

# CED M2 Chronograph

*Competitive Edge Dynamics*

Competitive Edge Dynamics have introduced their new CED M2 Chronograph System. Built on the original CED Millennium Chronograph, which has been an industry standard for the past 10 years, the new CED M2 Chronograph begins where its predecessor left off. Advancements in technology have enabled CED to double the operating speed of the CED M2 chronograph incorporating a controller that runs at 48MHz while expanding the operational velocity range from 50fps to 7,000fps. Memory storage has been expanded 500% from 220 stored velocities to 1000 stored velocities.



*When measuring the velocity set the screens at maximum cable length so that the muzzle blast does not affect the reading.*

A new keypad has been designed in a calculator style layout. And a built-in calculator has been added as well. The CED M2 now also includes a “Hi-Average” function which provides “one touch” calculation of the average of the three highest velocities in a string. This new function is ideal for calculating Power Factor at IPSC and IDPA matches. With the new built in calculator the results can be accessed faster. In addition, the CED M2 Chronograph adds even more new features like single function string removal, a two foot folding mounting bracket for all applications, the ability to recall specific strings from memory or to remove specific strings from memory, and a new USB interface. Now it is easier to connect your chronograph to your laptop or PC and download your saved data into the newly designed and updated CED Data Collector software program. The CED M2 Chronograph has been designed to provide the user with accurate results through easy to use functions that do not require an extensive amount of reading to learn and operate. By following the simple instructions in the operator’s manual will enable you to use the extensive array of features the CED M2 offers.

## **Set Up Procedure**

Mount the two foot foldable bracket to a tripod that uses a standard camera screw mount. Attach both sky screen sensors onto each end of the bracket, pushing them on as far as they will go until the end of the bracket is firmly against the back wall of the sensor. Adjust the plate screws on each to tighten them in place. Now install the side arms and diffuser screens supplied for each sensor. The arms slide into each side of the sensor and the diffuser screen fits on the top of each side arm.



*The two foot foldable bracket is secured to a tripod that uses a standard camera screw mount.  
Attach both sky screen sensors onto each end of the bracket.*

Position the tripod approximately 10 feet in front of your shooting position. Make sure that you have an unobstructed down range view and that your shots will impact on the back stop to insure complete safety at all times. Remember that each shot fired should be directed through the centre of the diffuser screens. Attach the shielded cables from the sensors to the CED M2. Remember that the front sensor (closest to the user) is plugged into the "START" jack and the rear sensor into the "STOP" jack.



*Position the tripod approximately 10 feet in front of your shooting position.*

Open the M2 and press the "ON/OFF" button to activate the chronograph. You will see "0000" along with "0" shots and "2.0 F" which stands for the two foot distance between the two sensors. This is the standard default setting and the M2 is designed only to function with the two foot mounting bracket.



*Open the M2 and press the "ON/OFF" button to activate the chronograph.*

You are now ready to shoot. Fire each shot through the sky screen windows. With every shot, the current velocity will appear on the LCD display, along with the cumulative amount of shots received (shot number). Continue recording shots in the same string but at any time the data received can be reviewed, edited and omitted, by simply pressing the appropriate button. When you wish to store a string of velocities or store all the data received, simply press the "STO" button briefly, and the data will be stored into memory. The unit can now be turned off without losing any of the stored data. There is no limit to the number of shots (data) allowed in each string, which can be up to the capacity of the chronograph. The M2 will accept 1000 individual shots (data entries) and up to 500 "strings". All data received will be stored permanently in a back-up memory until such time as it is erased, or cleared, through the above outlined procedure. This allows the user the opportunity to keep data until such time as it can be printed out or downloaded into a computer. When the chronograph is first turned on, all data entries received will become part of the first "string". Once the "CL/RESET" button is pressed, all data received to that point, would be stored into memory in the form of a string and a new string would begin with the next data entry received. The word "FULL" will appear on the LCD display when there is no more memory capacity. The user must then clear the memory before new data can be entered or accepted.

The M2 has a variety of functions, so we will describe just a few of these.

### **High Velocity (HI)**

When pressed, the highest velocity entry in memory (for the specific "string" on display) will appear. If a data entry has been edited or omitted, it will not be accepted in calculating this function. The total number of valid shots / velocities (data entries) in the "string" on display from which the HI velocity was calculated appears under the SHOTS column.

### **Low Velocity (LO)**

When pressed, the lowest velocity entry in memory (for the specific "string" on display) will appear. If a data entry has been edited or omitted, it will not be accepted in calculating this function. The total number of valid shots/velocities (data entries) in the "string" on display from which the LO velocity was calculated appears under the SHOTS column.

### **Extreme Velocity Spread (ES)**

When pressed, the extreme velocity spread is calculated by subtracting the highest velocity data entry minus the lowest velocity entry from the current "string" on display. If a data entry has been edited or omitted, it will not be accepted in calculating this function. The total number of valid shots / velocities (data entries) in the "string" on display from which the ES velocity was calculated appears under the SHOTS column.

### **Power Factor button (PF)**

This function calculates "power factor" which is used in all IPSC (International Practical Shooting Confederation) and USA NRA action shooting competitions. The M2 makes this function simple and easy to use. The PF is calculated from the data entry showing on the large digit LCD display. Therefore, PF can be calculated from the current shot / velocity recorded, from any reviewed data entry, or from the HI, LO, AV and AV3 ( high average ) modes. Once the desired velocity appears on the LCD display, press the PF button once and enter the bullet weight (3 or 4 digit) using the numerical numbers that appear on the key pad. Finally, press the "=" button to show the results. The power factor will now appear on the LCD display. To enter a new PF, simply bring up the new velocity to be calculated onto the display and repeat the PF procedure once again. The system is designed to accept a four digit bullet weight providing more precise accuracy to the tenth of a grain level. If the User only inputs three digits, the system will automatically calculate the fourth as zero. Therefore, if the actual bullet weight is 180.6 grains, enter 180 and "." and then 6 and press the PF button. If the User enters 180 only, the system will read it as 180.0.



*The velocity will appear on the LCD display, along with the cumulative amount of shots received.*

Remember, variations in the performance of ammunition are rarely due to inaccuracy of chronographs. Rather, they are due to weather conditions and temperature changes which have varying effects on powder and barrel performance. Therefore, you should use a safe margin is allowed for important matches to prevent possible trouble in meeting proper power factor levels.

## Indoor Shooting

For indoor use of the M2 artificial daylight must be used. Fluorescent lights will not work as they do not imitate natural light. Incandescent lamps shining down on the top of the diffuser or each sensor are required. Commonly found utility reflectors with 100 watt bulbs will work fine if they are positioned high enough to provide uniform illumination of the diffusers. A custom designed lighting kit for use indoors is both available from CED will allow the M2 to work indoors. An infra red sensor upgrade option is also available that allows the M2 to be used under any natural lighting conditions, including total darkness.



*A custom designed lighting kit for indoor use. An infra-red sensor option is available for use under any natural lighting conditions, including total darkness.*

## Shotgun and Bows

The CED M2 can be used to measure the velocity of shot gun cartridges. The system measures the velocity of the front pellets in the shot string. Position the first sky screen sensor four feet from the muzzle of the shotgun. In the case of bows, make sure that the sky screen sensors are far enough away to allow the arrow to fully leave the string of the bow before the tip of the arrow reaches the first sensor. Remember, the sensors need to see a change of light in order to read the arrow.

Each year, CED chronographs are officially used for championship matches worldwide. In addition to competitive matches and other target shooting applications, the products are used by law enforcement agencies and military organizations in over 20 countries for training purposes.