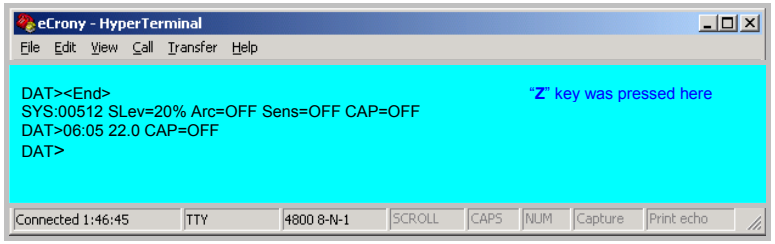
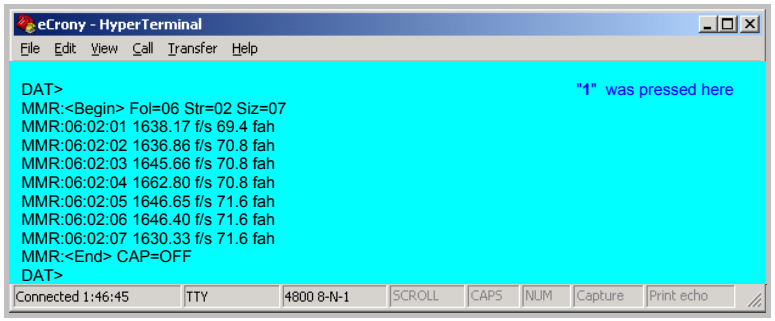
"Z" Turn sensors off

The "**Z**" key command turns sensors Off. When sensors are Off, battery power consumption is reduced by more then 50%. You may want to turn sensors Off when you are reviewing data or setting up the unit. The unit must be calibrated again with "**C**" command in order to accept shots again. CE-3 also logs your Setup changes for the current sequence number.



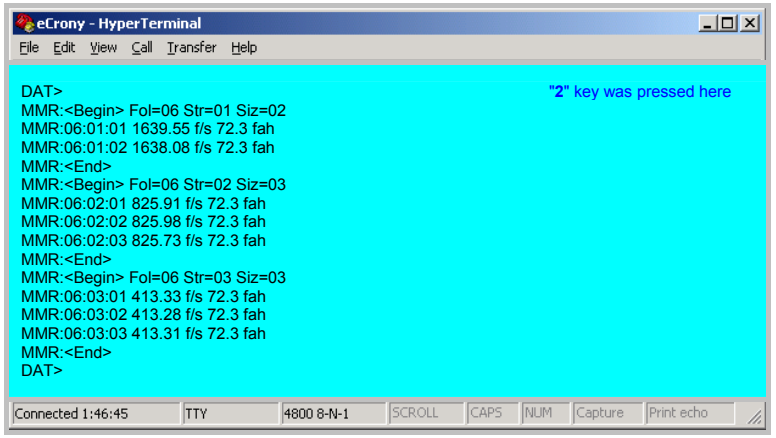
"1" Download current string

This command downloads current string from memory when "**1**" key is pressed. This can only be done from Data or Stats mode. Data is downloaded in the units currently selected by "**U**" command. It is a good idea to turn sensors off with "**Z**" command when you are reviewing or downloading data.



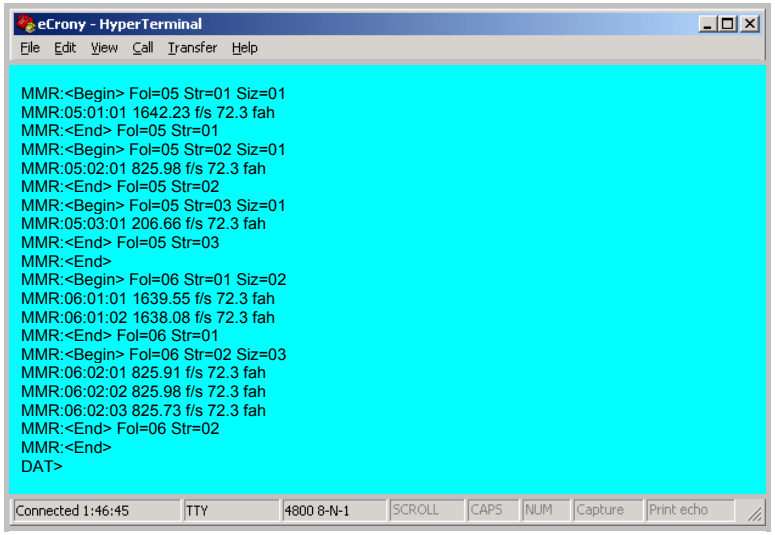
"2" Download folder

This command, when "**2**" key is pressed, downloads the strings from current folder, including empty strings. Data is downloaded in the units currently selected by "**U**" command. It is a good idea to turn sensors off with "**Z**" command when you are reviewing or downloading data.



"3" Download eDisk

This command, "**3**" key, downloads all the folders present on eDisk, including empty ones. Strings and folder are identified with abbreviated names. If your folders are full you may have to save downloaded data to a text file. HyperTerminal buffer has only room for 500 lines/shots. In the example below we show part of downloaded data:



"9" Turn the unit Off and saves folder

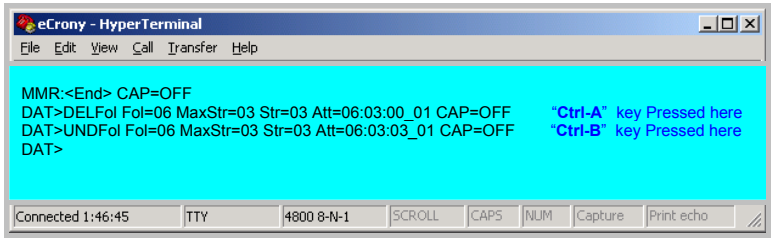
This is similar to "**P**" command – it turns the unit Off by pressing "**9**" key. But unlike "**P**" command, it saves current folder and your current working status to eDisk, before the unit is turned Off. When using PC, saving data to eDisk is unnecessary, because PC has a far better storage capability. Also PC stores more information then eDisk can. Use this command if you need to save current setup status, such power down time, sensitivity level, archery mode etc.

"Ctrl-A" Delete entire folder

This command deletes current folder by pressing "**Ctrl-A**" keys

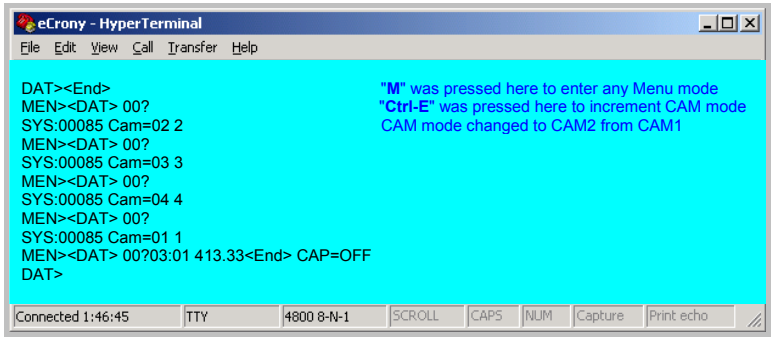
"Ctrl-B" Un-delete deleted folder

This command reverses deletion of current folder by pressing "**Ctrl-B**" keys.



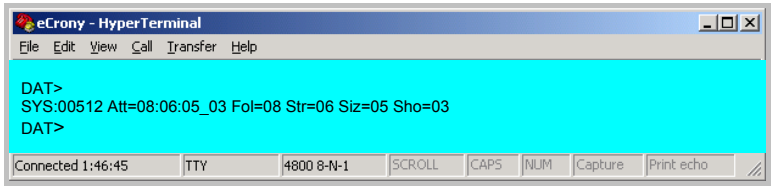
"Ctrl-E" Select CAM test mode

This command, when "**Ctrl-E**" keys are pressed, is only active from Data or Stats menu. There are 4 CAM modes and only CAM1 & CAM2 are documented here. CAM3 and CAM4 are reserved for service personnel and factory testing. Do not set the unit to CAM3 and CAM4. If you discover unfamiliar commands and change their values, you must restore factory settings by pressing <DATA+STATS+MENU> keys on the unit itself. This resets the unit; but before you do that, save your data by pressing "**9**" key first.



"W" Display current data location

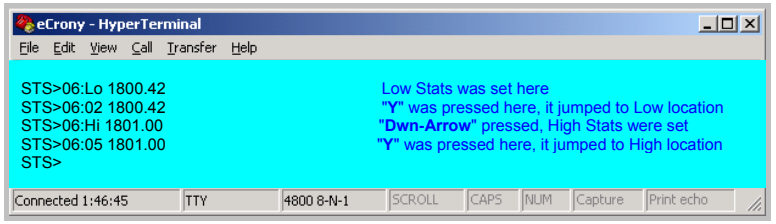
This command, "**W**" key, displays current data location. It refers to data that is stored in the unit and not on the PC. It is a good idea to check your present location before you start shooting, so that you know where your data will be stored. This is all logged on the PC.



Att=08:06:05_03	Location Folder 08, String 06, Shot 05, Reviewed Shot 03
Fol=08	Folder number is 8
Str=06	String is 6
Siz=05	Shot is 5, next shot will be placed in position #7
Sho=03	Currently reviewed shot number is 3.

"Y" Locate Min or Max position in the string

This command, by pressing "**Y**" key, finds the location of current stats, such as Low or High only. You must be in Stats Mode and select "**Hi**" or "**Low**" using scroll keys.

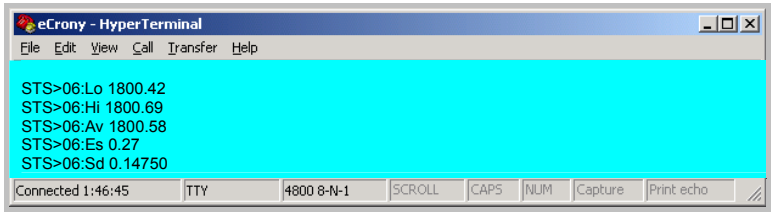


(STS>06:Lo 1800.42) indicates "Low" stats view for String 6.
(STS>06:02 1800.42) indicates the location of "Low" stats and can be recalled by "**D**" command.

(STS>06:Hi 1801.00) indicates "High" stats view for String 6.
(STS>06:05 1801.00) indicates the location of "High" stats and can be recalled by "**D**" command.

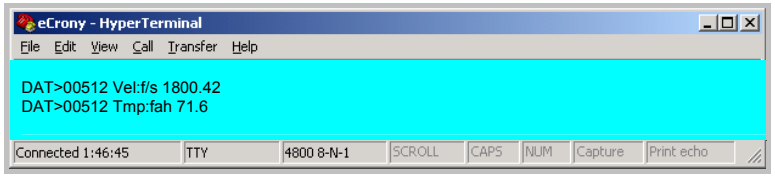
"S" Set Stats Mode

This command sets Stats mode. When "**S**" is pressed, the stats for the current string are displayed. Windows scroll keys can be used to move from stats to stats, from string to string and from folder to folder.



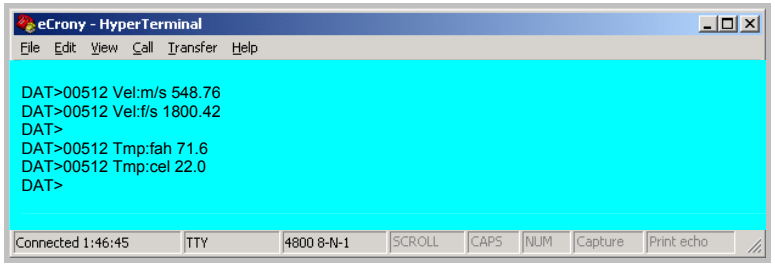
"T" Select data type

This command, by pressing "**T**" key, selects data type that Data Mode or Stats mode will display. CE-3 stores only two data types: Velocity and Temperature, and this command simply toggles between these two types.



"U" Change units for selected data type

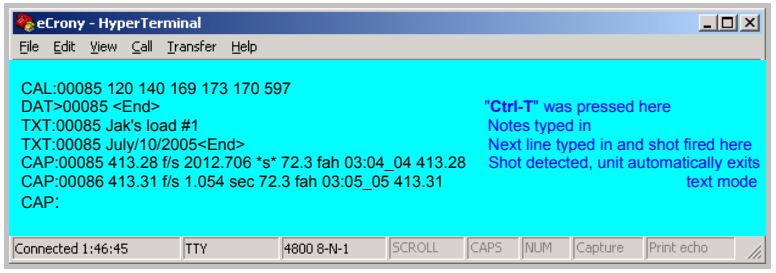
This command changes units of a selected data type by pressing "**U**" key. Velocity units can be changed from m/s to f/s (or vice versa) and temperature can be changed from Celsius to Fahrenheit (or vice versa). You must first select data type in order to be able to change the units.



"Ctrl-T" Text & Notes entry mode

This command, by pressing "**Ctrl-T**" keys, sets up text mode. Text mode allows you to enter notes into the log file.

After pressing "**Ctrl-T**" you can enter your text. Pressing "**Esc**" key or firing a shot will terminate this mode.
There is no limit on the amount of text that can be typed while in the text mode, but because this is a data logging program, you can not edit it.



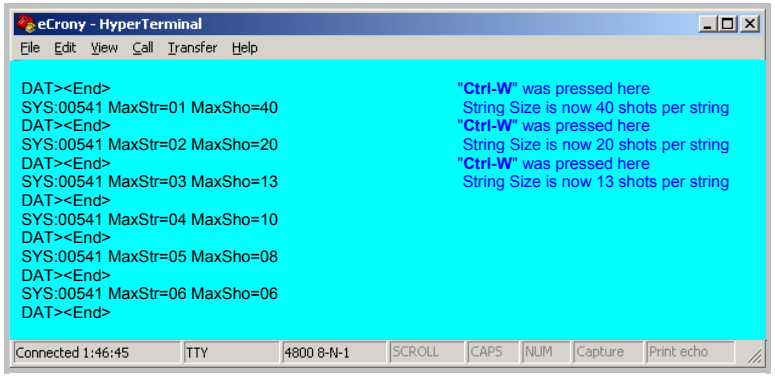
"Ctrl-W" Change string size

This command, by pressing "**Ctrl-W**" keys, changes string size.
When string size is changed, the folder is deleted. Use this command with caution; data recovery is still possible from Data Menu, however data sequence may be lost.

This command cycles through the possible string sizes - there are 4, 5, 6, 8, 10, 13, 20 and 40 shots per string. There is room for only 40 shots in each folder; therefore, as you increase string size, you reduce number of strings available.

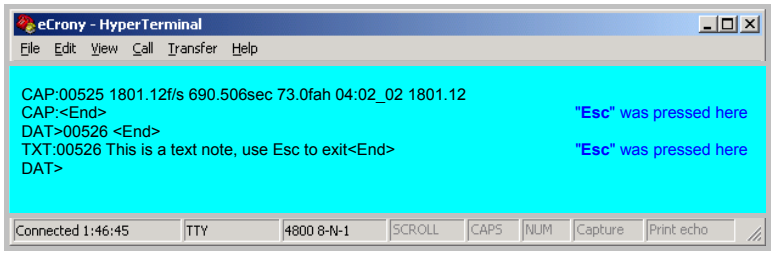
When you use PC, number of strings available on CE-3 does not matter because data logging allows you to store thousands of strings with Sequence ID from 00000 to 65,535.

String size setting is useful for "Running Stats" monitoring. By setting string size, your load group size, you will be able to see on the PC screen live stats as you add new shots.



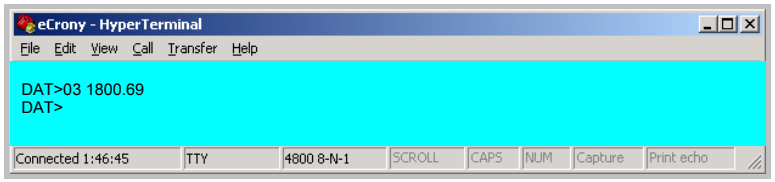
"Esc" Exit current operation

This command, "**Esc**" key, exits current, non-critical operation, such as "**CAP**:" or "**TXT**" mode, etc.



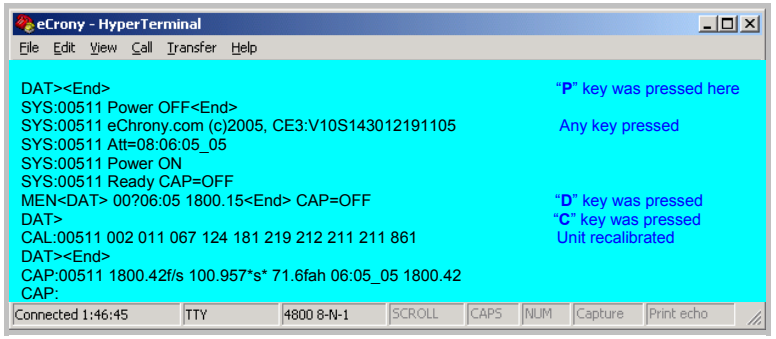
"Enter" Enter key same as <ENTER> key

This command is "**Enter**" key on PC keyboard and simulates the "**Enter**" button on the chronograph. In Data and Stats, it will acknowledge alarms, or display current Data or Stats. In menu mode, it displays function value or executes the function.



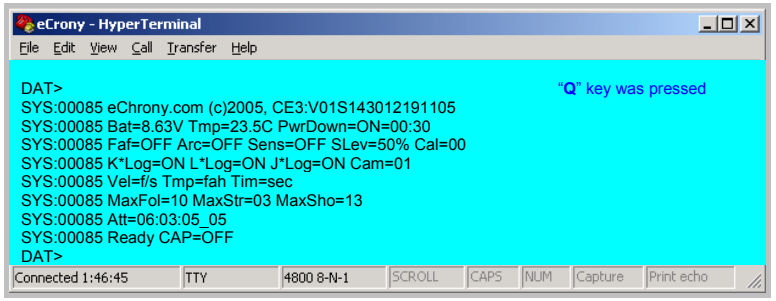
"Delete" Delete current shot

Pressing "**Delete**" key deletes current shot. See example below,where shot is deleted.



"Q" Query system status

This command displays system status, when "**Q**" key is pressed.
It is a good idea to check status of the chronograph before you start shooting.

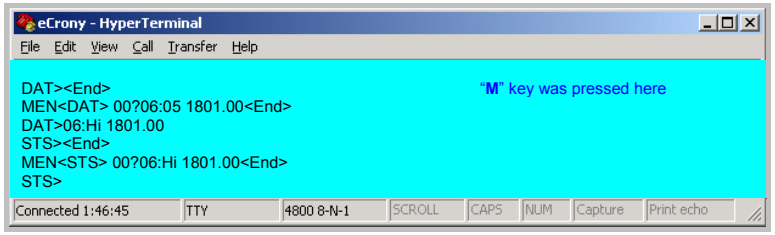


Bat=8.46V	Battery Power in Volts.
Tmp=23.5C	Ambient temperature in Celsius
PwrDown=ON=00:30	Automatic power shutdown, enabled, set for 30 min.
Arc=OFF	Archery mode is Off.
Sens=OFF	Sensors are Off
SLev=50%	Sensitivity level set to 50%
Cal=861	Current calibration setting is 861
Faf=ON	Fast fire is On.
J*Log=ON	Capture Tag log is On
K*Log=ON	Temperature log is On
L*Log=ON	Running Stats log is On
Vel=f/s	Velocity in feet per second.
Tmp=fah	Temperature in Fahrenheit.
Tim=sec	Time in seconds.
MaxFol=10	Maximum Folders available - 10
MaxStr=03	There are 3 Strings per folder for this folder
MaxSho=13	Each string has can have 13 shots in this folder
Att=06:03:05_05	Current location is Folder 06, String 03, Shot 05, review 05
Ready CAP=OFF	Unit is ready but sensors are turned Off, must calibrate

"M" Set Menu mode

This command, "**M**" key, takes the user to current menu mode. When in Stats Mode, it takes user to Stats-Menu. When in Data Mode, it takes user to Data-Menu.

This is a mirror image of menu key on the CE-3 unit. In Menu mode, PC keys replace pushbuttons on the unit. Scroll keys navigate trough the menu. "**PgUp**" is equivalent to <ENTER+UP> and "**PgDn**" is equivalent to <ENTER+DOWN>



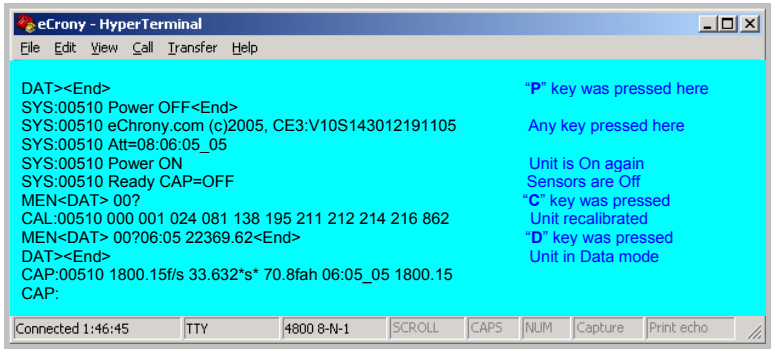
"O" Decrease Sensor Sensitivity

The command, "**O**" key, decreases optical sensitivity of the chronograph.
This is opposite of "**I**" command which increases sensor sensitivity. Please refer to "**I**" command on page 22.

"P" Turns the unit Off without saving

This command turns the unit Off when "**P**" key is pressed. It can be turned On again by pressing any key. However, when unit is turned On again, it goes into a safe mode with sensors turned Off, and hence, it has to be recalibrated and set to Data Mode to accept shots. There are two ways to recalibrate the unit:

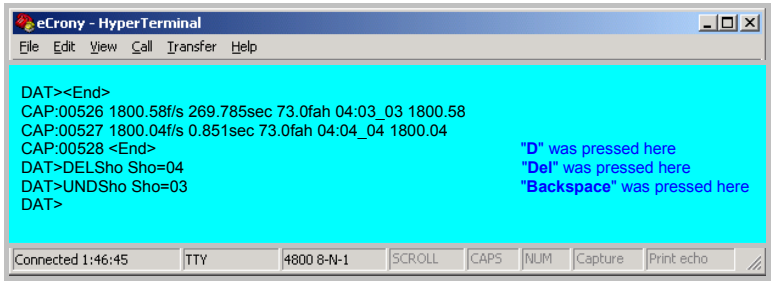
a) **The safe way** - press "**C**" to calibrate. When calibration is done, press "**D**" to continue with shooting (i.e., you decide to go ahead)**.**



b) **Normal mode** – press "**D**" to go to Data mode and from there press "**C**" to calibrate. In this mode CE-3 will decide for you if the environment is acceptable and enable sensors accordingly. Please note: CE-3 has a limited intelligence and may not always be right.

"Backspace" Un-delete deleted shot

By pressing "**Backspace**" key, you restore last deleted current shot.

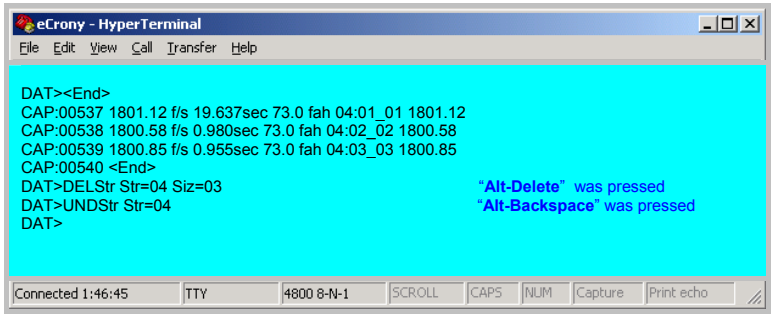


"Alt-Delete" Delete current string

This command, "**Alt-Delete**" keys, deletes current string number. See example below.

"Alt-Backspace" Un-delete deleted string

Press "**Alt-Backspace**" keys to undo deletion of the string.

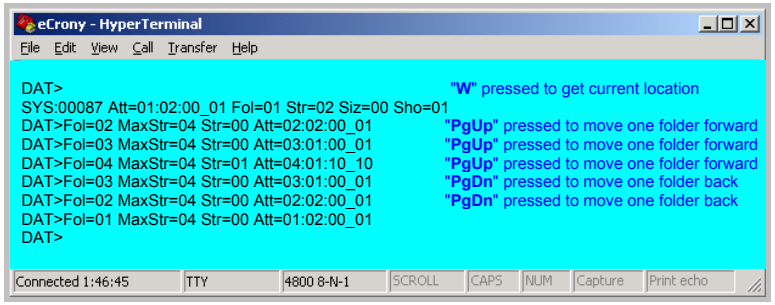


"PgUp" Move to the next folder

By pressing "**PgUp**" key, this command moves to the next folder, up one number. Current folder is saved on eDisk before the new one is retrieved.

"PgDn" Move to the previous folder

By pressing "**PgDn**" key, this command moves to the previous folder, down one number. Current folder is saved on eDisk before the new one is retrieved.

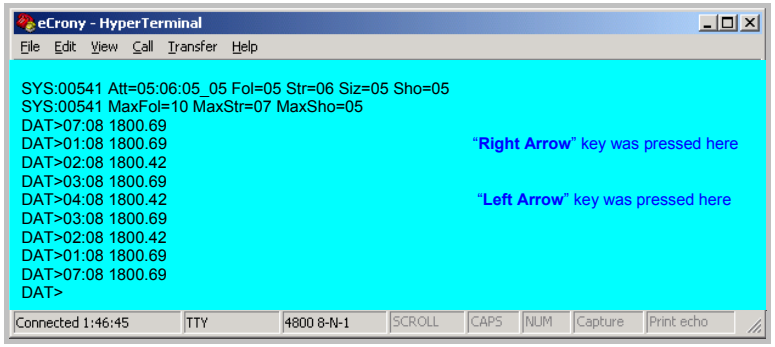


"Right Arrow" Move to the next string

This command, by pressing "**Right Arrow**" key, moves to the next string, up one number.

"Left Arrow" Move to the previous string

This command, by pressing "**Left Arrow**" key, moves to the previous string, down one number.

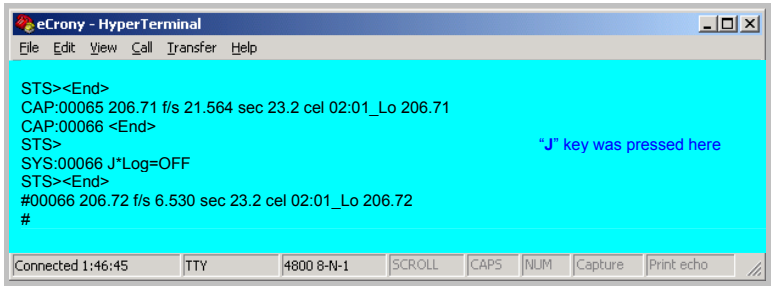


"Up Arrow" Move to the next shot or stats

This command, by pressing "**Up Arrow**" key, moves to the next shot or stats, up one number.

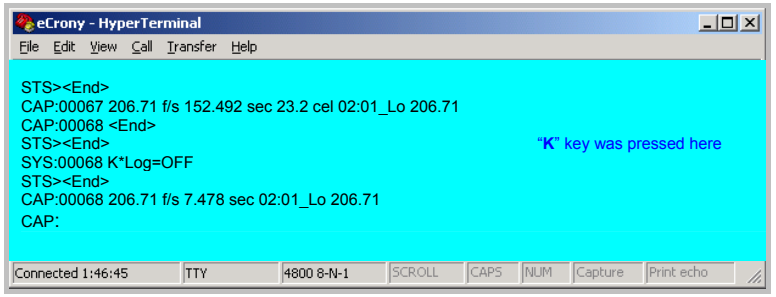
"J" Turn CAP: tag On/Off

This command toggles J*Log On or Off by pressing "**J**" key. When J*Log is Off, data is sent to PC without CAPTURE tag, just the sequence number. In the example below, first shot has J*Log On but the second shot has J*Log Off.



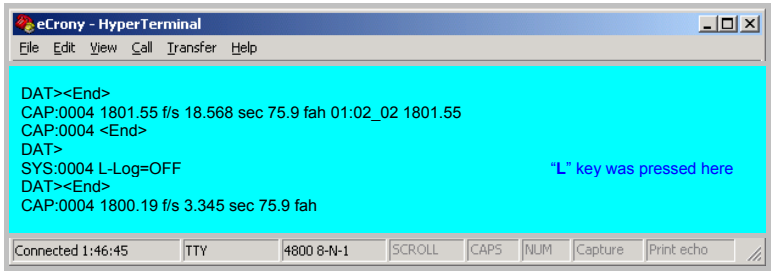
"K" Turns temperature Log sent to PC On/Off

This command toggles K*Log On or Off by pressing "**K**" key. When K*Log is off, temperature data is not sent to PC. In the example below, first shot has K*Log On, second shot has K*Log Off.

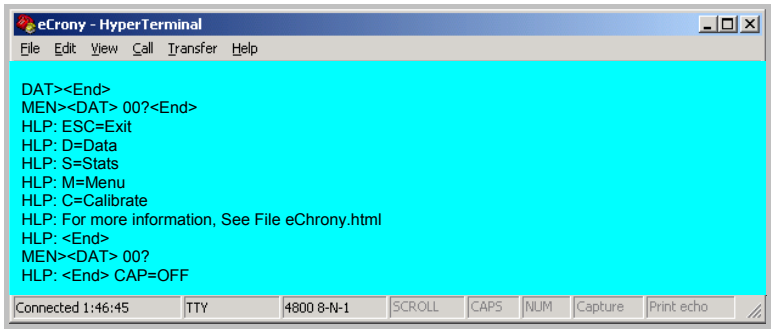


"L" Turns Stats Monitor Log sent to PC On/Off

This command toggles L*Log On or Off by pressing "**L**" key. When L*Log is Off, temperature data is not sent to PC. In the example below, first shot has K*Log on, second shot has L*Log off.



Help within Menu mode



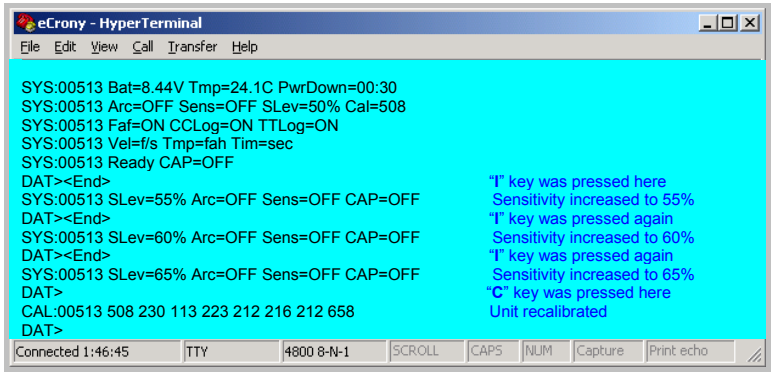
"I" Increase sensor sensitivity

This command, "**I**" key, increases optical sensitivity of the chronograph. This is generally handled by the CE-3 internal programs; however, you can override automatic setting by changing this value.

It can be set from 0% (the lowest value) to 95% (the highest value) in increments of 5%. Please remember that setting sensitivity too high (for example, 95%), may cause false reading. Default value is 60%.

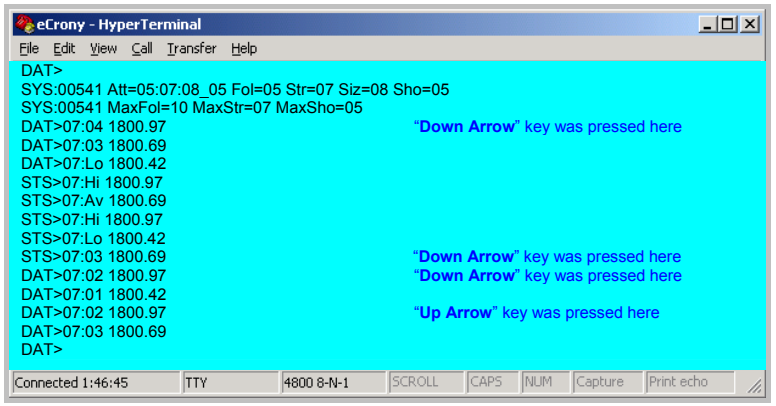
Before you change this value, please check system status by pressing "**Q**" key first. You may need to use "**O**" command (page 24) which decreases sensitivity.
In the example below, sensitivity it was increased to 65%.

Please note that commands "**I**" and "**O**" turn sensors Off, and therefore, any change here requires recalibration of the unit. You must press "**C**" to calibrate the unit (which is also the only way to find out if your setting will actually work). The fine settings, in increments of 1%, are available from Data Menu.



"Down Arrow" Move to the previous shot or stats

This command, by pressing "**Down Arrow**" key, moves to the previous shot or stats, down one number.



Excel Data Import Macros

Following macros are available to import eChrony Data

Macro Name	*Shortcut Key*	*What does it do*
Import CAP Data	**Ctrl-Shift-C**	Imports Captured data from **eChrony.ht**
Import MMR Data	**Ctrl-Shift-M**	Imports eDisk Memory from **eChrony.ht**
Stats Setup	**Ctrl-Shift-S**	Sets Up Stats for a single string.
Clear All Data	**Ctrl-Shift-Z**	Clears **MMR_Data**, **CAP_Data** sheets

Limitations: These formulas occupy a considerable amount of space in this file. Therefore, if you plan to shoot more than 500 shots per session, we recommend that you make your own spreadsheet file and use "Data Import" functions located under **<File>** or **<Data>** menu in Microsoft Excel. All fields are delimited with space character for easy data importing. Excel will automatically detect data format. You will also have to save your shots into a text file from within "**eChrony.ht**" because HyperTerminal has a buffer for only 525 shots.

Examples of PC Remote control

A1. OS Independent PC Interface

CE-3 Chronograph will communicate with any equipment that has RS232 port. This makes our unit virtually independent of any Operating System (OS) used. Most Operating Systems have access to some form of TTY terminal emulation; therefore, you can use CE-3 with old DOS machines, Windows 3.XX, Windows 95, Windows 98, Windows 2000, Windows ME, Windows XP, Linux, McIntosh etc. There are some restrictions:

1) Baud rate 300 to 4800 b/s, selectable from the CE-3 key. Default is 4800 b/s.
2) For higher baud rates, PC must support Software handshaking Xon/Xoff
3) CE-3 uses only 3-Wire interface, it does not support Hardware handshaking
4) CE-3 is shipped with standard DB9 interface connector only

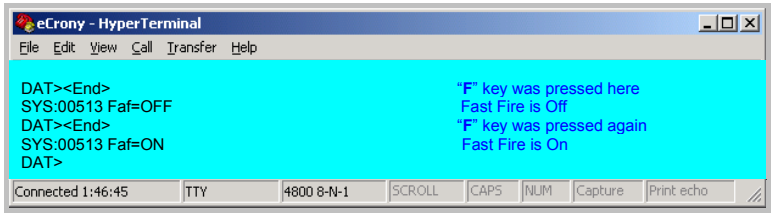
CE-3 can be remotely controlled from the PC, including Power On/Off, without the need for proprietary software. It uses a single key for all operations; that is you press one key only. If you forget the key for a particular function, just press "**H**" to get Help list. This help comes directly from CE-3; therefore, it is PC independent. For detailed description of all the command keys, click **Key Commands**.

Key Examples:

"H"	The help key, displays the list and description of control keys
"C"	Calibrates the unit
"Q"	Displays system status, settings, temperature, battery power etc.
"P"	Turns the unit off
"A"	Turns archery mode On/Off
"Del"	Deletes current shot
"Alt-Del"	Deletes current string.
"1"	Downloads current string
"2"	Downloads current folder
"3"	Downloads entire eDisk, all folders
"9"	Saves current folder to eDisk
"PgUp"	Moves to the next folder
"Right"	Moves to the next string.
"Up"	Moves to the next shot.

All keys have an equivalent "**Ctrl-Key**" available for the OS (Operating System) that does not support HyperTerminal emulation. All data for velocities, times, temperature etc. is sent in such format that most Spreadsheets and Data Base programs can easily import. The data can also be printed out directly to a printer. With old DOS machines the data can be "Echoed" to the printers directly.

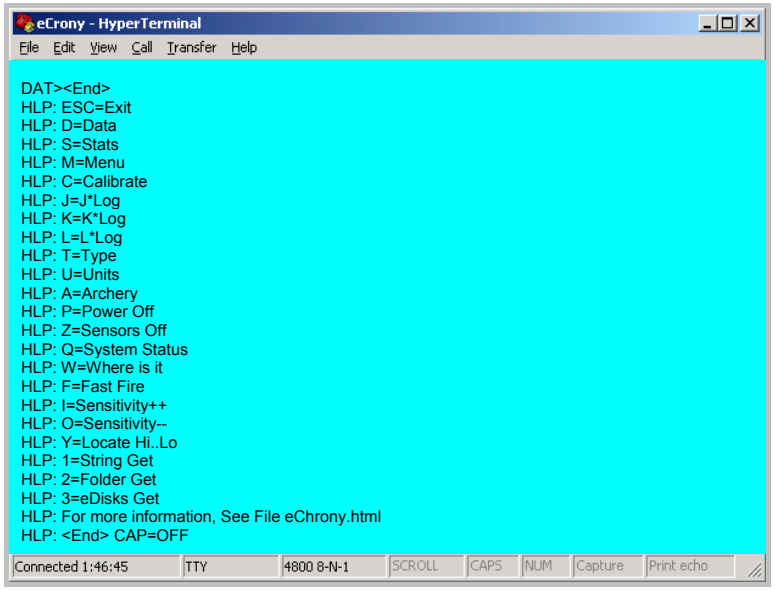
(**Faf=OFF**) indicates Fast Fire is Off and (**Faf=ON**) indicates that it is On.



"H" Display Help information

The "**H**" key command displays simple help text. Use this command to find your way out of a specific mode. This help resides inside the chronograph; therefore, it has a limited number of lines. You can press "**H**" any time except when in Text mode. Help screen is available from Data, Stats and Menu modes. Menu mode has help text only for emergency exit information.

Help within Data & Stats mode

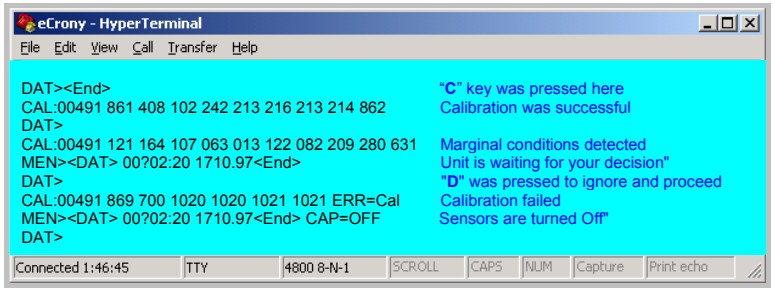


"C" Calibrates the unit

This command starts Adaptive Calibration by pressing "**C**" key. When completed successfully, with no error message, the unit returns to **Data mode** for the shot recording.

If the Calibration failed, the unit returns to **Data-Menu mode**. If calibration failure is critical, then sensors are turner off, as indicated by (**CAP=OFF**). From here it is necessary to proceed manually.

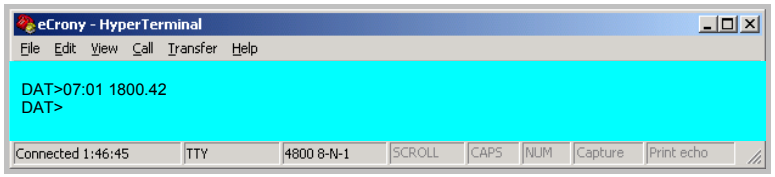
CE-3 does not have enough intelligence to make a good decision on marginal conditions, so you have to decide whether to proceed or not. It only recognizes serious problems and then alerts you with (**ERR=Cal**) and (**CAP=OFF**).



"D" Set Data mode

This command sets Data mode On. When "**D**" key is pressed, current shot and its location are displayed. In our example below (**07:01**) indicates String-7, Shot-1, with velocity (**1800.42**).

Windows scroll keys can be used to move through folders, strings and shots. See also command "S" Set Stats Mode (page 27)



"F" Turn Fast fire On and Off

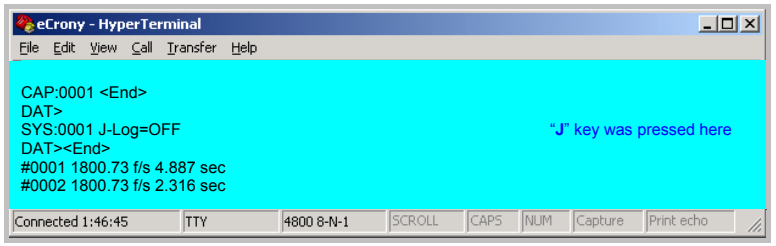
This command turns Fast fire On or Off when "**F**" key is pressed. This is not true rapid fire detection. Rapid fire requires far more complex operation than CE-3 can provide right now. Normal mode of operation holds sensors inactive between shots for about 2 seconds, and thus, increases measurement reliability. Fast fire mode holds sensors inactive between shots for 0.7 seconds, which reduces reliability. Our future releases will have a true rapid fire capability.

A2. Reduced Data Log

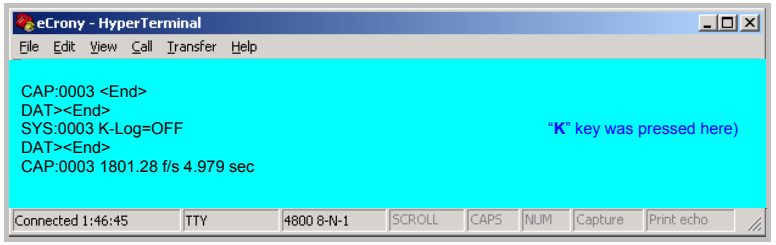
The unit sends to the PC all information available as each shot is fired. It sends identifying header, serial shot number, velocity, time between shots, ambient temperature and calculated string information, such as current location number or stats. Unless all this information is needed, it can clutter PC display. With a single key stroke you can turn some information On or Off.

To get rid of all extra information the unit sends to the PC, we provided 3 keys for this. "**J**" turns Off or On Data Capture headers, called "**J*Log**". "**K**" turns Off or On temperature data, called "**K*Log**", and "**L**" turns Off or On running stats & string location, called "**L*Log**". To make sure that you have access to these commands, press "**D**" to place the unit in a DATA mode.

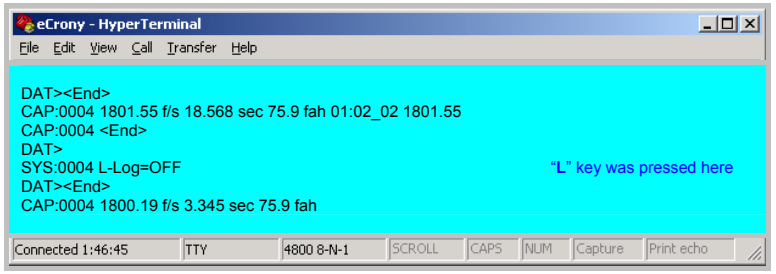
J*Log Command - turns Off or On Data Capture headers



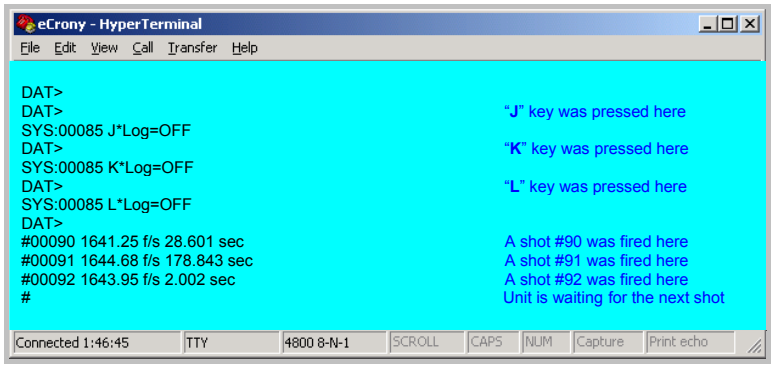
K*Log Command - turns Off or On temperature data



L*Log Command - turns Off or On running stats & string location

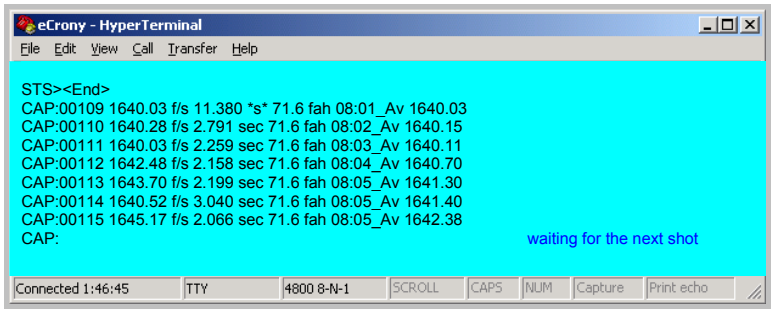


J, K, L*Log Off example



A3. Full Data Log

If "J*Log", "K*Log" and "L*Log" are not turned Off, then the unit sends all available information to the PC. In the example below the unit was setup to display the running average on the last 5 shots. It can easily display the Running Stats on Low, High, Average, STD etc.



A4. Magnified View

When HyperTerminal is used from Windows 95, 98, 2000, ME or XP, it can be set up to view the results from a distance by selecting large font. Below is an example of "HyperTerminal" setup for large text , which is "**Courier New, Bold, size 40**" (larger font may be used if your screen permits). The chronograph here is set up with "J*Log", "K*Log" and "L*Log" turned Off to reduce display clutter and the example below is real life size. We provide two HyperTerminal files, **eChrony.ht** for regular view and **eChronyBig.ht** for magnified view. The settings can be modified to suit your own needs.

CE-3 Chronograph can operate in the following modes, which are indicated by the prompt tag as follows:

Prompt Tag	Description	Selected by	Key
DAT>	Data mode for data viewing.	**User**	**"D"**
STS>	Stats mode for stats viewing.	**User**	**"S"**
MEN<DAT>	Data Menu mode for data control.	**User**	**"M"** *(*)*
MEN<STS>	Stats Menu mode for setup control.	**User**	**"M"** *(*)*
TXT:	Text mode for entering comments.	**User**	**"Ctrl-T"**
CAP:	Data Capture mode, shot detected	**Automatic**	**none**
SYS:	System mode, system changes made	**Automatic**	**none**
CAL:	Calibration mode, calibration executed	**Automatic**	**none**
ERR:	Error mode, when errors occur.	**Automatic**	**none**

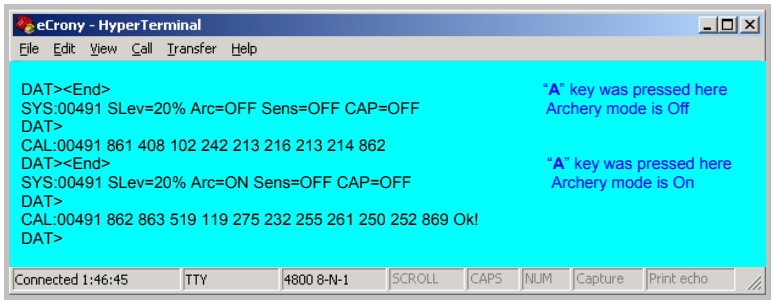
(*) Key "M" is active in either Data Mode or Stats Mode.

As most of the functions are automatic, all the user has to do is to select Data mode, Stats mode, Menu mode or Text mode.

Detailed Key Command descriptions

"A" Turn Archery On/Off

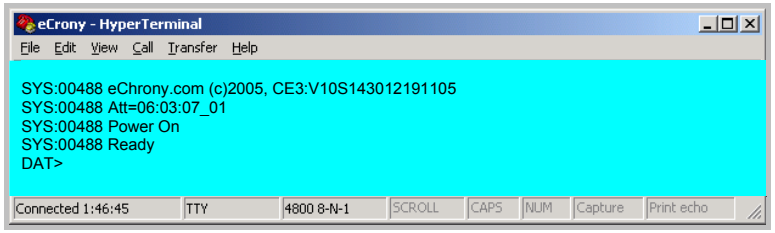
Pressing "**A**" key turns On or Off archery mode. When archery mode is changed, either turned On or Off, the sensors are turned Off as indicated by (**CAP=OFF**). The unit must be recalibrated again by pressing "**C**" key.



Keys that may cause data loss

TTY	PC	Function Description
1	**1**	**String Download**
2	**2**	**Folder Download**
3	**3**	**eDisk Download, *All folders***
3	**9**	**Save data to eDisk and turn the unit Off**
Esc	**Esc**	**Exit Current Operation**
*Ctrl-^*	**Del**	**Shot Delete**
Ctrl-	**BSpc**	**Shot Undelete**
Ctrl-_	**Alt-Del**	**String Delete**
Ctrl-]	**Alt-BSpc**	**String Undelete**
Ctrl-O	**PgUp**	**Folder Increment or Menu Value Increment**
Ctrl-K	**PgDn**	**Folder Decrement or Menu Value Decrement**
Ctrl-R	**Right**	**String Increment or Move to Next Menu**
Ctrl-L	**Left**	**String Decrement or Move to Previous Menu**
Ctrl-U	**Up**	**Scroll Up, Data, Stats or Submenu Up**
Ctrl-D	**Down**	**Scroll Down, Data, Stats or Submenu Down**
Ctrl-M	**Enter**	**Enter key, Execute menu, acknowledge alarms**
Ctrl-J	**Ctrl-J**	**Line Feed**
Ctrl-W	**Ctrl-W**	**Change String size, select next size**
Ctrl-A	**Ctrl-A**	**Folder Delete**
Ctrl-B	**Ctrl-B**	**Folder Undelete**
Ctrl-T	**Ctrl-T**	**Text Mode On, enter text notes**
Ctrl-E	**Ctrl-E**	**Select CAM mode, extended functions**

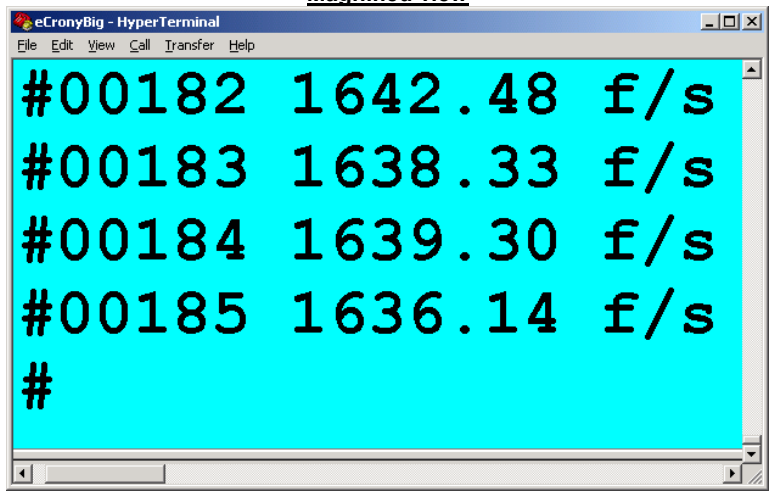
When the unit is first powered on, it displays the following text on the HyperTerminal or TTY screen:



Explanations for the above display

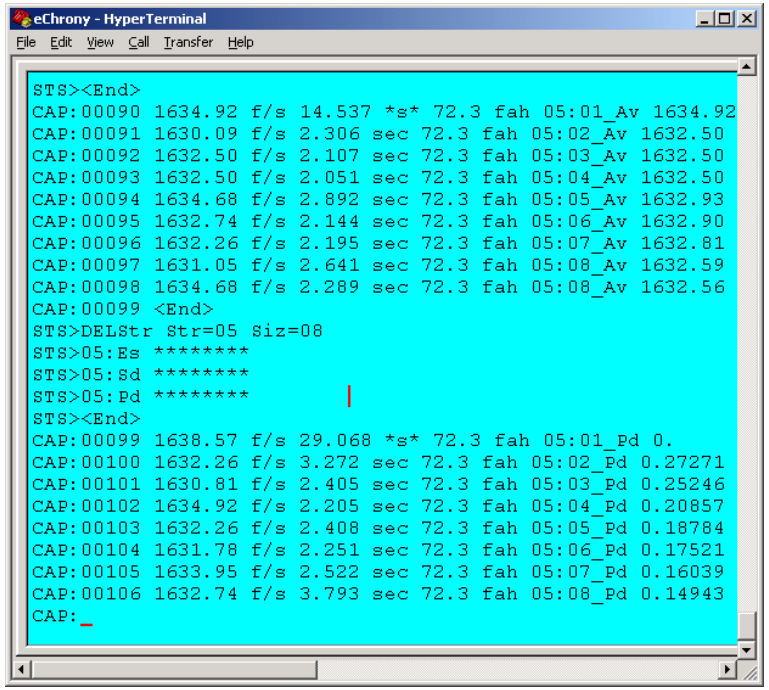
SYS:	System status tag
00488	Serial number for the next shot.
eChrony.com	The company eChrony Inc. that designed this product
(c)2005	This product's copyright belongs to eChrony Inc.
CE3:	This product's model number
V10	Firmware version number
S143012191105	Serial number
Att=06:03:07_01	Data Position, Folder=6, String=3, Shot=7, View Shot=1
Power On	Power is On
Ready	Unit is Ready
DAT>	You are in Data View mode

Magnified view



A5. Normal View

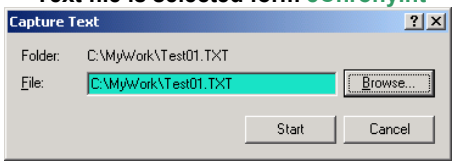
In normal view, with small regular font "**Currier New Regular 12**", you will see all the information at once. The example below shows shot serial number, velocity, time, temperature, string number and running average, or string number and running percent standard deviation. You can turn off some of the displayed data to suit your needs.



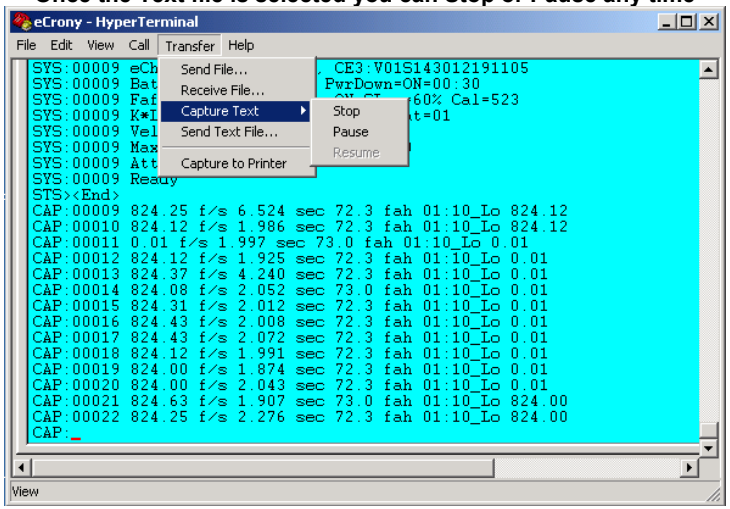
A6. Save Shots to a File

Our chronograph uses native HyperTerminal program that is supplied with all Microsoft Windows. HyperTerminal program, **eChrony.ht**, has a buffer memory for only 500 shots. For more than 500 shots, captured data have to be saved into a text file (even millions of shots per session can be recorded this way). To save your data to a text file, choose "**Transfer/Capture Text**" and select your destination: "**Text File**". CE-3 transmits data in an easy format for importing to any spreadsheet or Data Base programs. However, we only provide macros and some spreadsheet programs for Microsoft Excel.

Text file is selected form eChrony.ht



Once the Text file is selected you can Stop or Pause any time



A7. Import Data to Spreadsheet

Here is an example of importing a string from **eChrony.ht** (HyperTerminal program) to **eChrony.xls** (Excel program).

There are many ways to import data to Excel:
1) Import Captured data directly from **eChrony.ht** with our Excel macros.
2) Import Downloaded data from CE-3 eDisk with our macros.
3) Use Excel data import utility, which will easily detect our data format.

There are many ways to select data to be imported to your computer. In our case we have chosen string 02 with block select from HyperTerminal and pressed "**Ctrl-C**". You can also select an entire file or captured data block from within **eChrony.ht**. To move these shots to Excel, click on **eChroy.xls** and run import macro - see example below:

The "TTY Terminal" or the PC "Terminal Software" must permit the use of the following control keys.

Crtl-@	Ctrl-D	Ctrl-H	*Ctrl-L*	Ctrl-P	Ctrl-T	Ctrl-X	Ctrl-\
Crtl-A	Ctrl-E	Ctrl-I	*Ctrl-M*	*Ctrl-Q*	Ctrl-U	Ctrl-Y	Ctrl-]
Ctrl-B	Ctrl-F	*Ctrl-J*	Ctrl-N	Ctrl-R	Ctrl-V	*Ctrl-Z*	Ctrl-^
Ctrl-C	Ctrl-G	Ctrl-K	Ctrl-O	*Ctrl-S*	Ctrl-W	*Ctrl-[*	Ctrl-_

The control characters in red italic letters may be used by the TTY terminal software for its own use, as well as CE-3 Chronograph. Their functions are as follows,

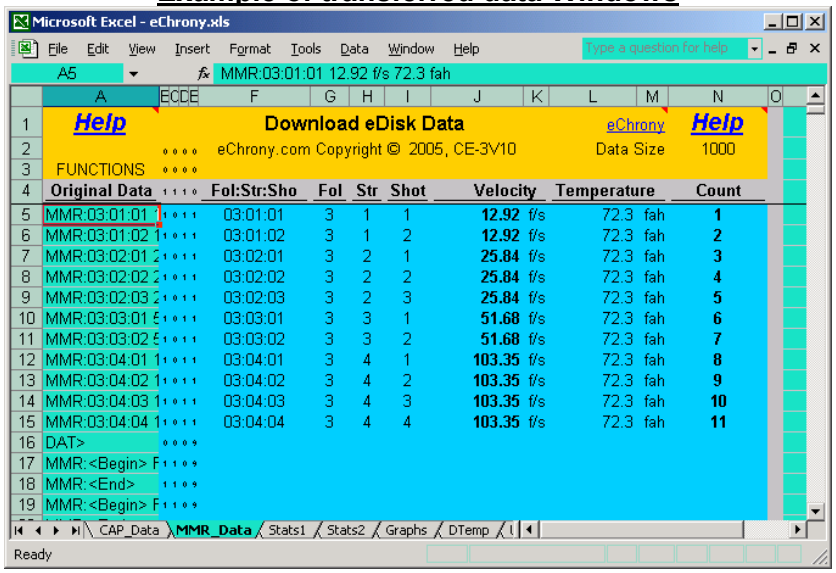
Ctrl-C	=	Stop Program Execution	*Ctrl-Q*	=	Xon, Terminal Ready
Ctrl-J	=	New Line	*Ctrl-S*	=	Xoff, Terminal Not Ready
Ctrl-L	=	New Page	*Ctrl-Z*	=	End of Text file
Ctrl-M	=	Carriage Return	*Ctrl-[*	=	Esc, Stop

Control keys for CE-3 chronograph

Keys that do not change data

TTY	PC	Function Description
A	A	Archery On/Off
B	B	*Reserved*
C	C	Calibrate
D	D	Data mode
E	E	*Reserved*
F	F	Fast fire On/Off
G	G	*Reserved*
H	H	Help
I	I	Sensitivity change, 0 to 95% by 5% steps
J	J	J*Log, CAP Index Log On/Off
K	K	K*Log, Temperature Log On/Off
K	L	L*Log, Calculated Value Log On/Off
M	M	Menu Mode On
N	N	*Reserved*
O	O	Decrease sensitivity, 0 to 95% by 5% steps
P	P	Power Off
Q	Q	Query system status.
R	R	*Reserved*
S	S	Stats Mode On
T	T	Data Type select, *Velocity or Temperature*
U	U	Units select, *Metric* or *Imperial*
V	V	*Reserved*
W	W	Where is Current Record Location, *Folder, String, Shot*
X	X	*Reserved*
Y	Y	Locate Position of *Minimum* or *Maximum* in the string
Z	Z	Turn sensors Off, reduce power consumption by 50%

Example of transferred data Windows



TTY Terminal Interface

CE-3 is controlled from PC or TTY terminal by pressing a single key. It uses alpha-numeric characters, **0** to **9**, **A** to **Z** and control characters **Ctrl-A** to **Ctrl-Z**.

Destructive operations use control character to prevent accidental use. These destructive operations are such as **Delete/Undelete** Folder, String etc.

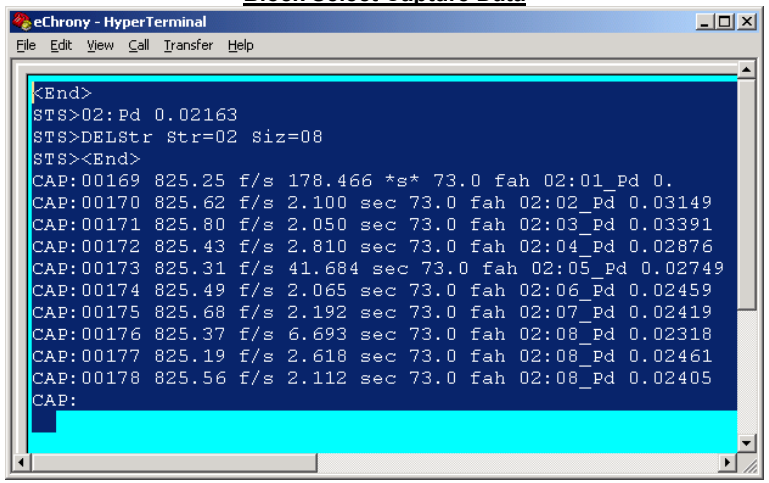
We provide a HyperTerminal script files for Windows 98, XP, ME and 2000 that takes advantage of the Windows keys for easy use. For Windows keys to work with Hyper Terminal you have to download HyperTerminal upgrade from Microsoft or from Hilgraeve website.

CE-3 will work with any TTY Terminal or Terminal software that uses RS232 communications. PC or TTY terminal must be setup with the following parameters:

Baud Rate:	**300 to 4800**
Data Bits:	**8 Bits**
Parity:	**None**
Stop Bits:	**1, 1-1/2 or 2**
Flow Control:	**XOn/XOff, or None**

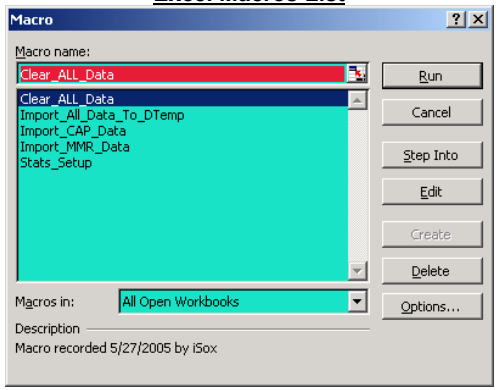
Note: When Flow Control is set to None, there may be loss of data if your PC is slow. CE-3 transmits data as fast as baud rate allows. This requires flow control for slow terminals and PC's.

Block Select Capture Data



To import eChrony data, just run one of the following macros available in **eChrony.xls** program:

Excel Macros List



After you execute "**Import_CAP_Data**", your spreadsheet will contain the data shown below. Please note that eDisk data are imported into "**MMR_Data**" sheet and Captured data are imported into "**CAP_Data**" sheet. The stats are available in "**Stats1**" and "**Stats2**" sheet. This is an open source Excel file and you can modify formulas and macros to suit your needs. All import data are translated with functions & formulas and not with Microsoft Visual Basic.

Capture Data Sheet

Microsoft Excel - eChrony.xls

File Edit View Insert Format Tools Data Window Help

A5 CAP:00169 825.25 f/s 178.466 *s* 73.0 fah 02:01_Pd 0.

	A	F	G	H	I	J	K	M	N	O	P
1	Help		Download Capture Data							eChrony	Help
2			eChrony.com Copyright © 2005, CE-3V10								
3	FUNCTIONS										
4	Original Data	Index	Velocity		Timer		Temper	Str:Sho_CCD		CCData	Count
5	CAP:00169 825.	169	825.25	f/s	178.466	*s*	73.0 fah	02:01_Pd		0.00000	1
6	CAP:00170 825.	170	825.62	f/s	2.100	sec	73.0 fah	02:02_Pd		0.03149	2
7	CAP:00171 825.	171	825.80	f/s	2.050	sec	73.0 fah	02:03_Pd		0.03391	3
8	CAP:00172 825.	172	825.43	f/s	2.810	sec	73.0 fah	02:04_Pd		0.02876	4
9	CAP:00173 825.	173	825.31	f/s	41.684	sec	73.0 fah	02:05_Pd		0.02749	5
10	CAP:00174 825.	174	825.49	f/s	2.065	sec	73.0 fah	02:06_Pd		0.02459	6
11	CAP:00175 825.	175	825.68	f/s	2.192	sec	73.0 fah	02:07_Pd		0.02419	7
12	CAP:00176 825.	176	825.37	f/s	6.693	sec	73.0 fah	02:08_Pd		0.02318	8
13	CAP:00177 825.	177	825.19	f/s	2.618	sec	73.0 fah	02:08_Pd		0.02461	9
14	CAP:00178 825.	178	825.56	f/s	2.112	sec	73.0 fah	02:08_Pd		0.02405	10
15	<End><End>										

CAP_Data MMR_Data Stats1 Stats2 Graphs DTemp Units

Ready

"**CCD**" shown in the above table is calculated data, which in this case, is the Running %STD on the last 8 shots. If you execute "**Stats_Setup**" macro, you get stats sheet shown below. We only provide a simple Stats functions in "**Stats1**" and "**Stats2**" sheet. You can use them as a working base for your own Spreadsheet calculations.

Stats1 Sheet

Microsoft Excel - eChrony.xls

File Edit View Insert Format Tools Data Window Help

A5 =IF(ROW()<5,1,IF($B5=0,"",SUM($B5:B5)))

	A	C	E	F	G	H	I	J	K
1	Help	Select c Statistics Lo, Hi, Av, Es for CAP_Data							Hel
2	1								
3	Shot	Velocity		Low	High	Average	ExSpread	Std	PSt
4	number	feet/sec	meters/sec	feet/sec	feet/sec	feet/sec	feet/sec	feet/sec	%St
5	1	825.25	251.536	825.25	825.250	825.250	0.000	0.000000	0.000
6	2	825.62	251.649	825.25	825.620	825.435	0.370	0.261630	0.031
7	3	825.80	251.704	825.25	825.800	825.557	0.550	0.280416	0.033
8	4	825.43	251.591	825.25	825.800	825.525	0.550	0.237557	0.028
9	5	825.31	251.554	825.25	825.800	825.482	0.550	0.227090	0.027
10	6	825.49	251.609	825.25	825.800	825.483	0.550	0.203142	0.024
11	7	825.68	251.667	825.25	825.800	825.511	0.550	0.199786	0.024
12	8	825.37	251.573	825.25	825.800	825.494	0.550	0.191605	0.023
13	9	825.19	251.518	825.19	825.800	825.460	0.610	0.205852	0.024
14	10	825.56	251.631	825.19	825.800	825.470	0.610	0.196638	0.023
15									

CAP_Data MMR_Data Stats1 Stats2 Graphs DTemp Units

Ready

Example of CE-3 downloading data

When you use CE-3 in the field without PC, all your work is saved in volatile memory. Please note, only CF mode saves data on eDisk whenever the unit is turned off or folders are changed. This data can be downloaded later on to your PC by following these steps:

1) **Plug CE-3 into the COM1 port on your PC.**
2) **Click on eChrony.ht, the HyperTerminal program**
3) **In HyperTerminal program click on "Transfer"**
4) **Select "Capture Text"**
5) **Choose file name to save your data.**
6) **Press "Space Bar" or any key to wake up the unit.**
7) **Press "3" to download entire work.**

The file contains entire disk; here only a portion is displayed, which belong to the folder number 3. All folders are distinctly identified for Excel import.

Downloaded Folder from memory

eCrony - HyperTerminal

File Edit View Call Transfer Help

```
DAT>
MMR:<Begin> Fol=03 Str=01 Siz=02
MMR:03:01:01 12.92 f/s 72.3 fah
MMR:03:01:02 12.92 f/s 72.3 fah
MMR:<End>
MMR:<Begin> Fol=03 Str=02 Siz=03
MMR:03:02:01 25.84 f/s 72.3 fah
MMR:03:02:02 25.84 f/s 72.3 fah
MMR:03:02:03 25.84 f/s 72.3 fah
MMR:<End>
MMR:<Begin> Fol=03 Str=03 Siz=02
MMR:03:03:01 51.68 f/s 72.3 fah
MMR:03:03:02 51.68 f/s 72.3 fah
MMR:<End>
MMR:<Begin> Fol=03 Str=04 Siz=04
MMR:03:04:01 103.35 f/s 72.3 fah
MMR:03:04:02 103.35 f/s 72.3 fah
MMR:03:04:03 103.35 f/s 72.3 fah
MMR:03:04:04 103.35 f/s 72.3 fah
MMR:<End>
DAT>
```

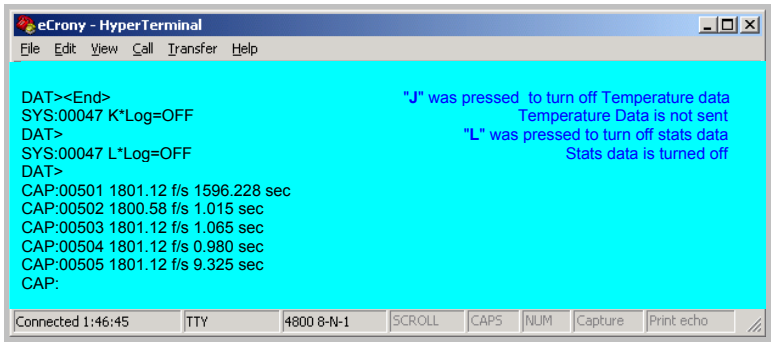
Connected 1:46:45 TTY 4800 8-N-1 SCROLL CAPS NUM Capture Print echo

Exporting data to Excel file

1) **Open text file created by eChrony.ht**
2) **Go to "Edit"**
3) **Choose "Select All"**
4) **Click on "Copy"**
5) **Open file eChrony.xls**
6) **Execute macro "Import_MMR_Data"**

All your data is now exported and aligned in the Excel spreadsheet. Data is also sorted to remove any comments etc.

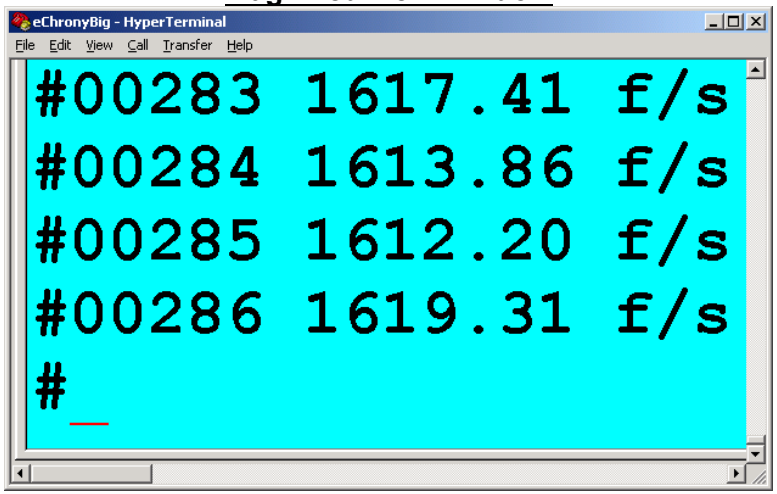
Turn off some data log



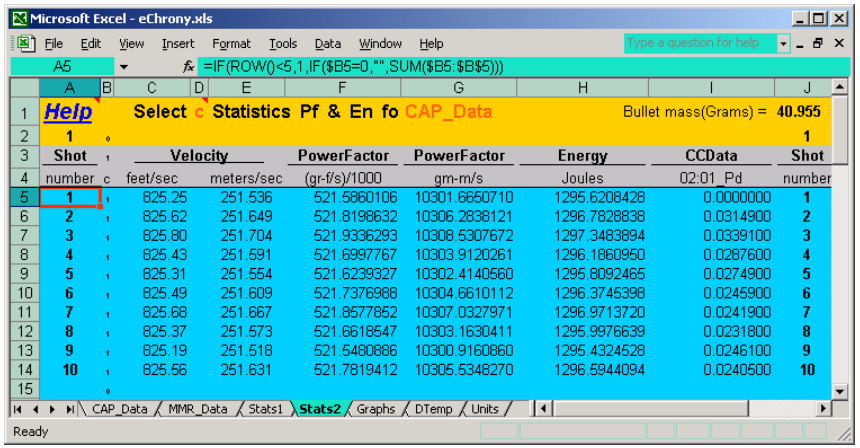
When display clutter is reduced, you can magnify the view within the **eChrony.ht** screen.
Here is an example with display set to font "**Courier New, Bold, size 40**". To reduce display clutter **J*Log**, **K*Log** & **L*Log** has been turned off with "**J**", "**K**" and "**L**" keys.

The timer values are not visible because the magnification it too large. Velocities can be clearly seen from a large distance. Here is an example from an earlier work session with sequence number **00283**.

Magnified view Window



Stats2 Sheet

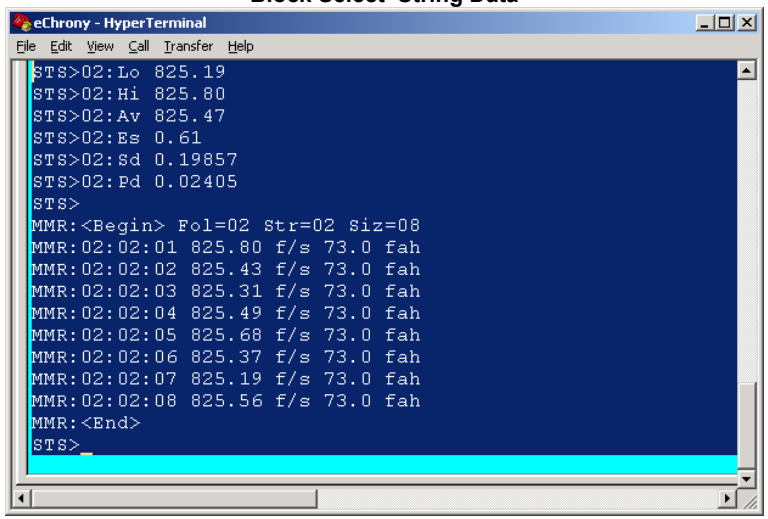


Import data size is limited to 65,000 shots for Microsoft Excel. Also, when importing large amounts of data (over 500 shots), you should use Excel data import utility and not our data import macros. Our macros have been fixed to import data on 500 shots. If you are familiar with Excel, you can modify our macros to import up to 65,000 shots.

We provide Microsoft Excel program **eChrony.xls** and some Excel macros to get you started. In the near future we will provide a direct link between Excel and eChrony CE-3 chronograph.

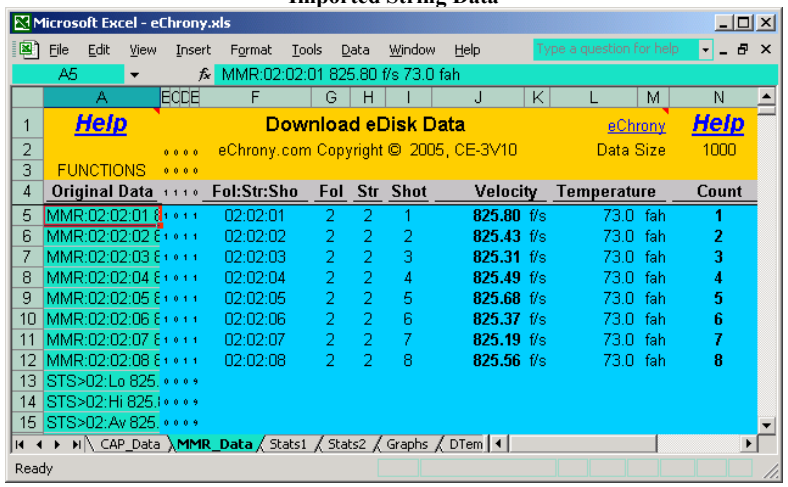
Here is an Example of eDisk data import, and, in this case, only a single string was imported. You can import a single folder or an entire eDisk with all the folders in it. Again, select a block and press "**Ctrl-C**" (shortcut keys for copying a selection):

Block Select String Data



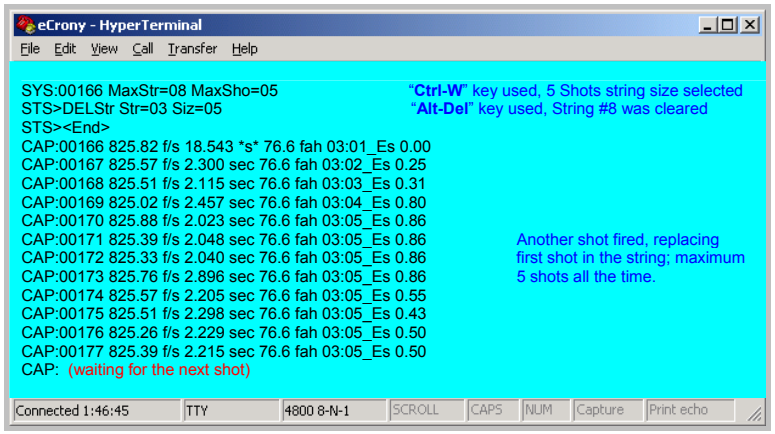
After executing "**Import_MMR_Data**" macro from **eChrony.xls** file, the data are transferred to the "**MMR_Data**" sheet shown below. Please note, that CE-3 does not save Time information on eDisk - it is only available with Data Capture.

Imported String Data



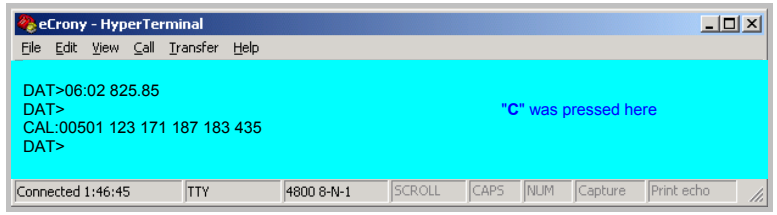
A8. Continuous Stats Monitor

When set to Stats mode, CE3 sends updated statistics of the current string to the PC on every shot. In this example we selected Extreme Spread ("**Es**") to be displayed after every shot. The string size selected was 5 shots per string. This way you can see continuous update of "**Es**" for each of the 5 shots:



To start CE-3, you may decide to press "**D**" key to go into Data mode, followed by "**C**" key to calibrate the unit. Display will then show:

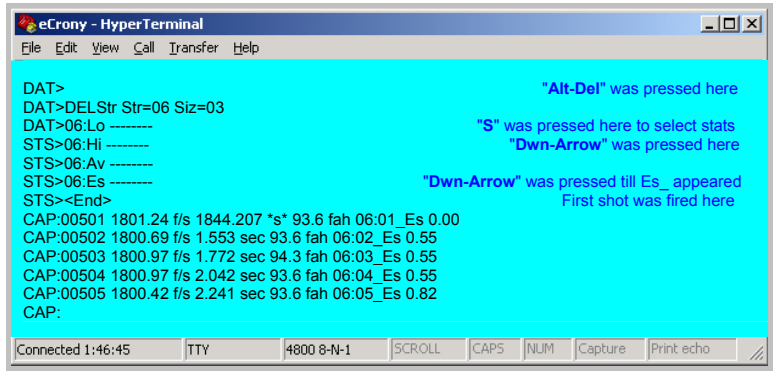
Calibrate unit Message



CE-3 completed the calibration successfully and it has decided that the range is fine. There is no CAP=OFF message because CE-3 turned the sensors on and it is now ready for your shots. If you do not care about Folders, Strings or Running Stats, then just start shooting.

You may want to clear current string first by pressing "**Alt-Del**" key. In this example we pressed "**S**" key to go into Stats mode and then "**Down**" key three times to select Running Stats for "**Extreme Spread**". After firing 5 shots, the display will show as follows:

Clear String & Set Stats example



The first shot had index number (**CAP:00501**) with velocity of (**1801.24 f/s**).

The elapsed time between this shot and previous shot was (**1844.207*s***). (***s***) indicates that the clock was turned off since last shot and therefore this time is not valid. Subsequent times are valid (**sec**). The ambient temperature was (**93.6 fah**). The extreme spread for string-6, shot-1 (**06:01_Es 0.00**) was (**0.00**). If you do not need temperature and running stats, these can be turned off to reduce the clutter. Here is an example:

easy import to any Spread Sheet or Data Base programs. It also allows data to be printed out on any printer.

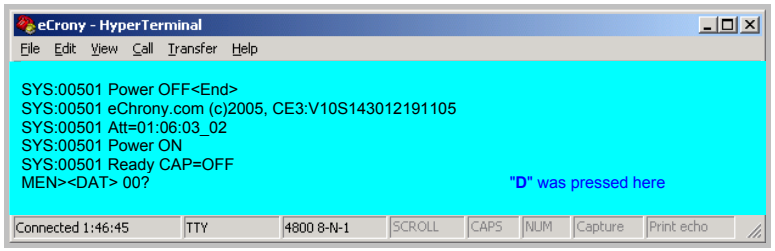
All events related to data capture and chronograph setup that may affect velocity measurement are given an Index number and an Identifier tag. This information is important for Excel and other Data Base programs because it is used for filtering out non essential information or to keep track of the work history. The Index number starts at 00000 and can go up to 65535. When it reaches 65535, it resets back to 00000. This sequence number is stored in the unit as system information.

Example of CE-3 interface

Here is an example of a typical display with Velocity data, Timer data, Temperature data and Running Stats. The Running Stats, in this example, are set to monitor the "**Extreme Spread**" on the last 5 shots. Velocity is in "**f/s**", Time is in "**sec**" and the Temperature is in Fahrenheit "**fah**".

1) **Click on the Excel file "eChrony.xls".**
2) **Click on the HyperTerminal program "eChrony.ht".**
3) **Here it is assumed that your PC has one free COM1 port. If you have an older PC, it may be necessary to find a free COM port first.**
4) **Plug the interface cable into on the PC and the other end into CE-3.**
5) **From within the HyperTerminal window press "Q" or "W" or "Space Bar" key. This will wake up the unit and display the following message**

Power On Message



Display shows the Company's name, Model number (**CE3**) and Version (**V10**).

(**eChrony.com**) is the engineering company that designed this product.

(**SYS:00501**) states that your next shot will have Index number (**00501**).

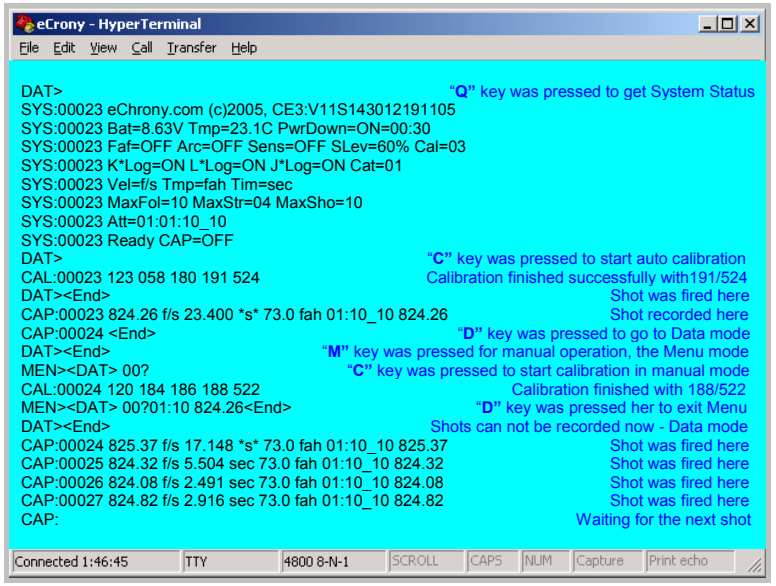
(**Att=01:06:03_02**) is the last working status before the unit was turned Off. Last work was at Folder number (**01**), String number (**06**) and Shot number (**03**). Number (**_02**) indicates your last data review position was shot number (**02**).

(**Ready CAP=OFF**) indicates that the unit is ready but the sensors are turned Off. When PC wakes up the unit, it always goes to CF Mode, first Data Menu location.

There are many ways to proceed from here. (**MEN<DAT> 00?**) indicates that you are in the Data-Menu.

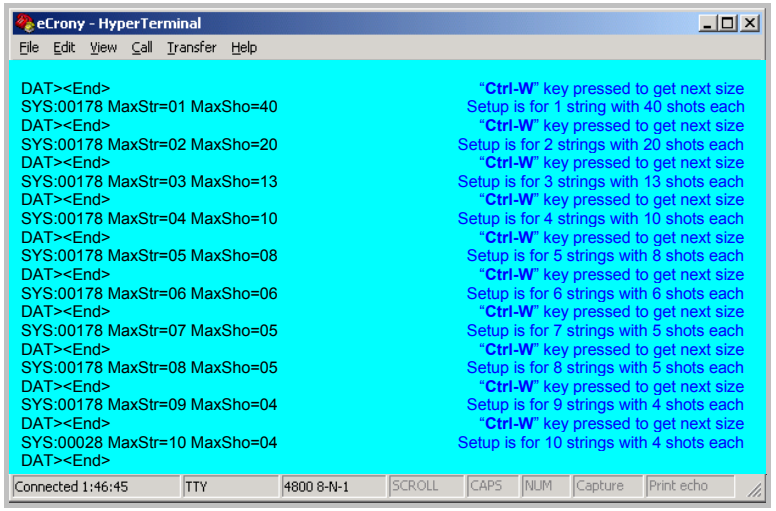
A9. Adaptive Calibration

CE-3 provides different ways to run adaptive calibration: remotely from a PC or locally from CE-3 keys. Adaptive calibration runs in automatic mode or in manual mode. Here are some examples:



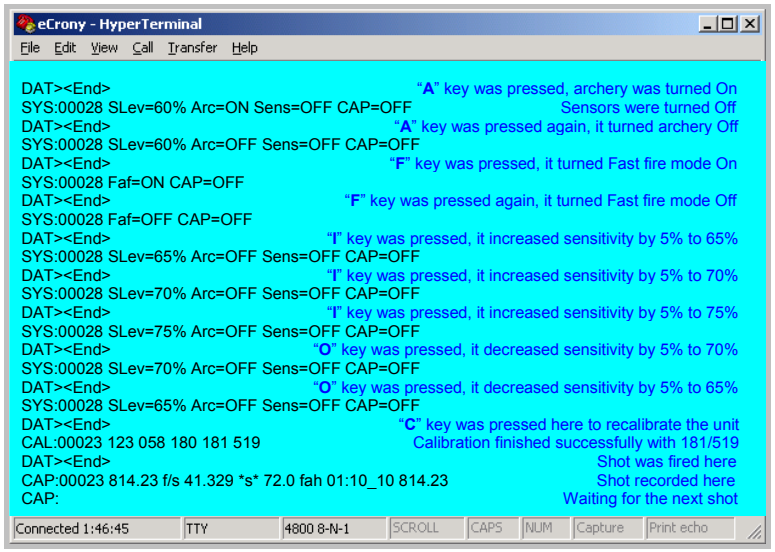
A10. Change String Size

"**Ctrl-W**" key is used here to toggle through string sizes. Since each folder can only hold 40 shots, increasing the string size reduces number of strings per folder. Since PC records all shots, therefore string size can be used for defining Stats Monitor during a shooting session.



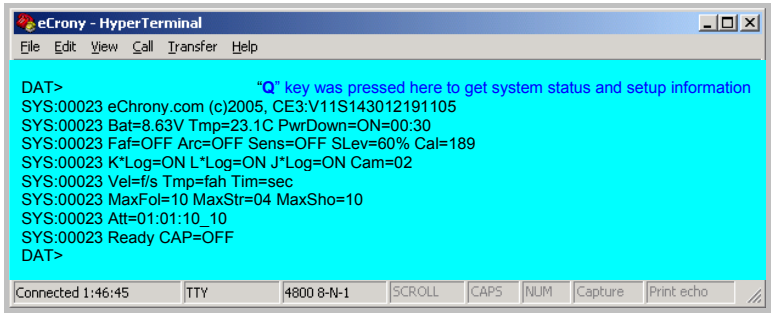
A11. Archery, Fast fire & Sensitivity

Pressing "**A**" key toggles Archery mode On or Off. Pressing "**F**" toggles fast fire On or Off. Pressing "**I**" key increments sensitivity by 5%. Pressing "**O**" key decrements sensitivity by 5%. When archery mode or sensitivity is changed, sensors are turned off as indicated by "**CAP=OFF**". The unit has to be recalibrated again to implement these changes. Calibration will also check your new settings against current environment and let you know if your setting will function in the current environment.



A12. Query Chronograph Status & Setup

When "**Q**" key is pressed, the unit sends System status and setup information.



There are two shortcut keys for macros, <**Ctrl-Shft-M**> for importing eDisk Memory data and <**Ctrl-Shft-C**> for importing Capture data. These macros can also be executed from <Tools> / <Macros> <Run> of the Excel program.

We used Macros & Formulas to make it easier for the end-user; however, there are other ways to import the data. If you are familiar with Excel, you can use Excel Data Import utilities from the main menu. From <File> menu choose <Open>, specify file type as text and type your file's name that you want you to import. From <Data> menu go to Import <External Data>, then to <Import Data>specifying file type as text. Excel will interpret CE-3 data ASCII format very easily.

Please note that spreadsheet file "**eChrony.xls**" has two Sheets:
1) "**MMR_Data**" for eDisk Data Importing.
2) "**CAP_Data**" for Capture Data Importing.

PC interface overview

1 - **Data transfer rate, 300 to 4800 Bits/Sec**
2 - **Exports data to Excel with just a few key strokes**
3 - **Data can be exported on the fly, anytime between shots.**
4 - **Downloads Current String data**
5 - **Downloads Current Folder data**
6 - **Downloads Entire eDisk data - all Folders (CE-3 V10 has only 10 folders)**
7 - **Records up to 65,536 shots per session into a file for later use**
8 - **Transmits Velocity data, from 2.00 f/s to 9999.99 f/s, (or m/s)**
9 - **Transmits Timer data, range of 8388.000 Sec, resolution +/- 0.001 Sec.**
10 - **Transmits Ambient Temperature data, in Fahrenheit or Celsius**
11 - **All Captured Shots are assigned Index number for Data Base Sorting**
12 - **The unit provides full remote control from PC, including power On & Off**
13 - **Selects what data to record, Temperature, running Stats, Tags etc.**
14 - **Displays running stats on the last, 4, 5, 6, 8, 10, 13, 20, 40 shots**
15 - **Stores up to 400 shots on eDisk when used without PC (*)**
16 - **Magnified Display View when using HyperTerminal.**

(*) Please note that CE-3 has memory for only 400 shots on eDisk.
Also, CE-3 does not store timer data on eDisk, it only transmits it to the PC.
Higher models will be able to store timer data and will have capacity on eDisk for up to 12,000 shots.

Basic features of the CE-3 PC interface

CE-3 is connected to the PC through a 16 feet cable provided with the unit. Extensions for 30, 60,120 & 200 feet are sold separately. You can also use commercial audio cable extensions. The unit is controlled remotely from PC with a single key stroke operation and without the requirement for complex interface programs.

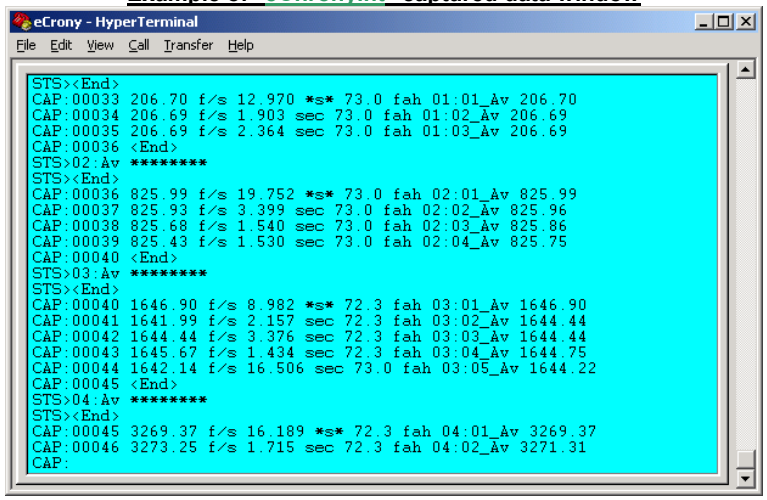
To make easier for the user, we provide HyperTerminal script files and Excel macro files. These files only run on Microsoft Windows operating systems. For other operating systems, you may have to find your own suitable ASCII Terminal programs. If you need a program for DOS 4.0, 5.0 or 6.0 please let us know.

When a shot is fired, CE-3 transmits Velocity Data, Timer Data, Temperature Data and Event-Sequence number to the PC. The information is in a data logging format for

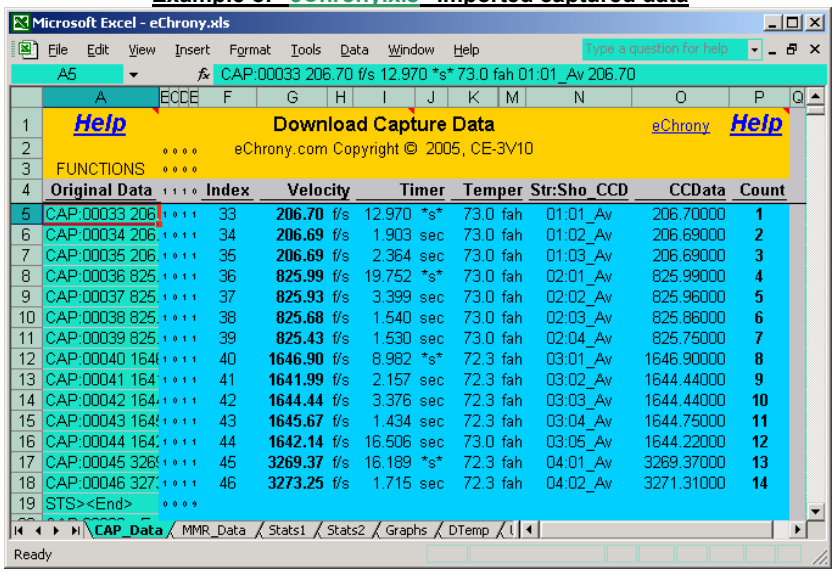
Quick steps to import live captured data

1) **Connect CE-3 to COM1 port on the PC.**
2) **Click on eChrony.ht file - this starts HyperTerminal program.**
3) **Click on eChrony.xls file - this starts Excel program.**
4) **Go to eChrony HyperTerminal window.**
5) **Type "Q" or press "space bar" - this will wake up CE-3, if not already on.**
6) **Select stats for stats monitor and fire your shots**
7) **Go to <Edit>, click on <Select All>**
8) **Go to <Edit>, click on <Copy>**
9) **Go to Excel window and press <Ctrl-Shft-C> - Capture data import macro**

Example of "eChrony.ht" captured data window



Example of "eChrony.xls" imported captured data



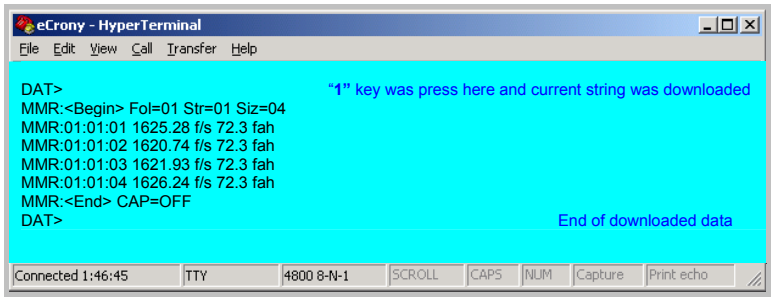
Description of the status and settings available: (please also refer to manual's index)

eChrony.com (c)2005	Company Name & Copyright
CE3:V11S143012191105	Model CE3, Version V1.1, Serial number S143012191105
Bat=8.63V	Battery Voltage 8.63 Volts.
Tmp=23.1C	Ambient temperature 23.1 Celsius
PwrDown=ON=00:30	Automatic Power Down enabled and set for 30 Minutes
Faf=OFF	Fast Fire set to Off
Arc=OFF	Archery set to Off
Sens=OFF	Sensors are Off, shots can not be recorded
SLev=60%	Sensitivity level is 60%
Cal=189	Last Calibration level was 189
K*Log=ON	Capture log tag is on," **CAP:**" tag will be sent
L*Log=ON	Temperature Log is on, temperature will be sent.
J*Log=ON	Calculated Stats log is on, calculated data will be sent.
Cam=02	Test mode enabled, full control over CE-3 enabled.
Vel=f/s	Velocity is in Feet/Seconds
Tmp=fah	Temperature in Fahrenheit.
Tim=sec	Time in Seconds.
MaxFol=10	Maximum number of Folders available
MaxStr=04	Maximum number of Strings per folders available
MaxSho=10	Maximum number of Shots per string available
Att=01:02:10_8	Folder=01, String=2, Total Shots=10, Current Shot=8
Ready CAP=OFF	Unit ready, Sensors are Off as indicated by "CAP=OFF"

A13. Download String, Folder or Entire eDisk

Data can be downloaded any time, even during the shooting session; the unit will remember your last position. If your PC can only receive data, you can initiate all downloads from CE-3 keys. This allows you to send downloads directly to a printer with serial port. You may need to lower the baud rate (see CE-3 manual).

String download:



Folder download:

eCrony - HyperTerminal

File Edit View Call Transfer Help

```
DAT>                                   "2" key was press here and current folder was downloaded
MMR:<Begin> Fol=01 Str=01 Siz=03       (Folder-1, String-1, Total 3-Shots)
MMR:01:01:01 1620.02 f/s 71.6 fah
MMR:01:01:02 1618.83 f/s 72.3 fah
MMR:01:01:03 1618.12 f/s 72.3 fah
MMR:<End>
MMR:<Begin> Fol=01 Str=02 Siz=02       (Folder-1, String-2, Total 2-Shots)
MMR:01:02:01 1623.60 f/s 72.3 fah
MMR:01:02:02 1618.60 f/s 72.3 fah
MMR:<End>
MMR:<Begin> Fol=01 Str=03 Siz=03       (Folder-1, String-3, Total 3-Shots)
MMR:01:03:01 1626.96 f/s 72.3 fah
MMR:01:03:02 413.19 f/s 72.3 fah
MMR:01:03:03 413.20 f/s 72.3 fah
MMR:<End>
MMR:<Begin> Fol=01 Str=04 Siz=01       (Folder-1, String-4, Total 1-Shot)
MMR:01:04:01 825.17 f/s 72.3 fah
MMR:<End>
MMR:<Begin> Fol=01 Str=05 Siz=01       (Folder-1, String-5, Total 1-Shot)
MMR:01:05:01 51.68 f/s 72.3 fah
MMR:<End>>                             End of downloaded data
DAT
```

Connected 1:46:45 | TTY | 4800 8-N-1 | SCROLL | CAPS | NUM | Capture | Print echo

eDisk download:

This example would look similar to Folder Download except that all folders are downloaded. CE-3 Version 1.01 has 10 folders and each can have its own setup.

A14. Move between Shots, Strings & Folders

When HyperTerminal "**eChrony.ht**" is used, the scroll keys from the PC keyboard move through the eDisk data in a similar manner as in a spreadsheet. In other operating systems, you may have to use "**Ctrl-Keys**" - see **Key Commands** for scroll key equivalents.

eCrony - HyperTerminal

File Edit View Call Transfer Help

```
DAT>01:01 1620.02                      "Up Arrow" key was pressed to view next shot
DAT>01:02 1618.83                      "Up Arrow" key was pressed to view next shot
DAT>01:03 1618.12                      "Down Arrow" key was pressed to view previous shot
DAT>01:01 1620.02                      "Right Arrow" key was pressed to move to the next string
DAT>02:02 1618.60                      "Right Arrow" key was pressed to move to the next string
DAT>03:03 413.19                       "Left Arrow" key was pressed to move to the previous string
DAT>02:02 1618.60                      "PgUp" key was pressed to move to the next folder
DAT>Fol=10 MaxStr=10 Str=00 Att=10:05:00_01   "PgUp" key was press again
DAT>Fol=09 MaxStr=10 Str=00 Att=09:10:00_01   "PgUp" key was press again
DAT>Fol=08 MaxStr=10 Str=00 Att=08:10:00_01   "PgDn" key was press to go back
DAT>Fol=09 MaxStr=10 Str=00 Att=09:10:00_01
DAT>                                   End of data scrolling
```

Connected 1:46:45 | TTY | 4800 8-N-1 | SCROLL | CAPS | NUM | Capture | Print echo

PC Interface manual, CE-3 Chronotar Chronograph, © Copyright eChrony inc. 2004/2005

Example of "eChrony.ht" downloaded eDisk data window

eChrony - HyperTerminal

File Edit View Call Transfer Help

```
DAT>
MMR:<Begin> Fol=01 Str=01 Siz=03
MMR:01:01:01 206.70 f/s 73.0 fah
MMR:01:01:02 206.69 f/s 73.0 fah
MMR:01:01:03 206.69 f/s 73.0 fah
MMR:<End>
MMR:<Begin> Fol=01 Str=02 Siz=04
MMR:01:02:01 825.99 f/s 73.0 fah
MMR:01:02:02 825.93 f/s 73.0 fah
MMR:01:02:03 825.68 f/s 73.0 fah
MMR:01:02:04 825.43 f/s 73.0 fah
MMR:<End>
MMR:<Begin> Fol=01 Str=03 Siz=05
MMR:01:03:01 1646.90 f/s 72.3 fah
MMR:01:03:02 1641.99 f/s 72.3 fah
MMR:01:03:03 1644.44 f/s 72.3 fah
MMR:01:03:04 1645.67 f/s 72.3 fah
MMR:01:03:05 1642.14 f/s 73.0 fah
MMR:<End>
MMR:<Begin> Fol=01 Str=04 Siz=02
MMR:01:04:01 3269.37 f/s 72.3 fah
MMR:01:04:02 3273.25 f/s 72.3 fah
MMR:<End>
DAT>04:02 3273.25
DAT>
```

Example of "eChrony.xls" imported eDisk memory data

Microsoft Excel - eChrony.xls

File Edit View Insert Format Tools Data Window Help

A5 fx MMR:01:01:01 206.70 f/s 73.0 fah

	A	F	G	H	I	J	K	L	M	N
1	Help	Download eDisk Data						eChrony		Help
2		eChrony.com Copyright © 2005, CE-3V10						Data Size		1000
3	FUNCTIONS									
4	Original Data	Fol:Str:Sho	Fol	Str	Shot	Velocity		Temperature		Count
5	MMR:01:01:01 2	01:01:01	1	1	1	206.70	f/s	73.0	fah	1
6	MMR:01:01:02 2	01:01:02	1	1	2	206.69	f/s	73.0	fah	2
7	MMR:01:01:03 2	01:01:03	1	1	3	206.69	f/s	73.0	fah	3
8	MMR:01:02:01 8	01:02:01	1	2	1	825.99	f/s	73.0	fah	4
9	MMR:01:02:02 8	01:02:02	1	2	2	825.93	f/s	73.0	fah	5
10	MMR:01:02:03 8	01:02:03	1	2	3	825.68	f/s	73.0	fah	6
11	MMR:01:02:04 8	01:02:04	1	2	4	825.43	f/s	73.0	fah	7
12	MMR:01:03:01 1	01:03:01	1	3	1	1646.90	f/s	72.3	fah	8
13	MMR:01:03:02 1	01:03:02	1	3	2	1641.99	f/s	72.3	fah	9
14	MMR:01:03:03 1	01:03:03	1	3	3	1644.44	f/s	72.3	fah	10
15	MMR:01:03:04 1	01:03:04	1	3	4	1645.67	f/s	72.3	fah	11
16	MMR:01:03:05 1	01:03:05	1	3	5	1642.14	f/s	73.0	fah	12
17	MMR:01:04:01 3	01:04:01	1	4	1	3269.37	f/s	72.3	fah	13
18	MMR:01:04:02 3	01:04:02	1	4	2	3273.25	f/s	72.3	fah	14
19	DAT>									

CAP_Data | MMR_Data | Stats1 | Stats2 | Graphs | DTemp

Ready

Data Recovery

There is command in CF Data menu, Und-, that restores all the contents found in the trash bin back to the string. This is intended for emergency use only when, for example, shots were deleted during sorting them out.

This command is only available from **CF** mode. Switch the unit to **CF** mode, press ***<DATA>*** key to get CAL: menu, press ***<MENU>*** two times to get Srn: menu, press ***<UNITS>*** three times to get Und- menu.

It may be necessary to delete unwanted shots, one by one, with ***<MENU+DATA>*** key function. The system cannot differentiate between bad and good shots; it restores all. The shots are restored back to memory in a correct sequence.

Introduction

CE-3 provides a simple remote control interface labeled "HIP", Human Interface Protocol. All data is sent and received through RS232 port from the PC. The data sent and received is in ASCII readable form. The unit has also a proprietary Binary Interface Protocol "BIP" that is not accessible through TTY terminal.

The "HIP" RS232 interface can operate with Windows 95, 98, ME, 2000, NT, XT, Linux with TTY programs and Macintosh with TTY programs. If your PC can emulate TTY terminal, and, most PCs do, then you can use it for CE-3. It will even operate with the old DOS and Windows 3.XX if you can run Telix, Crosstalk, Mirror or TTY program. If you are only downloading data from CE-3 for export to Excel or to print it out, you do not need to read this entire manual. Here are the simple steps to do this.

Quick steps to import eDisk Memory Data

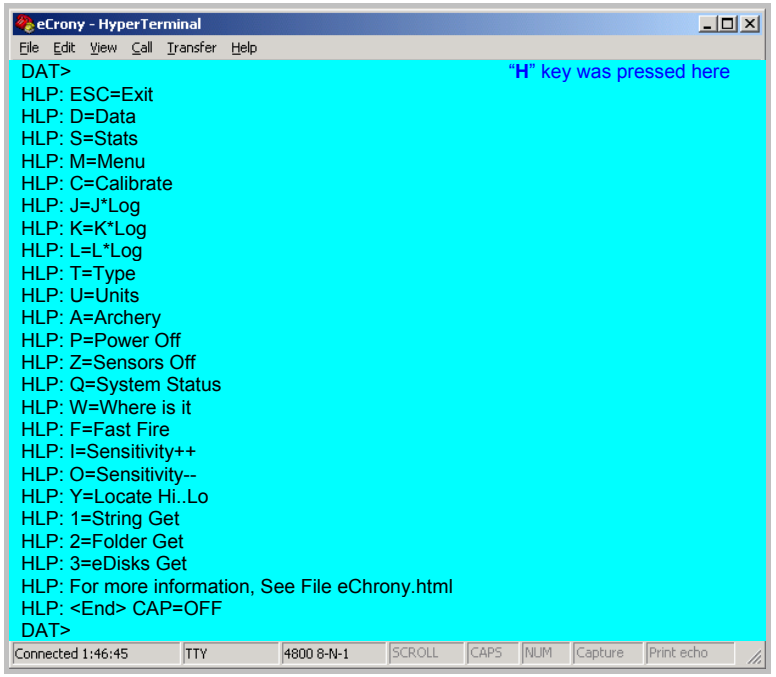
1) **Connect CE-3 to COM1 port on the PC.**
2) **Click on eChrony.ht file - this starts HyperTerminal program.**
3) **Click on eChrony.xls file - this starts Excel program.**
4) **Go to eChrony HyperTerminal window.**
5) **Type "Q" or press "space bar" - this will wake up CE-3 if not already on.**
6) **Type "3" - this downloads entire eDisk(*) to HyperTerminal.**
7) **Go to <Edit>, click on <Select All>**
8) **Go to <Edit>, click on <Copy>**
9) **Go to Excel window and press <Ctrl-Shft-M> - this is a macro for importing eDisk Memory data**

(*) eDisk*: an internal, permanent data storage for CE-3 chronograph. This is a tiny solid state disk, based on EEProm and it holds data without the use of battery power for up to 40 years (some chip manufacturers claim 100 years).*

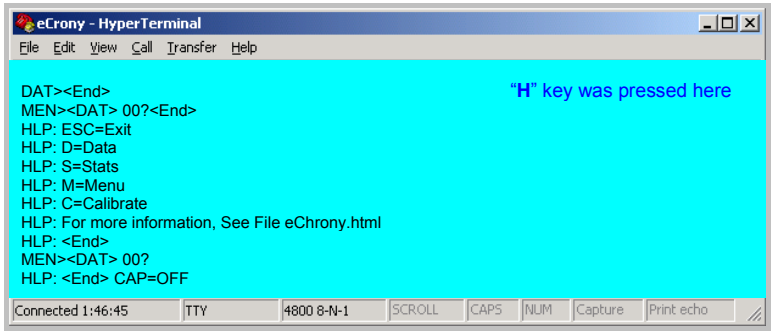
A15. Resident Quick Help

When "**H**" key is pressed, an abbreviated list of basic control keys is displayed. This information comes directly from CE-3 and it is independent of operating system of your computer. Because of memory constrains, CE-3 Version 1.01 does not send the list of all the available control keys - you have to refer to this manual for details.

Help within Data or Stats mode

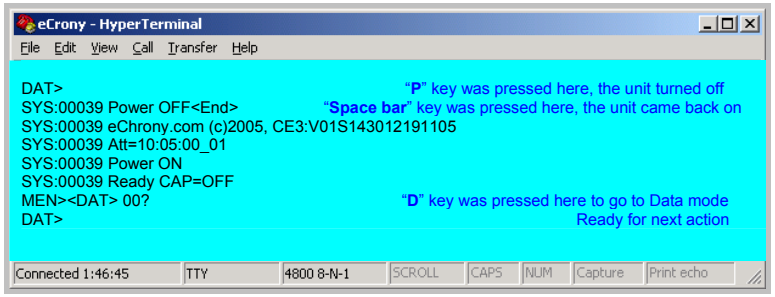


Help within Menu mode



A16 Turn Power Off-On

The unit has full remote control. Pressing "**P**" key turns the unit Off and pressing any other key turns the unit On. This turns power Off without saving data to eDisk. To save data to eDisk first use "**9**" command.



"How to Install CE-3 Software" - please refer to page 53

"How to Install Hardware" - please see page 54

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Important Notes

Sensitivity Control & Muzzle Blast

Sensitivity level may be reduced to lower the effect of muzzle blast and other noise. The range may be set from **00%** to **95%** in steps of **5%** for CE-3 and **1%** for CF-3. Lowering sensitivity reduces muzzle blast effect. Unfortunately, lowering sensitivity also reduces accuracy. For muzzle blast reduction, it is better to move the unit farther back rather than reducing sensitivity. For loud firearm use **50%**; Archery, Paintball and other quiet devices use **80%**. Higher values, **85%** and up, require low Electromagnetic & Optical interference, only found in the countryside.

Turning off sensors and alarms

Special function has been provided that turns off detection electronics to save battery power and stop environment alarms. The key sequence to do this is ***<MENU+UNITS>***. Use this feature when only data and statistics review are needed. To activate velocity measurement again, you **must** calibrate the unit. From CE mode, turn the unit **Off** and **On**. If you fail to calibrate it, the unit will **stop** detecting shots. To check whether sensors are turned Off, press ***<MENU>*** key which activates pending warning and alarms.

Change Battery without losing data

Turn the unit **Off** for about 5 seconds. While the unit is **Off** you must **not touch** any of the **keys**. The system will stay alive in hibernation, without battery at room temperature, from **4** to **20 minutes**. You have about **4** minutes to replace the **old** battery with a **new** one. If the battery is reversed, you do not lose data or damage the unit or the battery. The battery must still be replaced **correctly** within **4** minutes.

Flashing colon or flashing decimal points

Flashing colon or decimal points indicate that the unit will **no longer accept shots** because environment conditions have changed. You can turn sensors off and use the unit for data review only, or you can calibrate it again. Please note that the unit **will not accept shots** unless it is **calibrated** again.

Saving Data on eDisk is not necessary with PC

When **Power Down** command is executed with "**P**" key, CE-3 does not save data to eDisk when it is turned off. If you want to force data save before shutdown, then you must use "**9**" key command. Data saving is irrelevant when using PC because PC has a far better data storage capability. Please make sure that **HyperTerminal** is set to "**Transfer/Capture Text**"; it can log thousands of shots per session.

CE Mode does not use eDisk

CE-3 stores data in **volatile memory**; it means that data will be **lost** from it if the battery drops below **4.0 volts** or it **is removed**. Also, when you execute hardware reset with **<STATS+DATA+MENU>** keys, data may lose order **of sequence** and disappear; see Data Recovery below or refer to User's Manual on page 43. You can save your shots onto the eDisk from **CE mode** by pressing ***<MENU+POWER>*** key. This will force the unit to save current folder to eDisk, irrespective of the mode it is in. If you need to save your data on eDisk all the time, then you have to use **CF mode** where data saving operations are automatic. **CE mode** is intended for simple use, where all you need is some velocity measurements that do not have to be stored on eDisk. Because **CE mode** is not using eDisk, it prevents data clutter on it.

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Warning and Liabilities

Warning

Before you use this product, you must follow all safety instructions as recommended by manufacturer of your firing device, no matter what that device may be. Irrespective of who the manufacturer of your firing device may be, you alone are ultimately responsible for using correct safety precautions. You should not use this product to get combustion pressure for your firearm.

Liabilities

This product is a passive optical instrument. It does not emit any microwave radiation in order to measure projectile velocities.

It is your sole responsibility to safeguard yourself and other people against any injury or property damage when firing projectiles near the unit or accidentally into the unit. You must not use this product to determine firearm combustion pressure.

This product relies heavily on complex hardware, software and operating system. Because of its complexity, a finite probability exists that a software module or a hardware component may fail to function as intended. This failure may result in a loss or change of data which could produce erroneous velocity measurement. For example, a simple LCD-element failure may display number 8 as number 9 or 6. This product uses a low cost simple RS232 interface which may cause serious errors with some computers during data exchange between PC and CE-3. There are thousands of other possible failure modes; therefore, this product is not a fail-safe. If fail-safe velocity measurements are required, then this product must not be used without our written approval. Approval requests will be considered only if setup is based on "multi-chronograph-majority-vote design" and it must be accompanied by well documented failure analysis

We assume no responsibility for the injury to any person or persons whether be consequential or inconsequential as a result of using this product. We also assume no responsibility for the damage to any property or loss of profit as a result of using this product

This product and all its associated hardware and software design are ©Copyright property of eChrony inc.

If you do not agree with any of the above statements, you must immediately return this product in its original condition to the place of purchase for a full refund.

How to Install CE-3 Software

All the software below is available from the website
http://www.echrony.com

Media: CE-3 software comes on **CD** or a **3-1/2**" HD Floppy
3-1/2" floppy is the standard shipment. Visit **echrony.com** for downloads

Contents: We supply three files for Windows-95, Windows-98, Windows-2000, Windows-ME and Windows-XP. Our software also needs Windows programs listed below. The upgrade for HyperTerminal is available from Microsoft or from http://www.Hilgeave.com and is free of charge.

Required Microsoft Software

- **HyperTerminal** - must be upgraded to version 6.3 or higher
- **Microsoft Excel** - 2002 and Up
- **Microsoft Access** - optional data base use
- **Windows 95**, **98**, **2000**, **ME**, **XP**

CE-3 Software on the Disk

- **eChrony.exe** - a self extracting archive
- **INSTALL.EXE** - a simple installation file
- **README.TXT** - general text information

Files in the archive eChrony.exe

- **eChrony.ht** - normal Hyper Terminal script file
- **eChronyB.ht** - magnified view script file
- **eChrony.xls** - Excel sample import files with macros
- **eChronyH.htm** - help file in HTML format
- **eChronyH** - help file subdirectory

Printing Documents and Manual

eChrony.htm is a hyper text file and it does not print well. To get a printable version of all the manual and reference cards please visit **http://www.echrony.com**

Software Installation information

Insert supplied disk in drive A: and type **INSTALL**. This is a batch file that will perform the following task.

- Goes to drive **C:**
- Creates subdirectory **eChrony**
- Goes to created subdirectory eChrony and creates subdirectory **CE3**.
- Copies file eChrony.exe to subdirectory **CE3**
- Goes to subdirectory **CE3** and unzips all the files in **eChrony.exe**
- Deletes **eCHrony.exe** and exits

To access **eChrony** programs from Windows go to **C:\eChrony** subdirectory, point to **CE3** and click on it to create a shortcut. Move this shortcut to your **Desktop** for easy access. Whenever you click on **CE3** shortcut, all our programs will show up. To run any of them just click on the appropriate program: **eChrony.ht**, **eChronyBig.ht**, **eChrony.xls** or **eChrony.htm**

How to Install Hardware

Required hardware

CE-3 requires a free RS232 port on the PC. We only supply interface cable for DB9 connectors. If your PC has a DB25 connector, then you will need an adaptor to go from DB9 to DB25. DB25 is generally found on old equipment and we do not supply it.

Installing Hardware

Plug the mini stereo jack into the CE-3 on the right side. Plug the DB9 connector into the PC RS232 free port. If the RS232 port is not free when you run eChrony.ht, it will give you error messages that the port is not available or it is used by some other device. When these errors occur, you must find a free port and change HyperTerminal settings. Do the following

- Go to "**Call**" menu and click on "**Disconnect**"
- Go to "**File**" menu, select "**Properties**"
- Choose a different port in the "**Connected using**" list
- Make sure that the selected port is the one hooked up to CE-3
- Click "**Ok**"
- Go to "**Call**" menu, click on "Call" menu
- Check the connection by pressing **<DATA>** key on CE-3 unit
- Current string and velocity should be displayed.
- Now test PC remote control, type "**Q**" on the keyboard
- CE-3 system status should be displayed on the eChrony.ht window.

You are now ready to continue with your work.

If you have any problems with connection, get in touch with us at ce@echrony.com and we will try to resolve the problem as soon as possible.

If you are using older PC with DOS 4.0 and up, you will need some form of TTY terminal software.

If you are using MacIntosh or Linux, just use the resident TTY terminal software. At the moment we do not have any "TTY" software for these Operating Systems; you may have to solve communication problems yourself.

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Control CE-3 from your PC !

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CE–3 Main Features

- **2 Modes** of operation: simple **CE** mode and an advanced **CF** mode
  - **CE** mode is an easy to use **single-key** operation. It is fully automatic. Just turn the unit on and wait for Auto-Calibration to complete. When your work is done, turn the unit off and your data is saved automatically in the memory. This mode does not use eDisk for permanent data storage.
  - **CF** mode is **75+** functions, **menu** driven mode and it uses **eDisk**. This is an advanced mode with full control over the unit.
- Flip between **CE** & **CF** mode by pressing ***<MENU+ENTER>*** keys.
- **Sensitivity level** control increases accuracy whenever possible.
- **Adaptive Calibration** detects environment interference.
- **Super Archery** mode for very sharp arrows & very small objects.
- CE-3 has a **40 shot** volatile **memory** divided into **4** to **10 Strings.**
- CE-3 has a small **eDisk** drive for **400 shots**.
  eDisk holds data **without battery** for up to 40 years.
  eDisk is divided into 10 folders with 40 shots each.
- Data protection option, **eDisk On-Off**, available from **CAM** mode.
- In **CF mode**, data is automatically **Saved-Retrieved** to-from eDisk.
- **Remote Control** via PC Interface using plain **ASCII** readable text.
  Baud rates **300** to **4800** b/s, 3-wire cable, maximum **200** feet long.
  Operating System Independent Interface - RS232 **TTY** Terminal mode.
  Import data to any **Spreadsheet** or **Data base** with **ASCII** format.
  Macros provided for **Microsoft Excel** data import & some stats.
- **Elapsed time** between shots transmitted to the PC: **+/- 0.001** sec.
- **Download** data to PC; String, Folder or an entire eDisk.
- **Alarms** for low battery, missed or bad shots, memory full etc.
- Ambient **Temperature** is **recorded** with each shot.
- **Velocity** and **Temperature** are **synchronized** at all times.
- View **Statistics** in **Real time** as you shoot. **Available Stats** are Low, High, Average, Extreme spread, Standard Deviation, **Percent STD**, **Power Factor**, **Energy**.
- View **Cross String** Statistics by scrolling from string to string.
- Change **Units** on the fly from Stats or Data mode.
- Select **USA** or **METRIC** system with **One Time Conversion** view.
- **Bullet mass** entry, **0.005** to **40.950** gm or **0.077** to **631.95** grains
- **Power factor** in **grain-f/s** or **grams-m/s**, **Energy** in **joules**
- Scroll **up** and **down**, **Shot to Shot**, in Data or Stats mode.
- Scroll **lef**t and **right**, **String to String**, in Data or Stats mode.
- Scroll **forward** and **backward** from **Folder to Folder.**
- **Delete Shot** & *Undelete Shot.*
- **Delete String**, *Undelete String & Old Data restore.*
- **Delete Folder** & *Undelete Folder.*
- Auto **Power down**, select from **00:01** to **03:50 HH:MM** or **None.**
- Real time **Ambient Temperature** display in **Celsius** or **Fahrenheit**
- Real time **Battery Voltage** display for internal load conditions.
- For PC interface see **Remote Control Examples** below.

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DOX: T=0.50, I=0.17, G=0.70, B=0.30, O=0.17, Lft, Mrr, P=8.5+14, H=0.15, F=0.15
WAX: T=0.50, L=0.52, G=0.00, B=0.30, R=0.52, Lft, Nrm, H=0.15, F=0.15

CHRONOTAR

Address
Chronotar Micro
936 Monte Carlo Court, Suite #4
Mississauga, Ontario,
Canada, L5C-3M1

Telephone 416 223-7862

Fax 416 223-7862

E-mail
ce@chrony.com

Returning the unit

Before returning the unit, you must give us a call to obtain return Instructions *or visit our website and click on* Returns *menu. You can also contact us vial email at return@echrony.com.*

Technical support

If you have any problem with the unit, even a minor one, please let us know. You can either, call us, email a note to help@echrony.com, or contact us directly via our website. Just click on Contact Us *menu.*

Websites

http://www.echrony.com
or
http://www.chronotar.com

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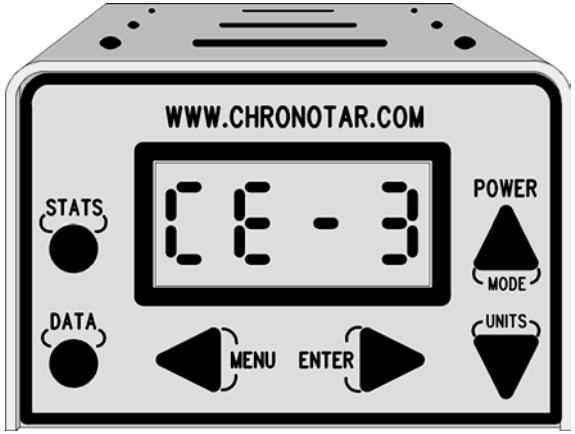
PC INTERFACE MANUAL

CE-3

CHRONOGRAPH

Version 1.01



Attention Microsoft Windows users!
You need to upgrade Windows HyperTerminal in order to access some Windows keys
The upgrade is free from
http://www.hilgraeve.com/htpe/download.html

How to Install CE-3 Software
see page 54

Printable manuals and software
are available from
http://www.echrony.com

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