Allied Diagnostic Application

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Abstract:

This document describes the features and operation of the Allied Diagnostic Application.

Revision History

Version 22

Update to coincide with the release of .NET software version 4.2.0

Version 21

Update to coincide with the release of .NET software version 4.1.0

Version 20

Update to coincide with the release of .NET software version 4.0.5

Version 19

Update to coincide with the release of .NET software version 4.0.4

Version 18

Update to coincide with the release of .NET software version 4.0.0

Version 17

Update to coincide with the release of software version 3.3.5

Version 16

Update to coincide with the release of software version 3.3.3

Version 15

Update to coincide with the release of software version 3.3.1

Version 14

Update to coincide with the release of software version 3.2.2

Version 12

Update to coincide with the release of software version 3.2.1

Version 11

Update to coincide with the release of software version 3.2

Version 10

Update to coincide with the release of software version 3.1.1

Version 09

Added PCI compliant commands for software version 3.1.0

Version 08

Update to coincide with the release of software version 3.0.10

Version 07

Added Compact Flash management

Version 06

Update to coincide with the release of software version 3.08

Version 05

Update to coincide with the release of software version 3.0.7

Version 04

Update to coincide with the release of software version 3.0.6

Version 03

Added SRAM management facility

Version 02

Update to coincide with the release of software version 3.0.3

Version 01

Initial version

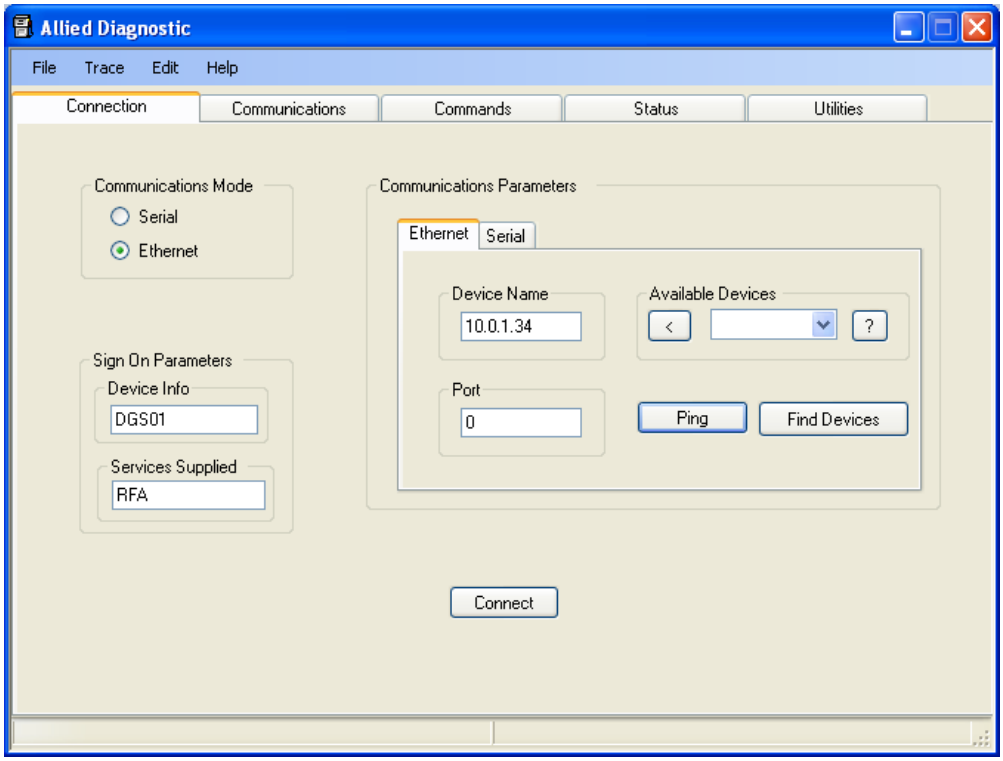
1 Introduction

The Allied Diagnostic Application Program (hereafter referred to as *DGS*, the mnemonic for *Diagnostic*) was developed as a means to communicate with and control the ANDI protocol based Station Site Controller (SSC), the NeXGen Forecourt Controller (NXG), and the Aegis Forecourt Controller / 3rd party software deployment platform.

DGS provides a rich suite of services for the developer, systems analyst, field technician, et al. In addition to sending and receiving message traffic, it provides a means to load and store command and response files, trace message traffic, download firmware, reset the devices, et cetera.

The DGS application is written in Visual Basic (.NET) and uses the Allied Active X Communicator object to communicate with the hardware.

Following is a screen shot of the DGS application as it appears after starting.



Tool Tips are available for most controls. If one hovers the mouse pointer over a control, after a short period of time a short description of the control will appear.

The DGS form can be minimized and maximized, but is not otherwise sizable. If you attempt to change its size, it will spring back.

2 Installation

The DGS program, along with its dependents and documentation, can be installed on a Windows PC using one of a set of Windows MSI files, depending on your needs and license arrangement. It will more than likely be zipped into an archive file to be sent to you, so it will have to be extracted.

For first-time installation:

As DGS has been built on the .NET Framework, this software must be present. To this end, a separate program: Setup.Exe has been included. This application must be run the first time that DGS is installed if no other .NET Framework application has been installed. Bear in mind that this Setup.Exe program takes care of the entire installation – so no other action should be require – i.e. you should not have to run the .MSI program.

There are separate Setup.Exe programs for DGS and SDK installations.

For updating an existing .NET installation:

The DGS application is installed by one of the following classes of installation kits:

- Allied_DGS.MSI
  - The installation kit designed for deployment for installers and servicemen.
- Allied_SDK.MSI
  - The installation kit designed for software developers and systems integrators.

The MSI script will perform a self installation operation with only a few user inputs.

Suffice it so say that installation is quite straight forward, as this file is included in the installation.

Nota Bene: You cannot simply copy the DGS application to your machine. It installs a number of dependent dynamic link libraries (DLLs).

Windows 7 and above Installation requires that the application run in Administrative Mode.

Prudent system management practices suggest that you should make a system backup or create a restore point before installing any software.

Feel free to contact Allied Technical Support for more information.

3 File - Configuration Menu

The DGS program gets its configuration information from a Windows compatible INI file. A default INI file (AlliedCommConfig.ini) is automatically created if it does not exist.

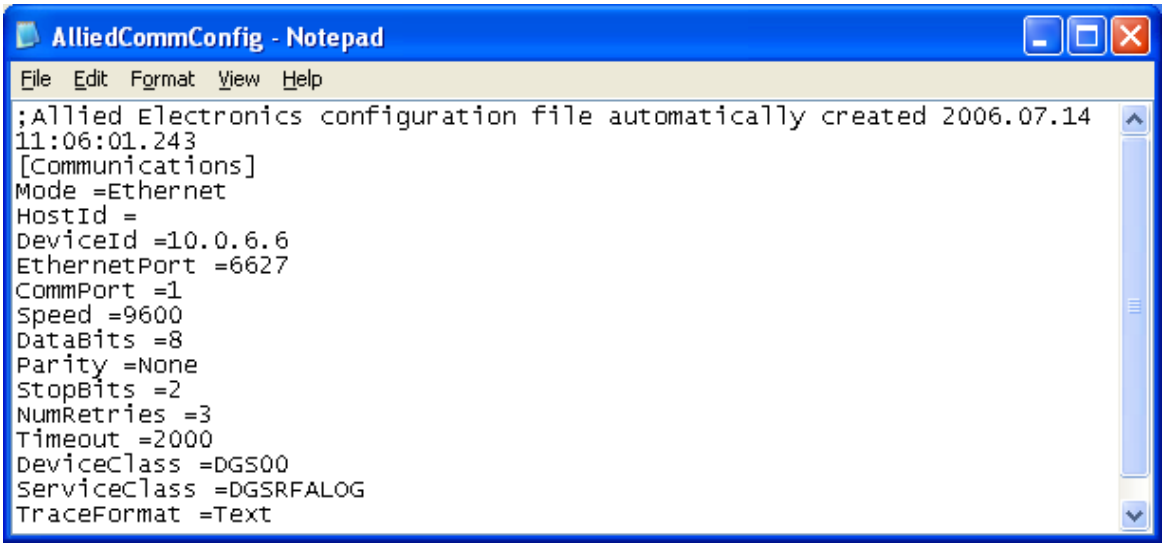
Most all settings in the INI file are accomplished behind the scenes by controls in the DGS application, so there is very little need to hand-edit the file.

The File Configuration menu item **Load** is used to read the INI files into which the user saved his configuration parameters. The **Save** command is used to write the configuration parameters. It is important to understand that your configuration parameters are not written to disk until you execute the **Save** command or you exit the application.

The Configuration sub-system provides a means to hand edit your configuration file. Clicking on the **Edit** command starts a Microsoft Notepad session and loads the currently selected INI file. Changes effected in the edit operation do not take affect unless one executes a subsequent **Load** operation.

Note also that you can save custom configurations by using a different file name.

Following is a screen shot of a typical INI file:



Nota Bene:

Concerning the INI file - inappropriate values are discarded during the load operation. It is preferable to use the controls of the DGS application to set parameters as they are most assuredly within legal range. This does not preclude hand editing; it is just a friendly, cautionary note.

Concerning multiple DGS sessions - be mindful that unless you establish a separate INI file for each session, the last session to touch the file will control the settings of DGS the next time it is loaded.

In general, the DGS application is written so that it can be set up and operated in an intuitive manner.

RFA Device selection

As the DGS application is built upon Allied's Active-X communicator object, it contains a fully-featured Remote File Access (RFA) server. Even though it is assumed that any RFA traffic is destined for the device on which the DGS application is running, one should specify explicitly the device on which the Remote File Access (RFA) sub-system stores its files. Access to the control to set the parameter is gained through the **File → Configuration→ Set RFA Device** command.

Clicking on that menu item will load a modal dialog box with a directory control. Selection is limited to currently mounted devices, and if the form is loaded with an inappropriate value, it will default to the drive on which the DGS application is running.

More information on the RFA sub-system can be found in the ANDI Point of Sale Interface document.

4 File Command Menu

Command and palette file functions are grouped under the File-Command sub menu. Their functionality is detailed below.

4.1 Configuration

The **configuration** sub-menu contains the commands associated with setting up the INI file. It contains Load, Save, Edit, and Set RFA Device.

4.2 Command

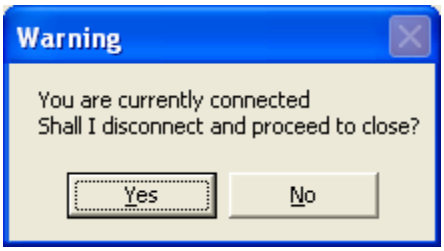
The **Command** sub-menu houses all the commands associated with Command Files, Palettes, and Palette Sets. These commands are detailed later in the document.

4.3 Response

The **Response** sub-menu houses all the commands associated with Automatic Response Files. These commands are detailed later in the document.

4.4 Exit

The File→Exit command causes the application to exit. If you are still connected to a controller, it will prompt you if you are sure you want to continue.



If you choose to do so, it will disconnect from the controller and then proceed with an orderly shutdown.

All daughter forms instantiated during the session will be unloaded and all resources (files, objects, et cetera) will be returned to the operating system.

4.5 Palette

With version 3.2 comes the ability to associate one or more ANDI protocol commands with a user-defined button. Buttons are housed on a daughter form called a palette.

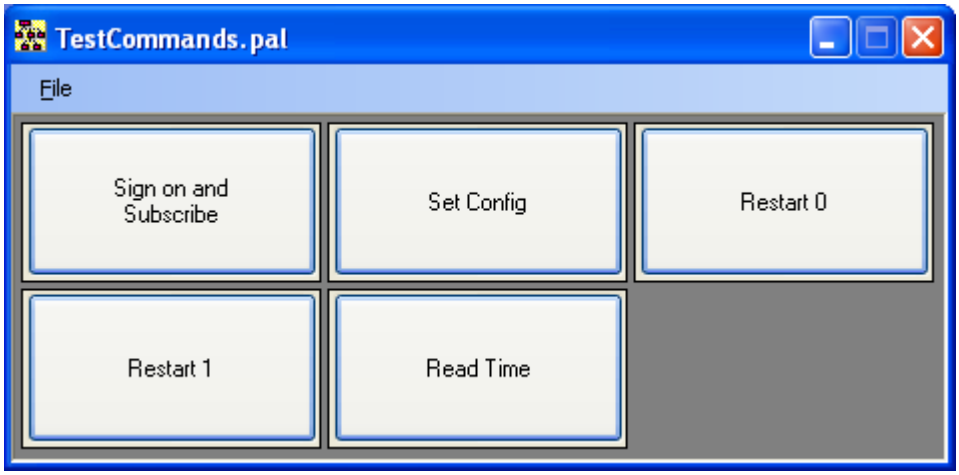
Palette files are loaded by the **File→Command→Palette→Load** menu command.

You may create a blank template file by clicking **File→Command→Palette→New**

4.5.1 Concepts

Unlike a command file, you can load as many palette forms as you like, but be aware that there is a limit of 32 commands per form.

Following is an example of a palette form:



By pressing one of the command buttons, you send vicariously one or more ANDI protocol commands through the DGS application to the communications object.

This feature allows you to set up a series of oft-used commands without having to navigate through the command file or retyping them each time.

Nota Bene: The command buttons are enabled and inhibited based on the connection state.

4.5.2 Palette File Format

The palette forms are configured through a text file roughly based on the Windows INI file format. They have a .PAL extension.

Command specification starts with a [Command] section header followed by the ANDI protocol command on the next line. For example: in the above palette, the Sign On command might be specified as:

```
[Command]
SSC   APOS0102LOGRFA
```

The next component is the caption used on the command button. This is similarly specified, using the section header [Caption] followed by the caption text on the subsequent line.

For example:

```
[Caption]
Sign on
```

The final section is the (optional) tool tip text, specified as [ToolTip]. In keeping with the general flavor of DGS, the inclusion of meaningful tool tips is encouraged.

They are specified as:

```
[ToolTip]
This command establishes a session with the controller.
```

Note that one can specify multi-line commands, for example:

```
[Command]
SSC   APOS0102LOGRFA
SSC   CPOS0103DISDPTEML
```

In the preceding example, a sign on command is sent, followed by an event subscription.

Again, there is a limit of 32 commands per palette form. When loaded, the form is sized automatically to according to the number of commands it finds in the PAL file.

Nota Bene: Palette commands appear in the Send and Message Log controls just as if they were typed by the user.

4.5.3 Palette Sets

In addition to palettes, you may save as a set the palettes currently displayed. By clicking on the **File→Command→Palette→Set→Load** command it will bring up a dialog box prompting you to enter a .LST file.

Selecting a file will cause the current collection of palettes to be replaced by those specified.

You can create a palette set file by selecting **File→Command→Palette→Set→Save**.

You can remove all the palettes by selecting **File→Command→Palette→Close All**

When the DGS application exits, any palette forms are closed

5 File-Response Menu

The File→Response menu manages response files. Response files provide the means for DGS to respond automatically to certain messages that you specify.

You can select the file you intend to use with the **Select File** command. This command presents the user with a dialog box from which he can select a new response file. The **Start/Stop** (toggle) command starts and stops response file processing. The Edit command brings into WordPad the currently selected response file.

5.1 Response file format:

The following tables present the key concepts of the response file format.

Control Characters	Description
;	The line is a comment
*	Indicates a line that contains a string that is compared with the message from the SSC to determine if the response file contains a response for the message. The string may contain wildcard characters '?' that will match any character.
-	Indicates an option string for the message response. It must follow the string preceded with an *. Options must be separated by a space. Arguments must not be separated by a space from the option character. Option characters are case sensitive.
#	The response for the message. Must follow the option string or the '*' string if no options are present.

Escape Sequence	Result
\\	\
\n	Linefeed
\r	Carriage return
\xhh	Converted hexadecimal value

Options	Description
Cc	Specifies completion code 'c'. If not specified CC_ACCEPTED is returned in the response.
Tnnn	Truncate message at nnn. If a response is present it is appended to the message after truncating.
N	Do not respond to message.

Examples:

*TCP?? B
#TCP??ABNXG

Upon receipt of a TCP B message with any token, echo back the message, adding an A to the completion code append NXG.

*FIM?? B
-t7

Upon receipt of the FIM B message with any token, truncate the message to 7 characters and respond back with an accepted completion code.

Nota Bene:

- All control characters must be the first character on the line
- The token field should always contain wildcard characters
- 'C' like escape sequences may be used in the response message to enter binary data.
- The response file is parsed for each incoming message except RFA, therefore comments should be kept to a minimum. Comments at the beginning of the file are skipped at construction time and do not slow the parsing process
- The token in the received message is always returned in the response
- **Use response files judiciously**. They are meant for testing and development and should not be a part of any production system

6 Trace Menu

The trace menu manages the built-in message tracing capability of the communicator object. The trace facility captures all message traffic coming into and going out of the communications resource. In the case of a serial connection, all bytes going to and coming from the buffer of the serial port; in the case of an Ethernet connection, all bytes coming and going to the connected socket. This does not mean that the trace facility captures the actual data being transferred, only that which is submitted to the operating system.

As an aside, comments entered into the Send text window are now routed into the trace file. This allows one to annotate trace files.

Nota Bene: Cardholder data are masked automatically prior to being written into the trace file.

6.1 Select File

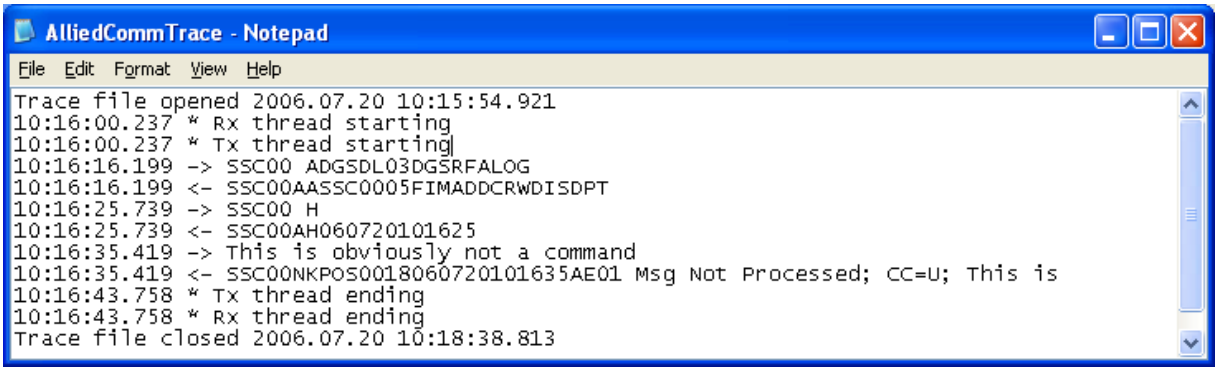
One can with this command select a file into which the trace data are written. The default trace file is specified as AlliedCommTrace.txt; which is perfectly acceptable under most cases.

6.2 Start/Stop Toggle

One starts and stops the trace operation using this command. You can start and stop it whenever you desire - it will not adversely affect your communications. The trace facility writes a record into the file whenever the file is opened or closed.

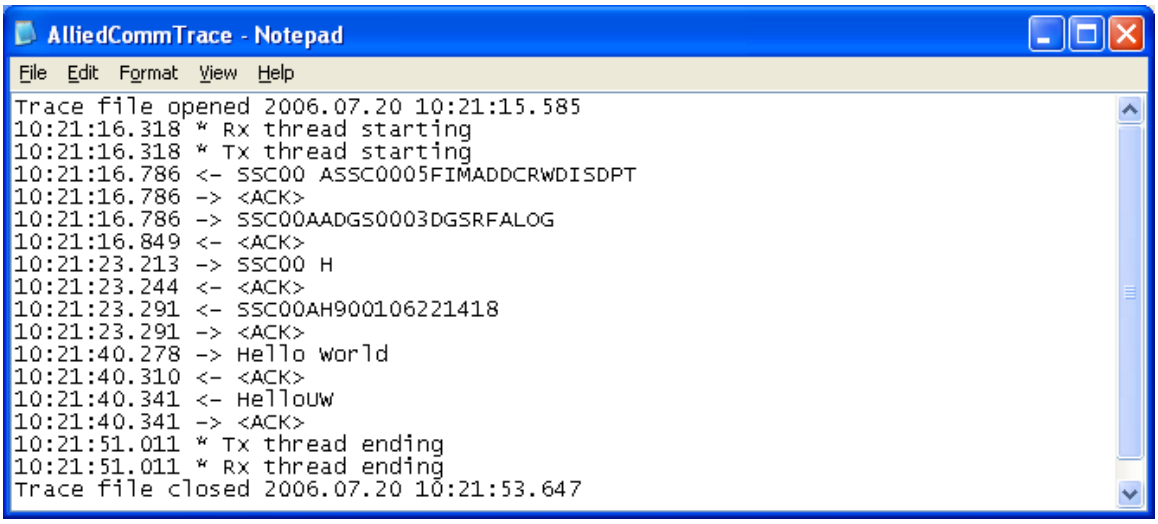
6.3 View

One can view the trace file, even while tracing, in a WordPad document using this command. When viewing, you will not receive any new data but it will be saved to the disk. Following is an example of a trace file:



Notice that all entries, with the exception of the open and close notification are tagged with the time. Informational messages are preceded with an asterisk (*); outgoing messages as preceded with the right arrow → and incoming are preceded with the left arrow symbol ←

Note in the preceding figure that we were connected to a NeXGen (Ethernet). In the following figure we are connected to an SSC (Serial). Notice that each message is followed by an entry of the opposing direction with an <ACK>. This signifies that the receiver acknowledged the message.



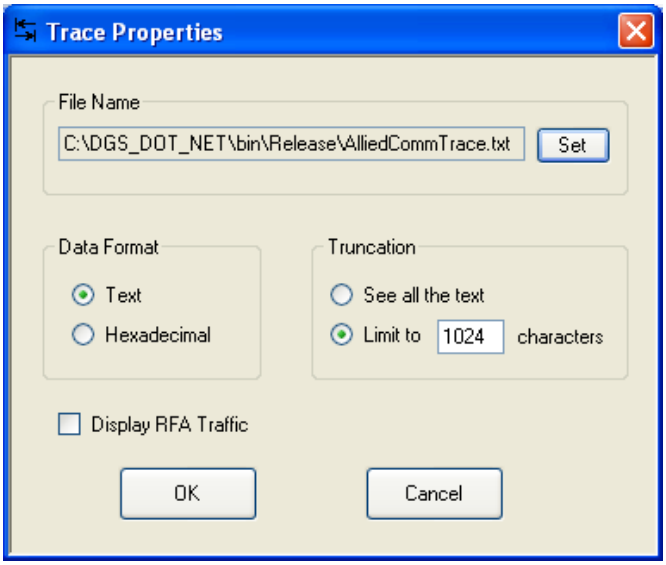
6.4 Reset

The Reset command allows one to clear the trace file or restart the tracing operation. When tracing is active, the user is pestered with a confirming dialog box before stopping, clearing, and then re-starting.

6.5 Properties

Version 3.2.1 brings a new form to control interactively the trace properties. Prior to this release, one had to edit the INI file to effect changes to the behavior of the command trace sub-system. With the popularity of this feature for troubleshooting, the need to promote the controls became apparent.

Following is a screen shot of the Trace Properties form.



The File Name frame lists the currently selected file and provides a command button to select a new file.

Data can be stored as ASCII text or in Hexadecimal format. Note that once you select one format over the other DGS will not covert already acquired data.

So as to reduce the bandwidth and the size of potential data sets, we provide a facility to truncate the data after a specified number of characters.

Another means to reduce the volume of data is to divert RFA messages from the trace file. The Display RFA check box provides a means to control the data flow.

7 Edit Menu

The Edit menu offers the standard Microsoft Windows edit commands for the in-focus control. Not all controls respond to the edit commands, but the entries are included in the spirit of completeness.

8 Help Menu

The Help About command loads the DGS About dialog.

In addition, the User's Manual command will load the current User's Manual into a separate PDF reader.

9 Connection Tab

All connection related parameters, along with the **Connect** command button are located on the **Connection** Tab. The following passages describe in detail the controls found on this tab.

9.1 Communications Mode

The DGS program supports transparently communication using both Serial (RS-232) and Ethernet (TCP) modes. The SSC uses Serial, the NeXGen and Aegis use Ethernet (although they do support serial mode with a special head-shell). This mode is set using the **Communications Mode** radio button or by selecting the appropriate tab in the **Communications Parameters** control.

9.2 Communications Parameters

This control group supports both Ethernet and Serial controls by each one having its own tab. Notice that the corresponding tab become active when you change the communications mode with one of the radio buttons.

9.2.1 Ethernet Tab

The Ethernet tab contains the controls necessary to set up a TCP connection over Ethernet. The **Device Name** text box can be used to manually enter the host name or dotted decimal IP address of the controller. Alternatively, one can press the **Find Devices** command button to automatically broadcast a *Hailing* message. This message directs all controllers to respond to the initiator with their IP and MAC addresses. Once all the nodes have responded, their IP addresses are placed in the **Available Devices** combo box.

*Nota Bene: If you position and hold the mouse over the text window of the **Available Devices** combo box, the tool tip text will contain the **IP** and **MAC addresses** of the current device.*

In addition, the **"?"** command button creates a report of the responding devices listing their IP and MAC addresses.

One can select an IP address from the combo box and press the < command button which copies it into the **Device Name** control.

The **Port** control allows us to specify the local TCP port we will use for communications with the device. Normally, one sets this value to ***0*** (zero) which signifies that we want the operating system to get the first free *ephemeral* port it can for our operations. Alternatively, it can be specified, but this is not recommended. Note that Allied Electronics has reserved port **6627** from the IANA.

Nota Bene: This becomes critical if more than one instance of the communications object is running on your PC. If more than one instance of the object is attempting to connect using the same port number, it will be unable to create a socket.

The **Ping** control is used to send an ICMP echo message. If there is an entry in the **Device Name** control, it will try to ping that node. Otherwise, it will simply load the Ping form for subsequent use.

Following is a screen shot of the Ping form:

Nota Bene: The PING command is oft times unavailable due to Windows security restrictions. Your system administrator might have to grant you extraordinary privileges to use this feature.

9.2.2 Serial Tab

Similar to the Ethernet tab, the Serial tab contains the controls specific to set up your communications link using RS-232. The **Port** control allows you to select any of the available serial ports on your machine. The **Baud Rate** control allows you to select the data rate from 300 through 38400 (exclusively). The default speed is 9600. The **Data Bits** control specifies the number of data bits used to represent each character. This must be set to 8 as the ANDI serial protocol uses the high order bit in its checksum calculation as well as in RFA processing. The **Parity** control determines how parity is generated and used. Normally this is set to **none** as we send a checksum word with the message to ensure correctness. The last control is for **Stop Bits**. This sets the number of bits used to indicate the end of a serial frame. The default value for this field is 2.

With version 3.2 comes the **Default** command button. This control will reset your controls to the default parameters.

If the user attempts to connect serially with parameters other than the default, a warning dialog box is shown with the option of cancelling the operation.

9.3 Sign on Parameters

As the controller can initiate a sign-on operation, the DGS object should be able to respond in kind. These controls allow one to specify the device information and services supplied by the DGS application.

The **Device Info** text box contains the *Device Class* and *Device Identification* fields used in the sign on and sign off process. The text is limited to 5 characters, and is normally configured as XXXYY, where XXX is a device class, such as DGS and YY is a server number, such as 01.

The **Services Supplied** text box contains a number of three characters service identifiers that the DGS application will support. Typically, these are ***DGS*** for Diagnostics, ***RFA*** for Remote File Access, and ***LOG*** for event logging. The following table lists the service classes available at this time; see the **ANDI Point of Sale Interface** document for more information.

Mnemonic	Description
CBM	Change Back Machine
CCH	Credit Card Host
CRW	Car Wash
DGS	Diagnostics
DIS	Dispenser Control
DPT	Dispenser Payment Terminal
EML	Electronic Mail
FIM	Fuel Inventory Management
FPS	Fuel Price Sign
IPT	Island Payment Terminal
LOG	Event Logging
LOY	Loyalty Card Processing
RFA	Remote File Access
SSC	SSC System Services
PCI	Payment Card Industry Data Security Standard Compliance
VND	Vending Solutions – *Contact Allied Tech Support for information on vending*

9.4 Connect/Disconnect Command

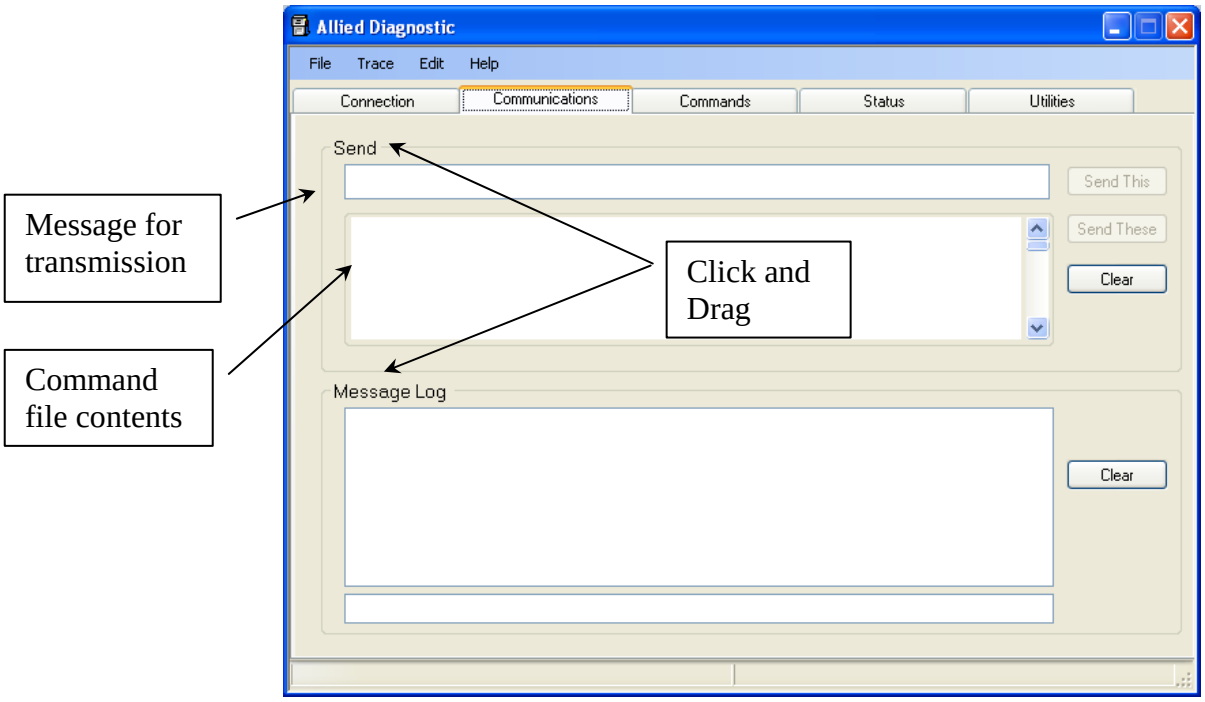
The **Connect** / **Disconnect** command button toggles with the state of the connection. It is used to initiate a connection when disconnected and sever a connection when connected. On successful establishment of a connection, the Communications tab will be highlighted so that the user can instantly start sending and receiving messages.

Nominally, a client application (like this one) will initiate an Ethernet-based connection to the controller. With the release of version 4.0.4, DGS can now listen for an incoming connection request. Not all Allied controller firmware supports this feature, but for those versions that do one can put DGS into a listening mode by clicking on the **Listen** command button located on the Utilities tab. This button toggles to "**Unlisten**" to cancel the request. Once a connection has been made, one severs the connection by pressing the **Disconnect** button on the Connection tab.

Nota Bene: The connection timeout for Ethernet is quite long, so users are cautioned that when attempting a connection to a non-responsive node, be prepared for approximately a sixty second delay before receiving an indication that the connection failed.

10 Communications Tab

The Communications tab presents the main interactive controls for communications with the device. The three frames: Send, Message Log, and Status segregate input and output. Following is a screen shot of the communications tab:



10.1 Send Frame

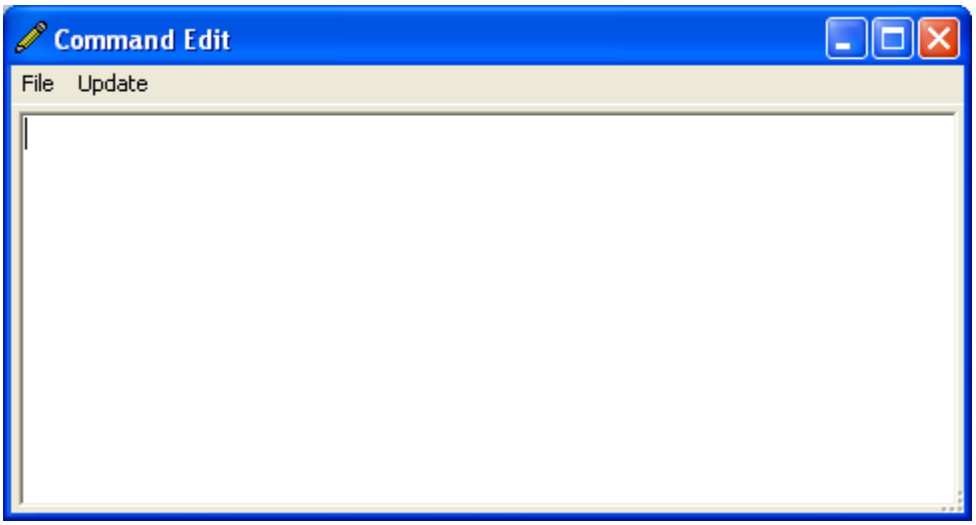
Outbound messages can be typed into the upper text box found in the **Send** frame (see message for transmission). That single message can be transmitted by pressing the **Send This** button.

Messages loaded from a command file are placed in the control marked Command file contents. Note the click and drag annotations in the preceding figure; they indicate that one can position the cursor over the frame, hold down the left mouse button and drag the frame over the text controls. When this happens, a new undocked **Command Edit** form will appear. This provides a means to load, save, and edit the contents of the command file. Messages loaded into the Command file contents control are sent to the device by pressing the **SendThese** command button.

*Nota Bene: You can also send commands one at a time from the command file by **double clicking** on them.*

10.2 Command Edit Form

The Command Edit form, depicted below, can be loaded by a drag operation in the Send frame or through executing the **Command → Edit** menu sequence.



This form allows the user to load and save commands files off disk. It also provides an **Update** command to transfer the contents of the window into the send frame's command file contents control. It should be noted that one cannot directly edit the command file contents in the send frame other than to erase it with the **Clear** command.

10.3 Message Format

The format of the messages, whether they are entered interactively, or loaded through the command files, follows the General Application Message Format (§2.9) published in the ANDI Point of Sale Interface document. It is assumed that the reader will have this document. In the event that you haven't a copy, contact Allied Electronics for information on how to obtain one.

Messages starting with a forward slash or semi-colon are treated as comments. They are routed to the Trace file if enabled, and otherwise ignored. They are not sent to the device.

Hexadecimal values can be entered by a preceding \x or \X. The very next two characters must be legal hex values 0123456789abcdef or 0123456789ABCDEF.

With the exception of an empty string, the DGS application will attempt to send whatever is entered into the text control.

10.4 Message Log

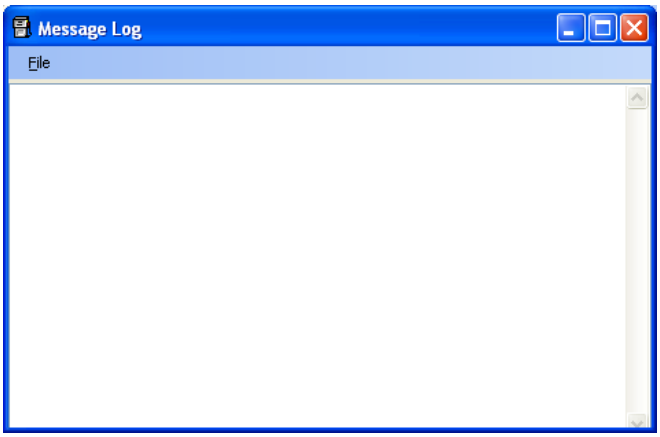
The Message Log shows the messages sent (in red) and received (in blue). The top portion shows all the messages received since the last time the **Clear** button was pressed. Due to the fact that we fixed the size of the form, you might not be able to see all the text of longer messages. To remedy this, the text box immediately below shows the currently highlighted message. One can then scroll through the message at will.

Like the Send frame, this frame also can be dragged to create an undocked Message Log Form.

Nota Bene: Cardholder data are masked by DGS before being placed in the message log control.

10.5 Message Log Form

If you click and drag the Message Log frame, you will cause the Message Log form to be loaded. This form is resizable, so you can stretch it out to encompass an entire message. It is kept in synchrony with the Message Log form. This form also allows the user to save and send message contents.

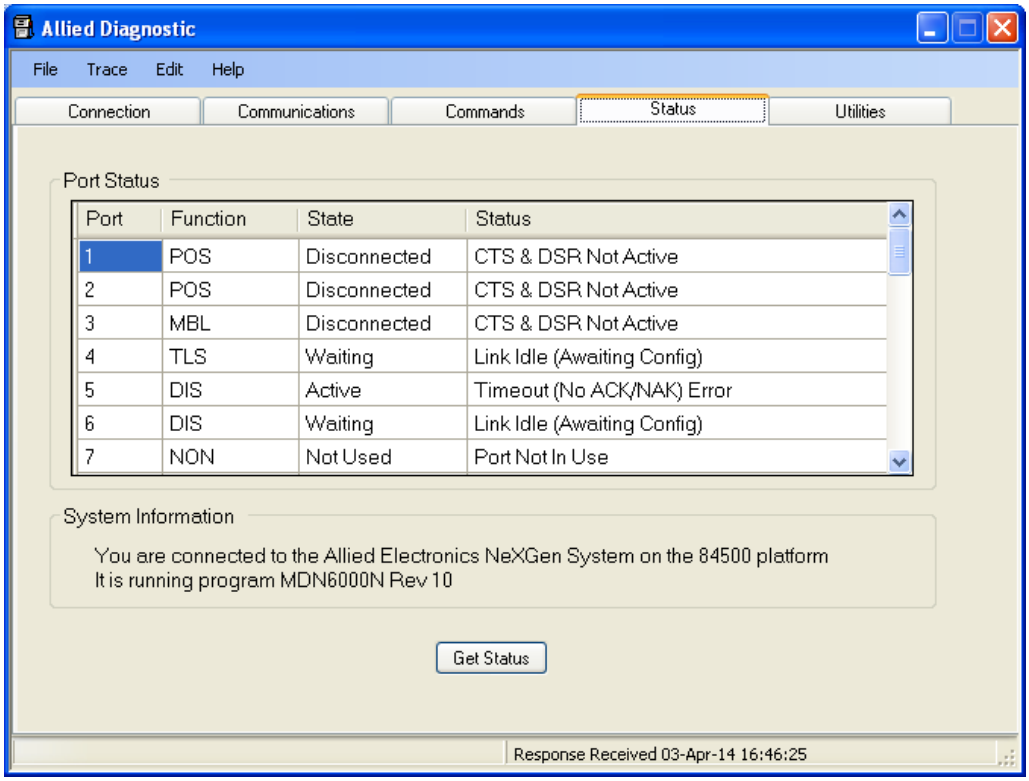


Nota Bene: Cardholder data are masked by DGS before being placed in the undocked message log form.

Pulling down the File menu entry uncovers Save, Print, and Exit commands.

10.6 Status

The Status text window displays the status, when appropriate, returned from the communicator object. This is a read-only display.



The Status tab will update automatically whenever the controller detects a change in state as long as the tab is active. In addition, the Get Status command will force the controller to refresh the table. When connected to the SSC, 16 ports are reported. When connected to most versions of the NeXGen/Aegis 32 ports are reported, although certain versions of these newer controllers will report up to 64 ports.

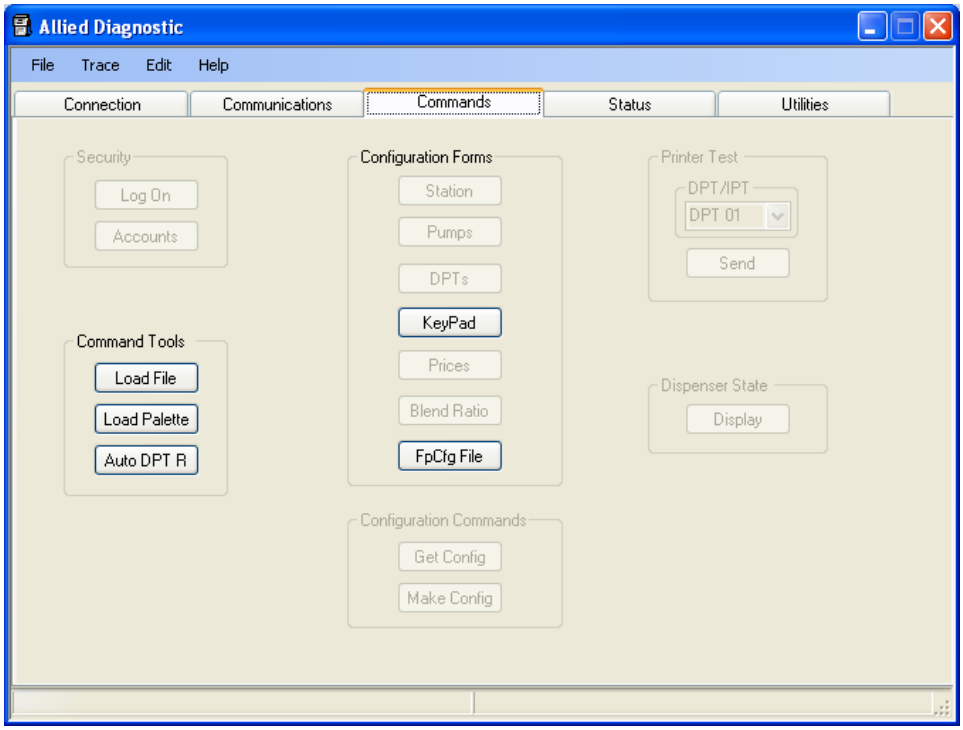
More information on the State and Status entries can be found in the ANDI Point of Sale Interface document.

11 Commands Tab

The Commands tab provides access to built-in, high-level command functionality.

It is arranged by functionality, including Security, Command Tools, Purpose-built Configuration Forms, DPT/IPT Printer Test, and Dispenser State.

Following is an image of the Command Tabs screen.



11.1 Security

The Payment Application Data Security Standard mandates, among other items, password protected accounts. In order to aid in the management of this sub-system, DGS has a log on form and System Security Management form.

While the ANDI protocol has a **Sign on** message, it must not be confused with the PA/DSS mandated **Log on** message. Sign on, establishes a behavioral relationship with the controller; log on establishes a level of security.

The Log on command provides a means to log on (securely) at any time. DGS automatically presents to the user this form when receiving a sign-on indication or response from the controller. This command is simply provided as a direct means to access this form should the need arise.

The Accounts command causes the System Security Management form to load.

As depicted above, the System Security Management form provides the controls to add/change/delete/reset user's accounts and passwords.

The functionality provided by this form is recognized only by those firmware versions that are PA/DSS compliant. While the commands may be sent to non-compliant controllers, they will have no effect other than to elicit an error response.

The User name, Password, and New Password text boxes are used as input to the User … commands. Fill-in the data and then press the appropriate menu command.

With the migration from PCI/DSS to PA/DSS, we must now encrypt strongly the passwords as they are communicated from the DGS application to the controller. By checking the Encrypt Passwords box, one enables this feature.

There are two files associated with PA/DSS compliance: User Accounts and Audit Trail.

11.1.1 File Read Audit Trail

Pressing the File → Read → Audit Trail command prompts the user for a file name and then directs the controller to upload to DGS the audit trail data to that file. After the last of the data are received, the file is loaded into word pad and displayed.

11.1.2 File Read Users

Pressing the File → Read → Users command directs the controller to upload a list of the users, their class (administrative or normal), and the hashed password. The data are displayed in word pad similar to the Audit Trail but under a fixed file name.

11.1.3 File Exit

File → Exit unloads the System Security Management form.

11.1.4 User Add Normal User

Pressing the User→Add → Normal User command sends a message to create a normal (non administrative) user's account on the controller using the data from the text boxes.

11.1.5 User Add Administrator

Pressing the User→Add → Administrator command sends a message to create an administrative user's account on the controller using the data from the text boxes.

11.1.6 User Change Password

Pressing the User →Change Password command sends a message to change the specified user's password using the data from the text boxes.

11.1.7 User Delete

Pressing the User → Delete command sends a message to remove the user specified by the User Name text box.

11.1.8 User Reset

Pressing the User → Reset command sends the command to reset a locked out user. This condition exists if the user log-on fails after 6 attempts.

11.2 Command Tools

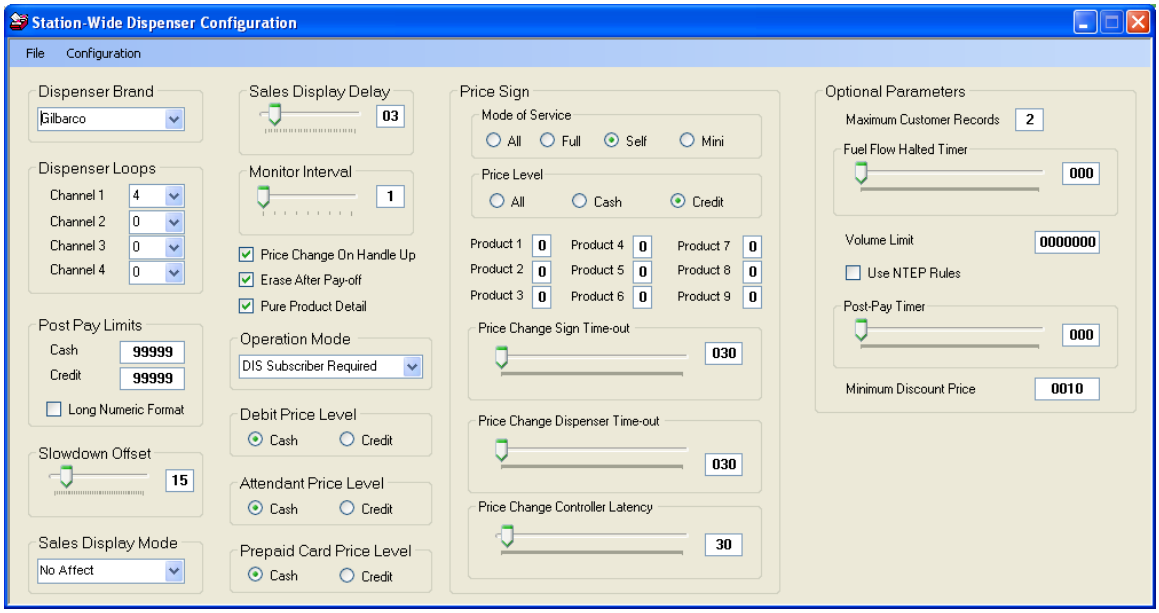
The Command Tools controls provide an alternate route to load a command file or a command palette. These controls perform identically to their counterparts found on the main form's menu bar.

11.3 Configuration Forms

With DGS version 3.2 comes a series of forms that provide controls to specify the parameters of the key configuration commands. While the ANDI message set is well thought out and "mature" it does contain somewhat long messages. The forms in this section provide a graphical means to gather and present these data. They allow one to read from the controller and write to either the controller or to the clipboard, and are normally populated with data when first displayed.

11.3.1 Station

The Station-Wide Configuration form assembles and decodes the DIS O or (o) message. Following is a screen shot of the form.

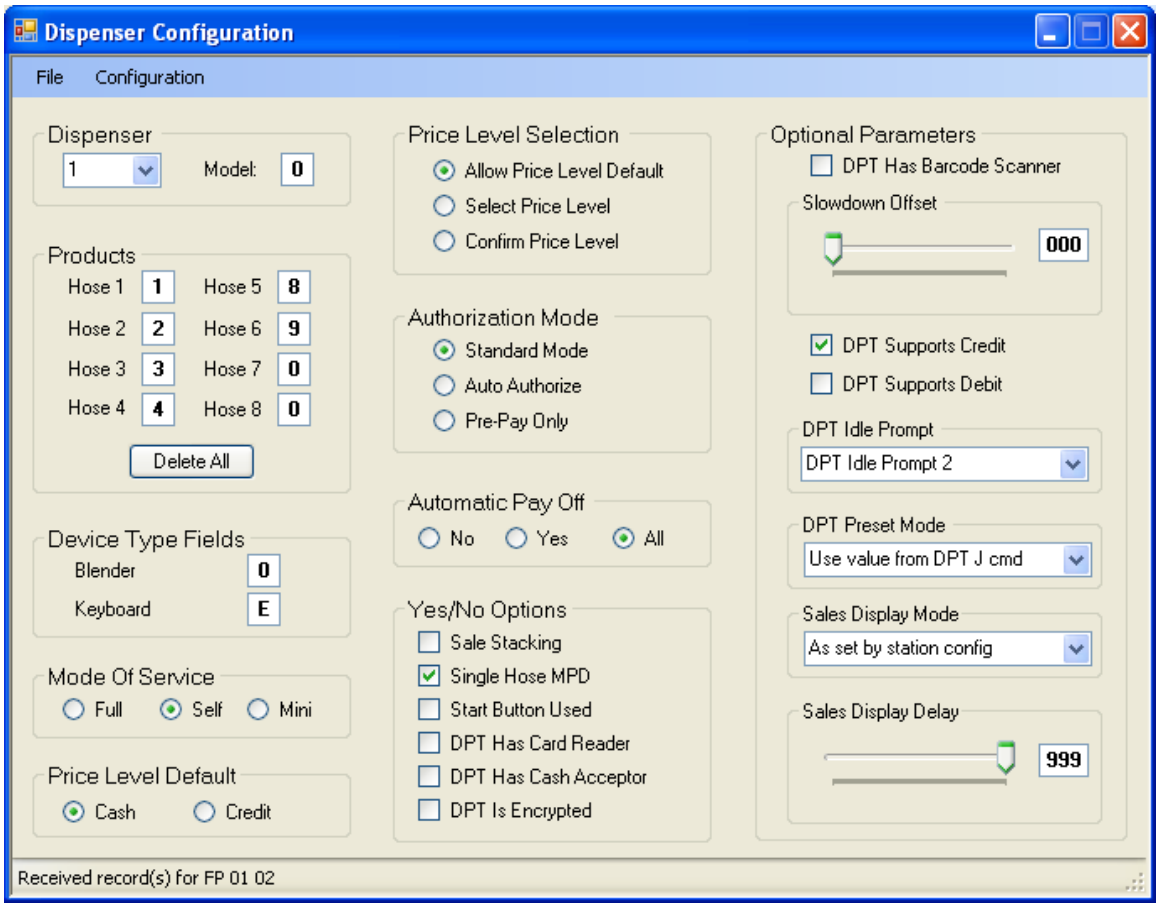


As with all forms in DGS tool tip text provides basic guidance. For details on the DIS O message, please refer to the *POS Interface for ANDI Systems* and/or the *POS to ANDI Configuration Options* documents.

11.3.2 Dispensers

The Dispenser Configuration form provides a graphical representation of the DIS M command. The DIS M command, as opposed to the DIS O command provides fueling point specific configuration. During the loading process a read DIS N command (specified as read all) is sent to the controller, which returns a configuration record for any and all fueling points that have been configured. When an un-configured fueling point is specified in the "Dispenser" control, the form will copy the data from the first one it finds, applying it as a starting point. One can un-configure a dispenser by pressing the **Delete All** command button and then sending the configuration.

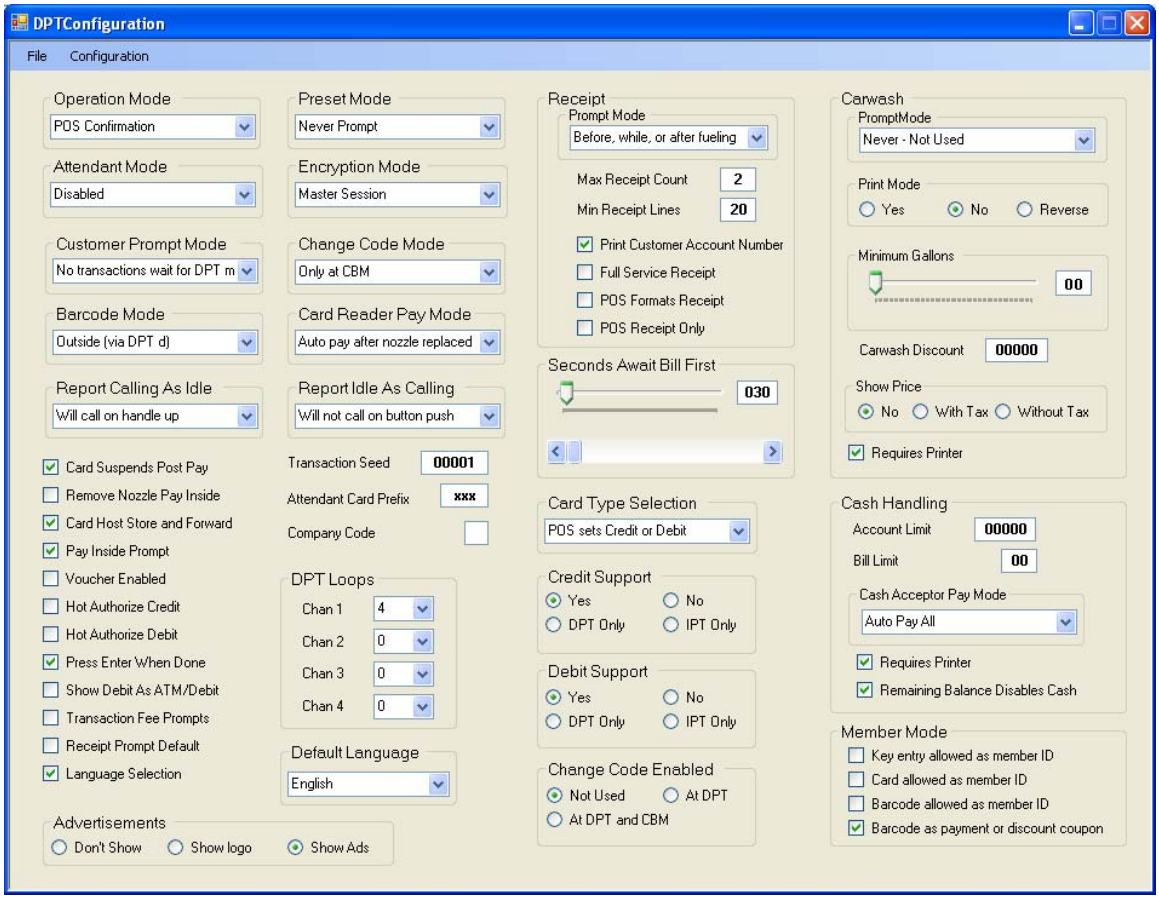
Following is a depiction of the form.



11.3.3 Dispenser Payment Terminal (DPT)

The DPT Configuration form provides a graphical representation of the DPT J command. The form operates similarly to the aforementioned in that it reads the existing configuration on initial display and provides the means to write the configuration to the controller or the clipboard.

Following is a depiction of the form:

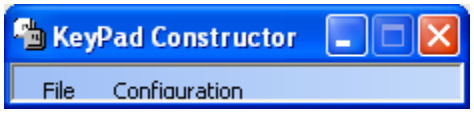


11.3.4 KeyPad

The SSC and NeXGen controllers have the ability to map physical keys to logical keys so as to assign specific functionality. The DPT N command can be used to accomplish this, but requires certain knowledge of the hardware that is not always available to the casual user. To make this task easier, a Keypad Configuration feature allows one to build the command using a graphical form.

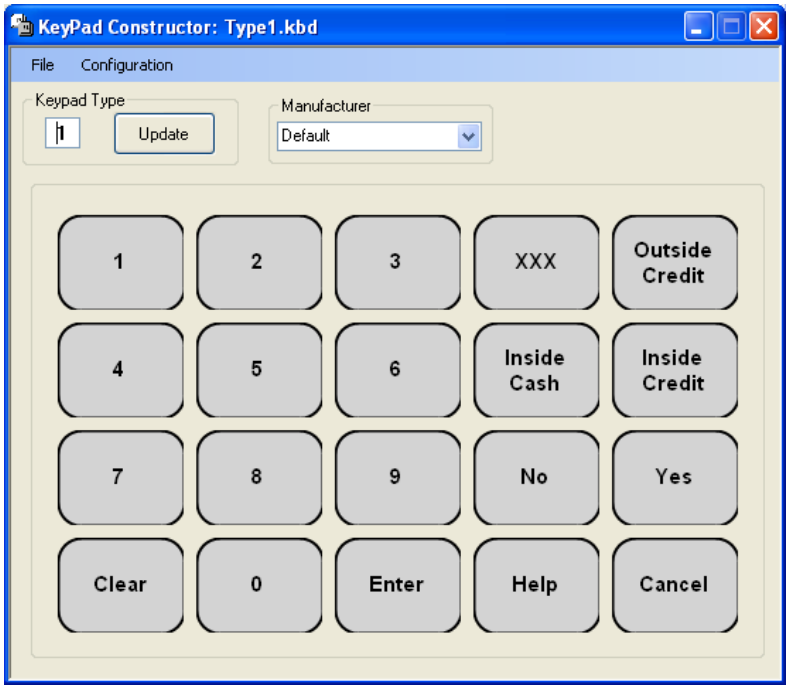
The layout of the keypad and key assignments are stored in .KBD files

When the KeyPad command button is pressed, it loads a blank constructor form – as follows:

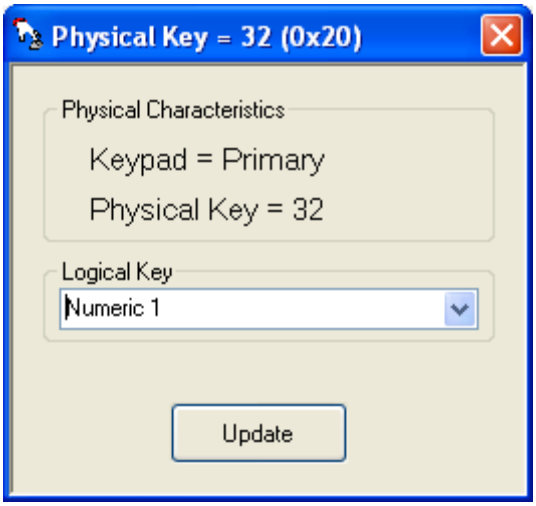


One can then load a template file by clicking on **File → Load**

Here is an example of a test keyboard containing two banks of soft keys, a main keypad, and an auxiliary keypad.



In addition to the Keypad Constructor form, a Key Properties form is also loaded. Following is an illustration of this form:



As one clicks on the various keys on the constructor form, the Key Properties form is updated with the information associated with the selected key. The Logical Key control provides the means to set the logical key value associated with the selected key.

If you click on a key for which there are two positions (tall or wide key) or there are two logical keys, the Key Properties form will grow to include information on the special key.

This is illustrated in the next section.

11.3.4.1 KBD File

The heart of this subsystem starts with the KBD file. This file (in modified INI format) provides not only the means to specify the layout of the keys on the form, but the keyboard type, shape, physical, and logical values.

A template might include just the rows, columns, shapes, and physical values for the keys. The user might then specify the type and the logical values.

The **type** field is a single alphanumeric value used by the controller to select a keypad.

Legal values are:
{0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz}

It is specified in the file after the section heading [TYPE]

For example, to specify a keypad of type J, one would expect to see in the file:

[TYPE]
J

There are five distinct groups of keys that can be specified: Left Soft Keys, Right Soft Keys, Primary Keys, Hot Row Keys, and Auxiliary Keys.

In above example all the keypads are used so as to illustrate how they are rendered.

The keys groups are differentiated by section headers as:

[SKL]	(Softkeys – Left)
[SKR]	(Softkeys – Right)
[AUX]	(Auxiliary keypad)
[HOTROW]	(Hot row – rendered with the primary keys)
[KEY]	(Primary keypad)

Each key to be defined starts with one of the five section headers.

The attributes for each key are specified in a single line and in comma separated entries.

For each key there are a total of five attributes: row, column, shape, physical value, and logical value.

For a “template file” one has to specify the row, column, shape, and physical value of all the keys. The user can then fill in the logical value for each key and from there save it on disk as well as create the DPT N command.

The row attribute (range 1 through n) is specified by the letter R. The column attribute (range 1 through n) is specified by the letter C.

For example: one might want a key on the primary keyboard at row 2 column 3. It would be specified as:

[KEY]
R=2, C=3

Nota Bene: The Row and Column specified here are not necessarily the same as those on the actual keypad. They are used to arrange the keys in the display of the form. By and large they will be, but one can draw the keypad as one sees fit.

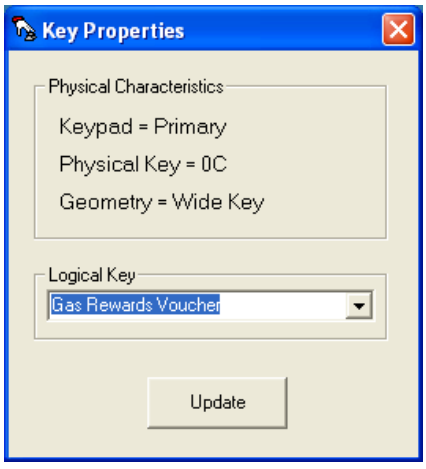
The shape of the key is the next item in the attribute list. There are four distinct shapes supported: Hidden (0), single row single column (1), single row two columns (2), and single column two rows (3). The shape is specified using the letter S.

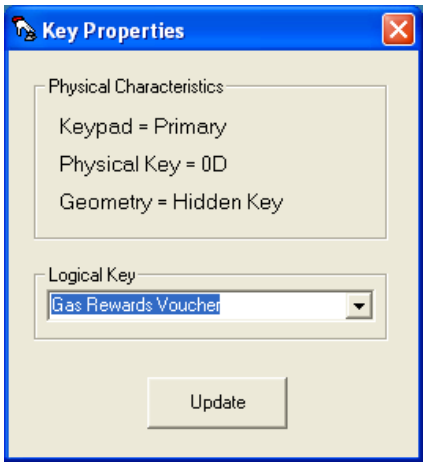
Building on our previous example, if our key is a simple rectangle, our entry becomes:

[KEY]
R=2, C=3, S=1

Hidden keys are available so that one can map two physical keys to the same logical value. Note the Rewards Voucher key has a type 2 shape. By clicking on the key one can alternate between specifying the row 5 – column 1 and row 5 – column 2 keys.

The two forms below illustrate:





The physical value is that which is actually returned from the hardware. It is a number between 0 and 255 and can be specified as numeric or hexadecimal.
Note that hex values are specified in the conventional manner (0x00 through 0xFF).

Adding again to our example, let us assume that the value returned to the controller from this particular key is 38 (base 10), our entry becomes:

[KEY]
R=2, C=3, S=1, P=38

The last attribute is the logical value which is used by the controller. This controls the behavior of the DPT state machine. Its range is specified in the ANDI Point of Sale Interface document in the DPT data element dictionary section.

In a "template file" this entry can be left blank and it will be assumed that the key is unused. The user will then fill-in the entry using the Logical Key pull down and Update commands on the Key Properties form.

11.3.4.2 Keypad Constructor Commands

KBD files are loaded with the **File→ Load** command. Like most other file load operations in DGS, a dialog box is popped up wherein one can specify the file. The last location where a file was loaded is remembered for convenience.

One can hand edit a KBD file with the **File→Edit** command. If a file is in-use, this command will load the Notepad application and cause it to read in the current file. Changes made in the file will not be reflected in the interactive form until the file is reloaded.

Changes made through the KeyPad Constructor form are saved to disk by the **File→ Save** command.

Clicking **File→Exit** causes the KeyPad Constructor and Key Properties forms to be unloaded.

With the introduction of the X-Files class of controller firmware (which includes support for all peripheral types in single builds) a manufacturer tag must be appended to the keypad construction message. These data are specified through the **Manufacturer** control.

The **Configuration→Write**… commands build a DPT N command from the current data and either send it to the controller or write it into the clipboard.

The Keypad Type can be specified by entering the single alphanumeric character in the text box and then pressing the Update button. No changes take effect until after you press the button.

As you navigate about the keys on the form, their attributes are communicated to the Key Properties form.

Where keys span more than one physical location or have more then one logical value, there is typically a “hidden key” which is used to specify/store the other value.

By repeatedly clicking on a key the “primary” and “hidden” keys are alternately selected.

11.3.4.3 Key Properties Form

This form provides the means to set the logical value for a key. The current value is written into the Logical Key control when the key is selected on the Keypad Constructor form.

The logical key value can be set by selecting the new value in the combo box control and then pressing the update button. No changes are made until such time as the button is pressed.

When a KBD file is loaded this form pops up automatically right in the middle of the Keypad Constructor form.

If the form is closed, it will reappear as soon as a new key is brought into focus.

11.3.5 Product Pricing

Fuel prices can be read and written through the Prices command button. Pressing the button will load the Product Pricing form.

This form, like the keypad form, can be used online and offline.

Following is an illustration of the form:

This form implements that DIS Q/q and DIS R/r commands. One navigates through the prices by clicking the arrow keys, or selecting a product.

Nota Bene: The form does not support mini service due to its severe decline in our industry. The ANDI message set still supports mini service; users requiring mini service can construct the DIS Q/q R/r messages by hand, create a series of palette commands, or a series of commands files as necessary.

Commands

The **File** menu contains just one command **File → Exit**. Clicking on this unloads the form.

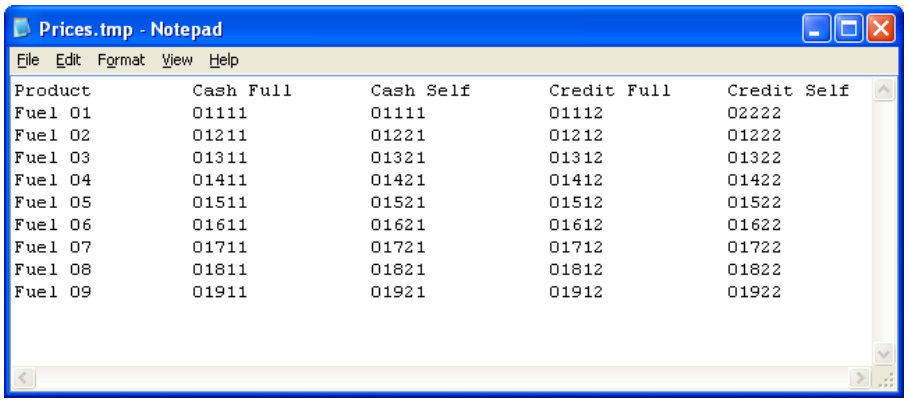
Clicking on the **Configuration → Read** command will construct and send a DIS R or DIS r command (depending on the state of the Price Format control. On receipt of the price information, DGS will create a collection of prices and populate the controls with the first product specified.

One can then navigate through them, as mentioned above. To change a price, you can type the new price in the appropriate text box. When you are satisfied with your entries, press the **Update** command. This will update the stored price in DGS.

To convey the information to the controller (or to the clipboard) click on either
Configuration → Write → To Controller or
Configuration → Write → To Clipboard (respectively)

In addition to the ability to write the prices, you can see your configured prices in tabular form by pressing **Configuration → Create Report**

This will generate and load a temporary file entitled *Prices.tmp* and looks like the following:



Product	Cash Full	Cash Self	Credit Full	Credit Self
Fuel 01	01111	01111	01112	02222
Fuel 02	01211	01221	01212	01222
Fuel 03	01311	01321	01312	01322
Fuel 04	01411	01421	01412	01422
Fuel 05	01511	01521	01512	01522
Fuel 06	01611	01621	01612	01622
Fuel 07	01711	01721	01712	01722
Fuel 08	01811	01821	01812	01822
Fuel 09	01911	01921	01912	01922

Note that if you set one of your products to *Not Used* (the first entry in the Product drop-down box) you will be asked if you want to delete the product.

Further, if you make a change to one of the prices and then navigate off the product, you will be asked if you want to keep your changes.

While there is only one product listed at a time, you can access the others by clicking on the left arrow, right arrow, or selecting another product in the Product combo box.

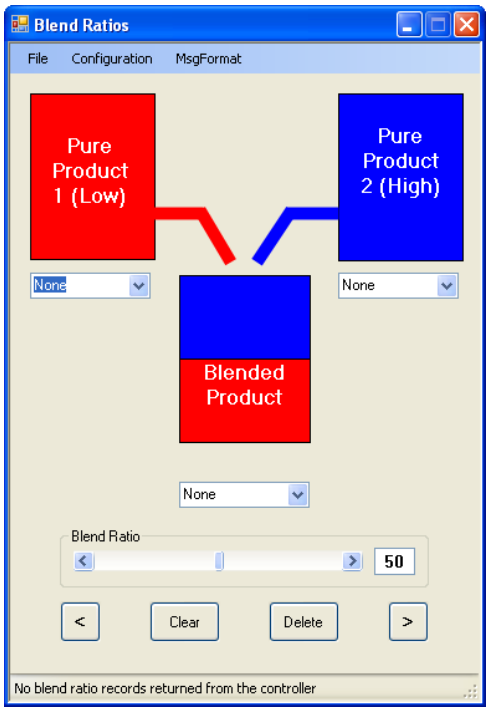
Selecting a product that exists allows you to edit the current contents. Selecting one that does not yet exist generates a new product and sets the prices to zero. You can then type in the appropriate values.

Pressing the **Clear** button sets all the prices to zero, but maintains the product in the collection. Again, to remove a product, you would set the Product to *Not Used*.

The status bar at the bottom of the form provides some feedback, listing the result of your most recent action.

11.3.6 Blend Ratio

The blend ratio commands (DIS U and V) can be managed interactively through the Blend Ratio form, pictured below:



General Operation

The form starts by reading any existing blend ratio records from the firmware and bringing them into a local database for editing. If no records are available, if you press the right arrow or enter a product, a new record will be created. If you want to add a new record an existing set, just press the right arrow to the end of the records and it will create a new one (after asking you if it is ok). Changing the blend ratio is just then as simple as moving the slider from side to side or entering an exact value in the text box. Pressing the left arrow or right arrow will move you from record to record within the database.

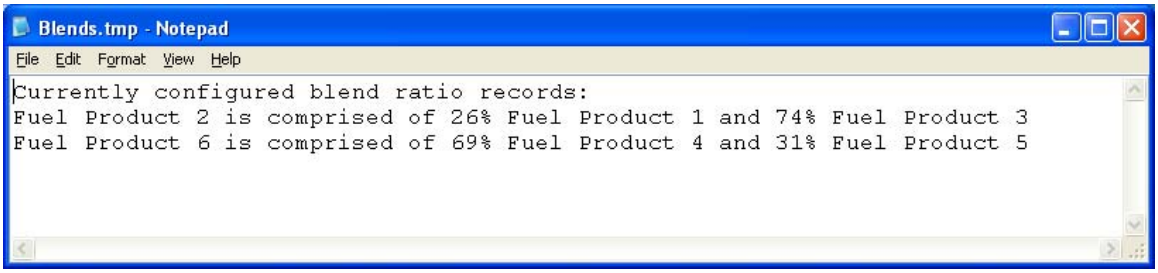
Commands

Selecting the **File → Exit** command will cause the form to exit.

The **Configuration → Read** command will send a read blend ratio command to the controller (if connected). When we receive the response message the current data will be erased and a new database built.

The **Configuration → Write** provides two commands: **To Controller** and **To Clipboard** which are used to send the blend ratio to a connected controller or to the clipboard so that you can paste it into a command file or command palette.

The **Configuration → Create Report** command is used to build a report of the contents of the blend ratio database. An example follows:



The **MsgFormat** commands specify the number of acceptable products (1 through 9 in short format) or (1 though 78 in long format)

Nota Bene: If you switch between long and short you will be asked if you want DGS to remove the out of range products automatically.

The three combo boxes underneath the graphical tanks are used to specify the products used in the components of the blend ratio. They are populated with the legal selections based on the selection of the **MsgFormat** control.

The **Clear** button is used to set the current blend ratio into a state where it will be removed when the controller receives it. You can do the same thing interactively by setting the blended product to pure product 1, setting pure product 2 to None, and setting the blend ratio to 100 percent

The **Delete** button is used to remove the current record.

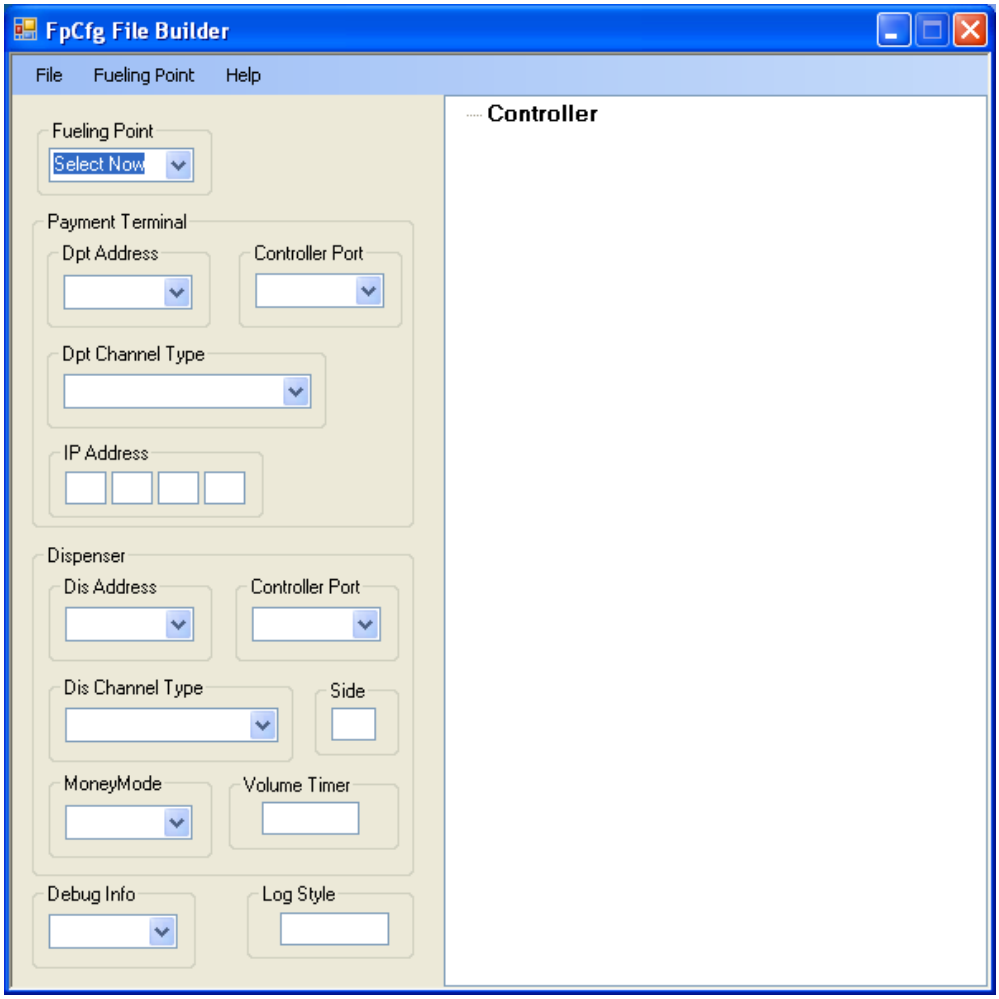
The **Blend Ratio slider** and **text box** work together to specify the ratio of product 1 to product 2 in the blended product. Note that the ratio is graphed in the Blended Product tank by the changing color boundaries – red for product 1 and blue for product 2.

11.3.7 FpCfg File Management

With the ever increasing use of Extensible Markup Language (XML) files for configuring the forecourt controller, the need has arisen for an interactive form to assist in the construction of the XML file used for fueling points.

To this end, the FpCfg File Builder form has been added to DGS.

Following is an image of the file at load time:



This form can be used without regard to the state of your connection to the controller, as it uses a local copy of the XML file. This means that in order to deploy the changes, one must download the file to the controller. This can be accomplished by the CF Access form or by using FTP or RFA commands.

Nota Bene: FTP is no longer supported for PA-DSS 2.0 compliant firmware.

There are 3 groups of menu bar commands: File, Fueling Point, and Help

In the File group one can **Load** a new file, set the **Format** of the output file (see the NXG FpCFg XML documentation for more detail), **Save** a file to disk, and **Exit** the form.

In the Fueling Point group one can **Add** a new fueling point, **Delete** one, and **Create a Report** of the fueling points by Fueling Point Number or by Channel.

The **Help** group is also the command, which causes the current NXG FpCfg XML.PDF document to be loaded into a separate PDF reader.

The form is divided into roughly equal panels – the left side containing the controls to configure the fueling points and the right containing a "tree view" control to select a particular fueling point or to select the controller itself to add a new fueling point.

The controls are context sensitive – in other words – they are turned on or off depending on whether you are adding, deleting, or editing a fueling point.

11.3.7.1 Add a Fueling Point

In order to add a fueling point, you must select the **Controller** element in the right pane. Doing so will cause the Fueling Point control to read "Select Now." You can then use the **Fueling Point** combination box to select any legal fueling point not already in use. In addition, DGS will read as much data as it can from the last fueling point and write it into the *nascent* fueling point.

Provided you don't navigate off the controller, you can then use the remaining controls in the left pane to configure this new point. When you are satisfied with your settings, you must then click the **Fueling Point → Add** menu command to add it into the right panel.

It should then appear as a new entry under the controller (in numerical order).

11.3.7.2 Delete a Fueling Point

Deleting a fueling point is carried out by selecting the condemned fueling point in the right pane and then selecting the **Fueling Point → Delete** menu command.

11.3.7.3 Reports

To generate a report of your fueling points by fueling point number, simply click on the **Fueling Point → Create Report → By Fueling Point** menu command.

To generate a report sorted by controller channel, simply click on the **Fueling Point → Create Report → By Channel** menu command.

11.3.7.4 Xml File Format

At the present time, there are 2 flavors of XML file – format 1 and format 2. Format 1 is the "legacy" version and supports only configuration of Payment Terminals. Format 2, on the other hand, supports both payment terminal and dispenser configuration.

Not all systems support format 2, and users are advised to refer to the NXG FpCfg XML document for more information and also to contact Allied Electronics for specific questions.

11.3.7.5 Fueling Point Specific Controls

The controls found in the left pane are those associated with each fueling point entry in the XML file. Note well that the Fueling Point combination box is inhibited and is "grayed out" when a fueling point has been selected in the right pane. This is because the fueling point number is used as an internal "key" to refer to that particular entry.

Other than the fueling point, all other controls are available to the user.

Nota Bene: The FpCfg Builder form does not check the validity of your entries.

11.3.8 Get Config

The **Get Config** command issues a series of ANDI commands and prepares a text report of their contents.

The commands issued are:

ANDI Command	Description
SSC00 E00	Controller Firmware Version
DIS00 S00	Dispenser Firmware Version
DPT00 O00	DPT Firmware Version
DPT00 O80	IPT Firmware Version
RFA00 E …	Read the length of the FpCfg.xml file to determine if it exists on the controller
DIS00 P	Site Configuration
DIS00 N00	Dispenser Configuration
DIS00 V	Blend Ratios
DIS00 R000	Fuel Price
DPT00 K	DPT Configuration
DPT00 k10100	Get DPT Display Prompts
DPT00 W00	IPT Configuration
DPT00 E0	Fuel Information
DPT00 G01…	Product Information (reads all of them)
FIM00 B	Tank Gauge Configuration
DGS00 P	ANDI Firmware Modules

The file created is named **config_info.txt**

When all the aforementioned commands complete, the file is loaded automatically with the Windows Notepad application.

11.3.9 Make Config

Similar to the **Get Config**, the **Make Config** command issues a series of ANDI commands, but instead of creating a report it creates the appropriate configuration commands in a text file. This feature is useful for copying and preserving your configuration.

Following is a list of the commands sent and built by the **Make Config** feature:

Command Sent	Command Created	Description
DIS00 P	DIS00 O…	Site Configuration
DIS00 N00	DIS00 M…	Dispenser Configuration
DIS00 V	DIS00 U…	Blend Ratios
DIS00 R000	DIS00 Q…	Fuel Price
DPT00 K	DPT00 J…	DPT Configuration
DPT00 W00	DPT00 V…	IPT Configuration

The file created is named **Config_cmd.txt**

When all the aforementioned commands complete, the file is loaded automatically with the Windows Notepad application.

11.4 DPT Printer Test

Often it is necessary to test the functionality of DPT or IPT printers. In order to do so, a command has been added to send a fixed text message to the selected payment terminal. The DPT/IPT is selected using the **DPT/IPT** combination box, and then the command is issued by pressing the **Send** button.

11.5 Dispenser State

The state of the dispensers can be displayed continuously in real time by pressing the **Display** command button.

That will cause the following form to be loaded and a subscription sent to receive dispenser status notifications.

Note that this form will automatically size itself (in banks of 8) depending on the number of fueling points that are configured.

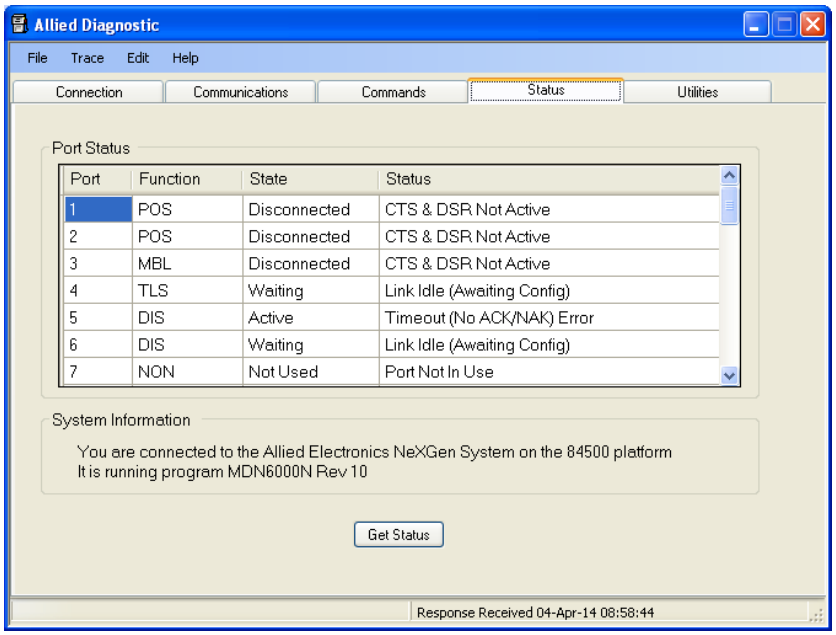
The state of the fueling point is depicted by a change in the appearance of the icon, as well as indicated by the Tool Tip Text displayed when the mouse pointer is hovered over the individual fueling point.

Following is a table of the icons along with their corresponding state:

12 System and Port Status Tab

This tab presents the user with information concerning the state and status of the communications ports (16 in the SSC, up to 64 in the NeXGen) and displays critical information about the system itself, such as firmware type and revision, et cetera.

When you select this tab, it sends a message to the controller to automatically update port status whenever it changes. When you click to another tab, it disables the automatic message. You can get the status information at any time by pressing the **Get Status** control.



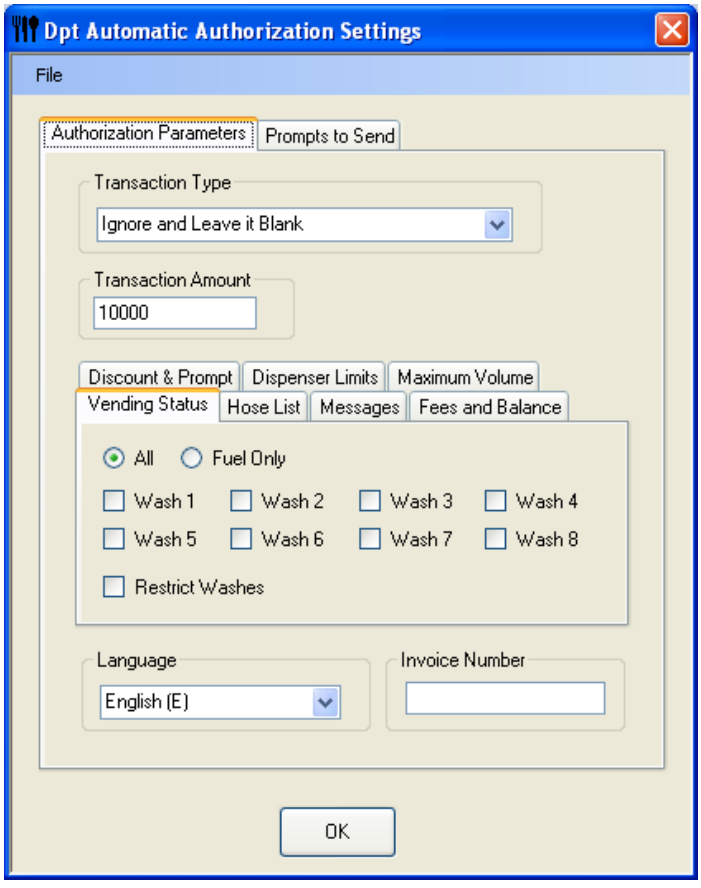
13 Automatic DPT R Processing

With version 4.0.2 the ability to process DPT R (card authorization) commands has been added to DGS.

This feature provides the means to supply data to incoming DPT R commands as well as to send prompt completion codes automatically or interactively and specify a final completion code for the transaction.

Prior to use, the authorization parameters and prompts to send must be configured. To facilitate this action, a Dpt Automatic Authorization Settings form has been included. You can load this form by pressing on the **Auto DPT R** command found on the **Commands** tab.

Following is an image of the Authorization Settings form:



The form is divided into two sections: Authorization Parameters (those sent to the controller) and Prompts to send (a collection of completion codes sent to collect specific data).

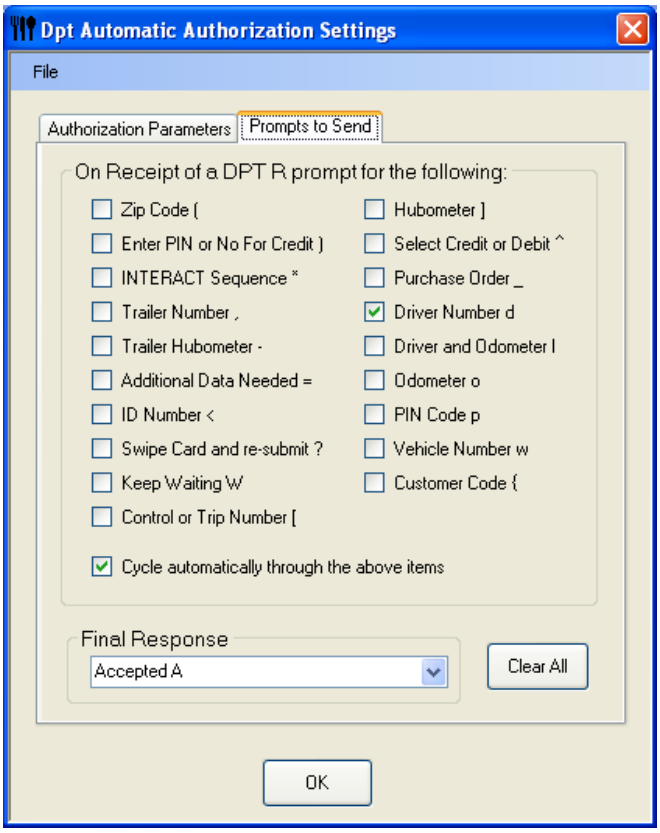
Nota Bene: The prompts sent in response to the DPT R command tend to be application specific. We have attempted to include all supported prompts. Contact Allied Electronics for questions or clarification on the support of specific prompts.

Following is a table of the various parameters that can be sent to the controller:

Parameter	**Description**
Transaction Type	Set by the controller or the POS, it describes the type information (Cash, Credit, Split tender, et cetera).
Transaction Amount	The maximum dollar amount of the transaction.
Vending Status	Restricts or frees purchase of items other than fuel and provides the means to restrict specific car wash selections.
Hose List	Enables, inhibits, or causes the user to be asked to confirm the purchase of fuel on a hose-by-hose basis. The data are ignored if the Send the Hose List box is unchecked.
Display Message	If populated, the text in this control will be shown to the user after all fleet prompting and before the dispenser is authorized.
Receipt Message	If populated, the text in this control will be printed on the trailer of the receipt.
Fee	A Transaction fee to be applied. The dispenser authorization amount will be decreased by this amount if supplied.
Remaining Balance	The funds remaining on a card. Not all systems use this field.
Remaining Uses	The remaining number of times that a card can be used. Not all systems use this field.
Single Use Balance	The amount of money that can be spent in a single use of a card. Not all systems use this field.
Discount Rule	The discount method and amount used in the transaction. See the ANDI POS Specification for more information.
Prompt Rules	The prompt mode, field type, and key list used in the transaction. See the ANDI POS Specification for more information.
Dispenser Amount Limit	Product-by-product amount limit.
Dispenser Volume Limit	Product-by-product volume limit.

Parameter	Description
Maximum Fuel Volume	The maximum amount of fuel that can be dispensed in the transaction – regardless of grade.
Language	Selects the language used for this transaction – when complete the language is restored to that which was in use.
Invoice Number	The invoice number to be applied to the transaction.

Moving on to the **Prompts to Send** panel we see the following:

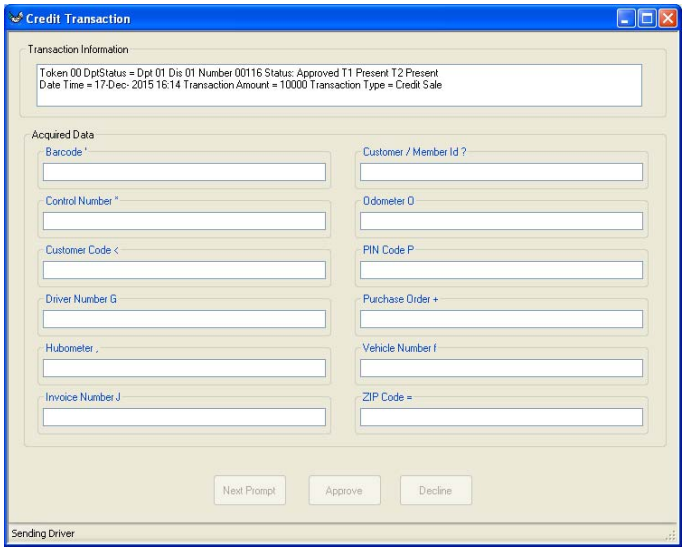


Note the Cycle automatically through the above items control which when checked will cause DGS to send the prompts in the order found above and then finally answering with the completion code set in the Final Response combination box.

The Clear All command is used to deselect all the checkboxes.

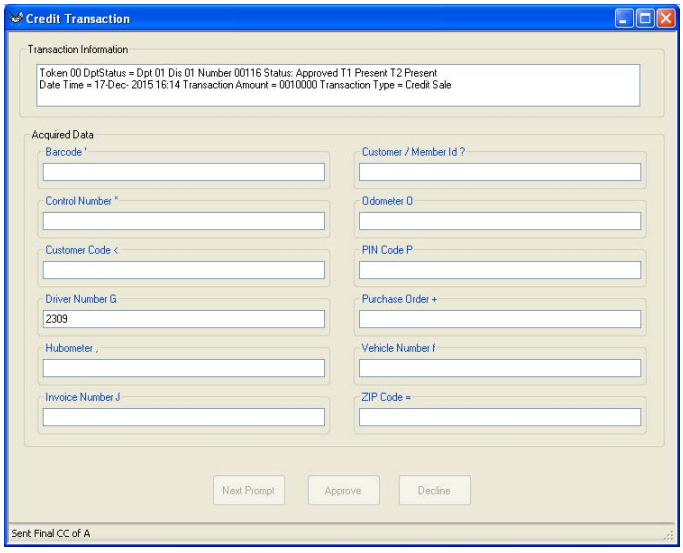
Additionally, one can load and save INI files containing specific configurations by using the eponymous menu items.

Assuming that any of the prompts are selected, upon receipt of a DPT R command the following form will be displayed:



Note that the status bar at the bottom contains “Sending Driver.” At this point the DPT is prompting the user to enter the driver number.

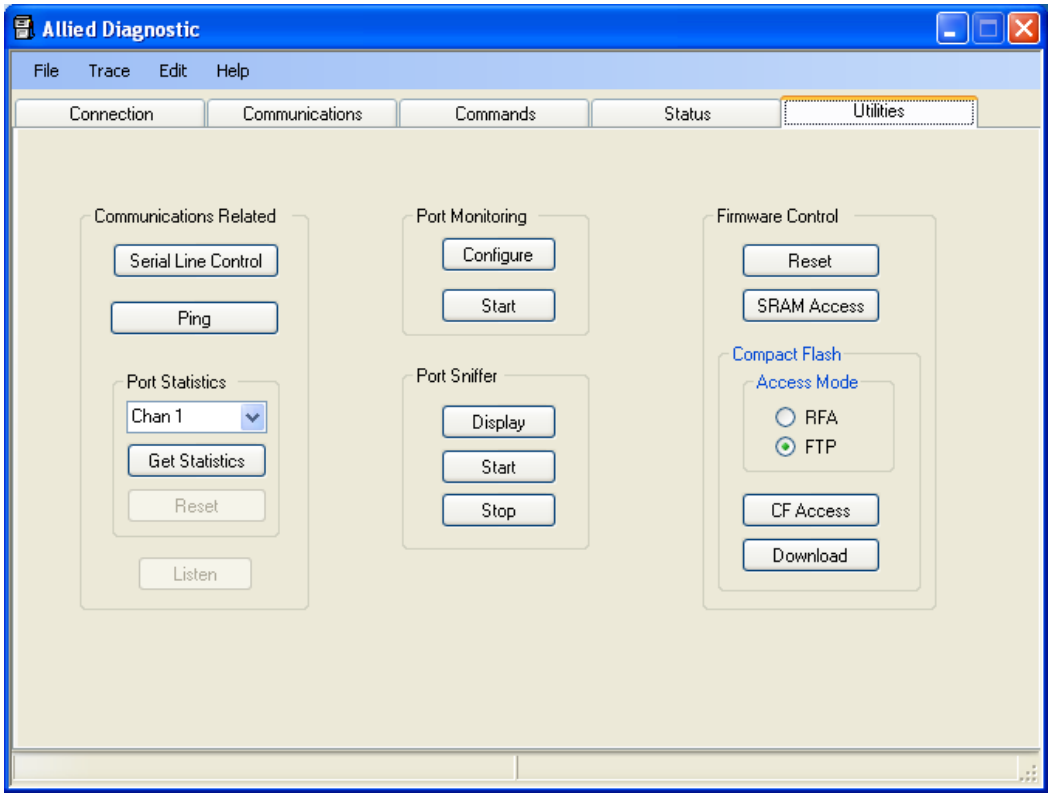
The user will then enter his data and then the following form is displayed:



The data are displayed and then the transaction is approved. Note that if the automatic prompting is un-selected the Next Prompt, Approved, and Decline commands are enabled.

14 Utilities Tab

The utilities tab contains features accessed more infrequently. They are grouped logically in frames of Communications Related, Port Monitoring, Firmware Control, and Port Sniffer.



14.1 Serial Line Control

The Serial Line Control command loads the Serial Line Control form. This form presents an interface to monitor the state of the CTS (Clear To Send) and DSR (Data Set Ready) lines, It allows one to toggle the write-only (RTS) Request To Send and (DTR) Data Terminal Ready lines, and it provides a means to send the protocol control characters across the serial line. This form has no effect when disconnected or connected via Ethernet.

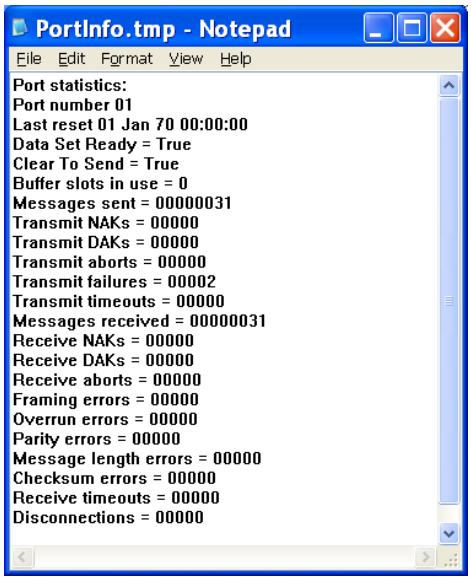
14.2 Ping

The **Ping** control is used to send an ICMP echo message. If there is an entry in the **Device Name** control, it will try to ping that node. Otherwise, it will simply load the Ping form for subsequent use. This is an alternate route to the Ping command and that it behaves exactly like the one on the Connection tab.

14.3 Port Statistics

The Port Statistics controls enable you to prepare a report of activities for a specified communications port. The combo-box is used to select the port of interest (1 through 16) and the **Get Statistics** command button sends the appropriate command and causes a report form to be loaded on completion.

Following is an example of the prepared report.



With the release of version 3.2, one can now reset these accumulated statistics as well.

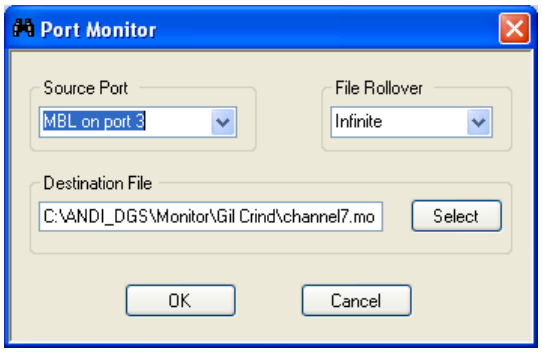
14.4 Listen/Unlisten

The Listen/Unlisten command toggles back and forth according to whether DGS is listening for an incoming connection request or not.

With the release of 4.0.4 this feature was introduced. Using the Local IP address and Ethernet Port, one can rig DGS to accept an incoming connection request from an appropriately configured forecourt controller. Not all Allied firmware supports this feature, so contact Allied Electronics Technical Support for more information.

14.5 Configure Port Monitoring

Invoking this command loads the following form:



The Port Monitor form sets up the parameters used for the monitoring command.

The **Source Port** is enumerated on sign on, so you just select the port of interest.

The **File Rollover** control provides the means to select how long data are written to a particular file. The default is infinite, meaning that the data are always written into the file specified in the **Destination File** control. Alternatively, you can elect to write into a file for a period of time. By specifying a file rollover time, your file name will be appended with an underscore (_) and three digits starting with 001. With the elapse of the file rollover time, the file number will increment.

For example: Specifying *C:\DataFiles\CreditHost.Mon* would result in the creation of *C:\DataFiles\CreditHost_001.Mon* and then *C:\DataFiles\CreditHost_002.Mon* – and so forth…

The **Data Capture** control specifies which of the data are saved.

The **Destination File** control specifies the file into which the data are written, with the understanding that if **File Rollover** is selected the underscore and three digit file number will be concatenated to the name.

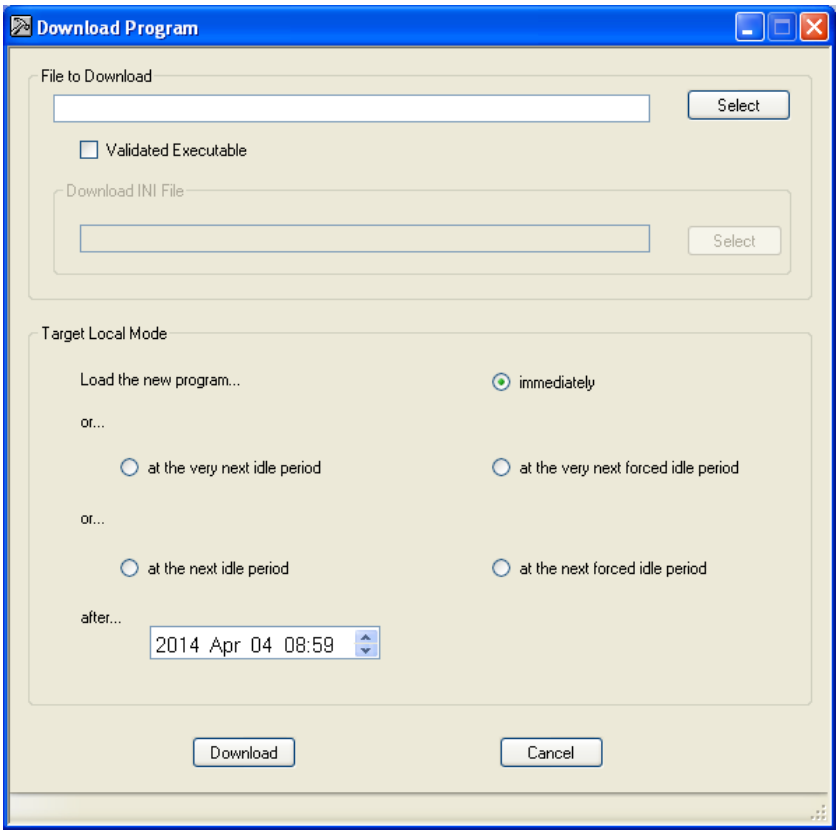
Pressing **OK** will save the parameters; **Cancel** will abandon your edits.

14.6 Start / Stop Port Monitoring

This command button toggles starting and stopping the port monitoring operation based on the parameters specified in the Configure operation.

14.7 Download Command

Pressing the download command causes the Download Program form to be displayed.



The **File to Download** text box allows one to type in the name, or one can use the **Select** command to browse with a dialog box to find the firmware file to be downloaded.

With the migration to PA/DSS the executable delivered to the controller must be validated to ensure that it came from Allied Electronics. In order to do so, a special INI file is included with the executable which contains an encrypted checksum of the executable. To enable this feature, check the **Validated Executable** checkbox and specify the appropriate INI file. This file is normally in the same directory as the executable and they travel in pairs.

The target load mode controls allow the user to select how and when the device will load this new binary image. Several options are available, which are mostly self explanatory.

One sets the date and time using the **after…** control, of which the minimum is the current date and time.

Once the salient parameters are in-place, you press the **Download** button to start the downloading operation.

The **Status** frame contains a status message and progress bar to keep the user up-to-date on the progress. Understand that downloading the firmware via the serial port is slow, so please be patient.

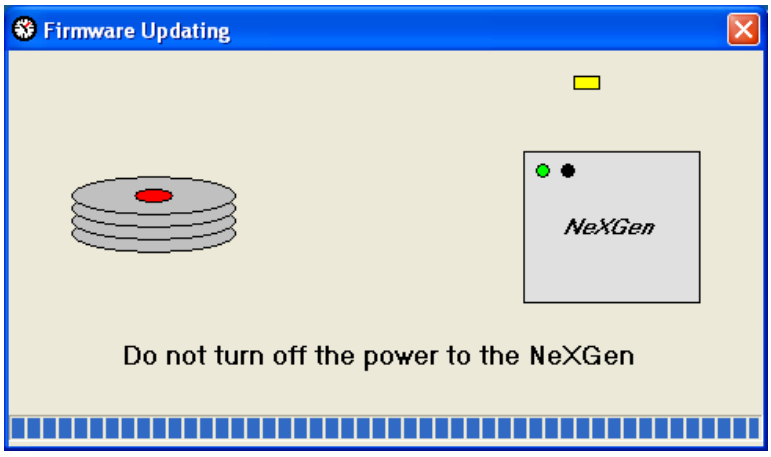
Nota Bene: You should ensure that the time in the controller is synchronized to the PC if you are going to employ a timed download.

14.7.1 NeXGen Post-Download

In the NeXGen environment, downloading new firmware brings with it the burden of ensuring that the existing executable file is not trashed on the compact flash. To minimize the chance of corrupting the existing file, new firmware is written to a temporary directory and then the executable is renamed rather than writing the executable block by block.

After the download session ends, the firmware recognizes that a new version is present and starts the updating process. This involves renaming the file in the temporary directory so that it becomes the new application and then restarting.

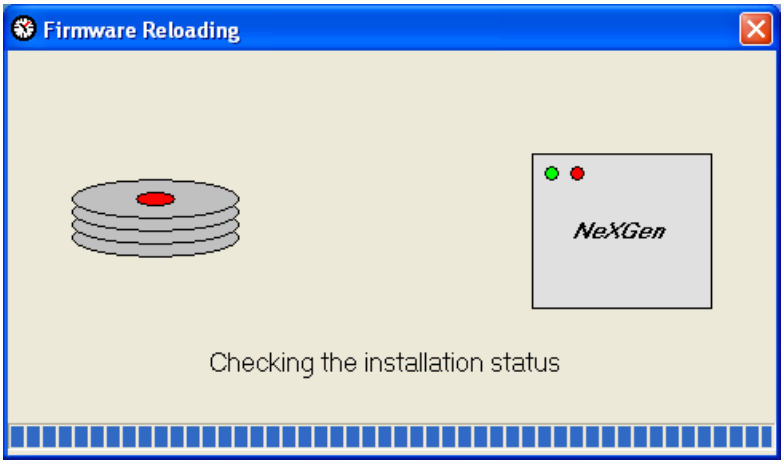
As this is underway, a form is displayed on the PC so that the user can track the progress.



The preceding screen shot shows a static picture of the process. In actual operation, the yellow bar will appear to travel between the disk and the NeXGen icons.

Once the firmware has been renamed, it will then start automatically the reboot process.

During reboot, the post-download status form will continue to monitor the progress and when complete, a dialog box will be displayed with the end status.



If in the event that this process fails, the status monitor form will close itself after a period of time. You may also close the form by clicking on [X].

Nota Bene:

Users are most strongly cautioned to follow carefully the upgrade instructions.

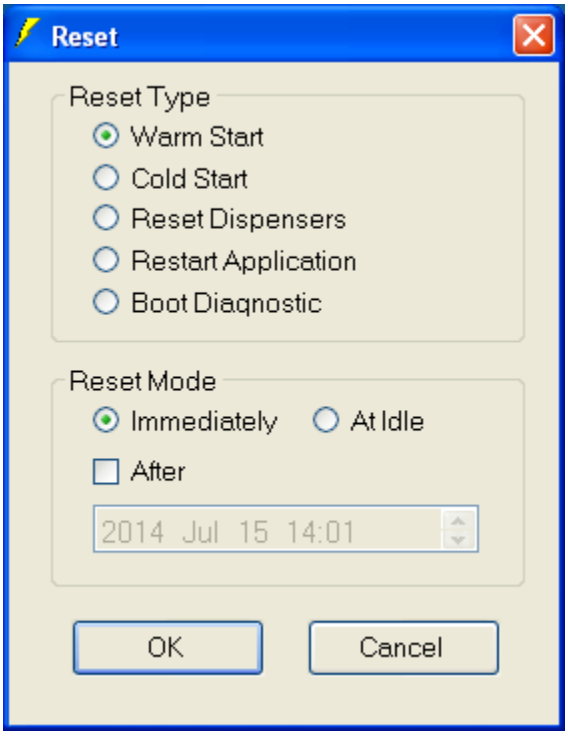
You simply cannot download the files and cycle the power on the NeXGen.

Under certain conditions during the reloading phase, there is a step in which the internal Static RAM is cleared, which takes a few moments.

If you deviate from the process, you might render your NeXGen unbootable.

14.8 Reset

Invoking the Reset command loads the following form:



One should select the type of reset and time in which the reset is executed then press OK to perform it or Cancel to abandon the operation.

The Reset Type options are:

- Warm Start
  Causes the controller firmware to reset without losing your configuration
- Cold Start
  Causes the controller firmware to reset and clear your configuration data
- Reset Dispensers
  Causes the controller to clear everything except credit card table data
- Boot Diagnostic
  Causes the serial loopback diagnostic application to load at reset
- Restart Application
  Causes the configuration and credit host specific data to be cleared at reset

Reset Mode specifies whether the action should be undertaken immediately or the next time that the station is idle (no pumps operating).

With version 4.0.5 the ability to direct the ANDI controller to schedule the reset operation at a future time has been introduced. To use this feature, one must check the **After** control and enter the date and time in the control immediately below the checkbox.

Not all firmware supports this feature, so feel free to contact Allied Electronics for more information.

The default setting is for the reset operation to happen immediately. Note that the date and time control becomes enabled once the After checkbox is checked.

The Reset command is limited to administrative users in PA-DSS compliant systems.

Nota Bene: For NeXGen users connected via Ethernet, you must reconnect once the device is back up and running, as virtual POS connections cannot be maintained across boot cycles.

14.9 SRAM Access

The NeXGen platform is outfitted with a Static Random Access Memory (SRAM) module which provides data integrity across primary power failures. DGS provides a means to manage this sub-system by way of a dedicated form which is loaded by pressing the SRAM Access command button.

The SRAM sub-system is designed to look like a disk drive with a file system. It contains a root directory with either one or two folders. The first folder, (Allied) contains system related files; the second folder, (named for the specific application) contains the files specific to the application and credit card host.

Access to the SRAM sub-system is limited to read-only; files are created, read, and written by the firmware.

When the form loads, it automatically submits commands to the NeXGen to read the SRAM module information and the directory structure. The response to these messages is written into the Module Information and File Structure frames. These commands can be sent manually by clicking the appropriate menu entry.

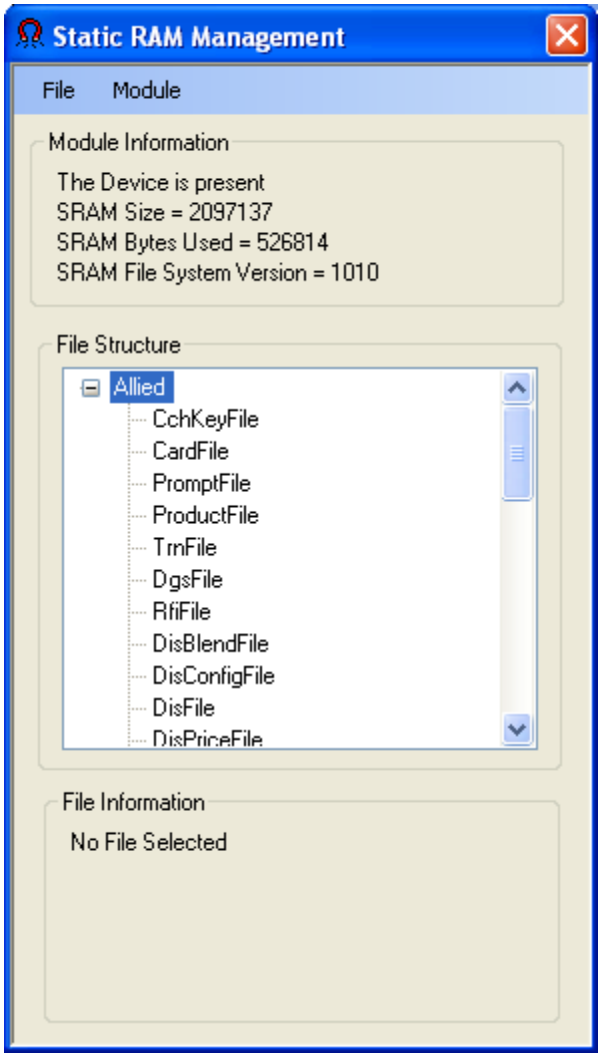
One can select a file for upload by clicking on it in the **File Structure** control. If you double click the file, it will select it and upload it your PC in one operation.

The Module Information frame lists the particulars of the SRAM module. The key field is whether or not the device is present. The Size, Bytes Used, and File System Version are all dependent on the firmware.

The File Structure frame contains a **Directory Tree** control which is used to select your file of interest. Information about the selected file is written into the File Information frame. Aside from the file name, the file's index into the SRAM data space, the amount of memory reserved, and file length (amount used) are provided. In the case where the file entry is a directory, the maximum number of file entries and the current number of entries in use is also provided. For files, these two fields are zero.

When uploading files, bear in mind that the files will be stored on the current hard drive in the path as they appear in the File Information frame. For example, in the following screen shot, were you to click **File → Upload**, the file C:\Allied\AdsConfigFile would be created and populated from the SRAM sub-system.

SRAM file read operations are not supported in PA-DSS compliant systems.



14.10 CF Access

The **CF Access** command button loads the Compact Flash Configuration control panel, which it detailed later in this document. One must be connected for this control to be enabled.

14.11 Port Sniffer

The **Display** command button loads the Port Sniffer's control panel. The **Start** and **Stop** command buttons send the start and stop commands to the Sniffer firmware. The Sniffer utility is detailed later in this document.

Nota Bene: The start and stop commands have no effect unless you are connected to a NeXGen with sniffer firmware.

15 Port Sniffer Utility

The Port Sniffer utility provides a means to intercept and forward the communications stream between serial devices. When troubleshooting communications between devices it is often preferable to do so using an independent piece of hardware. The SSC and NeXGen platforms both offer port monitoring, but with the understanding that one end of the hardware pair is also acting as the collection vehicle. The port sniffer addresses that concern by monitoring the traffic in a totally non-intrusive manner.

Nota Bene: The port sniffer software is used in conjunction with NeXGen hardware running DSA class firmware. Contact Allied Electronics for details on how to obtain the necessary hardware, firmware, cables, et cetera.

15.1 Theory of Operation

Data are transmitted and received from the controller, SSC or NeXGen, using a variety of serial interfaces. Regardless of the specific method or protocol, it is converted into ones and zeroes. This is the point at which we can tap into the communications stream, grab each byte as it passes, and transmit it via RS232 to the sniffer hardware.

On the SSC platform, one can install an RS-232 Adapter board between the main board and the communications board in question. Cables coming from the adapter are plugged in to channels 1 and 2 or 3 and 4 in the NeXGen sniffer hardware.

NeXGen sniffer hardware differs from that used in forecourt control only in that it contains firmware specific to the acquisition and retransmission of serial data.

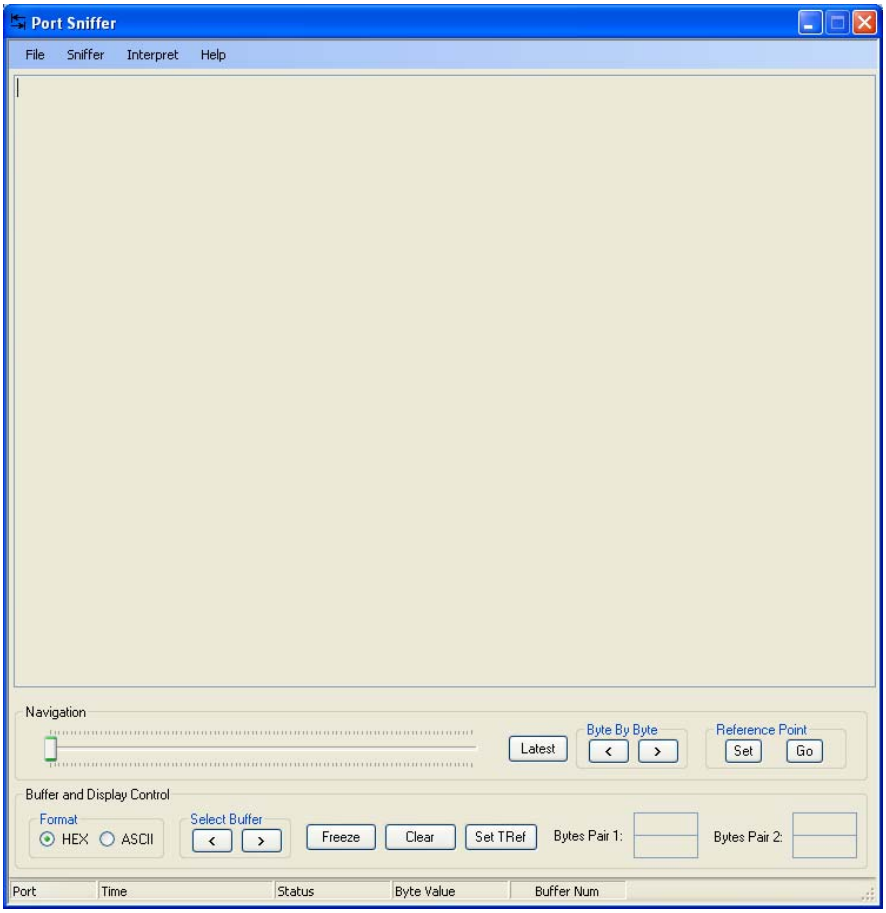
Your NeXGen sniffer hardware must be connected via Ethernet to the PC on which the DGS application is executing.

You would then use DGS as the control and repository for the sniffer data.

Note that you can run multiple copies of DGS simultaneously. You can have one instance shooting commands back and forth to the controller, and another instance acting as the sniffer controller.

15.2 Port Sniffer form

Below is a screen shot of the Port Sniffer form:



This form is the main interface to the port sniffer facility. Data coming in over the various ports are stored on repeated lines that scroll as needed.

Data are displayed as:

Port 1 …….
Port 2 …….
Port 3 …….
Port 4 …….
Port 1 …….
Port 2 …….
Port 3 …….
Port 4 …….

… Up to 8 times

It provides data visualization, sniffer control, buffer navigation and control, data format, and load and save capabilities.

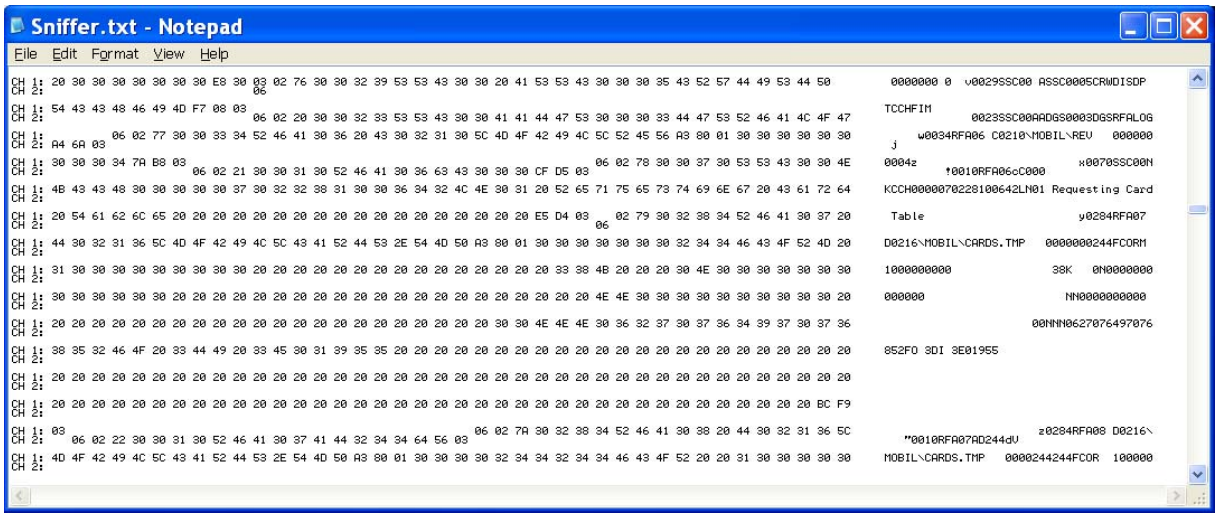
15.2.1 File menu controls

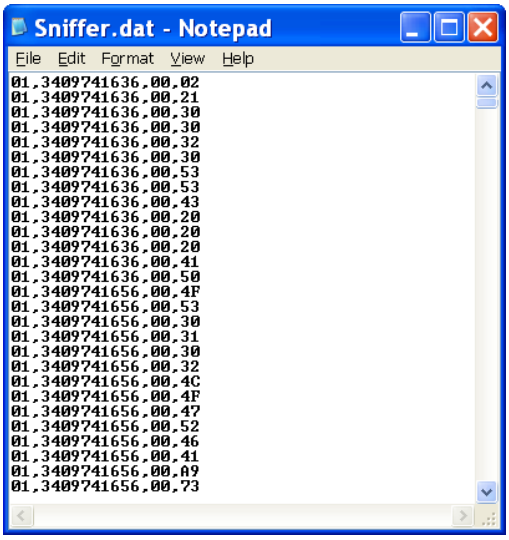
This menu section controls the load, save, and editing operations of the data, as well as presents an option to exit from the form. The operations are self explanatory, although it bears mentioning that if one edits a live file, the data in the buffer are unaffected. When saving the data, a copy is made of the memory buffer and then it is written to disk.

If a load operation is attempted with data in the buffer, a warning is issued with the option of clearing the buffer before proceeding.

With the release of version 3.0.7, a formatted output was introduced that writes the sniffer data arranged similarly to the display. Unformatted output data use the .dat suffix; formatted data use the .txt suffix. One can view either type with the built-in Notepad session, but the **Load** operation is limited to loading raw, unformatted data. It is important to understand that if you ever want to reload our data, save it in unformatted form; you can always save it in formatted form after the fact.

Following is an example of the formatted and unformatted output files:



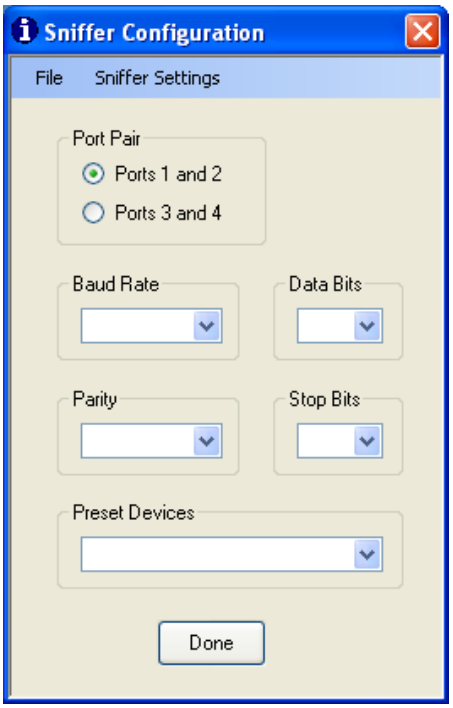


Note the file format:
Port**,** Time Stamp (in milliseconds)**,** Status (Hex)**,** Data (Hex) <CR LF>

15.2.2 Sniffer menu controls

This group provides a means to start, stop, and configure the operation of the sniffer firmware. The firmware remembers the last communications settings, so it can be pre-programmed for specific operations and then simply turned on in the field.

The configure menu option loads the following form:



This form provides the means to set the communications parameters for a port pair. The Sniffer Settings group reads from and writes to the firmware; the file group reads from and writes to the INI file used by DGS.

The Preset Devices combo box provides a means to quickly set all the communications parameters of commonly used devices.

Nota Bene: Your settings are not sent to the controller until you press the Sniffer ***Settings→Write*** *command.*

15.2.3 Help group

The About command loads a dialog box showing information specific to the version and configuration of the sniffer utility.

15.2.4 Sniffer Form Controls

The Data display window shows up to 90 characters per line when in ASCII mode and 30 characters per line when in HEX mode. There are 8 complete lines of text available for display at any point in time.

Right clicking on a character makes that character the zero time reference; subsequent left clicks cause the status bar at the bottom of the form to display the port, time received, status, and data (as ASCII and HEX) for the character. It should also be noted that the very first click, regardless of which button was pressed, will result in that byte being selected as the reference byte. You can always reset the reference byte with a right click.

A word about the **reference byte**: This facility provides a means to determine the time difference between any two bytes. It is bipolar, in that it works in both the positive and negative directions. The format is presented to the user as a combination of days, hours, minutes, seconds, and milliseconds depending upon how large the difference.

The **Navigation** frame contains those controls that allow the user to move about the buffer space. The **Percent of Buffer** control acts like a coarse tuner; you can zip from one end to the other rapidly. The **Byte by Byte** control acts like a fine tuner; moving you one byte at a time. The **Latest** command pegs the **Percent of Buffer** and **Byte by Byte** controls so that the last message we received will always be displayed. The **Reference Point** controls (**Set** and **Go**) provide a means to remember a specific position in the buffer and return there respectively.

The **Buffer and Display Control** frame contains those controls that are used to affect the data buffer, as well as if and how the data are rendered in the display. The **Format** frame offers the user the choice of displaying the data as ASCII or HEX.

The **Select Buffer** control navigates through the temporary buffers. Temporary buffers are created automatically when the number of bytes received exceeds the size of the memory resident buffer. The Navigation controls remain the same irrespective of the buffer-in-use.

The **Freeze** button, when pressed, stops new data from being added into the display. It then turns into the **Thaw** button, which when pressed, resumes rendering new data into the display. The **Clear** button erases all data in the buffer.

The **Bytes Pair 1** and **Bytes Pair 2** controls simply list the accumulated bytes received over the channels.

The form also contains a **status bar** that lists the port, time, status, and data received whenever one clicks over a byte in the display.

15.2.5 Protocol Interpreters

As the SSC and NeXGen support an enormous suite of peripherals, keeping track of the varied protocols is a significant challenge. To help ease this burden, DGS contains a collection of protocol interpreters that take Sniffer Data as an input and return human readable text representations of the various messages.

For the most part when troubleshooting, data are acquired through the Port Monitoring facility. In their native form, these data are not of the format required for the sniffer. Not to worry, as there is a command to import the monitor files into the sniffer. Once aboard, the data can be subjected to interpretation.

Currently, the suite of protocol interpreters includes:

- Bennett Dispenser
- Gilbarco CRIND
- Gilbarco Dispenser
- Orpak OrSPT
- Wayne CAT (DUKPT)
- Wayne CAT (MLKH)
- Wayne Dispenser

More types are forthcoming.

At this point, the interpreters assume transmit data on channel 1 and receive data on channel 2.

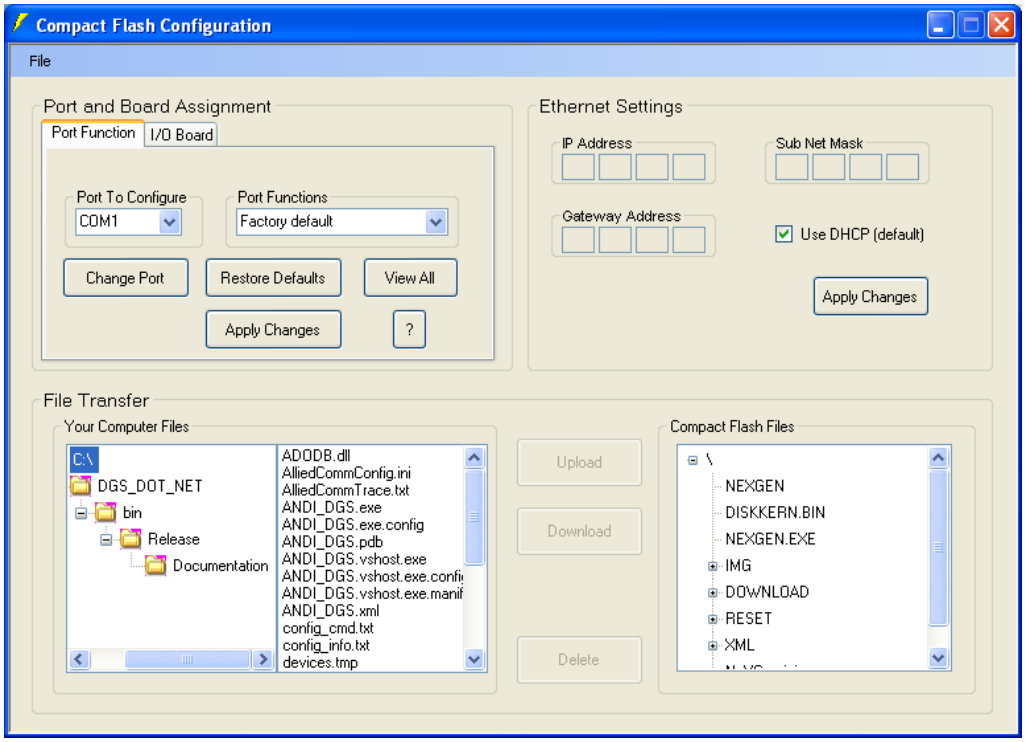
Contact Allied Electronics for more information and assistance.

16 Compact Flash Management

The NeXGen hardware platform uses Compact Flash technology in place of the *code boards* used by the Station Site Controller. The compact flash (CF) provides storage for the boot-loader and monitor, the firmware application (NEXGEN.EXE), graphics files for download, a download directory for updating the firmware application, a reset log, and a NeXGen.INI file. The purpose of the Compact Flash Configuration facility is to manage these resources.

Compact Flash file access commands are limited to administrative users in PA-DSS compliant systems.

Following is a screen shot of the Compact Flash Configuration form:



The Compact Flash Files control allows users to upload and download files through File Transfer Protocol (FTP) and Remote File Access (RFA). The Port Assignment panel provides a means to assign port function explicitly. The Ethernet Settings panel provides a means to specify those settings explicitly.

16.1 Port Assignment

The function provided by the communications ports on the NeXGen can be reassigned on the fly by this facility **provided it is done so within compatible hardware**.

For example: if a current loop channel were to suffer damage you could move the cable to another unused current loop channel, reassign the port to that new hardware, and restart the NeXGen.

When the form is loaded, the current settings and any reassignments found in the INI file are read from the device.

The **Port to Configure** control sets the port to which any changes you make are applied.

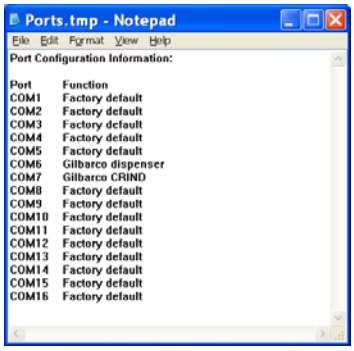
The **Port Functions** control provides a list of functions that are available for assignment. This control is populated by an internal list of constants contained the ANDI Communicator Object. If your port type is not found, it will warn you and the combo box will contain the best approximation of the port function that we can muster. You should contact Allied Electronics for an update to DGS should this happen.

The [**?**] command generates a list of the currently supported port types.

The **Change Port** command assigns the currently selected **Port Function** to the currently selected **Port to Configure**.

The **Restore Defaults** command returns all ports to their factory default.

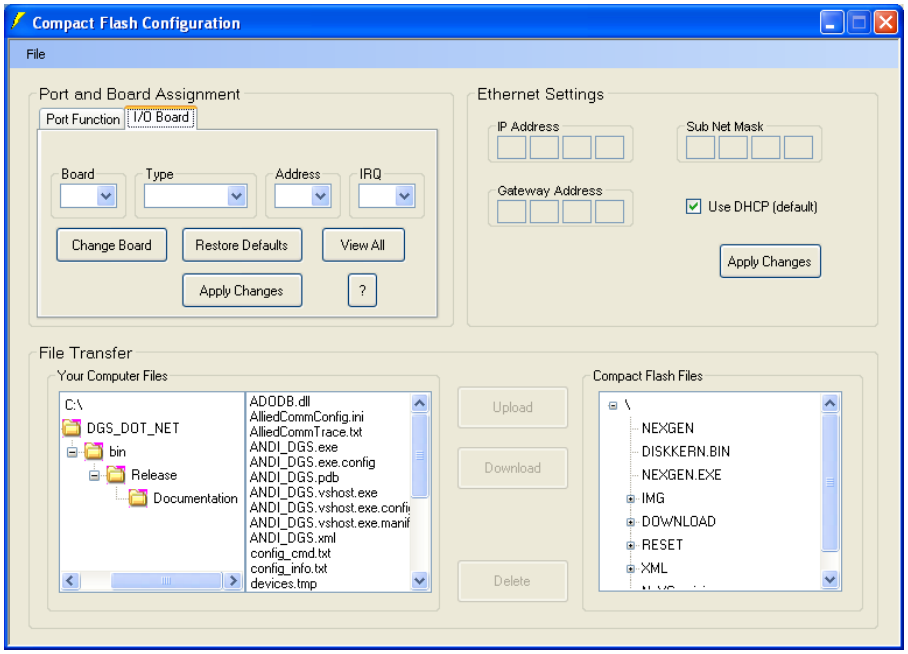
The **View All** command creates a report of all the settings in the Ports.tmp file and displays it using NotePad as illustrated below:



Clicking the **Apply Changes** button writes the changes for the ports into a local NeXGen.INI file and then transfers that file onto the Compact Flash.

16.2 I/O Board Settings

Setting up the I/O boards is accomplished in the I/O Board tab in the Port Assignment frame, as illustrated below:



In addition to setting the port types, the I/O boards can be reconfigured in the field by INI file entry. The I/O Board tab provides an interface to build these file entries.

There are 3 I/O boards that can be configured. The board to configure is selected using the Board combo box.

The Type of I/O board is selected by the Type box, which selects the actual hardware which will be mapped to the board previously selected.

The Address and IRQ combo boxes set the physical address and Interrupt Request number used for the selected board.

Similar to the Port Function tab, the **[?]** command on this tab generates a list of the currently supported board types.

Feel free to contact Technical Support at Allied Electronics for guidance.

16.3 Ethernet Settings

The Ethernet Settings panel provides a means to effect changes to the Ethernet address of the NeXGen by way of the NeXGen.ini file.

This control essentially provides the same functionality as the ANDI TCP D command, which can be found in the NeXGen TCP/IP Interface document.

When the NeXGen firmware starts, it looks on the compact flash for the NeXGen.INI file. That file can provide static IP addresses for locations where Dynamic Host Configuration Protocol (DHCP) are either unavailable or undesired. The default setting is DHCP.

Should one want to explicitly configure the network settings, one would first de-select the **Use DHCP** option button. This enables the **IP Address**, **Sub Net Mask**, and **Gateway Address** text boxes, which are inhibited under DHCP.

If one chooses to set the addresses, the **IP Address** and **Sub Net Mask** must be specified. The **Gateway Address** is considered optional.

The **Apply Changes** button writes your control settings into a local NeXGen.INI file and then transfers that file to the Compact Flash.

*Nota Bene: When connected serially, this is the only functional tab in the Compact Flash Configuration form. When the form is loaded, it will issue vicariously a TCP D command to read the programmed parameters, filling in the controls with the data gleaned. Pressing the **Apply Changes** command will then write them using that same TCP D command.*

16.4 File Transfer

The file transfer facility allows you to upload and download files from your computer to the compact flash device in the NeXGen.

It uses the File Transfer Protocol (FTP) service for systems up to PA-DSS 1.2 and Remote File Access (RFA) for all others.

For PA-DSS compliant systems, it employs the username and password supplied when you sign on to the controller. You do not need to specify a username or password for non-PA-DSS compliant systems.

Nota Bene: Exercise extreme caution when uploading and downloading files to and from your NeXGen. Prior to carrying out your request, DGS will prompt you to confirm the operation by way of a dialog box.

16.4.1 Your Computer Files

The **Your Computer Files** control allows you to specify files or folders to be downloaded to the Compact Flash device. Simply click on the file or folder you want to download and the Download command button will become enabled and will indicate whether you are downloading a file or folder.

16.4.2 Compact Flash Files

This control allows you to specify files or folders for upload just by clicking on them. Simply click on the file or folder you want to upload and the Upload command button will become enabled and will indicate whether you are uploading a file or folder.

16.4.3 Upload Command

The upload command changes in context depending on whether you have selected a file or a folder. Pressing this button will cause DGS to request the file(s) from the compact flash.

It will write them in the same path as that found on the compact flash. If the path is not present on your computer it will ask if it is OK to create it.

16.4.4 Download Command

The download command changes in context depending on whether you have selected a file or a folder. Pressing this button will cause DGS to send the selected file(s) to the compact flash.

It will write them in the same path as that found on your computer's disk. If the path is not present on the compact flash, it will create it.

16.4.5 Delete Command

With version 3.3.5, comes the ability to delete files on the compact flash. There are certain files that are off limits – such as those required for NeXGen to boot.

DGS will prevent deletion of some files and FTP will prevent deletion of others.

Please exercise caution when deleting files, as the operating system does not keep a copy in a recycle bin as Windows does.

17 Errata and Miscellany

DGS is intended to be a helpful tool, and we seek continual improvement. We welcome your feedback to aid us in this effort.

Errata are dealt with by inline correction and text replacement in this manual.

If you encounter errors in the documentation, or difficulties in the installation or operation of DGS, please contact the Technical Services Group.