Instruction Sheet
Micromate External Trigger Cable

This bulletin describes the procedure for connecting an External Trigger Cable (P/N: 721A1401) to the Micromate 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 is monitoring in Waveform mode.)

Explanation
When the optional auxiliary I/O is configured for an external trigger, the Micromate 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 at a specific time or to synchronize triggering up to six Micromate units. The Micromate 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 Micromates will still trigger based on their respective vibration and/or microphone configuration setups.

As an additional feature, with multiple Micromates using the Wire Make configuration, if the trigger mechanism fails, the first Micromate 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 to trigger and start recording data.
2. Four Micromates are installed in a building, each one on a different floor. The external trigger of each Micromate is connected to a contact that will be opened or closed by a vibration event. The activation of the contact causes all of the Micromates 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’s trigger levels are setup so that each will be triggered by an external event. As soon as one of the Micromates is triggered it will drive the external trigger signal low and force all of the remaining five units to start recording data.
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 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 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 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 recording parameters (refer to the Micromate 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 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.
10. Place the Micromate 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 Micromates with External Trigger Cables (up to 6 Micromates)

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).
4. Configure each Micromate Auxiliary I/O for External Trigger as per the section “Configure a Single Micromate 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 Micromates.
9. Place the Micromates in monitor mode.
10. When the External Trigger changes state (Make/Break trigger), the Micromate will start recording the event.