Electronic Measurement Device (EMD) Protocol for Long throws
Prepared by the Training Sub-Committee
Of USA Track & Field's National Officials Committee

This protocol was written so as to apply to any handheld device, any handheld field event administration (HFEA) software package, and any electronic measurement device (EMD).

The predominant EMD at this time is the LaserLynx unit, developed by Lynx Developers. The predominant HFEA software at this time is FieldLynx, also developed by Lynx Developers.

While it should be noted that this protocol is based on the predominant EMD and HFEA software, it does not mean that the protocol for setup, use and post-competition procedures would be any different for any other combination of handheld, EMD or HFEA software.

Setup procedures

1. Determine the best orientation for the tripod to the landing sector where the majority of the throws will fall. Be sure that the open side of the tripod is facing the operator for ease of access to the tripod and transit.
    a. Note: This also helps in reducing the probability of bumping the tripod sufficiently so that it throws off the unit is such as way that the unit will need to be recalibrated.
2. Push the tripod feet securely into the ground so that the tripod is stationary and secure.
    a. Note: In situations on artificial turf or other surface material where the tripod cannot be planted firmly in the ground, and if there is a possibility that the tripod may be moved, use sandbags or other weights to make the tripod as immoveable as possible.
3. Position the transit (herein the "head end") so that the circular bubble level is easily readable from the open side of the tripod (the side on which the operator will stand).
4. Attach the head end to the tripod and raise the tripod to a comfortable height for the primary official. This should allow the main eyepiece to be approximately nose height, so that the top peep sight is usable.
5. Using the leveling thumb wheels on the head end, make sure that the head end is in the lowest possible position.
6. Using the legs of the tripod, raise and/or lower them to get the circular bubble level in the approximate center of the level. Secure the tripod legs.
7. Attach the serial cable between the head end and the handheld device.
    a. Note: This affects the balance of the head end, and should be attached now as opposed to after leveling has been completed.

8. Using the thumb wheels, level the head end within the two bubble levels. The bubbles should be entirely within the lines.
    a. Note: the bubble levels will be on the right side and the front of the head end as it is situated on the tripod. Some newer devices may have the levels on the display of the head end unit. To view them, power the unit on, before beginning the leveling process
9. Remove the lens cap from the head end.
10. Turn the head end on and check battery power. If less than 75% battery life remaining, turn the unit off and replace it with a fully charged battery.
    a. Note: It is best practice to have an additional battery on hand that is charging. If the battery needs to be charged, put the fresh battery on the head end and the depleted battery on the charger.
11. Rotate the head end 360° through the vertical so that it can see the horizon. The head end display will display a location in degrees, minutes and seconds.
12. Set the precision horizontal and vertical knobs to approximately their mid point. If you can see the yellow line on either control, they are turned out too far.
13. ***Establish your first known distance***. Find the appropriate place in the event setup of the field event administration software for setting electronic measurement device (EMD) controls. Have another official take the marking pole (herein referred to as “the stick”) to the center of the circle, the origination point of the javelin sector, or one of the two sides of the horizontal take-off board.
    a. If in the horizontal jumps, select either near or far, the position relative to the location of the EMD setup.
14. Aim the EMD head end at the reflector on the bottom of the stick. Use the large focus ring around the eyepiece to focus the view of the reflector.
15. Using the macro positioning knobs (the smaller knobs) for the horizontal and vertical positioning, align the peep sight at the reflector. Once you have it roughed into position, lock the head end position both horizontally and vertically by turning the macro knobs clockwise.
16. Viewing through the eyepiece, use the micro positioning knobs (the larger knobs) to place the eyepiece cross hair in the center of the reflector.
17. Tap “Set” on the Set Controls screen on the handheld device. The head end will beep three times, and the distance from the transit to that point (the center of the circle, etc.) will be displayed, along with the angle. Record the distance on a separate sheet of paper or other notepad. In the horizontal jumps, you will repeat this procedure for the other side of the board.
18. In the throws, verify that the circle radius is correct for the event that you will be measuring.
19. Complete the event setup in the handheld device.
20. At this point, check-in at least one competitor for the event.
21. Using a fiberglass (or steel, preferred if available and the only acceptable tape for national level competition) tape, select a point along one sector

line to place a secondary reflector (if available) or other marker to establish a “check point”. If there is a permanent surveying monument convenient to the sector, you are encouraged to use it. Select a distance that is about 1/3 the length of the longest throw you anticipate (usually 30-40 meters) and place the checkpoint marker there.

22. Follow the same procedure for finding and adjusting the head end that you used in establishing the first known.
23. Bring up an athlete and tap the electronic measurement button in the field event administration software.
24. The head end and the handheld unit will beep. A distance will appear on the head end display, and momentarily after that, a distance will appear on the handheld display. Verify the distance on the handheld with the tape distance, and record the handheld distance on a separate piece of paper or notepad. Erase the distance from that athlete’s performance.
25. Continue to check-in athletes for the event.
26. Review with the judges in the impact area, and the official who will have the stick, any hand signals and body language that you will use during the competition.

Use in competition

1. When the first competitor is called up, call them up on your handheld device.
2. If you are working alone, secure the handheld device through a strap on the tripod or by some other means. If you are working as a team, have the handheld operator watch for called fouls at the circle, while you are watching the flight of the implement or the jump of the athlete.
3. Use the peep sight to roughly locate the landing of the implement or the athlete in the landing pit.
4. Lock down the head end using the macro positioning knobs.
5. Use the eyepiece and the micro positioning knobs to find the reflector on the stick. Once the laser is within the reflector, the transit will beep.
6. Continue to align the cross hair in the eyepiece as close to the center of the reflector as possible.
7. When you are in the center of the reflector, tap the read icon on the handheld screen. In a two-man team, simply announce, “read” and have the handheld operator tap the icon.
8. The head end will beep, and a distance will appear on its LCD screen. Make sure that the display is steady. If the head end beeps again, or if the distance disappears, make sure that the official with the marking pole has not moved.
9. The distance will appear on the handheld device.
10. If you are using an external performance display board that may be connected directly or via wireless to the handheld device, the information will appear on the display.

11. Leave the head end in the locked position until the next competitor is in the circle or on the runway.
    a. Comment: the reason that we do this is so that the throw can be reconstructed if need be. For example, if an athlete protests a call, the throw must still be measured and recorded elsewhere in case the protest is upheld. So long as the next throw has not occurred, even if the official with the stick has moved, the stick can be replaced in virtually the same spot if the head end is locked and has not moved.
12. Continue through the event.
13. Between flights or rounds, you can verify the distance to your checkpoint to make sure that nothing has changed.

Note: If a battery needs to be changed, it should only be done at the end of a round, or preferably a flight. It is better done between flights, or between trials and finals, since you will have slightly more time to do the recalibration, and this will not overly disrupt the flow of the competition.

Post competition

1. Verify the distance to your checkpoint.
2. If you are the chief electronic measurement judge, certify to the field referee or head field judge that the check measurements match.
    a. Note: In the event of a record, you will also need to sign and verify the record form. Make note of the pre- and post-competition verification checks, in case the accuracy of the measurement is called into question.
3. Begin tear down of the equipment. If this is the end of the day's competition, remember to remove the reflector from the marking pole for safekeeping.