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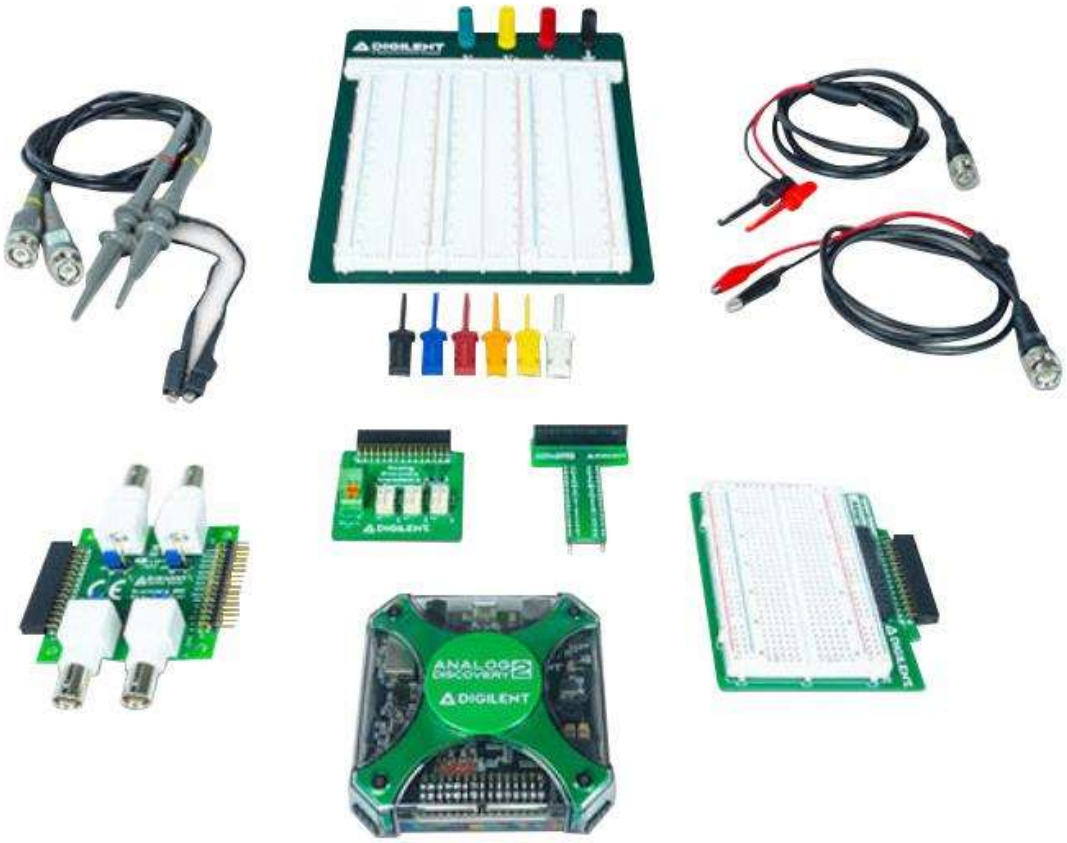

Part: 471-027

Kit Contents: Analog Discovery 2 with Accessories, Mini Grabbers with Leads & Test Clips, Cables, Breadboard Kit

Analog Discovery 2: 100MS/s USB Oscilloscope, Logic Analyzer and Variable Power Supply

Interested in purchasing the Analog Discovery 2 along with accessories? Check out our Pro Bundle, Ultimate Bundle, Student Bundle!

What is the Analog Discovery 2?

Digilent Analog Discovery 2 is a USB oscilloscope, logic analyzer, and multi-function instrument that allows users to measure, visualize, generate, record, and control mixed-signal circuits of all kinds. Developed in conjunction with Analog Devices and supported by Xilinx University Program. This test and measurement device is small enough to fit in your pocket, but powerful enough to replace a stack of lab equipment, providing engineering professionals, students, hobbyists. and electronic enthusiasts the freedom to work with analog and digital circuits in virtually any environment, in or out of the lab. The analog and digital inputs and outputs can be connected to a circuit using simple wire probes; alternatively, the Analog Discovery BNC Adapter and BNC probes can be used to connect and utilize the inputs and outputs.

Driven by the free WaveForms software (Mac, Linux, and Windows compatible) software, Analog Discovery 2 can be configured to work as any one of several traditional test and measurement instruments including an Oscilloscope, Waveform Generator, Power Supply, Voltmeter, Data Logger, Logic Analyzer, Pattern Generator, Static I/O, Spectrum Analyzer, Network Analyzer, Impedance Analyzer, and Protocol Analyzer.

USB Oscilloscope

Analog Discovery 2 among compatible add-on boardsThe Analog Discovery 2 is designed to be a portable alternative to a stack of benchtop equipment. It's durable enclosure measures (3.23 inch x 3.25 inch x7/8inch) and fits in a pocket. The Analog Discovery can be connected to circuits and designs via the included female flywires, or used in conjunction with the included gender changers when a male connection is necessary.

Accessories can be purchased separately to provide additional functionality, such as the BNC Adapter for higher bandwidth and BNC connectors, or the Breadboard Adapter and Breadboard Breakout for a direct connection to the breadboard, or the Impedance Analyzer for additional Impedance measurement functionality. The Analog Discovery 2 comes packaged in a durable project box that will fit all the included accessories and some additional adapter boards. The project box measures (7" x 5.75" x 1.5") and provides even more durability when stashing your portable Oscilloscope and multi-function instrument in your backpack or briefcase.

For improved Power Supplies, integrated BNC connectors and a replaceable breadboardable interface check out the Analog Discovery Studio.

- Two-channel USB digital oscilloscope (1MΩ, ±25V, differential, 14-bit, 100MS/s, 30MHz+*)
- Two-channel arbitrary waveform generator (±5V, 14-bit, 100MS/s, 12MHz+ bandwidth*)
- 16-channel digital logic analyzer (3.3V CMOS and 1.8V or 5V tolerant, 100MS/s)
- 16-channel pattern generator (3.3V CMOS, 100MS/s)
- 16-channel virtual digital I/O including buttons, switches, displays, and LEDs, which is perfect for logic training applications
- Two input/output digital trigger signals for linking multiple instruments or providing an external trigger source
- Two channel voltmeter
- Network Analyzer with Bode, Nyquist, Nichols transfer diagrams of a circuit. The Network Analyzer has a range of 1Hz to 10MHz
- Spectrum Analyzer capable of power spectrum and spectral measurements (noise floor, SFDR, SNR, THD, etc.)
- Data Logger with exportable data and plot functionality
- Impedance Analyzer for analyzing capacitive and inductive elements
- Protocol Analyzer with SPI, I2C, CAN, AVR, and UART
- Two programmable power supplies (0…+5V , 0…-5V). The maximum available output current and power depend on the Analog Discovery 2 powering choice.
- Stereo audio amplifier to drive external headphones or speakers with replicated Arbitrary Waveform Generator signals
- An available Software Development Kit for programming with Python and C++, and a toolkit for programming with LabVIEW.
- MATLAB support for the Data Acquisition Toolbox
- Product Compliance:
- HTC: 8471809000
- ECCN: 3A992.a
- *Note: To achieve maximum bandwidth, use of the BNC Adapter for Analog Discovery is required.

2x15 Flywires: Signal Cable Assembly for the Analog Discovery

The 2x15 MTE (Measurement and Test Equipment) Cable for Analog Discovery provides a simple connection method from any of the instruments on the Analog Discovery 2 to a circuit under test. The 30 female-terminated wires are color-coded and can be used as is, in conjuntion with a pin header gender changer to probe a female connector, or connected directly to breadboard wire.

One 2x15 MTE Cable is provided with the Analog Discovery 2, but it can be useful to have additional cables for testing multiple devices or in the event that it needs to be replaced.

- One 2x15 keyed female MTE connector compatible with the Analog Discovery Legacy and Analog Discovery 2
- Female-terminated probe ends
- Probe wires 260mm± 20 long
- Color Coded to match the device Pinout

6-pin Header & Gender Changer (5-pack)

The prolific Pmod ports and female terminated MTE cables available for Digilent FPGA boards and Test and Measurement devices provide a convenient way to connect peripherals and probe signals during the prototyping process. However often times a connection needs to be made between two female ports. The six-pin header and gender changer is ideal for facilitating and creating a secure connection between two female ports.

They come as a dual male header with 6 pins, but can be broken into smaller sets or individual pins as needed. These headers are different than the typical pin header as the plastic spacer is equidistant from each end, providing the best option for gender changing female MTE cables.

This is the same set of pin header and gender changers that comes with the Analog Discovery.

- Changes gender for any 6-pin female header, female to male
- Connects any 2 Digilent 6-pin cables together
- 0.64 mm pin width
- 6.35 ± 0.2 mm pin length
- Pins space 2.54 mm apart
- Ships in a pack of 5

Mini Grabber Test Clips with Leads

Digilent Test and Measurement devices use female or male terminated MTE cables to provide a convenient method of probing circuits. When probing small circuits or integrated circuits a more secure connection may be desired. The mini grabber test clips (also known as micro grabber test clips or IC clips) with leads provide a grabber type connection that can be added to the end of the MTE cables to connect to integrated circuits, component leads, and other circuit components.

The lead (or pigtail) end slides easily into female breadboard wire and provides a secure connection. The clip end has two small pincers that can grab components and wires up to 1.27mm in diameter. These spring loaded pincers are accessed by pushing on the end of the mini-grabber and when released will hold tight for full electrical contact. If noise is a particular concern the Mini-grabber Test Clips (needs link to other mini-grabbers) provide a direct connection from the grabbers to the MTE cables without the pigtail, but can be harder to connect.

This pack of five includes mini grabbers with leads in five different colors.

- Lightweight construction
- Pig-tail (breadboard wire) connection compatible with female terminated MTE cables
- Able to grasp components up to 1.27mm in diameter
- Product Compliance:
    - HTC: 8536908585
    - ECCN: EAR99

Mini Grabber Test Clips (6-pack) for use with Instrumentation Flywires

Digilent Test and Measurement devices use female or male terminated MTE cables to provide a convienient method of probing circuits. When probing small circuits or integrated circuits a more secure connection may be desired. The mini-grabber test clips provide a grabber connection that can be added to the end of the MTE cables to connect to component leads, wires, and other circuit components.

The spring-action clips use two-lead pincers to grab onto conductors up to 1.27mm in diameter. When released, the pincers hold tightly for good electrical contact. The mini-grabber test clips ship in packs of six with a variety of colors. The connection between the MTE cable and grabber is direct which can reduce noise concern, but can be difficult if the MTE cable is not oriented correctly. The Mini-grabber test clips with leads (needs link) provide an easier connection via a pigtail.

- Lightweight and durable construction
- Two signal connection points for signal wires
- Direct connection to female terminate MTE cable (no pigtail)
- Able to grasp components up to 1.27mm in diameter

BNC to Alligator Clip Cable

BNC Cables offer the best signal integrity and highest available bandwidth for connecting a waveform generator to a circuit under test and are the standard in the industry. This cable features a a BNC connector cable terminated by red and black alligator clips ideal for connecting securely to medium sized components. Included is one BNC to alligator clip test probe which has been selected for use with the BNC connectors on Digilent Test and Measurement devices. This cable is a great option to ensure secure connection with the waveform generator channels for Analog Discovery when using the BNC Adapter or with the Analog Discovery Studio.

For connecting to smaller components, a BNC to Mini-grabber cable is also available.

- BNC connection method
- Terminated with one black and one red alligator clip
- 39.37 inches (100±2cm) total length
- 7 inches (18cm) black and red lead lengths
- Product Compliance:
    - HTC: 8544200000
    - ECCN: EAR99

BNC to Minigrabber Cable

BNC Cables offer the best signal integrity and highest available bandwidth for connecting a waveform generator to a circuit under test and are the standard in the industry. This cable features a BNC connector cable terminated by red and black minigrabber test clips. Included is one BNC to minigrabber clip test probe, which has been selected for use with Digilent Test and Measurement devices. This cable is a great option to ensure secure connection with the waveform generator channels for Analog Discovery when using the BNC Adapter or with the Analog Discovery Studio. It is ideal for connection to small components or parts. Another great option is the BNC to Alligator clip cable.

- BNC connector cable
- Terminated by Black and red minigrabber clips
- 44.88 inches (114 cm) total length
- 2.36 inches (6 cm) black and red lead lengths
- Product Compliance:
    - HTC: 8544200000
    - ECCN: EAR99

Analog Discovery 2x15 Ribbon Cable

The 2x15 MTE Cable that comes with the Analog Discovery is a handy cable for probing circuits but is not the ideal solution for plugging in all of the signals at once. The 2x15 Female Extension

MTE cable for Analog Discovery allows a quick connector from one 2x15 header to another or extend the reach of a connector.

This is particularly useful for the Breadboard Breakout for Analog Discovery.

- Allows you to extend the Analog Discovery signals to a female header
- 2x15 keyed female connector on each side
- 30 color-coded signal wires match the Analog Discovery pinout
- The cable is 7 3/4" (19.68 cm) long
- Product Compliance:
    - HTC: 8544422000
    - ECCN: EAR99

Solderless Breadboard Kit: Large

Solderless Breadboards are the ideal solution for building and learning circuits that are not intended to be permanent. Simply slide the leads into the tie points and remove when you need to rebuild or adjust.

This solderless breadboard is comprised of three small solderless breadboards and 5 solderless power rails power rails, giving plenty of space for circuits ranging from a one stage lab project, to multistage final designs. The breadboards are permanently and securely affixed to a rugged steel backing with four optional screw terminals for attaching voltage sources and ground.

- Large breadboard with rugged steel backing
- Ideal for medium to large circuits
- 3x 630 tie point terminal strips
- 5x 100 tie point distribution strips
- Four screw terminals for power supply connections
- 4 adhesive rubber feet
- Product Compliance:
    - HTC: 8537109170
    - ECCN: EAR99

BNC Adapter for Analog Discovery

BNC probes offer the best signal integrity and highest available bandwidth for connecting an oscilloscope or waveform generator to a circuit under test, and are the standard in the industry. The BNC Adapter for Analog Discovery 2 provides this connection method to both the waveform generator and oscilloscope instruments, while keeping the option and convenience of the standard MTE cables for the other 10 instruments on the Analog Discovery 2. The BNC Adapter also adds the ability to AC or DC couple the oscilloscope and the option for either 0 or 50-ohm termination on the waveform generator, combining the portability and flexibility of the Analog Discovery 2 with industry standard features.

For a tutorial, Reference manual and other documentation, view the Support Materials tab.

Note: The BNC Adapter Board for the Analog Discovery does not have differential analog (scope) inputs

- Connects standard BNC-terminated test leads & probes to the Analog Discovery's oscilloscope and waveform generator
- Increases the oscilloscope bandwidth from 9 MHz to 30 MHz
- Increases the waveform generator bandwidth from 9 MHz to 12 MHz
- Jumper-selectable oscilloscope AC and DC coupling
- Jumper-selectable 50-ohm or 0-ohm output impedance on arbitrary waveform generator (AWG) channels
- Single-ended scope inputs with the negative input connected to the ground

Breadboard Adapter for Analog Discovery

The MTE cable included with the Analog Discovery provides a convenient probing method for all of the inputs and outputs on the device, but is not an ideal method of connection to a breadboard. The Breadboard Adapter for Analog Discovery provides a 400 tie point breadboard or prototyping surface, that can be directly connected to the Analog Discovery. Multiple Breadboard Adapters can be used in concert to conveniently switch between testing multiple projects without having to individually unplug the wired connections (up to 30).

Straight out of the packaging, the adapter provides a female header to pass through all connections from the Analog Discovery a 300 tie point prototyping surface and two power rails directly routed from the V+ and V- pins on the Analog Discovery. Components and wires can be soldered directly to the prototyping surface and power rails for a semi-permanent and secure set up or the included half-sized breadboard can be affixed to the adapter.

For a tutorial, Reference manual and other documentation, view the Support Materials tab.

Note: Once the Breadboard is attached to the adapter it is (almost) impossible to remove.

- Protoboard area consisting of twenty-six rows of 10 plated through-holes
- Two 26 hole V+, V-, and GND rails routed from the 30-pin connector
- 30-pin female header containing all signals from the Analog Discovery
- One half-sized solderless breadboard is included
- Ideal for small to medium sized circuits
- Provides an alternative to the flywires for Analog Discovery
- Product Compliance:
    - HTC: 8537109170
    - ECCN: EAR99

Breadboard Adapter for Analog Discovery

The MTE cable included with the Analog Discovery provides a convenient probing method for all of the inputs and outputs on the device, but is not an ideal method of connection to a breadboard. The Breadboard Adapter for Analog Discovery provides a 400 tie point breadboard or prototyping surface, that can be directly connected to the Analog Discovery. Multiple Breadboard Adapters can be used in concert to convienently switch between testing multiple projects without having to individually unplug the wired connections (up to 30).

Straight out of the packaging, the adapter provides a female header to pass through all connections from the Analog Discovery a 300 tie point prototyping surface and two power rails directly routed from the V+ and V- pins on the Analog Discovery. Components and wires can be

soldered directly to the prototyping surface and power rails for a semi-permanant and secure set up or the included half-sized breadboard can be affixed to the adapter.

For a tutorial, Reference manual and other documentation, view the Support Materials tab.

Note: Once the Breadboard is attached to the adapter it is (almost) impossible to remove.

- Protoboard area consisting of twenty-six rows of 10 plated through-holes
- Two 26 hole V+, V-, and GND rails routed from the 30-pin connector
- 30-pin female header containing all signals from the Analog Discovery
- One half-sized solderless breadboard is included
- Ideal for small to medium sized circuits
- Provides an alternative to the flywires for Analog Discovery
- Product Compliance:
    - HTC: 8537109170
    - ECCN: EAR99

Breadboard Breakout for Analog Discovery

MTE cables are a convenient connection method to probe circuits under test with the Analog Discovery, but can be cumbersome when using a breadboard. The Breadboard Breakout is designed to connect all of the inputs and outputs on the Analog Discovery directly to a breadboard. When switching between circuits, the entire breadboard adapter can be removed or the Analog Discovery can be unplugged from the adapter, leaving the entire circuit intact. Multiple Breadboard Breakouts can be used to conveniently switch between projects or designs.

The Analog Discovery connects to the Breadboard Breakout directly to the 2x15 pin connector on the top of the breakout, or with the optional 2x15 Ribbon Cable for Analog Discovery. All of the signals are passed directly through to the Cmod style header to individual nodes in the breadboard.

For a tutorial, Reference manual and other documentation, view the Support Materials Tab.

- One 2x15 female header to connect the Analog Discovery or Ribbon Cable
- 30 male pins broken out to fit into a standard breadboard
- Provides a direct connection with Digilent's Analog Discovery Inputs and Outputs
- Labels for breadboard breakout pins correspond to Analog Discovery header connections
- Product Compliance:
    - HTC: 8537109150
    - ECCN: EAR99

Impedance Analyzer for Analog Discovery

One of the 12 instruments of the Analog Discovery is the Impedance Analyzer instrument, which allows the user to analyze inductive and capacitive elements of a circuit under test. The Impedance Analyzer for Analog Discovery provides automatically adjusting reference resistors and relays, so that reference circuits don't have to be manually built for each test.

When plugged into the Analog Discovery, and connected to WaveForms the Analog Discovery will automatically select the most appropriate configuration for the attached unknown impedance. The adapter is loaded with a 2x15 female connector which can be plugged in directly to the Analog Discovery. Components or leads can be attached via the spring terminal block on the Impedance Analyzer.

Note: Use of this adapter requires WaveForms version 3.8.2 or later.

- 2-wire Impedance Analyzer integrates with the Impedance Analyzer instrument in WaveForms
- 50pF - 500µF Capacitance Measurement Range
- 10µH - 1000mH Inductance Measurement Range
- 1Hz - 15MHz Excitation Frequency Range
- 2x15 female header for connection to the Analog Discovery
- Two pin Spring Terminal Block for connection to the circuit under test
- Product Compliance:
    - HTC: 8473301180

- ECCN: EAR99

BNC Oscilloscope x1/x10 Probes (Pair)

BNC Probes offer the best signal integrity and highest available bandwidth for connecting an Oscilloscope to a circuit under test and are the standard in the industry. This set of BNC probes features two BNC cables terminated by contraction hook type oscilloscope probes. Both cables are rated for 6 MHz at 1X attenuation, and 100MHz at 10x attenuation. This pair of BNC-terminated oscilloscope probes, has been selected for use with the Analog Discovery in conjunction with the BNC Adapter for the Analog Discovery or with the Analog Discovery Studio.

- BNC-terminated
- Selectable 1X/10X input attenuation
- Contraction hook tip
- 12cm ground clip
- Localization sleeve adapts to IC testing
- Input resistance:
  - 1x1MΩ
  - 10x10MΩ
- Input capacitance:
  - 1x 70pF – 120pF
  - 10x 13pF – 17pF
- Bandwidth:
  - 1x DC-6MHz
  - 10x DC-100MHz
- Product Compliance:
  - HTC: 9030908911
  - ECCN: 3A992.a
- Note: The specifications listed are for the Oscilloscope probes only. When used with a test and Measurement device, make sure to check the specifications of that device to avoid exceeding voltage limitations.

Project Box: Jumbo-sized

This Jumbo-sized project box is perfect for storing and transporting a multitude of objects. It can easily fit an autorange digital multimeter along with an Analog Discovery 2. It's even large enough to fit two of our regular-sized project boxes inside, so you can separate different projects or components and rest easy knowing that they are safely contained. Two heavy-duty plastic clasps ensure that everything will remain locked up tight!

- Measuring 13" x 9" x 3.25", it's large enough to fit two of our regular-sized project boxes!
- Two heavy-duty locking clasps
- Rugged handle for convenient transport
- Transparent plastic