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Companion Software

1 COMPANION SOFTWARE

1.1 Overview

The Companion Software is a software package that runs under the Microsoft Windows 3.1 or Windows 95 Operating Systems and enables the user to

- Read and analyze data files recorded on the recorder in graphical or tabular format.
- Export files to spreadsheets such as Excel™ and Quattro™
- Download files from remote recorders via RS232 and modem.
- Fully configure units at remote locations .
- Examine files from different locations and dates to trend data.
- Search data for specific events

The software can read Point (data) files. It can display the data (points) graphically and in tabular format. Multiple points can be shown in one graph. Data can also be exported in formats usable by spreadsheet programs, etc. It can also display Information and Report windows. Graph, Table, Information and Report windows can be printed.

The data produced by the recorder are in a proprietary format and must be read with our software.

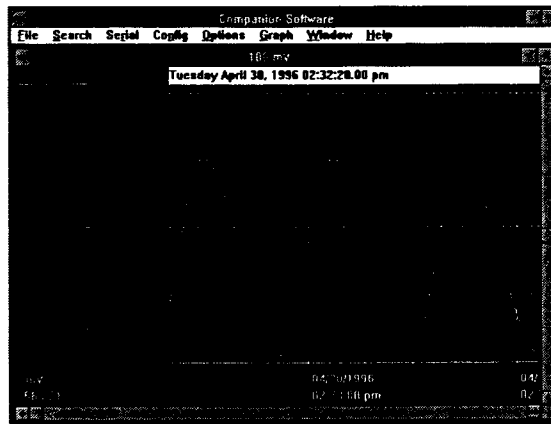


Figure 1 Companion Software

Companion Software

2 Installation

2.1 Windows 3.1 and Windows 95

Place the supplied 3½" disk into your floppy drive. Use the Windows Program Manager to select the File/Run menu item or in Windows 95 select Start/Run. Type in A:\SETUP or B:\SETUP depending on which drive you inserted the floppy disk into. Press the OK button. This will run the setup program which will automatically install your software. You will be asked to enter the destination drive and directory where you wish to have the software installed as shown below. If you do not wish to accept the default, type in the destination you want and press enter or click the "OK" button. Follow the instructions.

To run the program click on the icon in the program manager or use the Start button.

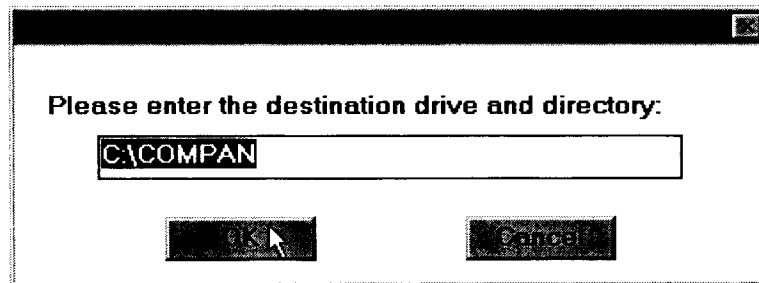


Figure 2 Installation Destination

3 The Menu

3.1 Using the Menu

The menu displays the primary selections available and each selection controls a specific portion of the program. Search, for example, has a sub menu that controls all the functions having to do with searching data. Some of the choices in a sub menu may in turn have a second level of sub menu, or may pop up a dialog box that enables data to be entered, or a selection to be made.



Figure 3 Menu Bar

The simplest method of accessing the menu is with the mouse. Simply position the mouse pointer on the menu selection required and press the left mouse button. Alternatively you can use the keyboard by pressing and holding the 'Alt' key and then pressing the highlighted (underlined) letter of the top menu option. To make selections from the sub

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menus, just type in the underlined letter of the desired selection. A third method is to press and release the 'Alt' key. Now use the arrow keys to move around through the menus.

The menu items are as follows:

3.2 File

The File menu has the following sub menu options:

3.2.1 Use Disk / Use Card Reader / Use Recorder

These mutually exclusive selections determine the source for file transactions. "Use Disk" will get files from the disk. "Use Card Reader" will get files from the card reader. "Use Recorder" will get files from a remote recorder over the RS232 serial port. The serial port needs to be set up correctly for this option to work.

3.2.2 Open

Will bring up a file dialog box. Enter one or more filenames of the point file(s) to be graphed. This will create a new graph window with the selected point(s) in it.

3.2.3 Transfer

This enables the user to transfer files from a source to a destination. It's primary intent is to copy files from a remote recorder or card reader onto a local disk drive to facilitate browsing.

if "Using" a disk:

The user will be presented with a file dialog box to select a file to transfer from the old files with extensions: DCI and DCF to the new format with the DT1, DT2, etc, extensions. The rest is the same as for a card.

if "Using" a Card Reader or Recorder:

This will transfer data file(s) from the card reader or recorder to a disk. A dialog box will allow the user to select the recording(s) to be transferred. The next a dialog box gets the filename for channel A's data. Another dialog box will get the filename for Channel B's data.

3.2.4 Erase

When "Using" a disk:

Will bring up a file dialog box. Enter the name of a file to be erased.

When "Using" a Card Reader:

On a card reader it will delete the last file on the card.

3.2.5 Hex Dump

This shows up to the first 1000 bytes of a card or file in hexadecimal format in a window and is for diagnostic purposes only.

3.2.6 Export

This feature creates a file that can be read by other programs such as spreadsheets. Files are exported in comma separated variables format (CSV). You must have a file loaded and the window active in order to export the file.

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3.2.6.1 Exported File Format - Graphs

Graph data may be exported in various formats.

Graph Data - The graph window must be active. Select the "File - Export" option. The export dialog window will be presented as shown below.

The export dialog box allows the user to select the start and end times, the format for the time and date, and optionally break up into smaller files based on a time interval.

The data is stored in engineering units as setup on the recorder, i.e. degrees C, Volts, pressure, etc. These are the same values and range that you see on the axis of the graph. Temperature, for example, is exported in actual degrees.

3.2.6.2 Export Dialog Box

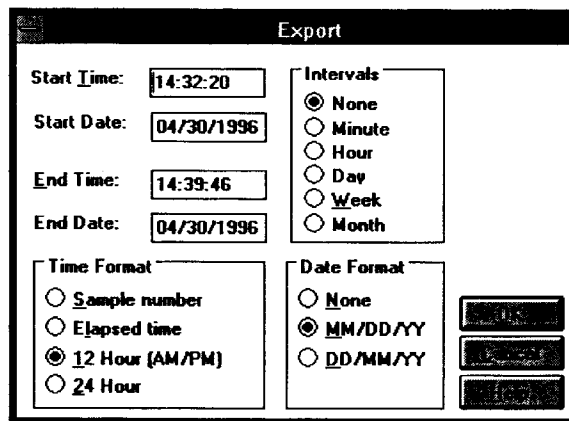


Figure 4 Export Dialog Box

3.2.6.2.1 Start Date and Time

Select the time to start exporting data, thus allowing part of the file to be exported.

3.2.6.2.2 End Date and Time

Select the time to stop exporting data.

3.2.6.2.3 Time Format

Select the time format either as sample number, where each value output will be numbered, elapsed time, where the first sample is time 0:00:00 and each sample is then time incremented, or select an absolute time format, 12 or 24 hour.

3.2.6.2.4 Date Format

Select either month day MM/DD/YYYY (American), or day month representation DD/MM/YYYY (European) or None to suppress the date.

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3.2.6.2.5 Intervals

The Intervals option allows the user to export "Blocks" of data rather than the whole file which may be too large for certain spreadsheets. The block may be selected as intervals of one minute, one hour, one day, one week or one month. An interval of none exports the entire file. Select the option you want.

Once the export options have been selected click on the OK button or press [ENTER]. A dialog box will appear to select or enter the name and location of the export file. When a filename has been selected, click OK and the data will be exported into that file.

3.2.7 Print

In order to print a graph, table or event, the window must be active. To print, select File/Print from the menu. This will bring up a dialog box that allows you to select print options. The printout will go to the default system printer. To change the default printer, use the Window's control panel to set the printer you wish to use as the default.

The print options are as follows:

3.2.7.1 Start From

File Start - will cause the printout to start printing from the start of the file.

Current Position - will cause the printout to start from the left edge of the current graph or top edge of other windows.

3.2.7.2 Keep Going

Until End of File - will cause the printout to continue until the end of the file.

for Pages - will cause the printer to print the number of pages in the edit box that is to the right of the radio button.

3.2.7.3 Setup

This button will bring up the dialog box for the default printer. This is where paper orientation, resolution, etc. can be set.

Press the "Print" button to start the printer or Cancel to exit.

3.2.8 Card Status

Status brings up a window telling you whether or not a card is present, the size of the card, if the card is write protected and if the battery is okay or bad. It is not updated on a regular basis, so if you want to see the new status of the card, you must close the window and open it up again.

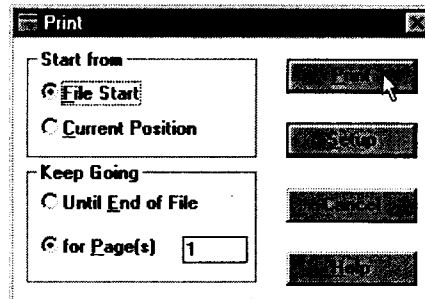


Figure 5 Print Dialog Box

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3.2.9 Test Card

Test Card is used to test the card. Selecting this option will write a pattern to the card, thus *erasing all the data* that is on a card, so you are given an option to cancel this out before any damage is done. It will then tell you whether or not the card is good or bad. If the card passed the test, it will automatically erase the card. If it failed the test, it will leave the test pattern AA 55 69 repeated throughout the card.

3.2.10 Erase Card

Erase Card will *erase the whole card* and again, you will be allowed to cancel out because if you do select this option, you will lose all your data.

3.3 Search

The Search menu allows the user to locate specific events in the open window. The following menu options are available. Note - First Setup the Find parameters.

3.3.1 Go to time

Enter in the Time (24 hour format) and Date to go to. Type in all four digits for the year. All windows that match the group number will move to the selected time. A group number of zero will update all open windows.

3.3.2 Find

Find the next data point that matches the search criteria. Can also be activated by pressing the "F2" key.

3.3.3 Search Setup

Select the pen, value, and directions for searching. Can also be activated by pressing the "Alt+F2" key. This brings up the Search setup dialog box shown in Figure 6 below.

3.3.3.1 Sense

Select whether the data must be "Greater than", "Less than" or "Equal to" the selected "Value" to be considered a match.

3.3.3.2 Pen

Select which trace or pen the search will be performed on.

3.3.3.3 Direction

Determines if the search will go "Forward" or "Backward" from the current position.

3.3.3.4 Event Hopping

If this box is checked, the search criteria must be false first then come true again before the next search stops. This prevents the

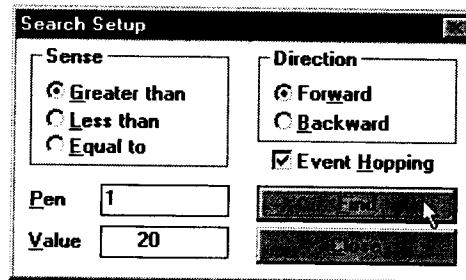


Figure 6 Search Setup

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search finding every point above a value on a sine wave for example, but it will find each crossing of the compare point.

3.3.3.5 Value

Enter the actual compare value in the same engineering units as the pen being searched.

3.3.3.6 Find

The "Find" button will cause a search to occur immediately.

3.3.3.7 Close

The "Close" button will just close the dialog box.

3.4 Serial

This menu option enables data to be read from the recorder using an RS-232 interface. It also allows the user to dial up a remote recorder using a modem rather than using a direct connection. The recorder requires the RS232 hardware option. Before using these menu items ensure that the serial port has been set up correctly in the "Options - Com ports" menu (Section 3.6.2 on page 13) .

3.4.1 Set Clock

Set Clock will set the Recorder clock to the current system time and date of your computer. The computer time may be altered by using the Window's control panel or from the DOS prompt using the DOS TIME and DATE commands.

3.4.2 Record Mode

Record Mode will bring up a dialog box allowing the user to either start or stop the recording on the Recorder.

3.4.3 View Status

View Status will allow the user to view the current status of the Recorder. The status is static but is updated each time this option is selected.

3.4.4 Dial Modem

This option allows communications to be established to a remote recorder and modem. It uses the internal (or external) PC modem. Use the "Option - Com Port" menu to select the PC modem. The modem at the recorder end as well as the recorder must be set up correctly. The baud rate must be set as the software disables the auto baud rate detect. The modem setup string at the PC end is in the Companion "Compan.ini" file. It is set for standard Hayes compatible modems and should not require editing. Note: compression and error correction are disabled.

The options are:

3.4.4.1 Phone Number

Enter the phone number to be dialed. Include all digits. To enter a pause between digits use the ~ (Tilde). To have the modem pulse dial, precede the number with a P. The modem will ignore (,) and -.

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3.4.4.2 Command

This is NOT the modem initialization string and should be left blank if not used. It is a string of characters that will be sent to the remote site once modem connection has been made. It can be used to command remote switching systems to select a particular channel.

3.4.4.3 Timeout

This is an additional time out to allow connection to a remote site. If you get a modem time out error you can add from 1 to 99 seconds additional time out here. Default is 0.

To dial, click on "OK". A pop up box will show "Modem Dialing". Once connection is made the display will show "Modem Connected". Click on "OK" and then proceed with remote communications as though the modem were not there. If connection is not made or the remote site does not answer, the display will show "Modem not connected". Check the phone number and com port setup and try again.

3.4.5 Hang up Modem

Once communication is completed, select Hang up modem to terminate the connection. The connection will automatically be terminated, and the modem will be reset, when you exit the program.

3.5 Config

The Config Menu refers to Recorder configuration. There are many options that can be set on the recorder, usually via the front panel keypad. If you have an RS232 option on the recorder, you can set these configurations from this Menu option. Alternatively you can save a configuration file onto a memory card (only one per card) and then load this file into the recorder and automatically configure it this way. This is a lot quicker than front panel settings and you can keep numerous Config files on disk and call them up as needed.

Most of the Config menu options affect a *local copy* of the configuration information. When changing a configuration in the Recorder over serial lines, it is usually best to load the current configuration from the recorder. Now the local copy of the configuration information is the same as what is in the Recorder. Any changes are then made locally and the configuration is then sent back down to the recorder where it is immediately written into the non-volatile memory.

PROCEED WITH CAUTION - THESE OPTIONS WILL AFFECT THE OPERATION OF THE RECORDER. ENSURE THAT THE RECORDER SETTINGS MATCH THE SERIAL PORT SETUP IN THE OPTION/COM PORT MENU.

For more detail about the recorder configuration, refer to The Recorder User's manual. The menu options are as follows:

3.5.1 Open

Read a previously saved configuration file from the disk or a card. It will immediately read a config file off a card reader or the card in a recorder. If the disk is the selected device, it will ask for a filename using the standard windows load file dialog box.

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3.5.2 Save

Save the configuration information to a card or disk file. Configuration files may be saved to card for later upload at remote recorders. If the disk is the selected device, it will ask for a filename using the standard windows load file dialog box.

3.5.3 Load from Recorder

If a password is set, the user must enter it before continuing. Next it will retrieve the current config information from the recorder. (Not from the card in the recorder. To do that, use the Open command above.)

THE CONFIGURATION SHOULD BE LOADED BEFORE ANY EDITING TAKES PLACE TO ENSURE YOU ARE WORKING WITH CURRENT RECORDER DATA.

3.5.4 Send to Recorder

If a password is set, the user must enter it before continuing. This will allow the user to send the configuration to the recorder from the PC. This configuration will be automatically written into the non-volatile memory of the Recorder. Then the recorder will reset and start operating using the new configuration. (This does NOT write the configuration to the card in the recorder. To do that, use the Save command above.)

THIS PROCEDURE NEEDS TO BE EXECUTED BEFORE ANY EDITED DATA WILL BECOME EFFECTIVE IN THE RECORDER.

3.5.5 Display

Select how the graph on the display will appear. Set the zoom factor to 1, 2, or 4. Set the number of pixels the chart is offset. Lastly one can select to have each dot on the graph joined together to form lines or not. If using join dots, one can have the last dot on a line turned on or not. This only subtly changes the appearance of the graph.

3.5.6 Sample Rate

Select the normal sample rate for the recorder here from 100 samples per second to 600 seconds per sample.

3.5.7 Clock

The Time may be shown as elapsed time from the start of recording or as time of day at the bottom right of the recorder's display. The time may be updated every minute, second, or tenth of a second.

3.5.8 Time Stamp

The time stamps of the graph may be on the top, in the middle, or on the bottom. They may also be left off entirely, show only the time, or both time and date.

3.5.9 Channel A and Channel B

For each channel, one may set the following options:

3.5.9.1 Sampling

Sampling is a method whereby the recorder takes more readings than it actually stores. The sampling or data acquisition rate is always at the maximum 100 samples per second, whereas the actual rate which data is stored in the Memory

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Card is determined by the "Sampling Rate" set by the user. This leaves more samples taken than stored.

For example, if the Sample Rate is set a 1 second/sample there will be 100 samples for every sample stored. If the Sample Rate is set at 10 minutes/sample there are 60,000 samples for every one stored on the card. These "extra" samples are dealt with in one of four ways.

3.5.9.1.1 None

The additional samples are discarded and the recorder stores only the reading taken at the selected Sample rate.

3.5.9.1.2 Average

All samples taken between the user defined sample rate are summed together then divided by the total number of samples. this is true averaging. The number of samples in the average is a function of the user selected sample rate. this acts as a smoothing filter on noisy signals.

3.5.9.1.3 Peak

The peak value measured during the sampling period is retained and stored at the user defined sample rate. Each sample is compared with the previous to determine the peak or maximum reading.

3.5.9.1.4 Valley

As for peak, but the recorder looks for valley or minimum readings.

3.5.9.2 Input Type

Select the type of input module that is plugged into the recorder. For all linear modules, select Analog.

3.5.9.3 Low Units

This is the engineering units shown when the input signal is "zero". The number of decimal places here determines the number of decimal places the recorder will use for engineering units for this channel.

3.5.9.4 High Units

This is the engineering units shown when the input signal is "full scale".

3.5.9.5 Units Label

This is the three character engineering units label shown for this channel on the recorder.

3.5.10 Alarms 1 - 4

For each alarm, select the following:

Which **channel** controls the alarm.

Is the alarm true if the sample is **higher** or **lower** than the **setpoint**.

Is the alarm **enabled**.

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If **lockout** is selected, the alarm condition must be untrue then true before the alarm will trigger.

If **latching** is selected, the alarm will remain triggered until it is manually reset. Otherwise the alarm will reset on its own once it goes below the **setpoint - deadband** for more than **reset delay** seconds in the case of a high alarm.

Note: Changing the the selected channel, etc can effect other *setpoint* and *deadband* values in this dialog box. As such they will automatically change to the closest valid value whenever the user tabs or clicks on another control in the dialog box or closes the dialog box.

3.5.11 External

An external digital signal can be used to trigger a relay. It is just like an alarm except there is no setpoint and deadband to set.

3.5.12 Relay-1 and Relay-2

For each relay, set which alarms 1-4 and/or external signal will control whether the relay is activated or not. If any of the selected sources are true, the relay will be activated.

3.5.13 Miscellaneous

3.5.13.1 Record Mode

The recorder can be in one of three record states: on, off, or triggered. If the recorder is in triggered mode, it will be recording if any selected Record Trigger sources are true.

3.5.13.2 Beeper

Turn the beeper on or off.

3.5.13.3 Filename

Select the filename used the label recordings on the memory card.

3.5.13.4 Menu Timeout

Select the amount of time with not keypad activity before the menu closes automatically and the backlight shuts off.

3.5.13.5 Password

Type in the password used to protect the advanced menu of the recorder.

When editing the Recorder password use:

- | | |
|-----------------------|-----|
| 1 for the left arrow | (⇐) |
| 2 for the right arrow | (⇒) |
| 4 for the up arrow | (↑) |
| 5 for the down arrow | (↓) |

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3.5.14 Record Trigger

If the recorder is in triggered mode, it will be recording if any selected Record Trigger sources are true.

3.5.15 Sample Rate Trigger

The recorder will use the Alternate Sample Rate as its sample rate whenever any of these selected sources are true.

3.5.16 Alternate Sample Rate

The recorder will use this Alternate Sample Rate as its sample rate whenever any of the selected Sample Rate Trigger sources are true.

3.6 Options

3.6.1 Display

Controls how data is shown in the windows on the screen.

3.6.1.1 Time Stamp

Select whether time is shown in 12 hour or 24 hour format.

3.6.1.2 Date Format

Select whether dates are shown in month/day/year MM/DD/YYYY or day/month/year DD/MM/YYYY format.

This affects how time and date is shown throughout the program. Time and date formats for Graph and Table window Exports are defined in the Export dialog box.

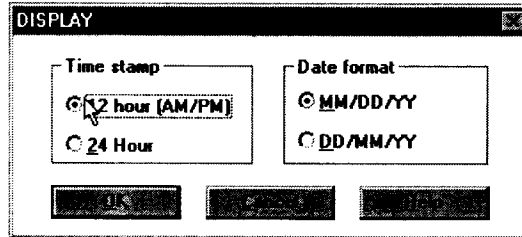


Figure 13 Display Dialog Box

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3.6.2 Com ports

Set up the serial port for communication with the card reader and recorder. The left side of the dialog box sets the com port and baud rate for the card reader. The right side sets the com port for the recorder. The recorder always uses a 9600 baud rate.

3.6.3 Set Password

This sets the password to prevent unauthorized access to change recorder settings or write to recorder's memory card over the serial port. Specifically, Erase card, Test card, Record mode, Set clock, Send Config to Recorder are protected.

If a password already exists, type it in. Now you can change the password. Type in the new password and repeat it to ensure you typed it correctly. To create "no password", type a password that has no characters in it.

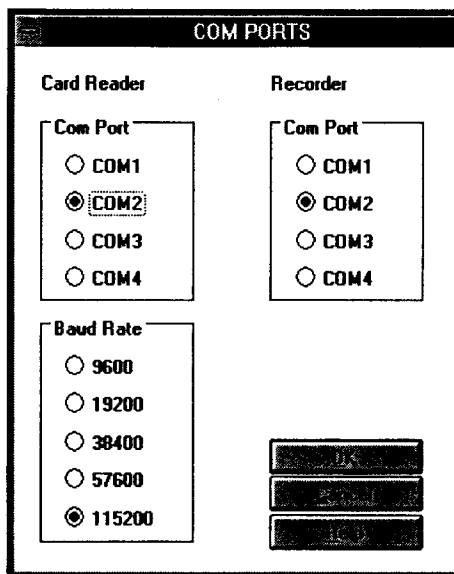
The image shows a dialog box titled "COM PORTS". It is divided into two main sections: "Card Reader" on the left and "Recorder" on the right. Under "Card Reader", there is a "Com Port" section with radio buttons for COM1, COM2 (selected), COM3, and COM4. Below that is a "Baud Rate" section with radio buttons for 9600, 19200, 38400, 57600, and 115200 (selected). Under "Recorder", there is a "Com Port" section with radio buttons for COM1, COM2 (selected), COM3, and COM4. At the bottom right of the dialog box, there are three stacked rectangular buttons labeled "OK", "Cancel", and "Help".

Figure 14 Comm Ports Dialog Box

3.7 Graph

This is only shown if a graph is the currently selected window.

3.7.1 Raw Graph

This sets many of the graph attributes to their default values.

3.7.2 Cursor Toggle

This turns the cursor on or off. (Also the T key). The cursor appears as a vertical line on the graphic screen and is used to identify individual samples. The cursor has a readout associated with it. By default the readout of amplitude and time / date is that of the extreme left hand sample (against the vertical axis). The cursor may be dragged with the mouse or moved with the left and right arrow (←,→) keys. The readout always refers to the samples directly beneath the cursor.

3.7.3 Zoom In

Zoom in will amplify the vertical axis by a factor of 2 each time it is pressed. It also may be activated by using the "+" button on the numeric keypad. Maximum Zoom is 32 times (5 Zooms).

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3.7.4 Zoom Out

Zoom out reduces the amplitude of the vertical axis by a factor of 2. It also may be activated by the "-" button on the numeric keypad.

3.7.5 Compress

Compress will compress more time onto the graph in the horizontal plane. Graphs have a range of 1/100th second per pixel to over 10 minutes per pixel. When scrolling in compressed mode, the system needs to retrieve more data from the disk. This may take some time. Compress also may be activated from the current graph window with the Numeric "/" button or by pressing "Alt" + "←".

3.7.6 Expand

Expand will spread the graph out in the horizontal direction. This feature also may be activated from the active graph window using the Numeric "*" button or by pressing "Alt" + "→".

3.7.7 Setup

Brings up the Edit Graph Dialog box. It may also be activated by double clicking on the graph window. Refer to "Using the Edit Graph Dialog Box" on page 21 for details.

3.8 Table

This menu option is only shown if a table is the currently selected window. It brings up a Table Options dialog box.

3.8.1 Label

Select whether Time stamp or Sample # (number) is displayed as the lead in for the table data. Sample numbers start from one and are numbered sequentially through the end of each block of data.

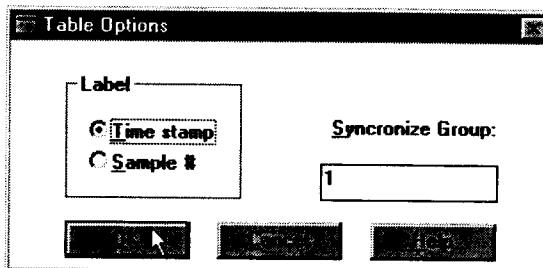


Figure 15 Table Options Dialog Box

3.8.2 Synchronize Group

The Synchronize Group option allows various windows, graphs, events and tables, to track one another in time. All windows assigned to the same group will move to the same point in time when any one of them is moved or the "S" key is pressed. This assumes they all cover the same time span. Event windows will synchronize to the closest time related event. There can be multiple groups, each distinguished by the group number.

3.9 Window

All the windows listed below may be printed by selecting the File/Print menu item.

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3.9.1 Graph

The Graph item will do one of two different things. If the currently active window is a graph window, selecting this menu item will create a second graph window of the same graph. This allows two windows on the same graph in different positions or different zoom levels. If the currently active window is not a graph, this option allows you to create a new graph by bringing up the Read File dialog box. The new file will be read into a new window. To add a file to an existing graph window use the Edit Graph dialog box.

3.9.2 Table

Create a table based on one of the pens in a graph. Use the Select Pen dialog box to choose which pen to use to create a table.

3.9.3 Intro

Create an information window that tells about each pen in a graph.

3.9.4 Report

Select the start and end time and dates for the report. Also select the which intervals to report. Each interval selected will have a max, min and average value shown in the report for that time interval. Any interval that has some data in it will be reported.

3.9.5 Cascade

Select "Windows - Cascade" to arrange all open windows one behind the other as shown in Figure 16 opposite. Alternatively Press and hold the Shift key and hold the Shift key and press "F5".

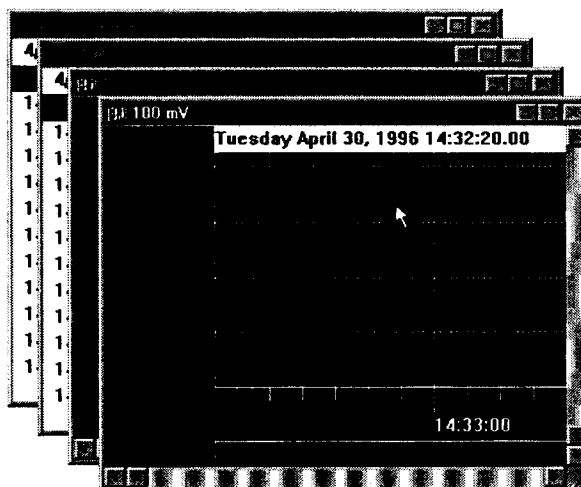


Figure 16 Cascaded Windows

Companion Software

3.9.6 Tile

Select "Windows - Tile" to arrange all open windows in the available space as shown in Figure 17 below.. Alternatively Press and hold the Shift key and press "F4".

3.9.7 Arrange Icons

If any window is minimized, selecting "Windows - Arrange Icons" will arrange the window icons along the bottom of the main window area.

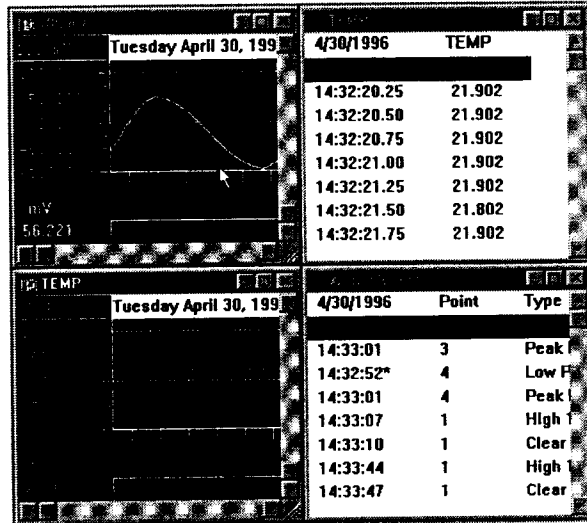


Figure 17 Tiled Windows

3.10 Help

3.10.1 About

Opens a window that gives the Title of the program, version number, and company information.

3.10.2 Contents

Shows the "Contents" page of the help file.

4 CARD READER

4.1 Overview

The card reader plugs into any IBM® compatible computer serial port (COM1 - COM4). The Companion software provides all the necessary functions to effortlessly read and write to the data cards. An external power supply and communications cable are provided.

Once set up and powered on, operation is simple. Run the software and insert the card into the card slot. See figure below. The card goes into the slot in the direction of the arrow. It will only go in right side up. The card should be pressed gently but firmly into the slot. To remove the card, grip it firmly and pull it out.

There are two LEDs (Light Emitting Diodes) on the front panel. One is marked POWER and is on all the time as long as power is applied. The other is marked BUSY and it has two functions. Under normal conditions, it blinks whenever the card is being accessed.

DO NOT REMOVE THE CARD WHEN THE BUSY LIGHT IS ON!

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The busy LED will also blink slowly on a continuous basis if the battery in the memory card is low and needs replacing. You can confirm this condition by checking the card status using the supplied software.

Before using the card reader you need to set the switches on the rear panel and plug in the AC adapter and communications cable. The rear panel appears as follows:

The AC adapter plugs directly into the wall outlet (115VAC model) and has a flexible cable with a power plug that plugs into the receptacle on the rear of the card reader panel - marked DC power in the diagram.

The RS232 cable plugs into the 9 pin socket (DB9) on the left, looking at the unit from the rear. The other end plugs into the appropriate COM port on the computer. You may need a 9 pin to 25 pin adapter.

4.2 Baud Rate Switches

All that remains to be done is to set the switches for the appropriate baud rate.

There are four switches grouped together on the rear panel. The switches are numbered 1 through 4 from right to left. When the switch is in the up position it is on.

Switch 3 and 4 are not used and **MUST BE IN THE OFF (DOWN) POSITION.**

Switch 1 and 2 determine the baud rate. It is advisable to select the highest baud rate your computer can sustain. Speeds above 19,200 are most successful on any '486 or better machine using a 16550A UART (high speed serial port). Once the baud rate is set, run the companion software and from the Option menu, select Comm. Ports, set the card reader to the correct port (COM 1 - COM 4) and set the baud rate to match the settings of the switches.

The baud rate switches are set as follows:

Switch 1	Switch 2	Baud Rate
ON (Up)	ON (Up)	9600
OFF (Down)	OFF (Down)	19,200
OFF (Down)	ON (Up)	38,400
ON (Up)	OFF (Down)	57,600

The Card Reader must be powered on and connected to the COM Port BEFORE you run the software.



IF YOU GET A LOT OF "TIME-OUT " ERRORS SELECT A LOWER BAUD RATE!

Companion Software

4.3 Busy LED

The busy LED has a dual purpose. The first is to indicate when the card reader is accessing the card. The card should not be removed while this LED is on.

The second function of the Busy LED is to indicate reader error status as follows

Constant slow blink when card is in	Card battery low
7 short blinks RS232.	Serial Framing error. Received garbage over
6 short blinks	Checksum error on serial data
5 short blinks	Time-out error on serial data
4 short blinks	Command error. Illegal command received.

There is little the user can do to correct these errors other than ensuring the correct baud rate is set.

5 Tutorial

5.1 Scroll bars

A scroll bar is used to move the object in the associated window (lists, graphs, tables).

There are two types of scroll bars, vertical and horizontal. The vertical scroll bar will be described, (Figure 20) but the horizontal scroll bar is analogous.

The scroll bar has five parts to it. An up arrow A, a top region B, a thumb button C, a bottom region D, and a down arrow E. The up arrow moves the associated object in the windows up one unit. The down arrow moves the object down one unit. The 'unit' may be a single line of text or a segment of the graph. To move the object by this single increment, place the mouse cursor (using the mouse) over either button and press the *left* button once.

The thumb button shows where the visible part of the object is relative to the beginning and end. Every time the object is moved, the thumb button reflects its new position. The thumb button may be held and dragged by pointing to it with the mouse cursor (using the mouse) then pressing and holding the *left* mouse button while dragging the mouse and consequently the thumb button up or down. The object will be moved accordingly.

Pressing the left mouse button when the mouse cursor is pointing to the top region (the area on the scroll bar between the up arrow and the thumb button), the object will move up by one "page". The object will move down one "page" when this is done on the bottom region.



Figure 20

5.2 Using Dialog Boxes

A dialog box is a special window where several selections can be made, or different types of data can be displayed or entered. Although dialog boxes may all appear very different, they all have some common functions.

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To edit any selection in an area of a dialog box, that area must be made current. This can be done by pointing to that area of the dialog box (e.g. a list of radio buttons) with the mouse cursor and pressing the left mouse button, or keep pressing the [TAB] key until that part is current (highlighted), or Press and hold [ALT] and the underlined letter in the label for that part. All keyboard entries are directed to the current object (part) of the current window.

Therefore, what a key does depends on which area is currently active.

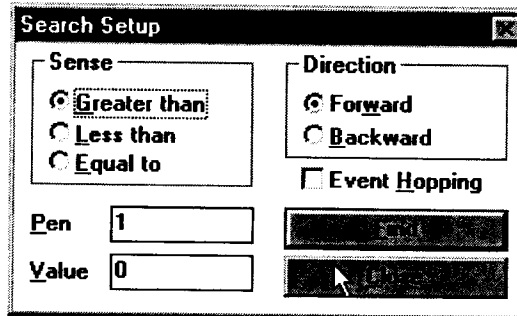


Figure 21 A Typical Dialog Box

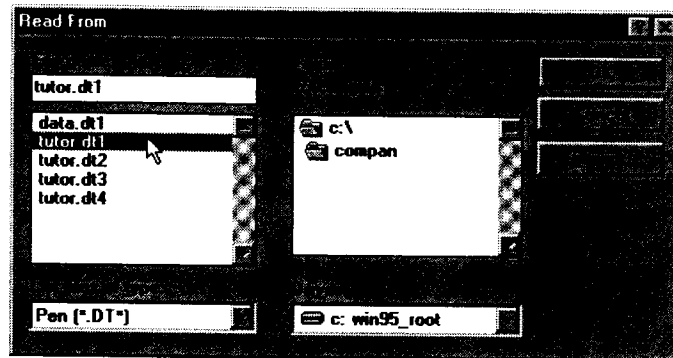


Figure 22 Read File Dialog Box

5.3 Open a Graph

To open a graph select the "File" menu, then select "Read File". The standard filename dialog box opposite will appear. There are various ways to select a file. Graph data files have the extension ".DT*", shown in the List files of type drop down box. Select the Drive (e.g. A:) and Folder (sub-directory) where the data files reside. A list of the available files will be shown in the File name list box.

Place the cursor over the file you want and click the left mouse button. The file name will be highlighted and will appear in the File name box. To select more than one graph to appear in a single graph window, hold the Ctrl (Control) key down while simultaneously clicking on the files you want in the graph. Each file will be highlighted. It is also possible to type the name of the file into the File name box. Click on the "OK" button. This will bring up a graph with the files you selected.

5.4 The Graph Window

The graph window is that part of the screen which display the graph. There can be more than one graph window on the screen at the same time.

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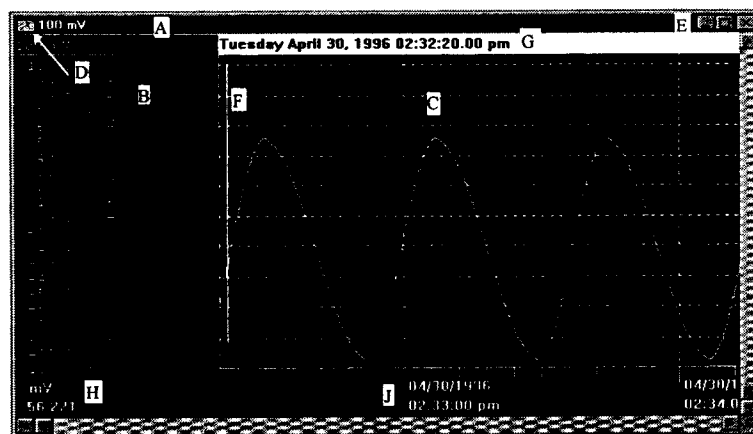


Figure 23 The Graph Window

The Graph Window has a title bar (A) which defaults to the point name of the first point in the graph. A window is made active by placing the mouse cursor in the window and pressing the left mouse button. The title bar changes color when it is active. The Ctrl + Tab or Ctrl + F6 button can be used to move among windows.

To the extreme left of the title bar is the System Button (D) box. This is like any other System button in a Windows environment. It enables you to move or size the window using the arrow keys. You can of course move the window with the mouse by moving the cursor into the title bar and pressing and holding the left mouse button. Drag the mouse and the window will move. Release the button to place the window. Similarly you can size the window by placing the cursor over the border edge of the window. The cursor will change shape indicating the direction in which you can drag the border. Press and hold the left mouse button and drag the border to the size you want. The system button also allows you to Size, Move or maximize (fill the screen) the graphics window. Finally you can close the window. To activate the System Button from the keyboard press ALT and the minus "-" key. To exit press "Esc" twice.

On the extreme right of the title bar are the size buttons (E) which will make the graph fill the screen, or reduce the screen to an icon. The function of the buttons depend on which version of Windows is being used, and follows standard Windows protocol. Check your Windows manual.

Along the right edge of the window is the Vertical Scroll bar. It has a button in the middle and an arrow button at either end. When the graph is zoomed, you can use these buttons to scroll the graph up and down. Note that the values on the left side of the window change accordingly. The button in the center of the scroll bar indicates the relative position of the current view in the window to the available scroll area. You can use the UP and DOWN Arrow keys, and Page Up and Page Down Keys to scroll, or you can click the arrow buttons with the mouse. You can also click and hold on the scroll bar button and drag it to the desired position with the mouse.

Along the bottom of the window is the Horizontal Scroll bar. It also has two arrow buttons at the ends and the position indicator button. These buttons work the same as the vertical scroll buttons. The left and right arrow buttons move you back or forwards through the file, and the position button indicates relative position. As you scroll, the system may need to read more data from a file. This may cause a slight delay in updating the screen. You can use the Left and Right arrow keys to scroll through the data but it is slow.

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If the cursor is turned on it is shown as a vertical line on the graph (F). The Date (G) and absolute values (H) are of the samples directly under the cursor. The cursor can be moved by placing the mouse pointer over it. The mouse pointer will change shape. Press and hold the left mouse button and drag the cursor to where you want it. You can fine move the cursor with the left and right arrow keys. If the cursor is turned off, the date (G) and amplitude values (H) refer to the samples against the left vertical axis.

The X Axis shows the time stamp (J) which is updated as you scroll.

The Y Axis has the scales along the left side of the window (B). There can be one column for each pen (point). The values below each scale is the current data (H) for the sample against the left vertical axis if no cursor is present, or the value of the sample under the data cursor if it is present. These values have the engineering units associated with them as set in the recorder. On color screens the traces (N) are color matched to the channel data.

To bring up the Graph Editor, double click in the graph area (C). To edit a pen (or trace) directly, double click on its Y scale (B).

5.5 Add a Point to the Graph

To add another trace (point) to the graph, double click the mouse over the graph area (C) or select "Graph - Setup" from the menu. The Edit Graph dialog box will appear. Press the Add button. This will bring up the Edit Pen dialog box shown below (Figure 24).

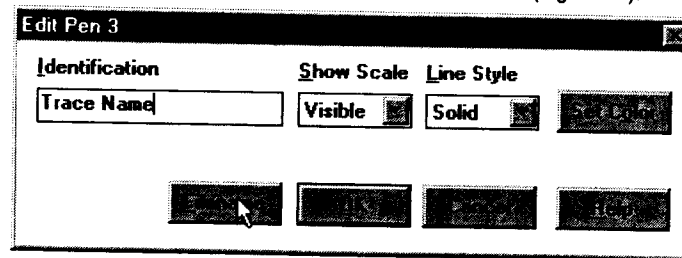


Figure 24 Edit Pen Dialog Box

Press the filename button. The read file dialog box will appear. Select a file and press the OK button. This will return you to the Edit Pen Dialog Box. Click on the "OK" button to return to the Graphics Window.

5.6 Using the Edit Graph Dialog Box

Double click the mouse over the graph area or select "Graph - Setup" from the menu to bring up this dialog box. Here the graph's title and colors can be changed. Pens (points) can be added to, edited, or deleted from the graph.

Title will change the graph's title that appears in the Title Bar and printouts.

Synchronize Group determines which other windows this window will track. All windows with the same Synchronize Group number will track in time. As one window moves horizontally, so will those with the same group number.

If the **Interpolate between samples** check box is checked, a straight line from one sample to the next will be drawn on the graph instead of using a "stair step". This only affects a graph that has been expanded so there are more than one pixel per sample. The

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interpolation will make the graph appear smoother. Only the graphics are interpolated. All digital displays are not interpolated.

Foreground Color and **Background Color** enable the user to customize the graph.

Make Default - Select this to save the setup into the "Compan.ini" file. These settings will be used in future.

To edit a pen, select a pen from the list using the mouse or arrow keys then press the **Edit** button or just double click on the desired pen.

To add a pen, press the **Add** button.

To delete a pen, select the pen using the mouse or arrow keys. Next press the **Delete** button.

If you are editing or adding a pen a Edit Pen dialog will pop up.

5.7 Edit a Pen

A pen or trace can be edited as it is being loaded above, or you can double click on the graphics area and then select the pen to edit from the Edit Graph Dialog box, or you can double click on the Y Axis of the pen.

The Edit Pen dialog box (Figure 24 above) can be used to add a name to the trace with the **Identification** box, simply type in the name you want. Use the **Show Scale** drop down list to select whether the Y Axis scale is visible or not (off). If all traces have the same axis it is not necessary to show them all.

The **Line Style** drop down list allows differing line types to be applied to the pens. This allows the different traces to be identified on monochrome monitors, but more importantly, it allows differentiation on print outs, since most printers cannot print color.

Finally the **Set Color** option allows the user to select any color for the trace. Click **OK** to return to the Graph..

5.8 Open a Table

When a graph is the currently selected window, select "**Window - Table**" from the menu. This will bring up a Select Pen dialog box. Highlight the desired pen and press the OK button. A window that contains a scrollable list of the point data will appear. The table contains sets of two columns, the exact number of these depends on the window size. The top line of the columns is the date (Or Sample # header) and description, below this is the time stamp (or sample number) and data as shown below.

Time Stamp Format:

4/30/96	TAG A
14:31:20.50	-32.951
14:31:20.75	-32.980
etc.	

Sample Number Format:

Sample #	TAG A
6	-32.951
7	-32.980
etc.	

To switch between time and sample number, the table window must be active. Click anywhere in the table to make it active. Then select "**Table**" from the menu. The Table dialog box pops up. You can select the label type and Synchronize group. Click "**OK**" when done.

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A single entry in the table is highlighted. This is the current sample. You can scroll up or down through the table using the up and down arrow keys, or you can use the vertical scroll bars and the mouse cursor.

To synchronize other windows, graph, table or event, make sure that this table belongs to the same synchronize group as the other windows. Select the sample you are interested in then press the "S" key to Synchronize. All other open windows will jump to the same date and time location (or as close as they can get).

5.9 Print a Graph, Table or other Window

With a Graph or Table as the selected window, select "File - Print" from the menu. This will bring up the Print dialog box. Refer to Section 3.2.7.

The radio buttons "From Start" and "From Current Position" determine where the printing will start. "From Start" will cause printing to start from the very beginning of the graph. "From Current" will cause printing to start where the graph is positioned in the window on the screen. The "To End of File" and "Page(s)" radio buttons select whether the printing will continue until the end of the graph or for the selected number of pages in the edit box beside the "Page(s)" radio button.

Select what pages you want to be printed. Press the Setup button if the printer needs to be setup. It is advisable to print in the landscape mode. If you are using a monochrome printer and there is more than one trace on the graph, use the Edit Pen option to set the line styles to make the traces more visible. Press the Print button to print.

Print will always use the default system printer. The default printer can be changed in the "Control Panel" using the Printers icon. In some versions of Windows, it can also be changed in the Print Manager. See the Window's manuals for details.

5.10 Using the Export Dialog Box

Highlight the Graph window you wish to export. Choose "File - Export" from the menu. The Export dialog box will be presented. The options are described in "Export" on page 3. Select "OK" and choose the file name from the File Save dialog box. Press "OK" to export.

5.11 Using the Search Setup Dialog box

You must be in an active graphic window to search. Select "Search - Search Setup" from the menu or press Alt-F2 from the keyboard to bring up the search setup dialog box. Refer to section "3.3.3" on page 6.

Select to search for the next occurrence when the data for a given "Pen" is "Greater than", "Less than", or "Equal to" the "Value". Search will start at the current position and search either "Forward" or "Backwards" though the file. When the "Event Hopping" check box is checked, search will first search for the search condition to NOT be true then find the next occurrence when it is true. This allows the user to quickly go from one "event" to the next. The "Find" button will cause the search to occur right now. the dialog box will stay up until the "Close" button or the "Close" system button menu item is selected.

5.12 Synchronizing Windows

Synchronizing windows allows two or more windows to track one another with respect to time. Thus if you have a window with a table and a window with a graph synchronized as a single group, as the cursor bar is moved in the graphic window, so the table will be

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automatically updated. Similarly if you scroll through a table, any time you press the "S" key, the graph will synchronize with the table entry. If you do not want two windows to synchronize, assign them to different synchronize groups.

5.12.1 Assigning Synchronize Groups

5.12.1.1 Graphics

From a Graphics Window double click on the graph area. This will bring up the Edit Graph dialog box, or if the graphic window is active, you can select "Graph - Setup" from the menu. Use the Synchronize Group Edit line to enter the group number. Click on "OK" to return.

5.12.1.2 Tables

From a Table Window select "Table" from the menu to bring up the Table Option dialog box. Use the Synchronize Group Edit line to enter the group number. Click on "OK" to return.

5.12.1.3 Synchronize Tips

For Graphic windows, turn the Graphic Cursor on by pressing the "T" key. This focuses the synchronize point at the cursor, otherwise the synchronize point is the Y Axis edge of the graph.

Tile the windows so that you can see what is going on between them. Maximize the main window to give yourself as much room as possible.

With tables, you must press the "S" key to get them to synchronize.

If you are comparing graphs of last weeks data with this weeks by way of example, make sure the two graphs are assigned to different synchronize groups, else they will try to track one another by absolute date and time, and you will not be able to see two different periods.

5.13 Time Discontinuities

It is possible to add a trace to a graph by double clicking on the graph area to bring up the Edit Graph dialog box and selecting "Add". This added trace may represent data recorded at a totally different date to the trace already on the graph. The difference could be years. The two traces will obviously not overlap if they do not share a common time period, however the difference in time between the end of one graph and the start of the next is compressed where there is no data, and a band is placed on the chart with two vertical time stamps, the left hand time stamp is the end time of the older graph and the right hand time stamp is the start time of the newer graph. The time stamps may be separated by days or years. If you drag the cursor across this band you will get the actual time and date in the date window. Thus the time band separates traces that are not contiguous in time. Refer to Figure 26 below.

This time discontinuity band may also be seen in a single trace. If you are recording data at a rate of one sample per minute, then you stop for an hour and then continue, you will see the time discontinuity band in the graphic window at the point in the trace where you stopped for the hour. In fact, at any point in a trace at which the program determines there is a time continuity, be it seconds, minutes or days, it will insert the time discontinuity band.

This feature allows the user to load totally unrelated files onto the same graph. For example you may have two recorders at different parts of the plant, one recording air pressure and one recording a process elsewhere. If the air pressure dropped, it may have

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affected the process. It is now possible to load the files from the two different recorders onto one graph and compare the dip in air pressure to the actual process. This may also be done in two separate graph windows that are synchronized.

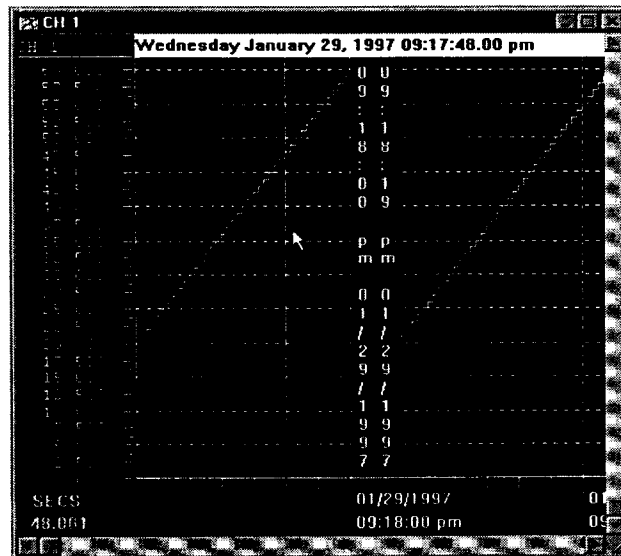


Figure 26 Time Discontinuity.

Note that the drag button in the horizontal scroll bar will affix itself to one or other ends as it generally cannot compute position across discontinuities. You can however use the left and right arrow buttons to move the window time frame.

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6 Appendix

6.1 File Types

The software works with various file types, both on the data card and from the computer disk. Some of the file types are PC specific, others are used both by the computer and the recorder. The files may have any name up to a maximum of eight characters. It is the last three characters appended to the filename that define the file types, and these are preset by the system. The following are the file types that are used, if the file name is unimportant it is indicated with an asterisk (*) and may be user defined.

*.DT1, *.DT2	Data files created by the Companion software.
COMPAN.INI	Text file use by this software only. Contains initialization data
*.DCF	Data files from the DOS version of this program contains binary data from memory card. It is a recording session created by the recorder or companion software. Use the transfer command to translate the file into the new *.DT* format.
*.DCI	Data files from the DOS version of this program contains binary data from memory card. It contains a complete card image on the disk. It could have data and/or a configuration. Use the transfer command to translate the data in this file into the new *.DT* format. Use the Config/Open command to get out any config file information.
*.DAT, *.CSV	Exported DATa file. Created by this software when you export data.
*.CFG	ConFiGuration file. Contains the recorder setup information. May be created by the recorder or the companion software. Only one .CFG file may reside on the memory card but many may reside on disk.

6.2 Supplementary Documentation

The following documentation may be helpful in setting up or understanding this software.

Recorder User's Manual
Microsoft DOS Manual
Microsoft Windows Manual

6.3 Comm Port Initialization And Interrupt Conflicts

By default the software requires a serial port. You must have a free serial port available before you run the software as the software tries to initialize the default port (defined in COMPAN.INI) on startup. If the default is set as COM 1 and this port happens to be used

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by some other device on your computer, e.g. Mouse or Modem, the companion software will lock up this port. You need to use the keypad (if the mouse locks up) to select the Option menu and redefine the comm port for the card reader. Once redefined, the software will release the problem comm port to the original owner. You can also exit the program and restart it if the problem does not clear.

The software communicates with the card reader and Recorder over the serial ports. These are referred to as COM 1 and COM 2. (Some machines may have COM 3 and COM 4 available - note though that COM 3 shares an interrupt with COM 1 and COM 4 shares an interrupt with COM 2 which can cause problems.) These comm. ports use interrupts 3 and 4 in the PC environment. There are also many other devices that use serial ports and these particular interrupts, specifically the serial MOUSE.

The Card Reader cannot share a serial port or that ports interrupt with any other device. If you have a mouse in COM 1, put the reader into COM 2. If you have a Modem and a mouse, try reassigning the modem to COM 3 if available.

If you get a number of TIME-OUT error messages when trying to read data from the card reader you probably have an interrupt conflict error or incorrect baud rate. Check for hidden causes such as Ethernet or other network cards using Interrupt 3. (Interrupt 3 is the standard for Novell compatible Ethernet cards). Reconfigure these cards to some other interrupt. Also Check for any TSRs (Terminate and Stay Resident programs) that usurp the interrupts. Another cause may be the Advanced Power Management (APM) hardware and software in some portables and laptops. Get into the configuration and turn off the serial port power down options.

The software and hardware provided have been thoroughly tested on a number of different systems and have been found to work just fine.

6.4 Error Messages

6.4.1 Serial Communications Errors

Input Timeout.	A character from the device was lost or device is not connected properly. If these occur often on the card reader, lower the baud rate.
Input error.	ACK missing. No acknowledge was received.
Checksum error	Checksum received didn't match the calculated checksum. Most often seen because of an Input Timeout.
Bad Count	Number of bytes expected didn't match those received. Not likely to ever show this since Input Timeout is usually the cause but has high precedence.
Can't set up port	Usually because the port number doesn't exist on your computer.
Device is not connected	Check the port number, baud rate set at both ends, the device is on and the proper cable is being used. NULL MODEM for the card reader. Straight through cable for the Data Chart.
Device is not turned on	As above
Card is write protected.	The operation can't continue because the data card is write protected.

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Card is absent.	There is no card in the card reader.
Can't flush port.	Usually caused by the same reasons as Can't set up port.
Can't get status.	Only will occur if other serial line problems exist.
Can't get block.	Other serial problems exist so block reads failed.
Device is not responding.	Similar to Device not connected.
Bad Type	Wrong type of data received.
@ Missing	Command starting character is missing.

6.4.2 Data File Errors

Pointers are corrupted	The pointers in data files are redundant. If they don't match they must be corrupted.
Pointers pointing backwards.	Pointers must always be bigger than the ones before them. If not, they are corrupted.
Sample Rate = 0.	File had a sample rate of 0.
File format not supported by this version.	The file was unrecognizable by this version of the program.
Too many channels	The file had more channels than is possible.
Not enough room for file	The card or disk file you are writing to doesn't have enough room for the file.

6.4.3 Disk File Errors

Cannot open file.	Usually the file name specified doesn't exist.
Error reading file.	Should never see this.
Error Closing file.	Should never see this.

6.4.4 Password Errors

All four characters MUST be present.	
Password has been set to empty.	A password must have four entries. No more, no less.
Illegal character X set to '1'.	Only the numbers 1,2,4,5 are legal. 1 = left arrow, 2 = right arrow, 4 = up arrow, 5 = down arrow.

6.4.5 Other Errors

When searching, if the search criteria is not met you will get a "Not found" error message.

When saving a config file or sending one over serial lines, the setup for channel A and B must be done else the following error message will be displayed and the file will not be sent or saved:

"Channel A low units MUST first be set lower than high units."

or

"Channel B low units MUST first be set lower than high units."

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