CROWD SUPPLY

Tiny-PAT

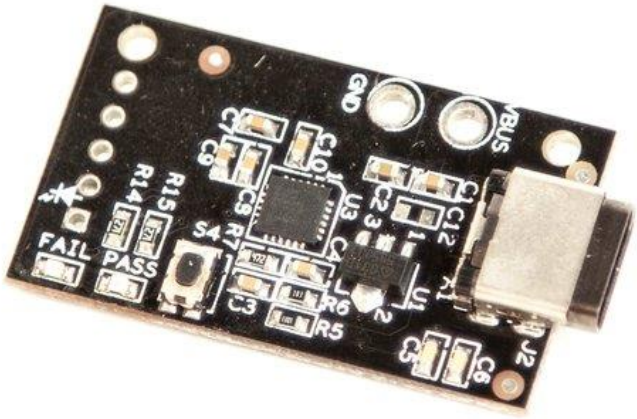
A small, open, affordable USB-C power adapter tester

We are quickly entering the age of USB Type-C. This “jack of all trades” port is appearing in more and more new electronic devices.

USB Type-C helps to reduce reliance on proprietary power adapters and USB cables; you can move to a single, robust, and compact solution that works on all devices. USB-C is quickly replacing various USB-B and USB-A connectors and cables with a standard that is meant to be “future-proof.”

As more and more of our devices will be using USB-C power adapters, it is essential that developers and manufacturers have an easy way to test their USB-C power adapters during development and manufacturing.

That’s where the USBCEE Tiny-PAT comes in – it’s the world’s smallest, fastest, easiest, and lowest cost USB-C power adapter tester.



Who Needs Tiny-PAT

- **Marketing/Sales Professionals**: Demonstrate power adapter quality
- **USB-C Power Adapter Developers**: Make quick, easy, and repeatable tests
- **IT Technicians**: Cut debugging steps and go straight to the source quickly and easily

How Tiny-PAT Compares

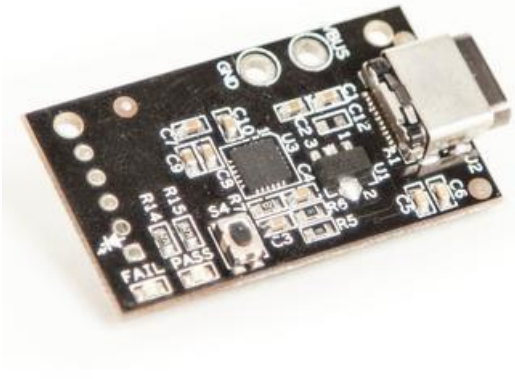
Traditional USB-C testing devices are expensive, cumbersome, and time-consuming to use. USBCEE aims to change that by developing the Tiny-PAT: a small, user-friendly, inexpensive, and powerful testing tool.

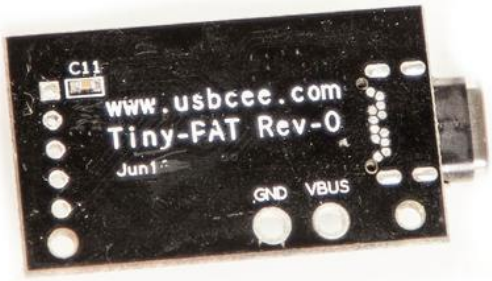
Testing during USB-PD power adapter design is always a challenge. Today, testing requires an Ellisys / LeCroy / MQP / GRL test box to perform very simple voltage transition tests, and just the setup alone is time-consuming.

Additionally, these test tools are very expensive. Do you share your current testing devices with a number of other colleagues? It is a huge waste of time, effort, and money when you are constantly waiting for your turn to use the testing equipment.

	Tiny-Pat	**Ellisys / Lecroy/ GRL/ MQP**
Cost		
Set up and test time	< 10 seconds	> 2 minutes
Additional software or PC needed	No	Yes
Size	35 x 20 x 2 mm	> 100 x 100 x 20 mm
Manual mode support	Yes	No
Suitable for a Manufacturer Test Kit	Yes	No

Features & Specifications





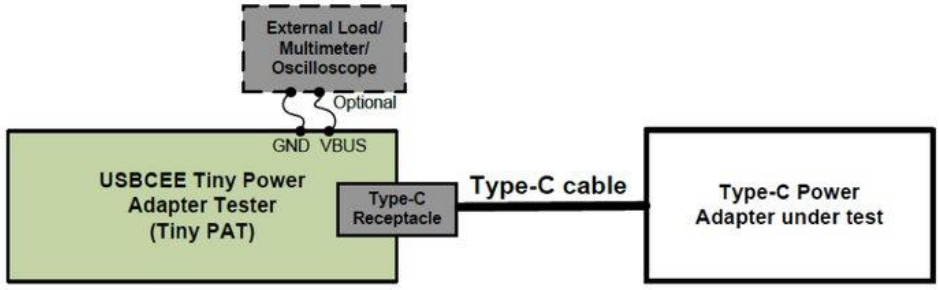
- **Dimensions**: 35 x 20 mm
- **Max Voltage**: 24 V
- **Max Current**: 5 A
- **Max Power**: 100 W
- **Supported USB Spec Version**: PD 2.0 / PD 3.0*
- **Power Consumption**: ~10 mA (may vary based on voltage)

** Note: PD 3.0 is backward compatible with the PD 2.0 spec*

USBCEE Tiny-PAT Operation

System Setup

Power on the power adapter (PA) to be tested, and connect it to USBCEE Tiny-PAT using a Type-C cable.



USBCEE Tiny PAT System Setup

USBCEE Tiny-PAT can be operated either in Auto test mode or in Manual test mode.

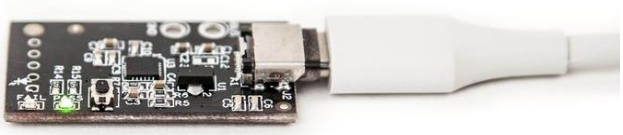
Auto Test Mode (Default Mode)

USBCEE Tiny-PAT has been configured to work in auto test mode upon power up. In this mode, Tiny-PAT requests all the power profiles advertised by the PA and measures VBUS voltage corresponding to each profile. The green LED (marked “PASS” on the board) turns on after successful completion of the test. The red LED (marked “FAIL” on the board) indicates test failure. Auto mode is particularly useful for testing devices in large volume.

Manual Test Mode

USBCEE Tiny-PAT can be configured to work in manual test mode by pressing the only button on the board (S4). Manual test mode is designed to scan PA power profiles by pressing the button consecutively. The first button press changes the mode to manual and requests the lowest power profile advertised by PA. The next press requests higher power profiles in ascending order. The device can be set to request Nth power profile by N consecutive button clicks. The green LED (marked PASS on the board) blinks once to acknowledge the successful completion of each power profile test.

Manual mode is primarily meant for debugging and validation. The button-controlled power profile transition allows Tiny-PAT to measure different parameters such as VBUS voltage, VBUS transition time, load current, etc. VBUS activity can be externally monitored for the selected power profile by use of breakout holes on Tiny-PAT.



Manufacturing Plan

The design is complete, and we have produced a working prototype. We also have had sample boards manufactured by our assembler. These have passed rigorous rounds of testing in all aspects.

As of now, the lead time to get the boards manufactured is approximately three to four weeks.

Timeline

1. Cost negotiations with manufacturers for bulk purchase and factory testing. **(DONE)**
2. Component procurement, component hand-over, final assembly.
3. Get certified tested products from factory.
4. Do second round of testing to ensure boards are ready to ship.
5. Ship to customers and keep rolling stock of boards to fulfill retail and bulk orders from backers.

Open Hardware

Once the campaign has completed, the board schematics will be made publicly available under an open license.

Shipping & Fulfillment

All orders will ship from our office in Bangalore, India. We will try to keep just enough component inventory so that we can do quick assembly, while at the same time optimizing our manufacturing costs (because we don't want to stock too many components at a time).

Risks & Challenges

Manufacturing anything comes with some risk. PCBs can be poorly made, the assembly can be poorly done, and components may have spontaneous shortages. While any of these may delay the delivery timeline, should any of them occur, the project should be recoverable.