Analog Discovery 2 Complete Control Panel – User Guide

This application provides a **graphical interface** for controlling and monitoring the Digilent Analog Discovery 2 device. It allows you to use the device's oscilloscope, function generator, power supplies, digital I/O, data logger, spectrum analyzer, protocol analyzer, and network analyzer features.

Getting Started

Requirements

- **Hardware:** Digilent Analog Discovery 2
- **Software:**
    - Windows OS
    - Digilent WaveForms SDK (dwf.dll must be available)
    - Python 3.x
    - Required Python packages: tkinter, numpy, matplotlib

Launching the App

1. Connect your Analog Discovery 2 to your PC via USB.
2. Ensure dwf.dll is accessible (in the same directory or in your PATH).
3. Run the app:

python complete_ad2_gui.py

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4. The main window will appear.

Main Features & Tabs

1. Oscilloscope & Function Gen

- **Connect/Disconnect:** Use the buttons at the top to connect or disconnect from the device.
- **Oscilloscope:**
    - Enable/disable channels, set voltage range, timebase, and trigger.

    - Start/Stop/Single acquisition.
    - Save acquired data as CSV.
    - View real-time plots of both channels.
- **Function Generator:**
    - Enable/disable each channel.
    - Select waveform (Sine, Square, Triangle, DC, Sawtooth, Noise).
    - Set frequency, amplitude, and offset.

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2. Power Supply

- **Enable/disable positive and negative supplies.**
- **Set voltage for each supply.**
- **Monitor current draw in real time.**
- **Enable/disable all supplies at once.**

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3. Data Logger

- **Select channels to log.**
- **Set logging interval and duration.**
- **Choose output CSV file.**
- **Start/Stop logging.**
- **Monitor progress and status.**

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4. Spectrum Analyzer

- **Set start/stop frequency and number of samples.**
- **Start/Stop spectrum analysis.**
- **View real-time spectrum plot (simulated data).**

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5. Digital I/O

- **Set digital output states for all 16 DIO pins.**
- **Monitor digital input states in real time.**

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6. Protocol Analyzer

- **Select protocol (SPI, I2C, UART, CAN).**
- **Set clock and data pins.**
- **Start/Stop protocol analysis (feature not implemented, placeholder only).**
- **View decoded data (not implemented).**

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7. Network Analyzer

- **Set frequency sweep parameters (start/stop freq, points, amplitude).**
- **Start/Stop frequency sweep.**
- **View Bode plot (magnitude and phase) of S11 response.**
- **Export data to CSV or save plot as image.**

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8. Settings

- **View device information.**
- **Calibrate Oscilloscope and Function Generator.**
- **Reset device to factory defaults.**
- **Set advanced parameters (buffer size, timeout).**

General Usage Tips

- **Connect the device** before using any features. Most controls are disabled until a device is connected.
- **Calibration and reset** operations are available in the Settings tab.
- **Data export** is available for Data Logger and Network Analyzer.
- **Some advanced features (Protocol Analyzer, real hardware spectrum/network analysis)** are placeholders or simulated. You may need to implement or extend these for full hardware support.

Troubleshooting

- **WaveForms library not loaded:** Ensure dwf.dll is present and accessible.

- **Device not found:** Check USB connection and drivers.
- **Feature not implemented:** Some tabs (e.g., Protocol Analyzer) are placeholders and will show an info dialog.

Closing the App

- Simply close the window or use the standard OS controls.

Support

For hardware issues, refer to the Digilent Analog Discovery 2 documentation.
For software issues, check your Python environment and dependencies.

Enjoy exploring your Analog Discovery 2!