

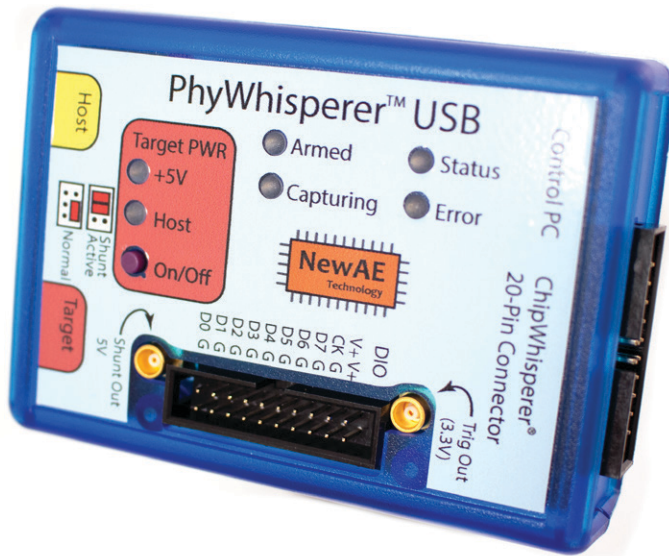


NewAE Technology Inc.
newae.com

ChipWhisperer® Embedded Security Analysis Tools
Triggering Tools

CW610: PhyWhisperer® USB

Product Datasheet



The PhyWhisperer® toolchain is designed for exploring physical layer protocols. The PhyWhisperer-USB is a fully open source (hardware, firmware, FPGA code, software) tool that can sniff USB 2.0 LS/FS/HS traffic.

It is primarily designed to work with the ChipWhisperer® and ChipSHOUTER® tools from NewAE Technology Inc., by serving as a unit to trigger on USB protocols with high accuracy.

The device allows offsetting the output trigger pulse from the actual event, as would be required during fault injection testing.

A built-in shunt allows monitoring power consumption on an external oscilloscope or ChipWhisperer, in order to perform power analysis over the USB power line.

Product Highlights

USB PHY front-end allows monitoring of USB 2.0 LS/FS/HS traffic.

Python control interface (API) for viewing of raw USB data, or piping data into analysis tools such as ViewSB.

Trigger on USB packets for fault injection or side-channel analysis triggering.

Programmable trigger offset delay & width to directly drive fault injection equipment such as ChipSHOUTER.

Convenient front-panel button allows power-cycling of target device (also accessible by API).

20-pin connector interfaces directly to ChipWhisperer for providing clock & trigger synchronization.

Expansion connector allows investigating other protocols (requires FPGA programming), with planned support for Arm Trace (ETM) and Ethernet protocols.

Translucent blue enclosure gentle reminder of the lure of the sea.

Ordering Summary

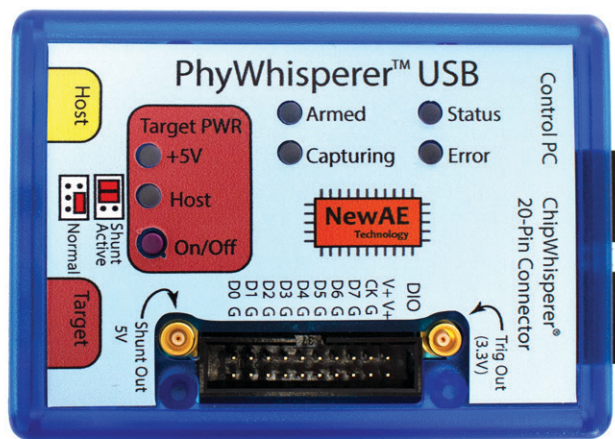
NAE-PHYWHISPERERUSB	PhyWhisperer-USB main unit with (2) micro-USB cables, (1) MCX to SMA cable, and (1) MCX to BNC cable.
----------------------------	---

Product Links

Full Documentation	http://www.phywhisperer.com
--------------------	---

Specifications & Photos

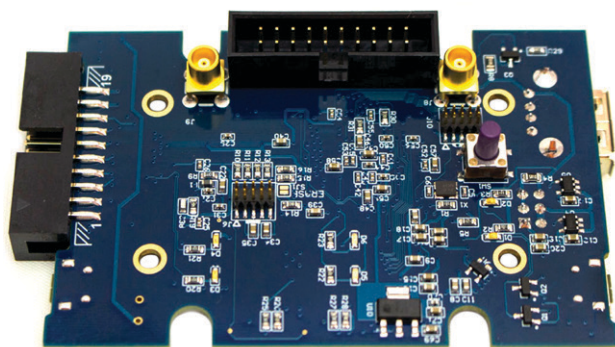
Feature/Specification	Notes/Range
USB Modes supported	USB 2.0 Low/Full/High-Speed.
FPGA	Xilinx Spartan 7S15.
FPGA Configuration	FPGA reconfigured through Python interface (no hardware needed).
Control PC connection	Micro-USB 2.0 HS.
Host USB connection	Micro-USB.
Target USB connection	Female A Connector.
Target power supply	Host USB or Control PC (software selectable with on/off).
Spare digital I/O	8 data pins, 1 clock pin routed to FPGA via 0.1"x0.1" male header.
Trigger pattern	1 - 64 bytes with mask.
Trigger delay	0 - 1048576 cycles of 240 MHz internal clock (derived from USB clock).
USB sniffer FIFO	8192 bytes.
Size	94 x 66 x 27 mm (0.10 x 0.072 x 0.030 yards)
Weight	90 g (0.000099 US Tons, 0.000089 British Tons, 0.000090 Metric Tons)
Colour	Translucent Blue.
Smell	Plastic.
Cursed	No.



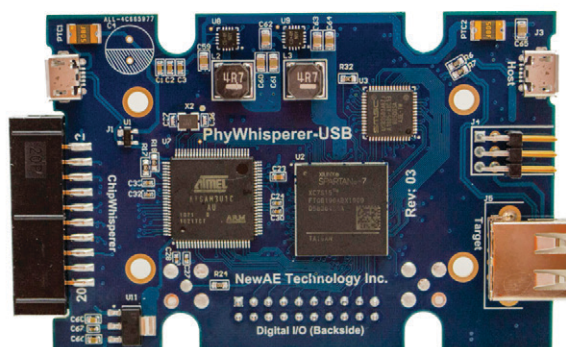
Front Panel Connections



Target connections

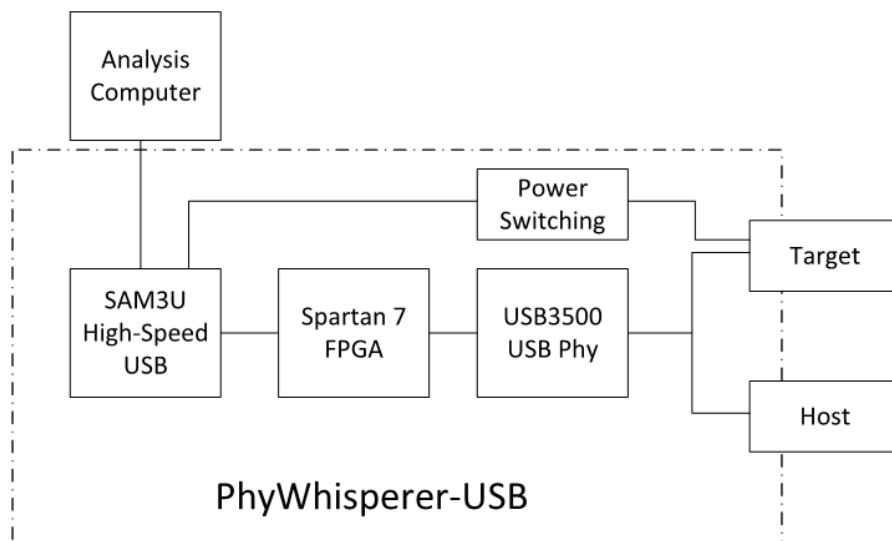


PCB Board (Facing Front)



PCB Board (Facing Into Case)

Design Overview



A USB3500 front-end provides a simple parallel interface to the Spartan 7S15 FPGA. This allows the device to monitor the USB traffic in real-time, along with triggering on bytes in the USB datastream. This device uses a ATSAM3U1C microcontroller as the high-speed USB interface to the host PC. The use of the AT-SAM3U1C provides flexibility to run code on the microcontroller for other tasks. Because the system is fully open-source, you can use this for your own development.

The USB front-end has a number of jumpers to allow routing of power in various ways. By default you can use it as a simple sniffer, but by adjusting some jumpers, you can insert a 5-ohm shunt resistor into the USB power line. This shunt resistor allows ‘simple power analysis’ to be performed on a device. The output of the shunt is routed to an MCX connector on the front-panel.

See [GITHUB](#) links for detailed design including PCB design sources, FPGA designs, microcontroller firmware, and software for PC interface.

Disclaimers

All content is Copyright NewAE Technology Inc., 2020. ChipWhisperer is a trademark of NewAE Technology Inc., registered in the United States of America, the European Union, and China. ChipSHOUTER is a trademark of NewAE Technology Inc., registered in the United States of America and the European Union. PhyWhisperer is a trademark of NewAE Technology Inc., registered in the United States of America and the European Union. Trademarks are claimed in all jurisdictions and may be registered in other states than specified here.

NewAE Technology makes no representations or warranties with respect to the accuracy or completeness of the contents of this document and reserves the right to make changes to specifications and product descriptions at any time without notice. NewAE Technology does not make any commitment to update the information contained herein. NewAE Technology products are not intended, authorized, or warranted for use as components in applications intended to support or sustain life. NewAE Technology products are designed solely for teaching purposes.

All other product names and trademarks are the property of their respective owners, which are in no way associated or affiliated with NewAE Technology Inc. Use of these names does not imply any co-operation or endorsement.

AVR and XMEGA are registered trademarks or trademarks of Atmel Corporation or its subsidiaries, in the US and/or other countries.

Artix and Spartan are registered trademarks or trademarks of Xilinx, Inc. or its subsidiaries, in the US and/or other countries.

Arm is a registered trademark of Arm Limited (or its subsidiaries) in the US and/or elsewhere.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[NewAE Technology:](#)

[NAE-PHYWHISPERERUSB](#)