

# Introduction

## Purpose of this Document

This document is designed as a reference for the firmware features used with the Gemini Series of digital stepper and servo drives. For hardware-related information (e.g., electrical wiring connections, specifications, setup/configuration and tuning procedures, etc.), refer to the relevant Gemini drive *Hardware Installation Guide*. These documents are available in Acrobat PDF format from the Compumotor web site (<http://www.compumotor.com>).

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### NOTE

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The commands described in this document can be used only with Motion Planner, Pocket Motion Planner, or the COM6SRVR Communications Server.

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# Description of Format

1.	2.	3.
	<b>DRES</b>	<b>Drive Resolution</b>
4.	Type	Drive Configuration
5.	Syntax	<a_><!>DRES<i> (takes effect after RESET or cycle power)
6.	Units	Rotary motors: i = counts/rev Linear motors: i = counts/electrical pitch
7.	Range	GT/GT6: 200-128000; GV/GV6: 200-1024000
8.	Default	GT/GT6: 25000; GV/GV6: 4000
9.	Response	DRES: *DRES25000
10.	See Also	DMEPIT, DRIVE, ERES

Item Number	Description
1.	<b>Mnemonic Code:</b> This field contains the command's mnemonic code.
2.	<b>Full Name:</b> This field contains the command's full name.
3.	<b>Valid Product &amp; Revision:</b> This field lists the Gemini Series products and the revision of each product when this command was incorporated or modified per the description. If the command does not apply to that particular product, the <b>Rev</b> is specified as "n/a".  You can use the <b>TREV</b> command to determine which drive operating system revision you are using. For example, if the <b>TREV</b> response is * TREV-GV6-L3E_D1.05_F1.00, the drive operating system revision is 1.05 and the flash boot code revision is 1.00.
4.	<b>Type:</b> This field contains the command's type. In Appendix B, you will find a list of all Gemini Series commands organized by command type.
5.	<b>Syntax:</b> The proper syntax for the command is shown here. The specific parameters associated with the command are also shown. Definitions of the parameters are described in the <i>Syntax</i> sections below. If the command requires a RESET to take effect, that is indicated as well. <u>If you use Gemini drives in a daisy-chain or multi-drop:</u> To address a command to a particular unit in a daisy-chain or multi-drop, you must use the <i>address specifier</i> (e.g., 2_LH0 disables both end-of-travel limit inputs on unit #2). If you leave off the address specifier, the command will affect all units on the chain. To assign addresses to multiple drives, refer to the <b>ADDR</b> command.
6.	<b>Units:</b> This field describes what unit of measurement the parameter (b, i, or r) in the command syntax represents. If you are using a linear servo motor, refer to the command value conversion requirements noted on page 74.
7.	<b>Range:</b> This is the range of valid values that you can specify. If you enter a value outside of the valid range, the Gemini drive will indicate an <i>error prompt</i> (see <b>ERRLVL</b> ). Due to the digital nature of the Gemini drive, non-integer numeric data entries are rounded to the nearest valid value. The maximum difference between the entered data (to the drive) and the reported value (from the drive) is given by the $\pm 0.nnn$ tolerance window. The maximum response field length is command dependent, as shown in the Response field.
8.	<b>Default:</b> The default setting for the command is shown in this field. A command will perform its function with the default setting if you do not provide a value. If you see the " <b>AUTO-SETUP</b> " note in the command description, this means that the default is automatically set according to the Parker motor you selected with the configuration wizard in Motion Planner (see page 6) or configuration tool in Pocket Motion Planner (see page 11). Some data-related commands (commands that accept binary or numeric data fields) are automatically retained in EEPROM memory ( <b>GT6 &amp; GV6: These commands are saved in EEPROM only if they are executed outside of a program</b> ); these commands are denoted with "☒" in the list on page 187.
9.	<b>Response:</b> Some commands allow you to check the status of the command. In the example above, when you enter the <b>DRES</b> command by itself you will receive the response *DRES25000 (response indicates the drive resolution is set to 25,000 counts/rev). The example responses provided are based on the default error level, established with the <b>ERRLVL4</b> command. <u>If you use Gemini drives in a daisy-chain or multi-drop:</u> To check the status on a particular unit in a daisy-chain or multi-drop, you must use the address specifier (e.g., 2_DRES to check the drive resolution of unit #2). If you leave off the address specifier, the response will be garbled characters because all units in the chain will be responding at once. To assign addresses to multiple drives, refer to the <b>ADDR</b> command.
10.	<b>See Also:</b> Commands related or similar to the command described are listed here.

# Syntax -- Letters and Symbols

The command descriptions provided within this manual use alphabetic letters and ASCII symbols within the **Syntax** description (see example below) to represent different parameter requirements.

DRES		Drive Resolution	Product	Rev
Type		Drive Configuration		
→ Syntax	<a_><!>DRES<i>	(does not take effect until RESET or cycle power)	GT	1.02
Units		Rotary motors: i = counts/rev Linear motors: i = counts/electrical pitch	GV	1.00
Range		GT/GT6: 200-128000; GV/GV6: 200-1024000	GT6	1.50
Default		GT/GT6: 25000; GV/GV6: 4000	GV6	1.50
Response		DRES: *DRES25000		
See Also		DMEPIT, DRIVE, ERES		

Letter/Symbol	Description
a_ .....	Represents an address specifier, numeric value from 0 to 99. An address specifier is required if multiple Gemini drives are connected in a daisy-chain or multi-drop configuration; in fact, leaving off the address specifier will cause parameter assignment commands to affect all units and response/transfer commands to request information from all units at the same time (multiple units transmitting characters at one time will garble the communication). To assign unique unit addresses to multiple drives, refer to the ADDR command.
b .....	Represents the values 1, 0, X or x; does not require field separator between values.
c .....	Represents a character (A to Z, or a to z).
i .....	Represents a numeric value that cannot contain a decimal point (integer values only). The numeric range varies by command. Field separator required.
r .....	Represents a numeric value that may contain a decimal point, but is not required to have a decimal point. The numeric range varies by command. Field separator required.
! .....	(GT6 and GV6 only) Represents an immediate command. Changes a buffered command to an immediate command. Immediate commands are processed immediately, even before previously entered buffered commands.
. .....	(GT6 and GV6 only) Bit select operator for use in IF and WAIT conditional expressions. The bit select operator allows you to base the conditional expression on one bit in the binary format of certain status registers. For example, WAIT(AS.1=b0) is a wait statement based on the condition of bit #1 in the axis status register (see TAS). <div style="text-align: center; margin: 10px 0;"> <p style="text-align: center;">WAIT(AS.1=b0)</p> <p>AS = Axis Status register      Bit state (0 = false, 1 = true)</p> <p>Bit select operator (.)      "b" is required to prefix the binary state</p> <p>Bit #1 is selected      "=" is required</p> </div>
, .....	Represents a field separator. Commands with the symbol r or i in their Syntax description require field separators. Commands with the symbol b in their Syntax description <b>do not</b> require field separators (but they may be included).
< > ....	Indicates that the item contained within the < > is optional, not required by that command.

# Syntax -- General Guidelines

Guideline Topic	Guideline	Examples
Command Delimiters: <ul style="list-style-type: none"> <li>• Carriage return (&lt;cr&gt;)</li> <li>• Line feed (&lt;lf&gt;)</li> <li>• Colon (:)</li> </ul>	All commands must be separated by a delimiter: carriage return, line feed, or colon. A carriage return is the most commonly used. The colon (:) allows you to place multiple commands on one line of code.	Set encoder resolution to 4000 counts/rev: ERES4000<cr> ERES4000<lf> ERES4000: DRES25000: DMODE2 <cr>
Neutral Characters <ul style="list-style-type: none"> <li>• Space (&lt;sp&gt;)</li> <li>• Tab (&lt;tab&gt;)</li> </ul>	Using neutral characters anywhere within a command will not affect the command.	Set encoder resolution to 4000 counts/rev: ERES<sp>4000<cr>
Comment Delimiter (;)	All text between a comment delimiter and a command delimiter is considered <i>program comments</i> (program comments are not stored in the Gemini).	Add a comment to the command: ERES4000<tab> ; set encoder res.
Case Sensitivity	There is no case sensitivity. Use upper or lower case letters within commands.	Set input active levels on inputs 1-3: INLVL001<cr> inlvl001<cr>
Field Separator (,)	Some commands with the symbol <i>r</i> or <i>i</i> in their Syntax description require field separators.  Commands with the symbol <i>b</i> in their Syntax description <b>do not</b> require field separators.	Set the beginning-of-transmission characters: BOT13,10,26<cr>  Set outputs 1-6 active low and 7 to active high: OUTLVL0000001<cr>
Bit Select Operations	Within IF and WAIT conditional expressions, you can use the <i>bit select</i> method to base the IF or WAIT operation on the condition of a specific status register bit. This allows a short-cut alternative to typing in the entire binary condition of the selected status register. The general syntax for the expression is as follows: (<register ID> . <bit #> = b <bit state>)  <b>NOTE:</b> If you upload a program from the Gemini, bit-select conditional expressions are translated to the equivalent masked binary expression. For example, IF (AS.12=b1) translates to IF (AS=bXXXXXXXXXX1).	Wait until no motion is commanded – this condition exists when bit #1 of the axis status register (see TAS) is set to zero (0). <pre>           WAIT (AS.1=b0)           AS = Axis Status register           Bit select operator (.)           Bit #1 is selected           "=" is required           "b" is required to prefix the binary state           Bit state           (0 = false, 1 = true)           </pre>

**NOTE:** The command line is limited to 80 characters (excluding spaces).

# Programming Interface Tools

Two graphical programming interfaces, Motion Planner™ and Pocket Motion Planner™, are provided as tools for programming your Gemini drive. These are the functions provided:

- Configuration (motor selection, tuning, motor matching and damping, etc.)
- Terminal emulation for sending commands and checking drive status
- Program editor for developing program files to send to the drive (Motion Planner only)
- Downloading and uploading program and operating system files to/from the drive

Motion Planner runs on the Windows 95, Windows 98 and Windows NT operating systems. Pocket Motion Planner runs on a hand-held PC using the Windows CE operating system.

Motion Planner and Pocket Motion Planner are installed from the “Motion Planner” CD which is included in your Gemini drive shipment (unless you ordered the -NK option).

**Communications Server:** Also available on the Motion Planner CD is the Communications Server (COM6SRVR.EXE). COM6SRVR.EXE is a 32-bit OLE automation server that allows you to add Gemini (as well as 6K) communication capability to your custom applications created with programming languages such as Visual Basic, Visual C++, and Delphi. The Motion Planner installation program installs COM6SRVR.EXE in the Motion Planner directory. Details on the Communication Server functions are provided on page [195](#).

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## NOTE

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The Gemini commands described in this document can be used only with Motion Planner, Pocket Motion Planner, or the COM6SRVR Communications Server.

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## *Using Motion Planner with a Gemini Drive*

Motion Planner is a programming interface for the Gemini product family, as well as the 6K product family. Motion Planner runs on the Windows 95, Windows 98 and Windows NT operating systems. Below are instructions on how to use Motion Planner with your Gemini product.


### **Installing Motion Planner:**

System Requirements:

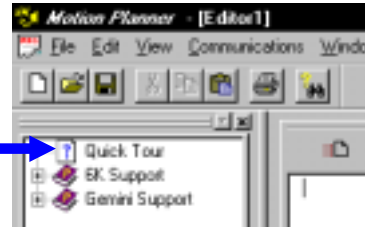
- IBM-compatible PC with a Pentium 166 MHz or higher processor.
- Operating system: Microsoft Windows 95, Microsoft Windows NT Workstation 4.0, or Microsoft Windows 98.
- 32MB RAM.
- Hard disk space: 16MB minimum.
- PCI VGA with 800 x 600 resolution or higher.
- CD-ROM drive or internet access for installation.
- Mouse or pointing device.
- RS-232C serial port for using serial RS-232C communications.

Insert the Motion Planner CD in your CD-ROM player. The installation program automatically launches and displays this dialog:



Click the “Install Motion Planner” button. The installation program installs Motion Planner on your hard drive and creates a Motion Planner group in the Programs menu accessed from the  Start button.

Orientation to Motion Planner:  
After you launch Motion Planner, browse the “Quick Tour” to orient yourself with the Motion Planner interface.




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**6K Users**

**CAUTION**

**6K Users**



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If you are using a 6K Controller and Gemini Drives, you should try to use two COM ports – one for the 6K and one for the Gemini Drive. If your computer has only one COM port, you will have to swap the serial cable connection between the 6K and the Gemini. Be aware that you must quit Motion Planner before swapping the serial cable between products. After the cable swap, you may launch Motion Planner and select the newly connected product. Failure to quit Motion Planner before the swap will corrupt communications with the attached Gemini or 6K.

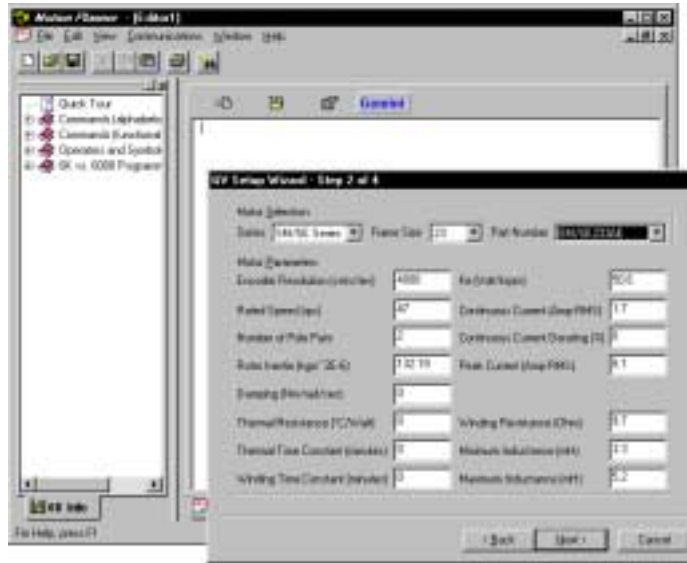
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### **Configuring Your Gemini Drive (see graphic below):**

1. Make sure that you have installed the Gemini according to the instructions in the *Hardware Installation Guide*.
2. Launch Motion Planner. When the product selection dialog appears, select a Gemini drive and select the COM port to which the Gemini is connected.
3. In the Editor window, click on the **Gemini** button to launch the setup wizard.
4. Select either “Express” or “Full” setup, and select one of these Wizard Initialization methods:
  - Use factory defaults. This method populates the wizard with the defaults as noted in the command descriptions in this document.
  - Use the current contents of the Editor window. This method populates the wizard with the data from the Editor window. The general intent of this method is to revise the drive’s configuration, based on the contents of a saved file or the current configuration of the attached Gemini drive.
  - Use the current configuration of the attached drive. This method uploads the drive’s configuration file and populates the wizard with those settings.
5. Click the “Next” button to proceed with the wizard. Fill in the wizard dialogs as prompted. At the end of the wizard, click the “Finish” button; this creates the setup code and places it in the Editor window (at the location of the cursor).

6. Optional: Modify the setup code if needed.
7. Click the  button to save the setup code to a file (\*.prg) on your hard drive.
8. Click the  button to download the setup code (contents of the Editor window) to the Gemini drive. When the download is complete, Motion Planner asks you if you wish to reset the drive to implement the new setup code.



**Drive setup is complete.** All of the setup parameters (command values) are stored in the Gemini drive's EEPROM and are automatically recalled when you cycle power or reset the drive. If you wish to return the drive to factory settings, use the RFS command.

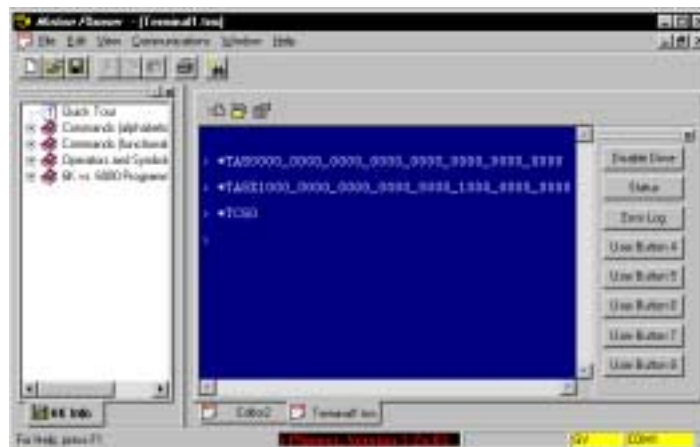


These motor parameters are automatically filled in based on the selected Parker motor. If you are using a non-Parker motor, or a custom motor that is not listed, you will have to fill in all of these motor parameters by hand. Failure to do so will result in a *motor configuration error*, which prevents the drive from being enabled.

This illustration shows an example of the motor configuration portion of the wizard.

### Communicating with the Gemini drive (see graphic below):

Click on the Terminal tab to view the terminal emulator window. From the terminal window you can type in status commands and setup commands as needed. You can also download stored files to the drive (click on ), and upload the drive's current configuration to a file (click on ).



These buttons can be configured to send one or more commands to the Gemini drive. In this example, the "Disable Drive" button sends the DRIVE0 command, "Status" sends the TAS : TASX : TCS command string, and "Error Log" sends TERRLG. The window shows the response from pressing the "Status" button. For configuration details, open the Quick Tour and see "Terminal Emulator".

## Updating the Drive's Operating System:

Gemini drives are digital motor drives that run under an internal software operating system. The operating system was loaded into your drive during the manufacturing process, and under ordinary circumstances you will not need to update your drive's operating system. However, because Compumotor continues to add enhancements and address software bugs, you may want to upgrade the operating system. You may obtain a new operating system file from the Compumotor web site, or from Technical Support (see phone numbers on the inside cover of this manual).

### *Web Site Download:*

The operating system file is located in the software download section of the *Compumotor Online* web site (<http://www.compumotor.com>). The file name is in this format: GEM\_n\_nm.ops. For example, the operating system file for version 1.50 is called GEM\_1\_50.ops. Download the file to the Motion Planner directory on your hard drive.

### *Update Procedure:*

1. Connect the Gemini drive to your computer's RS-232 serial communication port (see instructions in the Gemini drive's *Installation Guide*). **NOTE:** You can download the operating system to only one drive unit at a time and you must use RS-232 communication (no daisy chains).
2. Launch Motion Planner.
3. In the Default Communications Settings dialog box, select your Gemini drive and select the serial port to which the drive is connected, then click "OK".
4. Click on the Terminal tab to expose the terminal emulator.
5. From the **Communications** pull-down menu, select **Download OS**. When presented with the **Locate Gemini Operating System** dialog, locate the operating system file and click the **Open** button. This initiates the download to the drive and displays the download status dialog. During the download, the Gemini drive's left-hand LED flashes red and the right-hand LED flashes yellow.
6. When the download is completed successfully, Motion Planner displays a confirmation message. Also, the drive automatically resets itself and displays the **TREV** response in the terminal emulator window. Check the **TREV** report to verify that the proper operating system revision is now in the drive (e.g., the response "**\*TREV-GV-L3E\_D1.05\_F1.00**" indicates that the drive is using OS revision 1.05, denoted by "D1.05").

<p><b>NOTE:</b> If the download is interrupted or corrupted, the drive will flash the left LED (red) until a valid operating system is downloaded.</p>
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## Using Pocket Motion Planner

Pocket Motion Planner is a programming interface for the Gemini product family. Pocket Motion Planner runs on a hand-held and palm PCs using the Windows CE operating system.


### To Install Pocket Motion Planner:

System Requirements:

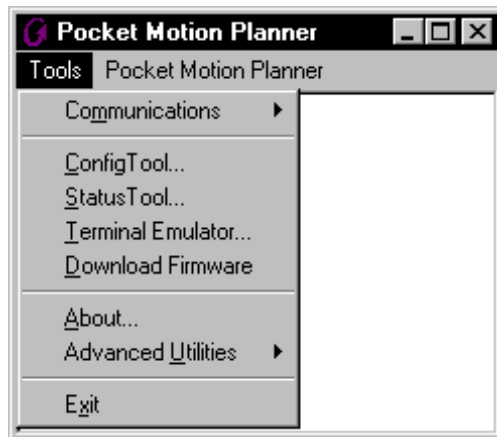
- IBM-compatible PC with:
  - CD-ROM drive or internet access for installation
  - Windows CE Services v2.2 or greater for installation
  - Serial port
- Hand-held or palm PC with:
  - Microsoft Windows CE v2.0 or greater
  - 4MB RAM (8MB recommended for speed)
  - Hard disk space: 500 KB minimum
  - Display: 240x320 or 640x240; gray scale or full color
  - Keyboard: soft or built-in
  - Processor: MIPS 4000 or SH3
  - RS-232C serial port, configurable for 9600 baud; null modem serial cable

Insert the Motion Planner CD in your CD-ROM player. The installation program automatically launches and displays this dialog:



Click the “Install Pocket Motion Planner” button. The installation program installs Pocket Motion Planner on your hand-held or palm PC and creates a Motion Planner shortcut that is accessed from the  Start button.

### Overview of Pocket Motion Planner Tools:



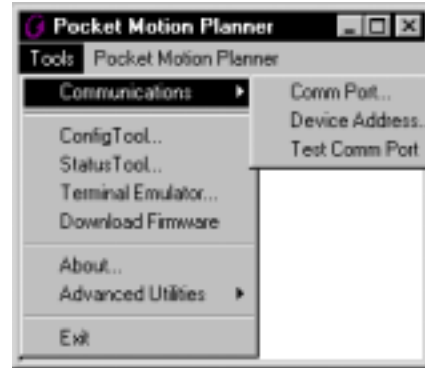
- Communications (see page 10) – Set device address, select COM port, test COM port.
- Config Tool (see page 10) – Configure the drive’s operational settings.
- Status Tool (see page 12) – View drive status reports. Particularly useful for troubleshooting and initial system setup.
- Terminal Emulator (see page 13) – Interactive communication to send commands and receive status information from any (or all) Gemini drive(s) connected via RS-232.
- Download Firmware (see page 13) – Download an updated operating system to the drive.
- About – Display the revision of Pocket Motion Planner
- Advanced Utilities (see page 14) – For complex troubleshooting tasks, to be used only at the direction of Compumotor support personnel.

◆ Communications Settings:

**Comm Port** – Allows you to select the appropriate RS-232 Comm port; Gemini requires 9600 baud.

**Device Address** – Sets the default device address for communications within the Config Tool, Status Tool, and Download Firmware utility. The default address will reset to 0 each time Pocket Motion Planner is started, which is the factory default device address for Gemini drives. Pocket Motion Planner assumes communication with one drive only, though that drive could be part of a daisy chain.

**Test Comm Port** – Tests your Comm Port and RS-232 cabling by sending out a command and expecting a reply from a connected Gemini drive. You are notified if the test has passed or failed. Tips on RS-232 troubleshooting can be found in the Troubleshooting section of the GT or GV *Hardware Installation Guide*.



◆ Configuration Tool:

(drive configuration procedure on page 11)

**Open Configuration File** – Allows you to browse your PC for previously saved configuration files and bring them into the configuration editor. Configuration files are typically saved with the .PMP extension, but other files may be opened.

**Edit Current Configuration** – Allows you to view and modify all available configuration parameters relevant to your Gemini drive. **NOTE:** The Config Tool is an *editor*; as values are modified, they are not sent to the drive until you use “Download Configuration to Gemini” (exceptions: stepper Interactive Motor Matching and servo Graphical Tuning). Editor contents may include:

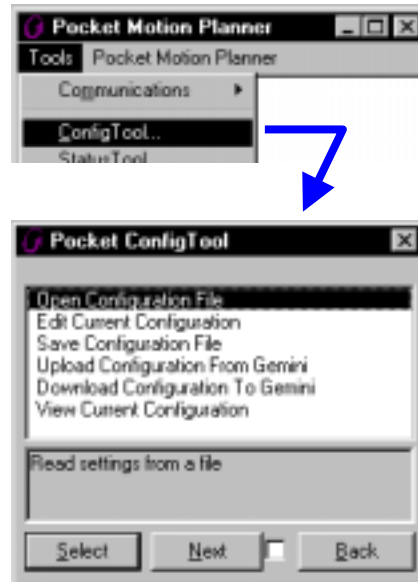
- Factory default values
- A previously saved configuration file
- Configuration uploaded from a Gemini drive
- Any user modifications to the above

**Save Configuration File** – Saves changes to currently active configuration file. The default file extension is .PMP and the default directory is My Documents\Gemini; however, other extensions and locations are allowed.

**Upload Configuration from Gemini** – Retrieves the configuration from the connected Gemini drive. A communication check is done when an upload is attempted and you are notified of communication problems if the upload can not be completed. Upon a successful upload, parameters are immediately available to you by choosing Edit Configuration File or View Current Configuration.

**Download Configuration to Gemini** – Sends the current contents of the configuration editor to the connected Gemini drive. A communication check is done when a download is attempted and you are notified of communication problems if the download can not be completed. You can either download to one particular device address, or all units connected in a daisy chain.

**View Current Configuration** – View of configuration editor contents. Parameters can not be modified in this function, simply viewed for quick reference.



## Configuring Your Gemini Drive:

Before you start: Make sure that you have installed the Gemini according to the instructions in the *Installation Guide*.

1. Select **Config Tool** from the Pocket Motion Planner **Tools** menu.
2. Select **Edit Configuration File** from the Config Tool main menu. If starting from scratch, do this immediately upon entry into the Pocket Config Tool. To modify a previous configuration, first choose **Upload Configuration from Gemini** to use the current configuration from your drive or choose **Open Configuration File** to edit a previously saved configuration file.
3. Select **Drive Type**. Choose your drive from the list or choose **Auto-Detect** if the drive is connected via RS-232. If the editor contains a previously saved, modified, or uploaded configuration, then the Drive Type will already be set.
4. Select either **Express Configuration** or **Full Configuration**:

**Express Configuration** displays a small subset of available drive parameters. This is useful for quick bench top tests, or when minimal modification of parameters is required.



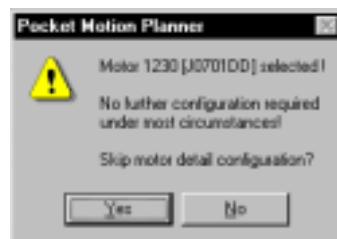
**Full Configuration** displays all available drive parameters, grouped into relevant categories and sub-categories.



5. Select **Choose Motor**.

If using a Parker motor:

When you select your Parker motor, Pocket Motion Planner automatically configures all the necessary motor parameters accordingly (see parameter list on page 84). Factory motor settings can be modified (**Configure** button), but this is not recommended and should be done with extreme caution, as using settings other than factory defaults can have unexpected and/or hazardous results. If you modify Parker motor settings and wish to revert to the factory defaults, re-select the motor. Click the **OK** button when finished; you will see a message similar to this:



In most situations, click **Yes** to skip the motor detail configuration, because the Parker motor selection already configures this for you.

If using a non-Parker motor, or a custom motor not on the available listing, select “**Other**” within the Choose Motor menu (**Other** is available only if you select **Full Configuration** in step 4 above). It is mandatory that all motor details be configured for “**Other**” motors to avoid a *motor configuration error*, which prevents you from enabling your drive. You will automatically be placed in the motor configuration menu when you select **OK** to finalize your motor selection of “**Other**”. When you finish in the motor configuration menu, click the **Back** button.

6. Modify other relevant drive parameters within the Express or Full Configuration menu. For help on each configuration item, refer to the respective command description in this manual.

- Exit the configuration editor by clicking on Back until you see the main Config Tool window. →

Note that clicking on the **X** in the upper right hand corner of any screen within Edit Current Configuration will attempt to close the entire Config Tool. The Back button is recommended for this basic procedure.

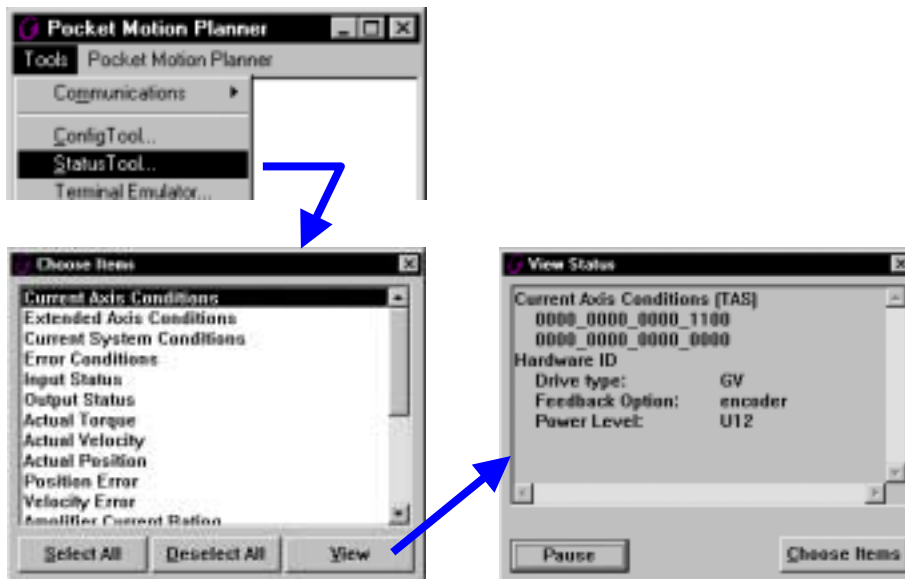


- Select **Save Configuration File** to save the current configuration to a file.
- Optional: Before you download the configuration file to the drive, it may be useful to **View Current Configuration** to make sure you are sending the appropriate settings.
- Select **Download Configuration to Gemini** to download the current configuration file to your Gemini drive. When prompted to Reset the drive, click **Yes** to make sure the new configuration is activated in the drive.

**Drive configuration is complete.** All of the configuration parameters (command values) are stored in the Gemini drive's EEPROM and are automatically recalled when you cycle power or reset the drive. If you wish to return the drive to factory settings, use the RFS command.

#### ◆ Status Tool:

Particularly useful for troubleshooting and initial system setup, the Status Tool allows you to select from an extensive list of drive status reports and watch them update continuously.



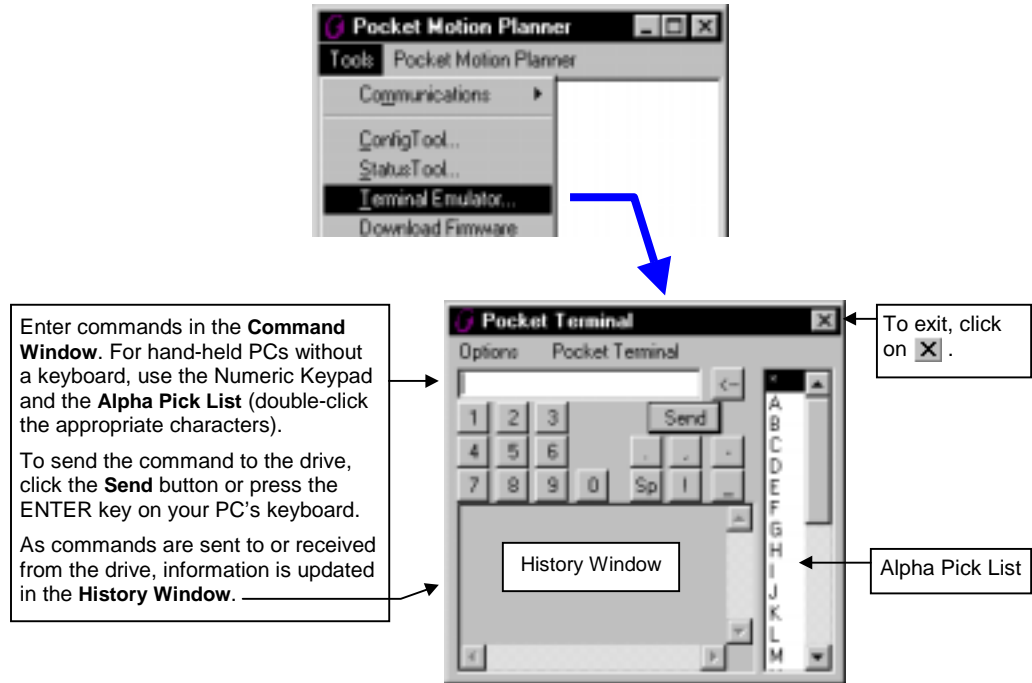
Select one or more items from the list available in the **Choose Items** screen. Click on **View** to view the items in the View Status screen.

The display window is updated every 0.1 seconds. The update can be frozen by clicking on **Pause**, and restarted with **Resume**.

To exit the Status Tool, click on **X** in the upper right hand corner of the window.

◆ Terminal Emulator:

The Terminal Emulator allows interactive communication with any (or all) Gemini drive(s) connected via RS-232.



**Options Menu:**



✓ = feature enabled

**Auto-Complete** – Automatically adjusts the available alpha characters in the Alpha Pick List based on your current selection in the Command Window. Also completes the command entry when there are no more alpha character options. *This is particularly useful for hand-held PCs with no keyboard interface.*

**Show Hex** – Allows you to enter standard ASCII commands and view the hexadecimal equivalents of the commands and responses in the History Window.

**Clear History** – Clears the contents of the History Window.

◆ Updating the Drive's Operating System (using the "Download Firmware" tool):

Gemini drives are digital motor drives that run under an internal software operating system. The operating system was loaded into your drive during the manufacturing process, and under ordinary circumstances you will not need to update your drive's operating system. However, because Compumotor continues to add enhancements and address software bugs, you may want to upgrade the operating system. You may obtain a new operating system file from the Compumotor web site, or from Technical Support (see phone numbers on the inside cover of this manual).

*Web Site Download:*

The operating system file is located in the software download section of the *Compumotor Online* web site (<http://www.compumotor.com>). The file name is in this format: GEM\_n\_nn.ops. For example, the operating system file for version 1.50 is called GEM\_1\_50.ops. Be sure to note the hard drive directory to which you download the file.

#### Update Procedure:

1. Transfer the new operating system file to your hand-held PC (or other Windows CE device) using the Win CE Services utilities provided with the hand-held PC. Place the file in the My Documents\Gemini directory.
2. Connect the Gemini drive to your hand-held PC's RS-232 serial communication port (see instructions in the Gemini drive's *Installation Guide*). **NOTE:** You can download the operating system to only one drive unit at a time and you must use RS-232 communication (no daisy chains, no RS-485).
3. Launch Pocket Motion Planner. You may need to select the serial port to which the drive is connected (from the **Tools** menu, select **Communications** and then **Comm Port...**).
4. From the **Tools** menu, select **Download Firmware**. When presented with the **Choose Firmware File** dialog, locate the operating system file and click the **Open** button. When you are asked if the drive is already in download mode, check to see if the drive's left-hand LED is flashing red — if it is click **Yes**, if it is not click **No**.

This initiates the download to the drive and displays the download status dialog. During the download, the Gemini drive's left-hand LED flashes red and the right-hand LED flashes yellow. When the download is completed successfully, Pocket Motion Planner displays a confirmation message. Also, the drive automatically resets itself (you may notice that the fault relay toggles at this time).

**NOTE:** If the download is interrupted or corrupted, the drive will flash the left-hand LED (red) until a valid operating system is downloaded.

5. From the **Tools** menu, select **Terminal Emulator** to open the terminal emulator window.
6. In the terminal emulator, issue the `TREV` command to verify that the proper operating system revision is now in the drive. For example, the response `"*TREV-GV-L3E_D1.05_F1.00"` indicates that the drive is using revision 1.05, denoted by `"D1.05"`.

#### ◆ Advanced Utilities:



**WARNING:** The Advanced Utilities are intended for complex troubleshooting tasks and should only be used at the direction of Compumotor support personnel. Modifying values or changing settings within the Advanced Utilities can lead to computer or Pocket Motion Planner problems if not done properly.

**Translator** – This tool allows you to translate the standard ASCII commands (referred to as “6000 commands”) into the actual hexadecimal value that is internally used by the Gemini drive, and vice versa. Note that no actual hex communication to a product takes place within the translation utility, it simply allows you to see the actual hex command format of commands sent to the Gemini drive.

**Advanced Options** – Allows you to change these default operational parameters for Pocket Motion Planner:

- Document Path: This is the default path used for file operations (save and open).
- Motor File: This is the file used to auto-configure the motor parameters by Parker motors.
- Log File
- Verbose Mode
- Terminal Emulator Option menu settings (see page 13):
  - Auto-complete
  - Show Hex

# Troubleshooting *(refer also to the back cover)*

## Error Messages

Depending on the error level setting (set with the `ERRLVL` command), when a command error is created, the Gemini drive will respond with an error message and/or an error prompt. A list of all possible error messages is provided in the table below. The default error prompt is a question mark (?), but you can change it with the `ERRBAD` command if you wish.

At error level 4 (`ERRLVL4` – the factory default setting) the Gemini drive responds with both the error message and the error prompt. At error level 3 (`ERRLVL3`), the Gemini drive responds with only the error prompt.

Error Response	Possible Cause
<code>INVALID_ADDRESS</code>	Address format is not correct (e.g., while attempting to address the <code>DRES</code> command to daisy-chain unit #2, you issue the <code>2DRES</code> command instead of the <code>2_DRES</code> ).
<code>INVALID_DATA</code>	Data for a command is illegal (e.g., <code>INLVL0011XX</code> ).
<code>INVALID_DATA_HIGH</code>	Data for a command is above the maximum value.
<code>INVALID_DATA_LOW</code>	Data for a command is below the minimum value.
<code>UNDEFINED_LABEL</code>	Command issued to the Gemini is not a recognized command or program name.

## Diagnostic LEDs

Green/Red (left-hand LED)	Yellow/Green (right-hand LED)	Meaning
--- none ---	Yellow	Initialization in progress. This occurs during power-up and reset.
Green	--- none ---	Drive Ready.
Green	Green (flashing)	Incoming Steps (variable rate).
Green	Yellow/Green (flashing)	Autorun Mode ( <code>DMODE13</code> ).
Red (flashing)	--- none ---	Awaiting new operating system download. (Motion Planner users see page 8 for download procedure; Pocket Motion Planner users see page 13 for download procedure)
Red (flashing)	Yellow (flashing)	Downloading new operating system.
Red	Green	Keep-Alive Mode. No AC power, but running off 24VDC only.
Red	--- none ---	Drive Faulted. Check <code>TAS</code> and <code>TASX</code> responses to find out why.

## Status Commands

Status commands are provided to assist your diagnostic efforts. These commands display status information such as, axis-specific conditions, general system conditions, error conditions, etc.

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### Checking Specific Setup Parameters

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One way to check the conditions that are established with a specific setup command is to simply type in the command name without parameters. For example, type "ERES" to check the encoder resolution setting; the response would look something like: \*ERES4000.

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Below is a list of the status commands that are commonly used for diagnostics. Additional status commands are available for checking other elements of your application (refer to "transfer" in the index). For more information on each status command, refer to the respective command description in this manual.

GT6 & GV6 only: To send a status command to the Gemini drive while a program is executing, prefix the command with an "!" (e.g., !TAS). This allows you the opportunity to check certain conditions concurrent with program and machine processes.

◆ Commonly used status commands (binary status bits are numbered 1 to n, from left to right):

- TERRLG.....Error log reports the last 10 error conditions, which includes the TAS, TASX, TDHRS, TDTEMP, and TMTEMP reports. The error log may be cleared with the CERRLG command.
- TAS.....General report, including fault conditions.
- TASX.....Additional report of conditions not covered with TAS.
- TCS.....If TASX bit #7 or bit #28 is set, you can identify the cause with TCS.
- TER.....Error status report. (Many of the error conditions are also reported with TAS or TASX.)
- TINO.....Bit #6 indicates the hardware status of the Enable input ("1" = OK to enable drive).
- TIN.....Status of digital inputs on the DRIVE I/O connector.  
GT6 & GV6: You can use INFNCn to report the state and programmed function of input n.
- TOUT.....Status of digital outputs on the DRIVE I/O connector, including the Relay output.  
GT6 & GV6: You can use OUTFNCn to report the state and programmed function of output n.
- TPROG.....(GT6 & GV6 only) Displays the contents of the specified program (e.g., TPROG PROG2 displays the contents of program #2, defined with the DEF PROG2 command). TPROG cannot be used to display profiles defined with DEF PROF.



## Trace Mode (GT6 and GV6 only)

The Trace Mode helps you debug programs. When in Trace Mode, enabled with the TRACE1 command, all commands executed are or transferred out the serial connection (RS-232 or RS-485) and displayed in the Motion Planner Terminal window; this allows you to track, command-by-command, the entire program as it runs. TSS bit #8 is set when the Trace Mode is enabled. A sample scenario is provided on page [174](#).

# Solutions to Common Problems

**Refer also to these troubleshooting tools:**

- Error message list ..... page 15
- LED diagnostic table..... page 15
- Status commands to use ..... page 16
- Trace Mode (GT6/GV6 only)..... page 16
- Back cover of this manual

Problem	Cause	Remedy
I can't communicate with the Gemini when using my own terminal emulation program.	The Gemini drive requires a translator, which is available only when using Motion Planner, Pocket Motion Planner, and the COM6SRVR Communications Server.	Use Motion Planner (page 5), Pocket Motion Planner (page 9), or the COM6SRVR Communications Server (page 195) to communicate with the Gemini drive. These tools are available for Windows 95/98 and Windows NT operating systems.
I've entered new command values, but they are not invoked in the Gemini drive.	Some commands require a reset (cycle power, RESET, or Reset input) before the new values are invoked in the drive. The command list on page 187 identifies the commands that require a reset.  GT6/GV6: Commands that are executed within a program are not stored in the Gemini's EEPROM memory and are lost after a reset.	Execute the RESET command or activate the Reset input. Refer to page 18 for additional details.
All programmed settings have returned to their factory default values.  GT6/GV6: All stored programs and profiles have been deleted.	You executed the RFS command.  Before executing RFS, make sure you have a backup of the configuration file and program files. If you didn't save the original files, you can upload the present settings and programs from the Gemini and save them to files on your hard drive: <ul style="list-style-type: none"> <li>• Motion Planner (Editor window): Click  to upload and view, then click  to save the file.</li> <li>• Pocket Motion Planner: Open the Config Tool (see page 10), select "Upload Configuration From Gemini", then select "Save Configuration File" to save the file. (<b>NOTE:</b> Program files cannot be uploaded and saved with Pocket Motion Planner.)</li> </ul>	GT/GV: If you have saved the drive configuration file, download the file from Motion Planner or Pocket Motion Planner. If you did not save drive configuration file, the settings are lost.  GT6/GV6: Restore the settings by downloading the program files saved to your hard drive (see programming process demonstrated on page 20).
GT6/GV6: There is a long pause (cannot communicate with the drive) when I download a program or profile, or execute END, DEL, RESET or RFS.	These processes require writing to the Gemini's EEPROM. When XON/XOFF is enabled (this is the factory default condition – see XONOFF), the Gemini temporarily disallows (XOFF) communication from the PC during the write to the EEPROM, and when the command buffer is full (e.g., when streaming large amounts of commands to the Gemini). If the serial connection is lost (cable disconnect, drive is powered down, etc.) during an XOFF, you will have to restart Motion Planner or Pocket Motion Planner (or the COM6SRVR).	N/A
GT6/GV6: Motion does not occur, the motor has lost torque, output #2 is activated, and the dry contact relay is activated.	A "Fault condition" exists.  ← (The outputs will be activated only if they are left in their factory default OUTFNC configuration.) →	One or more conditions can cause a "Fault condition", which automatically disables the drive (DRIVE0), activates output #2, and opens the dry contact relay. Check the possible causes with TAS and TASX.
GT6/GV6: When I execute a GO, no motion occurs. The only indication of an error is the ERBAD prompt (which, by default, is a "?" character). No errors are reported with TAS, TASX, or TER.	You have executed an s-curve average accel/decel command (AA, ADA, LHADA, or LSADA) with an illegal value.	Change the s-curve accel/decel command value to a valid range, or set it to zero to restore trapezoidal profiling. Refer to the table on page 54 for assistance.

# When are Commands Executed?

## GT and GV Drives:

All commands are either implemented immediately upon being sent to the drive, or they are implemented after you cycle power to the drive or reset the drive. To reset the drive, issue a `RESET` command or activate the Reset input (pin #3 on the DRIVE I/O connector). If a command requires a reset, it is noted in the command description.

## GT6 and GV6 Drives:

All commands are “buffered”, which means they are placed in the drive’s command buffer and executed in the order in which they are received. If the command syntax contains “<!>”, then it may be made “immediate” by prefixing it with the “!” character (e.g., `A` is buffered, `!A` is immediate). When an immediate command is sent to the drive, it is executed ahead of any existing buffered commands.

Some commands are not implemented until after you cycle power to the drive or reset the drive. To reset the drive, issue a `RESET` command or activate the Reset input (pin #3 on the DRIVE I/O connector). If a command requires a reset, it is noted in the command description.