Keysight Advanced Training Target

DS1232A Advanced Training Target

KEYSIGHT

USER MANUAL

Notices

Trademark Acknowledgments

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Safety Notices

CAUTION

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.

WARNING

A **WARNING** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

Where to Find the Latest Information

Documentation is updated periodically. For the latest information about these products, including instrument software upgrades, application information, and product information, browse to one of the following URLs, according to the name of your product:

https://www.keysight.com/us/en/product/DS1232A/advanced-training-target.html

To receive the latest updates by email, subscribe to Keysight Email Updates at the following URL:

https://support.keysight.com

Information on preventing instrument damage can be found at:

https://www.keysight.com/find/PreventingInstrumentDamage

Is your product software up-to-date?

Periodically, Keysight releases software updates to fix known defects and incorporate product enhancements. To search for software updates for your product, go to the Keysight Technical Support website at:

https://www.keysight.com/find/techsupport

Product and Solution Cybersecurity

Keysight complies with multinational regulations for the cybersecurity of its own products and is committed to providing information to assist you in protecting your products and solutions from external cyber threats. For more information, see:

https://www.keysight.com/us/en/about/quality-and-security/security/product-and-solution-cyber-security.html

Keysight also recommends that you secure your IT environments using appropriate third-party tools. For instruments that run the Microsoft Windows operating system, Keysight concurs with Microsoft's recommendations for ensuring that the instrument is protected:

- Get the latest critical Windows updates
- For network-connected instruments, use an Internet firewall (in Keysight instruments, Windows Firewalls enabled by default)
- For network-connected instruments, use up-to-date antivirus and anti-spyware software

Responsible Disclosure Program

Keysight recommends that security researchers share the details of any suspected vulnerabilities across any asset owned, controlled, or operated by Keysight (or that would reasonably impact the security of Keysight and our users) using this form:

https://www.keysight.com/us/en/contact/responsible-disclosure-program.html

Report a Product Cybersecurity Issue

If you discover a cybersecurity issue that you suspect may involve Keysight's proprietary software, or third-party software supplied by Keysight as part of a product, or that may affect the operation of Keysight products, we encourage you to report it to us using this form:

https://www.keysight.com/us/en/about/quality-and-security/security/product-and-solution-cyber-security.html

Contents

Precautions Before Using the Tools Inside the Box

CAUTION Do not use the tools on top of an electrically conductive surface (for example, a metallic table). This will irreversibly damage the hardware tools.

CAUTION Do not use the hardware tools next to open containers containing conductive liquids (for example, a glass of water). This can lead to accidental irreversible damage of the hardware tools.

What's in the Box?

The box contains the Advanced Training Target as well as all the required hardware accessories for completing the "Fundamentals of Embedded Systems Security" training course. The hardware kit additionally contains some tools: a multimeter, a PicoScope 2204A oscilloscope, and a Bus Pirate device.

Quantity[1]	Description	Photo	Identifier[2]
1	Advanced Training Target		Advanced Training Target
1	8 pin header (usually shipped inside the Bus Pirate cable bag)		
2	2.54mm jumper (usually 1x connected in the Advanced Training Target board, and 1x inside the Bus Pirate cable bag)		Jumper
1	Communication cable: USB-A - USB-mini B		USBmini
1	Communication cable: USB-A - USB-micro B		USBmicro

1	Hardware tool: Bus Pirate v3.6		BusPirate
1	Bus Pirate probe set		
1	Hardware tool: — PicoScope 2204A — PicoScope 2204A USB 2.0 cable — PicoScope 2204A manual (can be found below the padding foam)		PicoScope
1	PicoScope 2204A hook cap probes		
1	BMP280 sensor (depending on sensor revision, it may have pin headers soldered)		BMP280

1	Hardware tool: — Digital Multimeter (including test leads)		Multimeter
1	FTDI cable USB-UART 3v3		
1	2.54mm jumper wires (male-male connectors)		
1	2.54mm jumper wires (female-female connectors)		
1	"What's in the box" card		
-	This "DS1232A Advanced Training Target User Manual"		

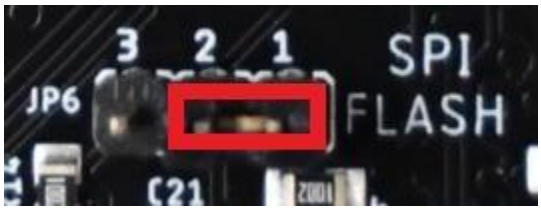
1. The amount or number of registered items (quantity, Qty)
2. Identifier used in this document to refer to the item

Quick Initial Verification of the Devices

To verify whether the Advanced Training Target, Bus Pirate, PicoScope, and Multimeter devices are working, you can perform the following quick checks:

Check 1: Advanced Training Target board

1. Make sure that one Jumper is placed in the position 1-2 of the JP6 connector (labeled as SPI FLASH in the PCB, check picture below). If there is no jumper in the JP6 connector, insert one of the supplied Jumpers in the position 1-2 as shown in the picture.
2. Connect the USBmicro cable to a USB-A socket in your computer and plug the USBmicro cable in the Advanced Training Target USBmicro-B socket labeled as USB POWER.
3. Check that the POWER LED next to the USB connector is on, and the LEDs LD1, LD2, and LD3 are off. This indicates that the board is booting correctly.



Check 2: Bus Pirate board

1. Connect the USBmini cable to a USB-A socket in your computer and plug the USBmini cable in the Bus Pirate USBmini-B socket.
2. The Bus Pirate PWR LED should be ON, and the USB LED will typically blink a few times and then stay off. This usually indicates that the Bus Pirate is operative.

Check 3: PicoScope 2204A DSO

1. Connect the USB cable to a USB-A socket in your computer and plug the USB cable in the PicoScope USB-B socket.
2. The PicoScope LED should turn ON. This usually indicates that the PicoScope 2204A is operative and ready to be configured by the PicoScope software running in the virtual machine provided with the training course.

Check 4: Multimeter

1. Rotate the multimeter center dial to any of the Voltage positions (labelled with the letter V).
2. Check the multimeter display. If it displays 0 V, the multimeter will be typically operational.

NOTE

Detailed instructions on how to use each tool will be given throughout the training course, as well as troubleshooting tips and additional help.

WARNING

To avoid damaging the tools, disconnect the cables and turn off the power from each device after each initial quick check.

Help and Troubleshooting

Common problems

Signal or behavior	Cause	Solution
The Riscuberry board seems to not boot at all	No jumper in the JP6 connector leads to a boot failure of the Advanced Training Target board. This can be observed either in no LED turning on in the device, or in the POWER LED turning on together with dim light in the LDx LEDs.	– Unplug the USBmicro cable from the Advanced Training Target. – Insert a jumper in JP6 in the 1-2 position. – Plug the USBmicro cable into the Advanced Training Target and your computer again.
The hardware tool seems to power up, but it does not work with the virtual machine software	The tool is connected to the physical machine host OS, but not connected to the VM guest OS.	– Connect the device to the virtual machine guest OS by clicking on the appropriate USB device under the “Devices” menu in the VirtualBox application. – Make sure the device shows a checkmark in the Devices menu afterwards (do not click again on the device, as this action will disconnect it)
The PicoScope application is extremely slow in the virtual machine	The host computer for the VM environment is not suitable (or is incorrectly configured) for high-volume data transfers over USB.	Install the PicoScope software in the host OS environment. You can download it from https://www.picotech.com/downloads

Still have questions?

1. Visit the Keysight Support Portal at https://support.keysight.com.
2. In case you wish to reach us via e-mail: you can contact us at the e-mail address riscuresolutions@keysight.com.

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