



AWMF-0224-DK-UG

Development Kit User Guide

	AWMF-0224 Developer Kit User Guide	Document	AWMF-0224-DK-UG
		Issue Date	8/24/23
		Revision	1.1
		Page	1 of 12

Revision	Date	By	Description of Change
1.0	3/30/23	AMS	Initial version
1.1	8/24/23	CJ	Change Table 2 Header Pin/Function of pins 22 & 24 to GND.

1	CONTENTS	
2	IMPORTANT READ THIS SECTION FIRST	3
3	SOFTWARE INSTALLATION	4
3.1	NI-8452 USB-SPI Installation	4
3.2	Hardware Validation.....	7
3.3	AWMF-0224 Control Software Installation	8
4	AWMF-0224 SOFTWARE OPERATION	9
4.1	Start Up	9
5	POWER UP PROCEDURE.....	10
5.1	Bias Configuration.....	10
5.2	Controller Connections	11
5.3	Reference Board	11
5.4	Additional Recommendations	12

	AWMF-0224 Developer Kit User Guide	Document	AWMF-0224-DK-UG
		Issue Date	8/24/23
		Revision	1.1
		Page	3 of 12

2 IMPORTANT READ THIS SECTION FIRST

Prior to powering up the evaluation board it is critical that you review and carefully follow the procedure outlined in:

5 Power Up Procedure

Failure to follow this procedure can result in damage to the device.

	AWMF-0224 Developer Kit User Guide	Document	AWMF-0224-DK-UG
		Issue Date	8/24/23
		Revision	1.1
		Page	4 of 12

3 SOFTWARE INSTALLATION

In order to control the evaluation board, two software installation steps are required. The first step is to install the necessary support software for the National Instruments NI-8452 USB-SPI adaptor as described in 3.1. The second step is to install the Anokiwave software specific to the evaluation board to provide the control user interface, as described in 3.3.

3.1 NI-8452 USB-SPI Installation

This section describes the software installation process for the NI-8452 hardware. The software should be downloaded via the link provided in the AWMF-0224-DKxxx-QSG Quick Start Guide. The user should follow the installation steps detailed in Figure 1 to Figure 13.

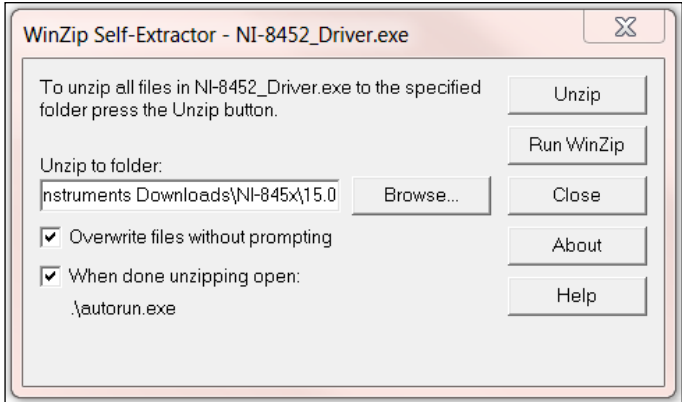
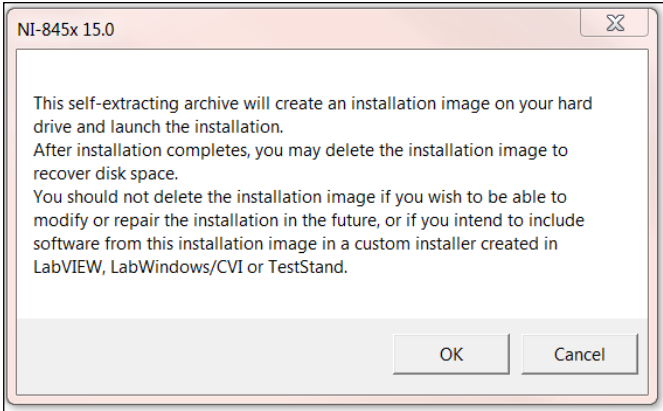


Figure 1: Run the Self-Extracting Archive Utility. Press OK to Continue

Figure 2: Recommend that the defaults shown above are used. Press Unzip to Continue

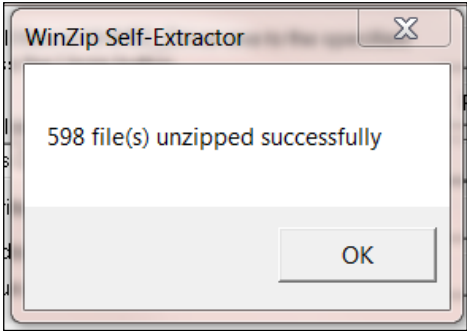


Figure 3: After the self-extraction process has completed the following message should be visible. Press OK to Continue

	AWMF-0224 Developer Kit User Guide	Document	AWMF-0224-DK-UG
		Issue Date	8/24/23
		Revision	1.1
		Page	5 of 12

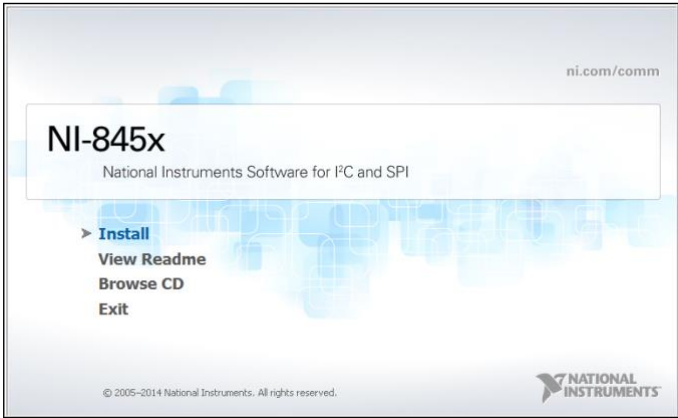


Figure 4: Select Install

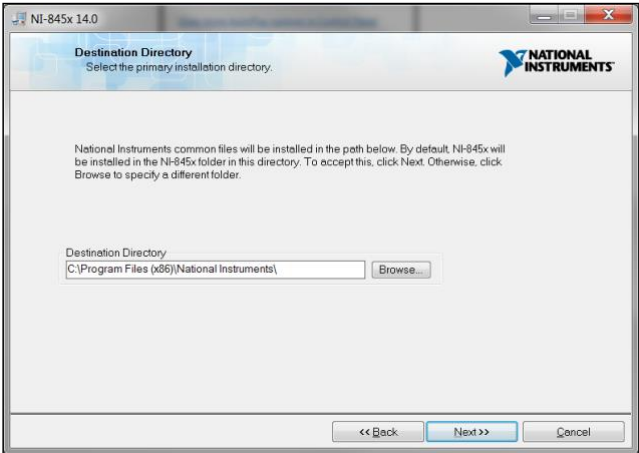


Figure 5: Recommend the default folder is used as shown above. Press Next to Continue

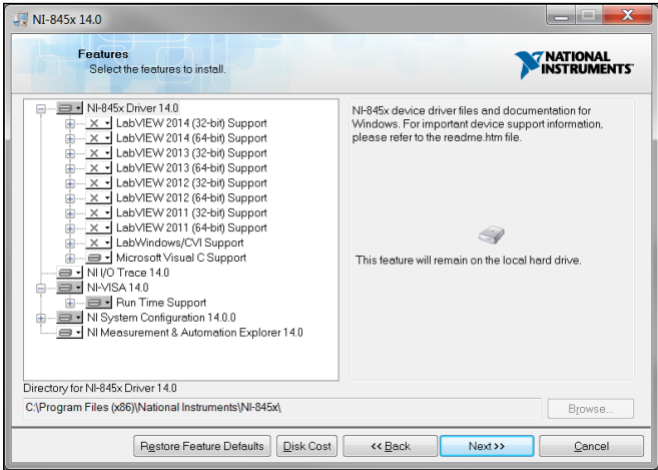


Figure 6: The installer will automatically select the necessary support files for the target system. Press Next to Continue

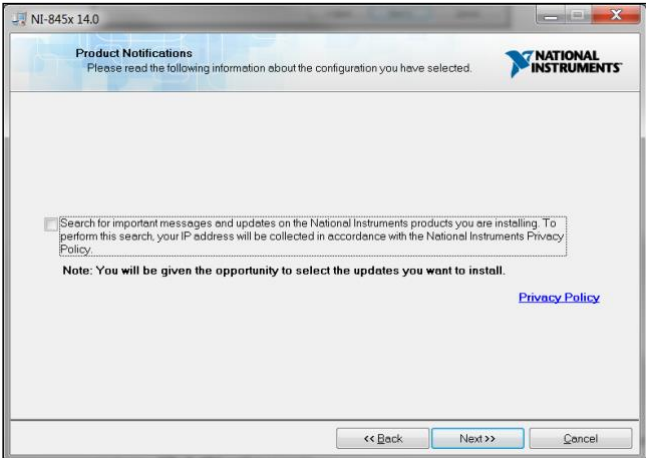


Figure 7: Uncheck the Search for important messages and updates. Press Next to Continue



Figure 8: Select acceptance of the license agreements. Press Next to Continue

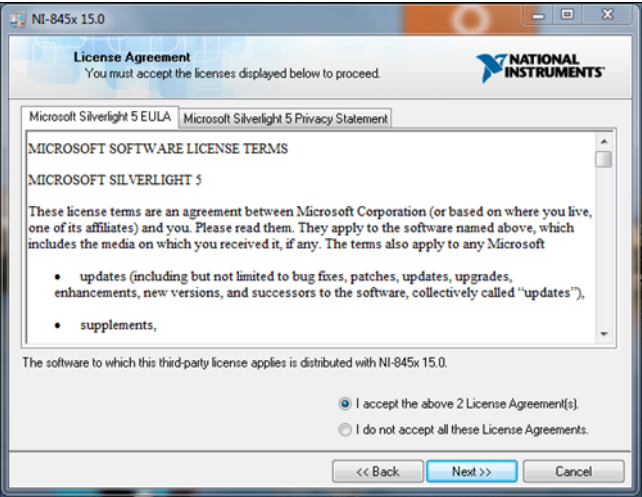


Figure 9: Select acceptance of the license agreements. Press Next to Continue (This dialog may not appear if Silverlight is already installed on the target system)



Figure 10: Maintain the check option if uninterrupted installation is required. Press OK to Continue

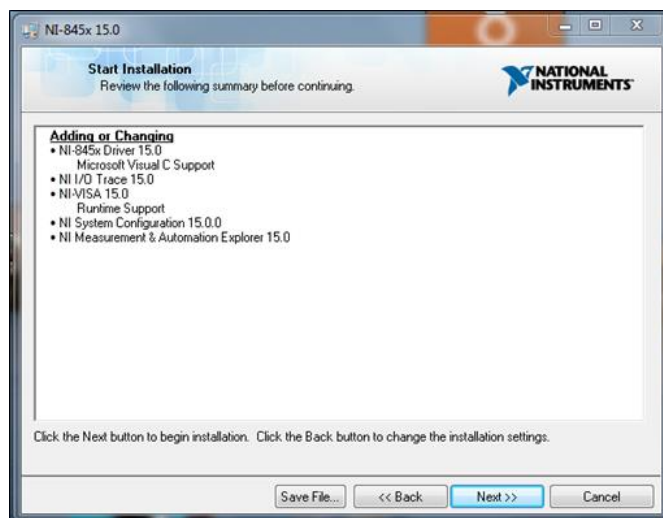


Figure 11: This dialog shows the tools that will be installed. The actual dialog may differ from the above depending upon installation options and the current configuration of the target machine.

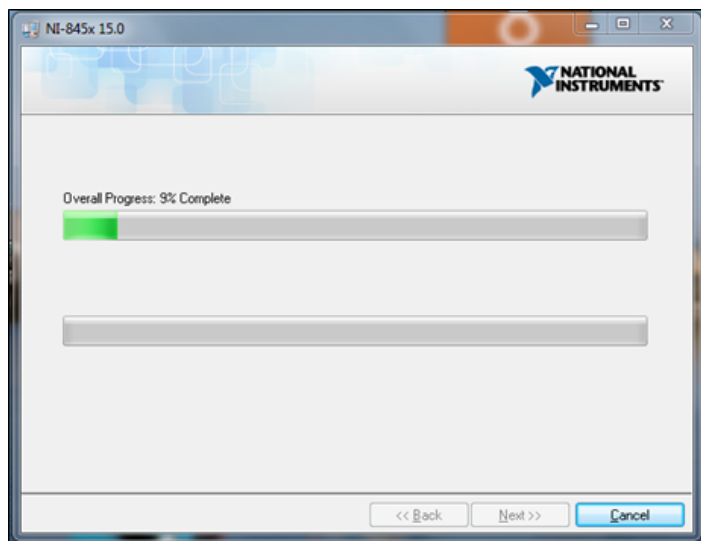


Figure 12: The NI-8452 driver and support files will then be installed. The process may take several minutes.

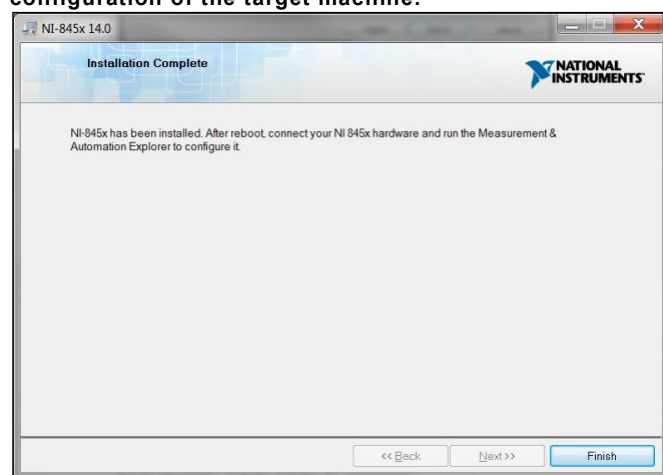


Figure 13: Press Finish to complete the installation process. Upon completion the user may be required to re-start the system.

	AWMF-0224 Developer Kit User Guide	Document	AWMF-0224-DK-UG
		Issue Date	8/24/23
		Revision	1.1
		Page	7 of 12

3.2 Hardware Validation

Once the NI-8452 software installation has successfully completed, the NI-8452 should be plugged into the PC using an available USB port. Successful installation and configuration can be confirmed if the blue LED labelled **USB** is lit, as illustrated in Figure 14.



Figure 14: Connecting the NI-8452 to the PC Should Result in the USB Indicator Being Lit

3.3 AWMF-0224 Control Software Installation

This section describes the steps necessary to install the Anokiwave Developer Kit control software. The software should be downloaded via the link provided in the AWMF-0224-DKxxx-QSG Quick Start Guide. Follow the steps detailed in Figure 15 to Figure 17 to extract the control software to a user defined folder.

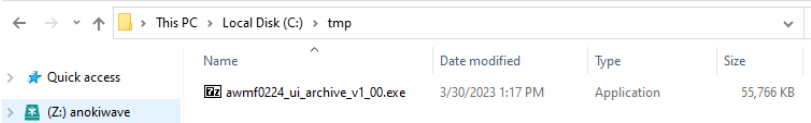


Figure 15: Copy the Self-Extracting Executable to a Temporary Folder

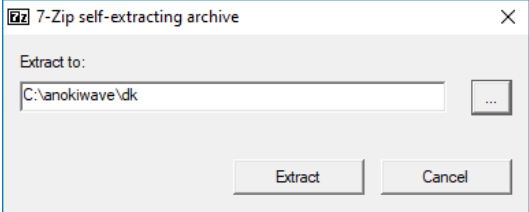


Figure 16: Select Folder to Extract Files (Recommend the default folder above)

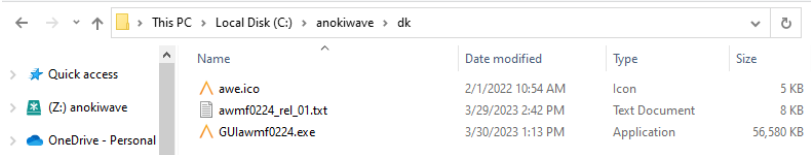


Figure 17: Folder Results After Successful Extraction

	AWMF-0224 Developer Kit User Guide	Document	AWMF-0224-DK-UG
		Issue Date	8/24/23
		Revision	1.1
		Page	9 of 12

4 AWMF-0224 SOFTWARE OPERATION

Note that the control software can be started in 'live' or 'simulation mode'. If live mode is selected, the evaluation board must be connected and powered on before selecting live mode. The hardware connections and power up sequence detailed in Section 5 should be followed prior to starting the control software in live mode. The 'simulation mode' does not require any hardware to be attached to the PC and is intended to help familiarize the user with the various controls and register write/read operations.

4.1 Start Up

Once the software is started, the user is first presented with a dialog box to configure the address of the NI-8452 controller. Selecting the default **usb** setting will result in the control software finding the next available NI-8452 in the system. This option is recommended for systems which involve a single evaluation board. For cases where the user is controlling multiple Anokiwave devices through separate controllers, the user can specify the serial number of the NI-8452 controller to be used. Selecting SIM (simulation mode) will start the control software in a mode that does not require any control hardware attached.

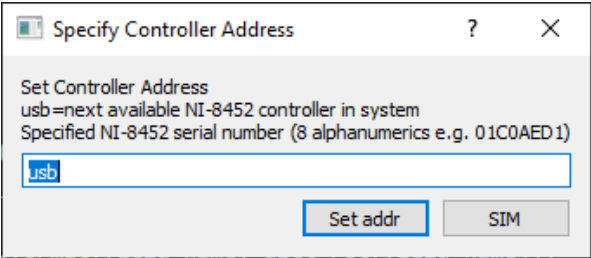


Figure 18: Control Software: Specifying the Hardware Controller Address

5 POWER UP PROCEDURE

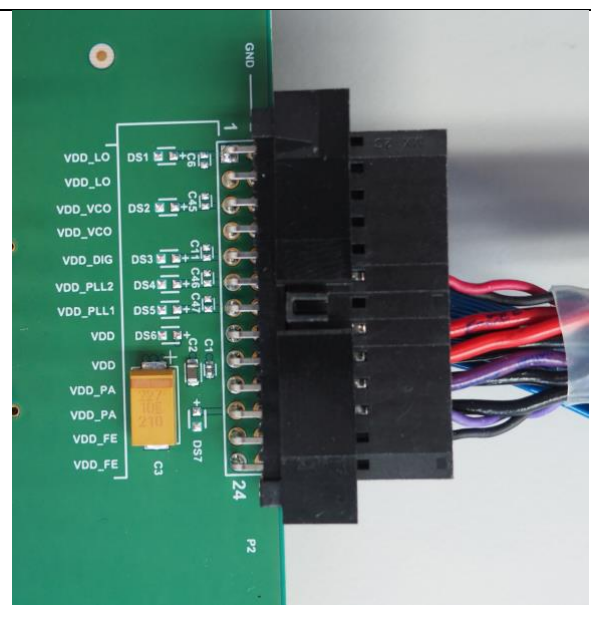
Note that it is critical that the steps in the following section are carefully followed to avoid damage to the device.

5.1 Bias Configuration

It is **strongly recommended** that a power supply capable of 4-wire (force/sense) operation is used and that the user is completely familiar with the 4-wire operation and voltage over protection settings on the supply. The supplied power harness should be connected to the 4W power supply as shown in Table 1.

Table 1: 4W Power Supply Connections

Pin	EVB Power Header Pin/Function	Cable Color	PSU Connection
01-10	n/c	-	n/c
11	V _{DD}	Red	V _{DD} SENSE HI
12	GND	Black	V _{DD} SENSE LO
13-14	n/c	-	n/c
15	V _{DD}	Red	V _{DD} FORCE HI
16	GND	Black	V _{DD} FORCE LO
17	V _{DD}	Red	V _{DD} FORCE HI
18	GND	Black	V _{DD} FORCE LO
19	V _{DDPA}	Purple	V _{DDPA} FORCE HI
20	GND	Black	V _{DDPA} FORCE LO
21	V _{DDPA}	Purple	V _{DDPA} SENSE HI
22	GND	Black	V _{DDPA} FORCE LO
23	n/c	-	n/c
24	GND	Black	V _{DDPA} SENSE LO
25-26	n/c	-	n/c



In order to confirm that the power supply is correctly configured the settings in Table 2 are recommended. The device should be powered on and the current consumption should be with ± 3 mA of the expected readings. If the current consumption is outside of this range, damage to the board should be suspected and your local Anokiwave Sales representative should be contacted.

Table 2: Recommended Power Supply Configuration - Initial Turn On SBY Mode (No SPI registers written)

Supply	Supply Voltage (V)	Expected Current (mA)	Over Voltage Protection Limit OVP (V)	Current Limit (mA)	Mode
V _{DD}	1.8	67	1.9	100	4W
V _{DDPA}	2.2	<2	2.3	20	4W

	AWMF-0224 Developer Kit User Guide	Document	AWMF-0224-DK-UG
		Issue Date	8/24/23
		Revision	1.1
		Page	11 of 12

5.2 Controller Connections

The supplied IO cable should be connected to P1 on the device evaluation board and P3 on the PCB-100034 NI Interposer board as shown in Figure 19 and Figure 20, respectively.

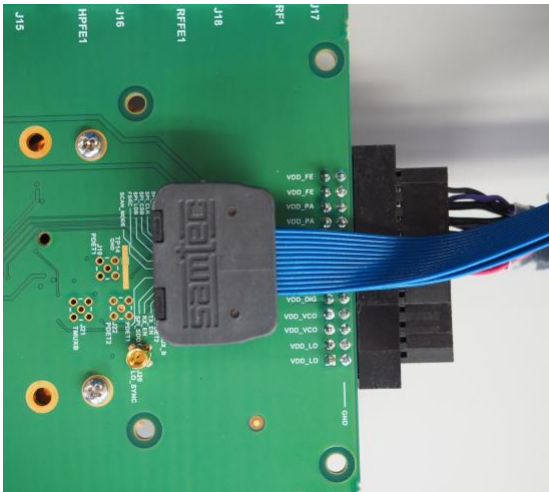


Figure 19: Connect IO Cable to P1 on Evaluation Board



Figure 20: Connect IO Cable to P3 on Interposer Board (P6 TMUX2 pin can be used to monitor the PLL lock detect signal)

5.3 Reference Board

The AWMF-0224 Develop Kit includes a 122.88 MHz Voltage Controlled Crystal Oscillator. This can be used to evaluate the PLL performance. The part should be powered from a 5V power supply using the cable provided and can be directly connected to the Evaluation Board using the SMA connectors supplied, as illustrated in Figure 21. The reference board should consume ~82 mA when powered on. It provides a differential signal to the reference inputs via the on-board balun. A schematic for the board is included in the data package as PCB-10037-V1A-SCH.



Figure 21: Reference Board Connection

	AWMF-0224 Developer Kit User Guide	Document	AWMF-0224-DK-UG
		Issue Date	8/24/23
		Revision	1.1
		Page	12 of 12

5.4 Additional Recommendations

- Any unused RF port should be terminated with a high quality 2.4 mm termination.
- The evaluation board is shipped with a heatsink attached and all data documented for this part is with the heatsink assembly attached to the board. **It is recommended that a fan be positioned close to the board to improve air flow when evaluating the part in TX and RX modes. Using a fan allows the part to reach thermal equilibrium faster, allowing the user to make more consistent measurements.**