD/QWL Gateway to a network with up to 4000' of wire, and up to 64 thermostats, and/or controllers. Thermostats and controllers will be referred to as controllers throughout the rest of this document. For networks larger than 64 controllers, one or more additional QD1010b's will be needed.

There are two ways to use the QD1010b to establish communications between a PC and one or more controllers.

1. Using the six conductor cord (included with the QD1010b) to plug directly into a controller.

NOTE: Plugging into one controller on a network gives access to the whole network. This should be only used as a temporary connection, not a permanent one.

2. Connecting the RS485 network (one or more controllers) directly to the terminal block on the QD1010b.

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Setup

All of the controller addresses on the network must be unique.

There is a jumper selection labeled "120 Ω ". Placing a jumper here installs a 120 Ω terminating resistor at the QD1010b. See RS485 Wiring and Setup on Page 3 for a complete discussion on the use of terminating resistors.

USB Cable Use

Plug the B male end of the USB cable into the USB port on the QD1010b. Plug the A male end of the cable into any available USB port on your PC or QD/QWL Series device.

NOTE: Windows should automatically detect and install the correct driver, however this driver is included with the TCS Insight software which can be downloaded from the TCS Basys Controls website (www.tcsbasys.com).

QD1010b/RS-485 Phone Cord Setup

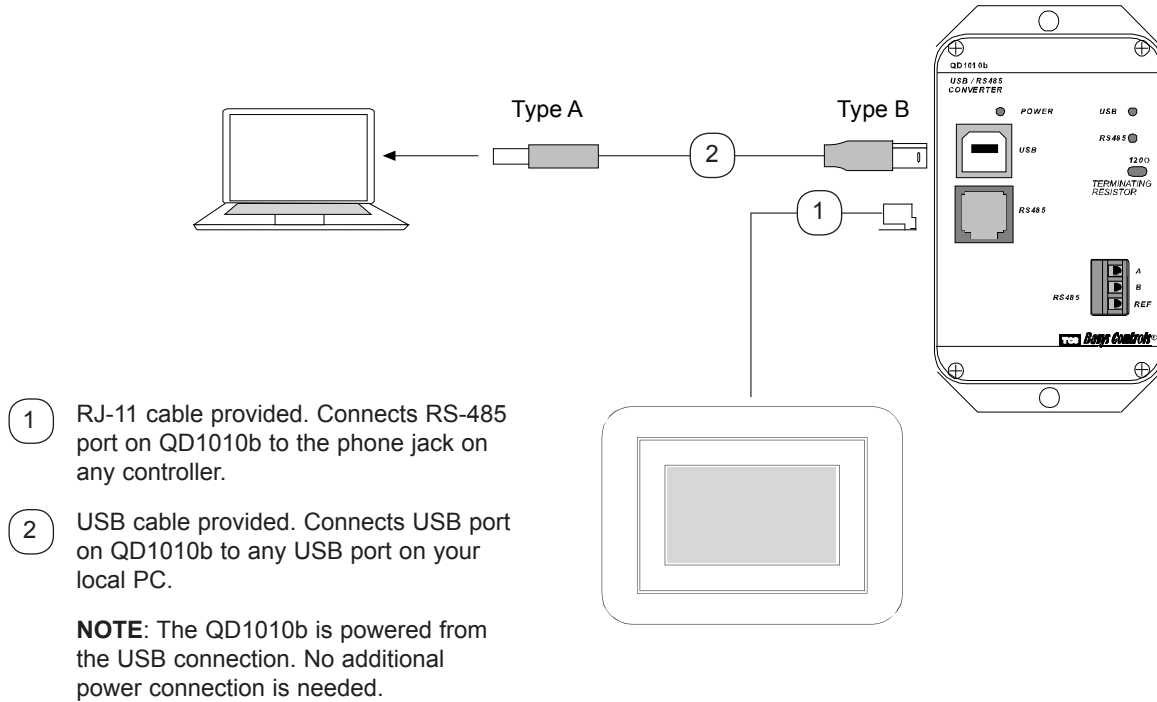
Plug one end of the RJ11 cable (included with the QD1010b) into the phone jack on any controller, and plug the other end of the cable to the RS-485 port on the QD1010b. See Figure 1.

QD1010b/RS-485 Wired Network Setup

Connect the "A", "B", and "REF" wires from the network to the terminals labeled "A", "B", and "REF" on the QD1010b. If you only have 2 wires available, you can just use the "A" and "B" terminals on the QD1010b.

NOTE: DO NOT use the shield drain wire as the "REF" wire.

Figure 1. Communications with a stand-alone thermostat.



Controller RS-485 Network Wiring & Setup

Use 22 AWG, twisted shielded 3-conductor cable for network wiring.

Network wiring should start at one controller and go to the next and then go to the next, and so on until the final controller is reached. Wiring is such that all "A" wires are connected to "A" wires, all "B" wires are connected to "B" wires, and all "REF" wires are connected to "REF" wires. A 120 Ω terminating resistor should be placed at each of the two ends of the network directly across the "A" and "B" wires.

If the QD1010b will be at one end of the network, you can use its built-in 120 Ω terminating resistor by placing a jumper on "OUT 120 Ω", or one can be hard wired across the "A" and "B" terminals at the QD1010b.

NOTE: A maximum of 2 terminating resistors can be used. See Figure 2.

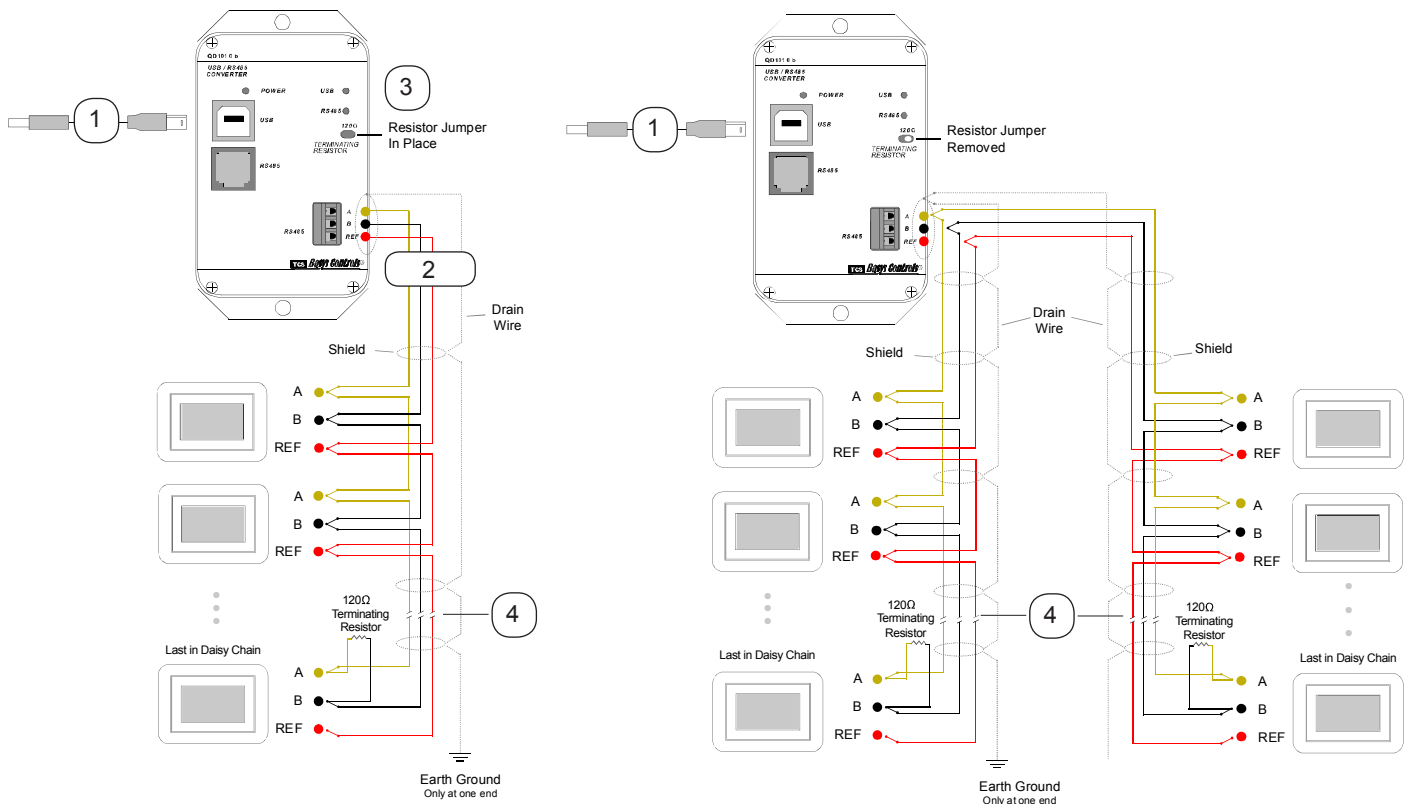
If the QD1010b will be in the middle of the network, or if an external terminating (also referred to as "balancing") resistor is used, the jumper on "120 Ω Terminating Resistor" **must** be removed. See Figure 3.

On small networks, you may find you do not need any terminating resistors. If a terminating resistor is not needed, the jumper on "120 Ω Terminating Resistor" **should** be removed.

Finally, connect one end (ideally the furthest end from the QD1010b) of the shield wire of the network wiring to earth ground.

Note: In the middle of the network, all network wiring shields should be twisted together and taped off to prevent accidental grounding. More than one ground on the network wiring can result in communication failure.

Figure 2. Communications with a network of thermostats/controllers, QD1010b at end of network and middle of network.



① USB cable provided. Connects USB port on QD1010b to any USB port on your local PC.

② Shielded, twisted 3-conductor communications wiring with one end earth grounded. (120 Ω balancing resistors provided.)

③ Use terminating resistor jumper when connecting at end of network

④ Can use up to the total of 64 controllers. For more controllers, will need to add another QD1010b

NOTES:

1. The QD1010b is powered from the USB connection. No additional power connection is needed.
2. If using more than 64 controllers more than one QD1010b will be needed.
3. Each controller must use the same baud rate and be assigned a unique address.

Troubleshooting Communications

Once a network is wired, you should test communications with all controllers on the network. This can be done using the TCS Insight software to find out which controllers communicate, and which ones don't. Go to the controllers that don't communicate and verify that the "A", "B", and "REF" wires are not switched. Verify the controller has the correct, unique address and its baud rate is correct as well. One of these three issues is usually the problem.

If you are still having trouble with communications, attempt to read the controller (monitoring or programming tabs) and watch the QD1010b's RS-485 (yellow) and USB (green) LEDs. The "USB" (green) LED blinks when communication is coming into the "USB" port from the PC. The "RS-485" (yellow) LED blinks when communication is coming into the "RS-485" terminal block from a controller. See the chart below for help.

IF	THEN
The RS-485 or USB LEDs never light.	Check that the QD1010b has power. The Power LED should be lit. Check that you have chosen the correct USB port for the computer in TCS Insight software.
Green LED blinks, Yellow LED is always off. If this happens, the computer is sending, but the controller is not responding.	Check that the baud rate set on the computer and controller(s) are all set the same. Verify controller address.
Both green and yellow LEDs will blink. Both the computer and the controller are responding, but you still receive communication errors.	Check the network wiring. Make sure that communication wiring runs are at least 5' away from fluorescent lights, motors, etc. Make sure that all controllers on the network have a unique address.
Yellow LED is always on. This is typically a problem with wiring.	Make sure that the "A", "B", and "REF" wires are not switched or shorted. Make sure that there is no stray voltage on the "A" and "B" wires. "A" to "B" should measure between 1 VDC and 4 VDC. "A" to "B" should measure 0 VAC. "A" to "REF" should measure between 0 VDC and 1 VDC. "B" to "REF" should measure between 2 VDC and 5 VDC. "A" to "REF" and "B" to "REF" should measure 0 VAC. "A" to "Shield" and "B" to "Shield" should measure 0 VAC and 0 VDC.
Communication errors/problems.	On smaller networks, try removing one of the two terminating resistors.