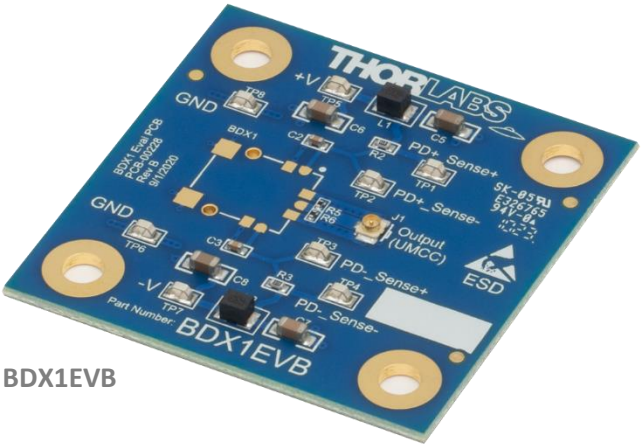
BDX1EVB Evaluation Board

FEATURES

- PCB for Mounting BDX Series Balanced Detectors
- Contact Hooks for Connecting Power
- Test Points for Monitoring Photodiode Current
- UMCC-to-SMA Coaxial Output Cable Included
- 2.0" x 2.0" (50.8 mm x 50.8 mm)



BDX1EVB

EVALUATION BOARD FOR BDX SERIES DETECTORS

The BDX Series Balanced Detectors are designed to be compact, surface mount devices for OEM and custom systems. The BDX1EVB evaluation board allows the user to solder a BDX detector in place so that power and output connections can be made with common cables and connectors. A BDX detector can be soldered to the evaluation board using the half-via contacts around the perimeter of the detector. A coaxial output cable is supplied with each BDX1EVB unit. Test leads/hooks for power are not supplied. Please observe all standard ESD-safe practices including discharging any cables before they are attached:

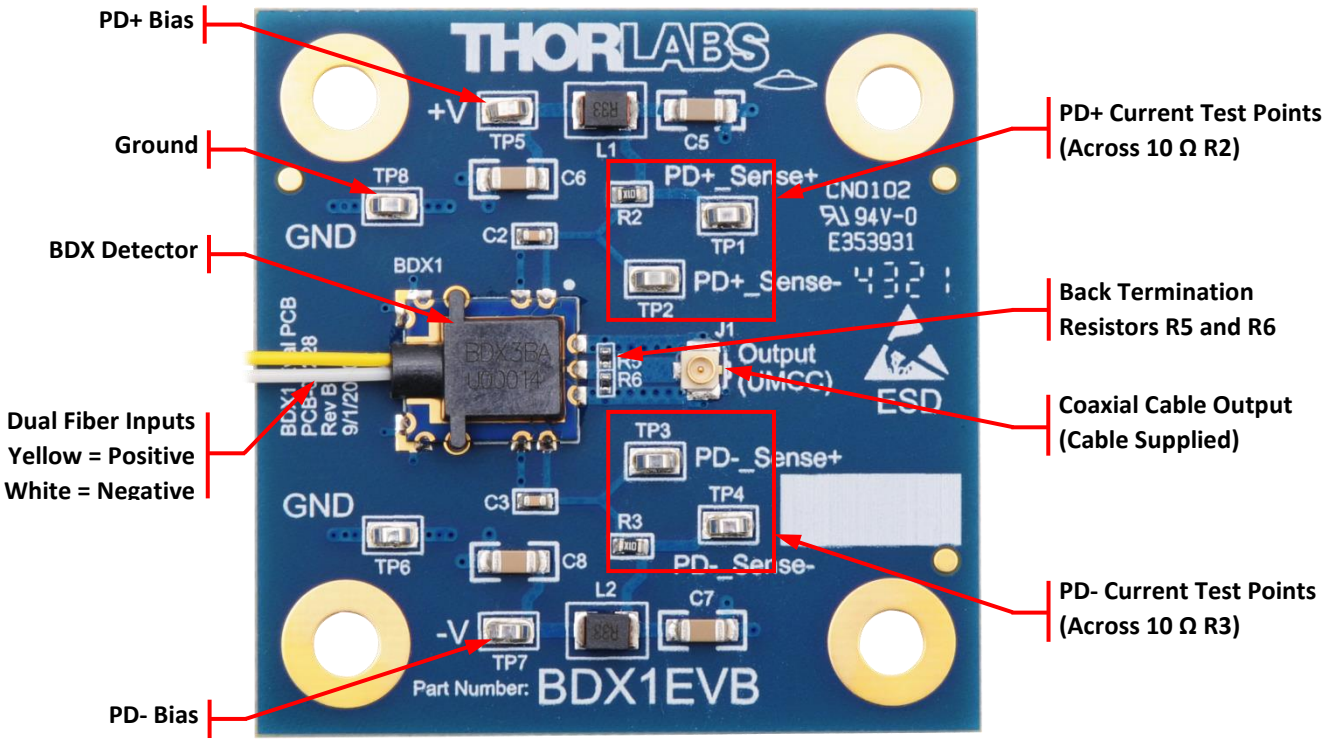


Figure 1 Diagram BDX1EVB Evaluation Board with Major Functional Elements
Board Dimensions: 50.8 mm x 50.8 mm
Mounting Holes: Ø4.4 mm (4 Places) Spaced 38.1 mm Apart

SOLDERING A BDX DETECTOR TO THE EVALUATION BOARD

Soldering of the half-vias needs to be done cleanly and quickly. For each contact, **do not exceed 5 seconds of soldering time at 250 °C contact temperature**, to avoid damaging the internal opto-electronic components. All soldering must be done by hand; a reflow oven will damage the device.

Materials and Equipment

- Epoxy Gel, Quick-Curing at 75 °C
- Solder Appropriate for Soldering Components to PCBs
- Flux Designed to Work with the Chosen Solder
- Hot Plate Capable of Maintaining a Temperature of 75 °C
- Soldering Iron with Tip Capable of Fitting Inside BDX Detector Edge Castellations

Recommended Soldering Procedure

1. With the BDX1EVB board on the hot plate (heating off), place a small bead of epoxy gel in the center of the BDX footprint. Only a small amount of epoxy should be used to ensure that it does not leak out onto the soldering contacts. To ensure that unwanted movement does not occur, the board can be taped to the hot plate using a tape rated for 75 °C.
2. Place the BDX detector onto the footprint on the evaluation board, ensuring that the alignment pins go through the holes in the board. Ensure that the edge castellations are aligned with the pads on the board as closely as possible.
3. Turn the hot plate to 75 °C and leave for long enough to let the epoxy cure.
4. With the hot plate still at 75 °C, set the temperature of the soldering iron to 400 °C.
5. Using a small syringe, apply a small amount of flux to each pad and adjacent castellation on the detector, ensuring that both are coated. For a video of this process, visit https://www.youtube.com/watch?v=wWPNIVZBfjM
6. Working quickly, apply a small amount of solder to the iron tip, then touch the tip to the castellation and pad simultaneously. If needed, add extra solder. A clean, shiny fillet should form between the pad and the castellation. If forming a fillet is difficult, using a lower-temperature solder may help.
7. Repeat steps 5-6 for each of the seven contacts near the output and the bias, as well as at least one of the ground contacts in each of the rear corners.
8. Clean the excess flux with a polyester cleanroom swab dipped in isopropyl alcohol.

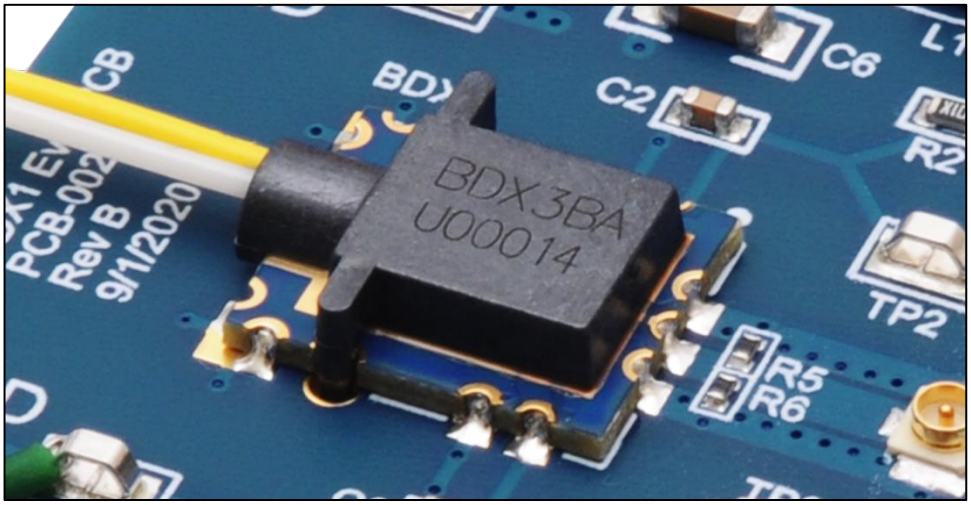


Figure 2 Detail View of a BDX Detector Soldered to the BDX1EVB Evaluation Board

OPERATING A BDX DETECTOR WITH THE EVALUATION BOARD

Standard test leads with spring hooks should be used to make power, ground, and test point connections (see Figure 3). For best balanced performance, clean the tip of each fiber before use. Follow the steps below to operate a BDX detector with the BDX1EVB evaluation board.

1. Place the assembled EVB on an ESD safe surface (e.g. dissipative bench top).
2. Attach the output coaxial cable to the UMCC connector on the EVB. Align the connector and push straight down until it snaps in place.
3. Connect the SMA end of the coaxial cable to your measurement equipment with a 50 Ω termination.
4. Test points are provided to monitor the photocurrent for each photodiode. For the positive input photodiode (PD+), connect a high impedance voltmeter across the current sensing resistor R2 using test points TP1 and TP2. Similarly for the negative input photodiode (PD-), connect a high impedance voltmeter across the current sensing resistor R3 using test points TP3 and TP4. The voltmeter will read 10 mV for every 1 mA of photocurrent.
5. Ground and power connections should be attached to the test points using standard test leads with spring hooks. The ground lead should be attached first, followed by both positive (+5 V) and negative (-5 V) bias voltages.
6. Turn on both the positive and negative power supplies. Ensure there are no voltage spikes. Dark current should be on the order of only a few nA for each photodiode.
7. Apply the optical signals using high quality connectors and adapters. Precise optical alignment of fiber cores is essential. Note that best performance is achieved by fusion splicing identical fibers together.
8. Power down the device by following the above steps in reverse order.

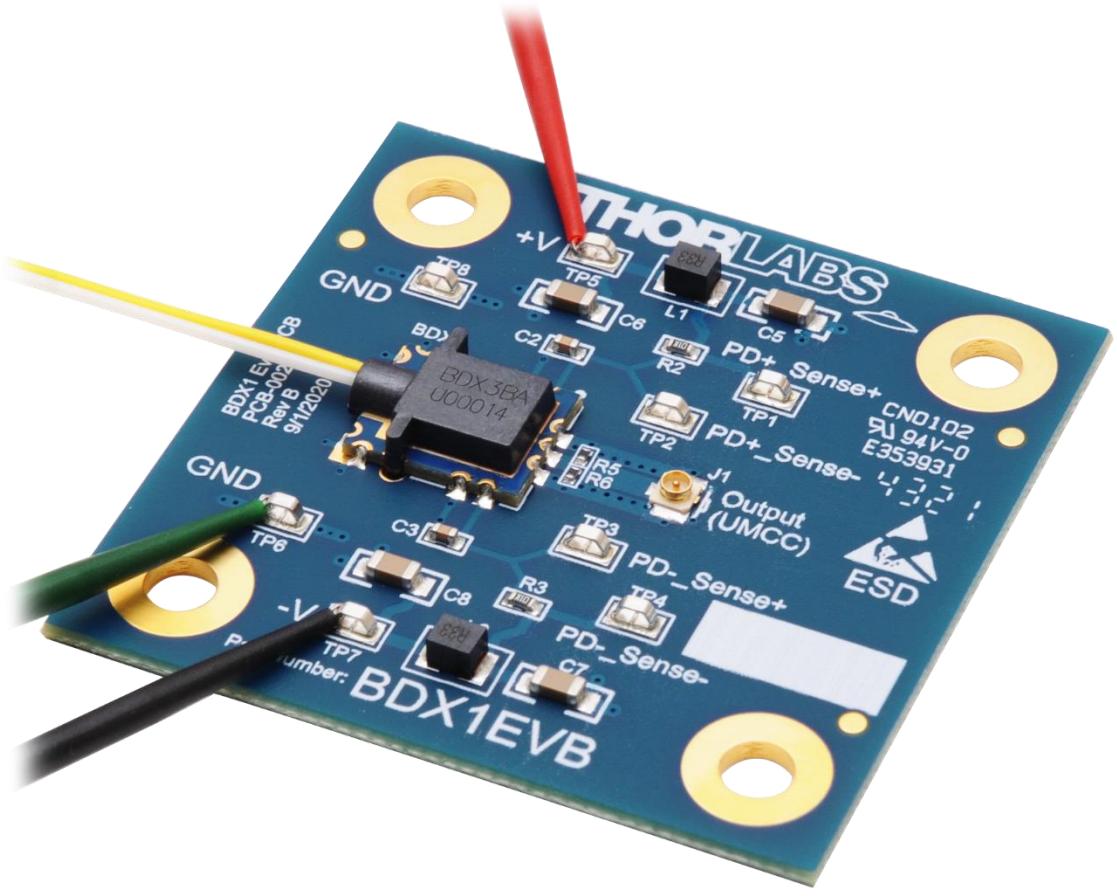


Figure 3 BDX1EVB Evaluation Board with Ground and Positive / Negative Leads Attached

Back-Termination Resistors

Resistors R5 and R6 (100 Ω each) are provided on the evaluation board for the purpose of back-termination. Together, they provide a 50 Ω load at the output of the BDX detector, reducing any back-reflections on the high-speed output line. In combination with the 50 Ω impedance of the output line, the effective load on the BDX detector is reduced to 25 Ω.

These resistors also have some negative effects. They shunt half of the output current from the detector to ground, effectively reducing the conversion gain of the detector by half as well. This slightly increases the bandwidth of the device, but also introduces some peaking in the frequency response which results in ringing in the time-domain.

We recommend removing the R5 & R6 resistors if your application is not sensitive to back-reflections. This will give a better time-domain response and more conversion gain. To remove them, desolder the connections or use a sharp micro-knife to cut through the soldered ends of each resistor.

Precautions



The components on this board are ESD sensitive. Take all appropriate precautions to discharge personnel and equipment before making any electrical connections to the unit. This also applies to coaxial cables that easily accumulate capacitive change.



- **Observe all operating specifications presented in the BDX Series Data Sheet.**
- **Use stable, noise-free power supplies within the specifications listed on the BDX Series Data Sheet.**

Manufacturing and Compliance

Manufactured by: Thorlabs Inc., Ann Arbor, MI 48103 USA