DEMO9S08LIN

User Guide

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CONTENTS

FIGURES

TABLES

REVISION

Date	Rev	Comments
February 24, 2007	A	Initial Release

CAUTIONARY NOTES

1) Electrostatic Discharge (ESD) prevention measures should be used when handling this product. ESD damage is not a warranty repair item.

2) Axiom Manufacturing does not assume any liability arising out of the application or use of any product or circuit described herein; neither does it convey any license under patent rights or the rights of others.

3) 3) EMC Information on the DEMO9S08LIN board:

   a) This product as shipped from the factory with associated power supplies and cables, has been verified to meet with requirements of CE and the FCC as a CLASS A product.

   b) This product is designed and intended for use as a development platform for hardware or software in an educational or professional laboratory.

   c) In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate prevention measures.

   d) Attaching additional wiring to this product or modifying the products operation from the factory default as shipped may effect its performance and cause interference with nearby electronic equipment. If such interference is detected, suitable mitigating measures should be taken.

TERMINOLOGY

This development module utilizes option select jumpers to configure default board operation. Terminology for application of the option jumpers is as follows:

Jumper – a plastic shunt that connects 2 terminals electrically

Jumper on, in, or installed = jumper is a plastic shunt that fits across 2 pins and the shunt is installed so that the 2 pins are connected with the shunt.

Jumper off, out, or idle = jumper or shunt is installed so that only 1 pin holds the shunt, no 2 pins are connected, or jumper is removed. It is recommended that the jumpers be placed idle by installing on 1 pin so they will not be lost.

Cut-Trace – a circuit trace connection between component pads. The circuit trace may be cut using a knife to break the default connection. To reconnect the circuit, simply install a suitably sized 0-ohm resistor or attach a wire across the pads.

Signal names followed by an asterisk (*) denote active-low signals.

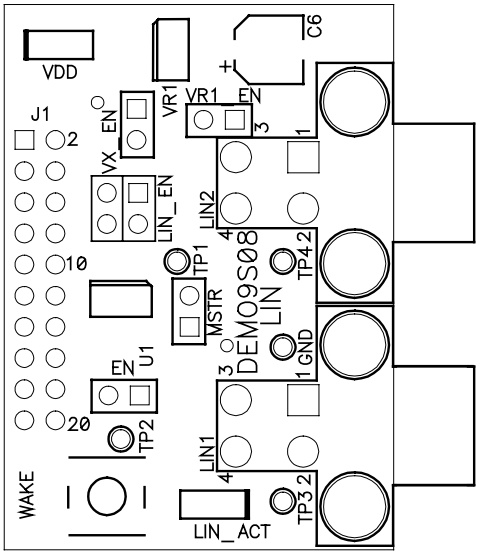
FEATURES

The DEMO9S08LIN board is a plug-in module designed to provide modular LIN connectivity. Although designed specifically for the DEMO9S08SH8 board, the DEMO9S08LIN module will function correctly with a variety of demonstration boards produced by Axiom Manufacturing. The only limiting factor is whether the target MCU support LIN communications.

The DEMO9S08LIN module may be powered from the host MCU board or may be configured to provide power to the host MCU board.

The DEMO9S08LIN board is not designed to function as a stand-alone module.

- LIN Physical Layer, 8-SOIC
  - Master / Slave configuration
  - 20K Baud
  - Low Slope Mode
  - Local or Remote Wake Up
  - TXD Dominant Time-out
  - Bus Terminal and Battery Pin Protection
  - Thermally Protected
- Configurable for Master or Slave Operation
- 2 ea. 4-pin Molex LIN connectors
- On-board +5V regulator
- +5V LED Indicator
- Power
  - Power from LIN Bus
  - Power from Host MCU board
  - Can provide power to Host MCU board
- Wake-up Push-button switch
- Option Headers
  - Power Input / Output Enable
  - LIN Signal Enable
  - PHY Enable
  - Master Mode Selection
- 2 x 10 Pin Header Interface to Host MCU board



Specifications:
Board Size 1.25 x 1.75”

Power Input: +12V to +20V on LIN connectors
+5V on Signal Interface Connector

REFERENCES

Reference documents are provided on the support CD in Acrobat Reader format.

DEMO9S08LIN_UG.pdf	DEMO9S08LIN User Guide (this document)
DEMO9S08LIN_QSG.pdf	DEMO9S08LIN Quick Start Guide
DEMO9S08LIN _SCH_A.pdf	DEMO9S08LIN Schematic Rev. A
DEMO9S08LIN_Silk_A.pdf	DEMO9S08LIN Top Silk, Rev A

GETTING STARTED

To get started quickly, please refer to the DEMO9S08LIN Quick Start Guide. This quick start will illustrate how to connect the board to a host DEMO9S08SH8 board. Refer to the DEMO9S08HS98 Quick Start Guide for details on configuration and use of the DEMO9S08SH8 board.

HARDWARE DESCRIPTION

LIN Transceiver

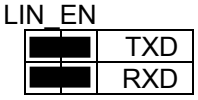
The DEMO9S08LIN board provides the user with modular LIN physical layer transceiver capabilities. This board is not designed to function as a stand-alone module. This board is designed specifically for use with the DEMO9S08SH8 demonstration board but may also be used with any of a line of demonstration boards produced by Axiom Manufacturing.

The DEMO9S08LIN board provides the interface between the LIN protocol controller located on the HOST MCU board and the LIN physical bus. The physical layer (PHY) transceiver supports communications between 2.4K and 20K baud. The PHY provides slew-rate control, low EME and high EMI.

LIN_EN

The LIN_EN option header connects the TXD and RXD signals on the LIN PHY to the SCI signals on the host MCU board. Removing the LIN_EN isolates the LIN PHY allowing the SCI signals on the host MCU board to be used for other purposes if necessary. The open-collector output RX is pulled up to prevent excessive current drain if the LIN_EN option jumpers are removed.

Figure 1: LIN_EN Option Header

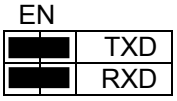


Connects host SCI TX output to LIN PHY TXD input
Connects host SCI RX input to LIN PHY RXD output

Transceiver Enable

The transceiver ENABLE input is routed to the signal interface connector J1 through an option jumper EN. The transceiver ENABLE input is biased such that if the option jumper is not installed, the PHY is enabled. This allows the host MCU processor to enable or disable the PHY under software control.

Figure 2: EN Option Header



Connects host SCI TX output to LIN PHY TXD input
Connects host SCI RX input to LIN PHY RXD output

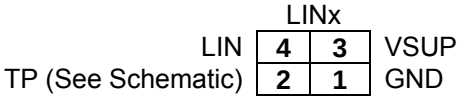
Local Wake-Up

The DEMO9S08LIN board provides a local WAKE pushbutton to allow the user force the LIN PHY out of sleep mode if necessary. Pressing the WAKE pushbutton applies a negative edge to the LIN PHY.

LIN Connectors

Two 4-pin Molex connectors provide connection points for the LIN bus to the DEMO9S08LIN board. The figure below shows the connector pin-out looking into the connector.

Figure 3: LIN Connectors



NOTE: Mating connectors consist of: 1 housing, Molex pn 39-01-2040 and 4 pins, Molex pn 39-00-0038

POWER

The DEMO9S08LIN is designed to be powered from the LIN bus. An on-board LDO allows the module to power the HOST MCU board if desired. The VR1_EN and VX_EN option jumpers configure power on the DEMO9S08LIN board.

Regulator

An on-board +5V LDO regulator energizes the upper voltage rail. This allows the DEMO9S08LIN board to power the DEMO9S08SH8 (host MCU board). The regulator takes voltage from the LIN bus and provides +5V out.

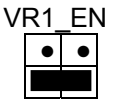
A green LED indicator lights when the VDD voltage rail is energized. A protection diode prevents the LDO from reverse powering the LIN bus.

CAUTION: LIN bus voltage **must** be limited to +20V; otherwise, damage to the LDO will result.

VR1_EN

The VR1_EN option header connects the on-board LDO to the LIN bus voltage rail.

Figure 4: VR1_EN Option Header

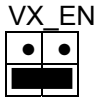


Disconnect LIN bus input voltage to LDO
Connect LIN bus input voltage to LDO

VX_EN

The VX_EN option jumper connects the LDO output to the signal interface connector at J1. This allows the DEMO9S08LIN board to power the host MCU board.

Figure 5: VX_EN Option Header



Disconnect LIN bus input voltage to LDO
Connect LIN bus input voltage to LDO

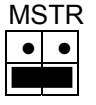
Activity Indicator

A green LIN activity indicator LED has been provided to show activity on the LIN bus. A delay element has been added to slow LIN transitions to a rate the LED can display. When the LED is ON, data is present on the LIN bus. When OFF, the LIN bus is idle.

Master Mode

A MSTR option jumper is provide to configure the LIN PHY in master mode. Installing the jumper indicates master mode to downstream devices.

Figure 6: MSTR Option Header



PHY Configured for Slave LIN mode
PHY Configured for Master LIN mode

Signal Interface

A 2x10 pin header provide the signal interface connector between the DEMO9S08LIN board and the DEMO9S08SH8 board. The table below shows the connector pin-out.

Table 1: Connector J1

	J1	
VX	**1**	**2**
GND	**3**	**4**
TXD	**5**	**6**
RXD	**7**	**8**
	9	**10**
	11	**12**
	13	**14**
	15	**16**
	17	**18**
EN	**19**	**20**

NOTE: Signal positions not shown are No Connects.