

***CED Millennium Chronograph
Instruction Manual***

CED Millennium Chronograph

The future has arrived!

Creating a new unparalleled standard in performance, function, and styling, the CED Millennium Chronograph will lead the industry for years to come!



The future has arrived!

Competitive Edge Dynamics presents the "CED Millennium Chronograph", with advanced technology, functional design, and unique features not seen until now! Creating a new unparalleled standard in performance, function, and styling, the CED Millennium Chronograph will lead the industry for years to come!

So advanced is the CED Millennium, that it required total custom design, tooling, and circuitry development. As with all CED products, the CED Millennium is packed with quality and value! No other chronograph offers as many quality features at such an affordable value as the CED Millennium.

Standard features every shooter will appreciate:

- * **High, Low, and Average Velocity**
- * **Extreme Spread**
- * **Standard Deviation**
- * **Edit and Omit Functions**
- * **10X Mode-measures to the tenth on low velocity**
- * **Multiple skyscreen distance selection**
- * **Meter or Feet recording capacity**
- * **9 volt battery operation**

The CED Millennium Chronograph goes far beyond the competition with additional advanced custom features including:

- * **Sleek, lightweight, and compact design**
- * **The largest custom LCD display in the industry**
providing all relative information at a single glance
- * **Large string and shot capacity**
- * **Permanent memory back-up**
- * **Voice chip technology** - Now, results can be heard as well as seen!
- * **"Advanced Error Warning" system**
- * **Dual Lens Skyscreen Sensors, Diffuser Screens, and 2 ft. foldable**
(tripod threaded) Mounting Bracket included!
- * **Custom Key pad** - No toggling required with "easy to read" format
and moisture resistant display
- * **Infrared printer interface**
- * **PC interface** - Download your data for additional use
- * **PC software** included
- * **Power Factor computation** - Easily computes IPSC Power Factors
- * **On / Off control, with no-memory loss "Auto-Shut Down" mode**
- * **Low battery warning** indicator
- * Back-up battery storage
- * 20 ft. Shielded cable

* The optional Infrared upgrade set allows usage of the CED Millennium Chronograph under any light conditions, even in total darkness. The NiMH Battery Pack provides up to 8 hours of field use where no electricity is available. Now, it is possible to chronograph velocities in the evening or on heavily overcast days when there is insufficient sunlight. No longer be dependent on good weather. The CED infrared upgrade Set provides total flexibility of use. The only one of its kind on the market today!

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Quick Steps to easy use-

The CED Millennium Chronograph has been designed to provide the User with accurate results through very "easy to use" functions that do not require an extensive amount of reading to learn or understand. However, to fully appreciate and enjoy the extensive array of features the CED Millennium offers, we do strongly suggest that this instruction manual is read completely at your leisure.

In the meantime, we offer the following "**Quick Steps**" to allow you fast, easy and satisfying results with your new CED Millennium Chronograph.

* Using the 2' foldable mounting bracket included with your purchase, mount the bracket to a tripod (standard camera screw mount). Attach both skyscreen 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 diffuser screens supplied to each sensor.

* Position the tripod approximately 7 to 10 feet in front of your shooting position. **Make sure that you have an unobstructed downrange view to insure complete safety at all times.** Remember that each shot fired should be directed through the center of the diffuser screens. If you plan to shoot a shotgun or archery arrows, read the appropriate section for further details.

* Attach the shielded cables from the sensors to the CED Millennium Chronograph. Remember that the front sensor (closest to the User) is plugged into the "START" jack and the rear sensor into the "STOP" jack. Open the CED Millennium Chronograph 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 that the sensors are to be positioned at. This is the standard default setting and should only be changed when a readout in meters is desired or a longer distance is required for the skyscreen set-up. 4, 6, & 8 ft. mounting brackets are available at additional cost for those who wish longer set-up distances.

* **Now you are ready to shoot!** Fire each shot through the skyscreen 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, 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 "CL/RESET" button briefly, and the data will be stored into memory. The unit can now be turned off without losing any of the stored data. If you turn the unit off without pressing the "CL/RESET" button first, the data entries received will NOT be saved.

As you wish to enjoy more great features, read on.....

* When you wish to begin a "new" string (group), simply press the "CL/RESET" button briefly. The display will return to "0000" and you can begin new input. If you wish to erase ALL entries (data) received in the chronograph memory, press the "CL/RESET" button for 3 seconds continuously. This will erase all data and reset the chronograph anew. If you wish to save previously stored strings, but not the current one in use, simply turn the unit off without pressing the "CL/RESET" button first. Then turn the unit back on and continue recording velocities. At any time, a string can be removed from memory by pressing the "OMIT" button for each shot recorded in that given string.

* There is no limit to the number of shots (data) allowed in each "string" up to the capacity of the chronograph that is. The CED Millennium Chronograph will accept over 220 shots (data entries) and up to 20 "strings". All data received will be stored permanently in a back-up memory until such time as it is erased (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 CED Millennium Chronograph includes an "Advanced Error Warning" system which provides notice that the most recent data entry is outside of acceptable tolerance. When activated, the "ERROR" word and the current velocity flash on the LCD display. If you feel the entry is suspect or incorrect, simply press the "OM" (omit) button to erase it from memory. Pressing the "ED" (edit) button will remove the entry from the calculations and string data, but the entry will be retained in memory for later print out.

* To review shot entries which have been stored into "strings", press and hold the "RE" (review) button for 3 seconds. The number "1" will appear on the large LCD screen indicating the first string along with the total number of shots (data entries) in that string appearing under the "shots" column. To review this string, press the "RE" button briefly for each shot to be reviewed. All of the other functions will work for the current string in review. To proceed to the next string stored in memory, press the "RE" button once again for 3 seconds. Continue in this same fashion until such time as you wish to resume new data entries (shots). Simply press briefly the "CL/RESET" button to return the CED Millennium Chronograph to its ready position.

* The "SP" (speaker) key is to be pressed when you wish to hear your data entries in addition to seeing them. It does not function when in "review" of data entries.

- The "PF" key represents "Power Factor" for use in IPSC related disciplines. To compute power factor, press the "PF" button, enter the bullet weight in 4 digits (example 130.2) and press the "PF" button once again. The power factor will appear on the large LCD display. Power Factor will work with any of the functions. Meaning it will calculate on a single velocity, a high, low, or even an average velocity obtained from a given string. Press "CL/RESET" to return to ready position or to reset prior to a new power factor entry being received.

As you become comfortable and at ease with your new CED Millennium Chronograph, take the time to read the following chapters which explain in more detail each of the great features of this fine product.

On / Off - turns the chronograph on and off. The CED Millennium Chronograph has an Auto-Shut Off mode which activates when no activity (input) occurs for a 30 minute period of time. There is no memory loss and the chronograph can be re-started by pressing the ON button once again. Any data entry(s) received prior to the Auto-Shut Off will automatically be stored as a "string" at the time the unit shuts down.

Meter / Feet (M/F) - Selects the mode of calculation the chronograph will use. In "Meter" it will read the speed of the projectile in meters per second and in "Feet" mode, it will read the speed by feet per second. The default mode is set at "2 feet"

Screen Set 2.4.6.8 - instructs the chronograph as to the distance that the screen sensors are set at, with pre-set selections of 2 ft., 4 ft., 6 ft., or 8 ft. in distance apart. Make sure that when longer distances between sensors are in use that the proper distance is set on the chronograph or the entries received will be incorrect. 4, 6, & 8 ft. mounting brackets are available at additional cost for those who wish longer set-up distances.

Printer / PC (PR/PC)- This button activates the printer or computer download function. When there is no connection to the computer serial port, the "PR/PC" button will only activate the infrared download for a compatible HP printer. The HP printer should be placed in a direct and unobstructed line (within one foot preferably) of the infrared jack on the back of the CED Millennium Chronograph. Place both units on a flat, non-shiny surface in order to prevent any possible reflection that could interfere with the reception of the printer. When a serial connector is attached to the CED Millennium Chronograph the "PR/PC" button will only function as a download for the computer it is attached to. Therefore, only one function can be in use at a time!

When the print command is given by pressing the "PR/PC" button, all inputted data (each data entry received) will print out by "string" followed by a summary of Hi, Lo, Es, Av., & SD for each specific string. In the summary, the total number of valid shots considered in the summary will appear in front of each string summary data. (5 - 1296.0 H) (this means that there was a total of 5 valid data entries in the summary with the highest velocity being 1296 fps.). There may have been more shots recorded in the string, but then edited or omitted. As a result, the summary does not include those. The printout download can be cancelled at any time by simply pressing the "CL/RESET" button. The following symbols are used for each summary data entry:

- S = String
- H = Highest Velocity
- L = Lowest Velocity
- E = Extreme Spread
- A = Average Velocity
- D = Standard Deviation

All edited data entries will print out with a "-" next to the entry indicating that the data had been edited (the "-" will appear in front of the data entry on the PC download and behind the data entry on the HP printer mode). The edited data will not be included in the summaries, but will appear in the printout. However, all OMITTED data will not appear!

***** For simple PC set-up procedures refer to the "PC Download Set-up" section later in this manual.**



**Custom Key Pad - No toggling required!
"Easy to read" format and moisture resistant display**

Review (RE) - At any time after one data entry has been received and up until such time as the memory is full, any / all data entries (velocities received) can be reviewed by pushing the "RE" button. When pressed, the chronograph will show the first input shot / velocity received during the current string. Every press of the "RE" button will advance to the next shot / velocity stored. You can review through all of the data entries in the specified "string" up to the last one received, or simply stop at any point along the way. If a new shot / velocity is received, the chronograph will automatically record it from the point where it left off initially in the "string", NOT from where the review function was interrupted at. *(Meaning that if 10 shots / velocities were received, and 6 later reviewed, followed by a new shot / velocity being received, the unit will store the latest data entry in memory as 11 shots / velocities received and add the new data entry to the current string.)*

To review shot / velocities which have been stored into "strings", press and hold the "RE" (review) button for 3 seconds. The number "1" will appear on the large LCD screen indicating the first string along with the total number of shots (data entries) in that string appearing under the "shots" column. To review this string, press the "RE" button briefly for each shot / velocity to be reviewed. All of the other functions will work for the current string in review. To proceed to the next string stored in memory, press the "RE" button once again, holding it for 3 seconds until the number "2" appears. Continue in this same fashion until such time as you wish to resume new data entries (shots). Simply press briefly the "CL/RESET" button to return the CED Millennium Chronograph to its ready position.

*** When reviewing shots / velocities in the current or a previously stored "STRING", each of the other function keys operates based on the data stored in the specific "STRING" in use on the LCD display.**

Edit (ED) -This function allows the removal of any undesirable data entry. The Edit button can be pressed immediately after the undesirable shot / velocity is received, removing it from calculations, or later during the review function. When in the review function and an undesirable shot / velocity is called up on the LCD display, the "ED" button can be pressed once which will thereby remove (edit) that data entry from all calculations. Edited shots / velocities remain in memory, but are removed from the summary and from the other functions such as average, high, low, extreme spread, or standard deviation. All shots / velocities which are edited will appear on printouts and PC downloads, but will not be included in the summary calculations. Each such entry will be indicated by a "-" mark to denote that it has been edited.

Omit (OM) - Functions exactly as the Edit function with one major exception. All shots / velocities which are omitted are removed from TOTAL memory and can not be recalled or printed out later and will not be included in any summary calculations. When a data entry is omitted during a "string" review, it will be removed completely in the same manner from the memory totally !

Standard Deviation - Based on the universal mathematical equation for uniformity, this function uses all the data entries in a string to calculate the Standard Deviation of the combined shots / velocities in that string. The larger the number of data entries in the string, the more accurate the SD becomes. The CED Millennium requires a minimum of 5 shots / velocities to be received in order to calculate SD. However, it should be noted that the more data entries used in SD calculations, the more reliable the SD will actually be. Statisticians usually recommend 20 shots / velocities for the best reliable results. Edited or omitted entries will not be included in SD calculations.

Standard deviation is very confusing to many people and as such, is not often used. However, in reality, it is the best textbook measure of velocity uniformity available and when used properly and in conjunction with other load data will give very meaningful results. Average velocity has been the standard for years. However, it does not indicate how much the velocities being measured varied above and below the average. The standard deviation actually measures how close each shot velocity will be to the "average". The more uniform you can make the ammunition, the better the odds (no guarantees) that it will produce the exact same results. The mathematical equation for standard deviation is extremely complex and prior to electronic calculation (computers) it was seldom used by shooters. What it means though, is that statistically, it has been proven that 68% of all things measured will fall between one standard deviation above or below the average. Additionally, 95.4% will fall between two standard deviations above or below, and 99.7% will fall between three standard deviations above or below the average.

Example = If you have a standard deviation of 10 fps with an average velocity of 1000 fps, then you can expect that 68% of the shots fired will fall within 990 fps to 1010 fps. Further, it can be determined that 95.4% of the shots fired will fall between 980 fps and 1020 fps and that almost all of the shots fired (99.7%) will fall between 970 fps and 1030 fps.

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.

Mean or Average Velocity (AV) - When pressed, an average velocity is calculated by adding together all the velocity entries from the current "string" on display and dividing them by the sum total of entries of that given string. 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 AV velocity was calculated appears under the SHOTS column.

Clear / Reset (CL/RESET) - When pressed briefly (for less than 3 seconds), all current data in memory will be cleared from the display, and STORED in memory in the form of a "STRING". As long as there is at least one NEW data entry prior to pressing "clear" then that data entry will be stored as a "string". Each time the CL/RESET button is pressed and data entries (shots / velocities) stored, the new data will be stored in consecutive "string" numbers. Example = String 1, String 2, String 3). If the CL/RESET button is pressed AND held for three (3) consecutive seconds, then the ALL data entries are completely cleared from memory including the "strings". As long as the CL/RESET button is not pressed for 3 or more consecutive seconds, all data entries stored in memory will remain permanently. Once the memory reaches full capacity, it must be cleared through the above outlined method in order to allow for new data entries to be received.

Power Factor button (PF) - This function calculates "power factor" which is used in all IPSC (International Practical Shooting Confederation) and NRA action shooting competitions. The CED Millennium 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, and AV 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 PF button once again to show the results. The power factor will now appear on the LCD display. To enter a new PF, simply press the CL/RESET button, clearing the display, then 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. The User does not need to input the decimal point. The system will do this automatically. Therefore, if the actual bullet weight is 130.6 grains, enter 1306 and press the PF button. If the User enters 130 only, the system will read it as 130.0.

The entered bullet weight will remain in memory until the User changes it or the chronograph is shutdown. Therefore, if a PF is desired for a different data entry using the same bullet weight, the User should bring the new data entry up on the LCD display and then push PF button which will show the previously inputted bullet weight on the LCD display. Press the PF button once again and the power factor calculation will appear. If a new bullet weight is desired, simply enter the new weight after the PF button is pressed the first time and before it is pressed again.

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, we suggest that a safe margin is allowed for important matches to prevent possible trouble in meeting proper power factor levels.

Speaker (SP) - Through advanced voice chip technology, the CED Millennium Chronograph provides the User with the capability of hearing each data entry (shot / velocity) recorded. The speaker, when turned on, provides the velocity entry appearing on the primary LCD display to be heard as well as seen. The audio has a 1.5 second delay built in to allow time for the muzzle blast noise to subside allowing the User to hear the results. The SP function works in the HI, LO, ES, AV, & SD modes as well, but does not function in the REVIEW mode.

10X - When pressed, shot / velocity data entries will be calculated in decimeters / tenths per second. Thereby adding a decimal point and recording to the tenth. This function provides more precise measuring of low velocities under 999 meters or feet / sec. such as with precision air rifles.

Low Battery Indicator - Appears in a flashing mode in the top center of the LCD display when the battery reaches a pre-determined low charged state. The system gives ample warning to allow sufficient time for the battery to be changed. Additionally, the CED Millennium Chronograph has a spare battery compartment to allow the User to store an extra battery on hand. It is located next to the battery compartment and can be accessed by removing the panel which separates the two compartments, inserting a spare battery and then replacing the panel. The battery compartment is designed to allow the battery to be inserted in one direction only to prevent error. It is a drop-in compartment with no additional connections needed to the battery leads.

Display - The CED Millennium Chronograph has been designed with the largest custom LCD display in the industry. It provides all relative information at a single glance. It features a full function display showing current velocity readings as well as the current function in use, the total number of shots / velocities recorded, and the screen setting distance in meter or feet measurement. Additionally, the LCD has built-in custom indicators (10X, low battery, & error warning) which allow the User to readily know when the 10X function is in use, or the battery needs changing, or when the system detects a possible error.



Large LCD full function display

ERROR Warning system - The CED Millennium Chronograph is designed with an advanced error warning system that provides the User with an indication when a velocity (data entry) is received by the Chronograph that varies outside of the normal expectation. In most situations, this fluctuation is a result of ammunition. Either faulty loads or changes in components used. The ERROR indication allows the User to be aware of the variance and to either edit, omit or accept the data entry as recorded. Occasionally, environmental influences can and do effect the performance of all photo electric sensors. Weather variations, lighting conditions, static electricity, bad ammunition, or even muzzle blasts from nearby shooters, can effect the sensors. The CED Millennium is designed to minimize these variables with the use of double shielded cables, wide sturdy diffuser screens, and dual lens sensors. When a shot / velocity is recorded that falls out of the acceptable tolerance range, the CED Millennium Chronograph will indicate it by flashing the data entry on the primary LCD display and the ERROR indicator located on the top center of the LCD display. They will remain flashing until the chronograph receives the next inputted action from the User, whether in the form of a function or new data entry. The "Error Warning System" is based on a calculated 7% margin. If a new data entry is + / - 7% of the average of the previously received data entries, a warning indication will occur.

Indoor Shooting - For indoor use of the CED Millennium Chronograph 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 is an available option from CED which provides the above in an easy to install and use format.*

* An optional Infrared upgrade set is available, which allows usage of the CED Millennium Chronograph under any light conditions, even in total darkness.

Skyscreen Sensors / Diffusers - Custom designed and featuring dual lenses for more accurate recording capabilities, precise positioning, and easy installation. A built-in pressure plate means no screws or nuts to be lost! The skyscreen sensors slide on the custom mounting bracket precisely to the correct position. A simple quarter turn of the custom plate knob and they are secure and ready to use. 20 ft. of shielded cable come with each sensor allowing variable distances up to 8 ft. spacing with no additional wiring required. Strong durable diffusers with 5 inch wide top plates provide excellent diffusion of the sun making an artificial cloud above the projectile allowing the sensors to function at their best. Skyscreen sensors want to see a dark projectile against a light background. As a bullet is darker than the sky above, the skyscreen sensors detect a slight light drop as the bullet passes over them thus allowing the chronograph to record the velocity. When there is not enough light on the diffuser or the bullet is too bright, there is the potential for problems. Additionally, when there is snow or water on the ground, the reflection which is cast back up on the bottom side of the bullet can prevent the sensors from seeing the bullet causing erratic performance. Under these conditions, it is best to change the location or wait for better conditions on another day. *The CED Millennium Chronograph is designed to eliminate most of the problems highlighted above, but can not prevent them in all situations. No chronograph can!*



Dual Lens Skyscreen Sensors & heavy duty diffusers

Shotgun / Bows - The CED Millennium Chronograph can be used for shotshells. The system measures the velocity of the front pellets in the shot string. A closer screen spacing of the tripod of (3 to 4 ft.) three to four feet from the muzzle of the shotgun should be used. This means that the FIRST skyscreen sensor should not be further than 4 feet from the end of the shotgun. In the case of bows, make sure that the skyscreen sensors are far enough away to allow the arrow to fully leave the strings of the bow before the tip of the arrow reaches the first sensor. Blunt arrow tips (rounded or flatter nose) work best! Remember, the sensors need to see a change of light in order to read the arrow.

* Please note that when measuring the velocity of arrows, the sensors must be positioned at least 4 ft. apart. CED offers an optional 4 ft. mounting bracket for this purpose. Longer brackets can also be used if desired. Make sure that the bracket length setting on the chronograph matches the mounting bracket in use.

PC Download Set-up – A CDROM, containing the “CED Millennium Data Collector” software is currently included with every Millennium Chronograph system. System requirements: A PC running Windows 95 or newer, CDROM and serial com port (or USB port and suitable adapter capable of RS-232 communications).

ALL NEW RELEASES of the CED Millennium Data Collector software program are also available for FREE download from www.shootingsoftware.com, or www.CEDhk.com web sites. Check these periodically for the latest releases. By downloading this new software, the user’s computer is automatically set-up for easy and convenient transfer of data from the CED Millennium Chronograph.

In addition to the above program, it is also possible for the users to program their computer to accept easy downloading of data from the chronograph. See directions on page 12 of this manual for this procedure.

Instructions for CDROM use – Install the Software from the CDROM or as downloaded from one of the above listed web sites. Launch the application and click on the HELP menu. You will see the following or something similar to this as it appears in the current release.

This utility software will download data from a CED Millennium Chronograph and reformat it for use in other programs. Simply connect any serial com. port to the Millennium with the cable provided (or between a USB port and a Keyspan PDA adapter) and then launch this software. Make sure the port selection corresponds to the port you are using then click the “Get Millennium Data” button and the “PR/PC” key on the Millennium display panel.

* For Macintosh computers using USB, the above directions using a Keyspan adapter should be sufficient. For older Macintosh computers without USB connections, a special software program / cable is available through the following software company and Millennium Dealer:

Recreational Software, Inc.
1343 Navajo Dr.
Cottonwood, AZ 86326 USA
Phone (928) 634-8028 (888) 634-8028
Email: info@shootingsoftware.com
<http://www.shootingsoftware.com>
"Better shooting thru computing"

Alternative Set-up for Windows 95 / 98 Users -

* Note that if you are using the CDROM included with your system, you DO NOT need to follow this format. The CDROM will provide the set-up and formatting. _

Open the Windows program

click **START**
click **PROGRAMS**
click **ACCESSORIES**
click **HYPER TERMINAL**

select either **AT&T MAIL.ht**, **COMPU SERVE.ht**, or **MCI MAIL.ht**:

click **File**
click **Properties**
click **Connect Using: Direct to Com 2** (if Com 1 is connected to a mouse)
click **Configure**

set the following:

Bits per Second	4800
Data Bits	8
Parity	None
Stop Bits	1
Flow Control	Hardware

click **OK**

You can now press the **PR/PC** button on the Chronograph to download the data to the PC. Then:

click **File**
click **Save As...**

give the file a name, then:

click **OK**

exit the communication software and proceed as follows:

click **PROGRAM**
click **Microsoft Excel**
click **File**
click **Open**

select the file you just saved. You will see the data on the computer monitor. You may at any time send the data to a printer for a printout or use it in spreadsheet format for computations, storage, or further use.

Please note that HP has discontinued their handheld Thermal Printer product line, which makes it more difficult to locate existing inventories of these products. With the prevalent use of laptop computers and PC's onto which data results can be so easily downloaded, there seems to be no current demand for these handheld printers. As a result, CED does not plan to modify this function going forward, and will instead continue to update and revise our computer Data Collector for PC use.

Examples of existing PC and HP Printer download format.

<u>PC Printout</u>	<u>HP Printout</u>
S 1	String 1
1 1296.0	1 1296.0
2 1287.0	2 1287.0
3 1306.0	3 1306.0
- 4 1469.0	4 1469.0 -
5 1290.0	5 1290.0
6 1310.0	6 1310.0
H 5 1310.0	
L 5 1287.0	5 1310.0 H
E 5 23.0	5 1287.0 L
A 5 1297.8	5 23.0 E
D 5 10.0	5 1297.8 A
	5 10.0 D

S 2	String 2

Note: The PC printout shows the edited (-) sign as well as the symbols BEFORE the velocity, but the HP printout indicates these symbols AFTER the velocity reading. In addition, note that the total number of valid velocities appears in the summary. Therefore, in the above example, 6 shots were recorded, but 1 shot (#4) was edited. Therefore, the summaries are based on 5 shots only.

The above format will continue until all strings have been printed. Following the last valid string, the printout will show the next consecutive string number along with its summary indicating "0.0" for each reading.

Velocity readings - from 50 ft. / sec. up to 5000 ft. / sec.

Temperature operating range:

- 0°□to 50° Centigrade
- 32° to 122° Fahrenheit.
- System should operate down to 0° F or -18° C.

Battery - Nine-volt NEDA 1604 alkaline battery recommended.

IN CASE OF TROUBLE

Things to check -

- a. Unplug the "start" & "stop" jacks and plug them in once again, making sure they are completely inserted and tight in their fitting.
- b. Check the sensor bracket to confirm it is pushed all the way into each sensor. The sensor bracket is designed to fit precisely into the back wall of each sensor cavity. When mounted correctly, the distance between the sensors will be precise. If mounted incorrectly, it will result in the velocities being recorded inaccurately. If it is difficult to push the bracket all the way into a sensor, loosen the tension adjustment at the bottom of the sensor.
- c. Check to see what is being shot through the Chronograph. If it is a small projectile such as a BB or pellet or a small fast bullet such as a .223 Rem., then re-position the point of aim to allow the shot to be closer to the sensor and not too high above it. Muzzle blast ahead of a subsonic bullet can cause incorrect readings. Re-position yourself farther away from the front sensor and try again.
- d. If the projectile is too bright or shiny, or if a strong reflection is cast off the ground, "glints" can occur. The reflection of light illuminated onto the bottom of the bullet prevents the sensors from reading it. Try using a black marker to paint the shiny surface of the bullet black. Also, make sure that the ground under the chronograph does not cast a strong reflection back up onto the chronograph. Conditions such as snow or water on the ground can cause such a reflection.
- e. In some cases when the sunlight reflects directly off shiny bullets, erratic recordings can occur. Try positioning a sun screen so that the bullet while passing over the sensors is in a shaded area.
- f. Inadequate Lighting or too much light can cause problems. In the case of too much light, try relocating the chronograph into an area that provides more shade from direct sunlight, but does not create inconsistent shade over the sensors themselves. In the case of inadequate lighting, you must either use the indoor lighting kit, the CED Millennium IR Screen upgrade, or wait until a better day!
- g. If the LCD display does not respond to shots fired, it means that the "start" sensor did not pick up the projectile and no signal was received. This could be due to inadequate lighting, or the projectile passing the sensors too close to the top screen or off to the side.
- h. Sporadic recordings of velocities that seem way too high or are recorded by the chronograph prior to shots actually being fired can be caused by electromagnetic interference or excessive electrical static (noise) in the area of use. Such occurrences can be a result of weather conditions, nearby power lines, electric fences, radar, electric motors, cellular telephones, or transmitters. All photo electric sensors are sensitive to the static electricity or interference that these types of things can generate the same way an AM radio is when it crackles. In cases where this occurs, check your immediate area to determine the cause, move the chronograph to a different location, rearrange or straighten the sensor cables or wait for a better day.
- i. insufficient light through the diffusers. Therefore, on overly cloudy days, try removing the top diffusers from the skyscreens and use the side arms for proper aim and positioning. On bright sunny days, always use the top diffuser screens in order to provide sufficient diffusion of the direct sunlight.

Things to check –(continued)

- j. Verify your sensors are mounted so that the front sensor and screen cannot swing upward. The hinged portion of the mounting bracket should be positioned between the tripod head and the furthest sensor. The skyscreen side supports may move due to muzzle blast, but for best results the sensors must not move.
- k. If your Millennium is equipped with the IR upgrade option and the weather is extremely humid or foggy, moisture in the air can diffuse the infrared light emitted by the IR array so that insufficient light is provided to the sensors. The only solution is to wait until the fog or moisture “burns off”, or for a better day.
- l. The IR upgrade option is not required for normal operation on bright sunny days. If however the IR upgrade option is used on an extremely bright day it is possible to provide too much light to the sensors. Placing a brown paper target or other solid material on top of the diffuser screens will reduce the amount of natural sunlight that can interfere with the IR emitters and sensors. If using the IR upgrade indoors under fluorescent lighting, the same situation applies. Fluorescent lights will interfere with All chronographs producing incorrect / inaccurate readings.
- m. All chronographs require the bullet to travel nearly parallel to the sensor bracket. Shooting high to low or low to high through the screens can produce errors. If several people of different height use the chronograph from a standing position you may need to adjust the tripod so the bracket and sensors are held parallel to the shooter’s firearm bore line.

Q & A Sheet for the CED Millennium Chronograph

Q. The CED Millennium Chronograph instruction manual states that it is compatible with an HP printer. If so, please advise as to which model?

A. Yes, the CED Millennium Chronograph has infrared download capabilities with Hewlett Packard hand held thermal paper printers, such as their model HP82240B. Although this product is no longer in active production, it is still available in many stores inventory.

Q. I have been unsuccessful in downloading stored information from the CED Millennium Chronograph to my PC. I have followed the instructions on pages 11 and 12 of the instruction manual and am still unable to transfer my data. What might be wrong?

A. If the LCD display continues to indicate "PR" when you attempt to download to a PC, then the cable connection is incorrect. Check your serial cable to make sure it is compatible. If the display indicates "PC" when downloading, then the data is leaving the chronograph correctly, but not being received by your PC. Review the instructions in the manual once again to make sure the PC is properly set-up.

Q. I just received my new CED Millennium Chronograph and it is everything I have been waiting for and will replace my old O----. I am a Macintosh user and can not find instructions for downloading my stored velocities onto my computer. Can you advise me as to how to accomplish this?

A. Macintosh computers with USB ports can connect the supplied cable with a Keyspan adapter for download use. Macintosh computers (without USB) require a special serial cable and software program. Both are available in kit form from the following software company.

Recreational Software, Inc.
1343 Navajo Dr.
Cottonwood, AZ 86326, USA
Phone: (888) 634-8028 / (928) 634-8028
Attn. Mr. Jim Ristow
Email: info@shootingsoftware.com
<http://www.shootingsoftware.com>
"Better shooting thru computing"

Q. I recently used my CED Millennium Chronograph for the first time. It would not register any shots I fired with my 30.06 rifle. I set it up according to the book and stood a couple of feet behind it. Nothing happened. The display continued to show "0000". Can you help me?

A. The CED Millennium Chronograph is designed to prevent error readings due to muzzle blast reaching the front sensor before the bullet does. When this occurs, the display will not present a reading! Therefore, you say "0000" only. In the case of large caliber rifles, you must position the end of the barrel a minimum of 7 to 10 feet behind the first sensor. This will prevent the muzzle blast from creating any problems. In the case of large caliber rifles, you can position yourself even further away or design a blast shield. REMEMBER, to always mount the first sensor onto the arm, which contains the tripod screw hole. This will eliminate any possibility of the "mounting bracket" shifting upward from heavy muzzle blasts.

- Q. I love my new CED Millennium Chronograph, but I damaged one of the sidearm screens the first day I used it. Can I get a replacement?
- A. Yes! A complete line of accessories are available including sensors and screens. Additionally, mounting brackets of various lengths, indoor lighting set, PC serial cable, custom carry case, and infrared upgrade screens are all available through CED distributors or direct from Competitive Edge Dynamics USA
- Q. Can the Infrared screens be placed further apart than 2 feet?
- A. The distance that the screens can be set is dictated by the length of the mounting bracket used with the sensors. CED makes 2, 4, 6, & 8 ft. mounting brackets for the CED Millennium Chronograph. Therefore, whether using daylight sunscreens, the indoor lighting set, or the infrared screen set, all will function at whatever length mounting bracket you have chosen to use.
- Q. What is the maximum distance the main Chronograph unit can be placed from the infrared screens and sensors?
- A. The sensors are connected to the main unit by a 20 ft. cable. Therefore, the main unit with display can be located anywhere within a 20 ft. range from the sensors themselves. The infrared screens require their own power source, but it does not have to be connected to the main unit. Thus, it can be located close to the screens themselves.
- Q. Will my CED Millennium Chronograph register shots if I put it down range further than the specified 7 to 10 feet?
- A. Yes, the CED Millennium Chronograph will register velocities at any distance from which you can shoot through it! Many customers put the unit 100 - 200 yards down range. Since the display is the largest on the market, it is easy to read through a rifle or spotting scope without having to walk down range after each shot fired.
- Q. How long does the NiMH Battery Pack last? How many times can it be recharged?
- A. The battery pack provides 7 1/2 to 8 hours of continuous use. The no-memory nickel metal hydride batteries can be recharged a minimum of 500 times, but may provide up to 1,000 recharges.
- Q. How do I know if the infrared screens are functioning? I can not see any light.
- A. Infrared light can not be seen by the normal eye. However, that does not mean it is not there. The CED Infrared Screen Set has been designed with two indicator lights. When the screens are properly set up and power is supplied correctly, the "green" LED light will be on. If using the NiMH battery pack and the battery charge falls below the minimum level required, the "red" light will come on. If neither light is on, check to make sure the power supply is properly connected. Also make sure that the screens have been set up with the metal contacts from the side arms and the top screens in contact with each other.
- Q. Can infrared screens be effected by sunlight or indoor lighting?
- A. It is possible for very bright sunlight or strong fluorescent indoor lighting to interfere with the use of infrared screens making it hard for the sensors to detect a break in the infrared beam itself. If this occurs, simply change the position of the screens to a shady (less sunny) location or place a piece of dark cardboard paper over top of each screen. If the sun is very bright, it is possible to turn off the infrared and use the screens with natural sunlight only as the diffuser. Infrared screens function with their own light source, which allows them to be used under cover, indoors, during cloudy or overcast days, or in the evening when there is insufficient sunlight or no sunlight at all.

GUARANTEE

**** 30 DAY MONEY BACK GUARANTEE ****

We want you to be completely satisfied with our product. If you are not satisfied, simply return it to the place of purchase along with the original receipt of purchase, and in an undamaged condition within 30 days for a full refund.

WARRANTY

**** TWO YEAR LIMITED WARRANTY ****

If the CED Millennium Chronograph breaks due to defective parts or workmanship, we will replace it for you. This warranty does not cover any failures attributable to abuse, mishandling, failure to follow operating instructions, alterations, or accident. If you accidentally break the Chronograph itself, we will repair it at cost for you. If you damage the Skyscreens or Sensors, replacement sets are available for purchase. All claims must be accompanied by the original sales receipt or written proof of purchase, and be returned in a properly packed manner with shipping charges prepaid. We are proud of our product and we want you to be too.

Returns or warranty service should be directed through your purchase location. However, if you should encounter any problems or wish to correspond on any matter, please write or fax to:

**Competitive Edge Dynamics Ltd.
GPO Box 10590, Central, Hong Kong
Phone (852) 2866-6802 Fax: (852) 2866-6505
Email: info@CEDhk.com**

Visit our Web Site at: www.CEDhk.com

**In the USA,
Competitive Edge Dynamics, USA
Phone: (610) 366-9752 Fax: (610) 366-9680
Or Email: info@CEDhk.com
with details of the problem and a return
address will be provided for shipping purposes.**