Instruction Sheet

External Trigger Cable

for the Micromate® Monitoring Unit

This bulletin describes the procedure for connecting an External Trigger Cable (P/N: 721A1401) to the Micromate monitoring unit and using it to trigger and record waveform events on one or more Micromate units.

(Note: The External Trigger Cable only works while the Micromate unit is monitoring in Waveform mode.)

2 m (6.6 ft) External Trigger Cable

Explanation

When the optional auxiliary I/O is configured for an external trigger, the Micromate unit will monitor the input signal from the External Trigger Cable for a voltage level change. The external trigger can be used to trigger the Micromate unit at a specific time or to synchronize triggering up to six Micromate units. The Micromate unit will determine the level, high or low, of the input before entering monitor mode and automatically start recording within one sampling period when the signal level changes from:

1. A high to a low level – This is referred to as a **Wire Make**. The two wires start out **not connected** and are then connected by a push button or vibration event.
2. A low to a high level – This is referred to as a **Wire Break**. The two wires start out **connected** and this connection is broken by a push button or vibration event.

If the external trigger does not change its state (trigger mechanism fails), the individual Micromate units will still trigger based on their respective vibration and/or microphone configuration setups.

As an additional feature, with multiple Micromate units using the **Wire Make** configuration, if the trigger mechanism fails, the first Micromate unit to trigger from the vibration or air overpressure will drive the external trigger signal low within two samples of this trigger. This will force the remaining units to start recording data. (Note: This feature is not available with the external trigger configured as a Wire Break.)

Example Applications

1. An operator sees that a train has reached a specific point. The operator activates the external trigger by pressing a button (or toggling a switch, etc.) This causes the Micromate unit to trigger and start recording data.
2. Four Micromate units are installed in a building, each one on a different floor. The external trigger of each Micromate unit is connected to a contact that will be opened or closed by a vibration event. The activation of the contact causes all of the Micromate units to trigger and start recording data. The results from each unit can help determine the propagation of the vibration through the building.
3. Six Micromate units are installed with all of their external triggers connected in parallel as a wire make. The Micromate unit's trigger levels are setup so that each will be triggered by an external event. As soon as one of the Micromate units is triggered it will drive the external trigger signal low and force all of the remaining five units to start recording data.

DANGER - Exercise Extreme Caution

The Micromate unit can supply up to a maximum of 0.14 mA of electrical current and 3.4 volts on the cable. Ensure that this amount of current and voltage is safe for the triggering methods implemented. Connecting multiple Micromate units together with external trigger cables will increase the amount of electrical current. The total current is calculated by multiplying the number of Micromate units by the maximum current from each unit. For six (6) units, the maximum current is 0.84 mA.

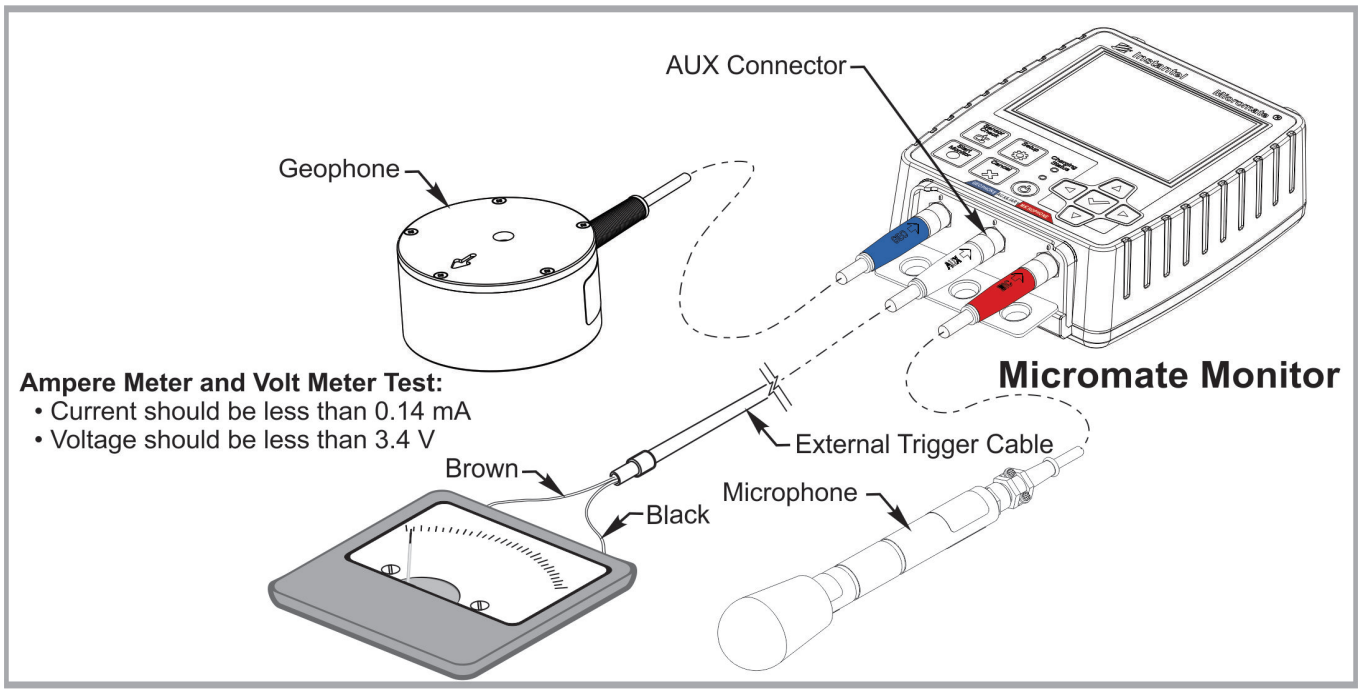
When the external trigger is used with explosives or detonators, ensure the total current and voltage are below the minimum firing thresholds. Properly trained and skilled personnel must assess and approve any remote triggering system prior to its use.

DO NOT connect the external trigger to the unit until all other connections and installations are complete and the area is safe and clear of personnel.

DO NOT install, use, or allow the external trigger to remain in place if there is any possibility of an electrical storm.

Tools and Materials Required

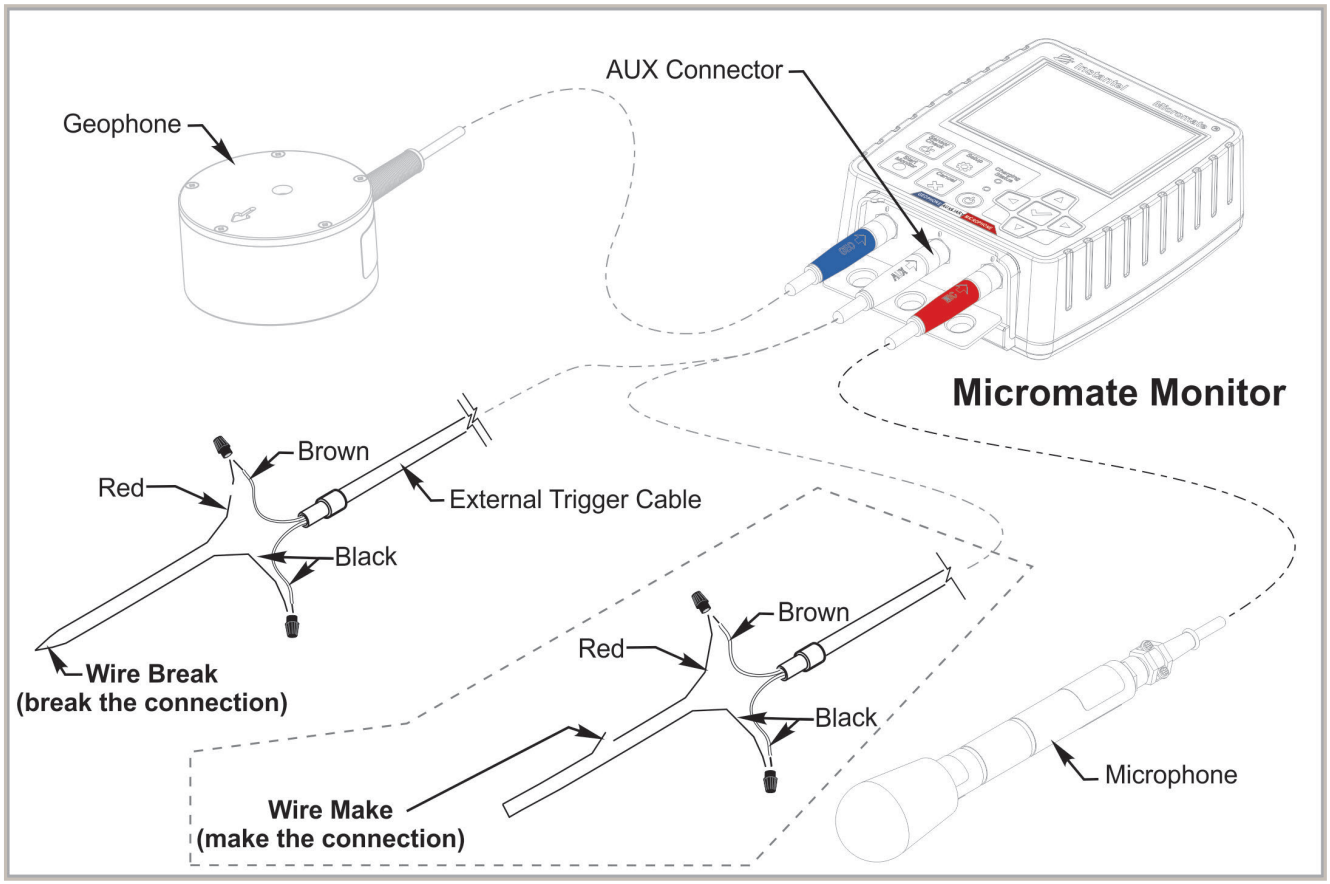
1. Micromate Monitoring Unit (up to 6 systems). . . . .(P/N: 721A2501, 721A2601, 721A3601, 721A3801)
2. Micromate Unit Auxiliary Port . . . . . .(P/N: 721A0101)
3. Micromate Unit External Trigger Cable (one per unit) . . .(P/N: 721A1401)
4. Up to 152 meters (498.7 ft) of 22 AWG red/black wire
5. Wire strippers
6. Two position switch, as required
7. Electrical tape, as required
8. Volt meter / Ammeter



Testing the External Trigger

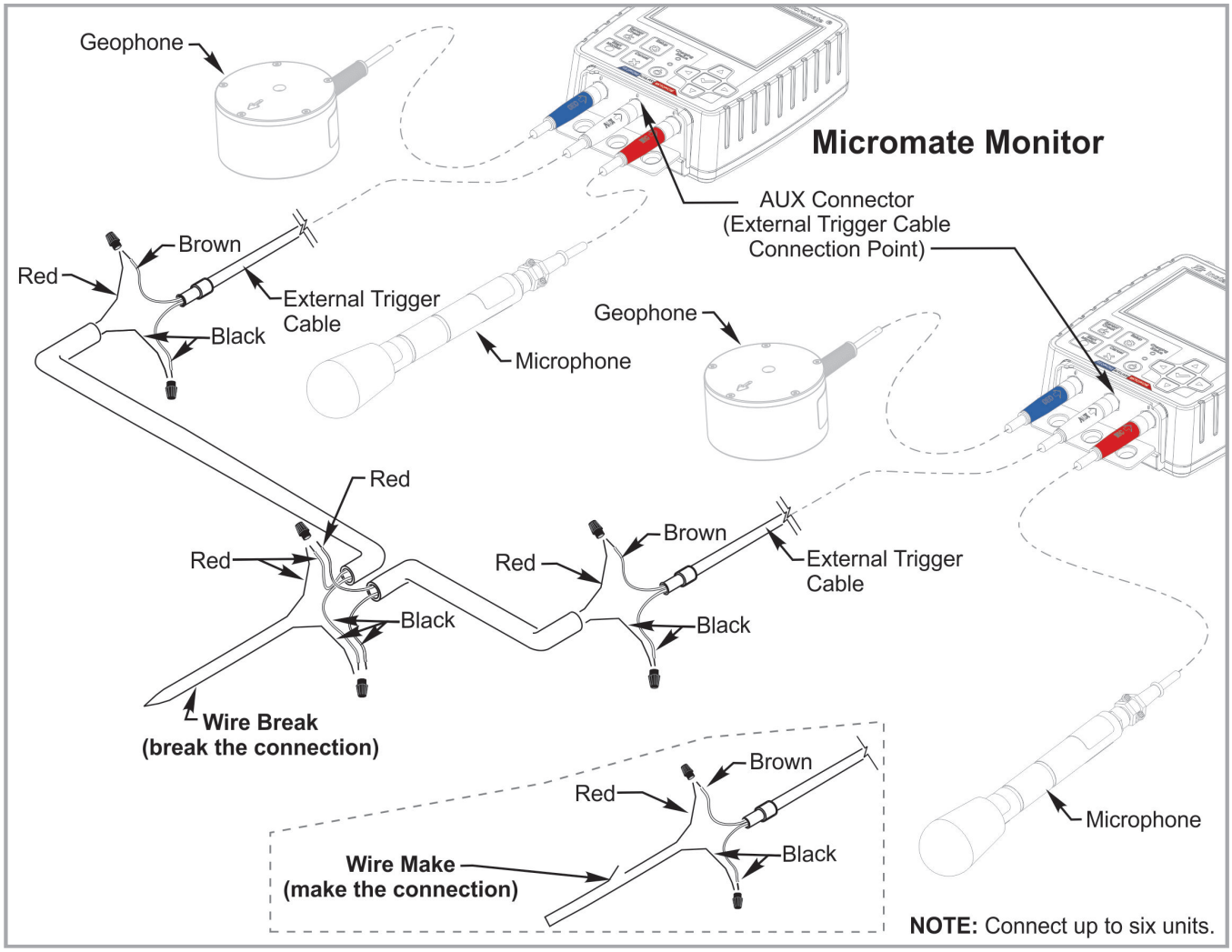
The External Trigger Cable should be tested prior to each use. Test the open circuit voltage and the short circuit current of the while it is connected to the unit. Attach the trigger cable to the Micromate unit as shown:

1. Test the open circuit voltage of the trigger cable while attached to the monitor. The voltage should be 3.4 volts. (Black wire is negative and brown wire is positive.)
2. Test the short circuit current of the trigger cable while attached to the monitor. The current should be less than 0.14 mA.



Configure a Single Micromate Unit with an External Trigger Cable

1. Test the maximum voltage and current as previously outlined in the "Testing the External Trigger" section.
2. Use the red/black 22 AWG wire to connect to the triggering device (switch or wire break mechanism).
3. Connect the free ends of the red/black wire to the Micromate Unit External Trigger Cable (red wire connected to the brown wire of the trigger cable, black wire connected to the black wire of the trigger cable).
4. Configure the Micromate Unit recording parameters (refer to the Micromate Monitoring Unit Operator Manual):
   a. Press the **Setup** key
   b. Select **View/Edit Current Setup**
   c. Active Sensors
   d. Record Mode – MUST be Waveform
   e. Record Time
   f. Sample Rate
   g. Trigger Level and source
   h. Any applicable notes
5. Configure the Micromate Unit's Auxiliary I/O for External Trigger.
   a. Press the **Setup** key
   b. Select **View/Edit Current Setup**
   c. Scroll to the **Auxiliary I/O** menu (bottom menu)
   d. Select **Auxiliary Mode** – External Trigger
6. Install the geophone and microphone sensors as required.
7. Perform a **Sensor Check** to ensure that all sensors are passing.
8. ENSURE THE VIBRATION SOURCE AREA HAS BEEN CLEARED.
9. Connect the External Trigger Cable to the AUX port on the Micromate unit.
10. Place the Micromate unit in monitor mode by pressing the **Start Monitor** key.
11. When the External Trigger changes state (Make/Break trigger), the Micromate will start recording the event.



Configure Multiple Micromate Units with External Trigger Cables (up to 6)

1. Test the maximum voltage and current as previously outlined in"Testing the External Trigger."
2. Use the red/black 22 AWG wire to connect all of the external trigger cables in parallel (red wire connected to the brown wire of the trigger cable, black wire connected to the black wire of the trigger cable), and to the triggering device (switch or wire break mechanism).
3. Configure each Micromate unit. Refer to the section "Configure a Single Micromate unit with an External Trigger" and the Micromate Monitoring Unit Operator Manual.
4. Configure each Micromate Auxiliary I/O for External Trigger as per the section "Configure a Single Micromate Unit with an Auxiliary Trigger."
5. Install the geophone and microphone sensors for each unit as required.
6. Perform a **Sensor Check** to ensure that all sensors are passing.
7. ENSURE THE VIBRATION SOURCE AREA HAS BEEN CLEARED.
8. Connect the External Trigger Cables to the AUX ports on the Micromate units.
9. Place the Micromate units in monitor mode.
10. When the External Trigger changes state (Make/Break trigger), the Micromate unit will start recording the event.

Warranty

Instantel products come with a limited one-year warranty against defects in materials or workmanship unless otherwise stated. The warranty begins on the date of shipment from the Instantel factory to the customer and is subject to certain exclusions and conditions as stated below. Monitoring units and sensors will have the warranty extended for a second year if they are returned to the Instantel factory for service and calibration within 30 days of the 'Next Calibration' date printed on the calibration label located on the product.

If, within a period of one year from the date of shipment to a customer, the instrument fails to perform in accordance with Instantel's published specifications under normal use and operating conditions, it will be repaired or replaced at the sole discretion of Instantel free of charge. Components subject to fair wear and tear in regular use, as solely determined by Instantel, are excluded from this coverage. This warranty will not apply if the damage or malfunction occurs due to (i) adjustments, additions, alternations, abuse, misuse or tampering of the instrument; (ii) instrument operation or use contrary to the operating instructions; (iii) power fluctuations; or (iv) any other cause not within the cause or control of Instantel. If inspection by Instantel fails to disclose any defect covered by this limited equipment warranty, the instrument will be repaired or replaced at customer's expense and Instantel's regular service charges will apply. This warranty is non-transferable.

Any shipments returned directly to Instantel must have prior approval, and all packages must display the Return of Material Authorization (RMA) number issued by Instantel. Shipping charges to Instantel's factory will be paid by the customer and return shipment to the customer will be paid by Instantel.

To protect your warranty, you must complete and return a Warranty Registration Certificate, or complete the online Warranty Registration Form, within ten days of purchase. Products will be assumed out of warranty if no warranty card is on file at Instantel. Retain this warranty statement and the proof of purchase for your records.

Except for the foregoing limited equipment warranty, Instantel makes no other warranties and hereby disclaims and excludes all other warranties, whether statutory, express or implied, whether arising under law or equity or custom or usage, including any implied warranty of merchantability, fitness for a particular purpose, non-infringement, satisfactory quality, or quiet enjoyment, and any warranty that the product supplied may not be compromised, or that the product will in all cases provide the function for which it is intended.

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