GDS100

GRAPHICS USER INTERFACE

OPTION MANUAL

PN:EDU135

IDENTIFICATION

for

GDS100
Option Manual

by

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CHAPTER 1: INTRODUCTION

This manual describes the GDS100 Windows program.

The GDS100 is a Windows software application that operates the UNIDEX 100 Motion Controller. The GDS100 simplifies UNIDEX 100 programming, reduces program debugging time, and facilitates detailed monitoring of programs and motion in progress.

1.1: FEATURES

The GDS100 has two major features. It offers a "Windows-like" appearance (and operation), and it gives the user the ability to utilize multi-tasking (both on the UNIDEX 100 and within the GDS100 itself).

By imitating the "Windows" look and feel, the GDS100 allows the user who is familiar with Windows to avoid learning another new system or language to control their motion application. User's familiar with other Windows applications (e.g., Excel and Word) should have little or no trouble operating the GDS100.

However, this manual is not a manual for the UNIDEX 100 itself. Although the GDS100 permits efficient and smooth operation it does not allow the user to avoid learning the UNIDEX 100. For details on how to operate your UNIDEX 100, refer to the *Unidex 100 Operation & Technical Manual*.

1.2: USING THIS MANUAL

This manual assumes that the reader is familiar with the basic functioning of Windows programs (e.g., Microsoft Excel and Word). Therefore, this manual does not cover details such as menu operation, window resizing, or similar basic Windows issues.

Chapter 2 gives the background information needed to connect the GDS100 and get you started running your UNIDEX 100.

Chapter 3 details each GDS100 menu item. Each section of Chapter 3 describes one menu item, and the order of these sections corresponds to the order of the menu items as they appear, from left to right, in the GDS100 menu. The user may read Chapter 3 as a tutorial to the GDS100, but they can also later use it as a reference.

In the GDS100, as in most Windows applications, the user can achieve nearly all functions with shortcut keys (the only exceptions are certain buttons, such as Cancel, etc.). In this manual, each time a menu function name appears, it will appear with the shortcut key underlined in its name. For example:

The Help function is on the far right of the menu.

1.3: TECHNICAL NOTES

This section describes the GDS100 multi-tasking capabilities. Though reading this section is not necessary, it helps the user make full advantage of the GDS100 and the UNIDEX 100.

Technically, the GDS100 is not a true multi-tasking system; however, it can run three tasks independently and without interference. For example, the user can run a program and simultaneously monitor the state of certain variables. And, at the same time, the user can upload and download files. The user can also watch two programs executing at once, on two different UNIDEX 100 tasks.

Since there is only one processor on the PC, the GDS100 can not execute two programs simultaneously. Consequently as the user increases the number of tasks being performed, the GDS100 slows down the execution of each task. Note that this restriction DOES NOT apply to the UNIDEX 100, where the execution speed of one task is independent of another task.

The UNIDEX 100 is a true multi-tasking machine that allows three concurrent tasks to run simultaneously: tasks 0, 1, and 2. Task 1 and Task 2 are for running the user's programs and commands, while Task 0 does housekeeping and other duties (e.g., the GDS100 runs entirely in Task 0). Please see Section 4.2 of the *Unidex 100 Operation & Technical Manual* for more information on the UNIDEX 100's task storage and time slot assignment.

1.3.1: Conversation Screens

The GDS100 performs its multi-tasking functions through non-modal dialog box windows called conversation screens. Conversation screens are what allows the GDS100 to perform many functions at once. These screens differ from those usually encountered in Windows applications in that they do not force the user to complete the given transaction before proceeding. For example, the Save function in Word for Windows does not permit the user to invoke any other menu item without completing the present dialog box. In contrast, the user can access any conversation screen without restricting other GDS100 functions.

This manual describes each component of every GDS100 conversation screen, starting with the topmost, leftmost component of the conversation screen and proceeding across the row to the right. After fully describing all the components in a single row of controls, the description proceeds with the next row of controls.

The components of a conversation screen are familiar by sight to the Windows user, but the terms denoting them are probably not familiar. *Figure 1-1* shows a particular conversation screen (the Parameter Screen), and labels the most basic components. The terms shown in this figure are ones that the manual consistently uses.
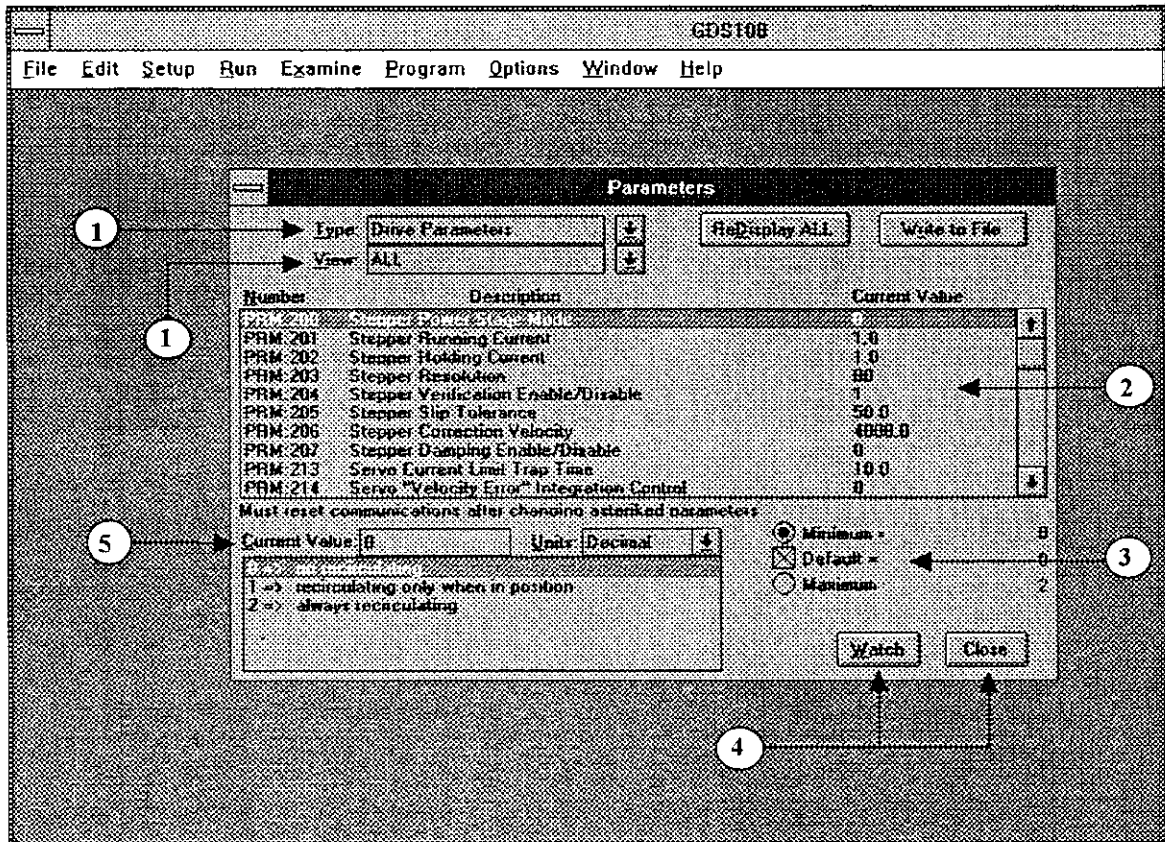
Figure 1-1: Conversation Screen Components

The following descriptions apply to the above figure.

1. Combo Box
2. List Box
3. Radio Buttons
4. Buttons
5. Edit Field

CHAPTER 2: GETTING STARTED

This chapter provides the necessary background information for connecting the GDS100 and running your UNIDEX 100.

2.1: SYSTEM REQUIREMENTS

To operate your GDS100 it is necessary to have the following hardware and software.

Aside from the hardware requirements mentioned in the *Unidex 100 Operation and Technical Manual*, you will need the following:

- Personal Computer (386/486 PC AT)
- The GDS100 Software Disk

In addition to the software requirements mentioned in the *Unidex 100 Operation and Technical Manual*, you will need the following:

- Windows 3.1 operating system
- 1.0 MB of free disk space

2.2: INSTALLATION

To install your GDS100 software follow the steps below.

1. Create a sub-directory in which you plan to keep all the GDS100 executable code. Use the make directory (MD) DOS command, if needed, to create a new sub directory.

2. Put the GDS100 installation disk in the appropriate PC drive.

3. Type "A:install.bat a: target" (or "B:install.bat b: target" if the GDS100 installation disk is in the B drive) from DOS, or a DOS Windows box. Target, in this context, is the name of the sub-directory created in step 1.

4. To run the GDS100 while in File Manager just double click on the GDS100.exe icon. In Program Manager the user must define the icon before he can invoke it with a double click (under File Properties).

5. Read the status bar at the bottom of the GDS100 main-menu screen. If it says "Connected to U100", you are ready to go. Otherwise, insure that the following conditions are true:

A. The UNIDEX 100 has power and is connected to the UNIDEX 100 communications cable.

B. The GDS100 and the UNIDEX 100 share the same communications cable and the GDS100 is set up with the same port as the communication cable. To verify this, look under the GDS100 Setup menu.

NOTE: The following line must appear in your autoexec file to run the GDS100 or the UNIDEX 100.

DEVICE=C:/DOS/ANSI.SYS

CHAPTER 3: USING THE GDS100 FUNCTIONS

This chapter describes all the functions available in the GDS100 program. Each subsection located in Section 3.2 describes a particular sub-menu item within that menu. Some sub-menu's invoke popup conversation screens that contain a variety of control components (see Section 1.3.1 to understand what conversation screens are). To describe these components, this chapter starts with the topmost, leftmost component of the conversation screen and proceeds across the row to the right. After fully describing all components in a single row, the description proceeds with the next row of controls in the conversation screen.

Section 3.1 describes only those UNIDEX 100 functions not associated with any particular menu item: the Emergency Stop button and the status bar.

Section 3.2 explains all the functions accessible through the GDS100 menu's.

3.1: GENERAL

This section describes functions not invoked from a particular menu item: the Emergency Stop button and the status bar.

3.1.1: Emergency Stop

The Emergency Stop button, when pressed, immediately stops all motion and any programs running on the UNIDEX 100. The stop that results is not a controlled stop and therefore, the user should use it with caution. For further information on the controlled stop, refer to Section 4.1.6 of the *Unidex 100 Operation & Technical Manual.*
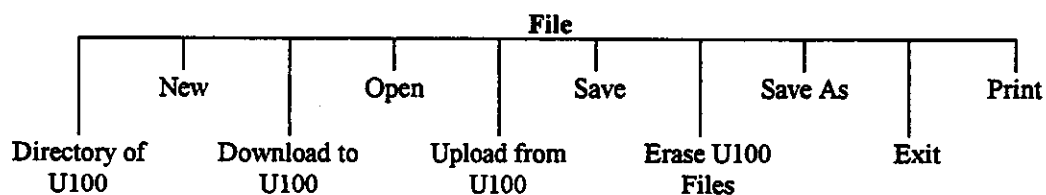
3.1.2: Status Bar

The status bar indicates to the user the state of the communications with the UNIDEX 100. Some examples of conditions announced on the status bar are: the cable is disconnected, the UNIDEX 100 is busy compiling a file, and the UNIDEX 100 is awaiting commands from the GDS100. The user should pay particular attention to all conditions that appear in red on the status line (e.g., the cable is disconnected) since the conditions could affect operation.

In reality, the status bar reflects what Task 0 on the UNIDEX 100 is doing at the present time. Please see Section 1.4.1 and Section 4.2 of the *Unidex 100 Operation & Technical Manual* for more details on what Task 0 does.

3.2: GDS100 Menu's

There are nine menu's that control the operation of the GDS100: File, Edit, Setup, Run, Examine, Program, Options, Window, and Help. The following sections fully define each one of the GDS100 menu's.

3.2.1: File Menu

```
                                    File
     ┌────────┬────────────┬──────────┬─────────────┬──────────┐
     │  New   │    Open    │   Save   │   Save As   │  Print   │
     │        │            │          │             │          │
 Directory of   Download to   Upload from   Erase U100      Exit
    U100          U100          U100          Files
```

The File menu contains functions consistent with those found in most Windows applications. Through this menu, the user can begin, save, close, or re-continue edit sessions. The only File menu items that are unique to the GDS100 are in the center of the menu: Directory, Download, Upload, and Erase. The sections that follow describe all the File menu items.

The user may create or edit files on the PC, but in order for the UNIDEX 100 to recognize the files the user must download them to the UNIDEX 100. One way to simplify the editing/downloading process is to choose the Options Auto Download function. The Options Auto Download function automatically downloads each edited file. Refer to Section 4.1.7.4 of the *Unidex 100 Operation & Technical Manual* for more general information on transferring files to the UNIDEX 100.

NOTE: It is a very common mistake to edit a program and forget to download it to the UNIDEX 100. This results in running an old program version. See the Options Auto Download function to prevent this occurrence.

3.2.1.1: New

Selecting the File New function permits the user to begin editing a new program file. For convenience, the UNIDEX 100 automatically includes the BEGIN and END statements (required for all UNIDEX 100 programs) in all new files.

3.2.1.2: Open...

Selecting the File Open function allows the user to open an existing program file. The user may open a UNIDEX 100 file for editing, copying, transferring, or just viewing. In fact, with the GDS100, the user may edit any ASCII coded text file.

3.2.1.3: Save

Selecting the File Save function allows the user to save open files.

3.2.1.4: Save As...

Choosing the File Save As function allows the user to save an active file under a new name.

3.2.1.5: Print...

Selecting the File Print function allows the user to print an active file.

3.2.1.6: Directory of U100...

Choosing the File Directory of U100 permits the user to view all the files presently on the UNIDEX 100. For convenience, there are buttons available (immediately below the directory listing) that allow the user to execute file functions directly from this screen. These buttons are: Erase ALL, Erase, UpLoad, Run (Animate), and Run. These buttons perform exactly the same functions as their corresponding sub-menu items. (The Run menu items appear under the Run menu item while the others appear under the File menu item.)

3.2.1.7: Download to U100...

File Download to U100 copies a file from the PC down to the UNIDEX 100. This function can download more than one file at a time. Upon selecting this function a dialog box appears that allows the user to select the PC file they plan to download. Once the user selects the PC file name(s), a Download Verification Screen appears. In this screen, the user may choose a different name for the file on the UNIDEX 100 than the PC name. However, the UNIDEX 100 file name must be a valid UNIDEX 100 name. During the downloading process a dialog box flashes on the screen, telling the user how the operation is progressing.

NOTE: Though the UNIDEX 100 has restrictive file naming conventions, the PC has no such restrictions. If the user, as is recommended, keeps copies of the UNIDEX 100 files on the PC, then the user has to make an important choice:

1. Name the PC files the same as the UNIDEX 100 file (i.e., PGM1 on the UNIDEX 100 is PGM1 on the PC).

2. Name the files differently on the PC (i.e., PGM1 on the UNIDEX 100 is Profile93 on the PC).

Choice #1 makes file transfers easier. By default, the GDS100 assumes that the filenames are the same, so the user only needs to select one filename on the upload or download, and hit return at the verification screen. An additional simplification is available with the Options Auto Download option (see Section 3.2.7.2.).

Choice #2 offers more flexibility in program storage, allowing the user to name the PC files in a more descriptive fashion. However, this means that the user must specify both the PC and the UNIDEX 100 name for both downloads and uploads.

3.2.1.8: Upload from U100...

File **Upload from U100** copies a file from the UNIDEX 100 up to the PC. The user can only upload one file at a time. Upon selecting this function a dialog box appears that allows the user to select the UNIDEX 100 file they want to upload. Once the user selects the UNIDEX 100 file name, an Upload Verification Screen appears. In this screen, the user may choose a different name for the file on the PC than the UNIDEX 100 file name. A second choice allows the user to hit a return, in which case the same name is used on the PC as their UNIDEX 100. During the operation a dialog box appears on the screen telling the user how the operation is progressing.

3.2.1.9: Erase U100 Files...

File Erase U100 Files erases one selected file or all files from the UNIDEX 100 memory.

3.2.1.10: Exit

The File Exit function permits the user to exit the GDS100 software entirely.

3.2.2: Edit Menu

```
                                    Edit
    ┌──────────┬──────────┬──────────┬──────────┬──────────┐
        Undo       Cut        Copy       Paste      Cut Line
  Paste Line    Find     Find Next   Find Previous   Select All
```
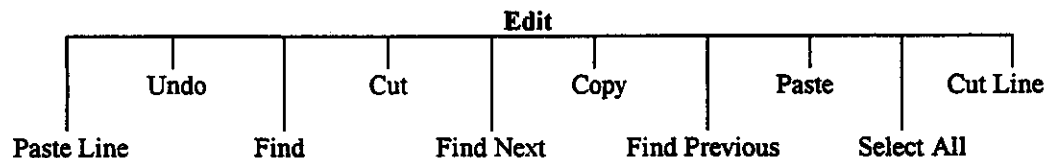
The Edit menu contains functions consistent with those found in most Windows applications. With this editor the user may edit any type of UNIDEX 100 file (e.g., program or macro files). The GDS100 editor is very much like the Notepad editor provided with Windows 3.1. However, the GDS100 editor includes cut line and paste line convenience features that Notepad does not.

3.2.2.1: Undo

The Edit Undo function permits the user to undo their last requested action. Should the user inadvertently delete important information in a file, the undo fixes (reverses the last action) the mistake. Remember, though, that this is only good for the last edit function that took place. Failure to catch errors quickly results in lost text.

3.2.2.2: Cut

Edit Cut menu takes text out of the file and puts it into the clipboard. The user can select the desired text with the mouse followed by selecting Cut. The text disappears from the file, but is now held in the clipboard. The user may freely copy and paste the cut text between different edit files.

3.2.2.3: Copy

The Edit Copy function allows the user to copy text out of a file and put it into the clipboard. The user can select the desired text with the mouse followed by selecting Copy. The text does not disappear, but a copy gets stored in the clipboard. The user may freely copy text between different edit files.

3.2.2.4: Paste

Edit Paste takes previously cut text from the clipboard and pastes that text at a specified insertion point in a document. The user may freely paste between different files.

3.2.2.5: Cut Line

Edit Cut Line permits the user to cut one line of text from the active file. There is no need to highlight the entire line of text that you wish to cut, just place the cursor anywhere within the line and select Cut Line. The user may freely cut lines and paste lines between different files.

3.2.2.6: Paste Line

Edit Paste Line allows the user to paste one line of previously cut text at the cursor's present position. The user may freely cut and paste lines of text between different files.

3.2.2.7: Find...

The Edit Find function searches for user specified text within an active file. This function does not permit the user to search more than one file at a time. There is no replace function on the GDS100 editor.

3.2.2.8: Find Next

The Edit Find Next function allows the user to scroll and continue searching for additional repeats of the last known find operation. If you wish to change the text that you are searching for, use the Edit Find function.

3.2.2.9: Find Previous

The Edit Find Previous function is similar to the Edit Find Next function. However, the Edit Find Previous function allows the user to repeat the last find operation, but looking toward the beginning of the file.

3.2.2.10: Select All

The Edit Select All function permits the user to choose (or highlight) all text in a document for editing. In other words, it selects the entire file.

3.2.3: Setup Menu

```
                              Setup
   |          |          |          |          |          |
Unconnected  COM Port 1  COM Port 2  COM Port 3  COM Port 4  Reset Unit
```
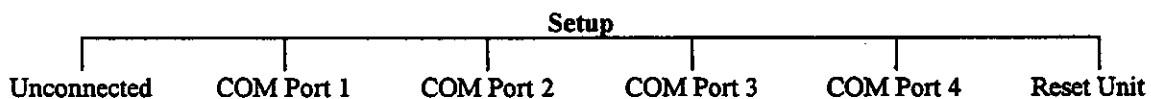
The Setup menu opens and reopens the communications to the UNIDEX 100.

3.2.3.1: Unconnected

Setup **U**nconnected allows the user to disconnect the unit from the UNIDEX 100. This function blocks communications between the UNIDEX 100 and the PC. It serves as a safety feature: the user can use the GDS100 editor to edit files, without the possibility of an accidental action on the UNIDEX 100.

3.2.3.2: COM Port (1, 2, 3, 4)

There are four available COM Ports (1, 2, 3, and 4) for establishing communications with the UNIDEX 100. The purpose for having four ports is so that the user may connect the PC to the UNIDEX 100 over any port. To choose the communications port, choose the port that matches the one attached to the communications (typically a RS-232-C) cable.

3.2.3.3: Reset Unit

The Setup **R**eset Unit resets the entire UNIDEX 100. This halts any programs in progress and stops all existing motion. Doing this type of reset does not change the values of any parameters. This function is similar to CTRL + D used with the UT100 Utility Software.

3.2.4: Run Menu

```
                          Run
        ┌─────────────────┬─────────────────┐
      Single         Program Run       Program Run
     Command          (Normal)          (Animated)
```
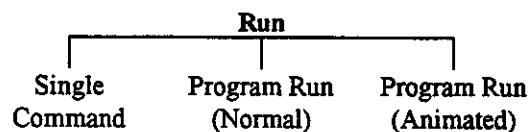
The **R**un menu controls the running of UNIDEX 100 commands and programs.

3.2.4.1: Single Command...

The Run Single Command function runs single commands on the UNIDEX 100. After initiating this menu item, a Run Immediate Conversation Screen appears (please see Section 1.3.1 for a description of a conversation screen). Provided in this screen is an edit field for the user to enter the command for execution. After the user enters the command and selects Run or hits enter, the conversation screen vanishes from the screen, indicating that the command is being executed. Command execution occurs in whichever task is free. If both tasks are free, the command always executes in Task 1.

A Field Service Mode exists in the GDS100 to aid Aerotech engineers in debugging problems with the GDS100 interface. This mode is NOT for customer use since its improper use can have unpredictable results on both the GDS100 and/or the UNIDEX 100.

3.2.4.2: Program (Run Normal)...

The Run Program (Run Normal) function runs motion programs already downloaded to the UNIDEX 100. (See Section 4.1.7.4 on how to download into the UNIDEX 100.) The Run Normal Mode operation runs programs in its entirety, without stopping at each line. For this reason, this mode is useful for running debugged programs. After initiating this menu item, a Run Program Conversation Screen appears. Within this screen the user can choose the file name that they want to run and the task they want to run it under. If the user attempts to execute a program under a busy task, the program does not run and the GDS100 returns with an error message.

Keep in mind that both UNIDEX 100 tasks (Task 1 and Task 2) are independent and can run two different programs concurrently. Also, remember that both running tasks can each contain the same program. Refer to Section 4.2 in the *Unidex 100 Operation & Technical Manual* for a full explanation of the UNIDEX 100's concurrent task capability.

3.2.4.3: Program (Run Animated)...

The Run **Program (Run Animated)** function runs motion programs already downloaded in the UNIDEX 100. Running programs in the Run Animated Mode executes only one line at a time - in a stepping like process. The user has complete control over when they want to execute each command line. This mode is especially useful for debugging programs in their development stage.

After invoking Run Program (Run Animated), a Run Program Conversation Screen appears. Within this screen the user can choose the file name that they want to run and the task they want to run it under.

Once the user initiates an animated run, the GDS100 displays a Program Trace Screen. This screen has three components: (listed from top to bottom as they appear) the tool bar, the list box, and a task status bar. Remember that the UNIDEX 100 designates Task 1 and Task 2 for program runs and permits programs to run in both tasks concurrently. If you run both tasks in the Animated Mode, the GDS100 places a Program Trace Screen, for each task, on the screen.

The UNIDEX 100 List Box, in the center of the Program Trace Screen, displays the program being run. Initially, this screen highlights the first executable statement. Each time the UNIDEX 100 executes a command, the screen highlights the line corresponding to the line just executed. The user cannot edit the program shown in the list box. Upon executing the entire program, the GDS100 displays a "Program halted" message on the task status bar.

The tool bar contains four buttons (listed as they appear from left to right) that include: Step, Execute, ReStart, and Exit. The Step button advances the program one line and stops. If the user hits Execute, two things happen: the Execute button changes into a Pause button, and the GDS100 begins to automatically execute successive step commands. The GDS100 continues to step indefinitely through the program until the program ends or the user hits the Pause button (which then changes back to an Execute button). If the user presses the Pause button during a motion command, the restart only reinstates the program. This stops the program and moves the highlighted line back to the first executable statement. Pressing the ReStart button while motion is present brings about a controlled stop of the UNIDEX 100. Finally, the Exit button closes the Program Trace Screen and, in a controlled fashion, stops program execution on the UNIDEX 100.

The task status bar, below the list box, indicates what is taking place down on the UNIDEX 100. Most often this task status bar indicates that the UNIDEX 100 is executing a command or waiting for the next command. If a condition occurs that the user should know about, the task status bar displays an appropriate message.

NOTE: Hitting the Pause button causes the GDS100 to stop automatically executing program lines, but it does not interrupt the program line currently being executed. If the presently executing command is a motion command, the motion continues normally. There are six ways to stop a motion command in progress: 1) exit GDS100 2) Emergency Stop 3) Feed Hold located in Motion Status 4) Stop located in Motion Status 5) ReStart located in the Program Trace Screen and 6) Exit located in the Program Trace Screen.

NOTE: In some cases it is important to realize that running the program in Auto Mode is not quite the same as running a program in Animated Mode. In both cases the program runs until fully completed; however, the Animated Mode executes the program more slowly. The slower program execution during the Animated Mode is a result of the command lines being fed to the UNIDEX 100 on a one-by-one basis. If the user runs other functions on the PC while the GDS100 concurrently runs in the Animated Mode, the rate at which the lines get fed becomes slower. In contrast, when running a program in normal mode the program's execution speed is unaffected by the GDS100's task load.

3.2.5: Examine Menu

Examine

Motion Status   Machine Status   Error Status   Parameters   Registers   Variables
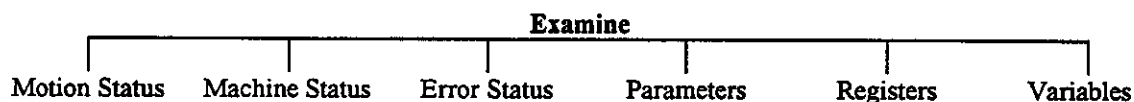
The **Examine** menu contains functions that permit the user to determine or change the value of any UNIDEX 100 parameter, register, or variable.

NOTE: For this section, parameters, registers, and user-defined variables are treated equally. Therefore, we use the word "machine state" to mean parameters, variables, and registers collectively.

The user may view a particular set of machine states to communicate a certain aspect of the machine (e.g., machine states particular to the motion in progress). To accomplish certain actions more easily, this screen contains shortcut buttons (e.g., Stop motion button). The status selections are for viewing purposes only and do not allow the user to directly change the machine states. To change machine states, the user must select Parameters, Registers, or Variables from the Examine menu.

The Examine (Parameters, Registers, or Variables) functions give a more general access to the machine states. These conversation screens allow the user to change as well as examine any machine state. Also, with the push of a button, the user can write machine state settings into a disk file on the PC. The user may then download this file to the UNIDEX 100 and run it to restore the state of the machine. These screens can also decode the value of some states. For example, parameter PRM:104 can have two values: a "0" or a "1". The Parameter sub-menu not only shows its present value (0 or 1), but also shows what each value means (e.g., "0 => turn off the filter" and "1 => turn on the filter").

The UNIDEX 100's multi-tasking capabilities allow the user to examine the machine states and never affect any programs running. Therefore, the user can examine the UNIDEX 100 without worry. However setting a machine state may effect the motion of a running program if that program uses that machine state. Though setting machine states while programs are running can be a powerful tool for debugging, use it with caution.

3.2.5.1: Motion Status...

The Examine Motion Status function provides the user with a quick and easy way to monitor the motion on the UNIDEX 100. Below are descriptions, starting from top to bottom, of the components of this menu.

The checkboxes appearing at the top of the status screen serve much the same function as the status lights on the UNIDEX 100 front panel. However, only a selected subset of these indicators appears in the GDS100 motion panel checkboxes. Note that when a control fault or overload is indicated, the user can obtain more information by using the Examine Error Status Screen.

The set of controls below the checkboxes contains two edit fields (that surround the Home button). These edit fields show the feedback position and the feedback velocity. These values update as fast as possible, given the communication line constraints. For notes on the update speed, refer to the notes on watched parameters in Section 3.2.5.2. Through parameters PRM:040 and PRM:041, the user can dictate that different quantities be displayed in these edit fields (e.g., commanded or error values). Parameter PRM:041 applies to the left edit field while parameter PRM:040 applies to the right edit field. Look under parameters PRM:040 and PRM:041 to see the exact meanings of the different settings.

The Home button executes a home command. A home command is not complete until the machine has hit the home limit. However, if there is no limit set or no feedback on the motor, the motor spins indefinitely looking for the home position.

The fourth line down contains three buttons for controlling motion. The leftmost button, the Feed Hold, feed holds the motion in progress. To accomplish a feed hold the GDS100 suspends both tasks, regardless of whether the tasks are running motion. Once the user presses the Feed Hold button, a controlled stop occurs on the motion and the button changes to a Resume button. Pressing the button again (it now says Resume) restarts the motion in a controlled fashion. Should the user be running any programs, execution resumes in both tasks. If there are no programs running and the user presses the Feed Hold button it has no effect.

The Stop button also brings the motion to a controlled stop, but the user cannot resume the motion afterwards. The GDS100 achieves a motion stop by halting the execution of both tasks. If there are no programs running and the user presses the Stop button it has no effect.

The Reset Limit button brings the motor out of a limit condition. This button does nothing if the machine is not in a limit condition. To verify that a limit condition exists, look at checkboxes at the top of the Motion Status Screen.

The set of controls at the bottom of the Motion Status Conversation Screen all relate to the jog or slew. The UNIDEX 100 moves the shown jog distance, at the shown jog velocity, each time the user strikes the + or - buttons. The acceleration/deceleration rate used during the jog is the most recent setting for acceleration/deceleration ramp time. The user must press and release the button each time they want a jog to occur. By default, the jog velocities and distances are the default velocity and distances respectively. If the user changes the jog velocity or distance, then the default distance and default velocity remain unchanged.

3.2.5.2: Machine Status...

The Examine **Machine Status** function provides an easy way to view a variety of important machine states that do not relate directly to motion or errors. In addition to this, the user can monitor any three machine states of their choice through the custom watches. Below, starting from the top, are descriptions for each component of the Machine Status Screen.

The top two edit fields (labeled Task 1 and Task 2) indicate the state of the two tasks. These states include:

Idle	The task is not running a program.
Executing (Auto)	The task is running a program in the normal mode (see Section 3.4.2.2).
Executing (Block)	The task is running a program in animated mode (see Section 3.4.2.3) while executing a program line.
Waiting (Block)	The task is running a program in animated mode (see Section 3.4.2.3), but is not executing a program line.
Suspended	The UNIDEX 100 suspended program execution.

The second row contains two buttons that stop a task running a program. When the user stops an active task the motion is brought to a controlled stop before the program ends. The left button stops Task 1 while the right button stops Task 2. Once a task stops, the UNIDEX 100 abandons the program. Stopping a task currently running motion results in the motion being brought to a controlled stop, before the program ends.

The third row down contains two Pause buttons. Each Pause button causes the running task to pause. The Pause buttons operate identically to the Stop buttons except that the task can restart execution exactly where it left off. Hitting the Pause button changes it into a Resume button; the user can hit this button when they want the program execution to continue. If the user paused a task running motion, resuming that task allows the motion to ramp up in a controlled fashion.

Found on either side of the Pause buttons are the input and output edit fields. The purpose of these fields is to display the state of the first eight bits of the inputs and outputs (registers 1 and 2 respectively). The rightmost bit in each field corresponds to bit 0. The user cannot change the inputs or outputs with these fields, they are for display only.

The GDS100 devotes the remainder of the Machine Status Conversation Screen to custom watches. With the custom watches, the user can define what machine states they wish to monitor. The GDS100 can monitor all machine states (except write only registers) in these watches.

Watched parameters update continuously, but only as fast as the processing of the GDS100 allows. This rate varies significantly depending on three things: 1) the PC being used 2) the number of other tasks the GDS100 is performing, and 3) any other processes running on the PC. Each watch, under the fastest conditions, takes about a quarter of a second to refresh. Since the main load on the GDS100 is usually the watches themselves, the update time for each watch (in seconds) can be approximated as the total number of watches divided by four.

Custom watches allow the user to customize the Machine Status Conversation Screen to reflect the programs they wish to run. For example, in a particular program a user might have defined BV:1 as a loop counter. Then, by installing a custom watch on BV:1, the user can monitor the number of passes executed by that loop. Custom watches are a very handy tool when it comes to debugging programs. They are also very useful for defining a customized monitoring screen; customized for a particular program the user is running. A user can step through the program (see Section 3.4.2.3) and use the custom watches to monitor critical variables. The user can define a maximum of three custom watches at once.

The procedure for setting custom watches is as follows:

1. Select the Examine Machine Status menu.

2. Without closing the Machine Status Conversation Screen, open up the conversation screen that displays the machine state you wish to watch: Parameters, Registers, or Variables (located under the Examine menu).

3. In the parameters, registers, or variables screen, highlight the item you want to watch. Do NOT close this screen.

4. Expose the Examine Machine Status Screen, either by moving the parameters, registers or variables screen away, or by choosing "machine status" under the Windows menu.

5. In the Examine Machine Status Control Panel, check off the box that appears immediately to the left of the display you want to customize.

The Option Save Settings on Exit function permits the user to save settings that occur during program execution (see Section 3.2.6.4). However, if this option is on, the GDS100 saves the custom watches in-between the different executions.

Since the Machine Status Conversation Screen prohibits the user from setting parameters, registers, or variables, its usage can not affect running programs.

3.2.5.3: Error Status...

The Examine Error Status function provides an easy way to view errors (including both faults and overloads).

The Error Status Conversation Screen resembles a chart or spreadsheet and consists of four equal sections. However, only one section at a time is visible. To control which section of the chart you want to see, use the provided scroll bars.

Each row in the Error Status Conversation Screen represents a particular error condition that can occur on the UNIDEX 100. Each column relates directly to the contents of some parameter or register. The entries in each column correspond directly to the bits within that machine state, where the lowest order bit is the topmost entry and so on. An "on" entry indicates that the given bit is a one while an "off" entry indicates a bit set to zero. This screen is for observing only; therefore,

if the user wishes to change any values (e.g., parameters), they must access the parameter through the Parameters Conversation Screen (see Section 3.2.5.4).

The first column of the Error Status Conversation Screen (labeled Error Status REG:302) indicates whether a given error condition is present on the UNIDEX 100. The second column indicates whether there is a latch on that given error condition. The remaining eight columns indicate if any active masks were present during the error conditions. The mask columns have an extra row on top (ACTIVE MASK REG:307) to indicate the step of action taken based on each error occurrence. The user may define a procedure that they wish to occur each time a mask becomes activated. For example, a user could define that striking a hard limit shuts down the drive. For more detail on this subject consult the *Unidex 100 Operation & Technical Manual* (see Section 4.2.4).

3.2.5.4: Parameters...

The Examine **Parameters** function displays a conversation screen that permits the user to display or change any of the UNIDEX 100 parameters. To safely operate your UNIDEX 100 be very careful in what parameters you are changing since the UNIDEX 100 is sensitive to changes of certain parameter values.

CAUTION — IF CRITICAL HARDWARE IS CONNECTED, IT IS ADVISED THAT THE USER FULLY UNDERSTAND ALL OF THE PARAMETERS THEY ARE CHANGING.

The most important thing to understand about the Parameters Conversation Screen is that values the user sees are NOT necessarily those that are on the UNIDEX 100. It is not possible, given the limitations of the UNIDEX 100 communication line, for the GDS100 to continuously monitor the state of all parameters on the UNIDEX 100. The GDS100 refreshes the displayed value only at certain times, as described in the next paragraph, so that it accurately reflects the value of the UNIDEX 100 at that time.

The GDS100 updates all the parameter values shown each time the user opens the Parameters Conversation Screen, changes the view of the parameters, or presses the ReDisplay button. Also, the user can update a particular parameter value by double clicking on that parameter. Finally, the user can designate to have certain parameters watched continuously (see Section 3.2.5.2). The user can define a maximum of 25 watches at once.

Watched parameters update continuously, but only as fast as the processing of the GDS100 allows. This rate varies significantly depending on three things: 1) the PC being used 2) the number of other tasks the GDS100 is performing, and 3) any other processes running on the PC. Each watch, under the fastest conditions (66 MHz, DX2), takes about a quarter of a second to refresh. Since the main load on the GDS100 is usually the watches themselves, the update time for each watch (in seconds) can be approximated as the total number of watches divided by four.

The combo box in the upper left-hand corner of the Parameters Conversation Screen announces what parameters the user is viewing at the moment. The user can choose to view all parameters, or a logical subset (e.g., all Motion Parameters). Directly below the Type Combo Box is a View Combo Box that serves a similar purpose. This screen restricts the view of parameters to either ALL or WATCHED parameters, based on the selections made in the Type Combo Box.

The ReDisplay ALL button (at top) performs a refresh of all the parameters being viewed.

The Write to File button in the upper right-hand corner of the Parameters Conversation Screen allows the user to write the values of "changed from deFault" parameters to a disk file. The user can then download that file and run it (as a program) to reinstate the parameter values captured at the time the user wrote the file. Before proceeding with this download read the note below.

NOTE: The written parameter file stores only those parameters changed from the default; therefore, to be used properly the file should only be run after a hardware setup (refer to Section 3.6 of the *Unidex 100 Operation & Technical Manual.*

Since the file written is a program, the user can later edit this file in any way they feel appropriate. The GDS100 writes all parameter values with new default values, and not just the values of the ones presently being viewed.

The largest item on the Parameters Conversation Screen is a list box that appears in the middle of the screen. This list box shows the Parameter No., Parameter Description, and the Current Value. While this list box is only large enough to show data for about ten parameters or so, the user can use the provided scroll bar to view a much larger number of parameters.

The user can view the data of more than one parameter at a time, but can only change the value of a highlighted parameter. There are a few different ways to change the value of a parameter, all of which involve components that appear below the list box. The following paragraphs describe each of these components.

The Current Value Edit Field allows the user to type in a new value for the selected parameter. This newly entered value is not set on the UNIDEX 100 until the user hits a return or selects another parameter. If, after typing in this edit field, the user wishes to avoid changing the parameter, they can just erase all the characters in the edit field. The parameter value will then be unchanged. Also, the value does not change when the user enters a non-numeric string or an inappropriate value for that parameter.

The Units Combo Box allows the user to display all parameter values in a different number format. The choices include a decimal (base 10) format and a hexadecimal (base 16) format. Parameters represented by floating point values always remain in decimal format regardless of whether the user chooses hexadecimal or decimal.

The next set of controls includes three buttons: Minimum, Default, and Maximum. These buttons display the minimum, maximum, and default values for the selected parameters as well as permit the user to select any one of these values to act as the current value. Checking the button to the left of the minimum, default, and maximum controls, immediately sets the UNIDEX 100 to that value. The button indicates that the present value of the highlighted parameter is equal to that value.

The bottom right-hand corner is the enhanced access control. This area permits the user to display or change the parameter values (through bits and option codes, or a scroll bar). The particular control displayed here depends on the parameter shown. To get a feel for the appearance of these controls it is advisable that the user select a parameter (e.g., PRM:148 and PRM:317) that contains bit settings or option code settings.

In order to understand the enhanced access controls in the Parameters Conversation Screen, the user must understand what the different types of parameters are. The following paragraph describes these categories.

Parameters fall into three different categories: option coded, bit coded, or normal. The option coded parameters are always integers, where each integer value represents a particular condition or state (e.g., off or on). The bit coded parameters are also integers, but their values get interpreted as bit patterns, where each bit represents a binary state. An option coded parameter operates a single switch with a potentially unlimited number of positions. In contrast, a bit coded parameter operates, in parallel, a number of two position switches. A Normal parameter can be either integer or float and does not contain any options or bit codes (e.g., velocity and distance parameters).

The controls that appear below the scroll bar depend strictly on the type (e.g., bit coded, option coded, or normal) of parameter that the user selects.

Option coded parameters (e.g., PRM:148) display a list box on the screen with all the possible values that a parameter can accept along with a line of text that describes the option. The highlighted option displays which option is current to the parameter. Highlighting one of the other options changes the current selection.

Bit coded parameters (e.g., PRM:317) show a list of check boxes (along with a scroll bar) for each bit and a description of what that bit means. Bits set to a "1" contain a check in the check box. To change this bit to a "0" the user must check the other box. For example, a value of 5 has checks in the first and third box.

If the user wishes to change a normal parameter they may use the horizontal scroll bar to enter a value in the Current Value Edit Field or they may select the minimum, default, or maximum check boxes.

The final two buttons appear next to the Access Control Panel in the lower, right-hand corner of the Parameters Conversation Screen. These buttons are the Watch and Close buttons. The Watch button allows the user to designate a parameter(s) as being observed. Parameters being watched have the following text shown in between the parameters' title and its value.

---watched---

These parameters continuously get refreshed for as long as the GDS100 can process the requests and its other duties. The refresh rate may decrease significantly based on the number of watches present. To remove a watch simply press the Watch button again.

On exiting the Parameters Conversation Screen, the GDS100 gets rid of all watched parameters - the next time the user brings up the screen there will be no watches.

3.2.5.5: Registers...

The Examine **Registers** function brings up a conversation screen that allows the user to display and/or change all the UNIDEX 100 registers. Its appearance and operation is almost identical with the Parameters Conversation Screen (see Section 3.2.5.4). Therefore, this section only discusses the differences between the two.

Unlike the Parameters Conversation Screen, the Registers Conversation Screen does not have a default button and default display. This is because registers represent machine states that (in many cases) constantly change. There is no appropriate default value for registers.

There are three types of registers: read/write, read only, and write only. For the read only registers, the user does not see an Access Control Panel. Instead, the user sees a Current Value Combo Box that holds the parameter value, but does not permit the user to change the value. For the write only registers, the phrase "Write Only" will appear everywhere on the Registers Conversation Screen that the value would normally appear. This is because is not possible to know what the actual value of that parameter is.

The GDS100 does not write the read only or the write only registers to a file when the user presses the Write to File button - only the read/write register values get written to a file.

3.2.5.6: Variables...

The Examine **Variables** function displays a conversation screen that allows the user to display or change any or all the UNIDEX 100 user defined variables. The screen's appearance and operation are nearly identical to the Parameters Conversation Screen (see Section 3.2.5.4). Therefore, this section only discusses the differences between the two.

The Variables Conversation Screen (at the top of the screen) offers a View Combo Box that allows the user to alter the view of the variables. The user can select a range of the variables they want to view and only the variables whose index is within that range are displayed. Regardless of what range the user chose they can only view 15 variables of a particular type (e.g., Boolean, Port,...) at once.

3.2.6: Program Menu


```
                         Program
          ┌────────────────┬────────────────┐
     Acceleration        Dwell        Indexed Move
```

The **Program** popup menu allows the user to write UNIDEX 100 Motion Commands (e.g., dwell, time, distance, velocity) into an active edit session without typing the command into the file. In this menu the user may access a Dwell, Acceleration, or Indexed Move dialog box that asks the user to enter the command data. Then, by pressing Write or hitting return, the current command gets written into the edit file. In a program, the user can freely mix commands generated by the program dialog boxes and commands entered directly by the user in the editor. The following items are an example of the sub-menu's contained in the Program menu.

3.2.6.1: Acceleration...

The **Program Acceleration** function displays an Acceleration/Deceleration Screen that allows the user to write a command to a program to adjust the ac/de rate for a motion program. Before selecting to open this screen, the user must open an edit file (see Section 3.2.1.1 and 3.2.1.2). Once the user has the edit file open they must choose the acceleration sub-menu item that causes a Program Dialog Box to appear.

In the upper left-hand corner of the Acceleration/Deceleration Screen a list box allows the user to choose a type of argument. For example, in most cases the user would change the acceleration rate with the use of a constant (which the GDS100 interprets as a given value). In other cases, the user may want to accelerate at a rate dictated by a variable. In such a case, the user must select the type of variable from this list box. These types include: Integer/Long Integer/String/Float Point. If the type is integer, then the operand is the index of the integer variable to use. For additional information on variable types refer to Section 4.4.3 of the *Unidex 100 Operation & Technical Manual*.

To write the text to an existing or new file the user must hit the Write button (at the bottom of the screen) or hit a return. The text gets written directly after the present point of insertion in the opened file.

3.2.6.2: Dwell

The Program Dwell function brings up a dialog box that resembles the Acceleration Screen, but pertains to a dwell. The user has no units to choose from here since it is necessary to have the dwell in seconds.

3.2.6.3: Indexed Move

The Program Index Move function displays a dialog box that resembles the Acceleration Screen, but instead the user can specify two quantities (a distance and velocity). Like the dwell command, there is no choice of units. The units are always in user units/per second for velocity, and user units for distance.

3.2.7: Options Menu

Options

Save Settings on Exit   Auto Download
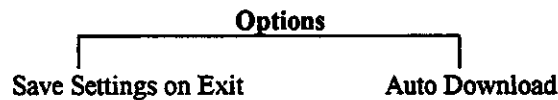
The Options popup menu permits the user to configure settings for their system.

3.2.7.1: Save Settings on Exit

The Options Save Settings on Exit function is an important setting that many Windows users often overlook. If this setting is on when the user exits the program the GDS100 saves most of the operational settings. Then, if a user re-opens the file, the format appears almost the way it did before closing it. However, if this setting is off, the program comes back up the same way each time. The most important GDS100 settings that the GDS100 saves include: the communication port setting, the default filename, the default directory, the machine status custom settings, the Value Conversation Screen data, and the emergency stop setting. For example: assume that Save Settings on Exit is on, the user sets a custom watch on parameter PRM:100, and then quits the program. Upon reopening the GDS100 the user can note that the custom watch setting still exists.

3.2.7.2: Auto Download

The Options Auto Download function permits the user to (indicate with a check) choose to have edited programs automatically downloaded to the UNIDEX 100. If a user edits a program without making changes, then the file will not be downloaded.

3.2.8: Window Menu

Window

Tile   Cascade   Close All   {File}
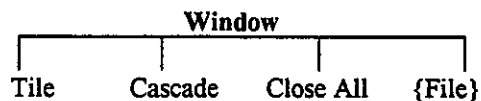
The Window popup menu functions very much like that of other Windows applications.

3.2.8.1: Tile

The Window Tile function arranges all open edit screens. This does not apply to any of the conversation screens (e.g., Program (Run Animated) or Machine Status). They are therefore unaffected by this command.

3.2.8.2: Cascade

The Window Cascade function arranges all open Edit screens in a cascading or stepped fashion. Cascading does NOT apply to any conversation screens such as Motion Status or Program (Run Normal) and these screens are therefore unaffected by this command. The cascade function is also useful when the user has a number of edit sessions up and has lost one behind the other.

3.2.8.3: Close All

The Window Close All function allows the user to close all open edit sessions. This function also applies to all conversation screens.

3.2.8.4: [File]

As with most other Windows applications, a title appears below the Close All function for each window that the user has open. In the case of the GDS100 this includes both edit sessions and conversation screens. The user then has the option to select that title that then pulls that screen to the front of all other screens. The screen that is up front is the active screen.

3.2.9: Help Menu

```
                              Help
          ┌───────────────────┴───────────────┐
          │                   │               │
       GDS100          U100 Commands    About Aerotech GDS100
```
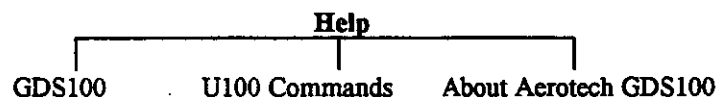
The Help popup menu functions the same as most other Windows applications.

3.2.9.1: Commands...

The <u>H</u>elp **Commands** function causes a main list box to appear displaying all the UNIDEX 100 commands. If the user double clicks on a particular command or highlights the command and presses the Help button, the command description from the *Unidex 100 Operation & Technical Manual* appears in a popup list box. Each command description includes a programming example.

3.2.9.2: About Aerotech GDS100...

The <u>H</u>elp <u>A</u>bout Aerotech GDS100 Dialog Box provides the user with a small amount of important information on their GDS100. This will include:

- The version of GDS100 the user is running.

- The date of release for that version.

- Partial copyright information on the GDS100.

- A copy of the GDS100 icon.

CHAPTER 4: TROUBLESHOOTING

4.1: Troubleshooting

If the GDS100 does not seem to be doing what you might expect, take the following corrective actions, one by one, in the following order. After each step, check to see if the condition is corrected; if so, do not perform any more actions. Later steps represents more through "resets".

1. Close the given GDS100 screen.

2. Invoke Close All under the Window menu of the GDS100.

3. Invoke the Reset function under the Setup menu.

4. Exit the GDS100, and run it again.

5. Erase the file: "windows/gds100.ini" (found under whatever disk Windows is installed under).

6. Power down the UNIDEX 100, and the PC.

7. Hit the File Erase files function. This can also be done through the UT100 Utility Software.

8. Reset the U100 parameters. First you have to default the parameters (for details on how to do this, refer to the *Unidex 100 Operation & Technical Manual*, Section 3.6) then you must set the parameters specific to your particular application. Make sure that you have a written record, or a program, which stores the particular settings needed for your application. If you do not know if you have such a record, do not perform this action until you have preserved the present parameter settings of your machine (invoke the function: Examine, Parameters, Write to file).

APPENDIX A: SHORTCUT KEYS

The following is a summary of short cut keys for the GDS100. Note that the shortcut key being used must be done while in the appropriate menu.

Menu	Function	Function Key Strokes	Menu	Function	Function Key Strokes
Edit	Copy	<Alt> + P	File	Print	<Alt> + P
Edit	Cut	<Alt> + C	File	Save	<Alt> + S
Edit	Cut Line	<Alt> + T	File	SaveAs	<Alt> + A
Edit	Find	<Alt> + F	Help	About Aerotech GDS100	<Alt> + A
Edit	Find Next	<Alt> + N	Help	Commands	<Alt> + C
Edit	Find Previous	<Alt> + R	Options	Auto Download	<Alt> + A
Edit	Paste	<Alt> + S	Options	Save Settings on Exit	<Alt> + S
Edit	Paste Line	<Alt> + E	Program	Acceleration	<Alt> + A
Edit	Select All	<Alt> + L	Program	Dwell	<Alt> + W
Edit	Undo	<Alt> + U	Program	Index Move	<Alt> + I
Examine	Error Status	<Alt> + E	Run	Program(Run Animated)	<Alt> + A
Examine	Machine Status	<Alt> + C	Run	Program (Run Normal)	<Alt> + N
Examine	Motion Status	<Alt> + M	Run	Single Command	<Alt> + S
Examine	Parameters	<Alt> + P	Setup	COM Port 1	<Alt> + 1
Examine	Registers	<Alt> + R	Setup	COM Port 2	<Alt> + 2
Examine	Variables	<Alt> + V	Setup	COM Port 3	<Alt> + 3
File	Directory	<Alt> + R	Setup	COM Port 4	<Alt> + 4
File	Download	<Alt> + D	Setup	Reset Unit	<Alt> + R
File	Erase	<Alt> + E	Setup	Unconnected	<Alt> + U
File	Exit	<Alt> + X	Window	Cascade	<Alt> + C
File	New	<Alt> + N	Window	CloseAll	<Alt> + A
File	Open	<Alt> + O	Window	Tile	<Alt> + T

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