UM12075

PCAL9722HN-ARD evaluation board

Rev. 1.0 — 13 June 2024   **User manual**

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1   Introduction

The PCAL9722HN-ARD evaluation board features a 22-bit general purpose I/O expander that provides remote I/O expansion for most microcontroller families via the SPI interface. The board can be connected in parallel with other SPI-bus demo boards to create an evaluation system.

The IC communicates to the host via the industry standard SPI-bus port. The evaluation software runs under Microsoft Windows 7, 8, and 10 PC platform.

2 Features

- A complete evaluation platform for the PCAL9722HN, Ultra low-voltage translating 22-bit SPI I/O expander with Agile I/O features, interrupt output and reset
- Easy to use GUI based software demonstrates the capabilities of the PCAL9722HN
- On-board LEDs, 7 segment display and key switches for PCAL9722HN general purpose I/O evaluation.
- Convenient test points for easy scope measurements and signal access
- USB interface to the host PC
- Power supply from USB port or external power supply can be used to power PCAL9722HN-ARD evaluation board

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3   Finding kit resources and information on the NXP web site

NXP Semiconductors provides online resources for the evaluation board and its supported device(s) on http://www.nxp.com.

The information page for PCAL9722HN-ARD evaluation board is at http://www.nxp.com/PCAL9722HN-ARD. The information page provides overview information, documentation, software and tools, parametric, ordering information and a **Getting Started** tab.

The Getting Started tab provides quick-reference information applicable to using the PCAL9722HN-ARD evaluation board, including the downloadable assets referenced in this document.

4 Getting ready

Working with the PCAL9722HN-ARD evaluation board requires the kit contents, additional hardware, and a Windows PC workstation with installed software.

4.1 Kit contents

- Assembled and tested evaluation board in an antistatic bag
- Quick Start Guide

4.2 Additional hardware

In addition to the kit components, the following hardware is necessary or beneficial when working with this kit.

- Oscilloscope
- Multimeter for current/voltage measurement
- PC for running GUI

4.3 Assumptions

Familiarity with the SPI-bus is helpful but not required.

4.4 Static handling requirements

CAUTION	
⚠️	This device is sensitive to ElectroStatic Discharge (ESD). Therefore care should be taken during transport and handling. You must use a ground strap or touch the PC case or other grounded source before unpacking or handling the hardware.

4.5 Minimum system requirements

- PC Pentium processor (or equivalent)
- One USB port (either 3.0 or 2.0 or 1.1 compatible)
- Windows 7, 8, 10
- OM13089 MCU board (from www.nxp.com)

4.6 Power requirements

The LPC55S69-EVK MCU board obtains power from the PC USB port, two USB parts can be connected to the LPC55S69-EVK MCU board simultaneously. Please use external power supply option if exceeding the USB port current capabilities.

5 Hardware installation

5.1 PCAL9722HN-ARD EV board and LPC55S69-EVK MCU board connection

PCAL9722HN-ARD evaluation board is connected to the LPC55S69-EVK MCU board using four connectors (J4/J5/J11/J12 on PCAL9722HN-ARD board and P16/P17/P19/P18 on LPC55S69-EVKboard) for SPI-bus and power supply.

The LPC55S69-EVKMCU board communicates with PCAL9722HN demo GUI through PC USB port and uses SPI to communicate to PCAL9722HN.
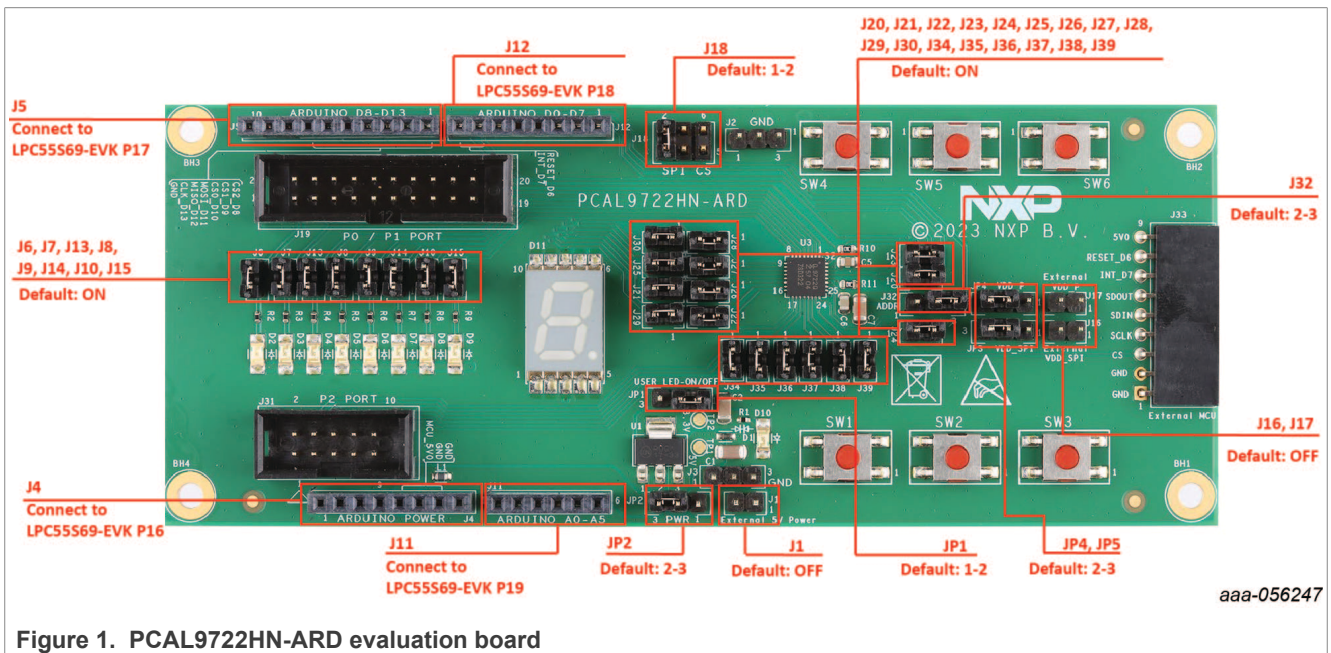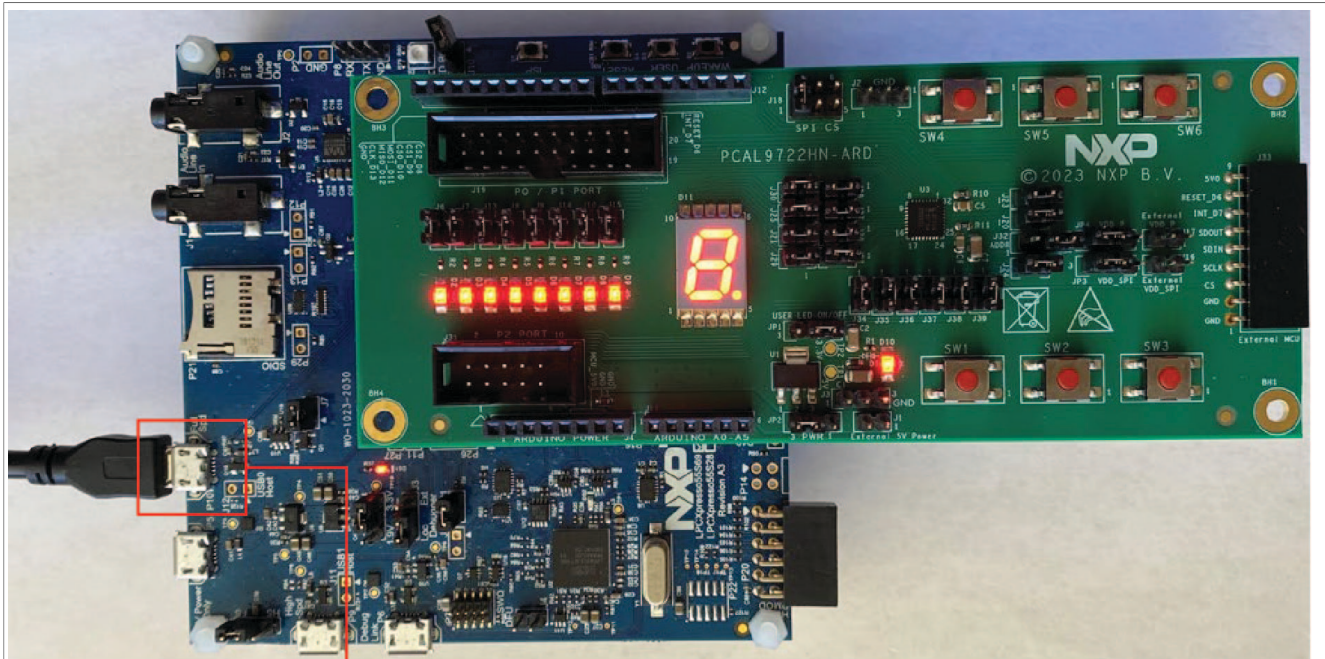

Figure 1. PCAL9722HN-ARD evaluation board

Use P10 (USB micro-B connector) on LPC55S69-EVK for power supply and GUI communication port.

Figure 2. PCAL9722HN-ARD evaluation board connecting to the LPC55S69-EVK MCU board

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6 Hardware description

- J4/J5/J11/J12 are connected to the LPC55S69-EVKMCU board for PCAL9722HN-ARD power supply and SPI-bus interface.
- JP1 selects user LED on/off.
- JP2 selects internal or external +5V power supply.
- JP3 selects internal or external VDD_SPI power supply.
- JP4 selects internal or external VDD_P power supply.

Table 1. PCAL9722HN-ARD EV board main components

Device	Description	Location
PCAL9722HN	I3C, SPI-bus, 0.5 °C accuracy, digital temperature sensor	U3
7 segment display	Displaying number	D11
NCP117ST33T3G	5V to 3.3V LDO	U1
Red LED	Power supply on LED	D10

Table 2. Jumper settings

| Jumper	Default setting	Comment
J4, J5, J11, J12		Arduino connector
J1		External 5V power supply pins
J2, J3		Ground test pins
J6, J7, J13, J8, J9, J14, J10, J15	On	User LED current measurement pins
J16		External VDD_SPI power supply pins
J17		External VDD_P power supply pins
J18	1-2	SPI CS 0-2 select pins
J19		Port 0 and 1 test pins
J20	1-2	SCK test pin
J23	1-2	SDIN test pin
J24	1-2	SDOUT test pin
J21, J22, J25, J26, J27, J28, J29, J30	1-2	7 segment display test pins
J31		Port 2 test pins
J32	2-3	ADDR select pin
J33		External MCU connector
J34, J35, J36, J37, J38, J39	1-2	Key switch test pins
JP1	1-2	User LED on/off select pin
JP2	2-3	Internal or external +5V power supply select pin
JP3	2-3	Internal or external VDD_SPI power supply select pin
JP4	2-3	Internal or external VDD_P power supply select pin

7   Schematic

The schematic diagram of PCAL9722HN-ARD is available at URL: http://www.nxp.com/PCAL9722HN-ARD.
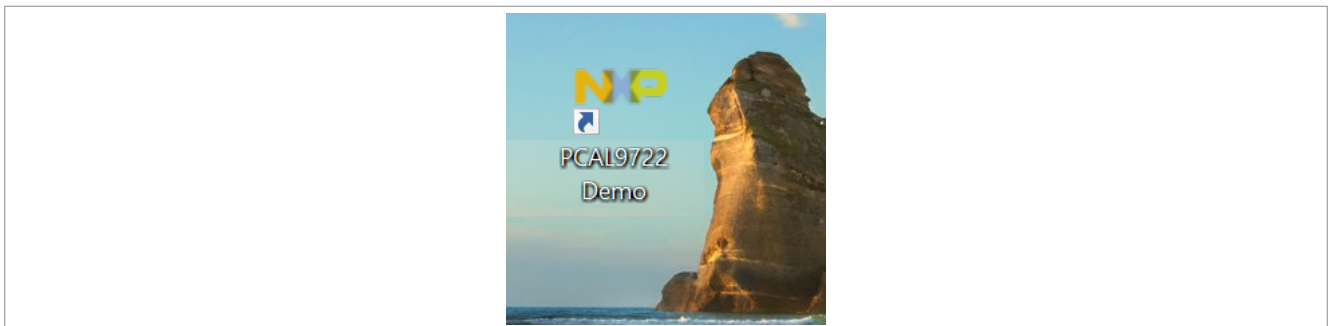
8 PCAL9722HN demo GUI

8.1 Install PCAL9722HN-ARD Demo GUI

• Double click on "setup.exe" to install PCAL9722HN-ARD demo GUI.
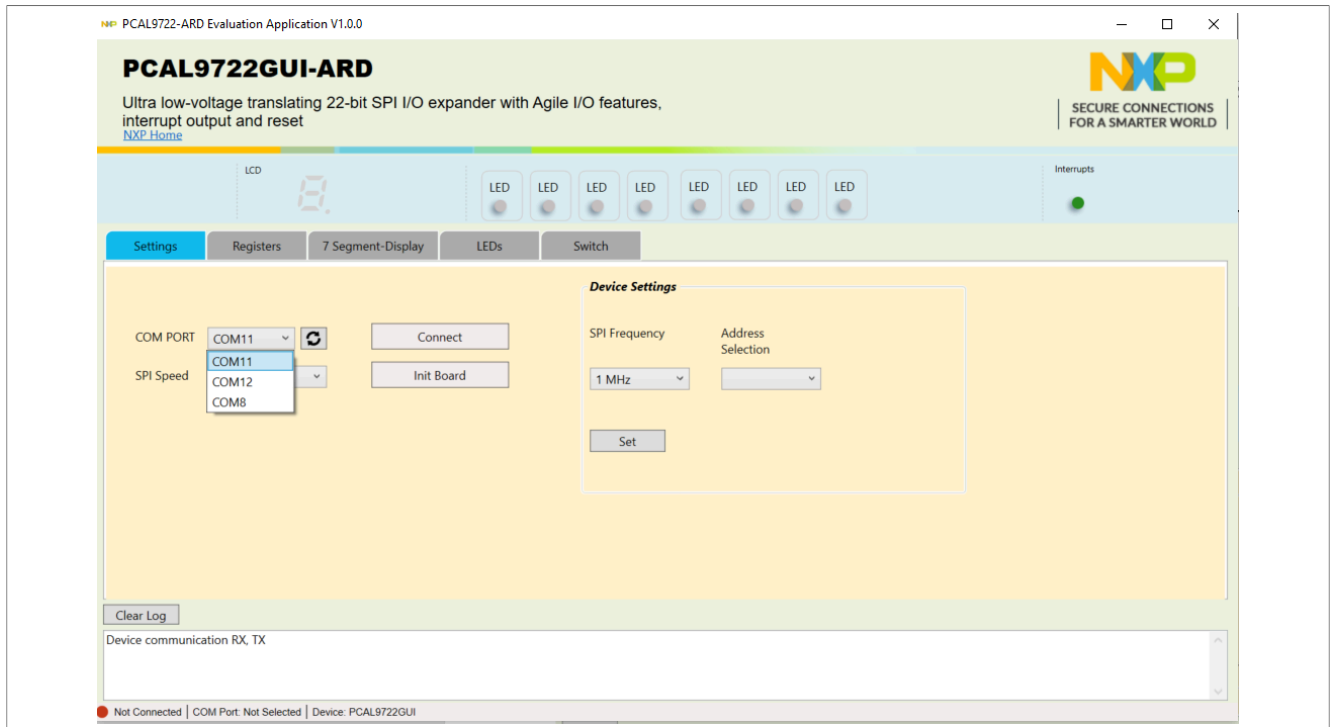• Click "Next" button three times to complete installation.
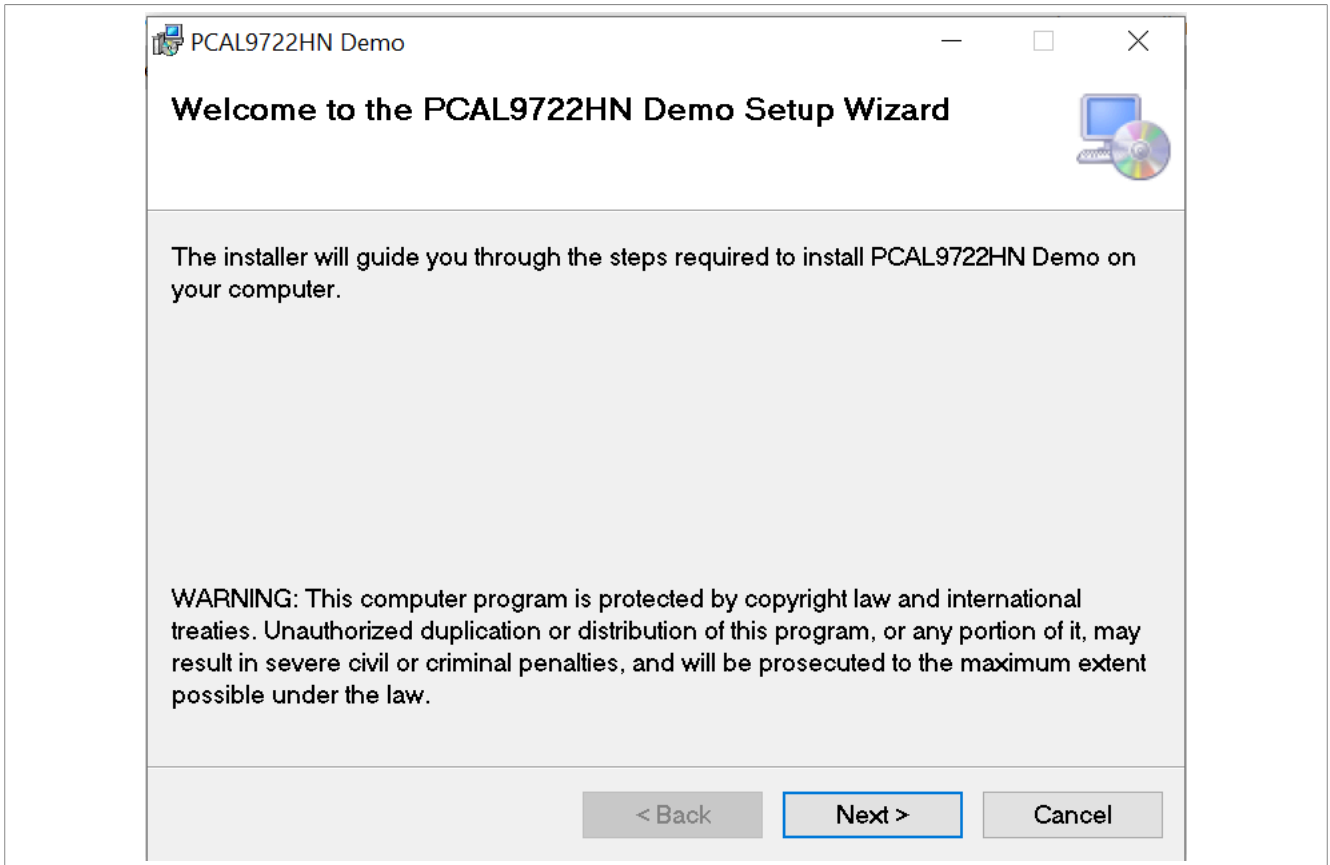
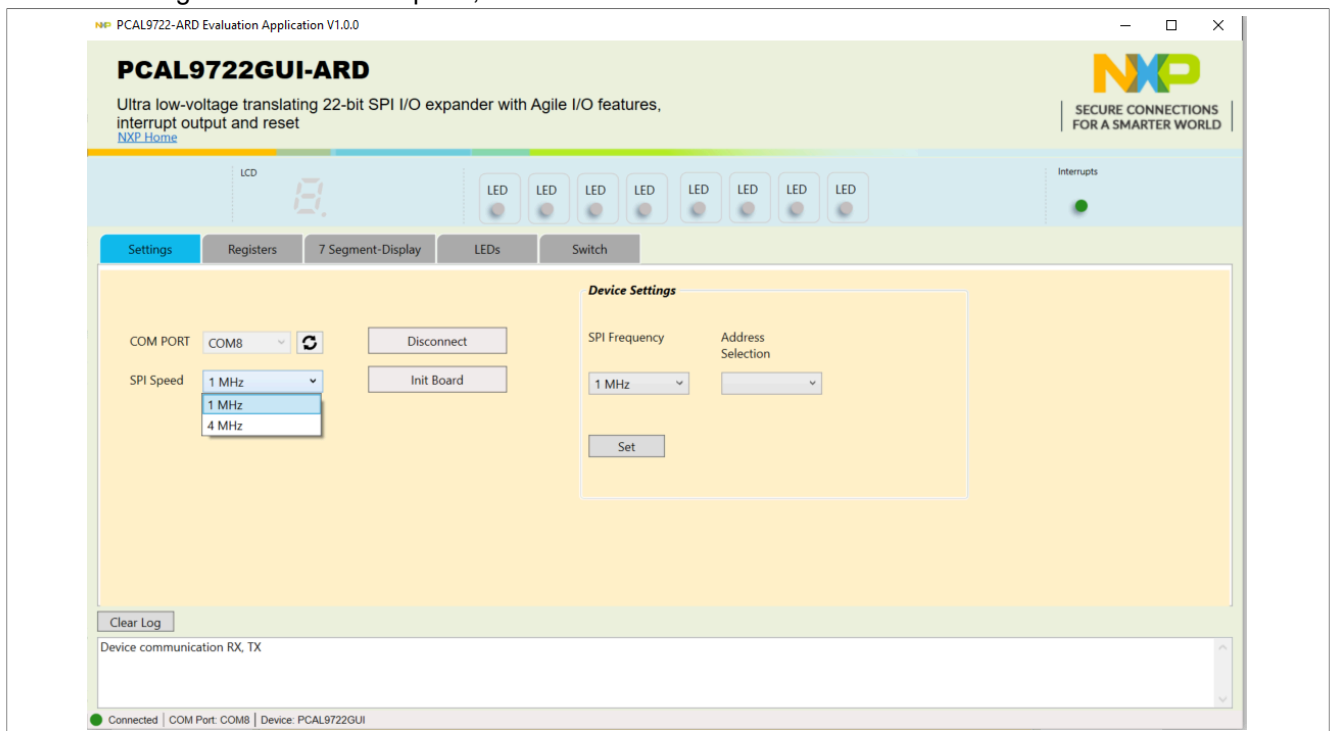## 8.2 Run PCAL9722 Demo GUI on Windows 7, 8, and 10 PC

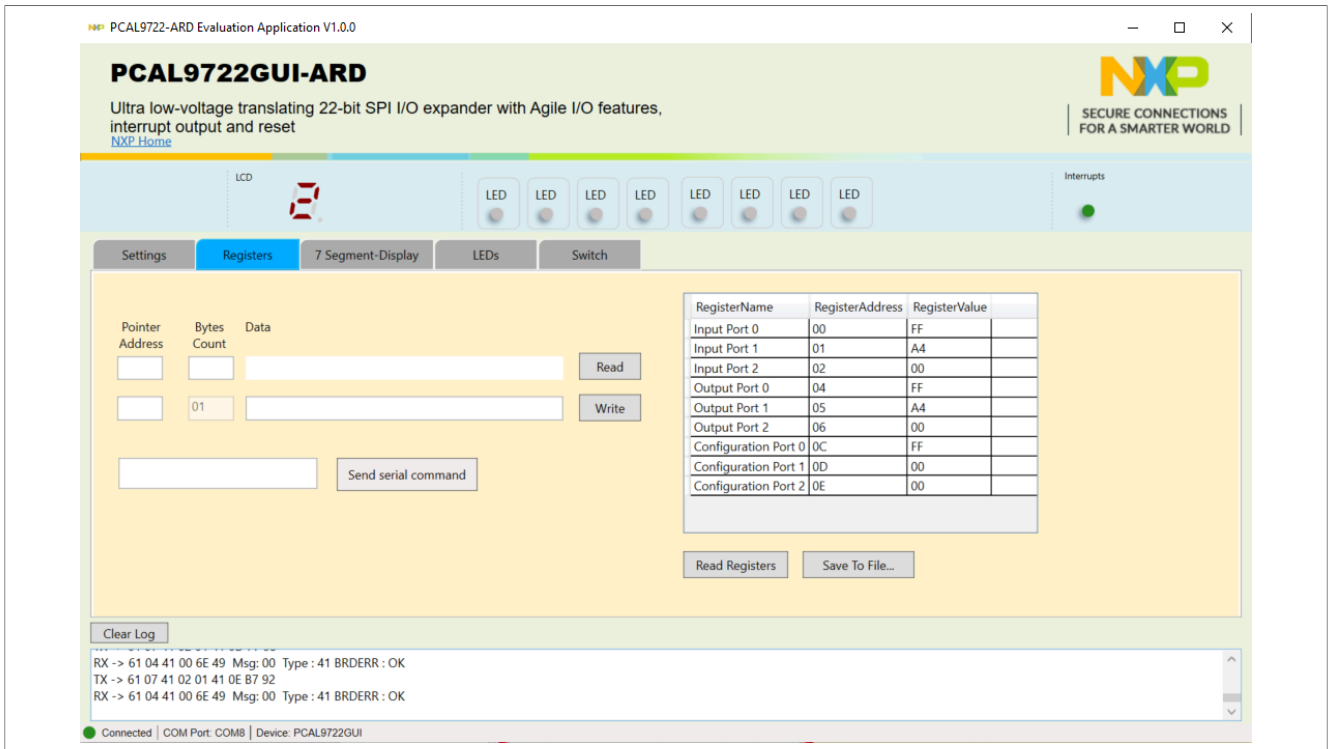1. Double click on "PCAL9722 Demo" icon to start GUI.

2. Select proper COM port (last COM port normally) and click "Connect" button to connect LPC55S69-EVK board.
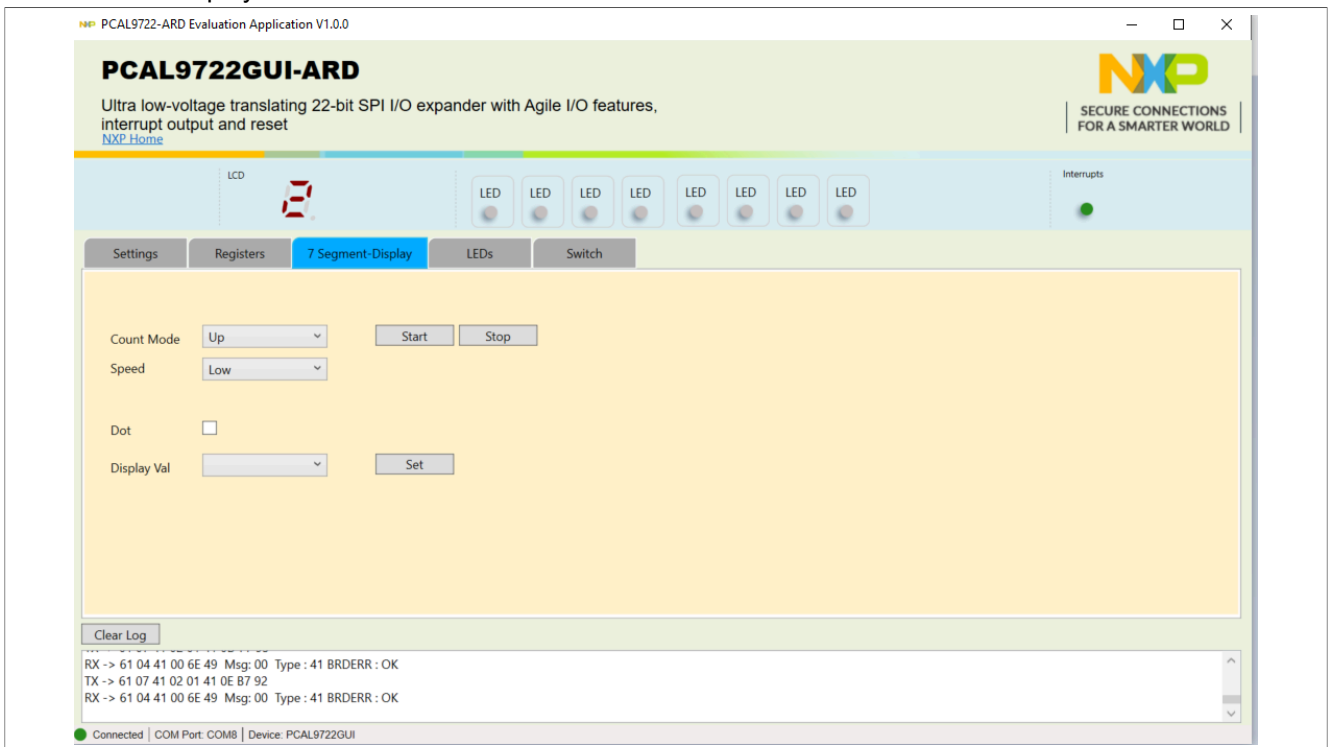
3. Use Setting tab to select SPI speed, and click on the "Init Board" button.
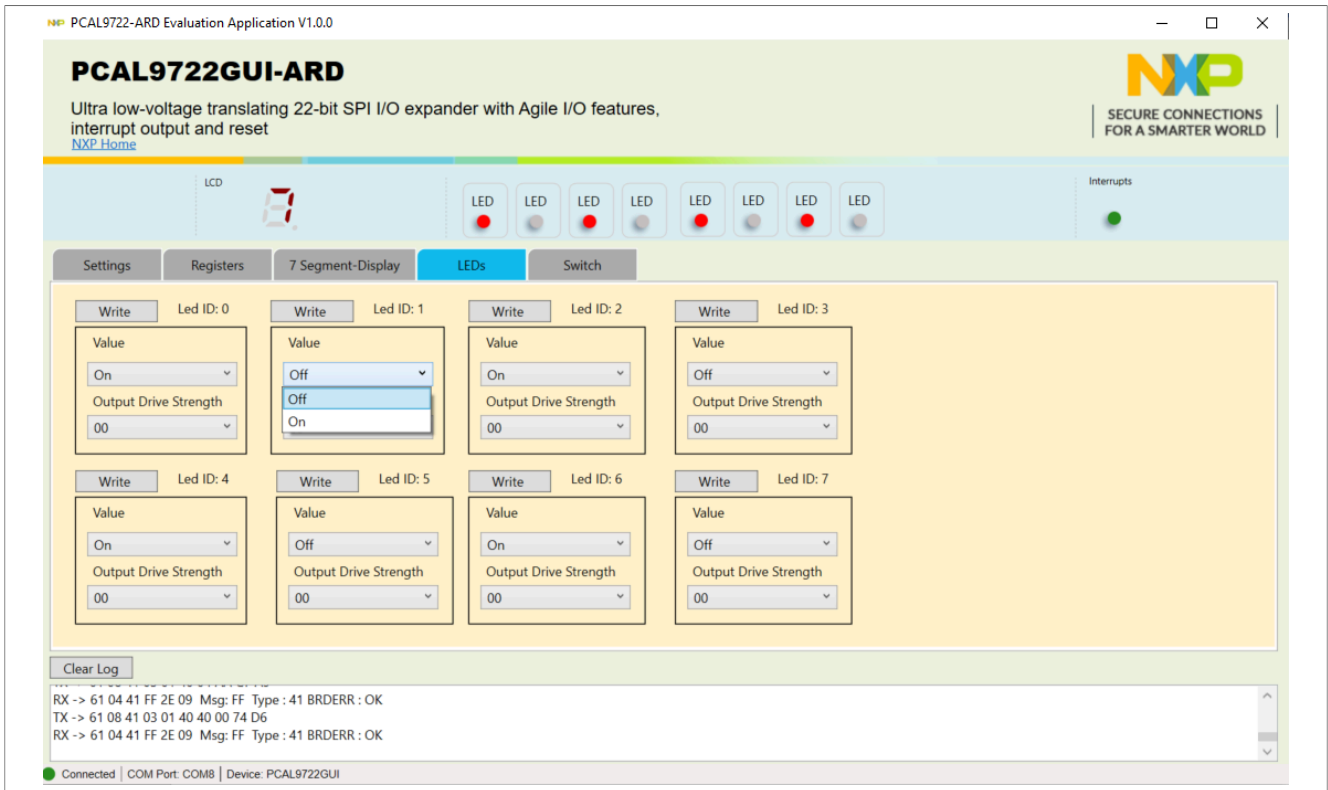

4. Use Register tab "Read Register button" to read out PCAL9722 internal register data and "Save to File" button to save data in a file.

5. Use 7 Segment Display tab to run number up/down on display automatically, or select fix number to be shown on display.

6. Use LED tab to set GPIO drive strength and turn on/off 8 LEDs.

7. Use Switch tab to set input port latch, polarity, pull-up/down settings, and read button to read in key switch statue.

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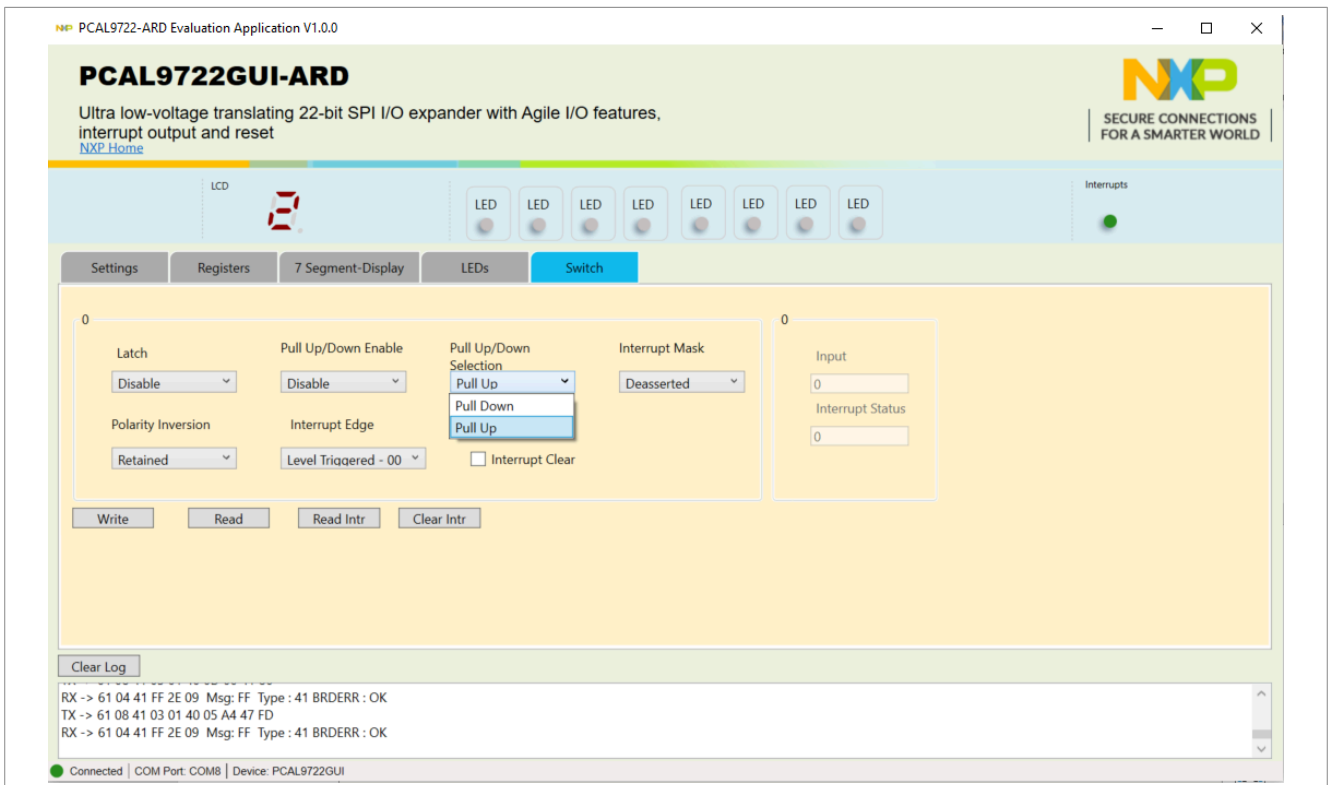
9 Abbreviations

Table 3. Abbreviations

Acronym	Description
ESD	Electro Static Discharge
GUI	Graphical User Interface
SPI-bus	Serial Peripheral Interface bus
IC	Integrated Circuit
LED	Light Emitting Diode
PC	Personal Computer
USB	Universal Serial Bus

10 References

1. *PCAL9722HN, Ultra low-voltage translating 22-bit SPI I/O expander with Agile I/O features, interrupt output and reset; NXP Semiconductors*

11 Revision history

Table 4. Revision history

Document ID	Release date	Description
UM12075 v.1.0	13 June 2024	• Initial version

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