

AD-Logger

Configuration-based Data Logger

User's Manual

 Manual Rev.
 2.00

 Revision Date:
 March 9, 2009

 Part No:
 50-11239-1000



Advance Technologies; Automate the World.



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1 Introduction to AD-Logger

1.1 What is AD-Logger?

AD-Logger is a smart and easy-to-use data acquisition software that works with all ADLINK devices which equip with analog input and digital input function. AD-Logger provides an intuitive user interface that helps complete a data acquisition application in only four steps without any programming. Get started by defining a DAQ task with the DAQPilot interactive dialog; then configure the recording conditions, and start logging for online analysis or export the data for offline analysis and post processing



1.2 Features and Highlights

- Logs data based on DAQPilot task configurations
- ► Supports both real-time and historical viewers
- Supports intuitive user interface as a ready-to-run application
- Supports data exporting functions for offline analysis in third party applications, including Microsoft Excel, NI® DIADem, and Mathworks MATLAB®
- Supports all ADLINK DAQ hardware
- Provides basic analysis functions, such as FFT
- Provides monitoring features via a user-friendly toolbox
- Provides a buffer monitoring mechanism to automatically evaluate the system performance to know if the captured data can be processed in real-time



1.3 Terminology

Below are some of the terms used in this document.

| Word | Description |
|---------------------|--|
| DAQ | Data acquisition. The capture or collection of data. |
| Task | A DAQ task is a complete set of parameters including channels, timing, and trigger properties. A DAQ task represents a type of measurement that you want to perform. You can easily create task, modify task and delete task in AD-Logger. |
| Tracking | The tracking function is embedded in the DataView for you to easily trace captured data. When the tracking function is enabled, the axes will adjust their min and span values based on the tracking style. In addition to enabling tracking, all cursors will be hidden, and the axes min and span will be restored to their previous values when the axes tracking were initially disabled. |
| DAQPilot | DAQPilot is a task-oriented DAQ driver comes with an intuitive wizard to assist you in developing cutting-edge DAQ applica- tions in an instant. |
| Buffer Mechanism | AD-Logger provides a buffer evaluation mechanism to monitor system performance of data acquisition in real-time. |
| Export | Output data function. You can convert the logged files to other data formats for the further processing. |
| FFT | Fast Fourier Transform. AD-Logger provides FFT power spec- trum analysis. |
| Log | Data logging is the practice of saving DAQ data to hard drive. |

Table 1-1: Terminology



2 Software Installation

This section provides the installation information before you start to use AD-Logger software.

2.1 Where to Obtain AD-Logger

The AD-Logger evaluation version is available on the All-In-One CD that comes in your DAQ card package. You can also download the latest evaluation version from the ADLINK website through the following URL: http://www.adlinktech.com/MAPS/AD-Logger.html.

2.2 Before You Proceed

Before you starting to use AD-Logger software, make sure your system meets the following requirements.

System Requirements

- Windows 98/NT/2000 or 32-/64-bit editions of Windows XP/ Server 2003/Vista operating system
- ▶ Intel Pentium-class CPU or higher
- ► VGA display or higher
- ▶ Minimum 64 MB of memory
- ▶ Minimum 40 MB of free hard disk space
- Mouse

Please install DAQMaster before other ADLINK software for basic configuration and diagnosis. The ADLINK DAQMaster is a smart device manager that accesses ADLINK data acquisition products (refer to http://www.adlintkech.com/MAPS/DAQ-Master.html).



2.3 Installing AD-Logger

This section provides instructions on how to install AD-Logger in your system. Prepare the ADLINK AD-Logger CD that comes with the card package.

To install AD-Logger:

- 1. Place the ADLINK AD-Logger CD to the optical drive of the computer.
- 2. When the installation window appears, click on the AD-Logger installation button.
- NOTE If Autorun is not enabled in your computer, explore the CD, and then double-click on the SETUP.EXE to display the installation window.
 - 3. When installation is complete, simply launch AD-Logger to log data for further analysis.







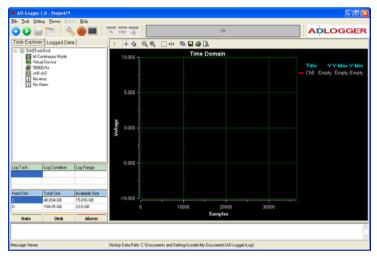


2.4 Uninstalling AD-Logger

Uninstall AD-Logger using the "Add/Remove Programs" tool in the Control Panel in Windows.. Select AD-Logger from currently installed programs and click Change/Remove button to delete the software.

2.5 Launching the AD-Logger

To launch the AD-Logger from the Windows Start menu, click **Start** >**ADLINK**>**AD-Logger**>**AD-Logger**. The main AD-Logger window will appear.





3 Understanding AD-Logger

3.1 Main Menu



| Menu | Function | | | | | |
|---------|-------------------------------------|--|--|--|--|--|
| File | ystem commands | | | | | |
| Task | AQ task commands | | | | | |
| Setting | System configuration options | | | | | |
| Viewer | View commands | | | | | |
| Export | Export log data commands | | | | | |
| Help | Online help and support information | | | | | |

3.1.1 File Menu

The File Menu provides the following options:

| File | Function | | | | |
|---------------|---|--|--|--|--|
| New Task | Create a new DAQ Task | | | | |
| Open | Open a Task or Log file | | | | |
| New project | Create a new AD-Logger project to perform data acquisition | | | | |
| Open project | Open an existing AD-Logger project | | | | |
| Close project | Close current AD-Logger project | | | | |
| Save project | Save all current data acquisition task configurations into cur- rent project | | | | |
| Print | Print current Data | | | | |
| Print Preview | Preview current Data for printing | | | | |



3.1.2 Task Menu

The Task Menu provides the following options:

| Task | Function | | | | |
|-------------|---|--|--|--|--|
| New task | Launch the DAQPilot Interactive Dialog to create a new data acquisition task | | | | |
| Modify task | Launch the DAQPilot Interactive Dialog to modify The selected data acquisition task | | | | |
| Delete task | Delete an existing data acquisition task from the Task View Panel | | | | |
| Start tasks | Start to perform all data acquisition tasks on the Task View Panel | | | | |
| Stop tasks | Stop all data acquisition tasks on the Task View Panel | | | | |

3.1.3 Setting Menu

The setting menu provides the following options:

| Setting | Function | | | | |
|-----------------|--|--|--|--|--|
| Display | Provides the Display configurations of time domain which includes X-axis, Y-axis, Appearance and Channel settings. | | | | |
| FFT | Provides the Display configurations of frequency domain which includes X-axis, Y-axis, Appearance and Channel settings. | | | | |
| Recording | Enable/Disable the function of data acquisition task. The Log functions can be stopped by manual, by pre-defined sample and by time. The location to save log data can also be selected. | | | | |
| Alarm Condition | Enable/Disable the Alarm functions which could be above or below a constant value. | | | | |



3.1.4 Viewer Menu

The Viewer Menu provides the following options:

| View | Function | | | | |
|----------------|---|--|--|--|--|
| Graph Viewer | Enable/disable the time domain data display of the selected data acquisition task | | | | |
| FFT Viewer | Enable/disable the frequency domain data display of the selected data acquisition task | | | | |
| Status Viewer | Enable/disable the display of the system information, log task setting and hard disk space. | | | | |
| Message Viewer | Enable/disable the display of system commands and message. | | | | |

3.1.5 Export Menu

The Export Menu provides the following options:

| Export | Function | | | | | |
|-------------|--|--|--|--|--|--|
| Excel | Export the logged data to a Microsoft Excel file | | | | | |
| CSV | Export the logged data to a comma separated value file | | | | | |
| Third-party | Export the logged data for the post-processing in third-party software, such as LabVIEW®, DIAdem, or MATLAB® | | | | | |

3.1.6 Help Menu

The Help Menu provides the following options

| Help | Function | | | |
|--------------------|--|--|--|--|
| AD-Logger Help | Get on-line help | | | |
| Contact us | Get technical support | | | |
| About AD-Logger | Display the ADLINK AD-Logger version and copyright statement | | | |
| About my computer | Display the system information such as the operating system version, processor and memory usage status | | | |
| Register AD-Logger | Form to input the license number for using a licensed version of AD-Logger | | | |



3.2 AD-Logger Function

ADLINK AD-Logger is designed with six major function blocks that can be enabled/disabled individually for operatiosn. Refer to the block diagram below.

| Main Menu (system function) | | | | | | |
|--------------------------------|------------------|--|--|--|--|--|
| 1.Speed Buttons 2.Buffer View | | | | | | |
| AB | DataView Toolbar | | | | | |
| 3.Task Viewer/ History View | 5.DataView | | | | | |
| 4.Status View | | | | | | |
| 6.Message View | | | | | | |

TabSheet A for Task View; TabSheet B for History View

| 🍬 AD-Logger | 1.0 - Projectl* | | | | | | | | |
|--|---------------------------|-----------------------------|----------------------------|----------------|-----------------------|---------------|--------------------|------|---|
| Ele Isik Sen | ing Viewer Exp | ort <u>H</u> elp | | | | | | | |
| 00 🖬 🛅 🔌 🙆 🔳 🗌 | | | (x CIV x3) | | | 0% | | | ADLOGGER |
| | Logged Dat | a | $\rightarrow \pm \diamond$ | ର୍ ଭ୍ 🛛 |) el el 🐚 🖬 🖨 | i 🗟 | | | |
| E Z DAQTa | skūtsk Sontinuous Mode | | 10.000 | | Tim | e Domain | | | |
| Vitual Device RE 50000 Hz ch0 ch2 I No emor I No Alarm | | | 10.000 | | | | | | Title YY-Max Y-Min Ch0 Empty Empty Empty |
| | | | 5.000 | | | | | | |
| | | | Voltage | | | | | | |
| Log Task | Log Condition | Log Range | -5.000 | | | | | | |
| Hard Disk. | Total Size 44,756 GB | Available Size 4.4395 G8 | -10.000 | | | | | | |
| D: | 23.745 GB | 13.569 GB | | | 10000 | 200 | 100 30 | 1000 | |
| Data | Disk | Alarm | | | | Sample | 5 | | |
| Data | UISK | Alarm | | | | | | | |
| | | | | | | | | | |
| Analog Input Date | 8 | | History Data Pat | h: C:\Document | s and Settings\yinghs | ien/My Docume | nts\AD-Logger\Log\ | | |



| Panels | Description | | |
|---|--|--|--|
| 1. Speed Buttons | Includes four major task operations and related func- tions (such as exporting data). | | |
| 2. Buffer Viewer Display the buffer status. | | | |
| 3. Task /History View | Display the information of existed DAQ task and his- tory log. This part include two tabsheets : "Task Explorer" and "Logged Data" | | |
| 4. Status Viewer | Display system information including the task setting, available hard disk and the system resource. | | |
| 5. Data View | Display the logged data in time domain and fre- quency domain. | | |
| 6. Message View | Display the history commands and task status | | |



3.2.1 Speed Buttons

These speed buttons are designed with major task commands and exporting functions. The buttons will be dynamically enabled or disabled depends on the operation mode.



| Speed Buttons | Description | | | |
|---------------|---|--|--|--|
| Create Task | Launch the ADLINK DAQPilot interactive configuration dialog to create a new data acquisition task. AD-Logger is powered by DAQPilot, so you can finish DAQ applica- tion without any programming effort. | | | |
| Start | Start to perform the all data acquisition tasks | | | |
| Stop | Stop all data acquisition tasks | | | |
| Setting | Launch the setting form for configuration such as Graph FFT, Log, Alarm and ADC. | | | |
| Modify | Launch ADLINK DAQPilot interactive configuration dia- log to modify the existed data acquisition task. | | | |
| Recording | Enable/disable the recording function. | | | |
| FFT | Enable/disable the power spectrum view panel | | | |
| Excel | Export the logged data to an Excel file. | | | |
| CSV CSV | Export the logged data to a comma separated value file. | | | |
| Third Party | Export the logged data for the post-processing in third- party software, such as LabVIEW®, DIAdem and MAT- LAB®. | | | |



3.2.2 Buffer Viewer

AD-Logger provides a data buffer evaluation mechanism. The buffer evaluation mechanism will be automatically enabled to monitor and display the buffer status on the Buffer Viewer when you perform a DAQ task with recording function. The buffer status will be dynamically changed in real-time depending on system performance.

| 95% | ADLOGGER |
|-----|----------|
| | |

Buffer View StatusDescriptionBlue ColorThe system's performance is ample for data logging
with the DAQ tasks. The buffer has more than 50 per-
cent of available space when logging data.Yellow ColorThe buffer usage is sufficient with the the DAQ tasks.
The buffer has 20 percent to 50 percent of available
space when logging data.Red ColorThe buffer usage is running low with the DAQ tasks.
The buffer has less than 20 percent of available space
when logging data.

The Buffer View has following status:



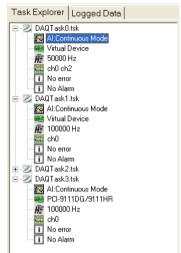
3.2.3 Task Explorer/Logged Data Viewer

The Task/History view Panel is located on the left part of the AD-Logger main window. The View Panel displays the current DAQ tasks in the Tasks panel (page 15) and history log data in the Logged Data panel (page 16).



"Task Explorer" Tabsheet

The Tasks tabsheet displays the all DAQ tasks and related attributes in the project. The task with a blue background color is the selected task which displays logged data in the Data View Panel. You can click the task node to check the task status and doubleclick the task node to modify parameters via the pop-up configuration window.

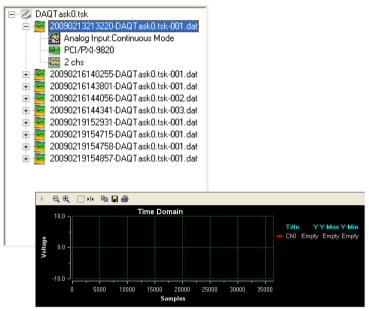


| Icons | Description | | | | |
|----------|---|--|--|--|--|
| Jan Ja | DAQ task name. | | | | |
| | DAQ tasks type. This icon will be dynamically changed depends on the DAQ task type. | | | | |
| | DAQ device type. | | | | |
| ĤĪ | Sample rate of the DAQ task. | | | | |
| <u>}</u> | Enable channel(s) of DAQ task. | | | | |
| I | Operation error message. | | | | |
| i | Alarm status | | | | |



"Logged Data" Tabsheet

The "Logged Data" tabsheet displays the logged file(s) which are classified by the task name and sorted by logged time. You can double click the node to display the logged data value in the Data View.





3.2.4 Status Viewer

The Status Viewer consists of three blocks. Each block is described as follows.

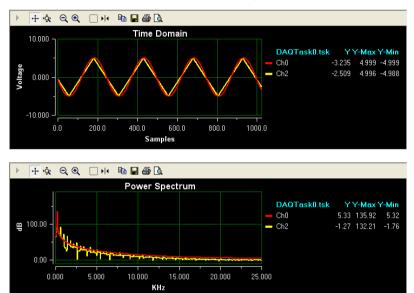
| Log Task | Log Condition | Log Range | |
|--------------|---------------|----------------|---------|
| DAQTask0.tsk | Stop by User | None | Block 1 |
| DAQTask3.tsk | Stop by User | None | DIOCK |
| | | | |
| Hard Disk | Total Size | Available Size | |
| C: | 44.756 GB | 4.4004 GB | Block 2 |
| D: | 29.745 GB | 13.569 GB | Brook 2 |
| | - | | |
| Data | Disk | Alarm | Block 3 |

| Status View | Description | | |
|-------------|---|--|--|
| Block 1 | Shows the selected log task(s) and its log condition. | | |
| Block 2 | Displays hard drive status | | |
| Block 3 | Indicates if the following status is enabled in AD-Logger. ▶ Data: Acquiring data if this label is blinking ▶ Disk: Recording to Disk if this label is blinking ▶ Alarm: Alarm indicator | | |



3.2.5 Data Viewer

The Data Viewer displays the logged data in both time and frequency domains. Initially, the selected DAQ task only displays time domain data. User can enable the frequency domain data on demand. Please refer to Section 3.2.1 (Speed Buttons).





The toolbars on the top on the time domain and frequency domain graph both provide the same function to control the data display. The functions are described as follows.

| Data Viewer Toolbars | Description | | | | |
|----------------------|--|--|--|--|--|
| Resume | The resume button enables tracking function on all axes. When tracking function is enabled, the axes will adjust their min and span values based on the tracking style. In addition to enabling tracking, all cursors will be hidden, and the axes min and span will be restored to their previ- ous values when the axes tracking were initially disabled. | | | | |
| + Scroll (Axes) | When the Axes Scroll Mode button is enabled, you can drag the axis and scroll the view. When this button is selected, the Axes Zoom Mode button is correspondingly unselected. | | | | |
| 🔆 Zoom (Axes) | When the Axes Zoom Mode button is enabled, you can drag the axis and zoom the view. When this button is selected, the Axes Scroll Mode button is correspondingly unselected. | | | | |
| Q Zoom out All Axes | When this button is clicked, all axes are zoomed out by a factor 2x. When this button is clicked, the tracking function on all axes will be disabled and the view data will be fro- zen. | | | | |
| € Zoom in All Axes | When this button is clicked, all axes are zoomed in by a factor 2x. When this button is clicked, the tracking function on all axes will be disabled and the view data will be fro- zen. | | | | |
| Zoom Box | This button allows you to band a region in the Data Viewer for zooming into. The box can start at any point, but must be dragged to the lower right to define a region for zoom function. The zoom action will affect all axes. | | | | |
| ▶I Data Cursor | This button shows or hides all data cursors. | | | | |
| Copy to Clipboard | This button copies the current plot image to the clipboard. | | | | |
| Save to File | This button brings up a Save dialog to save the plot image to a file. You can select from bitmap, metafile, or JPEG as the file type. | | | | |
| Print | This button prints the plot image. | | | | |
| Rreview | This button launches the Print-Preview dialog before printing out the plot image. | | | | |

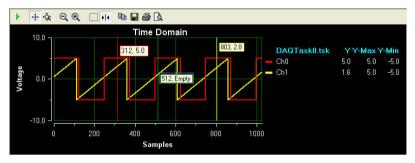


Data Cursor

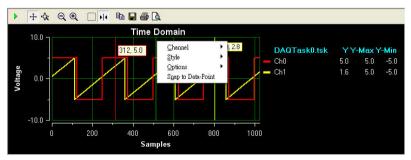
The Data Cursor of the DataView has many useful functions which let you to check the data value on the DataView. You can click the

button to enable the Data Cursor function.

When you enable the Data Cursor function, you can just drag and drop the green line in the middle of the DataView to any position. The x and y value of the Data Cursor will be displayed in real-time.



The Data cursor provides advanced configurations: you can rightclick the mouse on the middle green line to launch the popup menu (as shown below). You can see there are sixteen Data Cursors in each domain in the Data Viewer Panel. You can set all Data Cursors to only a specified channel at a different position, each Data Cursor to each channel, or any style you wish.





The popup menu of the Data Cursor contains the following settings.

| Menu | Description | | | | | |
|---------|---|--|--|--|--|--|
| Channel | Set the Data Cursor to detect which channel you specify. | | | | | |
| | The value of Data cursor can be configured to several styles. ► Value of x-y: Show both the X and Y axes falues. | | | | | |
| | Value of x: Only show the X-Axis value. | | | | | |
| | Value of y: Only show the Y-Axis value. | | | | | |
| Style | Period: Show a period value of two cursors on the X-Axis | | | | | |
| | Peak to Peak: Show the difference in value between two peaks on the Y-Axis | | | | | |
| | Frequency: Display the inverse of the instance along the X-Axis or the frequency. | | | | | |
| | Use Channel Color: Set the cursor's color to channel color. | | | | | |
| Options | Hide Hint on Release: Hide all value styles. | | | | | |
| | Flip alignment: Switch value label to the opposite position. | | | | | |



3.2.6 Message Viewer

The Message Viewer logs a history of operation command(s) and system messages.

```
< Task > Start DAQ Taks(s) at 18:24:50
< Task > Stop DAQ Taks(s) at 18:24:52
```

The Message Viewer includes the following three types of log messages:

| Prefex | Description | | | |
|-------------------|---|--|--|--|
| <task></task> | Regarding a DAQ task operation. | | | |
| <config></config> | > Regarding Data Viewer, Log, and Alarm configurations. | | | |
| <buffer></buffer> | Regarding the Buffer Mechanism status. | | | |



4 Starting AD-Logger

When you launch AD-Logger, there is a default DAQ Task with pre-defined continuous analog input function which works with a Simulated Device. You can easily modify the task for further configurations.

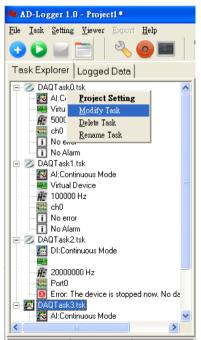
4.1 Configure a DAQ Task

4.1.1 Modify Task

- 1. Choose the task node that you want to modify.
- 2. Click the Modify button

or right-click the task node

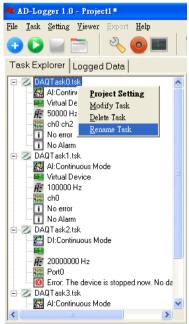
and select "modify task" in the pop-up menu to launch the DAQPilot configuration dialog. The DAQPilot interactive configuration dialog will guide you in configuring the DAQ task.





| AD-Logger 1.0 - Projecti * | | | . 6 🛙 |
|---|--|--|---|
| De Da Jone Deve Boort Bry | <u><u>x</u> cy i</u> | 01 | ADLOGGER |
| Task Explorer Logged Data | ++4 @@ - | ++ 📭 🖬 📾 🗛 | |
| Would Device Young Device | | | vill 158 VV Mee V Me -427 499 -492 -478 499 -493 |
| Log Tesk Log Condition Lo | | | ankültek YY-Max Y-Min 70 96 28 1 133 -9 |
| Hard Disk Total Size Av | | Company Bears C | erent 1 |
| C 44.756.08 4.4 D 29.745.08 12 | | the local data and the local dat | the second se |
| | | Kitz | M. |
| Data Disk Alarm | | | |
| < Task. > Cancel Modily Task. < Task. > Open DAQPilot to Modily DAQ Task. | | | 0 |
| DAQ Task Verver | History Data Path C1/Documents | and Settings' yangholes' My Documents' AD-Logger' Logi- | |

 The Task name will be shown in the DAQPilot interactive configuration dialog as shown in Step 1. If you need to change the Task name, you need to modify it first on the task node on the tree.





4. Select the supported device, then configure the channels

| AD Logger 1 | 0 - Projectl = | | | | | | | | | | 8 | 6 X |
|-------------------|-------------------------|----------------|---------------------------|------------------|------------------|------------------|------------------------------|--------------------|--------|----------|-----------|-------|
| The Isk Setting | Yurves Espoit | Help | | | | | | | | | | |
| 00 | 2 3 | 0 🔳 | IN CITY > | | | | 0% | | | ND. | LOGG | ER |
| Task Explorer | Logged Data | | > + - | 4 9.9 | - +le 🗈 | | 1 | | | | | |
| E Z DAQTasko |), tsk. tinuous Mode | Analogator | nt Continuor | waveform (| Constitution | | | | | 1 | | |
| Vinual | Device | | | / | D | | | | | ask0.tsk | YY-Mox Y | Min |
| ch0 ch | 2 | 11 | | | D | AG | Pilc | Л | | -4 | 727 4.999 | 4.992 |
| I No Ala | 613 | 1 | | | S | elect Devi | ce and Chann | el | | 4, | 788 4.998 | 4993 |
| E Z DAQTask1 | I.tsk knuous Mode | | | - | | | | | | | | |
| Vitual | Device | | | Select device | | | | | | | | |
| ch0 | | | | - Device | | | All devices | Inter | | | | |
| No enc | | | | Vatual Deva | ce . | | | 0 | | | | |
| E DAGTatk2 | 2.tsk finuous Mode | | | Channel confi | 10000 | | | | | | | |
| B 20000 | | | | Chattines contra | Chaunel | Range | RefGround | | | | | |
| Port0 | | MATERIAL | HALF | • 1-01 | | +/-10¥ +/-10¥ | Single Ended Single Ended | | | | | |
| 8 Z DAGTask3 | | and the second | and the second | | AL2 | +/-10V | Single Ended | | | | | |
| Al Con | linuous Mode | data acqui | pilot tu isition world | 0.8-CB) | DV13 | +/-107 | Single Ended | | | | | |
| Log Task | Log Condition | | | | | | | | | | | |
| | | | DLINK | | ġ., | _ | | _ | | ask0.tsk | 70 96 | 28 |
| | | - | | | Cogyright | E 2007 ADUN | K Technology Inc. | All Eights Reserve | 6. | | | -9 |
| | Total Size 4 | 2 | | | | | + Back | Best + | Cancel | | | |
| | | | | | 0.0 | 10.0 | | | 230 | | | |
| Data | Disk | Alarm | | | | KH | z | | | | | |
| (Task > Open DAI | Pliet to Modily DAD | | | | | | | | | | | 0 |
| < Task > Cancel M | odily Task | | | | | | | | | | | ~ |
| Create New DAQ Ta | ask | | History Data F | ath: C:\Docume | ints and Setting | s\yinghsien\\ | ly Documents \AD | Logger/Log/ | | | | |

The DAQPilot interactive configuration dialog allows you to select the device and define the corresponding channel settings. This configuration window enables you to easily set the Range and RefGround from the drop-down combo box. For more details about using the DAQPilot interactive configuration dialog, please refer to Chapter 3 of the DAQPilot user manual. More information can also be found at http://www.adlinktech.com/MAPS/DAQPilot.html



5. Acquisition Parameters

The next window enables you to set the acquisition parameters. This includes the setting of the clock source, sampling rate, etc.



Click Next when finished.



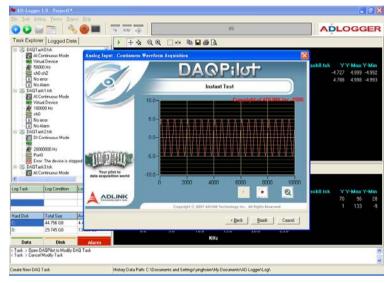
6. Testing the Task

After setting the task parameters, you can use the DAQPilot built-in test panel to check whether the task parameters are

in range and the task works well. Click **I** to begin to test

the task. To stop testing, click 🗾 . You can click 🧕 to

change the setting of instant test panel.



After a quick task verification, you can click the **Finish** button to complete defining your DAQ task and close the configuration interactive dialog and return to the AD-Logger main window.



4.1.2 Create Task

Click the
 button to launch the DAQPilot interactive configu-

ration dialog to create a new DAQ task.

When the DAQPilot interactive dialog appears, right-click the mouse to select the task type/function; then select the task sub-type from the pop-up menu. AD-Logger supports analog and digital input functions as shown in the figures below.







The task types AD-Logger supports are listed as follows.

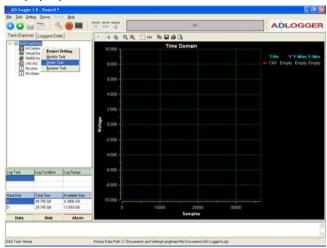
| Function | Support Mode |
|------------------------|------------------|
| | Continuous Mode |
| Analog Input Function | Single Shot Mode |
| | Polling Mode |
| | Continuous Mode |
| Digital Input Eurotian | Single Shot Mode |
| Digital Input Function | Port Mode |
| | Line Mode |

After choosing the task type, please refer to section 4.1.1- to modify the selected task for following setting illustration.



4.1.3 Delete Task

In the Task Tree, you can right-click the mouse on the task node to launch a pop-up menu and choose **Delete Task**.



If there is no task in the **Task tree**, the AD-Logger will automatically be settled in disabled mode. A DAQ task must be created or loaded.

| 001 | 1 2 | 600 | IS OV 18 | | 01 | | ADLOGGE |
|------------|-------------------------|-----------------------------|----------|-------|---------|-------|---------|
| Task Explo | ver Logged Da | ne | +4 98 | | 2 | | |
| | | | 10.000 | Time | Domain | | |
| | | | 8.000 | | | | |
| | | | 6.020 - | | | | |
| | | | 4.020 - | | | | |
| | | | 2.000 - | | | | |
| | | | Aoliaje | | | | |
| | | | -2.000 - | | | | |
| | | | -4.000 - | | | | |
| g Task | Log Condition | Log Range | -6.000 - | | | | |
| | | | -8 000 - | | | | |
| and Diak | Total Size 44.756 GB | Available Size 4 3018 GB | -10.020 | | | | |
| | 23745.68 | 4.3018 GB 12.569 GB | 0 | 10000 | 20000 | 30030 | |
| Data | Disk | Alarm | | | Samples | | |



4.2 Setting DAQ Condition

After creating a new DAQ task, the AD-Logger will automatically open the setting form to configure the Display, FFT View, Recording Conditions and Alarm Conditions settings. If you want to launch the setting form, you can just click the task node and click

| Setting Page | |
|---|--|
| | GER |
| X-Axis Setting View Number(Samples) Tracking Precision 1024 Scroll Bar X-Axis Title Text Samples Font Show Rotate | Appearance Background Color Grid Lines I Show Color Major Style Minor Style Solid I Solid I |
| Y-Axis Setting Image: Precision Max : 10 Image: Tracking Precision Min : -10 Scroll Bar Y-Axis Title Image: Text Voltage Font Image: Show | Channel Setting XAxes V YAxes V Y-Max V Y-Min Ch0 Color |

The following sections will describe the setting forms.



4.2.1 Display Settings

| Display FFT Recording | Alarm Condition | | |
|--|--------------------------|---------------------------------------|--|
| X-Axis Setting View Number(Samples) 1024 X-Axis Title Text Samples | Tracking Scroll Bar Font | Precision 3 V Show Rotate | Appearance Background Color Grid Lines I Show Color Major Style Minor Style Solid I Solid I |
| Y-Axis Setting Max : 10 Min : -10 Y-Axis Title Text Voltage | Tracking Scroll Bar Font | Precision 5 V Show Rotate | Channel Setting XAxes V Axes V Y-Max V Y-Min ch0 Color |

| item | Description |
|-----------------|--|
| View Number | Set the number of data samples you want to display on the time domain Data Viewer. |
| Tracking | Enable/disable the tracking function. When the tracking function is enabled, the axes will adjust their min and span values based on the tracking style. |
| Scroll Bar | Enable/disable scroll bar. |
| X-Axis Title | Set the X-Axis title. |
| Max/Min | Set the Y-Axis maximum/minimum display value. |
| Y-Axis Title | Set the Y-Axis title. |
| Appearance | Configure the color of background, grid lines and the style of grid lines. |
| Channel Setting | Enable/disable the display of X and Y-Axis values in legend and set the related channel color. |



4.2.2 FFT setting

| Display FFT Recording | Alarm Condition | | |
|--|------------------------------|----------------------------------|--|
| FFT Setting Power Spectrum | ⊂ Enable ⊙ Disable | | Appearance Background Color |
| X-Axis Setting Samples 1024 • X-Axis Title Text Hz | ✓ Tracking Scroll Bar | Precision 3 Show Rotate | Show Color |
| Y-Axis Setting Max : 21 Min : 1 Y-Axis Title Text dB | ✓ Tracking ✓ Scroll Bar Font | Precision 3 Show Rotate | Channel Setting XAxes V YAxes Y-Max V Y-Min Ch0 Color |

| item | Description |
|-----------------|--|
| Enable | Enable/disable to perform the FFT calculation when capturing data. |
| View Number | Set the number of data samples to perform FFT calculation and display the result on the fre- quency domain DataView. |
| Tracking | Enable/disable the tracking function. When the tracking function is enabled, the axes will adjust their min and span values based on the tracking style. |
| Scroll Bar | Enable/disable the function of scroll bar. |
| X-Axis Title | Set the X-Axis title. |
| Max/Min | Set the Y-Axis maximum/minimum display value. |
| Y-Axis Title | Set the Y-Axis title |
| Appearance | Configure the color of background, grid lines and the style of grid lines. |
| Channel Setting | Enable/disable the display of X and Y Axis values in legend and set channel color. |



4.2.3 Recording Condition

| Display FFT Recording Alarm Condition | |
|--|---|
| Data Log Log to Disk © Enable © Disable | Recording Condition Stop by user By Sample Number By Time Interval |
| By Sample Number Number of 1024 Samples | By Time Interval Start 2009/ 3/23 ▼ PM 06:45:59 ÷ Stop 2009/ 3/23 ▼ PM 06:45:59 ÷ |
| Log Data Path C: [] ADLINK AD-Logger C:\Documents and CheckSN | Settings\Leslie\My Documents\AD-Logger\Log\ |

| item | Description |
|---------------------|--|
| Data Log | Enable/disable to log DAQ data to disk. |
| Recording Condition | Set a condition to automatically stop log- ging file to disk. |
| By Sample Number | Set the amount of sample to log data to disk. |
| By Time Interval | Set the time range to log data to disk. |
| Set Location | Set a path to store logged data. |



4.2.4 Alarm condition

| Disable 0 Normal Ch1 Disable 0 Normal | | | Value (v) | Status Normal | |
|---|--|---------------|-----------|------------------|--|
| | | Disable 👻 | | | |
| | | Uisable 🔽 | 0 | Nomia | |
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| | | | | | |
| | | | | | |

| ltem | Description |
|--------------------------|---|
| Alarm Condition Settings | You can enable/disable the alarm condi- tion and set trigger value for each chan- nel of the DAQ task. If AD-Logger detects the trigger value you set, the Alarm warning will show in the Status Viewer . |



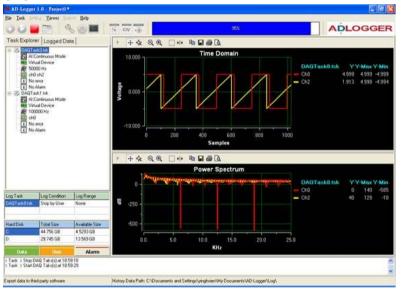
4.3 Start Data Acquisition

After you configure the DAQ parameters in section 4.2, you can

click button in the AD-Logger main window to start data acquisition based on the pre-defined DAQ task.

Display Log Enable Status

If the task start with the recording function. (Section 4.2.3), the **Buffer Monitor Bar** will display the available memory status of buffer (see figure below). When the AD-Logger completes the logging task, the **Buffer Monitor Bar** will switch to a disabled status.





Display Alarm Status

If the task starts with the alarm function (Section 4.2.4), AD-Logger will keep detecting the alarm condition during the data logging until you click the **Stop** button. If AD-Logger detects the trigger condition, AD-Logger will automatically stop the DAQ procedure (figure below). The related task in the Task View Panel will also show the **alarmed** status with a red color.

| Log Task | Log Condition | Log Range |
|-----------|---------------|----------------|
| | | |
| | | |
| Hard Disk | Total Size | Available Size |
| C: | 48.834 GB | 18.392 GB |
| D: | 184.05 GB | 24.32 GB |
| Start | Logging | Alarm |

You can launch the setting form and switch to the **Alarm Condi**tion tabsheet to configure the Alarm conditions.

| AD-Logg | re 1.0 - Paniesti | 6 | | | | | | | | - 6 8 |
|------------------------|-----------------------|-----------|---------------------|-----------------|---------------|---------------------|------------------|--------|---|---------|
| Sh Ish D | other Yeves De | | | _ | | | | | _ | |
| 001 | 2 B 2 | S @ 1 | IN CIV 13 | | | | 等 | | A | DLOGGER |
| Task Explo | ver Logged De | sta. | 1 + 4 | 2 9 9 | - Delet - Ba | | | | | |
| N 3 DAGT | Taskill tok. | | | | | Time Doma | n. | | | |
| * 2 DAQ1 | | Set | ing Tage | | | | | 8 | | |
| | | | 10001000 | 7 | | | | | | |
| | | | | | 0 | 0 | | | | |
| | | | AL | | J. | G | 90 | R | | |
| | | | | 4 | | | | | | |
| | | De | play FFT Rec | ording Alarm Co | ndtion | | | 1 | | |
| | | | Nam Condition Setti | | | | | | | |
| | | | | | Value (v) | Status | 1 | | | |
| | | | | Xoable • | 0 | Normal | | | | |
| | | 0 | 261 0 | Xoable • | 0 | Nomal | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| - | L | - | | | | | | | | |
| LogTaik | Log Condition | LogRan | | | | | | | | |
| | | | | | | | | | | |
| Hard Dick | Total Size | Avaiable | | | | | | | | |
| Hard Drick: | 44.756.68 | 4.3721 6 | | | | _ | OK Cance | Apply | | |
| D: | 29.745.68 | 13 569 68 | 1 | | | Samp | den | | | |
| Data | Disk | Alarm | 4 | | | | | | | |
| and some statements of | iguration Form Open | | | | | | | | | |
| | and the second second | 15% | | | | | | | | |
| Project Selling | | | in a second second | | | Autochaiten My Docu | | | | |
| a volance 2 Hourd | | | mundy Data P. | ant to woodness | a ana setangi | gengenseen Way Docu | nervi vu)-Loggen | elogn. | | |



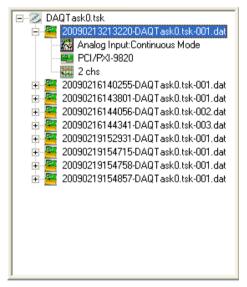
4.4 Stop and Export Data for post-processing

Click the evident to stop the task(s). If you already have data

logged in the system, the log files could be managed in the Logged Data tabsheet.

Switch to **Logged Data tabsheet**; double click the selected log file to display the data in the **DataView Window**.

If the sample number is more than 1024, the scrollbar can be used to switch the data block for display.



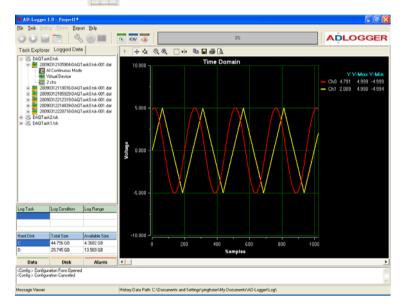


5 Exporting Functions

The AD-Logger log data is in binary files with private data format (Appendix). You can manage log file on AD-Logger "**Logged Data**" **tabsheet** or use the following exporting functions. The AD-Logger provides several data formats which help you to do analysis and post-processing in the third-party applications.

5.1 Export Data to Excel for post processing

- 1. Launch AD-Logger and select the Logged Data tabsheet.
- 2. Double click the log file you want to export.
- 3. Click the show Export Data setting form.





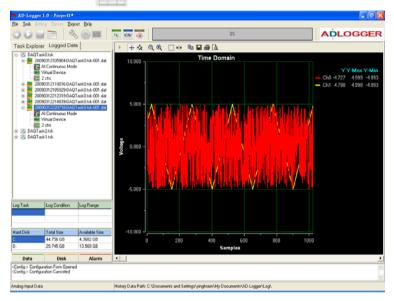
| 洚 Export Data | | | |
|---------------------------------|-----------|------------|---------|
| Data Format | C LabView | O DIAdem O | MATLAB |
| File Name: D:\Untitle.xls | | | Browser |
| Range Option | | <u> </u> | |
| Screen Range | C All | C Ra | inge |
| Sample Unit | Start | 1 | •• |
| C Time Unit | End | 225000 | •• |
| Export | | Close | |

- 4. Specify the file name and file path by **Browser** button.
- 5. Configure the **Range Option** and click the **Export button**. The exported data will be automatically loaded and displayed in the Excel tabsheet.



5.2 Export Data as a CSV file for Excel for post processing

- 1. Launch AD-Logger and Switch to the Logged Data tabsheet
- 2. Double click the log file you want to export.
- 3. Click the cov button to show Export Data setting form.





| N 1 | export Data | | | |
|------------|------------------------------|-----------|----------|----------|
| | Data Format | C LabView | C DIAdem | C MATLAB |
| | File Name: D:\Untitle.csv | | | Browser |
| | Range Option © Screen | © All | c | Range |
| | Range © Sample Unit | Start | 1 | |
| | C Time Unit | End | 225000 | •• |
| | Export | | Close | |

- 4. Specify the file name and file path by **Browser** button.
- 5. Configure the **Range Option** and click the **Export** button. The data will be exported to a CSV file in the path you specified.



Export Data into LabVIEW for post processing 5.3

This section will demonstrate how to perform Data Acquisition with ADLINK PCI-9221 and do FFT analysis in LabVIEW. Before the post-processing captured in LabVIEW, you need to use AD-Logger Export function to convert the AD-Logger file to LabVIEW compatible format. The process includes three steps:

- Configure DAQ device and Set log conditions.
- Start the data acquisition and Export captured data to Lab-VIFW
- Use LabVIEW to do FFT analysis
- Configure DAQ device and parameters.

Launch AD-Logger and click K Modify DAQ task button

to open DAQPilot interactive configuration dialog. You can configure DAQ device and relative parameters in the following setting dialogs.





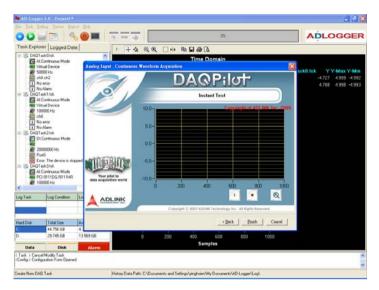


<Interactive Configuration Dialog STEP 1: Select Device & Channel>



<Interactive Configuration Dialog STEP 2: Timing/Trigger Setting >





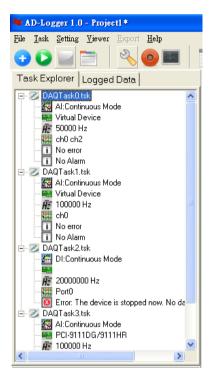
<Interactive Configuration Dialog STEP 3: Get Instant Result>

After quick task verification, you can click **Finish** button to finish the definition of your DAQ task then close the configuration interactive dialog and return to the AD-Logger main window.



2. Set log conditions

Click the Project Setting button to open the AD-Logger setting form.



Change to Log Tab sheet and finish following steps.



| Setting Page | X |
|--|--|
| ADLO | GGER |
| Display FFT Recording Alarm Condition | |
| Data Log Log to Disk C Enable C Disable | Recording Condition Stop by user By Sample Number By Time Interval |
| By Sample Number | By Time Interval |
| Number of 16384 Samples | Start 2009/ 3/23 ▼ PM 06:45:59 ÷ Stop 2009/ 3/23 ▼ PM 06:45:59 ÷ |
| Log Data Path C:[] ADLINK AD-Loger C:\Documents and C:\Docume | Settings\Leslie\My Documents\AD-Logger\Log\ |
| | OK Cancel Apply |

- ▶ Step 1: Set Enable data Log>
- ▶ Step 2: Set Data Log Condition by Sample Number>
- ▶ Step 3: Set 16384 Samples to log>
- ▶ Step 4: Set the Path to save log file to>
- ▶ Step 5: Click OK button to return AD-Logger Main Window>



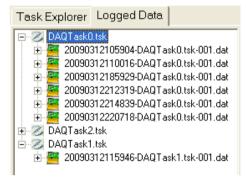
3. Start to DAQ and Export data to LabVIEW file

After configuring DAQ and log parameters, click

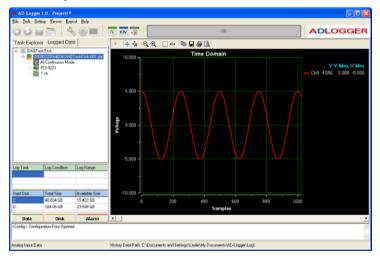


the AD-Logger will start to perform DAQ; the log file will be saved to the path you specified.

Click "Logged Data" change to See history data



The log files will be sequentially list by task name and time in the **Logged Data tabsheet**. Double click the file name in the tree, AD-Logger will display the data value in the Time Domain Data View; then the **Export** buttons will be enabled.





Click the

button to show the Export Data setting form.

- Step 1: Choose LabVIEW data format
- Step 2: Set exported file name and path
- Step 3: Set ALL range data to export
- Step 4: Click Export button

| Export Data | | | X |
|-------------------------------|--------------|--------------|---------|
| Data Format | SV 💿 LabView | C DIAdem C I | MATLAB |
| File Name: D:\LogData\9221 | Data.lvm | | Browser |
| Range Option | • 🔊 | C Ra | nge |
| Range | | | |
| Sample Unit | Start | 1 | •• |
| C Time Unit | End | 16384 | •• |
| Ex | port | Close | |



4. Use LabVIEW to do advanced analysis

Load the exported LVM file into LabVIEW.

- Step 1: Open a Blank VI in the NI LabVIEW software.
- ► Step 2: Right click and place a "Read From Measurement File" Express VI in the Block Diagram.

| Unlitled I Front Punct * s Edit Hisw Project Oper | an Tools Window Hala | | |
|--|--|---|---|
| D Untitled 1 Block Diago | | | 2 |
| | Qpense Iooh Hindow Help 2 2: 40 C of 12pt Application Font | 2 | |
| | Practical Depres Provide Provide | | |
| | User L-bancie Scherte VI Simulate Sig Simulate Sig Read Mean Fale Primpt User Fale Daalog | | |
| | | | |

- Step 3: In the Configure "Read From Measurement File" form, specify the file location that you want to import.
- Step 4: Click "Read File Now" button can preview the data value then close form by click OK button.

| File Name | | | | | |
|---|----------------------------------|--|-------|---------|---|
| D.'LogDete/9221Deta.lvm | | | | | |
| File Format | | Time Stamps | | | |
| Text (LVM) Read generic text files | | Relative to start of measurem | and . | | |
| Binary (TDMS) | | O Absolute (date and time) | | | |
| Binary with XML Header (TDM) | | Segment Size | | | |
| Action | | Retrieve segments of original size Retrieve segments of specified size | | Sampleo | |
| | | | | 16384 | 0 |
| • Tab Comma | 4.168091 4.125671 4.082489 | | | | ^ |
| Start row of numeric data | 4.036102 | | | | |
| | 3.938141 3.882141 | | | | |
| First row is channel names | 3.826599 3.768463 | | | | |
| First column is time channel | 3.708344 | | | | |
| Decimal Point (dot) | 3.645782 3.579712 | | | | |
| (comma) | 3.508911 | | | | ~ |
| | | | | | |

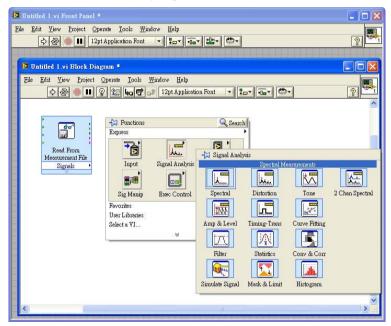


 Step 5: Right click and place a "Spectral Measurements" Express VI of Signal Analysis in the Block Diagram. The "Spectral Measurements" setting form will be opened.

Example: Using FFT function to calculate power spectrum result.

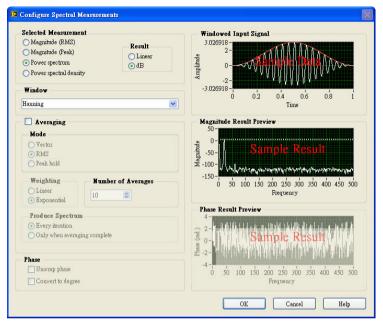
Input Signal = 1022.34 Hz

Sampling rate = 250 KHz





Step 6: There are four measurement functions in the Configure Spectral Measurements, in this case we chose "Power spectrum" function.

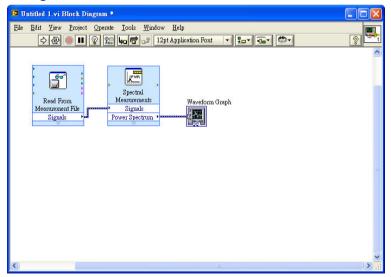




| 🔽 Untitled 1.vi F | ront Panel * | |
|-------------------|---|----------|
| | Project Operate Iools Window Help | <u> </u> |
| | - Controls Q. Search | |
| | Express | |
| | | |
| | Num Ctris Buttons Text Ctris | |
| | | |
| | User Ctris Num Inds LEDs | |
| | 🔝 🖓 Graph Indicators | |
| | Text Inds Graph Indicators Waveform Graph | |
| | User Controls Select a Control. | |
| | | XY Graph |
| | | |
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| | | |

Step 7: Place a "Waveform Graph" VI in the Front Panel

 Step 8: Finish following signal links in the Block Diagram.





Step 9: Right click on the Waveform Graph VI and choose property of the pop-up menu.

| Untitled 1.vi Block Diagram * | |
|---|--|
| Ele Edit Yiew Project Operate Tools Window Help | |
| Read From Messurement File Signals Power Spectrum | eform Graph Visible Items Find Indicator Hide Indicator Change to Control Change to Constant Description and Tip Signal Manipulation Palette Create Data Operations Advanced View As Icon Properties |
| < | > |

 Step 10: In the Scales tab, set Name of the X-Axis and Multiplier of Scaling Factors(sample rate).

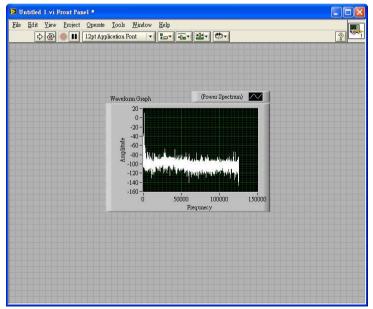
| ppearance | Display Format | Plots | Scales | Cursors | Documentation | Data I ⊀ | |
|------------|--------------------|---------|----------|-------------|---------------|----------|--|
| Time (2 | K-Axis) | | , | ~ | 0 | | |
| Name | Frequency (Hz) | | | | | | |
| 🗹 She | ow scale label | | 🗹 Auto | scale | _ | | |
| Show scale | | | 0 | | Minimum | | |
| Log | | | 100 | | Maximum | | |
| 🔲 Inv | reted | | Scaling | | | | |
| | | | 0 | | Offset | | |
| | | | 250000 |) | Multiplier | | |
| —Scale St | yle and Colors — | | | - Grid Styl | e and Colors | | |
| [1.0-] | Major tick | | | | Major grid | | |
| 0.5- | Minor tick | ι. | | <u> </u> | Minor grid | | |
| | Marker te: | kt | | | | | |
| 🗹 Ig | nore waveform time | stamp o | n x-axes | | | | |
| | | 030 | | | | | |



| Appearance | Display Format | Plots | Scales | Cursors | Documentation | Data I ⊀ |
|-----------------|--------------------|-------------|--------------|--|---------------|----------|
| Plot 0 | | | • | | | |
| Name | | | | | | |
| Plot 0 | | | | | | |
| У-scale | | • • • | | <no< th=""><th>7.</th><th>×</th></no<> | 7. | × |
| Amplitud | le (Y-Axis) | ~ | | | | |
| X-scale | | | | | | |
| | y (Hz) (X-Axis) | ~ | | | | |
| 🗹 Ignore | e waveform or dyna | umic attril | butes, inclu | ding plot na | unes | |
| · | | | | | | |

► Step 11: In the Plots tab, enable the following option.

Step 12: Switch to the Block Diagram, start to execute the program will display the power spectrum result.





5.4 Export Data into DIAdem for post processing

- 1. Launch AD-Logger and Switch to the Logged Data tabsheet.
- 2. Double click the log file you want to export.
- 3. Click the solution to show the Export Data setting

Ele De Tos

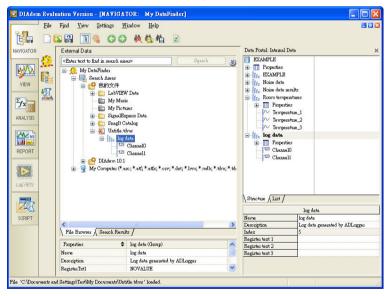
Log1 DAD Hard C D

Expo

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| (L) | | | | ġ. | | 0 600 Samples | | | |
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| | | | | Export | | Close | | | _ |
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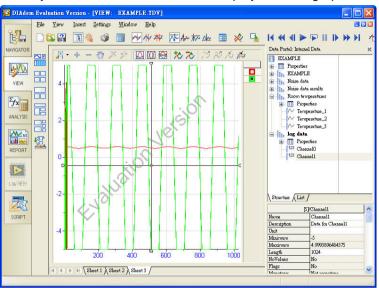
- 4. Assign the file name and file path.
- 5. Click the DIAdem data format.
- Configure the Range Option and click the Export button. The exported data can be found in the path you specified.
- 7. Load the exported data through the **DIAdem NAVIGA-TOR**.
- 8. Drag and drop the **Group Name** of log file into the **Data Portal** window. Then the Group Name will be added in the **Data Portal** for further operations.



 Switch to the VIEW window of DIAdem, select a 2D Axis System in the worksheet.



10.Drag and drop Channel 0 and Channel 1 to the 2D Axis System. The data value will be displayed in the graph.





Export Data into MATLAB post processing 5.5

This section will demonstrate how to perform Data Acquisition with ADLINK PCI-9221 and do analysis in MATLAB. Before the postprocessing captured in MATLAB, you need to use the AD-Logger Export function to convert the AD-Logger file to MATLAB compatible format. The process includes three steps:

- Configure DAQ device and Set log conditions.
- Start the data acquisition and Export captured data to MAT-IAB
- Use MATLAB to do advanced analysis
- Configure DAQ device and parameters.

Launch AD-Logger and click 🤍 Modify DAQ task button

to open DAQPilot interactive configuration dialog. You can configure DAQ device and relative parameters in the following setting dialogs.







<Interactive Configuration Dialog STEP 1: Select Device & Channel>



<Interactive Configuration Dialog STEP 2: Timing/Trigger Setting >



| 🍓 AD-Logger 1.0 - Project1# | | | | | 🔳 🖉 🔀 |
|--|-----------------------------------|--------------------------------|-----------------------------|--------------|----------------------|
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| and a study when any shares | | | | | Y |
| Create New DAQ Task | History Data Path: C:\Documents a | nd Settings/yinghsien/My Docu | uments\AD-Logger\Log\ | | |

<Interactive Configuration Dialog STEP 3: Get Instant Result>

After quick task verification, you can click the **Finish button** to finish the definition of your DAQ task then close the configuration interactive dialog and return to the AD-Logger main window.



2. Set log conditions







Change to Log Tab sheet and finish following steps.

| Setting Page | |
|---|---|
| ADLO | GGER |
| Display FFT Recording Alarm Condition | |
| Data Log Log to Disk I Disable | Recording Condition |
| By Sample Number | By Time Interval |
| Number of 16384 Samples | Start 2009/ 3/23 PM 06:45:59 |
| • | Stop 2009/ 3/23 PM 06:45:59 |
| Log Data Path | |
| C: [] ADLINK AD-Logger C: \Documents and C: \ | Settings\Leslie\My Documents\AD-Logger\Log\ |
| | OK Cancel Apply |

- Step 1: Set Enable data Log
- ► Step 2: Set Data Log Condition by Sample Number
- ► Step 3: Set 16384 Samples to log
- ► Step 4: Set the Path to save log file to
- Step 5: Click OK button to return AD-Logger Main Window



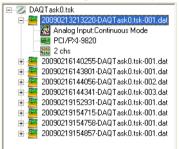
3. Start to DAQ and Export data to MATLAB file

After configuring DAQ and log parameters, click

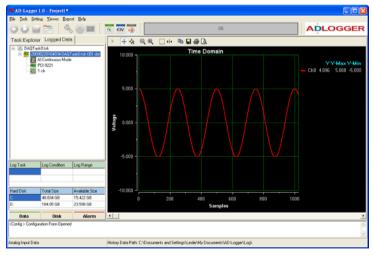


button the AD-Logger will start to perform DAQ; the log file will be saved to the path you specified.

Click "Logged Data" change to History Data View



The log files will be sequentially list by task name and time in the Logged Data tabsheet. Double click the file name in the tree, AD-Logger will display the data value in the Time Domain DataView; then the Export buttons will be enabled.





Click the

button to show the Export Data setting form.

- Step 1: Choose MAT-LAB data format
- Step 2: Set exported file name and path
- Step 3: Set ALL range data to export
- Step 4: Click Export button

| ixport Data | | | |
|---------------------------------|-----------|------------|---------|
| Data Format | C LabView | C DIAdem @ | MATLAB |
| File Name: D:\LogData\D92210 |)ata.csv | | Browser |
| Range Option | • 🗐 | C Ra | inge |
| Range | | | |
| Sample Unit | Start | 1 | •• |
| C Time Unit | End | 16384 | •• |
| Expo | t | Close | |

4. Use MATLAB to do advanced analysis

Load the exported CSV file into MATLAB.

- Step 1: Set the Current Directory to the exported file saved.
- Step 2: Type "load D9221Data.csv" in the Command Window
- Step 3: An array created with the same name of the exported file in the Workspace.





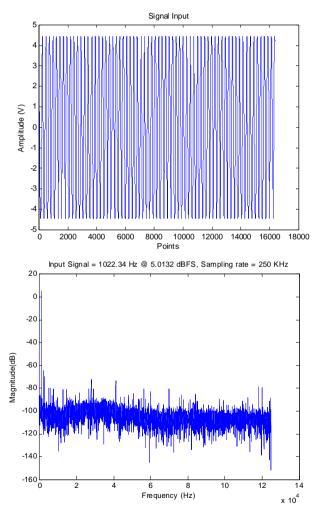
Step 4: You can use this data array to do the advanced analysis like following pictures

Example: Using FFT function to calculate power spectrum result.

Input Signal = 1022.34 Hz

Sampling rate = 250 KHz

The source code is listed in the next page.





```
load D9221Data.csv
Fs = 250000; % Sampling frequency
fin = 1022.34;
numpt = 16384; % Length of signal
notdc = 3;
figure(1);
plot(D9221Data);
title('Signal Input');
xlabel('Points');ylabel('Amplitude (V)');
Doutw = D9221Data.*hann(numpt);
Dout spect = fft(Doutw);
Dout dB = 20*log10(abs(Dout spect));
     % Recalculate to dB
spectP = (abs(Dout_spect)).*(abs(Dout_spect));
     % Determine power spectrum
FFT_freq = [0:numpt/2-1].*Fs/numpt;
FFT spectrum = Dout dB(1:numpt/2);
figure(2);
% Plot single-sided amplitude spectrum.
plot(FFT_freq,FFT_spectrum)
title('Power Spectrum of Input Signal')
xlabel('Frequency (Hz)')
ylabel('Magnitude(dB)')
pll_title = ['Input Signal = ', num2str(fin), '
     Hz @ ',num2str(signal_dBFS),
    ' dBFS',', Sampling rate = ', num2str(Fs/
     1000), ' KHz'];
title(pll_title);
```





6 Appendix

6.1 AD-Logger .DAT File Format

This appendix describes the file format of the .dat files logged through file AD-Logger file system. The data file includes five parts, ADLINK DASK Header, ChannelRange, Data Block, AD-Logger Header and ChannelRange. The file structure is shown in the figure below:

| DASK Header | | |
|------------------------|--|--|
| ChannelRange(Optional) | | |
| DAQ data | | |
| AD-Logger Header | | |
| ChannelRange(Optional) | | |
| | | |



6.1.1 DASK Header

The DASK header part records the information related to the stored data and its total length is 60 bytes. The data structure of the file header is as follows:

| DASK Header Length: 60 bytes | | | |
|------------------------------|---------------|-----------------|--|
| Elements | Туре | Size (bytes) | Comments |
| ID | char | 10 | file ID ex. ADLinkDAQ1 |
| card_type | short | 2 | card Type ex. PCI-7250, PCI-9112 |
| num_of_channel | short | 2 | number of scanned channels ex. 1, 2 |
| channel_no | unsigned char | 1 | channel number where the data read from (only available as the num_of_channel is 1) ex. 0, 1 |
| num_of_scan | long | 4 | the number of scan for each chan- nel (total count / num_of_channel) |
| data_width | short | 2 | the data width 0: 8 bits, 1: 16 bits, 2: 32 bits |
| channel_order | short | 2 | the channel scanned sequence 0: normal(ex. 0-1-2-3) |
| ad_range | short | 2 | the AI range code Please refer to ADLINK DASK Function Refer- ence Appexdix B ex. 0 (AD_B_5V) |
| scan_rate | double | 8 | The scanning rate of each channel (total samplingate/ num_of_channel) |
| num_of_channel_range | short | 2 | The number of ChannelRange* structure |
| start_date | char | 8 | The starting date of data acquisi- tion ex. 12/31/99 |
| start_time | char | 8 | The starting time of data acquisi- tion ex. 18:30:25 |
| start_millisec | char | 3 | The starting millisecond of data acquisition ex. 360 |
| reserved | char | 6 | The AD-Logger supports log files which the first byte of reservd ele- ment is "A". Others no used. |

*If the num_of_channel_range is 0, the ChannelRange block won't be included in the data file.



6.1.2 ChannelRange

The ChannelRange part records the channel number and data range information related to the stored data. This part consists of several channel and range units. The length of each unit is 2 bytes. The total length depends on the value of num_of_channel_range (one element of the file header) and is calculated with this formula:

Total Length = 2 * num_of_channel_range bytes

| ChannelRange Length: 2 bytes | | | |
|------------------------------|------|-----------------|---|
| Elements | Туре | Size (bytes) | Comments |
| channel | char | 1 | scanned channel number ex. 0, 1 |
| range | char | 1 | the AI range code Please refer to ADLINK DASK Function Reference Appexdix B ex. 0 (AD_B_5V) |

The data structure of each ChannelRange unit is listed below:



6.1.3 Data Block

The data is written to file in a 16-bit binary format, with the lower byte first (little endian). For example, the value 0x1234 is written to disk with 34 first followed by 12. The total length of the data block depends on the data width and the total data count.

The file is written in Binary format and may not be read by normal text editor. You can use any binary file editor to view it or the functions used for reading files (such as fread) to get the file information and data value. PCIS-DASK provides the DAQCvt utility to convert the binary file. Refer to the PCIS-DASK user manual for details



6.1.4 AD-Logger Header

The AD-Logger header part records the information related to the stored data and its total length is 64 bytes. The data structure of the file header is as follows:

| AD-Logger Header Length: 64 bytes | | | |
|-----------------------------------|---------------|-----------------|--|
| Elements | Туре | Size (bytes) | Comments |
| ID | char | 10 | file ID ex. ADLogger1 |
| task_type | unsigned long | 4 | The DAQPilot DAQ task type ex. Continuous Wave Acquisition |
| card_type | short | 2 | card Type ex. PCI-7250, PCI-9112 |
| num_of_channel | short | 2 | number of scanned channels ex. 1, 2 |
| channel_no | unsigned char | 1 | channel number where the data read from (only available as the num_of_channel is 1) ex. 0, 1 |
| num_of_scan | long | 4 | the number of scan for each chan- nel (total count / num_of_channel) |
| data_width | short | 2 | the data width 1: 8 bits, 2: 16 bits, 4: 32 bits |
| channel_order | short | 2 | the channel scanned sequence 0: normal(ex. 0-1-2-3) |
| ad_range | short | 2 | the AI range code Please refer to ADLINK DAQPilot User Manual ex. 0 (AD_B_5V) |
| scan_rate | double | 8 | The scanning rate of each channel (total samplingate/ num_of_channel) |
| num_of_channel_range | short | 2 | The number of ChannelRange* structure |
| start_date | char | 8 | The starting date of data acquisi- tion ex. 12/31/99 |
| start_time | char | 8 | The starting time of data acquisi- tion ex. 18:30:25 |
| start_millisec | char | 3 | The starting millisecond of data acquisition ex. 360 |
| reserved | char | 6 | No used. |

*If the num_of_channel_range is 0, the ChannelRange block won't be included in the data file.



6.1.5 ChannelRange

The ChannelRange part records the channel number and data range information related to the stored data. This part consists of several channel and range units. The length of each unit is 2 bytes. The total length depends on the value of num_of_channel_range (one element of the file header) and is calculated with this formula:

Total Length = 2 * num_of_channel_range bytes

The data structure of each ChannelRange unit is listed below:

| ChannelRange Length: 2 bytes | | | |
|------------------------------|------|-----------------|--|
| Elements | Туре | Size (bytes) | Comments |
| channel | char | 1 | scanned channel number ex. 0, 1 |
| range | char | 1 | the AI range code Please refer to ADLINK DAQPilot User Manual ex. 0 (AD_B_5V) |