RS-485 Option Card

NPB-2X-485

INSTALL SHEET

This document covers the mounting and wiring of the NPB-2X-485 option card in a Tridium® JACE® controller, including models T-200/600 (JACE 2/6), T-700 (JACE 7), T-202/602-XPR (M2M JACE), or Security JACE series.

Table 1 NPB-2X-485 option description.

Description	Notes / COM Port Assignments
Dual port, optically isolated RS-485 adapter, with two 3-position, removable screw-terminal connector plugs. See Figure 3 on page 2 for location of Option Slots 1 and 2 on a T-200/600.	Recent option cards have jumpers for enabling onboard bias resistors. See "Preparation," page 1, for more details. Most JACE models have two option slots, where COM assignments are: • T-200/600, Security JACE: If *single* RS-485 option in Slot 1: COM3, COM4. If *two* RS-485 options, ports are Slot 1: COM3, COM4 and Slot 2: COM5, COM6. • T-700: If *single* RS-485 option in Slot 1: COM5, COM6. If *two* RS-485 options, ports are Slot 1: COM5, COM6 and Slot 2: COM7, COM8. The T-202/602-XPR series (M2M JACE) accepts only one option card, where ports are COM7 and COM8. Also see "COM Port Usage," page 3.

Refer to the appropriate JACE® mounting and wiring document for further installation details.

Included in this Package

Included in this package find the following items:

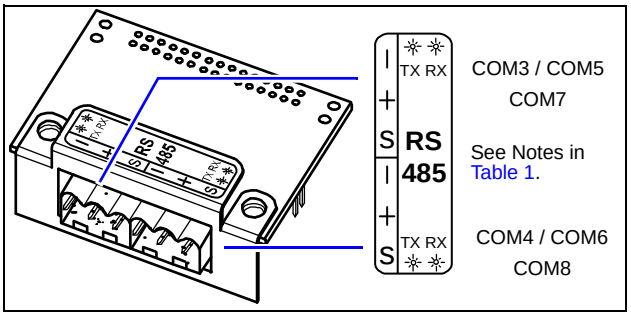
- NPB-2X-485 option card, connector end plate, and (if recent model) four 2-pin jumper blocks.
- Two 3-position terminal plugs, for wiring to an RS-485 network.
- This *NPB-2X-485 Option Install Sheet*, Part Number 11873 Rev 1.1.

Material and Tools Required

The following may be required for installation:

- #2 Phillips screwdriver: used to install the card.
- Small flat-blade screwdriver: used for making wiring connections to the RS-485 networks.
- #1 Phillips screwdriver: to remove and refasten T-202/602-XPR covers (if applicable).

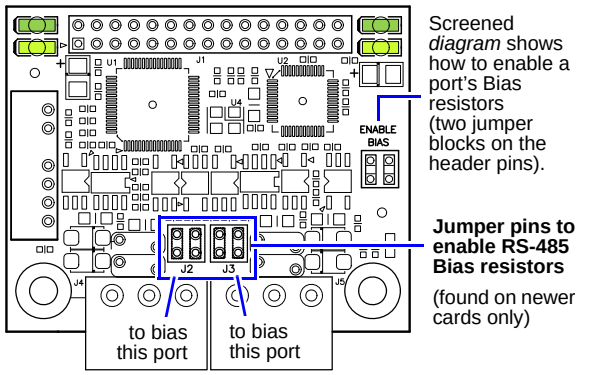
Figure 1 NPB-2X-485 option.



Preparation

Examine the component side of the option card to see if bias resistor jumper pins are available. See Figure 2. If so, you may wish to enable biasing for either (or both) RS-485 ports *before mounting* the card—you cannot reach these jumpers when the card is installed.

Figure 2 Jumpers to enable RS-485 bias resistors.



Note An earlier NPB-2X-485 option card does not have Bias jumpers. It operates like the newer option card in factory-shipped state (jumper blocks not installed—no biasing).

Installing jumpers to enable biasing adds two onboard 3.3K ohm resistors into an RS-485 port's circuit:

- from RS-485 "+" to 5V.
- from RS-485 "–" to Ground.

Biasing sometimes improves RS-485 communications by eliminating "indeterminate" idle states.

In general, only one device on an RS-485 trunk should be biased. Otherwise, undue loading of the circuit may result, with fewer devices supported.

Note RS-485 bias resistors are *different* than "termination resistors", externally installed at the two physical ends of a daisychained RS-485 trunk, across the "+" and "–" terminals. Termination resistors are typically 100 or 120 ohm value resistors.

Whenever termination resistors are used, RS-485 biasing is typically required.

To enable biasing, install two 2-pin jumper blocks on that port's jumper header, as shown in Figure 2. To turn off biasing, *remove* both 2-pin jumper blocks from that port's header (the factory-shipped state).

Mounting

Warning **Power to the controller must be OFF when installing or removing option cards, or damage will occur! Also, you must be very careful to plug any option card into its connector properly (pins aligned).**

Mount the NPB-2X-485 option card in either of the option card slots of the JACE, as needed. Note the T-202/602-XPR series has only one option card slot.

See "Preparation," page 1 for details about RS-485 resistor biasing, available on newer option cards.

See "COM Port Usage," page 3 for details about JACE COM port assignments.

Procedure 1 Mounting NPB-2X-485 option card on a JACE.

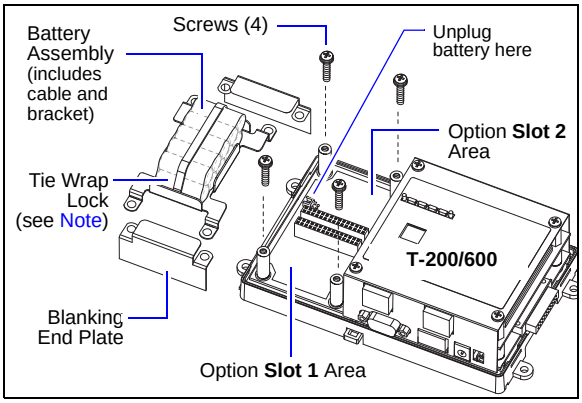
1. Remove power from the JACE—see the previous Warning. Wait for all LEDs on the unit to be Off.
2. Remove the JACE cover or covers (T-202/602-XPR). For all but the T-202/602-XPR, press in the four tabs on both ends of the unit, and lift the cover off.

Note If accessory modules are plugged into the JACE, you may need to slide them away from the unit to get to the cover tabs.

For the T-202/602-XPR, first remove the right cover, then the left cover, retaining the two screws that secure each cover.

3. If a T-200/600 series or Security JACE, remove the battery and bracket assembly by taking out the screws holding it in place, setting screws aside for later. See Figure 3.

Figure 3 Remove screws and battery assembly.



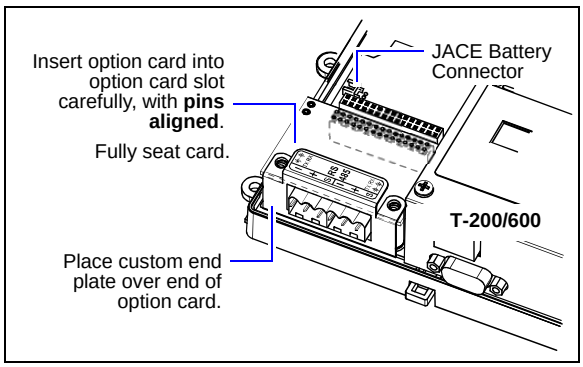
Note The tie wrap on the battery pack should have its lock "knot" on **top**, as shown in Figure 3. If not, cut and *remove* the tie, then *re-install* another tie wrap with its lock tab on top. (*Tie lock at bottom interferes with option card*).

4. Remove the blanking end plate for the slot you are installing the option card into. (Retain the blanking end plate in case the option card must be removed at a later date.)

Note Slot 2 option card installation in a T-700 controller requires careful attention! See the *T-700 Mounting and Wiring Guide* for more details. This document focuses on installation in a T-200/600 series controller.

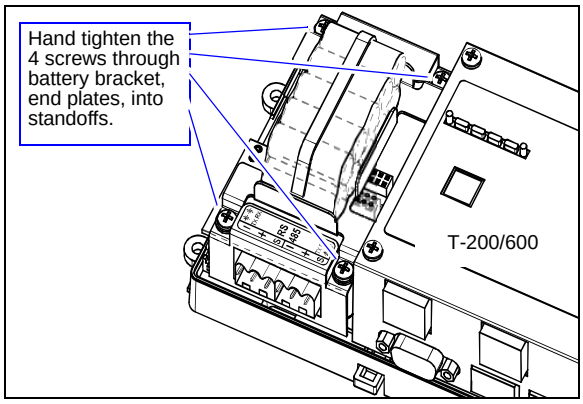
5. Carefully insert the pins of the NPB-2X-485 into the socket of the appropriate option card slot. The mounting holes on the option board should line up with the standoffs on the base board. If they do not, the connector is not properly aligned. Press until the option card is completely seated.
6. Place the custom end plate that came with the NPB-2X-485 over its connector (see Figure 4).

Figure 4 NPB-2X-485 inserted, end plate on top.



7. If unplugged, plug the battery cable back into the battery connector on the JACE (see Figure 4 for location on the T-200/600).
8. For the T-200/600 series or Security JACE, set the battery and bracket assembly back over the option card slots, with mounting holes aligned with the standoffs. Screws enter holes in the battery bracket first.

Figure 5 Re-fasten screws.



9. Place the screws through the end plate(s), and into the standoffs on the base board. Using a screwdriver, hand tighten screws.
10. Replace the JACE cover or covers (T-202/602-XPR).
11. If accessory modules were unplugged from the JACE, plug them back as before, and secure.

Wiring

Connect to an RS-485 multipoint network using one of the 3-position screw terminal connectors, using shielded 18-22 AWG wiring. Refer to the TIA/EIA-485 standard for more details.

Screw terminals are minus (–), plus (+), and shield (S), as indicated on the NPB-2X-485 end plate label—see Figure 1 on page 1.

LEDs

Four LEDs are visible on the top of the NPB-2X-485 option card (cover must be removed from JACE). The label on the NPB-2X-485 end plate notes these four LEDs as "TX" and "RX"—see Figure 1 on page 1.

The two LEDs for each port are described as follows:

- TX (yellow) — Transmit, indicates that the JACE is *sending* data to a device connected on the RS-485 trunk.
- RX (green) — Receive, indicates that the JACE is *receiving* data from a device connected on the RS-485 trunk

COM Port Usage

The NPB-2X-485 option card has two onboard UARTs, and so adds *two* COM ports on the installed JACE controller. The hosted station automatically resolves the option's COM addresses.

- If a T-200/600 or Security JACE controller and installed in Option Slot 1, or if the *only* option card, ports are COM3 and COM4.
- If a T-700 controller and installed in Option Slot 1, or if the *only* option card, ports are COM5 and COM6.

If installed in Slot 1 of a JACE along with *another* option card that uses COM ports in Option Slot 2, note that COM assignments for that other card are affected.

For example, if aT-200/600 with a NPB-2X-485 option installed in Slot 1, and a single port RS-232 option (T-NPB-232) installed in Slot 2, COM assignments are: Slot 1 (RS-485): COM3, COM4, Slot 2 (RS-232): COM5.

The same option card mix in a T-700 controller yields: Slot 1 (RS-485): COM5, COM6, Slot 2 (RS-232): COM7

The NPB-2X-485 installed in the only (single) option slot of a T-202/602-XPR (M2M JACE) controller is seen as COM7 and COM8.

COM Port Usage