

UM12158

PCA9958HN-ARD evaluation board

Rev. 1.0 — 16 September 2024

User manual

Document information

Information	Content
Keywords	SPI-bus, PCA9958HN, RGB and White LEDs, 24-channel x 8-bit PWMs
Abstract	The PCA9958HN-ARD evaluation board is easy to test and design for the PCA9958HN which is a 24-channel SPI 4-wire bus 63 mA/5.5 V constant current LED driver. The PCA9958HN-ARD uses LPC55S69-EVK MCU board to provide an easy to use evaluation platform.



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1 Introduction

The PCA9958HN evaluation board features LEDs for color mixing, blinking and dimming demonstrations. A graphical interface allows the user to easily explore the different functions of the driver. The board can be connected in series 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 PCA9958HN 24-channel SPI-bus 63 mA/5.5 V constant current LED driver
- Easy to use GUI based software demonstrates the capabilities of the PCA9958HN
- On-board white and RGB LEDs for variable experiments
- Convenient test points for easy scope measurements and signal access
- USB interface to the host PC
- Power supply from USB port (x2) or external power supply can be used to power PCA9958HN evaluation board

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 PCA9958HN-ARD evaluation board is at <http://www.nxp.com/PCA9958HN-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 PCA9958HN-ARD evaluation board, including the downloadable assets referenced in this document.

4 Getting ready

Working with the PCA9958HN-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 Assumptions

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

4.3 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.

4.4 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
- LPC55S69-EVK MCU board (from www.nxp.com)

4.5 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 PCA9958HN-ARD EV board and LPC55S69-EVK MCU board connection

PCA9958HN-ARD evaluation board is connected to the LPC55S69-EVK MCU board using four connectors (J5/J6/J35/J36 on PCA9958HN-ARD board and P16/P17/P19/P18 on LPC55S69-EVKboard) for SPI-bus and power supply.

The LPC55S69-EVKMCU board communicates with PCA9958HN demo GUI through PC USB port and uses SPI to communicate to PCA9958HN.

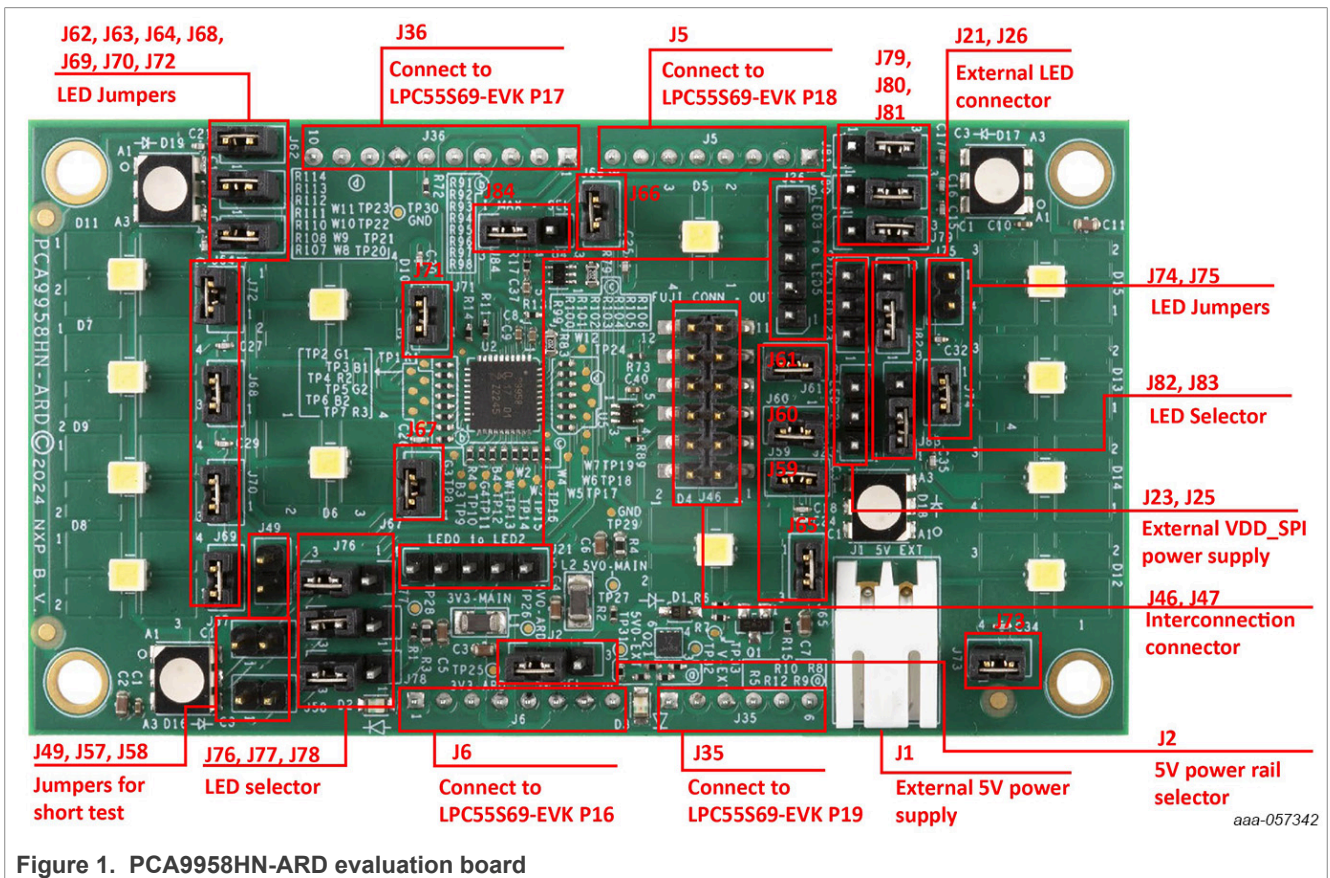
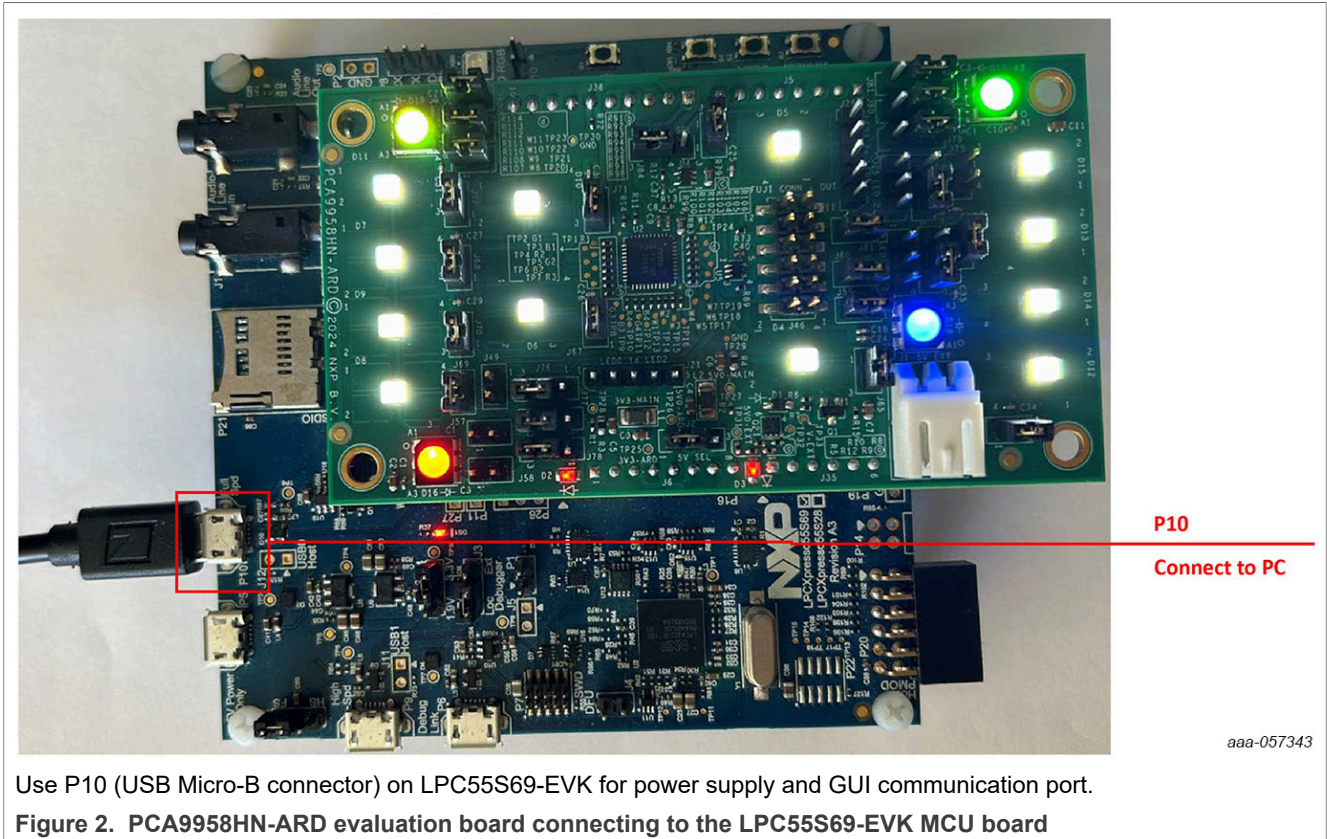


Figure 1. PCA9958HN-ARD evaluation board



6 Hardware description

- J5/J6/J35/J36 are connected to the LPC55S69-EVKMCU board for PCA9958HN-ARD power supply and SPI-bus interface.
- J1 selects external 5 V power supply.
- J2 selects 5 V power rail.
- J23, J25 selects external VDD_SPI power supply.

Table 1. PCA9958HN-ARD EV board main components

Device	Description	Location
PCA9958HN	24-channel SPI serial bus 63 mA/5.5 V constant current LED driver	U2
74LVC1G66GW	Bilateral switch	U4, U5
BC807-40	45 V, 500 mA PNP general-purpose transistor	Q1
PMPDB80XP	20 V, dual P-channel Trench MOSFET	Q2
Red LED	3.3 V power supply LED	D2
Red LED	5 V power supply LED	D3
White LED	User white LED	D4, D5, D6, D7, D8, D9, D10, D11, D12, D13, D14, D15
RGB LED	User RGB LED	D16, D17, D18, D19
Inductors	100 Ω	L1, L2

Table 2. Jumper settings

Jumper	Default setting	Comment
J5, J6, J35, J36		Arduino connector
J1		External 5V power supply pins
J2	1-2	5 V power rail selector
J21, J26		External LED connector for D16, D17
J23, J25		External VDD_SPI power supply pins
J46, J47		Interconnection connector
J49, J57, J58	Open	Jumpers for short test
J59, J60, J61, J62, J63, J64, J65, J66, J67, J68, J69, J70, J71, J72, J73, J74, J75	1-2	Jumpers for on-board LEDs connection
J76, J77, J78, J79, J80, J81, J82, J83, J84	2-3	On-board / external LED selector

7 Schematic

The schematic diagram of PCA9958HN-ARD is available at URL: <http://www.nxp.com/PCA9958HN-ARD>.

8 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

9 References

1. *PCA9958HN, 24-channel SPI serial bus 63 mA / 5.5 V constant current LED driver; Product data sheet; NXP Semiconductors*

10 Revision history

Table 4. Revision history

Document ID	Release date	Description
UM12158 v.1.0	16 September 2024	• Initial version

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