Secondary Ignition Pickup

01-712-BNC
01-712-BP
01-712-LS

Application
The 01-12 secondary ignition pickup can be used to capture secondary ignition waveforms from distributor and EI (DIS) systems using most lab scopes, either analog or digital. Secondary waveforms from distributor systems can be displayed as a single cylinder, superimposed or a parade pattern. Waveforms from EI systems can only be displayed as a single cylinder using the 01-12.


01-12-BNC

Variations
The 01-12 is available with a BNC connector for use with scopes such as the Fluke 97, Fluke 190 series, Tektronix, analog scopes, etc. and with banana plug connectors for use with scopes such as the LS-2000/ADL-7100, OTC Perception and others.

Attenuation
The 01-12 has a 1000:1 attenuation. This means that each 1V measured on your scope represents 1000V (1KV) in the secondary.

Scope Connection
The 01-12 connects to your scope just like any other test lead. Just connect it to the input channel that you wish to view the waveform on.

Ignition System Connection
To avoid possible damage to your scope, **always connect the 01-12's ground clip to a suitable engine ground first!** Next, connect the 01-12 secondary clip around the coil wire on distributor systems or an individual wire for the cylinder you wish to view as with EI systems.

For coil-in-cap systems such as GM's HEI, adapter plates are available. These plates attach to the distributor cap and you then connect the 01-12 to the plate. Visit www.aeswave.com or call us for more details.


01-12-BP
01-12-LS

Scope Setup
Some automotive-specific scopes may have built-in menus and setups for using a secondary ignition probe. Always refer to your scopes users manual. For scopes that do not have built-in setups, follow these basic guidelines:

- Make sure your scope is set to measure DC voltage.
- Since the 01-12 outputs 1V for every 1KV in the secondary, start with a volts per division setting on your scope of 1V. Some scopes are adjusted by the total voltage displayed, not volts per division. In this case, try to select a voltage range of 0-10V.
- Select a time base of 1mS or 2mS per division to start. Some scopes are adjusted by selecting the total time displayed rather than time per division. In this case try to select a total time of around 10mS to start.
- Start with the trigger set to automatic. Once you begin seeing the waveform on the screen you can stabilize it by setting the trigger. Set the trigger to normal mode. A trigger level about half way up the waveforms "spike" and a positive slope setting usually works best.

Fine-tuning the Display
- Adjust the time and voltage settings until you achieve the desired display. Keep in mind that no matter what voltage setting you use on your scope, 1V is always equal to 1KV.
- A fast time base, 1mS or 2mS per division, is great for single cylinders or superimposing. A slower time base can be used to parade all of the cylinders on a distributor ignition system. Keep in mind that the more spark events on the screen at once, the less detail you will see. Also, you have no idea which cylinder corresponds to which spark event on the screen. A synch probe can be used with multi-channel scopes to synchronize the display.
- Experiment with trigger setting until you find what works best for your particular scope.
- You may want to use your scopes peak-detect or min/max mode to be sure and capture all of the high-speed ignition events.

Analyzing the Waveform

- You can calculate the burn time based on the time-base setting that you are using. Just use your scopes cursors to measure the length of the spark line.
- Burn voltage can be determined by measuring the voltage level of the spark line. For instance, a spark line at roughly 1.5V would represent 1.5KV (1V is equal to 1KV).
- When superimposing on distributor systems, look for repeated variation in burn time and/or voltage.
- Many technicians are used to observing the ignition "spike" with a traditional engine analyzer. This can be misleading sometimes with a digital scope due to the speed of the event. Some scopes may not catch it all of the time and you might possibly be led to bel ieve there is a problem when there really isn't. Keep in mind that anything that affects the "spike" also affects the burn time/voltage so most problems can be found without seeing the "spike" at all. Some digital scopes however have peak-detect or min/max modes that enable them to reliably display high-speed events such as an ignition "spike". It pays to be 100% familiar with your scope.

Accessories

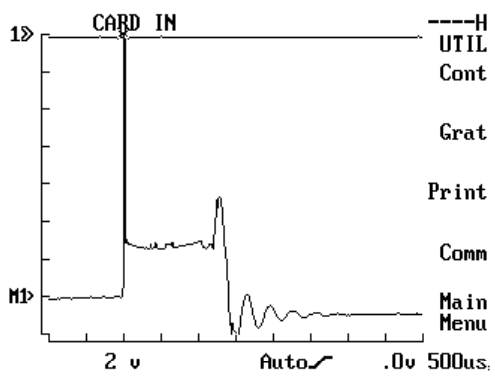
There are several accessories that you may want to use with your 01-12 secondary pickup:

- **Coil-in-cap adapters:** Adapters are available for GM HEI, Toyota and Nippondenso distributors that use an integral coil.
- **Synch probe:** The 01-14 synch probe is available to synchronize the display when parading on distributor system. It can also be used to trigger on either power or waste events on EI systems. The synch probe clamps around an ignition wire (usually #1) and allows you to display the cylinders in the firing order. It can also be used for applications besides ignition. The 01-14 is available with banana plug connectors for scopes such as the LS-2000, OTC Perception, etc., and BNC connectors for scopes such as Tektronix, Fluke 190 series, etc. There is a special 01-14 synch probe for analog scopes. Visit www.aeswave.com or call for details.
- If you'd like to parade allcylinders on an EI (DIS) equipped vehicle, special EI ignition probes that are available. Visit www.aeswave.com or call for details.

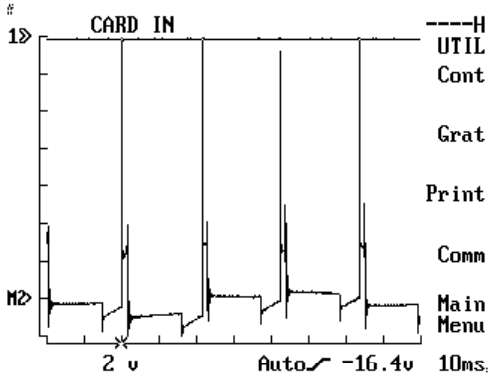
Notes About Specific Scopes

- The Sun LS-2000/UEI ADL-7100 have a peak-detect that is always on both channels. This makes them ideal for ignition.
- The 01-12 **is not** recommended for use with the Snap-on Vantage™.
- The 01-12 can be used with the Interro PDA, Matco Insight and OTC Vision. However, the attenuation does not match that of the probe included with the scope for it's "Quick Ignition" test. If you use the 01-12 for this test, keep in mind that the measured KV values will be incorrect.
- If the waveform appears upside-down from what you expect, use your scopes invert function. For scopes such as the LS-2000/ADL-7100 simply reverse the plugs at the scope. If your scope has a BNC input and no invert functions, call AES and ask us about the 01-12-switch secondary pickup that has an integrated invert switch.

Examples:



Superimposed or single cylinder display



Paraded display

Application

The 01-14 synch probe can be used to synchronize your scope's display with a firing event. Most often, this event will be the firing of the number 1 cylinder. This is useful for parading secondary ignition because it allows you to determine which spark event corresponds with a specific cylinder. The 01-14 can also be used to isolate specific portions of other types of signals such as the unique ID of crankshaft position sensor for instance. The probe works with both distributor (conventional) and EI (DIS) ignition systems.

01-14-BNC

Variations

The 01-14 is available with a BNC connector for scopes such as the Fluke 190 series, analog scopes, etc., banana plug connectors for scopes such as the OTC Perception, Ferret, etc. and modified banana plug connectors for the LS-2000/ADL-7100.

Scope Connection

The 01-14 connects to the input channel that your scope's trigger works off of. This is usually channel one or channel A.

Ignition System Connection

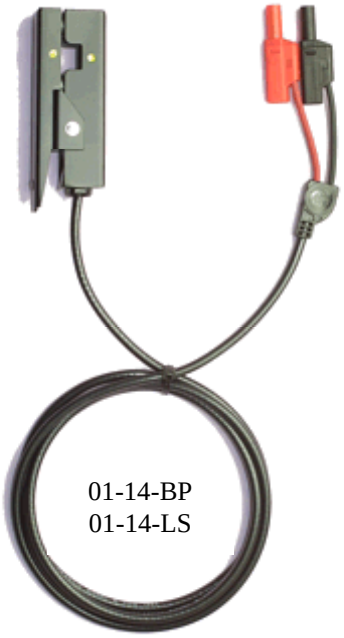
Simply clamp the 01-14 around the appropriate ignition wire. The 01-14 has two dots on one side of it's housing. The only consideration for connecting the 01-14 is to be sure these dots are facing the spark plug.

Scope Setup

Setting up your scope for using the 01-14 is fairly simple:

- Begin by making sure your scope is set up to trigger off of the channel you have the 01-14 connected to.
- Connect your secondary probe or other test lead to the scope's other channel.
- On the channel you have connected the 01-14 to, select a volts per division setting of 2V to start. On scopes that adjust by setting the total voltage displayed, try to select a setting close to 20V.
- Set the time base according to the signal you will be looking at on the other channel.
- The 01-14 should produce a well-defined positive voltage spike (See examples). Set the scope's trigger roughly half way up the spike. On EI systems, set the trigger level as high on the spike as possible to avoid triggering on the waste spark event.
- Select a positive or rising trigger slope.
- Set the trigger mode to "norm".

The scope is now triggering off of the voltage spike produced by the 01-14. This means that the scope is in effect, triggering off of the firing of a particular cylinder. This allows you to synchronize the display to recognize particular cylinders when parading ignition, isolate cylinders when superimposing ignition and isolate certain portions of a signal when looking at things like the unique ID of a crankshaft position sensor.



01-14-BP
01-14-LS

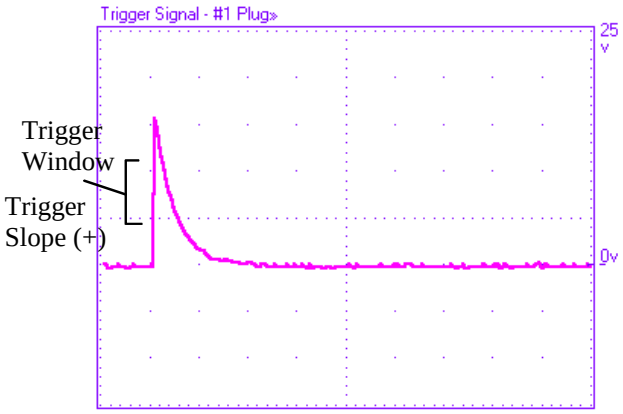
Fine-tuning

Adjust the time, voltage and trigger settings on your scope as necessary for the best performance on your application.

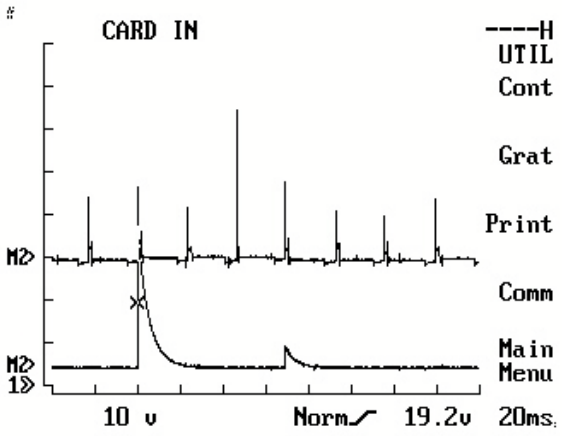
Notes About Specific Scopes

- Analog scopes and some DSO's with external trigger ports require a special analog version of the 01-14. Visit www.aeswave.com or call us for details.
- The 01-14 works great with the lab scope module of the Interro PDA, Matco Insight and OTC Vision. If you want to replace the trigger probe that you use with the "Quick ignition" function or the engine analyzer module though, you should order the 01-14 for analog scopes. Contact AES for more information.

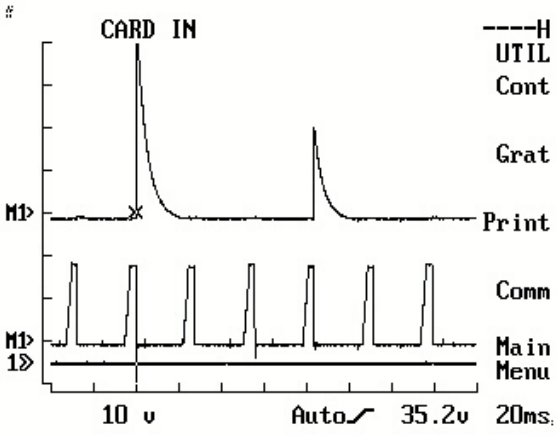
Examples



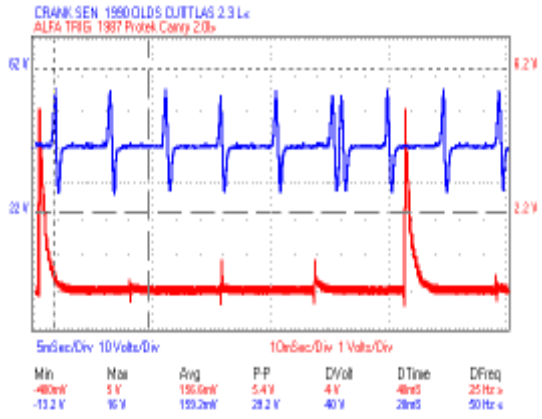
A typical waveform produced by the 01-14



Synchronizing the display of secondary parade



Using the 01-14 to isolate coil packs when current ramping EI (DIS) ignition systems



Using the 01-14 to isolate and stabilize the unique ID on a crankshaft position sensor signal.