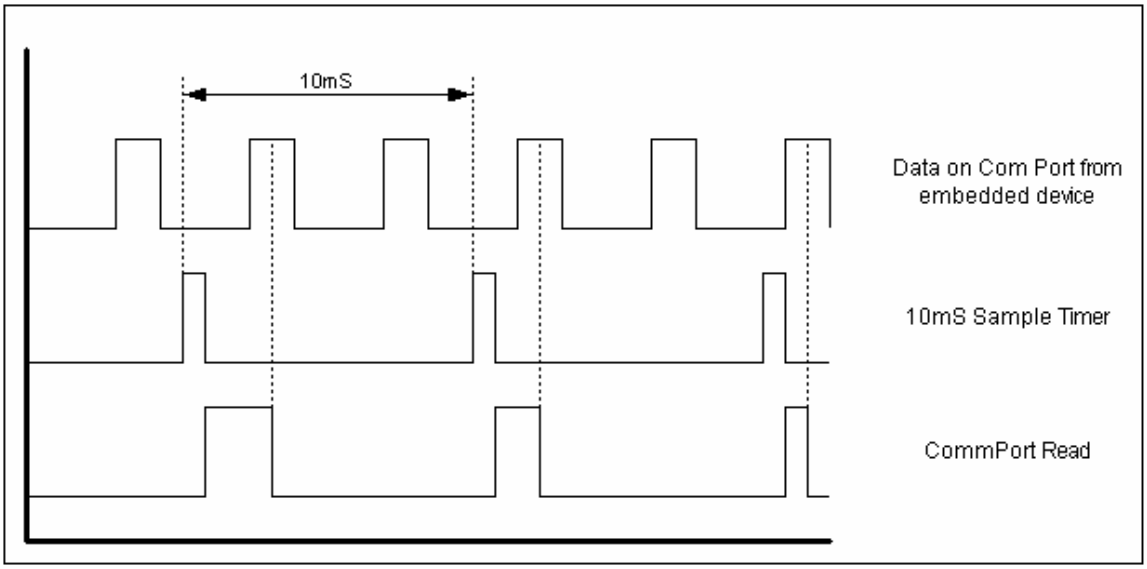
DataLogger II

Instruction and Operation Manuel

By 0x34

The DataLogger was originally written to log serial data from the serial communications port over a long period of time. Although the original embedded device (CF3) used with this software is classified, I've decided to publicly release the source code as it has many other uses.

The DataLogger reads the port at a 10mS rate. There is ***no signal out*** from the selected RS232 port signaling a device to send the next byte. An internal clock triggers at 10mS which tells the PC to read the next byte sent. The program expects the connected device to be sending data at a steady rate at or above one byte per 10mS (Minimum of 100 Hz).



Timing Example

The DataLogger II processes data in single byte increments. The serial communications port (RS232 Port) is read once every tenth millisecond (10mS Sample rate). The byte value is stored in an array and plotted graphically as a serial progression of time vs. data. The data values can be displayed in either HEX or Decimal.

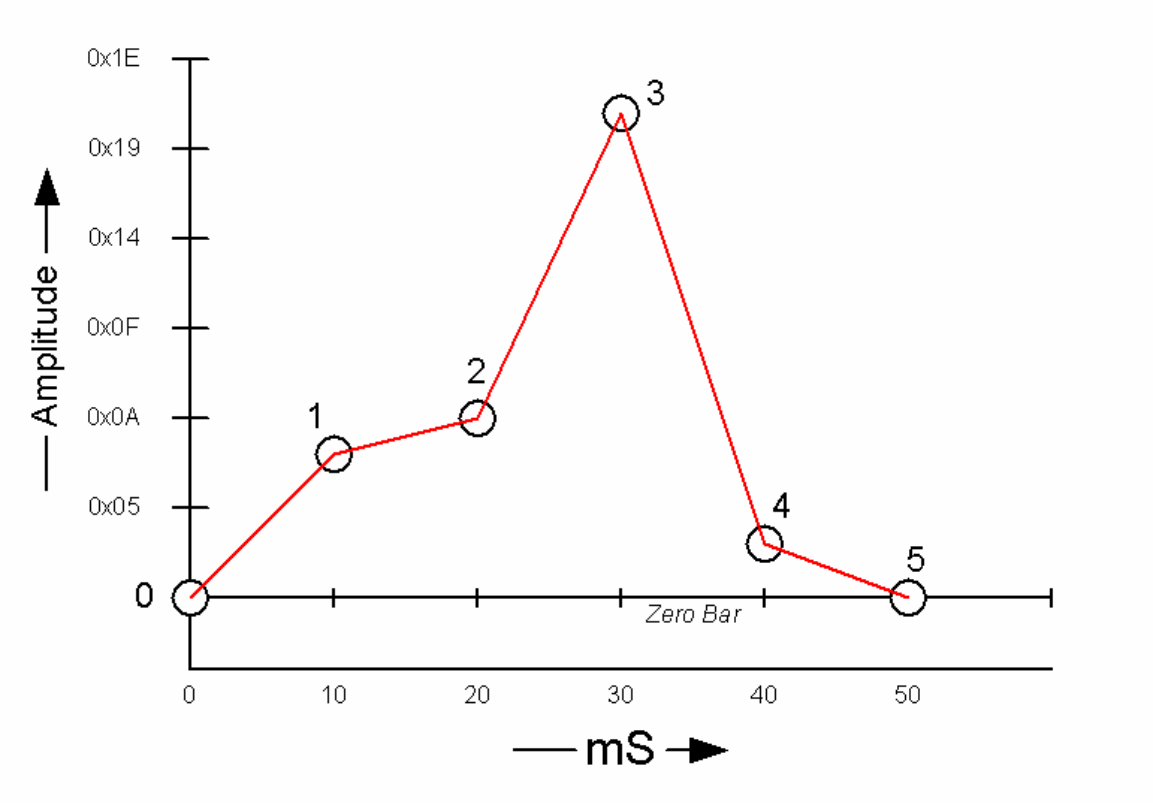
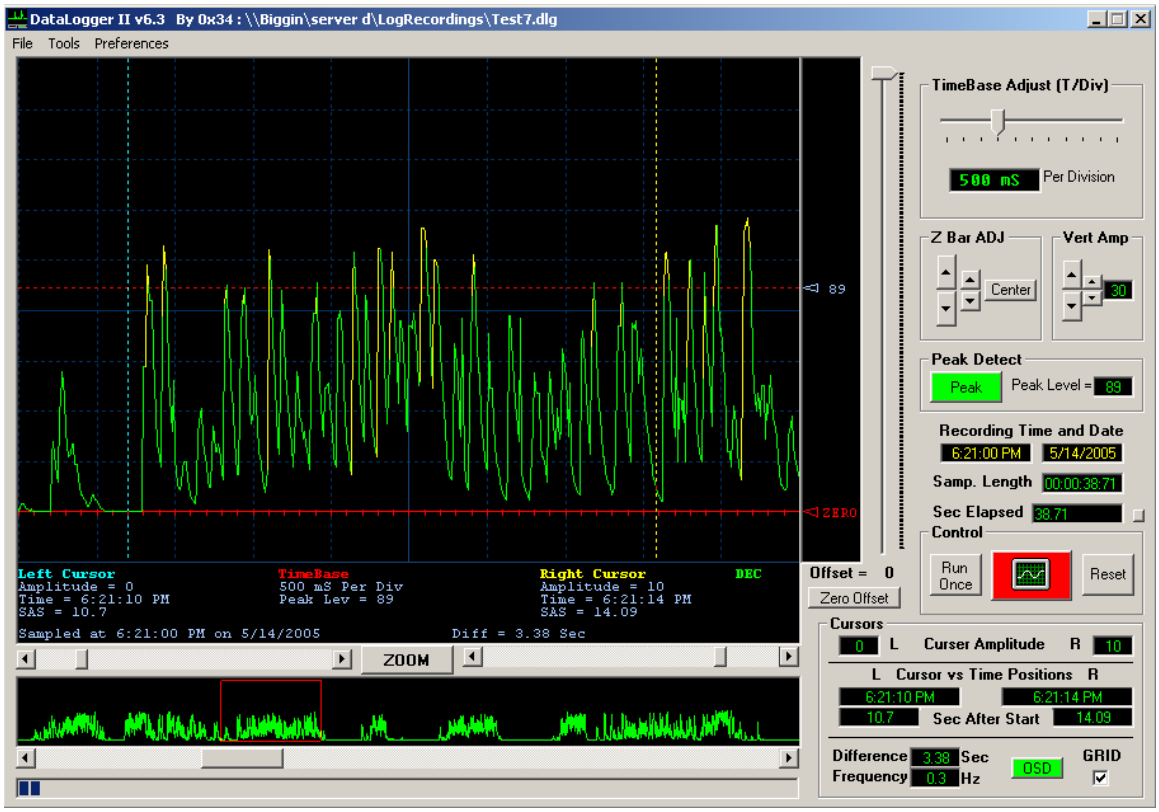


Figure #1. Graph process example.

Figure #1 is an example of a 50 mS sample. When the user starts the sample process, the main data array is empty. The first com cycle loads the incoming data byte into the data storage array (buffer), and then plots it on the screen. From that position, a line is drawn to the next incoming byte value position, and so on. This process continues until the sampling is stopped. In figure #1, the value at point #1 is 8 (0x08), point #2 is10 (0x0A), point #3 is 27 (0x1B), point #4 is 3 (0x03) and point #5 is 0. Each value is incremented at a 10mS step rate.

When reading the Com Port at a fixed rate, with a free running device sending at a different rate, a beat anomaly may occur.

User Interface



User Interface

The **DataLogger II** user interface was designed to function the same as a standard digital oscilloscope. The functions and controls are very similar to standardized industry test equipment.

Vert. Amp:

The vertical amplifier will adjust the vertical size of the sample in the main display window only. Since the amplitude of the sample will always range between 0 ~ 255 (0x00 ~ 0xFF), there was no need for grid synchronization. The horizontal grid lines are for reference only. There is no level per division for vertical amplitude associated to the grid.

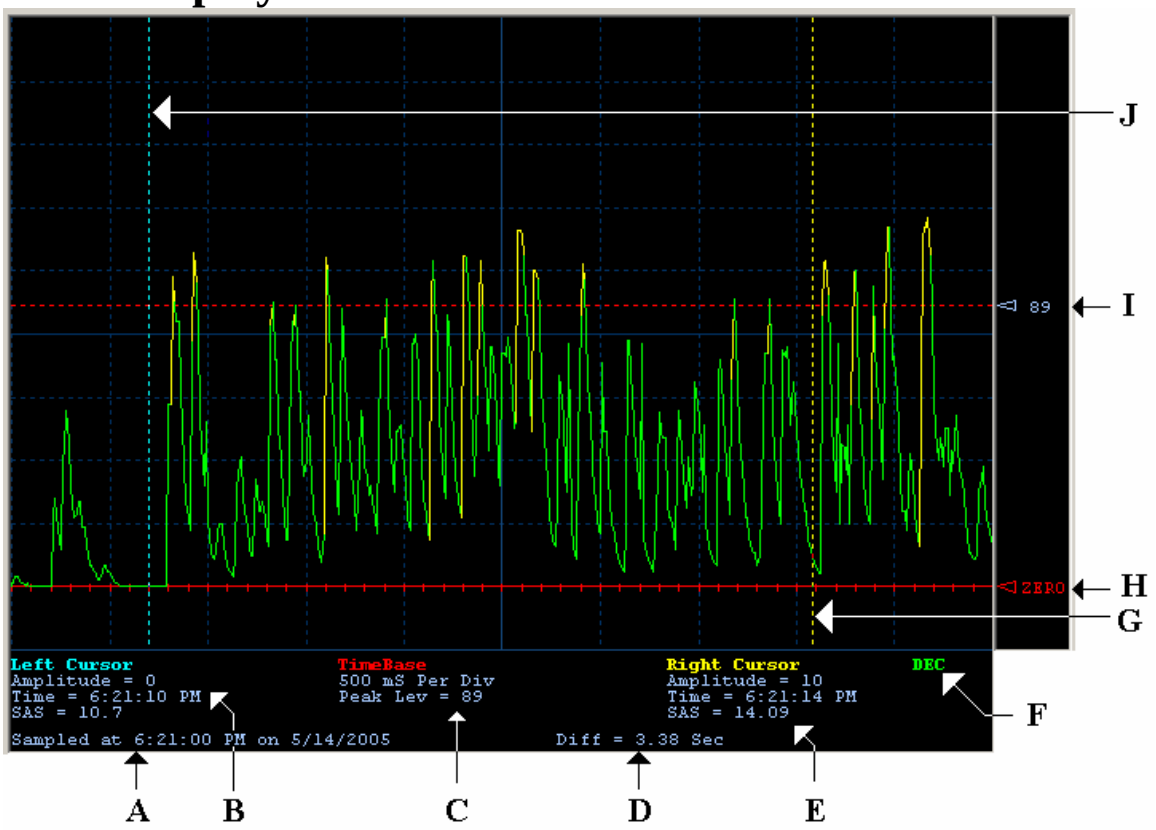
TimeBase Adjust (T/Div.):

The display time base works the same as any DSO. The grid is synchronized to the time base adjustment and will remain accurate across the scale. The display resolution is variable between 10mS to 30 minutes per vertical division. Cursor functions are not available above 30 sec per division.

Z Bar ADJ:

The Zero reference bar position can be adjusted using these controls.

Main Display Window:



A) Sample time and date. This is the date and time that the displayed sample was acquired. Whether is was just sampled or if it was loaded as a DLG file.

B) Left Curser Data. Displays the amplitude, position in time and seconds after the start of the sample (SAS) for the left cursor.

C) Time Base Settings. Displays the horizontal time per division and peak level value.

D) Difference between cursors. Displays the amount of time between the two cursors.

E) Right Curser Data. Displays the amplitude, position in time and seconds after the start of the sample (SAS) for the right cursor.

F) Data display type. DEC when values are in Decimal, HEX when in Hexadecimal. Selectable under the Preferences menu.

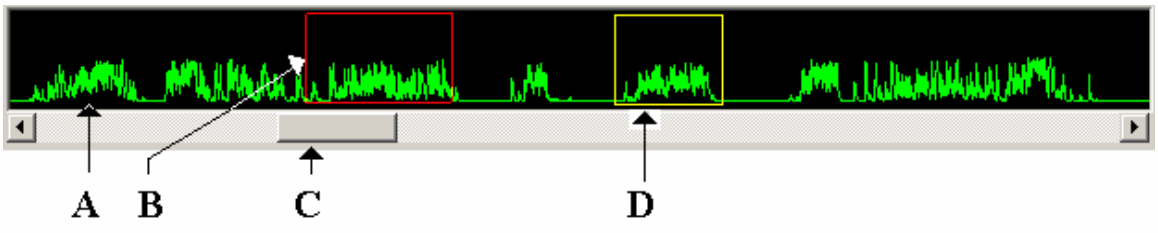
G) Right Cursor. Hold down the right mouse button and drag this cursor from side to side. For precise measurements, use the scroll bar to move the cursors.

H) Zero Bar Pointer. This is the absolute zero reference. Right click and drag in right window to adjust, or use Zero adjust controls.

I) Peak Bar Pointer. Peak bar setting. Displays value of peak setting. Left click and drag in right window to adjust, or use Peak adjust controls.

J) Left Cursor. Hold down the left mouse button and drag this cursor from side to side. For precise measurements, use the scroll bar to move the cursors.

Buffer View Window:



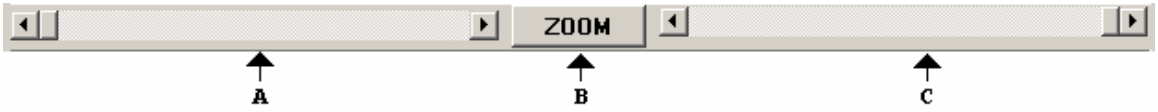
The Buffer View window is an interactive window, which will display the complete sample. During recording, it will display the recording time setting and mirror the sample in real time. The progress bar below the buffer view window indicates the fullness of the data buffer relative to the buffer size selected by the user prior to sampling (duration measured in time).

A) Mirrored sample. A graphical representation of the sample retained inside the data buffer.

B) Display box. This red box encompasses the portion of the buffer which is currently being displayed in the main display window. This can be adjusted (moved side to side) by clicking the left mouse button and dragging within the buffer-view window, or by moving the scroll bar (C). The size of this red box will vary depending upon the horizontal time base setting.

C) Position select scroll bar. Move left or right to select buffer range to display in main display window.

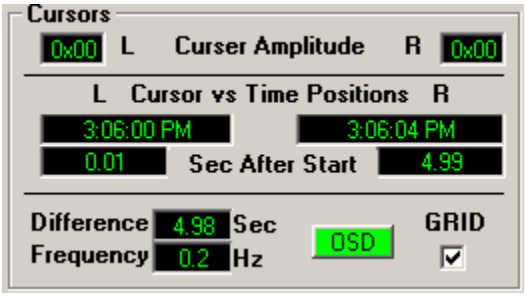
D) Quick-Zoom Box. Right click and drag in the Buffer-view window to select a portion of data to Quick-Zoom onto and display in the main display window. Grid time-base divisions are not guaranteed to remain accurate in zoom modes, however all other timing indicators will remain valid.



A) The left cursor adjustment scroll bar. Use this to move the cursor position when accuracy is imperative. This will produce the most accurate timing measurement.

B) ZOOM. When pressed, the main display window will zoom to the portion of the sample that is between the two cursors. Use this function to view fine details within a sample. Grid time-base divisions are not guaranteed to remain accurate in zoom modes, however all other timing indicators will remain valid.

C) The right cursor adjustment scroll bar. Use this to move the cursor position when accuracy is imperative. This will produce the most accurate timing measurement.



Cursor Data

Cursor data is displayed in this box.

Amplitude and **Time** are displayed for both cursors at the top of the box. The Time Position is relative to the actual time the sample was acquired.

Sec After Start displays the respective cursors position in time with respect to the beginning of the sample.

Difference displays the amount of time between the two cursor positions.

Frequency displays what the frequency would be based on the positions of the two cursors. ($1/ t_{dif}$)

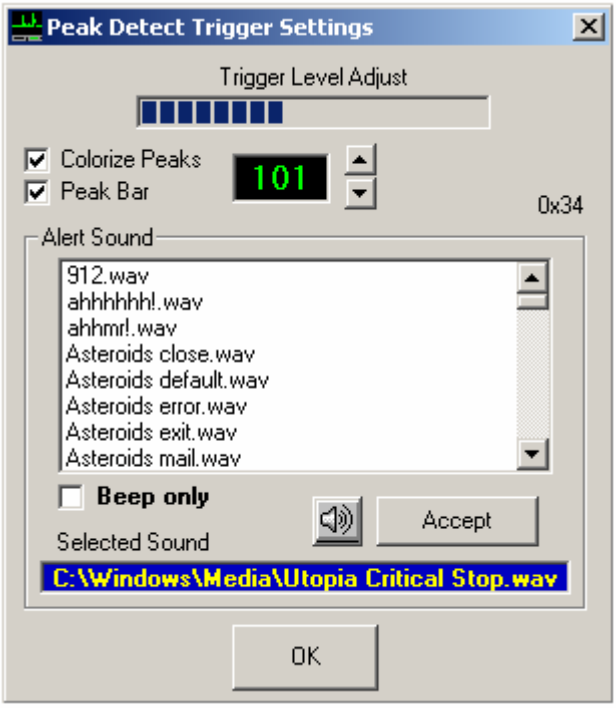
OSD. This button turns on/off the On Screen Display.

Grid. Allows the user to disable the Grid in the Main Display Window.

Peak Detector

The Peak Detector allows the user to set a value which will cause an event when reached. A left mouse button click on the Peak button toggles on/off the peak function. The peak button will glow green when active. The selected peak value is displayed in the box to the right.

Adjusting the peak value can be done 2 different ways. The user can click and drag the peak bar in the main display window, or open the Peak Adjust box. The box can be opened in the menu, or by right clicking the Peak button.



This control is very interactive. The peak value can be adjusted by using the Up/Down control, or by clicking on and dragging the progress bar.

Colorize Peaks: When selected, any value which is at or above the peak value will be drawn in the main display in a user specified color (refer to color adjustment).

Peak Bar: When selected, a horizontal bar will be drawn in the main view window representing the peak value.

Alert Sound: Use this to select the desired sound to be played whenever a sample value reaches or exceeds the peak value setting. To listen to a sound, click it twice in the list box, or highlight it and press the speaker icon. To move a sound into the selected sound box, highlight it and press the accept button. To listen to the current sound (selected sound), click on the selected sound box. If you want the computer to beep only, place a check in the beep only box.

The list box will load all and any .wav sounds located in the Windows Media folder on the C:\ drive (***C:\Windows\Media*.wav***).

If the Peak Detect function is turned off during a recording, the peak bar pointer will track the maximum amplitude received.

Control Panel:

Run Once: Record one screen. This will record one screen worth of data. The amount of data recorded depends upon the Time per Division setting.

RUN: (*The red button*) This causes the data logger to begin logging. It will continue to log data until either stopped by the user; stopped by the recording file size limiter or until the data buffer is full.

Reset: Resets the buffer. All data will be lost when the program is reset. A warning nag will appear only if "SAVE NAG" is checked in the menu.

If the buffer contains data, pressing any of these buttons will cause the save nag to appear. The user will have the option of either saving or discarding the data. If the nag is turned off, the buffer will be cleared with no warning. Any data in the buffer will be permanently lost when the software resets.

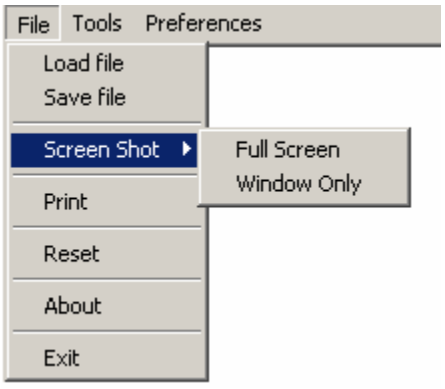
If you have an older; slower computer, it may have difficulty (be slow) displaying large buffer sizes of data.

OFFSET:

The vertical scroll bar along the right side of the main display widow allows the user to apply a negative offset to the displayed sample. The offset is referenced to the Zero Bar. The offset can range between 0 ~ -255 (0x00 ~ 0xFF). Changing the offset value does not affect the data contained in the buffer or displayed by the cursors. Only the displayed graphical representation of the data in the main display window is altered.

MENUS:

File:



Load: The user can load a saved sample using a standard windows file load dialog. DataLogger II stores files with ".dlg" extensions. This is a custom file format used solely with the DataLogger.

Save: The user can save a sample as a ".dlg" DataLogger II data file using a standard windows file save dialog.

Screen Shot: The user can save either a full screen (full user interface) or main display window picture at any time. The file will be saved in .bmp format using a standard windows file save dialog.

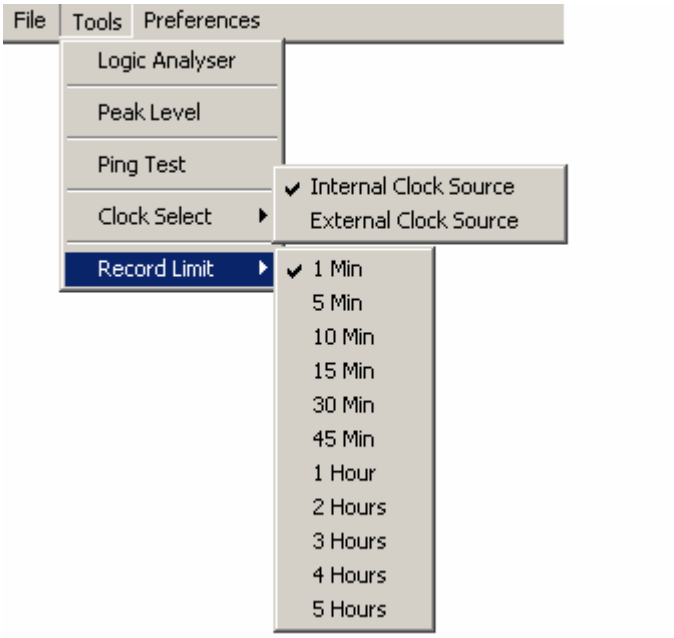
Print: This will cause the default printer to print a landscape image of the main display window. The print will contain all of the on screen data. There is no printer selection screen; therefore the user must be certain that the default printer is ready before printing.

Reset: Resets the data buffer.

About: Displays the about splash screen.

Exit: Exits the program.

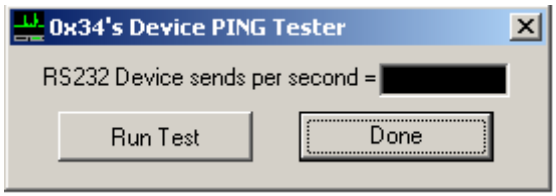
Tools:



Logic Analyzer: Project in the works – (*not completed, and I know its spelled wrong*)

Peak Level: Opens the Peak Detector adjustment window.

Ping Test:



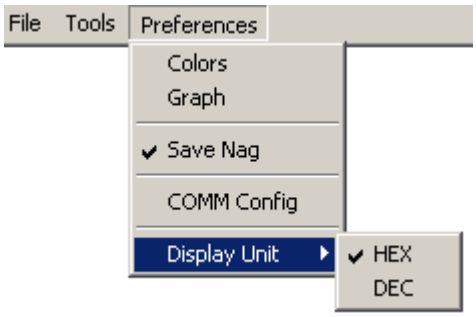
The Ping Tester was developed to determine the free-running data send rate of a device connected to the PC's com port. Running the test will count the average amount of sends per second. This is valuable for determining timing values when running the DataLogger in external clock mode.

Clock Select:

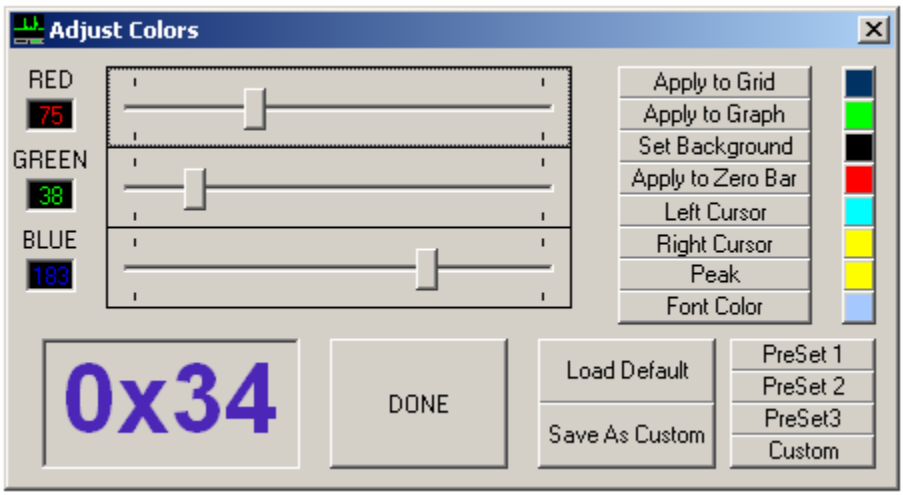
Internal Clock – Sampling will occur based on the timing of an internal 10mS clock source.
External Clock – Sampling will be based on the external device's data send rate.

Record Limit: Selects the maximum buffer sample range in time.

Preferences:



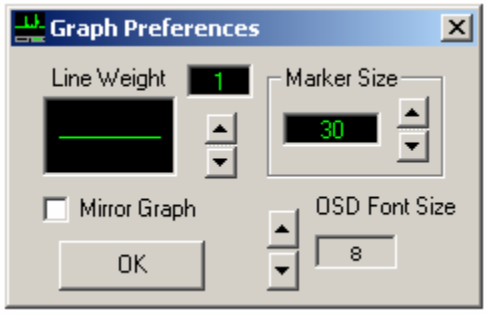
Colors:



This tool allows the user to alter any of the system colors within the program. A custom color configuration can be saved and recalled later. There are 4 preset configurations (Default and presets #1, 2 & 3).

Adjust the three color sliders until you've acquired the color that you want. Then apply the color to a function by pressing one of the "Apply to" buttons to the right of the color sliders. Repeat this for each component. Once you've set the colors where you prefer them, you can save the color profile by pressing "Save As Custom." You can recall that profile the next time you run the program by pressing "Custom."

Graph:

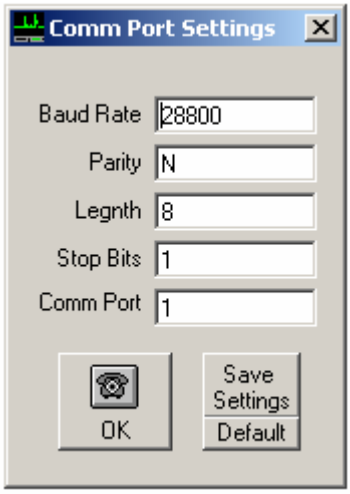


Line Weight allows the user to adjust the thickness of the graph.
Marker Size adjusts the size of the markers on the Zero Bar.
OSD Font Size adjusts the size of the On Screen Fonts.
Mirror Graph creates a duplicate negative graph inverted below the zero bar.

Save Nag:

When checked, a nag dialog will appear any time the buffer contents are about to be cleared. The nag will not appear if the buffer has already been saved or if the data was loaded from a file.

COMM Config:



The Communications Port configuration tool allows the user to configure the program to match the device hooked to a RS232 Serial Port.

Display Unit:

Sets the data type displayed in all aspects of the program. The user can choose between Decimal numbers (DEC) or Hexadecimal numbers (HEX).

File Types:

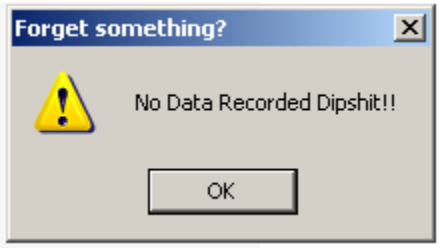
The DataLogger saves all data files (samples) with the extension ".dlg". The "Load File" dialogue defaults to filter only this file type, however it can also be set to All Files.

When the program is run for the first time, it creates three configuration files:

DLogC.cfg – Custom Color save file.
DLogCM.cfg – Com Port settings.
DLogSnd.cfg – Peak Sound settings.

These configuration files will be placed in the same location that the main program is executed.

Stuff:



After I decided to publicly release the DataLogger II, I figured I'd better clean-up some of the language. I cleaned up most everything; however I decided to leave in a little. I apologize if anyone is offended, but I think it helps humanize things.

This program was written by **Ken Slater** (aka 0x34). The source code (VB6) has been posted at PlanetSourceCode.com. It is open source and you may use and modify it as you need.

The addition of a Logic Analyzer is in the works. However the embedded device will require synchronization with the software. I intend to post a schematic and firmware (PIC) for the device with the completed project. - *Coming soon!*

I've had several people inquire about getting my permission to commercially sell the program with a device of their own design. If this is your intention, please contact me first.

If you like this program and find it useful to you, and you feel guilty for using it free of charge (*can't sleep at night, etc.…*), let yourself feel better by sending a monetary donation to:

Ken Slater
215 West Elm Street
Lodi Ca.
95240

If you need or just want to contact me:
Lpd52@sbcglobal.net
Any time!

Enjoy!

Happy Coding