TOTAL PHASE

Intelligent visibility into embedded systems

Advanced Cable Tester v2





Cables Tested

USB Type-C to:

- USB Standard-A
- USB Micro-B
- USB Standard-B
- USB Type-C

USB Standard-A to:

- USB Micro-B
- USB Standard-B
- USB Type-C

USB Standard-B to:

- USB Standard-A
- USB Type-C

Apple Lightning USB2 to:

- USB Standard-A
- USB Type-C

Video:

- HDMI to HDMI
- DisplayPort to DisplayPort

Custom cables supported

WHY TEST CABLES?

Data cables manufactured today carry exponentially more power and increased functionality versus those created in the past. With additional complexity the likelihood of failure increases; with the increase of available power, the potential damage from bad cables is costly. The oversupply of high power, existence of complicated circuitry, problems with interoperability, and signal integrity issues are all factors that increase the complexity of manufacturing high quality cables today.

"Apple recommends the Total Phase Advanced Cable Tester v2 for production line electrical testing of Lightning to USB-C/USB-A charge/sync cables." — Apple AIS

"The Total Phase Advanced Cable Tester is an all-in-one solution for rapidly ensuring your cables meet design specifications. This tool is intended for factory production testing and may additionally be used for pre-scan testing." — USB 3.2 Test Tools, USB-IF

Problems

You make high quality products that connect to other devices. Interconnecting cables are required. Maybe you bundle a cable with your product. What happens if the cable doesn't perform as expected?

- Devices don't work
- Damage to devices
- Potential cable/device fire
- Shock/electrocute children
- Slow data transfer
- Devices fail to connect to hosts
- Poor video quality, screens with snow, stars, artifacts or no picture
- Customers can't download content (images/data)
- Music doesn't stream

Solutions

- 100% Individual Quality Control
- Detect shorts
- Detect opens
- Verify routing
- Identify protocol errors
- Verify resistors
- Measure DC resistance for power and ground
- Measure DC resistance for digital lines
- Measure signal integrity on data lines up to 12.8 Gbps
- Validate consistency between E-Markers and cable capabilities (USB Type-C only)
- Final test data – results archive

Impact

- More support calls
- More returned product
- Poor quality reputation
- Damage to your brand
- High cost/lost profit

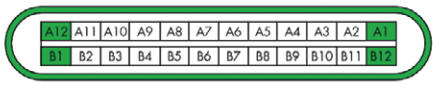
- Higher quality, less support needed
- Higher quality, fewer returns
- High quality reputation
- High quality is cost effective

TOTAL PHASE

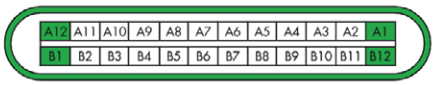
Full graphical display of all test pins and wire pairs

Test Report Details

TIME	TEST PROFILE	
12/2/1999, 03:29:00 PST	USB Full-Featured Type-C Cable, SuperSpeed Gen2, 3A	PASS



Plug 1 : USB Type-C (Flipped Orientation)



Plug 2 : USB Type-C (Normal Orientation)

Complete Analysis of Shorts/Opens/Continuity

Continuity

Status	Wire	Plug 1	Expected Plug 1	Plug 2	Expected Plug 2
✓	CC	A5	A5	A5	A5
✓	DN1	A7	A7	A7	A7
✓	DN2			B7	B7
✓	DN2	B7	B7		
✓	DP1	A6	A6	A6	A6
✓	DP2			B6	B6
✓	DP2	B6	B6		
✓	GND	A1, A12, B1, B12, SHELL	A1, A12, B1, B12, SHELL	A1, A12, B1, B12, SHELL	A1, A12, B1, B12, SHELL
✓	RX1N	A3	A3	B10	B10
✓	RX1N	B10	B10	A3	A3
✓	RX1P	A2	A2	B11	B11

Accurate DCR measurement for pins, shield, wires

DC Resistance

Status	Group	Label	Sources	Sinks	Expected Min (Ω)	Expected Max (Ω)	Measured (Ω)
✓	GND / Shield	Plug 1 Pin A1	Plug 1: A1	Plug 1: B1, A12, SHELL, B12 Plug 2: A1, B12, SHELL, B1, A12	0.000	0.100	0.026
✓	GND / Shield	Plug 1 Pin A12	Plug 1: A12	Plug 1: B1, SHELL, A1, B12 Plug 2: A1, B12, SHELL, B1, A12	0.000	0.100	0.033
✓	GND / Shield	Plug 1 Pin B1	Plug 1: B1	Plug 1: A12, SHELL, A1, B12	0.000	0.100	0.026

Verification of E-Marker Data (USB Type-C)

E-Marker Presence

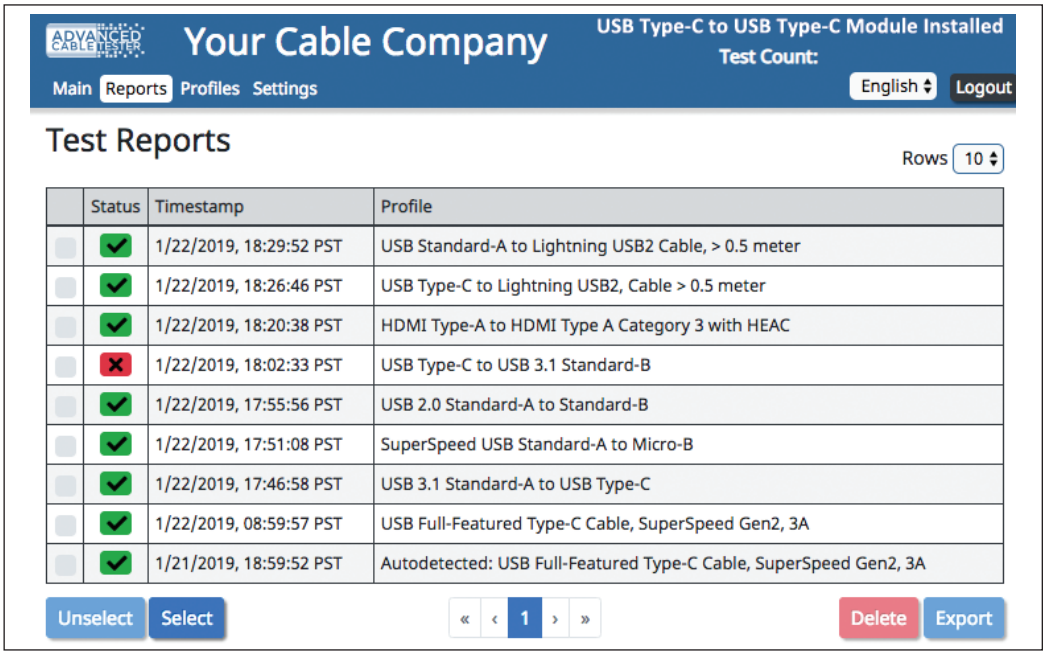
Status	Plug	PD Spec Version	Packet Type	Expected	Measured
✓	1	2	SOP'	Present	Present
✓	1	2	SOP''	Absent	Absent
✓	2	2	SOP'	Present	Present
✓	2	2	SOP''	Absent	Absent

E-Marker VDOs

Status	Subtype	Expected	Measured
	vendor_id		0x050D
	modal_supported		true
✓	product_type	Passive Cable (0b011)	Passive Cable (0b011)
	xid		0x0447
	productID		0x023B
	bcdDevice		0
✓	ss	USB 3.1 Gen 2 (0b010)	USB 3.1 Gen 2 (0b010)
✓	sop_dprime	false	false
✓	vbus_through	true	true
✓	vbus_current	Three Amps (0b01)	Three Amps (0b01)

Over 1 million test records stored locally

- Data export for test results
- PDF print test results
- Summary view available
- Instant pass/fail
- Detailed failure analysis
- Easy debug for failures



Eye Diagrams to verify signal integrity at speeds from 520 kbps to 12.8 Gbps



Passing eye-diagram 10 Gbps USB Type-C to USB Type-C cable.



Failing eye-diagram USB2 data line for USB Standard-A to USB Standard-B cable.

- High Volume
- Industrial Design
- Test Result Database
- Thorough Test Coverage
- Statistical/Individual Quality Control

Video/Apple Lightning/USB Tests

- Accurate/Precise DCR measurement
- Ra/Rp/Rd measurement
- USB PD 2.0/PD 3.0 compatible
- E-Marker verification for USB
- SuperSpeed signal integrity testing

Design Certification is only part of the solution

- **The major protocol governing bodies** such as USB-IF, HDMI.org, and VESA have established very strict standards to certify cable designs. Cable design certification only requires that the manufacture and test of a limited representative sample conforms to the industry design specification.
- **The challenge with industry design certification** is the impossibility of ensuring that well designed cables are always well manufactured. Ensuring good designs are properly manufactured is the scope of manufacturing quality control. There are two types of manufacturing quality control: IQC (100% individual quality control) or SPC (statistical process control).
- Both methods are excellent; however, **more complex designs are heavily impacted** by subtle changes in the manufacturing process that can occur over a single shift. Without 100% full manufacturing automation, inconsistencies may significantly impact product quality.
- **The Advanced Cable Tester v2** was designed to enable cost effective, full coverage, high speed cable testing at the end of the manufacturing line. Guarantee your cables are manufactured exactly as specified.

Specifications

Application Features
- Web Interface
- Fast Testing
- Auto-start on cable insertion
- Tabular data and eye diagrams
- Instant results
- Headless Mode
- Connect via USB or Ethernet

Data Management
- Local storage of > 1,000,000 test results
- Pass/Fail indication on LCD screen
- Easy to read, printable reports
- Exportable test data

Hardware
- Industrial Design, Factory Ready
- LCD screen to present test results
- Audible alarm to indicate test results

Cable Test Protocols Supported
- USB 2.0/3.0/3.1/3.2
- USB PD 2.0/PD 3.0
- DP 1.1/1.2/1.3/1.4/2.0
- HDMI 2.1

Operating Systems Supported
All

Browsers Supported
- Chrome (preferred)
- Firefox

Input Power Requirements
- Input Power: 110V/220V
- Current Draw (max): 3A/1.5A

Dimensions
- ACT v2: 12 x 10.8 x 4 inches (30.5 x 27.3 x 10.2 cm)
- Power Supply: 4.5 x 2 x 1.25 inches (11.4 x 5.1 x 3.2 cm) (excluding line cord)

Weight
- ACT v2 including 1 connector module: 7.9 lbs (3.6 kg)
- Power Supply including line cord: 0.5 lbs (0.23 kg)

Operating Temperature
- 10°C – 35°C (50°F – 95°F)

Quality Manufacturing
- ISO 9001:2018
- ISO 13485:2016
- ITAR
- AS9100D

Advanced Cable Tester v2 Package Includes

Advanced Cable Tester v2 Hardware
- 110V/220V Power Supply
- Line Cord with your choice of Type B/F/G adapters
- 1 x 6 foot USB 2.0 Standard-A to USB Micro-B cable
- 1 x 2 meter Ethernet cable
- Comprehensive 1 year warranty included
- Optional extended support available

Your choice of a connector module bundle:
USB Type-C
- 1 x USB Type-C to USB Type-C
- 1 x USB Type-C to USB Standard-A
- 1 x USB Type-C to USB Micro-B
- 1 x USB Type C to USB Standard-B

Apple Lightning
- 1 x USB Type-C to USB Type-C
- 2 x Lightning USB2 to USB Standard-A
- 1 x Lightning USB2 to USB Type-C

Video
- 2 x HDMI to HDMI (2.1)
- 2 x DisplayPort to DisplayPort (2.0)

Learn more
www.totalphase.com/products/advanced-cable-tester-v2/

Ordering information

Advanced Cable Tester v2	
Part Number	TP800110
Country of Origin	USA
HTS	8543200000
ECCN	EAR99

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