

DN 6000401

**USERS MANUAL FOR THE MODEL
2680P AGC DATA LOGGER**

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ACROAMATICS DOCUMENT HISTORY

The following table indicates major changes made to Users Manual for the Model 2680P AGC Data Logger, Acroamatics Document Number DN 6000401, released on August 31, 2004 and contains a record of all revisions made since that date.

DN 6000401 CHANGE HISTORY			
Rev	Date	Action	Name
	08-31-04	Original Issue	MMU
A	10-13-04	System time logged as UTC. Reformatted document.	MMU
B	01-24-05	Added System Configuration chapter and documented columns/channel feature.	MMU
C	03-01-05	Added jumper and switch settings.	MMU
D	08-06-07	Added clarifications to System Configuration and Software Installation, and Startup.	MMU
E	01-30-09	Documented local time card configuration. Added clarification to Software Installation section. Added IRIG Time Configuration dialog.	MMU
F	11-18-10	Documented System Configuration using National Instruments M series DAQ card, and moved E series description to Appendix A.	MMU
G	12-21-10	Updated text describing Excel row limit support.	MMU

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CHAPTER 1

SYSTEM CONFIGURATION

1.1 Introduction

The Model 2680P AGC Data Logger is a stand-alone system configured to monitor the analog AGC outputs from thirty-two telemetry receivers. The hardware is composed of off-the-shelf items. The system is controlled by a 1U rack mounted PC with a 1U Keyboard/Monitor, which can accommodate up to two PCI cards. The system can also be built with a 2U rack mounted PC, which can accommodate up to 3 PCI cards. The PC includes a non-removable Hard Disk system drive, a CD R/W drive for creating permanent archives of mission results, and integrated video and Ethernet 10/100/1000. The AGC voltages are sampled using a National Instruments PCI DAQ card, which includes a multi-channel programmable A to D. The A to D has 16-bit converters with a composite sampling rate of greater than 100K Samples/Sec and input voltage range of $\pm 10V$. The system also includes 2 National Instruments rack mountable BNC interface panels, and the cables necessary to connect these to the PCI DAQ card. The system can fit into as little as 2U of rack space (or 3U for the larger PC), and provides input for 32 channels. The system can optionally include an Acroamatics 1626P Multi-Channel Frame Sync card, which can act as an IRIG time translator, enabling IRIG time annotation of the AGC log without need for any external hardware.

The system's software includes Microsoft Excel 2002 or later, and a custom GUI that allows a user to set up a sampling regimen and operate the system. The GUI can set up sampling tasks for up to 32 channels at a programmable rate of up to 10 scans per second. Each scan produces a log entry annotated by time read from the PC's system clock. In addition, if the system has a 1626P card installed or network access to an Acroamatics TDP containing an Acroamatics IRIG Time Translator/Generator card (503V or 472M), you can add IRIG time annotation. The GUI acquires log entries directly to an ASCII comma separated text file. A post-acquisition dialog allows the transfer of the log entries from the CSV file to an Excel file, with capability to select a time windowed subset. The resulting .xls file can be written on the CD for distribution to range customers or accessed over the network as a remote file.

1.2 Installation

All components are rack mountable. The PC and its 1U keyboard/monitor mount at the front of the rack requiring a total of 2U of rack height. If a 2U PC is used, the PC and keyboard/monitor require 3U of rack height. The two BNC connector panels, each 1U high, can mount at the rear of the rack requiring a total of 2U of rack mounting space. The individual components need not be adjacent nor directly behind the front mounted components, but must be sufficiently close that the 2 meter cable from the PCI DAQ card in the PC reaches the BNC panels. The following figure summarizes the components and their connections.

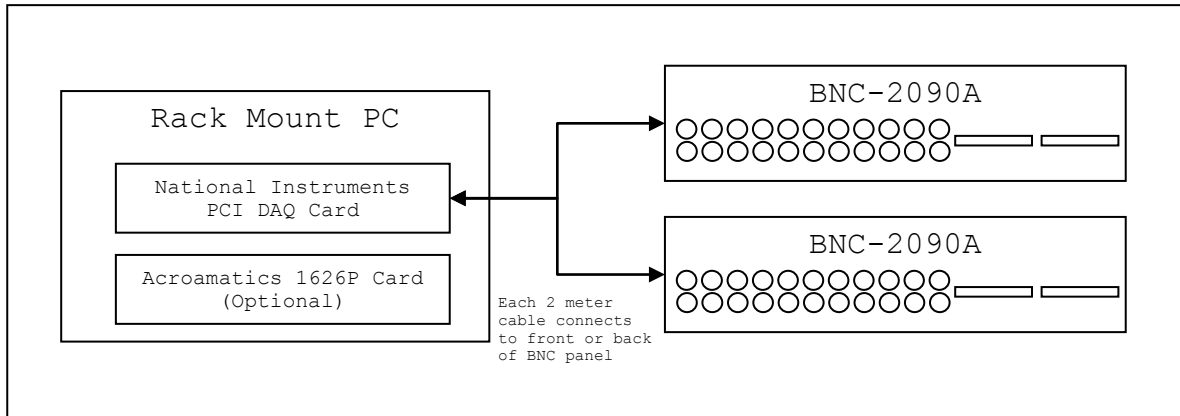


Figure 1-1: System Block Diagram

1.2.1 Jumper and Switch Settings

This section discusses configuration of each of the system's components.

1.2.1.1 PCI DAQ Card

The PCI DAQ card is installed on the PCI bus inside the rack mount PC. It does not have any jumper or switch configuration. It is setup at runtime by the AgcLog software to use bipolar $\pm 10V$, single-ended NRSE mode.

1.2.1.2 BNC-2090A

For each of the two BNC-2090A units, the following must be configured:

- On the front panel, switch all 8 SE/DIFF switches to **SE**.
- On the front panel, switch the RSE/NRSE switch to **NRSE**.

For more details about all BNC-2090A switch settings as well as installation details, refer to the BNC-2090A User Manual.

The BNC-2090 has a 68 position connector on both the front and back of the unit. Either can be used to connect to the PCI DAQ board.

1.2.1.3 Acroamatics 1626P (optional)

Refer to Acroamatics document DN6000404, Technical Manual for the Model 1626P PCI Multi-Channel Frame Synchronizer, for information about the adjustable jumper and switch settings on the 1626P board. The factory settings are included on the test report delivered with the card.

1.2.2 PCI Card and Device Driver Installation

To ensure easiest installation of the device drivers, the PCI cards and software installations should be performed in a particular order. See section 2.2 for details about software and PCI card installation.

1.3 Connections

1.3.1 IRIG Time

IRIG time capability is optional. When installed, the IRIG Time input is located on the 1626P PCI card edge. It is the SSMB connector closest to the micro-D connector, as shown below. The other 1626P connectors are beyond the scope of this document. Refer to Acroamatics document DN6000404, Technical Manual for the Model 1626P PCI Multi-Channel Frame Synchronizer, for more information.

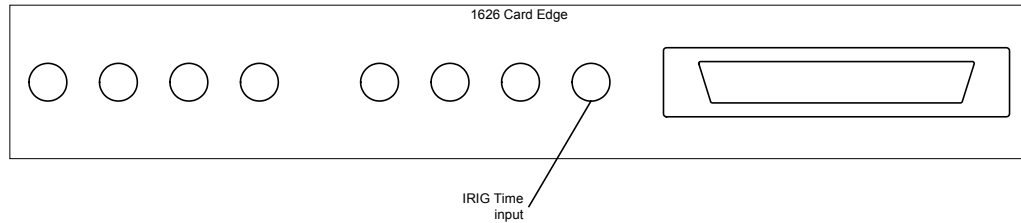


Figure 1-2: IRIG Time Input

CHAPTER 2 SOFTWARE SETUP

2.1 Introduction

AGC Data Logger (AgcLog) is a graphical user interface that records time tagged voltage samples from a National Instruments DAQ Device to a log file. Once installed, it can be launched from the AGC Logger shortcut found on the Windows desktop or Start menu. Up to 32 named analog inputs can be logged at a rate configurable from 10 times per second to once every 10 minutes. Once per sample period, AgcLog writes the voltages to the log file along with a timestamp read from the PC's system clock. You can also include a timestamp read from an Acroamatics IRIG Time Translator/Generator card (503V, 472M, or 626P). At the end of acquisition, the logged data is copied to an Excel spreadsheet for easy viewing and analysis.

2.2 Installation

AgcLog depends on several software packages that must be installed separately, as summarized by the table in section 2.2.1. For simplest installation of the device drivers, there is a specific order in which the card and software installations should be performed. That procedure is described in section 2.2.2. Typically, the AGC Data Logger system software is installed by Acroamatics before the system is delivered, but the following is provided in case a customer should have to re-install.

2.2.1 Summary of Software Packages

Package	Availability	Purpose
Acroamatics Multi-Channel Frame Sync Software (PN 6065154)	Acroamatics Model 1626P CD (PN 6066026)	Controls 1626P card to allow local acquisition of IRIG time. Required only when 1626P card is installed in system.
National Instruments NI-DAQ Software	National Instruments NI-DAQ install CD or www.ni.com .	Installs interface to National Instruments Multifunction Data Acquisition board.
Agc Data Logger (PN 6065148)	Acroamatics Agc Data Logger Install CD (PN 6066024).	Installs the Agc Logger GUI and the Microsoft .NET Framework 2.0.
Adobe Acrobat Reader Version 6.0 or later	Acroamatics Agc Data Logger Install CD (PN 6066024).	Allows viewing of system documentation.
Microsoft Excel 2002 or later	Microsoft Excel Install CD	Allows log files to be displayed in a spreadsheet
Acroamatics Remote Display and Control Software (PN 6065045)	Acroamatics Remote TDP Installation CD (PN 6066015).	Allows communication with a remote TDP over ethernet. Required only if IRIG time is to be acquired from a remote TDP. Should NOT be used if a 1626P is installed in the local system.

Table 2-1: Installation Packages

2.2.2 Software and PCI Card Installation Order

For easiest installation of the device drivers, follow this procedure for installing the PCI cards and software:

1. Start with the system powered down and no PCI cards installed. If the system includes an Acroamatics 1626P card, install it in its PCI slot. Do NOT install the National Instruments PCI DAQ card yet.
2. Power the system on.
3. If there is not a 1626P card in the system, skip this step. Otherwise, after power-up, the “Found New Hardware” wizard should appear because it detects the 1626P card. Dismiss it without performing any installation. Install the Acroamatics Multi-Channel Frame Sync Software, which will automatically install the device driver. Do not shutdown yet.
4. Install the NI-DAQ software.
5. Shutdown the system.
6. Install the NI PCI DAQ card into its PCI slot.
7. Power the system on.
8. The “Found New Hardware” wizard should appear because it detects the PCI DAQ card. Install the device driver by selecting “Install the Software Automatically” at the appropriate step.
9. Install the Acroamatics Agc Data Logger, Microsoft Excel, and Adobe Acrobat Reader. These can be installed in any order.
10. If the system does NOT include a 1626P, and the user intends to obtain IRIG time from another Acroamatics TDP or AGC Logger over the LAN, install the Acroamatics Remote Display and Control Software. Do NOT install this if the system includes a 1626P and you installed the Acroamatics Multi-Channel Frame Sync Software in step 5. The Acroamatics remote software cannot be installed on any system where local Acroamatics control software has already been installed.

2.3 Data File Directories

All data files used or generated by the AgcLog software (setups, logs, etc.) are stored under a common root directory. The location of this root directory depends on which version of Windows is running on the host PC. In Windows XP, AgcLog stores all of its data in sub-directories under the AgcLog installation directory, typically

```
“C:\Program Files\Acroamatics\AGCLog”
```

Starting with Windows Vista, AgcLog stores all of its data in a sub-directory named “Acroamatics\AgcLog” under the logged-in user’s “Documents” directory. Each user has a personal set of AgcLog data directories. Assuming the user directories are in the Windows default location, a user named “AgcUser” would find his AgcLog data files rooted at

```
“C:\Users\AgcUser\Documents\Acroamatics\AgcLog”
```

The AgcLog GUI provides menu items to open an Explorer window in one of its data directories. See Section 2.7.2.

2.4 Startup

The AgcLog software is launched from the AGC Logger shortcut found on the Windows' desktop, or in the Start menu. Alternatively, it can be launched by double clicking the executable found at "C:\Program Files\Acroamatics\AGCLog\AgcLog.exe".

2.5 Setup

Setup the log before initiating acquisition. Once logging is initiated, the setup cannot be changed. The following sections describe the different aspects of the setup.

2.5.1 Analog Input Channels

CHL	NAME	VOLTS	CHL	NAME	VOLTS
00	<input checked="" type="checkbox"/> Channel 00		16	<input checked="" type="checkbox"/> Channel 16	
01	<input checked="" type="checkbox"/> Channel 01		17	<input checked="" type="checkbox"/> Channel 17	
02	<input checked="" type="checkbox"/> Channel 02		18	<input checked="" type="checkbox"/> Channel 18	
03	<input type="checkbox"/> Channel 03		19	<input type="checkbox"/> Channel 19	
04	<input type="checkbox"/> Channel 04		20	<input type="checkbox"/> Channel 20	
05	<input type="checkbox"/> Channel 05		21	<input type="checkbox"/> Channel 21	
06	<input type="checkbox"/> Channel 06		22	<input type="checkbox"/> Channel 22	
07	<input type="checkbox"/> Channel 07		23	<input type="checkbox"/> Channel 23	
08	<input type="checkbox"/> Channel 08		24	<input type="checkbox"/> Channel 24	
09	<input type="checkbox"/> Channel 09		25	<input type="checkbox"/> Channel 25	
10	<input type="checkbox"/> Channel 10		26	<input type="checkbox"/> Channel 26	
11	<input type="checkbox"/> Channel 11		27	<input type="checkbox"/> Channel 27	
12	<input type="checkbox"/> Channel 12		28	<input type="checkbox"/> Channel 28	
13	<input type="checkbox"/> Channel 13		29	<input type="checkbox"/> Channel 29	
14	<input type="checkbox"/> Channel 14		30	<input type="checkbox"/> Channel 30	
15	<input type="checkbox"/> Channel 15		31	<input type="checkbox"/> Channel 31	

Enable All Channels

Disable All Channels

Figure 2-1: Channel Setup

Place a checkmark next to each channel to be logged, and give each a **NAME** of up to 20 characters. The names will be column headers in the Excel spreadsheet. The **VOLTS** box will show the channel's latest voltage sample once logging has started, but it is not used during setup. Right-clicking inside the channel setup area displays a context menu allowing you to enable or disable all channels.

2.5.2 Interval, Columns/CHL, Irig Time, and Generating Excel

Interval (ms): <input type="text" value="100"/>	Columns/CHL: <input type="text" value="Volts,DB"/>	<input checked="" type="checkbox"/> Include Irig Time	<input type="button" value="Setup"/>
		<input checked="" type="checkbox"/> Generate Excel at Stop	

Figure 2-2: Log Setup

Interval (ms) is the number of milliseconds between log entries. Each log entry contains the PC's system time expressed using the UTC time zone, IRIG time when enabled by the **Include Irig Time** checkbox, and AGC values. Depending on the **Columns/CHL** setting, the AGC values are recorded in units of **Volts, DB** (-20 dB/Volt), or both. When **Volts,DB** is selected, each channel has two columns in the log: one containing the AGC values in volts and a second with the same AGC values expressed in decibels.

To guarantee a reliable time base, AgcLog always includes the PC system time with each log entry. You can also include Irig time from an Acroamatics IRIG Time Generator/Translator card by checking the **Include Irig Time** checkbox. Use the **Setup** button to specify the IRIG time configuration, which is described in the following section, 2.5.2.1.

For performance reasons, AgcLog records the raw data as comma separated values in a text file. At the end of acquisition, AgcLog can format the data in an Excel spreadsheet. Check the **Generate Excel at Stop** checkbox to automatically open the **Generate Excel** dialog (Section 2.7.1) when the **Stop** button is pressed. You can generate an Excel file at a different time by selecting **Generate Excel** from the **File** menu.

2.5.2.1 IRIG Time Configuration

IRIG time can be included in your log when AgcLog has access to an Acroamatics Time Generator/Translator card. The time card can be installed in the local chassis, or accessed in a remote chassis over the local area network.

The typical "local time card" configuration uses an Acroamatics 1626P Multi-Channel Frame Sync card. For AgcLog to access the 1626P, the AGC Logger system must have the Acroamatics Multi-Channel Frame Sync Software installed, which is done at the factory when the 1626P is installed. See section 2.2 for more details.

The "remote time card" configuration accesses the time card over the LAN. The time card is typically either an Acroamatics 472M card installed in a TDP, or a 1626P installed in another AGC Logger unit. For AgcLog to access the remote time card, the AGC Logger system must have the Acroamatics Remote Display and Control Software installed, which is typically done at the factory when no local time card is installed. See section 2.2 for more details. In addition, you must edit the C:\tdpsys\tdpc.cfg file on the AGC Logger unit to specify the remote server's name, which is done using a text editor such as notepad to add a line similar to the following:

```
ACRO_TM_SERVER=ServerName
```

ServerName is either the computer name or IP address of the remote TDP or AGC Logger unit that contains the time card. The Guest account on the server computer must be enabled, or there must be a user account with same name as is being used on the AGC Logger computer. If you need to check whether the remote authentication is working, confirm that you can access folders shared by the remote server on the AGC Logger system.

2.5.2.1.1 IRIG Time Configuration Dialog

Open the **IRIG Time Configuration** dialog by pressing the **Setup** button when the **Include Irig Time** box is checked. See section 2.5.2. The dialog is shown Figure 2-3.

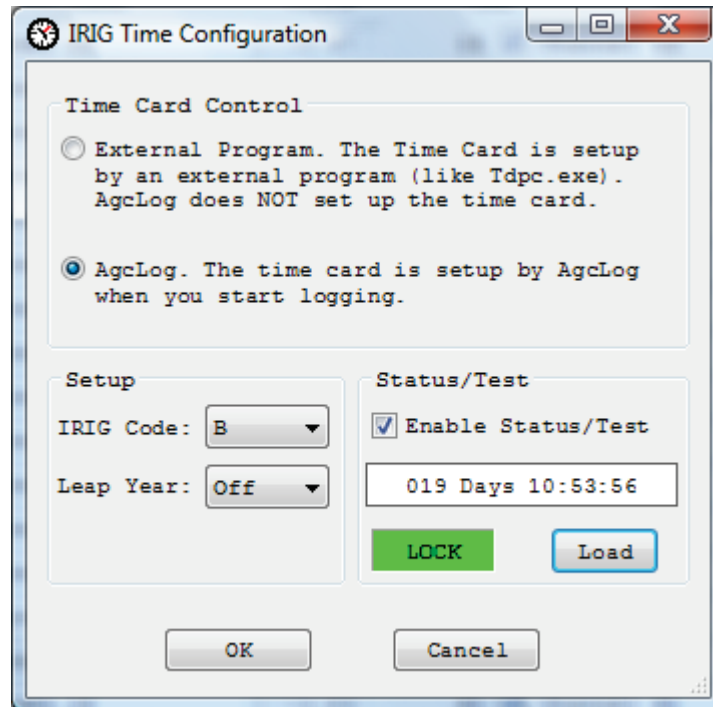


Figure 2-3: IRIG Time Configuration

By default, AgcLog expects an external program to perform the time card setup. This is useful when AgcLog is acquiring IRIG time from a remote TDP or AGC Logger, and a program on the remote computer is responsible for setting up the time card. It is also useful if you want to perform some advanced setup of the time card that is not supported by the AgcLog GUI, and you prefer to setup the time card using the TDP compiler, `tdpc.exe`. If you want AgcLog to set up the time card, select the **AgcLog** radio button in the **Time Card Control** group box.

When you have chosen AgcLog to control the time card, enter the setup in the **Setup** group box. AgcLog will automatically load this setup when you start logging. You can test your system's connectivity to the time card, as well as your setup using the controls in the **Status/Test** group box. Checking the **Enable Status/Test** box causes AgcLog to display the time card's current IRIG time and lock status. To test the setup specified in the Setup group box, press the **Load** button. The **Status/Test** controls are for diagnostic purposes only—they do not affect AgcLog's setup of the time card.

2.5.3 Saving and Retrieving Setup Configurations

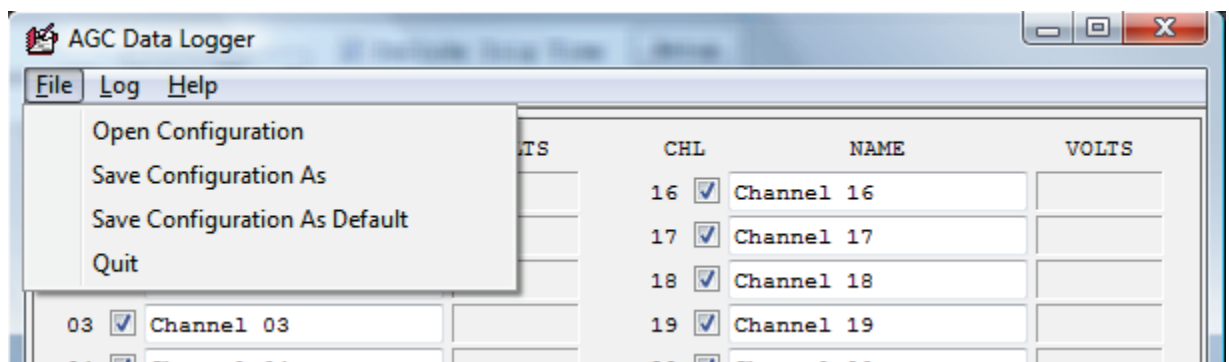


Figure 2-4: File Menu

Use the **File** menu to save and retrieve setup configurations. AgcLog configurations use the file extension ".AgcLogConf". At startup, AgcLog loads its initial configuration from the file .\Configurations\Default.AgcLogConf. See Section 2.3 for a discussion of data file directories. To save the current setup as the default, select **Save Configuration as Default** from the **File** menu. To save to a different name, use **Save Configuration As**. Use **Open Configuration** to read a previously saved configuration.

2.6 Runtime

2.6.1 Start, Stop, and Runtime Errors

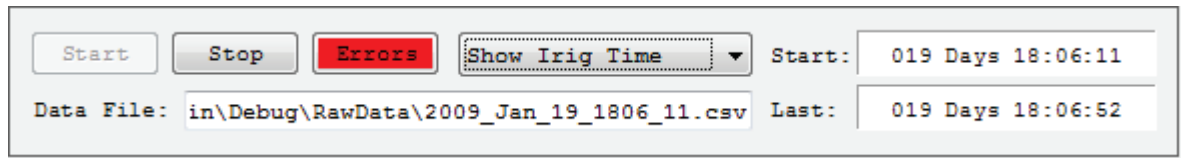


Figure 2-5: Control and Status

Press the **Start** button to initiate logging and the **Stop** button to terminate it. The **Errors** button opens the Runtime Errors console. The Errors button is normally gray, but will turn red when one or more error messages are displayed in the console. The **Data File**, **Start**, and **Last** boxes are described below.

2.6.2 Data File

The **Data File** box shows where the log's raw data is being recorded. AgcLog automatically generates a unique filename based on the PC's UTC date and time. It cannot be changed. The file is placed in the .\RawData directory, where "." stands for the base directory for AgcLog data files (see section 2.3). You can access the directory by selecting **Open Raw Data Directory** from the **Log** menu.

For performance reasons, the raw data is logged in a comma-separated-values text file. The first line is the column headers. The first column is always "System Time (UTC)". If IRIG time is included in the log, it is always the second column and labeled "IRIG Time". The rest of the columns are AGC values. Each enabled AGC channel has two columns labeled "Name (Volts)" and "Name (DB), where each channel's Name is defined as described in section 2.5.1, Analog Input Channels. A channel's "Volts" column contains its AGC values expressed in units of volts. The channel's "DB" column contains its AGC values expressed in units of AGC DB, which are defined by the relation 20 volts per AGC DB. AgcLog can automatically format the raw data into a spreadsheet, as explained in section 2.7.1, Generating an Excel File.

2.6.3 Start, Last, and VOLTS Status

In Figure 2-5, the **Start** box displays when the log was started, and **Last** shows when the latest log entry was made. Use the nearby drop-down to select **Show System (UTC)** or **Show Irig Time** as the displayed time. Note that this selection does not affect the logged data, only what is displayed in the **Start** and **Last** boxes during runtime. IRIG time cannot be displayed unless it is included in the log.

The **VOLTS** box for the selected input channels and the **Last** time box are updated each time an entry is added to the log. The maximum screen refresh rate is once per second. Because the refresh rate is tied to the logging rate, the status will update slowly if the **Interval** parameter is long.

CHL	NAME	VOLTS	CHL	NAME	VOLTS
00	<input checked="" type="checkbox"/> Channel 00	-1.90	16	<input checked="" type="checkbox"/> Channel 16	-1.73
01	<input checked="" type="checkbox"/> Channel 01	-1.72	17	<input checked="" type="checkbox"/> Channel 17	-1.02
02	<input checked="" type="checkbox"/> Channel 02	-0.70	18	<input checked="" type="checkbox"/> Channel 18	-0.09
03	<input checked="" type="checkbox"/> Channel 03	-1.21	19	<input checked="" type="checkbox"/> Channel 19	-1.83
04	<input type="checkbox"/> Channel 04		20	<input type="checkbox"/> Channel 20	
05	<input type="checkbox"/> Channel 05		21	<input type="checkbox"/> Channel 21	

Figure 2-6: VOLTS Status is displayed at runtime.

2.7 Post Acquisition

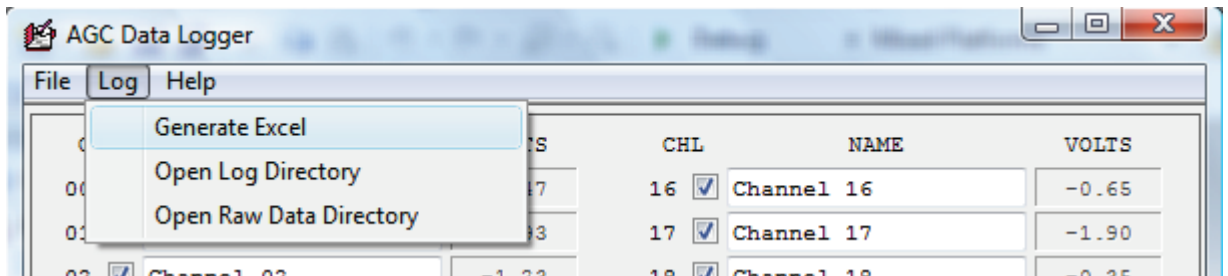


Figure 2-7: Log Menu

The **Log** menu contains items to help with post acquisition analysis and file management. The following subsections describe its use.

2.7.1 Generating an Excel File

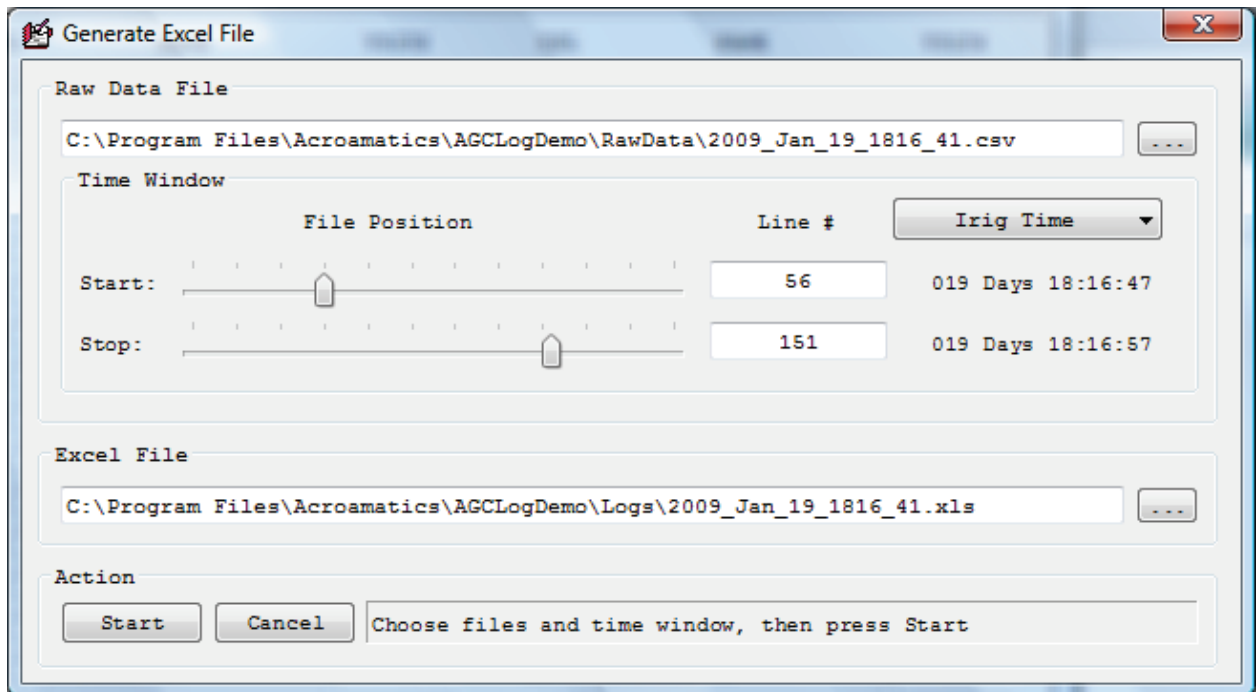


Figure 2-8: Generate Excel File Dialog

For performance reasons, AgcLog records the raw data as comma-separated-values in a text file. At the end of acquisition, use the **Generate Excel** dialog to format the data in an Excel spreadsheet. Use the **Generate Excel at Stop** checkbox during setup (see section 2.5.2) to automatically open the **Generate Excel** dialog. Otherwise, open it by selecting **Generate Excel** from the **Log** menu.

Once a **Raw Data File is selected**, use the **Time Window** controls to select which portion to include in the spreadsheet. The raw data file contains a line for each sampling interval elapsed during the acquisition. Each line contains a time stamp from the PC system clock, IRIG time if enabled, and the sampled voltages. Use the **File Position** sliders for coarse adjustments, and the **Line #** text boxes for fine adjustments. The time column shows the times associated with the selected lines. Use the drop-down list to show **System Time (UTC)** (from the PC clock) or **Irig Time**. Excel's ".xls" file format has a 65,536 row limit. The dialog limits your selection to one less than the limit, leaving room for a header row.

After selecting the destination Excel file, press Start. AgcLog opens Excel, and copies the log data into it.

2.7.2 Open Log Directory and Raw Data Directory

AgcLog stores raw data files in the ".\RawData" directory, and log files in ".\Logs", where "." represents AgcLog's base data file directory (see section 2.3). AgcLog always generates a unique filename for new raw data files, and never overwrites existing ones. Likewise, Excel will always prompt before overwriting a spreadsheet. Therefore, the user is responsible deleting raw data files and log spreadsheets when they are no longer needed. Use the **Open Log Directory** and **Open Raw Data Directory** items under the **Log** menu as shortcuts to these directories, and use the explorer window to delete unneeded files.

APPENDIX A

INSTALLATION OF LEGACY N.I. E-SERIES DAQ CARD

Introduction

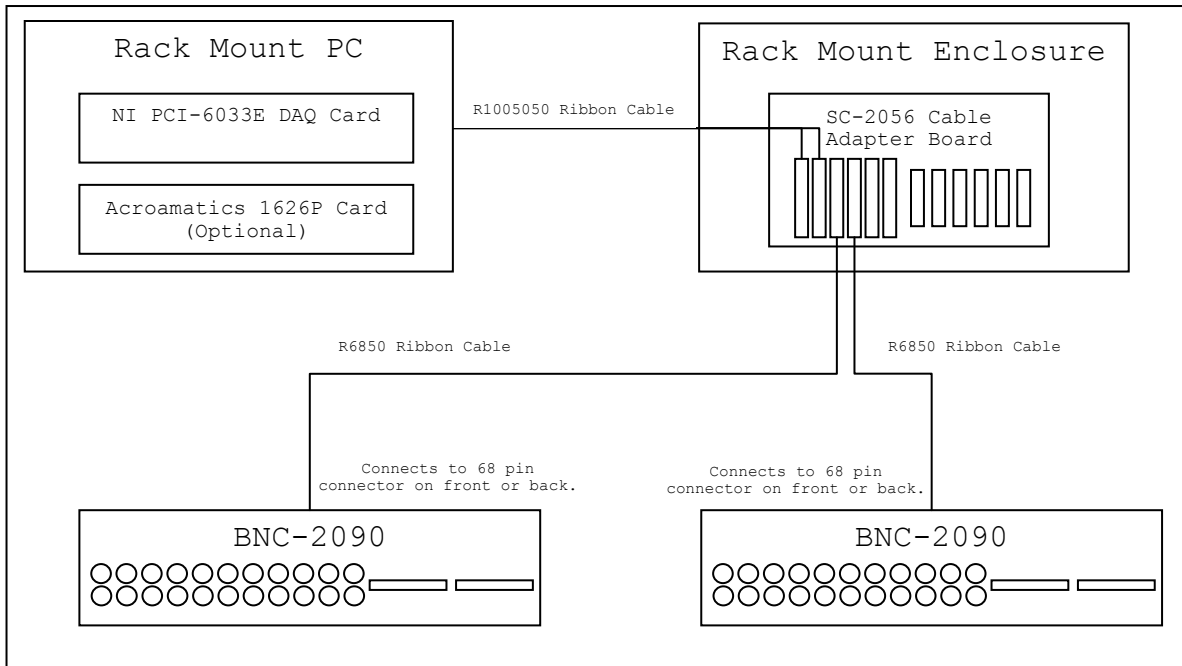
The 2680P AGC Data Logger was originally built using the National Instruments PCI-6033E DAQ card. National Instruments has since superseded the E series DAQ cards with the M series, which offers higher composite sampling rates and improved I/O connectivity. This section documents the configuration of these legacy systems.

In these legacy systems, the AGC voltages are sampled using a National Instruments PCI-6033E DAQ card, which includes a multi-channel programmable A to D. The A to D has 16-bit converters with a composite sampling rate of 100K Samples/Sec and input voltage range of $\pm 10V$. The system also includes 2 National Instruments BNC-2090 rack mountable interface panels, a SC-2056 cable adapter board with a rack mountable enclosure, and the cables necessary to connect these to the PCI-6033E card. The system can optionally include an Acroamatics 1626P Multi-Channel Frame Sync card, which can act as an IRIG time translator, enabling IRIG time annotation of the AGC log without need for any external hardware.

All components are rack mountable. The PC and its 1U keyboard/monitor mount at the front of the rack requiring a total of 2U of rack height. If a 2U PC is used, the PC and keyboard/monitor require 3U of rack height. The two BNC-2090 connector panels, each 1U high, and a 3U rack mounted enclosure for the SC-2056 cable adapter mount at the rear of the rack requiring a total of 5U of rack mounting space. The individual components need not be adjacent nor directly behind the front mounted components, but must be sufficiently close that the 1 meter ribbon cable from the PCI-9033E card in the PC reaches the cable adapter, and the 1 meter ribbon cables from the cable adapter reach the BNC-2090 panels.

Block Diagram

The following shows a block diagram of the system's components and connections.



Jumpers and Switches for NI Equipment

PCI-6033E DAQ Card

The PCI-6033E DAQ card is installed on the PCI bus inside the rack mount PC. It does not have any jumper or switch configuration. It is setup at runtime by the AgcLog software to use bipolar $\pm 10V$, single-ended NRSE mode.

BNC-2090

For each of the two BNC-2090 units, the following must be configured:

- On the front panel, switch all 8 SE/DIFF switches to **SE**.
- On the front panel, switch the RSE/NRSE switch to **NRSE**.
- On the rear panel, the LPM-16/MIO-16 switch must be set to **MIO-16**.

Acroamatics leaves jumper W1, located inside the BNC-2090 near the power switch, at the National Instruments factory default setting, which connects the shield of 68-position connectors and the BNC-2090 metal case through a 100 Ω resistor to the DGND signal. For more details about all BNC-2090 jumper and switch settings as well as installation details, refer to the BNC-2090 User Manual.

The BNC-2090 has a 68 position connector on both the front and back of the unit. Either can be used to connect to the SC-2056 cable adapter board

SC-2056

The SC-2056 cable adapter board has a single jumper W1, which Acroamatics leaves at the National Instruments factory default setting, which connects chassis ground and MIO digital ground. For more details about SC-2056 jumper and switch settings as well as installation details, refer to the SC-205X Series User Manual.

Software Installation

The National Instruments NI-DAQ software should be installed prior to installing the PCI-6033E card. If applicable, the Acroamatics 1626P card should be installed prior to installing its software (just dismiss the Found New Hardware wizard which will appear after log-in).