

Appendix 1

How to Connect the Chainer and Counter Unit for Close Interval Survey Applications

The following section describes how you would make appropriate connections in order to incorporate the MCM chainer (wire measure) and counter unit for CIS applications.

When properly configured, the counter emits a short audible signal (beep) each time 2.5 feet (or 1 meter for the metric version) of trail wire is fed through the chainer. A longer beep is emitted each time 100 feet (or 100 meters for the metric version) of trail wire is fed through the chainer. An operator can then trigger readings (or designate survey flag locations) in response to the audible signals using the push-button switches on the MCM data-probes. This represents the “manual triggering” option.

An alternative approach is possible, which is known as the “automatic triggering” option. In this case, readings are triggered automatically each time 2.5 feet (or 1 meter for the metric version) of trail wire is fed through the chainer.

There are two possible mounting scenarios for the counter/display unit and, in each case it is possible to use manual triggering or automatic triggering. Consequently, there are four possible cabling configurations and each of these configurations is described below.

Counter/Display Unit Mounted Separately on Data-Logger Tray:

Option 1: Manual Triggering

Figure 1 illustrates the cabling configuration for this option. As can be seen from the figure, a 3-wire cable (coiled black cable with 3-pin plugs on either end) connects the hip pack (or the back pack) with the counter unit. Two of the wires carry the wire measure signal and the third wire connects to the structure (pipe) via the trail wire.

The structure can be connected to either the positive or the negative side of the data-logger’s voltmeter by connecting a banana plug cable from the

counter unit to either the red or the black banana plug terminal on the data-logger. By connecting this cable to the red banana plug terminal (positive side of the voltmeter) and using two black-band cables to connect the data-probes to the data-logger via the dual-probe adapter (effectively connecting the data-probes to the negative side of the voltmeter), you would read **negative** pipe-to-soil voltages. This situation is illustrated in Figure 1. If you wanted to read **positive** pipe-to-soil voltages, you would connect the banana plug cable from the counter unit to the black banana plug terminal on the data-logger and you would use two red-band data-probe cables.

Option 2: Automatic Triggering

Figure 2 illustrates the cabling configuration for this option. A “trigger cable” is connected from the counter unit to the 5-pin terminal on the data-logger as shown in the figure. The red and the black wires of the trigger cable are connected to the “External Beeper” connection terminals on the underside of the counter unit. The red and the black wires connect to the terminals labeled, positive and negative, respectively.

Again, as in Option 1, the structure (pipe) can be connected to either the positive or the negative side of the voltmeter by connecting a banana plug cable from the counter unit to either the red or the black banana plug terminal on the data-logger. By connecting this cable to the red banana plug terminal of the data-logger (positive side of the voltmeter), as shown in the figure, the data-probes would be connected to the negative side of the voltmeter, via the black banana plug terminal on the data-logger. In this case, you would read **negative** pipe-to-soil voltages. If you wanted to read **positive** pipe-to-soil voltages, you would connect the banana plug cable from the counter unit to the black banana plug terminal on the data-logger and you would connect the data-probes to the red banana plug terminal on the data-logger.

Note: With this option (Option 2), you do not use the MCM data-probe cables. Instead, you would connect banana plug cables (not supplied with the package) to the banana plug terminals on the data-probes and, via a common connection, you would connect both banana plug cables to either the black or the red banana plug terminal on the data-logger, depending on whether you wanted to read negative or positive pipe-to-soil voltages (see above).

Counter/Display Unit Mounted Directly on Data-Logger:

Option 3: Manual Triggering

Figure 3 illustrates the cabling configuration for this option. This option is similar to Option 1 except that, in this case, the counter unit is mounted directly on the data-logger via the banana plug prongs on the counter unit.

In this case, an external banana plug cable is not required between the counter unit and the data-logger to make connection to the structure (pipe). Instead, this connection is made via the internal wiring in the counter unit.

The structure (pipe) lead inside the counter unit can be wired to the positive or to the negative side of the voltmeter. In the illustration shown in Figure 3, the structure lead is wired to the positive side of the voltmeter, which means that you would read **negative** pipe-to-soil voltages when using the black-band data-probe cables connected to the data-probes. If you wanted to read **positive** pipe-to-soil voltages, you would connect the structure (pipe) lead (inside the counter unit) to the negative side of the voltmeter and you would use two red band data-probe cables to connect to the data-probes.

Note: The counter unit comes with the structure (pipe) lead pre-wired to the negative side of the voltmeter, however, by opening up the unit, you can change the connection to re-wire the structure to the positive side of the voltmeter (for negative pipe-to-soil readings).

Option 4: Automatic Triggering

Figure 4 illustrates the cabling configuration for this option. This option is similar to Option 2 except that, in this case, the counter unit is mounted directly on the data-logger via the banana plug prongs on the counter unit. The “trigger cable” is used in this option and is connected as described in Option 2.

Again, an external banana plug cable is not required between the counter unit and the data-logger to make connection to the structure (pipe) with this option. Instead, this connection is made via the internal wiring in the counter unit.

In the illustration shown in Figure 4, the structure lead is wired to the positive side of the voltmeter, which means that you would read **negative** pipe-to-soil voltages with the data-probes connected to the negative side of

the voltmeter, as shown. As with Option 3, the structure (pipe) lead inside the counter unit can be wired to the positive or to the negative side of the voltmeter. If you wanted to read **positive** pipe-to-soil voltages, you would connect the structure (pipe) lead (inside the counter unit) to the negative side of the voltmeter and you would connect the data-probes, via banana plug cables, to the positive side of the voltmeter.

Note: With this option (Option 4), you do not use the MCM data-probe cables. Instead, you would connect banana plug cables (not supplied with the package) to the banana plug terminal on the data-probes and, via a common connection, you would connect both banana plug cables to either the black or the red banana plug terminals on the data-logger, depending on whether you wanted to read negative or positive pipe-to-soil voltages (see above).

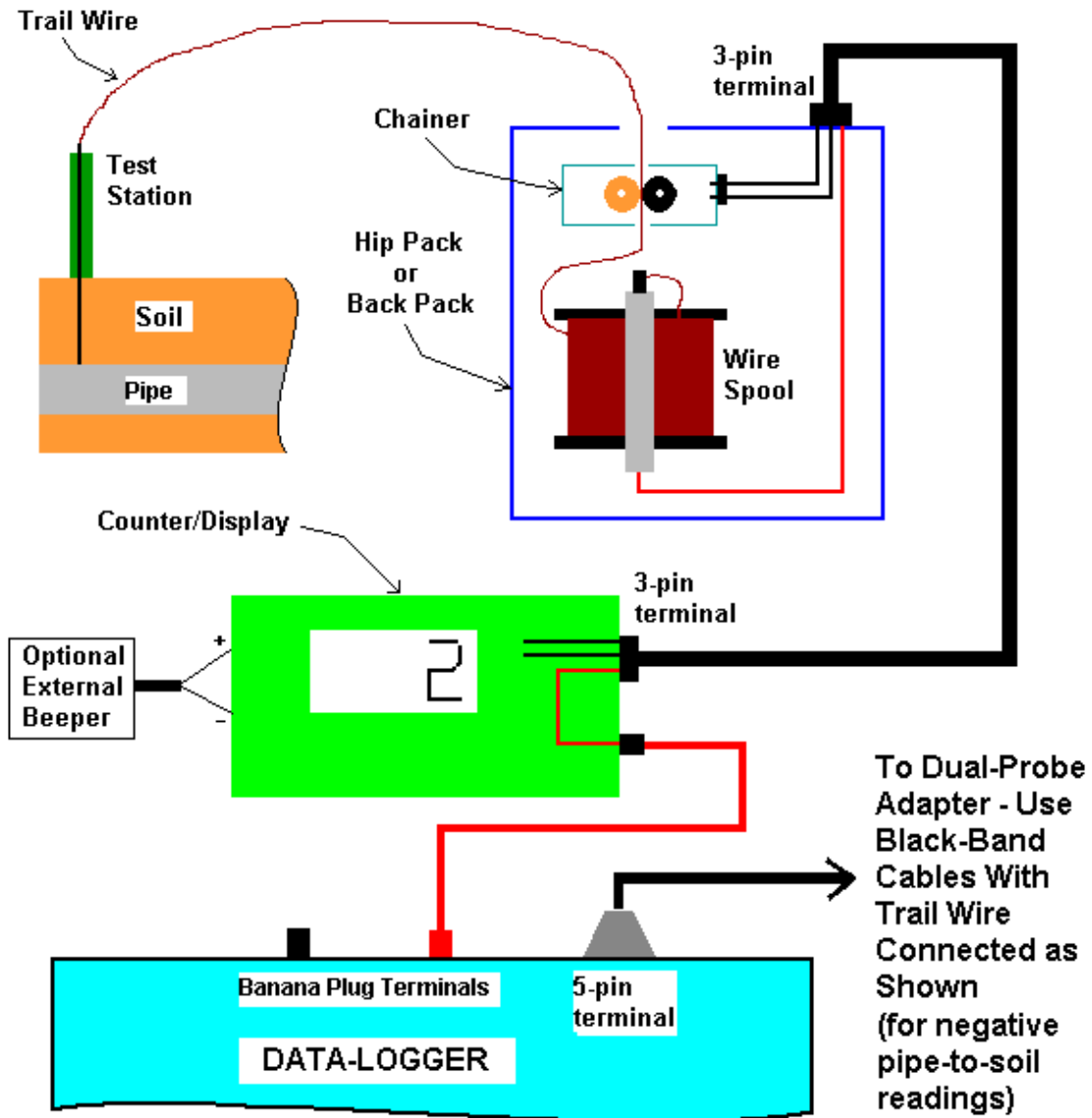


Figure 1: Counter/Display Unit Mounted on Tray – Connections for Manual Triggering of Readings Using Data-Probe Push-Buttons

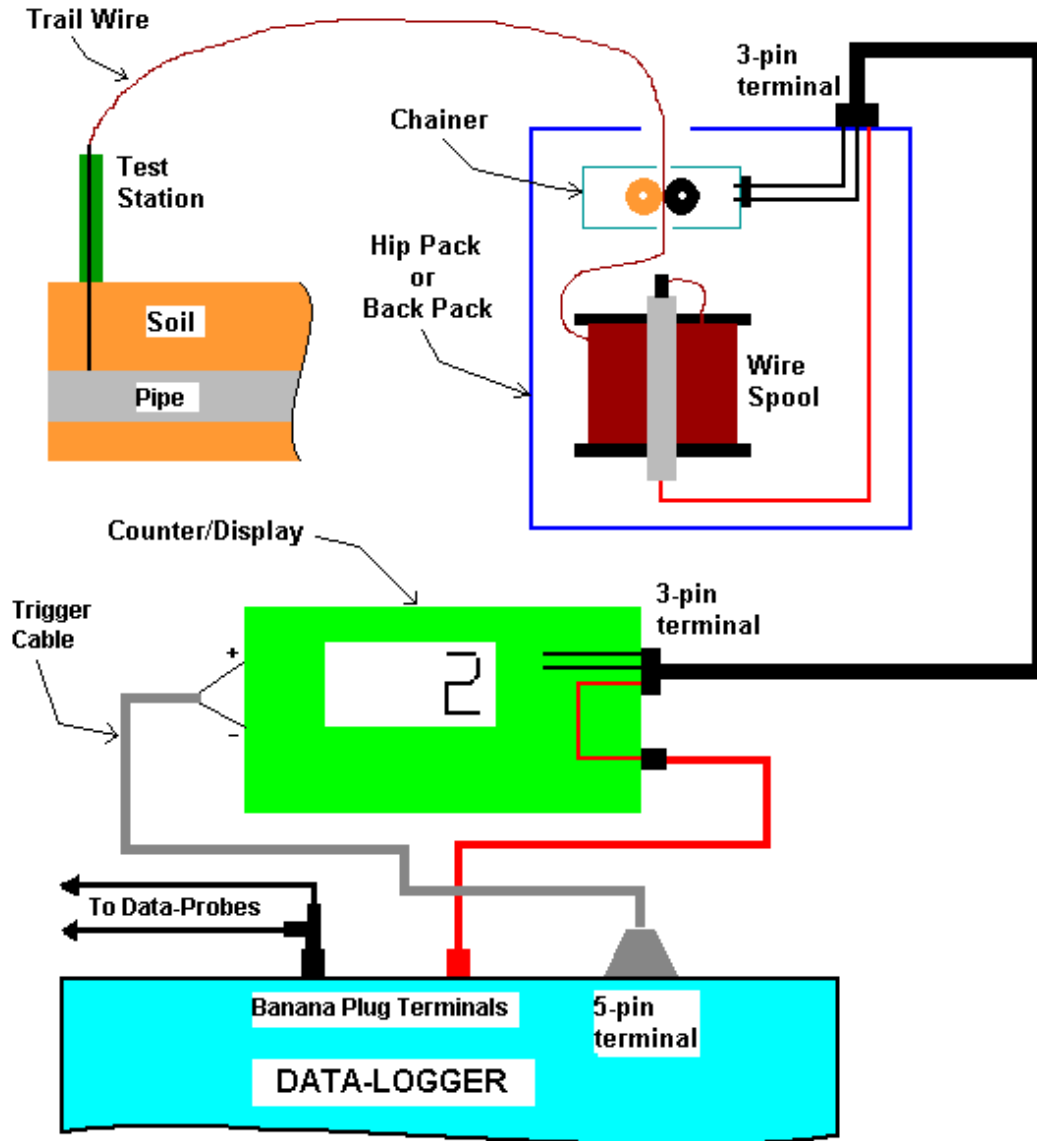


Figure 2: Counter/Display Unit Mounted on Tray – Connections for Automatic Triggering of Readings
 [banana plug cables (not included with package) are connected to the data-probes – MCM data-probe cables are not used]

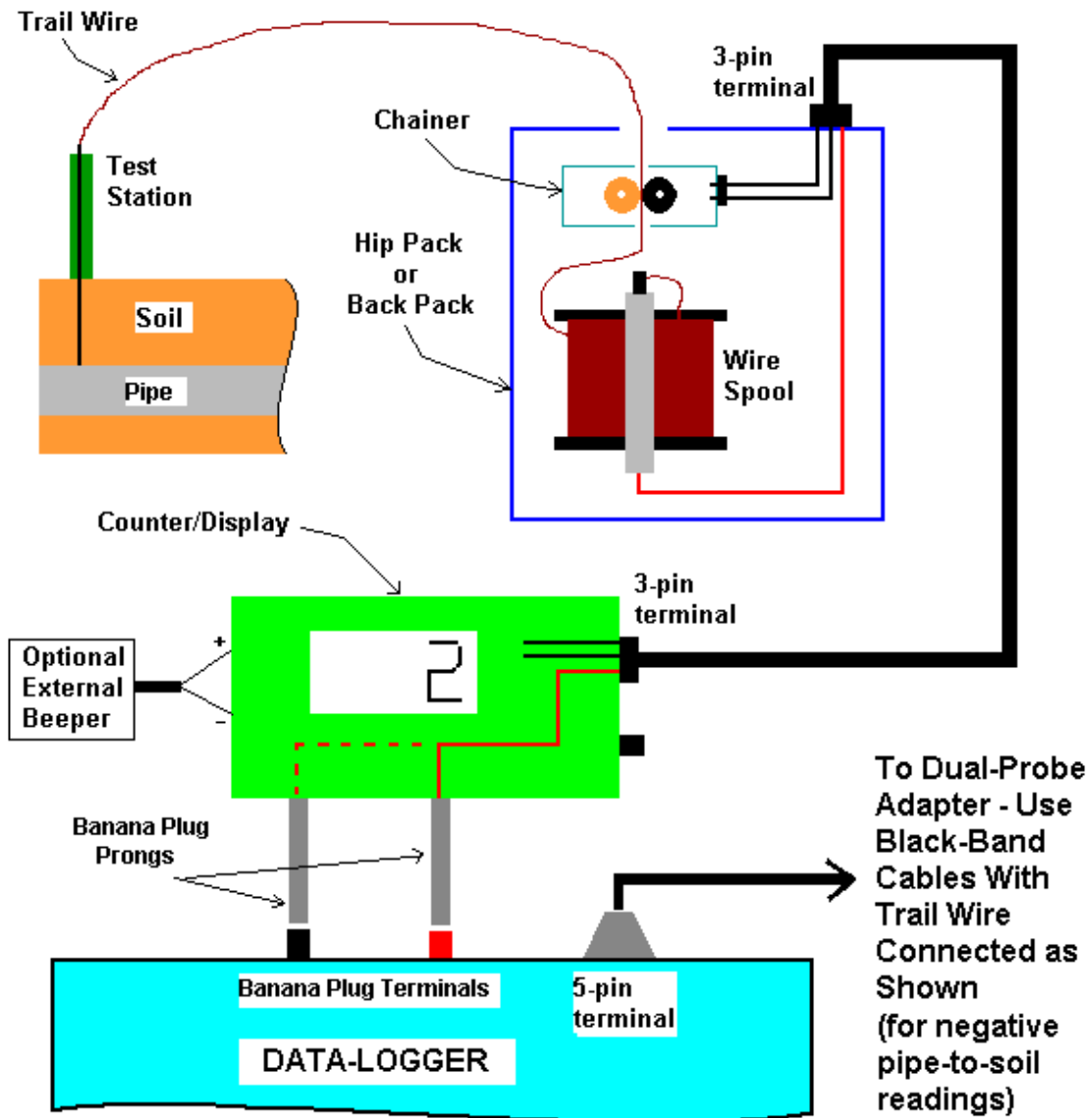


Figure 3: Counter/Display Unit Mounted Directly on Data-Logger - Connections for Manual Triggering of Readings Using Data-Probe Push-Buttons
 [Structure lead shown as wired to POSITIVE for negative pipe-to-soil readings using black-band data-probe cables]

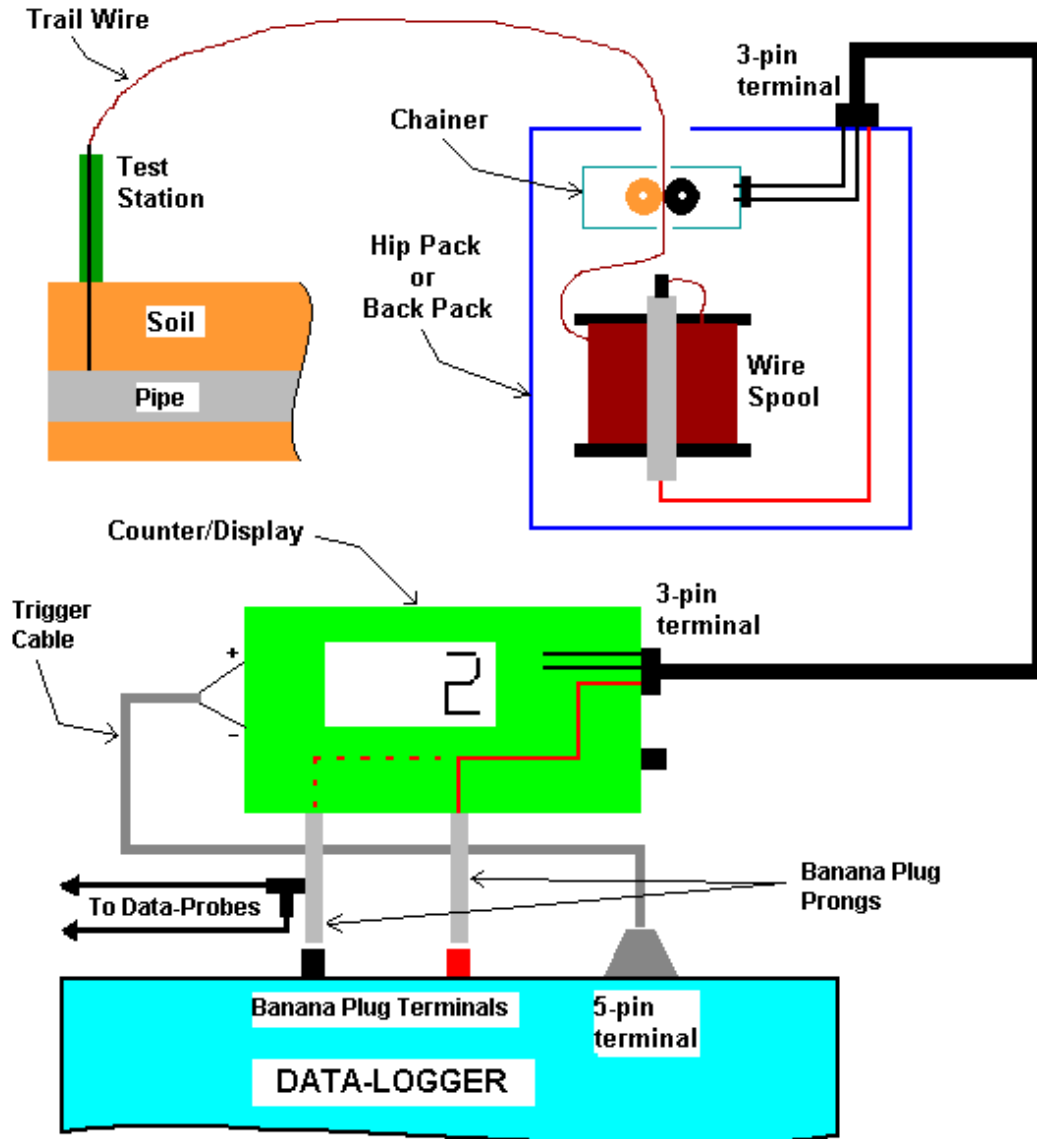


Figure 4: Counter/Display Unit Mounted Directly on Data-Logger - Connections for Automatic Triggering of Readings
 [Banana plug cables (not included with package) are connected to the data-probes – MCM data-probe cables are not used. Also, structure lead shown as wired to POSITIVE for negative pipe-to-soil readings]