Quin Systems Limited

PTS Toolkit Software for Windows

User Manual

Issue 1.2

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Software Versions

This manual reflects the following software versions.

- PTS Toolkit Software version 1.2 or higher
- MiniPTS, PTS2 & MiniPTS 2+1 firmware versions 1.7 or higher

Important Notice

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PTS Toolkit User Manual

1. Introduction

This document gives a description of the capabilities and use of the Quin PTS Toolkit software package. The software has been designed to work under the Microsoft Windows operating system (version 3.1+).

PTS Toolkit contains an integrated suite of machine design tools for use with Quin Systems Motion Control products. The tools described in this help manual are all available for use within PTS Toolkit but may not all be included with your version of the software. For more information on available tools or any other queries please contact your Sales Office or Quin Systems.

The information provided in this manual is also contained in electronic form in a Windows Help file, "*QUINPTS.HLP*" shipped with the PTS Toolkit software. It can be accessed from the Windows Help file manager or from the Help menu in the PTS Toolkit main menu.

The appendices to this document contain complete installation instructions, along with important information relating to the use of PTS Toolkit on different computers and in different control applications. It is strongly advised that these are consulted before trying to use PTS Toolkit for a motion application.

Please Note

The descriptions throughout this manual assume at least a basic knowledge of the Microsoft Windows operating system and the Quin Systems PTS. If more information is required on either of these topics please refer to your Microsoft Windows software documentation or the Quin PTS Reference Manual respectively.

IMPORTANT NOTICE

The PTS Toolkit software has been designed to make the maximum use of available PC processor and serial communications speed. It uses a standard RS-232 serial interface, avoiding the requirement for complex checking or handshaking protocols for its data transfer.

The result is quick and simple to use but could in theory lock the communication channel of the PTS processor. It is therefore advised that the software should not be left active, whilst connected to the programming port of the PTS system, on a live automated system where safety or production could be at risk.

Appendix B contains more information on running PTS Toolkit and serial communications under the Windows operating system.

2. General Description

The facilities and tools contained in the PTS Toolkit package are described briefly below and in more detail in the following sections of the manual.

2.1 Text Editor

The PTS Note Text Editor can be used to create, view and edit PTS program files. PTS Toolkit will allow multiple text files to be opened for viewing &/or editing at any time. Cut & Paste operations and a line-by-line download system are supported between open text files and the Terminal.

2.2 Terminal

The Terminal provides a communications window between the PTS Toolkit software and Quin motion control products. The Terminal supports Cut & Paste operations between itself and text files, a download facility for programming the PTS and historical logging facility for recording communications.

2.3 Tuning Screen

The Tuning Screen provides the user with a graphical display for monitoring motor velocities as an aid to tuning. The software enables the user to view a motor's velocity profiles and its position error, whilst tuning parameters are adjusted via a Windows Dialog box.

2.4 PTS Scope

PTS Scope provides a PC based oscilloscope for monitoring signals (parameters) from the Quin PTS. The software allows up to 4 different traces to be plotted on the PC screen at a time, chosen from up to 9 different channel parameters or any available digital/analogue I/O line.

2.5 Motion Generator

The Motion Generator is a powerful software package developed for graphically designing custom machine motions. The package allows the user to define any motion using a library of complex mathematical models. The motion is stored as a set of parameters that describe the vector profile generated by the software. These parameters can be easily downloaded to the PTS system and automatically translated into a PTS motion profile or map.

3. PTS Note Text Editor

3.1 Introduction

The PTS Note Text Editor can be used to create, view and edit PTS program files. PTS Toolkit will allow multiple text files to be opened for viewing &/or editing at any time. Cut & Paste operations are supported between open text files and the Terminal Window.

3.2 PTS Note - File Menu Commands

This section briefly describes the operations available from the PTS Note File menu.

New

Opens a new blank text file (see section 3.5).

Open...

Opens an existing text file from disk (see section 3.6).

Close

Closes the current text file. If the file has changed the user is prompted to save the changes before closing.

Save

Saves the current text file (see section 3.7.1).

Save As...

Saves the current text file with a new filename (see section 3.7.2).

Print...

Prints the current text file on the Windows Default Printer (see section 3.8).

Download from Cursor

Starting at the cursor you are prompted whether the current line should be downloaded to the PTS via the terminal. Each line can be edited if required, sent or skipped. This feature is especially useful whilst debugging sequences and programs written for the PTS and is only available when a terminal window is open.

Recent Files List

Displays a list of the last four text files opened. Selecting a filename will open the text file if is not already open.

Exit

Quits PTS Toolkit. The user is prompted to save any changes to open text files.

3.3 PTS Note - Edit Menu Commands

This section briefly describes the operations available from the PTS Note Edit menu.

Cut

Deletes selected text and copies it to the Windows Clipboard overwriting previous contents.

Copy

Copies selected text to the Windows Clipboard overwriting previous contents.

Paste

Pastes the contents of the Windows Clipboard into the text file at the current cursor position or overwrites selected text.

Delete

Deletes the selected text.

Select All

Selects all the text in the current text file.

Time/Date

Pastes the current time and date into the text file at the current position.

Find...

Searches current text file for characters or words. Can match uppercase/lowercase letters and search forwards or backwards.

Find Next

Repeats the last search operation without opening the Find dialog box.

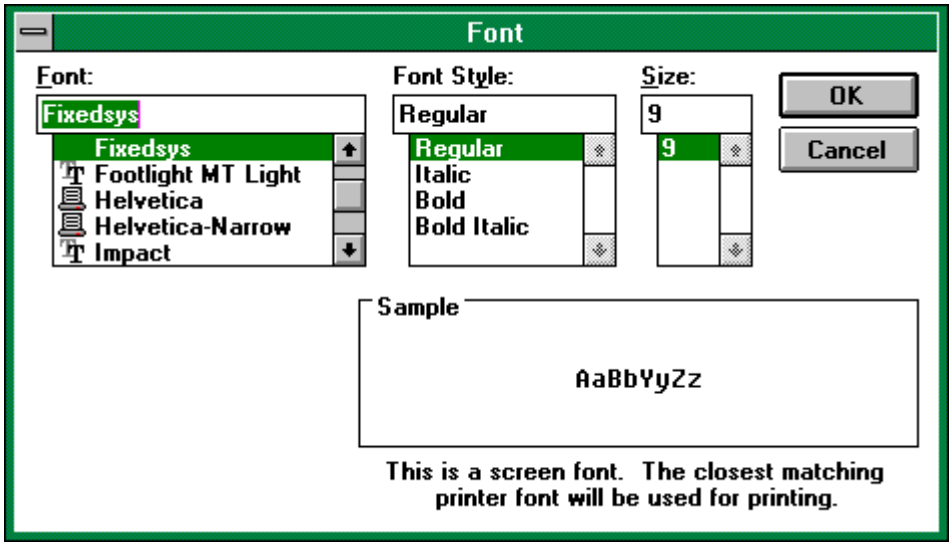
3.4 PTS Note - Options Menu Commands

This section briefly describes the operations available from the PTS Note Edit menu.

Toolbar

Toggles the toolbar display on or off.

Select Font...
Changes the display and print font of the current text file. This font is NOT saved with the file.



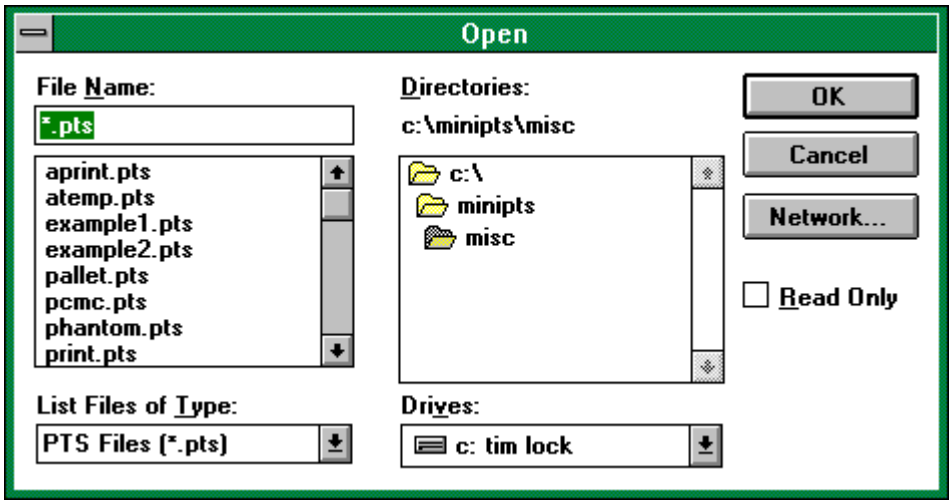
3.5 Creating a New Text File

Select the File option from the main menu. Select New Text File. A new blank text file will be opened and displayed at the front of the screen. The default title for the text file will be “PTS Note”; this will be updated with the file name next time the file is saved.

This command will display an error message dialog box and will not open a new file if the maximum number of text files is already open.

3.6 Opening an Existing Text File

Select the File option from the main menu. Select Open Text File. An Open dialog box prompts the user for a file name. Type in the required filename or select one from the list.



The selected file will be opened and displayed at the front of the screen. PTS Note cannot open files larger than 32 Kbytes. If a large file needs to be edited use another editor. This command will display an error message dialog box and will not open a new file if the maximum number of text files is already open.

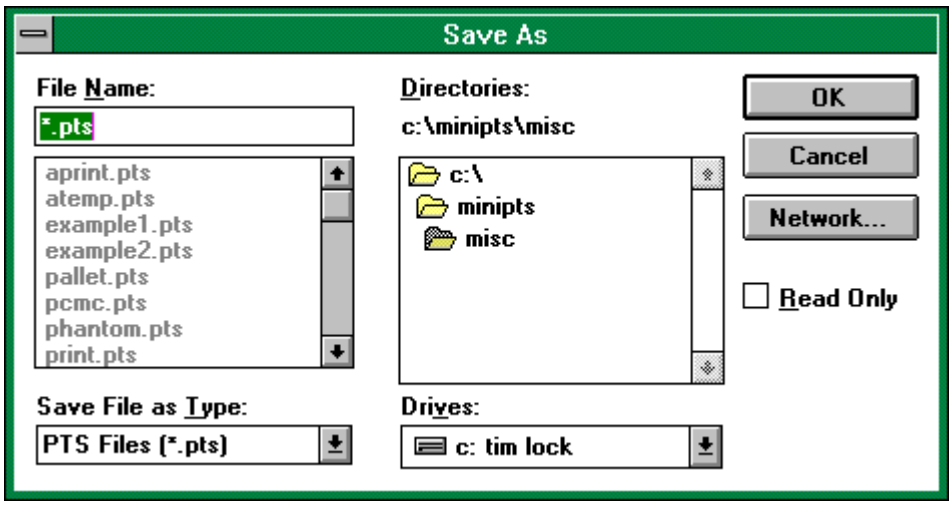
3.7 Saving a Text File

3.7.1 Saving text with the current file name

Select the File option from the main menu. Select Save. The current text file will be saved with its current filename.

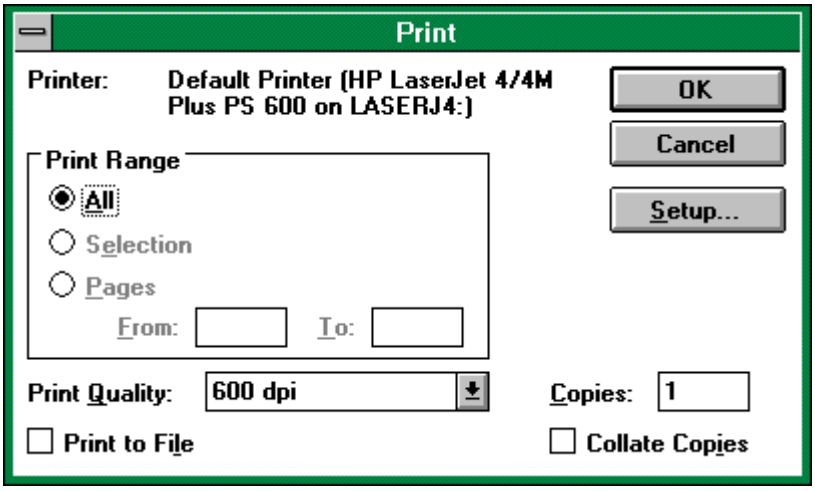
3.7.2 Saving text to a new filename

Select the File option from the main menu. Select Save As. A Save dialog box prompts the user to enter a filename for the text file (NB: Typically PTS program files use extension *.PTS). The current text file will be saved with the new filename.

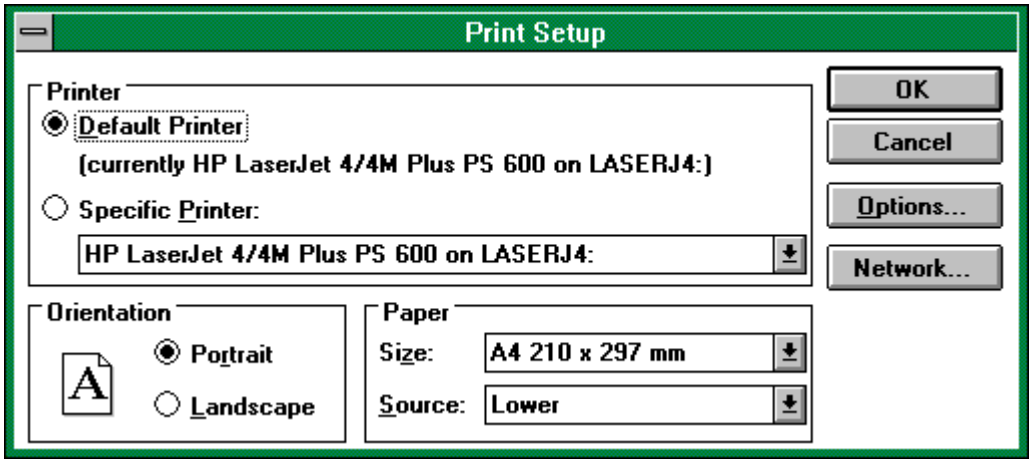


3.8 Printing a Text File

Select the File option from the main menu. Select Print. Press OK in the Print dialog box to print the current text file on the Windows Default Printer.



The Setup button in the print dialog box enables the current Windows printer setup to be modified (see Windows documentation for more information).

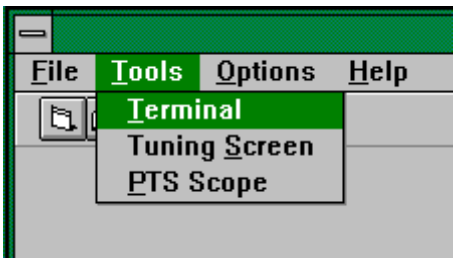


The printer will use the font currently selected in the PTS text editor. This font can be changed using the Select Font option found under the main Options menu (see section 3.4).

4. Terminal Window

4.1 Introduction

The Terminal provides a communications window between the PTS Toolkit software and Quin motion control products. The Terminal supports Cut & Paste operations between itself and text files, a download facility for programming the PTS and historical logging facility for recording communications.



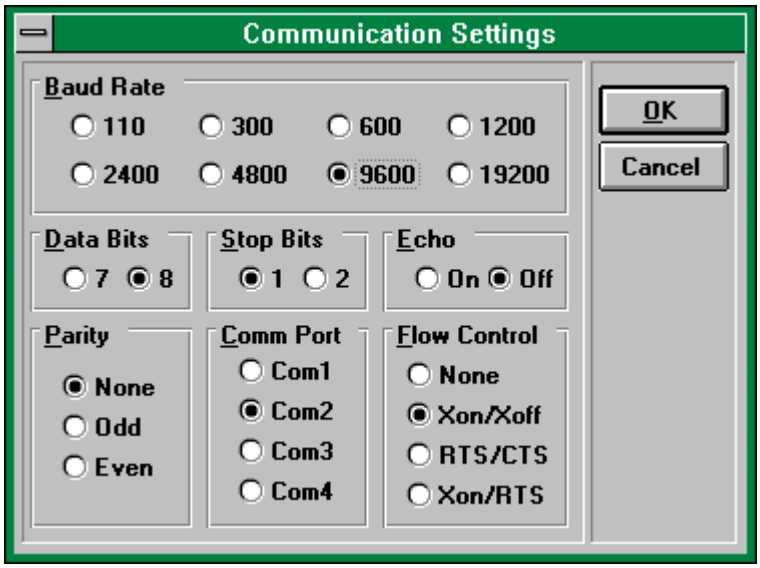
To start the Terminal Window select the Tools option from the main menu. Choose the Terminal option from the list of available tools. The Terminal Window will automatically start up and try to open a serial port on the PC. The port selected will usually be the port it used previously; or COM1 as default. If it fails to open a serial port correctly the software will display the Communication Settings window.

The Terminal Window cannot be used to connect to the PTS unless the serial port is free and configured correctly.

Note: Some functions of PTS Toolkit require the PTS to be in Privileged Mode. Currently the "PM" command is sent by the terminal when it is opened. It assumes no password has been set up. If a password has been set up it will be necessary for the user to use the "PM" command and password before continuing with some PTS Toolkit operations.

4.2 Configuring the Terminal Settings

If the Terminal window fails to work check the communication settings as described below. Select the Options command from the main menu. Select Settings to display the Communication Settings dialog box as shown below.



Set the required parameters as described below and press OK to accept the new values. The Terminal will save its settings when it is closed.

Baud Rate

Specify the speed (transfer rate) for the serial port. Quin motion controllers use 9600 baud.

Data Bits

Specify the number of data bits in data packets sent across the serial port. Quin products use 8 data bits.

Stop Bits

Specify the number of stop bits used. Quin products use 1 stop bit.

Parity

Set the parity check used for communications. Set to none for Quin products.

Comm Port

Select the PC serial communication port to be used for the Terminal window. This may need to be changed if the PC uses serial ports for other devices. You cannot use the same serial port for multiple devices.

Flow Control

Indicate what the Terminal should do if the buffer becomes too full. Select XON/XOFF for a standard Quin controller. If the Terminal still reports errors select RTS/CTS (or Xon/RTS). See Appendix B for more information on using serial communication with the Windows operating system.

Note: RTS/CTS hardware handshaking is only available on the MiniPTS with firmware versions 1.7 or higher.

4.3 Modem Communications Between PTS Toolkit and a PTS equipped with a modem

It is possible to use the PTS Toolkit remotely from a PTS by using modem communications. The choice of the modem for use connected to the PTS needs some care. If you wish to use this feature, contact your Quin sales office.

4.4 Terminal Window - File Menu Commands

This section briefly describes the operations available from the Terminal File menu.

New Text

Opens a new blank text file (see section 3.5).

Open Text...

Opens an existing text file from disk (see section 3.6).

Open Log File...

Opens a text file on disk to record all information displayed in the Terminal window (see section 4.8).

Close Log File

Closes the text log file.

Download Text File

Downloads a PTS program file, operators panel file or map/profile data file to the PTS via the Terminal (see section 4.7).

Close Terminal

Closes the Terminal window. Closing the Terminal when either the Tuning Screen or PTS Scope is open will limit their available functions.

Recent Files List

Displays a list of the last four text files opened. Selecting a filename will open the text file if is not already open.

Exit

Quits PTS Toolkit.

4.5 Terminal Window - Edit Menu Commands

This section briefly describes the operations available from the Terminal Edit menu.

Copy

Copies selected text to the Windows Clipboard overwriting previous contents.

Paste

Pastes the contents of the Windows Clipboard to the PTS via the Terminal.

Select All

Selects all the text contained in the Terminal window and scroll buffer.

Clear Buffer

Clears the Terminal window and scroll buffer.

4.6 Terminal Window - Options Menu Commands

This section briefly describes the operations available from the Terminal File menu.

Open / Close Port

Toggles the serial port open or closed.

Note: Some functions of PTS Toolkit require the PTS to be in Privileged Mode. Currently the "PM" command is sent by the terminal when it is opened. It assumes no password has been set up. If a password has been set up it will be necessary for the user to use the "PM" command and password before continuing with some PTS Toolkit operations.

Settings...

Displays the communications settings dialog box (see section 4.2).

Modem

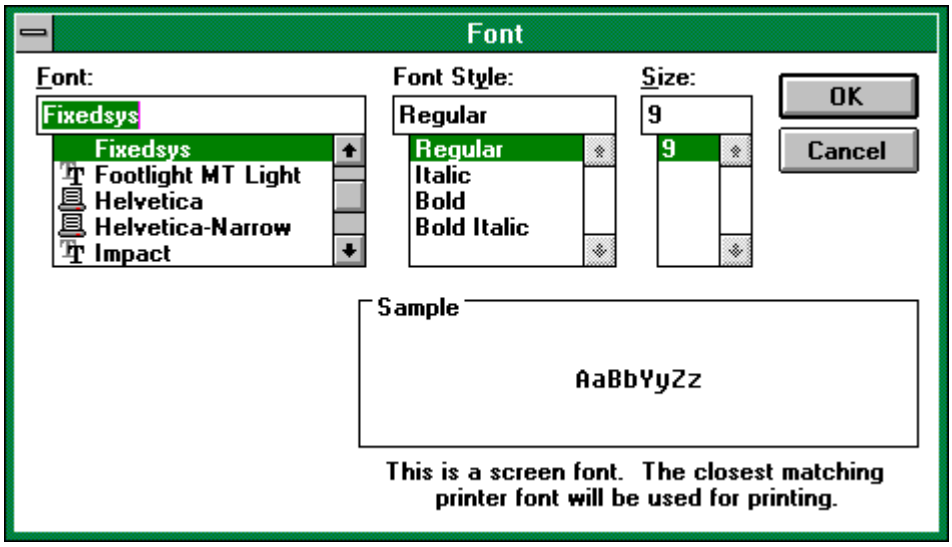
These features are an advanced use of the PTS Toolkit. If you wish to use this feature please contact your sales office for a separate manual detailing this feature (for both the PTS Toolkit and the PTS hardware).

Toolbar

Toggles the toolbar display on or off.

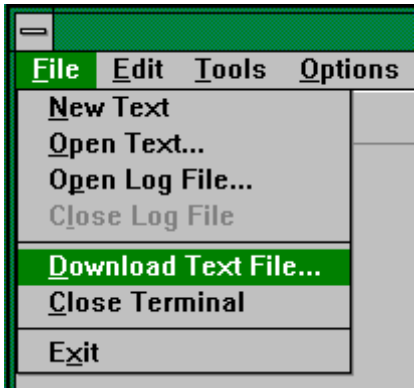
Select Font...

Changes the display font of the terminal window.

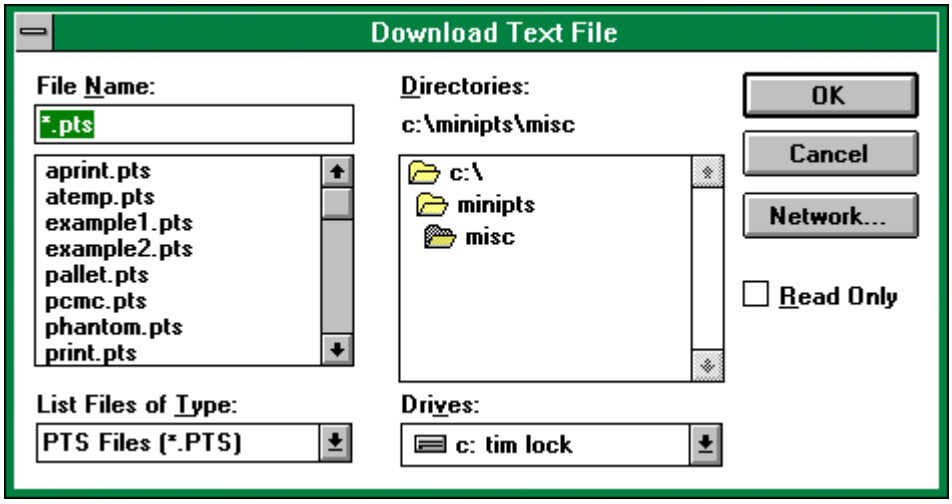


4.7 Downloading a PTS Program File

To program a PTS controller with commands in a PTS program file; the easiest method is to send the contents of the file directly from disk to the PTS through the serial port.



Select the File option from the main menu. Select Download Text File. Type the filename of the program required, or select the file from the directory list. Press OK.

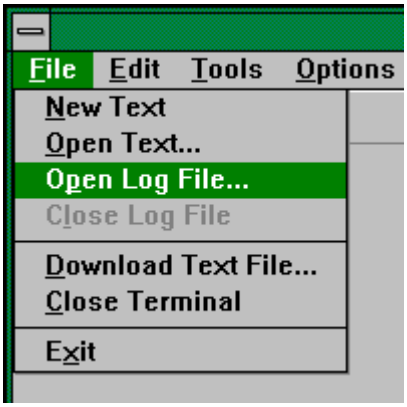


WARNING: The PTS must be in Privileged Mode (PM Mode) before attempting to download a program file. Errors may occur if an attempt is made to download a file when in Normal Mode.

4.8 Using a Log File

To view any serial communication since the terminal was opened, the vertical scroll bar function can be used. This will allow up to the last 32,768 characters received to be viewed.

To record the communication across the serial port over a longer period of time a Log File can be used. Select the File option from the main menu. Select Open Log File. Type the filename of the file to be used or select an existing file from the directory list to overwrite.



When a log file is opened the Terminal window title will indicate the name of the log file. To stop logging the serial communication and close the log file, select the File option from the main menu and Close Log File.

A log file on disk can be viewed in the same way as a program file using the PTS Note Editor.

5. Tuning Screen

5.1 Introduction

The Tuning Screen provides the user with a graphical display for monitoring motor velocities as an aid to tuning. The software enables the user to view a motor's velocity profiles and its position error, whilst tuning parameters and moves can be adjusted using Windows Dialog boxes.

The Tuning Screen shows the Demand, Actual and Averaged Velocities, and the Position Error recorded on the PTS, for a selected motor channel. The screen display is split in two, with the top half of the screen displaying the velocity traces and the lower half the position error. This enables the user to view both velocity and position error at the same time.

The Tuning Screen can operate in two different modes; Scope Mode and Historical Mode. The selected mode of operation determines the functions available to the user. Both modes provide the ability to take a hard copy of the current screen display using the Windows Print Manager; to any Windows compatible printer capable of printing graphics.

Using the Mouse buttons, to operate the Left and Right hand cursors, trace information can be obtained from the screen to measure exact velocity and position error values.

To start the Tuning Screen facility select the Tools option from the main menu. Choose the Tuning option from the list of available tools.

5.2 Tuning Screen Scope Mode

In Scope Mode the Tuning Screen acts in a similar manner to a standard refresh oscilloscope. It is designed to work "on-line" with the PTS and display the velocity and position error values in real time.

WARNING: To operate the Tuning Screen in Scope Mode the PTS Toolkit Terminal Window must be open and connected to the PTS. In addition the PTS must be in Privileged Mode (see section 4.1); otherwise the Tuning will not operate. If the Terminal is not open correctly the Tuning screen will only operate in Historical Mode and not all facilities will be available.

5.3 Tuning Screen Historical Mode

The Tuning Screen Historical Mode can be used for two types of operation; the first is "on-line" in a similar way to the Scope Mode of operation, the other is simply as a passive application for viewing (and saving) previously created PTS Toolkit *"*.DAT"* Tuning and Scope files.

In the "on-line" mode the Tuning Screen acts as a "snap-shot" recorder for PTS data. When started the Tuning Screen commands the PTS to start sending the velocity and position error information as recorded in 4 msec intervals, starting from the time the Tuning Screen was started.

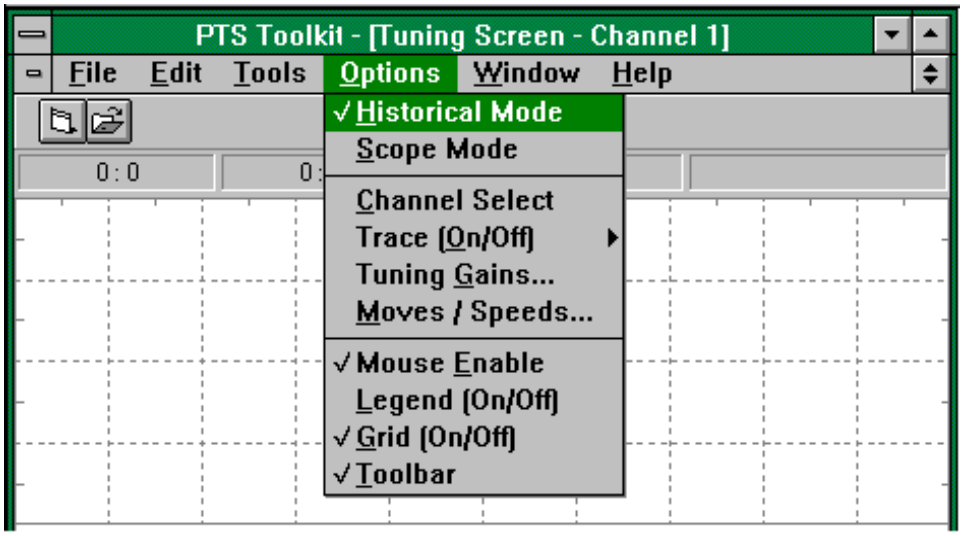
For example; if the Tuning Screen Time Base is set to 100 msec per division, when the Tuning Screen is started the PTS will send back 250 points at 4 msec intervals from the time it received the start command. This mode of operation enables traces to be recorded at a much higher resolution but does not operate in "real time". The PTS measures the data immediately then buffers it up until it is sent to the Tuning Screen.

The data points retrieved back from the PTS are plotted on the screen as individual points. These can be joined using the Join Points option under the main Edit menu.

WARNING: To operate the Tuning Screen in historical logging or "snap-shot" mode the Terminal Window must be open and connected to the PTS. In addition the PTS must be in Privileged Mode (see section 4.1), otherwise the Tuning will not operate. If the Terminal is not open the Tuning screen will only allow the user to view previously created display files.

5.4 Selecting Mode of Operation

To choose the required operation select the mode required from the list under the Options choice from the main menu. The mode cannot be changed if the Tuning screen is currently operating, i.e. retrieving data from the PTS. The Tuning Screen cannot be operated in Scope Mode if the Terminal Window is not open and connected to the PTS.



5.5 Selecting the Required Motor Channel

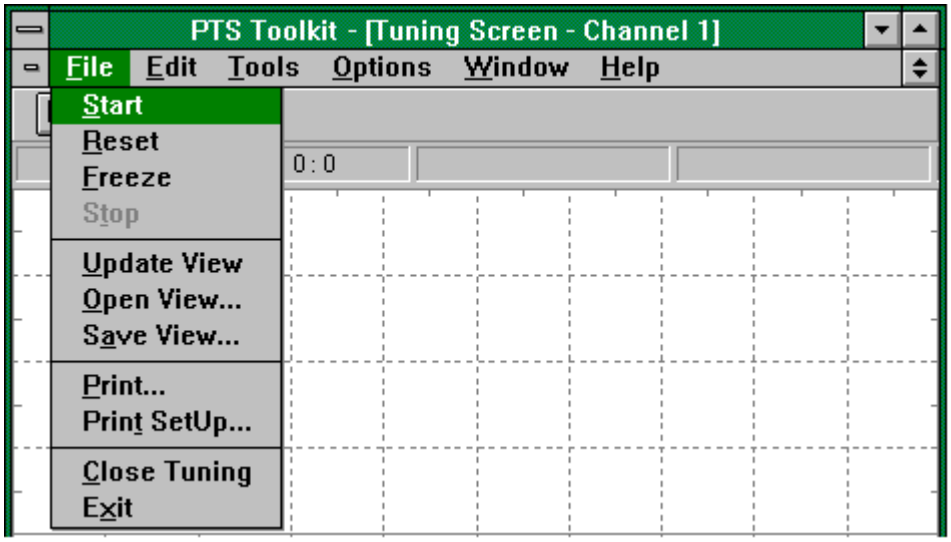
The Tuning Screen monitors the velocities and position error on a single motor channel on the PTS. Before starting the user needs to select which of the PTS motor channels is to be monitored.

Using the Options selection from the main menu and selecting Channel Select a channel number can be chosen. The number of the channel connected is shown in the title bar of the Tuning Screen.

Note: If the Terminal Window is not open the channel cannot be changed; the Tuning Screen will show "Not-Connected" as the channel number.

5.6 Starting and Stopping the Tuning Screen

The Tuning Screen data retrieval from the PTS is controlled by the Start and Stop options on the File menu.



Start automatically resets the display and commands the PTS to start sending data. Stop will force the PTS to stop the data transfer.

The screen can be reset at any time using the Reset option on the File menu. The Freeze option "freezes" the screen display with the next full screen of information; this option only stops the screen update not the data retrieval from the PTS.

Note:

(i) If the Terminal Window is not open, commands cannot be sent to the PTS and some functions of the Tuning Screen will be unavailable; e.g. the Moves / Speeds and Tuning Dialog boxes.

(ii) If the PTS is not in Privileged Mode the traces will not be displayed.

(iii) Advanced users may note that during data retrieval the screen update on the Terminal Window is disabled; however commands can still be sent to the PTS, they just won't be echoed on the screen.

5.7 Adjusting the Tuning Screen Display Settings

The Tuning Screen shows the Demand, Actual and Averaged Velocities, and the Position Error recorded on the PTS, for the selected motor channel. The screen display is split in two, with the top half of the screen displaying the velocity traces and the lower half the position error.

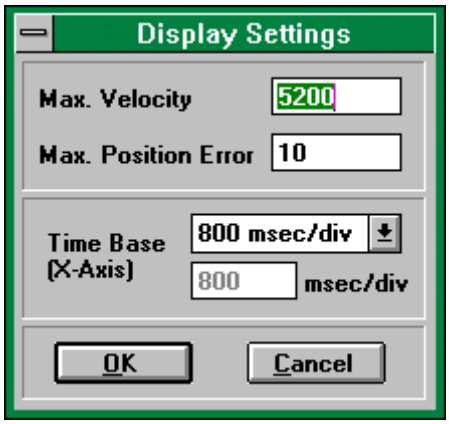
To view the traces on the screen it may be necessary to adjust their Y-axis (or vertical) scaling. This is achieved by setting the maximum velocity and maximum position error values displayed on the screen.

The minimum values for the display are automatically set to the negative absolute value of the maximum setting. All three velocity traces are set to the same scaling factor.

The scale on the X-axis (horizontal axis) is the Time Base for the Tuning Screen. It is measured in milliseconds per division; where one division is one tenth of the time displayed across the whole width of the screen and is shown by the minor grid lines. The user can select a time base value from a list of common values, or specify a custom value.

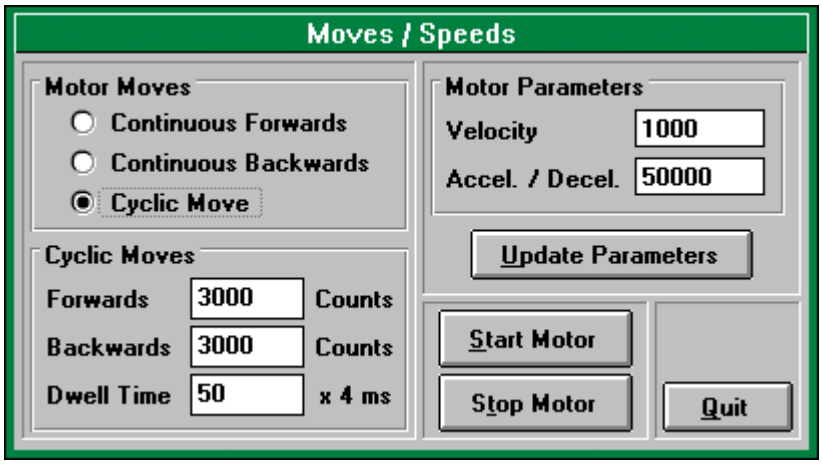
In Scope Mode the Tuning screen retrieves data points from the PTS with a time of approximately 70-80 msecs between points. This speed also depends on the speed of the computer running PTS Toolkit. If the Time Base is very small or the computer very slow the resolution of the traces will be reduced. In Historical Mode the time between successive data points is always 4 msecs.

All the scaling factors are set from the Display Settings Dialog box. From the main menu select the Edit option, then use the Display Settings option to show the dialog box. Set the maximum velocity, the maximum position value and the time base required and press the OK button to update. The Cancel button will remove the dialog box, ignoring any changes.



5.8 Executing Basic Motor Moves & Changing Motor Parameters

To enable easy tuning of the motors, various motor moves, the motor speed and the acceleration can be set from within the Tuning Screen, using the Moves / Speeds Dialog box. This allows the user to send commands to the PTS to execute moves without using the Terminal Window directly.



Select the Moves / Speeds option from the main Options selection on the main menu. This will display the Moves / Speeds dialog box.

Use the Motor Moves section to select the type of move required. If a cyclic move is selected, use the Cyclic Moves section to set the various parameters required. The Start Motor button starts the motor moving with the selected move. The Stop Motor button stops the current move. The Quit button will remove the dialog box without making any changes.

WARNING:- The Start Motor button starts the motor moving. Ensure that this is safe before starting.

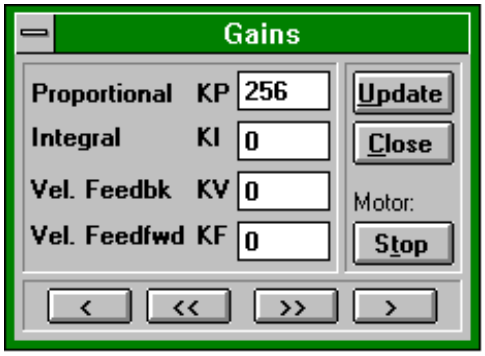
Using the Motor Parameters section type in the required velocity and acceleration/deceleration values. Pressing the Update Parameters button will send the new information to the PTS. The Quit button will remove the dialog box without making any changes.

The Moves/Speeds dialog box is "modeless" and can be left displayed whilst the Tuning Screen is in use, although it may obscure the view of the traces display.

Note: If the Terminal Window is not open, commands cannot be sent to the PTS and the Moves / Speeds Dialog box is unavailable.

5.9 Changing Motor Tuning Parameters

To enable easy tuning of the motors, the four main motor tuning parameters can be set from within the Tuning Screen, using the Tuning Gains dialog box. This allows the user change motor tuning gains in the PTS without using the Terminal Window directly.



Select the Tuning Gains option from the main Options selection on the main menu. This will display the Gains dialog box. Type in the new value required for each gain term. The Update button will update all four gain values in the PTS. The Cancel button will remove the dialog

box without making any more changes. A stop motor button is also provided to enable you to quickly stop the motor you are tuning.

The arrow buttons can be used to update each gain value individually. > increments & < decrements the gain value by 1; << increments & >> decrements by 10.

The Tuning Gains dialog box is "modeless" and can be left displayed whilst the Tuning Screen is in use, allowing parameters to be easily changed "on-the-fly".

For more information on motor tuning refer to the PTS Installation Manual supplied with the Quin PTS.

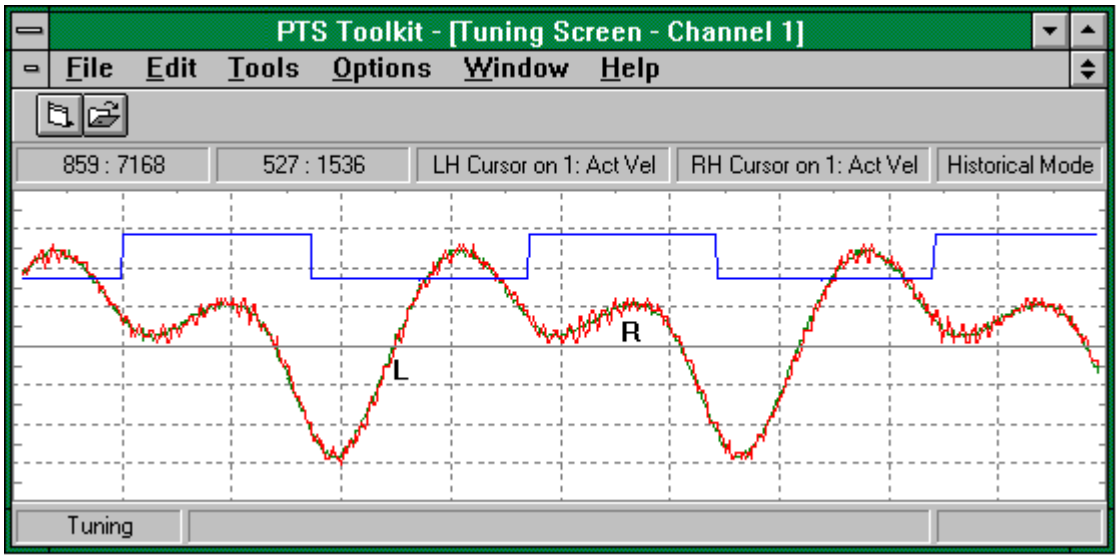
WARNING: Take care when changing gain values to make sure the motor remains stable. Large changes in a gain value may result in a dangerous unstable situation.

Note: If the Terminal Window is not open, commands cannot be sent to the PTS and the Tuning Dialog box is unavailable.

5.10 Using the Cursors to Measure Screen Trace Values

The Tuning Screen makes use of a standard two button Windows compatible mouse to control two screen cursors. Clicking a mouse button will select the nearest data point in the display screen to the current screen cursor position.

If the left hand mouse is clicked the data point selected is highlighted by a dot and an "L" character. If the right hand button is used to select a data point it will be represented by a dot and an "R" character.



Trace information about the position of the selected points is shown in the status bar above the display. The left hand status box shows the absolute position co-ordinates of the left hand point; e.g. "122000 : 4000" - indicates the data time value is 122000 msecs since the PTS was powered up and that the Y value (velocity or position error) is 4000 (counts per second or counts respectively).

The next status box shows the position co-ordinates of the right hand point relative to the position of the left hand point; e.g. *"625 : -860"* - indicates the right hand point was recorded 625 msecs after the left hand point and that the Y value (velocity or position error) is 860 (counts per second or counts respectively) less than the value of the left hand point.

The third and fourth status boxes indicate the actual trace the points rest on; e.g. "LH Cursor on Dem Vel" indicates that the left hand point lies on the Demand Velocity trace.

If the cursors are used whilst the Tuning Screen is updating it is advisable to use the Freeze function to stop the screen refresh at the end of each complete screen display.

5.11 Tuning Screen - File Menu Commands

This section briefly describes the operations available from the Tuning Screen File menu.

Start

Starts the Tuning Screen; i.e. starts logging data from the PTS.

Reset

Resets the Tuning Screen display.

Freeze

Freezes the display at the end of the next full screen of information. NB: The software continues to retrieve data from the PTS.

Stop

Stops retrieving data from the PTS.

Update View

Updates the Tuning window display in Historical mode.

Open View...

Opens a previously created Tuning Screen (or Scope) display file.

Save View...

Saves current display view to a file on disk.

Print...

Prints the display on the Windows Default Printer.

Print Setup...

Sets up the titles and comments to be included on the printout of the display

Close Tuning

Closes the Tuning Screen.

Exit

Quits PTS Toolkit

5.12 Tuning Screen - Edit Menu Commands

This section briefly describes the operations available from the Tuning Screen Edit menu.

Join Points

Toggles on and off to join points displayed in Historical mode.

Zoom In

Zooms the display in between the current Left and Right cursor positions. Does not affect the y-axis scaling.

Zoom Out

Zooms the display in back out, after a Zoom In operation, to show all the display information.

Display Settings...

Displays the trace scaling dialog box. Sets the maximum and minimum scaling values for motor velocities and position error and the time base (x-axis display).

Display Colours...

Allows the screen colours to be changed for the background, the grid and the four screen traces. Choose the colour required from the Colours dialog box displayed and press OK.

Trace Width

Allows the width for the four screen traces to be selected from: thin, medium and thick setting.

Grid Style

Allows the line style of the grid major and minor axis to be changed. Choose from: solid, Dash, Dot, DashDot or DashDotDot.

5.13 Tuning Screen - Options Menu Commands

This section describes the operations available from the Tuning Screen Options menu. Not all options will be available at any time; the selections depend on the current mode of operation.

Historical Mode

Selects the Historical or Snapshot mode of operation.

Scope Mode

Selects the Scope or On line mode of operation.

Channel Select

Selects the motor channel to be tuned.

Trace On/Off

Switches the display traces on and off.

Tuning Gains

Displays the Tuning dialog box.

Moves / Speeds

Displays the Moves and Speeds dialog box.

Mouse Enable

Toggles the mouse click enable. When disabled mouse clicks are ignored within the Tuning Screen.

Legend (On/Off)

Toggles the trace legend display on the lower status bar on and off.

Grid (On/Off)

Toggles the screen grid display on and off..

Toolbar

Toggles the toolbar display on or off.

6. PTS Scope

6.1 Introduction

PTS Scope provides a PC based oscilloscope for monitoring signals (or parameters) from the Quin PTS. The software allows up to 4 different traces to be plotted on the PC screen at a time; chosen from up to nine different channel parameters or any available digital &/or analogue I/O line (the amount of I/O available depends on the PTS configuration).

The Scope function can operate in three different modes; Accumulate Mode, Scope Mode and Historical Mode. The selected mode of operation determines the functions available to the user. All modes provide the ability to take a hard copy of the current screen display using the Windows Print Manager, to any Windows compatible printer capable of printing graphics.

Using the Mouse buttons, to operate the Left and Right hand cursors, trace information can be obtained from the screen to measure exact parameter values.

6.2 PTS Scope - Scope Mode

In Scope Mode PTS Scope acts in a similar manner to a standard refresh oscilloscope. It is designed to work "on-line" with the PTS and display the selected trace parameter values in real time.

WARNING: To operate the Scope in Scope Mode the PTS Toolkit Terminal Window must be open and connected to the PTS. In addition the PTS must be in Privileged Mode (see section 4.1), otherwise the Scope will not operate. If the Terminal is not open correctly the Scope will only operate in Historical Mode and not all facilities will be available.

6.3 PTS Scope Historical Mode

PTS Scope in Historical Mode can be used for two types of operation; the first is "on-line" in a similar way to the Scope Mode of operation, the other is simply as a passive application for viewing (and saving) previously created PTS Toolkit *"*.DAT"* Scope and Tuning files.

In the "on-line" mode PTS Scope acts as a "snap-shot" recorder for PTS data. When started the Scope orders the PTS to start sending the selected trace information as recorded in 4 msec intervals, starting from the time the start order was sent.

For example: if the Scope Time Base is set to 100 msec per division, when started the PTS will send back 250 points at 4 msec intervals from the time it received the start command. This mode of operation enables traces to be recorded at a much higher resolution but does not operate in "real time". The PTS measures the data immediately then buffers it up until it is ready to be sent to the Scope. The number of points requested by the Scope can also be set by the No. Points option in the X Axis Display Settings dialog box.

The data points retrieved back from the PTS are plotted on the screen as individual points. These can be joined using the Join Points option under the main Edit menu.

WARNING: To operate the Scope in historical logging or "snap-shot" mode the Terminal Window must be open and connected to the PTS. In addition the PTS must be in Privileged Mode (see section 4.1); otherwise the Scope will not operate. If the Terminal is not open the Scope will only allow the user to view previously created display files.

6.4 PTS Scope Accumulate Mode

PTS Scope Accumulate Mode provides the ability to accumulate trace data over a period of time to produce an emerging information picture. The mode of operation resembles that of an oscilloscope with signals connected to both the X and Y axes, but with each point plotted individually.

It is designed to work "on-line" with the PTS and display the selected trace parameter values in real time to provide data logging for a cyclical process or repeating operation; i.e. mapping

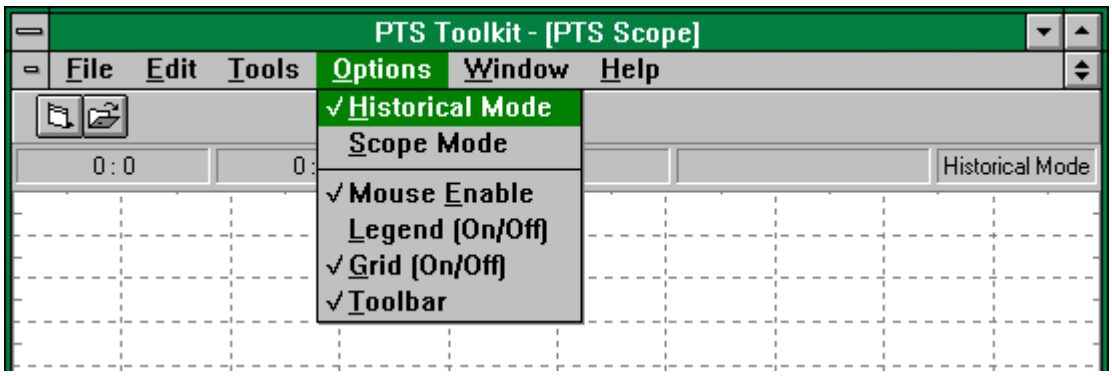
between multiple channels. The number of points displayed on the screen can be used to control the amount of data recorded at any time. The X-axis variable can be changed using the Display Settings dialog box to allow the four traces to be plotted relative to up to five different parameters.

WARNING: To operate the Scope in Accumulate Mode the Terminal Window must be open and connected to the PTS. In addition the PTS must be in Privileged Mode (see section 4.1), otherwise the Scope will not operate. If the Terminal is not open the Scope will only allow the user to view previously created display files in historical mode.

Note: Some versions of the PTS Toolkit Scope may not offer this Accumulate Mode option.

6.5 Selecting Mode of Operation

To choose the required operation select the mode required from the list under the Options choice from the main menu. The mode cannot be changed if PTS Scope is currently operating, i.e. retrieving data from the PTS. PTS Scope cannot be operated in the Accumulate or Scope Modes if the Terminal WindowTerminal_Brief is not open and connected to the PTS.



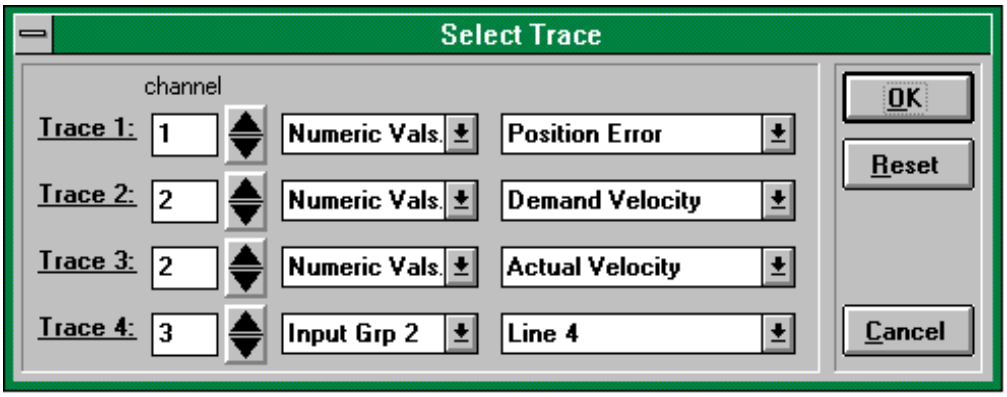
Note: Some versions of the PTS Toolkit Scope may not offer the Accumulate Mode option.

6.6 Selecting Scope Trace Parameters

Before starting the Scope the screen trace parameters need to be selected. These can be selected from up to nine different channel parameters or any available digital &/or analogue I/O line (depending on the PTS configuration).

From the main menu select the Edit option; then use the Select Trace option to show the Select Trace dialog box (shown below). Use the list boxes displayed to select the channel required (left hand list box) and its associated parameter (right hand list box).

If a digital I/O line is to be monitored, select the input or output group (middle list box) and the actual input or output line required (right hand list box).



Press the OK button to accept the selected parameters (from the list shown below) and remove the dialog box. The Reset button clears all the trace selections. Pressing the Cancel button will remove the dialog box and ignore any changes.

Demand Position

The Demand Position is the value calculated internally by the PTS for the motor's required position. It is measured in counts.

Actual Position

The Actual Position is the value of the current motor position as measured from the motor encoder. It is measured in counts.

Position Error

The motor Position Error is the difference between the calculated demand and measured actual positions of the motor. It is measured in counts.

Demand Velocity

The Demand Velocity is the value calculated internally by the PTS for the motor's required velocity. It is measured in counts per second.

Actual Velocity

The Actual Velocity is the value of the current motor velocity, as calculated from successive motor encoder positions. It is measured in counts per second.

Averaged Velocity

The Averaged Velocity is the measured actual velocity after applying an averaging mechanism as set up by the VT command. It is measured in counts per second.

Reference Error

The Reference Error value is the absolute position error relative to the last valid reference input. It is measured in encoder counts.

Snapshot Position

The Snapshot Position value is the absolute position measured when the last snapshot input signal was detected. It is measured in encoder counts.

Analogue Input

The Analogue Input is the measured value for the current analogue input signal voltage. It is calculated as a number in the range -2047 to +2047, corresponding to -10V to +10V.

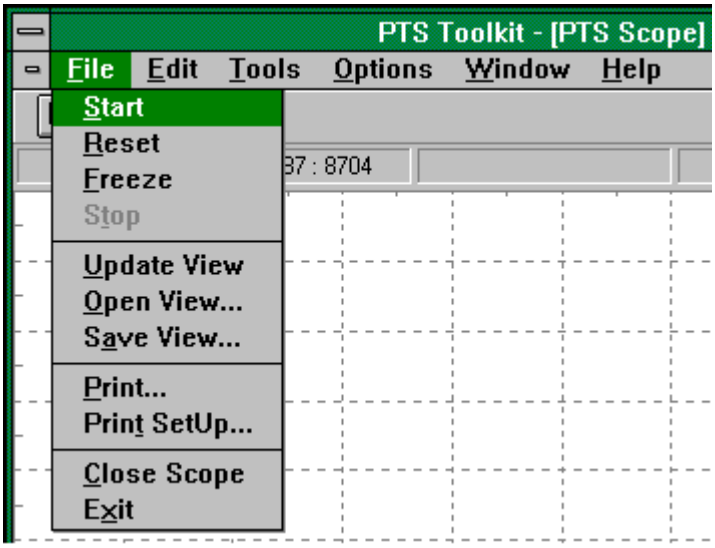
Digital Inputs and Outputs (I/O)

The digital input and output lines can be monitored by the Scope and displayed on the PC screen as a value 1 (high) or 0 (low). Care needs to be taken to ensure that the Y axis scaling is set correctly.

Note: Care must be taken when selecting parameters to ensure that the PTS has been configured correctly. This is especially important when selecting the correct I/O groups.

6.7 Starting and Stopping the Scope

The Scope data retrieval from the PTS is controlled by the Start and Stop options on the File menu.



Start automatically resets the display and commands the PTS to start sending data. Stop will force the PTS to stop the data transfer.

The screen can be reset at any time using the Reset option on the File menu. The Freeze option "freezes" the screen display with the next full screen of information; this option only stops the screen update not the data retrieval from the PTS.

Note:

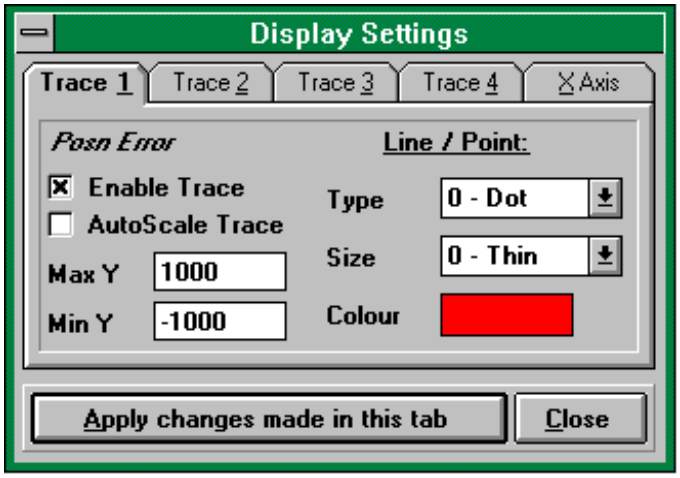
(i) If the Terminal Window is not open, commands cannot be sent to the PTS and some functions of the Scope will be unavailable.

(ii) If the PTS is not in Privileged Mode the Scope traces will not be displayed.

(iii) Advanced users may note that during data retrieval the screen update on the Terminal Window is disabled; however commands can still be sent to the PTS, they just won't be echoed on the screen.

6.8 Adjusting the Trace Display Settings

The display settings for each trace are set from the Display Settings dialog boxes. Each trace can be set up individually from the other traces. From the main menu select the Edit option; then use the Display Settings option to show the trace settings dialog box. Use the tab buttons to select which trace you wish to modify. Specify the settings required, as described below, and press the Apply button to update the display. Changes are not actioned until Apply is pressed.



Enable Trace

This check box turns the current trace On or Off (checked or un-checked)

Point Type

This option allows the user to select the point type used in the Historical and Accumulate Modes. Select from a list containing: Dot, Cross, Star and Circle. These point types are also used on the "hard copy" printouts to distinguish between traces.

Point/Line Size

The screen point size or line width can be select from a list of: Thin, Medium and Thick. The default is thin and may need changing on screens with low resolutions or Laptop computers.

Colour

Selecting this box displays a Windows Colour dialog box. Select the colour required from the options displayed and the press OK button. If using the keyboard press the Space Bar to select the colour.

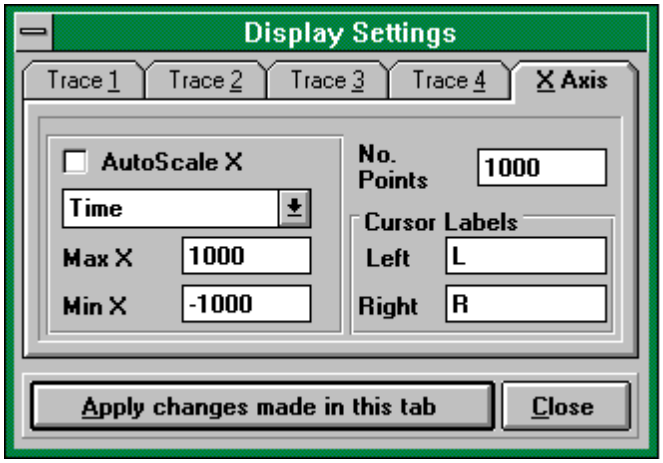
Trace Scaling (Y Axis)

The maximum and minimum values for the displayed Y axis for each trace can be set individually, or by using the AutoScale function. Checking the AutoScale Trace check box will force the display to scale the Y axis to fit the trace values currently recorded in the Scope. This scaling will take place when the Apply button is pressed and will overwrite any values currently shown in the maximum and minimum text boxes.

The values set for the Y axis scaling relates only to the displayed values; i.e. does not affect the actual trace values returned by the PTS. If the scaling values are not set correctly the traces may not appear on the screen; e.g. if the trace values are approx. 1000 and the max. Y is 500, the trace will not appear on the screen.

6.9 Adjusting the Scope X Axis Display Settings

The X axis display settings are obtained from the same menu. From the main menu select the Edit option; then use the Display Settings option to show the dialog box below. Select the X axis tab. Specify the settings required, as described below, and press the Apply button to update the display.



Time Base

In "on line" Scope Mode the scale on the X-axis (horizontal axis) is the Time Base. It is measured in milliseconds per division; where one division is one tenth of the time displayed across the whole width of the screen and is shown by the minor grid lines. The user can select a time base value from a list of common values, or specify a custom value.

In Scope Mode the Scope retrieves data points from the PTS with a time of approximately 70-80 msecs between points. This speed also depends on the speed of the computer running PTS Toolkit. If the Time Base is very small or the computer very slow, the resolution of the traces will be reduced. In Historical Mode the time between successive data points is always 4 msecs and so the Time Base cannot be changed.

X-Axis Scaling

In the Historical and Accumulate Modes of operation the Scope X axis can be customised. The X axis defaults to Time but can be changed by selecting the required parameter from a list. This list contains up to five parameters: time and the parameters selected in the Select Trace dialog box. This allows the four chosen traces to be plotted relative to time or each other.

The maximum and minimum values for the X axis can be set individually or by using the AutoScale function. Checking the AutoScale X check box will force the display to scale the X axis to fit the values currently stored in the Scope for the selected X axis. This scaling will take place when the Update button is pressed and will overwrite any values currently shown in the maximum and minimum text boxes.

The No. Points value sets the number of points that the Scope will store for each trace, up to a maximum of 1000 points per trace. This number also specifies the number of data points requested back from the PTS in "snap shot" Historical Mode.

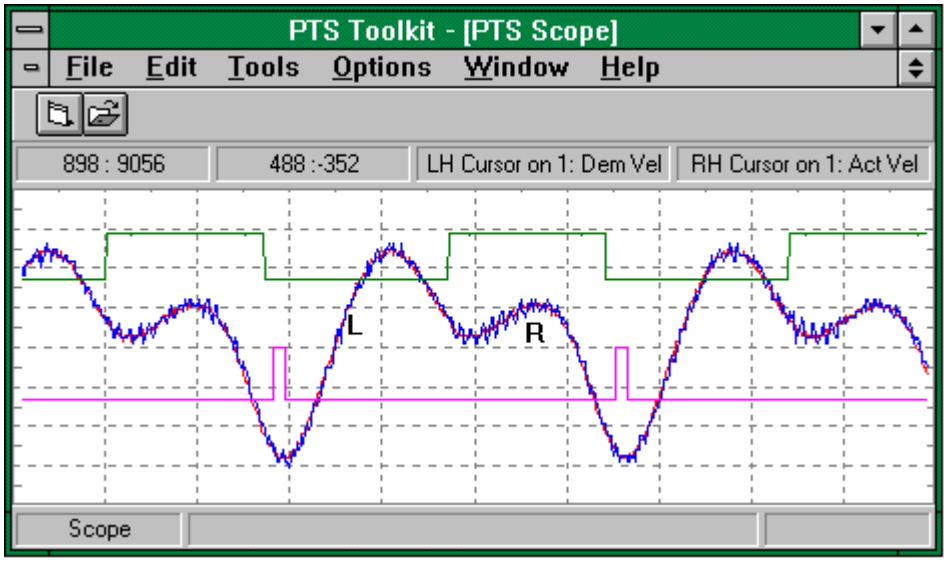
Cursor Labels

This option allows the user to customise the text displayed next to the selected point when the mouse buttons are pressed, up to a maximum of 8 characters. The mouse buttons can be used to interrogate the traces to obtain actual PTS parameter values.

6.10 Using the Cursors to Measure Screen Trace Values

PTS Scope makes use of a standard two button Windows compatible mouse to control two screen cursors. Clicking a mouse button will select the nearest data point in the display screen to the current screen cursor position.

If the left hand mouse is clicked the data point selected is highlighted by a dot and an "L" character. If the right hand button is used to select a data point it will be represented by a dot an "R" character. The character string displayed when a mouse button is clicked can be changed in the Display Settings dialog box.



Trace information about the position of the selected points is shown in the status bar above the display. The left hand status box shows the absolute position co-ordinates of the left hand point; e.g. *"122000 : 4000"* - indicates the data time value is 122000 msecs since the PTS was powered up and that the Y trace value is 4000 (units depending on parameter currently displayed).

The next status box shows the position co-ordinates of the right hand point relative to the position of the left hand point; e.g. *"625 : -860"* - indicates the right hand point was recorded 625 msecs after the left hand point and that the Y trace value is 860 (again units depending on parameter currently displayed) less than the value of the left hand point.

The third and fourth status boxes indicate the actual trace the points rest on; e.g. "LH Cursor on Dem Vel" indicates that the left hand point lies on the Demand Velocity trace.

If the cursors are used whilst the Scope is updating it is advisable to use the Freeze function to stop the screen refresh at the end of each complete screen display.

6.11 Opening & Saving Historical Scope Views

PTS Scope in Historical Mode can be used simply as a passive application for saving screen displays and viewing previously created PTS Toolkit *"*.DAT"* Scope and Tuning files.

To Save a screen display in Historical Mode simply select the File option from the main menu, then Save View. A Windows Save dialog box prompts for a filename for the data file (NB: the default extension used by the Scope is *.DAT).

The current Scope display will be saved with the specified filename. The saved data file will contain information about the number of points, trace set up and scaling current set in the Scope.

To open a Scope screen display from a file previously created; select the File option from the main menu, then Open View. A Windows Open dialog box prompts for a filename. Type in the required filename or select one from the list. If the selected file is a valid Scope display file the Scope display screen with be update with the new data.

NB: The Scope will use the trace and scaling settings saved with the data file; overwriting any current settings.

6.12 PTS Scope - File Menu Commands

This section briefly describes the operations available from the Scope File menu.

Start

Starts the Scope; i.e. starts logging data from the PTS.

Reset

Resets the Scope display.

Freeze

Freezes the display at the end of the next full screen of information. NB: The software continues to retrieve data from the PTS.

Stop

Stops retrieving data from the PTS.

Update View

Updates the Scope display in Historical mode.

Open View...

Opens a previously created scope (or Tuning Screen) display file.

Save View...

Saves current display view to a file on disk.

Print...

Prints the display on the Windows Default Printer (‘Scope needs to be frozen or stopped).

Print Setup...

Sets up the titles and comments to be included on the printout of the display.

Close Scope

Closes the Scope Function.

Exit

Quits PTS Toolkit

6.13 PTS Scope - Edit Menu Commands

This section briefly describes the operations available from the Scope Edit menu.

AutoScale

Automatically scales all Y traces enabled on the display screen. Individual traces can be scaled using the Display Settings dialog box (see below). This function can be useful if a new "logging" operation has been started where trace values are unknown and cannot be seen on the current screen display.

Join Points

Toggles on and off to join points displayed in Historical mode.

Zoom In

Zooms the X-axis display between the current Left and Right cursor positions. Does not affect the y-axis scaling.

Zoom Out

Zooms the display in back out, after a Zoom In operation, to show all the display information.

Select Trace...

Displays the Select Trace dialog box. Allows each of the four individual scope traces to be set up to display the motor channel parameter or I/O line required. See How to Select Trace Parameters for more information.

Display Settings...

Displays the Display Settings dialog box. This dialog box allows trace display settings to be changed. These include: maximum X & Y, minimum X & Y, width, point type, colour and time base values to be set as required. See How to Change Display Settings for more information.

Display Colours...

Allows the screen colours to be changed for the background and the grid display. Choose the colour required from the Colours dialog box displayed and press OK.

Grid Style

Allows the line style of the grid major and minor axis to be changed. Choose from: solid, Dash, Dot, DashDot or DashDotDot.

6.14 PTS Scope - Options Menu Commands

This section briefly describes the operations available from the Scope Options menu.

Accumulation Mode

Selects the Accumulation mode of operation (where this option is available).

Historical Mode

Selects the Historical or Snapshot mode of operation.

Scope Mode

Selects the Scope or On line mode of operation.

Mouse Enable

Toggles the mouse click enable. When disabled mouse clicks are ignored within the Scope display.

Legend (On/Off)

Toggles the trace legend display on the lower status bar on and off.

Grid (On/Off)

Toggles the screen grid display on and off..

Toolbar

Toggles the toolbar display on or off.

7. **Motion Generator Package**

The Motion Generator is a powerful software package developed for graphically designing custom machine motions. The package allows the user to define any motion using a library of complex mathematical models. The motion is stored as a set of parameters that describe the vector profile generated by the software. These parameters can be easily downloaded to the PTS system and automatically translated into a PTS Toolkit profile or "map".

A separate manual is provided with this feature and the related PTS embedded motion generator.

8. Miscellaneous Features

8.1 Introduction

Some of the functions in the PTS Toolkit package are similar for all the different tools. This section describes some of the common features of the PTS Toolkit programming package.

8.2 PTS Toolkit - Window Menu Commands

This section briefly describes the operations available from the PTS Toolkit Windows menu. These operations are common to most Windows compatible applications.

Cascade

Cascades all non-minimised windows open in PTS Toolkit.

Tile

Tiles all non-minimised windows horizontally.

Split

Splits all non-minimised windows vertically.

Arrange Icons

Arranges icons of all minimised windows.

Window List

Displays a list of current windows in PTS Toolkit. Selecting the window required will display it in the package at the front of the screen.

8.3 Using the PTS Toolkit Toolbar

Some PTS Toolkit operations can be carried out quickly whilst in any tool by pressing the buttons displayed on the Toolbar. The list below describes the buttons available in each tool and their corresponding action.

New: Opens a new blank text file.

Open: Opens an existing text file.

Save: Saves the current text file. Only available in the Text Editor

Cut: Deletes selected text and copies it to the Windows Clipboard overwriting previous contents. Only available in the Text Editor

Copy: Copies selected text to the Windows Clipboard overwriting previous contents.

Paste: Pastes the contents of the Windows Clipboard into a text file at the current position or overwrites selected text. In the Terminal window this operation sends the contents of the clipboard to the PTS.

Find: Searches current text file for the next instance of the specified text. Only available in the Text Editor

Find Next: Repeats the last find operation. Only available in the Text Editor

8.4 Version Number

The version number for the PTS Toolkit software can be found from the About dialog box under the main Help menu. This manual describes the PTS Toolkit Software versions 1.0 (or higher). The note in brackets next to the version number details the options available in this software as follows:-

- **Mini :** contains the standard Text Editor and Terminal tools,
- **Standard:** contains the standard Text Editor, Terminal and Tuning Screen tools,
- **Scope:** contains the standard tools and the PTS Scope function,
- **Motion:** contains the standard tools and the Motion Generator package,
- **Professional:** contains the standard tools, the PTS Scope and the Motion Generator,

The text editor and terminal functions of this software are device independent. The Tuning Screen and PTS Scope functions (where included) have been designed to work with the Quin PTS running version 1.6 (or higher) firmware. RTS/CTS hardware handshaking is only available with the Quin PTS running version 1.7 (or higher) firmware.

9. Glossary of Terms

Actual Position

The Actual Position is the value of the current motor position as measured from the motor encoder. It is measured in counts.

Actual Velocity

The Actual Velocity is the value of the current motor velocity, as calculated from successive motor encoder positions. It is measured in counts per second.

Analogue Input

The Analogue Input is the measured value for the current analogue input signal voltage. It is calculated as a number in the range -2047 to +2047, corresponding to -10V to +10V. For more information see the Analogue Control section of the PTS Reference Manual.

Averaged Velocity

The Averaged Velocity is the measured actual velocity after applying an averaging mechanism as set up by the VT command. It is measured in counts per second.

The measured motor velocity, or Actual Velocity; is calculated from successive encoder positions. These are measured at 4ms intervals, and so the measured speed is only accurate to 256 encoder counts per second.

The VT command sets up an averaging mechanism on the motor axis, such that the number of samples of speed doubles for each increment in the value of VT. At VT=0 (the default), no averaging is done, and the Averaged Velocity is equal to the Actual Velocity. At VT=8 (the maximum value), 256 samples are averaged over a period of 1 second, giving a speed measurement accurate to 1 count per second.

The system keeps a running average of the speed which is updated at each 4ms sample, so that the latest average speed is always available. Note that whenever the averaging time is changed, the current average value is reset to zero and the running average is restarted.

Cut & Paste

Cutting and Pasting are the terms given to the operation where selected text can be transferred to and from the Windows Clipboard. The technique is useful for moving or copying blocks of text between different text files and/or the terminal window.

Demand Position

The Demand Position is the value calculated internally by the PTS for the motor's required position. It is measured in counts.

Demand Velocity

The Demand Velocity is the value calculated internally by the PTS for the motor's required velocity. It is measured in counts per second.

Digital Inputs and Outputs (I/O)

The digital input and output lines can be monitored by the Scope and displayed on the PC screen as a value 1 (high) or 0 (low). Care needs to be taken to ensure that the Y axis scaling is set correctly.

Motion Generator

The Motion Generator is a powerful software package developed for graphically designing custom machine motions. The package allows the user to define any motion using a library of complex mathematical models. The motion is stored as a set of parameters that describe the vector profile generated by the software. These parameters can be easily downloaded to the PTS system and automatically translated into a PTS Toolkit profile or map.

Position Error

The motor Position Error is the difference between the calculated demand and measured actual positions of the motor. It is measured in counts.

PTS Scope

PTS Scope provides a PC based oscilloscope for monitoring signals (parameters) from the Quin PTS. The software allows up to 4 different traces to be plotted on the PC screen at a time; chosen from up to 9 different channel parameters or any available digital/analogue I/O line.

Reference Error

The Reference Error value is the absolute position error relative to the last valid reference input. It is measured in encoder counts. For more information see the Reference Commands section in the PTS Reference Manual.

Snapshot Position

The Snapshot Position value is the absolute position measured when the last snapshot input signal was detected. It is measured in encoder counts. For more information see the PS configuration command in the PTS Reference Manual.

Terminal

The Terminal provides a communications window between the PTS Toolkit software and Quin motion control products. The Terminal supports Cut & Paste operations between itself and text files, a download facility for programming the PTS and historical logging facility for recording communications.

Text Editor

The PTS Note Text Editor can be used to create, view and edit PTS program files. PTS Toolkit will allow multiple text files to be opened for viewing &/or editing at any time. Cut & Paste operations are supported between open text files and the Terminal Window

Tuning Screen

The Tuning Screen provides the user with a graphical display for monitoring motor velocities as an aid to tuning. The software enables the user to view a motors velocity profiles and its position error; whilst tuning parameters are adjusted via a Windows Dialog box.

Appendix A - Installation Guide

A.1 PTS Toolkit System Requirements

To install and run PTS Toolkit you should have certain hardware and software installed on your computer. Requirements include:

- Any IBM compatible personal computer (PC) with an 80386 processor or higher.
- A hard disc drive with at least 1.5 Mbytes (PTS Toolkit 'mini' version) 3 Mbytes (PTS Toolkit 'all' version) of disc space free.
- A 3 1/2" floppy disc drive.
- An EGA, VGA, 8154, Hercules or compatible display.
- At least 1 Mbyte of free memory.
- A Microsoft Windows compatible mouse.
- Microsoft MS-DOS version 3.1 or later.
- Microsoft Windows version 3.1 or later in standard or enhanced mode.

These are the minimum requirements to run PTS Toolkit. Some of the features of the software will exhibit improved performance on more powerful systems. In particular the Tuning Screen, PTS Scope and Motion Generator will run much quicker on faster processors.

A.2 Installing PTS Toolkit

Use the SETUP.EXE program on the installation (first if two) disc to install PTS Toolkit. This program will automatically uncompress and install the required files from the installation disc in to the correct directories on the target hard disk.

To start setup:

1. Insert the disk into your floppy disc drive; usually drive A.
2. Start up Windows on your PC.
3. From the **File** menu of the Program Manager choose the **Run** option.
4. Type **a:\setup** <*RETURN*>, where "**a**" is the name of your floppy disc drive.
5. Follow the Setup instructions on the screen.

A.3 Starting PTS Toolkit

Once the PTS Toolkit has been successfully installed the application can be started by double-clicking the PTS Toolkit icon in the new program group.

This Reference manual explains how to use the software once it has been installed. The information is also stored in a Windows Help file, "*QUINPTS.HLP*" shipped with the software. It can be accessed from the Windows Help file manager or from the Help menu in the PTS Toolkit main menu.

The descriptions throughout this manual and in the Windows help file assume at least a basic knowledge of the Microsoft Windows operating system and the Quin Systems PTS. If more information is required on either of these topics please refer to your Microsoft Windows software documentation or the PTS Reference Manual respectively.

Appendix B - Important Information

B.1 PTS Toolkit Applications Notes

As with all control software, care should be taken when using the PTS Toolkit front end to connect to a “live“ system. The software allows the operator access to some of the more critical control parameters of a control system; this can lead to a potentially hazardous situation. PTS Toolkit should not be used to change, update or modify the PTS whilst it is operating a machine, unless the user is fully aware of the consequences.

The PTS (and other Quin motion controllers) have been designed to work as stand alone computers. They are generally more rugged and immune to hardware and/or software system failures than standard PCs, especially in an industrial environment. Leaving a PC connected to the programming port on the PTS, during normal system operation, may leave the control system susceptible to PC system errors.

PTS Toolkit has been developed as a machine design tool for use during development of a motion control system. It is therefore advised that the PTS Toolkit software is used for system programming, configuration and commissioning rather than long term data logging and/or system monitoring.

If run-time control and monitoring of a machine is required, a number of more suitable products and techniques can be used. Please contact the Quin Systems Sales Department for more information on available products.

B.2 Windows Serial Port Communication

PTS Toolkit has been designed to work on all IBM compatible PCs; extensive testing has been carried out at Quin Systems and on customer sites to ensure that this is the case. However it is impossible to test the software on every single type and configuration of PC currently on the market.

This section provides a brief description of some of the potential problems with running PTS Toolkit on different PC types and configurations; in particular these problems concentrate on running serial ports under the Windows operating system.

If the PTS Toolkit Terminal reports “Buffer Overflow” or “Buffer Overrun” errors, this indicates that data sent by the PTS is being lost by the PC. Using a handshaking protocol between the PC and PTS should eliminate this problem.

There are two main types of handshaking: software (XON/XOFF) and hardware (RTS/CTS). The PTS Toolkit Terminal offers a third type which is a combination of these two (see Configuring the Terminal Settings in section 4.2). If errors are being reported it is suggested that the Terminal should be set to hardware handshaking (RTS/CTS) to communicate with Quin motion controllers (see the next section for PC to Quin products connection information).

The handshaking operation still depends on the type and configuration of the PC and Windows operating system used. If problems still persist with Terminal errors, try the following suggestions.

- It has been discovered that the Battery Managers on some Laptop computers can interfere with the serial communication. If possible disable the battery management application.
- Running a network on the PC can interfere with the serial communication under Windows. If possible disconnect the network and disable any network software that is running.
- Many new computers use the 16550 UART serial communications chip. Customers are advised that problems may be encountered when trying to use this chip to communicate with PTS systems running firmware below version 1.7. Using a hardware handshaking protocol should overcome the problems in these cases.
- The standard communication drivers shipped with Microsoft Windows may have limitations when used for high performance communication. A number of companies have produced custom communication drivers to replace the standard ones for use under Windows. In

particular these custom drivers generally implement more effective handshaking. Contact your software supplier for more information.

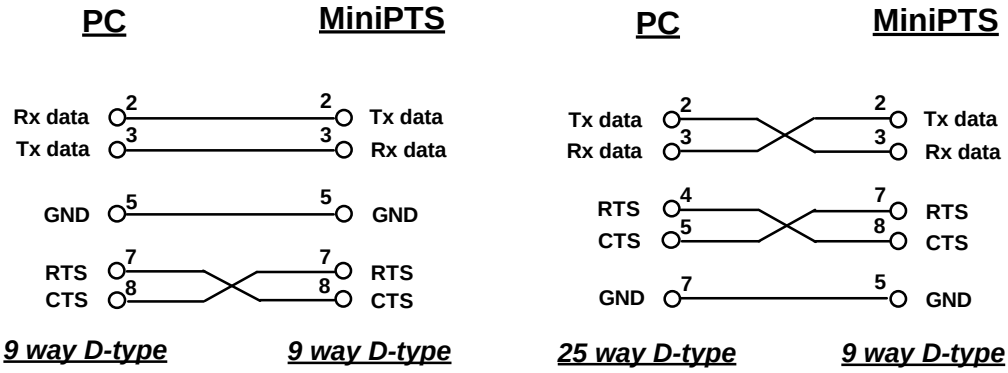
- Windows for Workgroups (WFWG) can have potential problems when running a serial port in certain situations. It is advised to replace some of the software drivers used by the operating system to eliminate these. An updated SERIAL.386 file is available from Microsoft to replace the standard product shipped with WFWG. It is also advised to use the COMM.DRV file shipped with the standard Windows operating system, in place of the WFWG file. Contact your Windows software supplier for more information on how to obtain these files.

It must be emphasised that in general the majority of computers can be used to run PTS Toolkit without any problem. These notes cover general problems that may be encountered by any Windows user trying to use a serial port for high performance applications.

B.3 Serial Port Connections

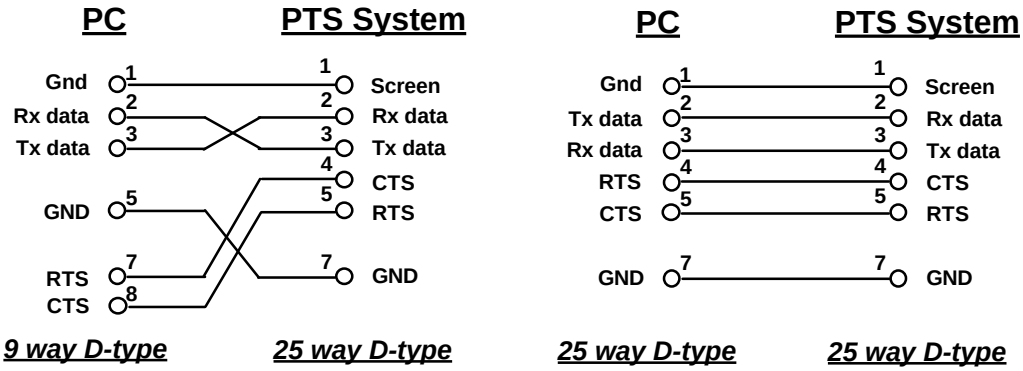
This section provides detailed information relating to the actual serial connections required to interface a PC to a Quin motion controller.

B.3.1 Serial cable connection between a PC and a Quin MiniPTS



Note: Pins 7 and 8 on the PTS are only required to be connected if RTS/CTS hardware handshaking is to be used. See section B.3.4 for more information on using hardware handshaking with the PTS.

B.3.2 Serial cable connection between a PC and a Quin PTS System



Note: Pins 4 and 5 on the PTS system are only required to be connected if RTS/CTS hardware handshaking is to be used. See section B.3.4 for more information on selecting handshaking options on the PTS.

B.3.3 Serial cable connection between a PC and a Quin TRC Unit

The serial connections between a PC and Quin TRC units are similar to those used between a PC and a Quin PTS System. The only difference is that hardware handshaking is not an option available on the Quin TRC units.

B.3.4 Handshake Selection on the Quin MiniPTS and PTS

MiniPTS

The Quin MiniPTS (4 channel) uses XON/XOFF software handshaking by default for serial communication using the programming port. To select the hardware handshaking option, insert a link between pins 1 and 2 of jumper J10 on the MiniPTS SRV-4 board (see the Quin MiniPTS Installation manual for more details). Connect the PC, with hardware handshaking selected in the Terminal settings, using a cable with the RTS and CTS lines connected. Then power on the MiniPTS. It is important that pin 8 (CTS) on the MiniPTS programming port is "pulled high" or logically ON, when the MiniPTS is powered on. Connecting the PC first should ensure that this happens.

To return to software handshaking remove the PC connection and power the MiniPTS off and on. If there is any risk that a user may connect a PC set for software handshaking, with a lead configured for hardware handshaking, the link on jumper J10 should be removed.

The MiniPTS 2+1 uses software to permit hardware handshaking on the serial ports. To enable hardware RS232C handshake, use command CF to set port A to RS232 with hardware handshake, then power off and back on with the CTS pin 8 held high. Power on with CTS off will revert to software handshake; use command CF again to set port A to RS232, software handshake to inhibit hardware handshake and prevent any error in selection.

IMPORTANT

The MiniPTS must be set back to software handshaking before removing the PC connection for any extended period of time. If the connection needs to be removed without powering off the MiniPTS, pins 7 and 8 on the programming port should be linked immediately after removing the PC connection. This should only be used as a temporary measure until the MiniPTS can be safely powered off.

PTS

The Quin PTS systems automatically detect the handshake mode without the requirement for any user configuration.

The Quin PTS 2 systems, which use 4-axis servo controllers, use the link between pins 1 and 2 of jumper J18 on the CPU20 board to permit hardware handshake, when serial port pin 4 is high at power-on.

IMPORTANT

As for the MiniPTS systems above, removal of the serial lead with hardware handshake active can block control operations. A temporary expedient is to link pins 4 and 5 of the programming port until power can be cycled.

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