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AVR32901: EVKLCD100/EVKLCD101 Hardware User's Guide

Features

- QVGA (EVKLCD100) or VGA (EVKLCD101) 5.7" LCD panel
- AC97 codec with touch controller
- Mono microphone input
- Resistive touch panel
- Stereo audio output

1 Introduction

This application note describes how the EVKLCD100 and EVKLCD101 evaluation kits should be assembled with the NGW100 reference design. The EVKLCD100 and EVKLCD101 kits might also be used with other designs as long as these designs provide the same headers as found on NGW100 expansion headers.

This assembly requires some hardware from the user:

- One soldering iron delivering roughly 25 watt with a fine tip.
- Solder with suitable thickness for the header pins.
- Optional solder wick for removing excess solder.

Figure 1-1. EVKLCD100 QVGA and AC97 evaluation kit

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Application Note
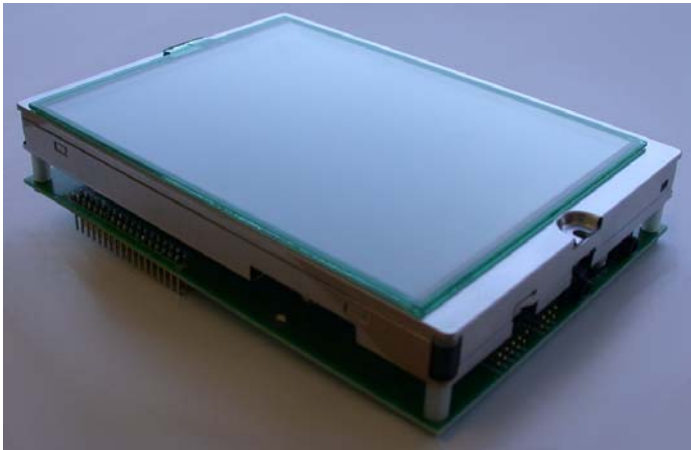
2 Hardware overview

2.1 EVKLCD100 and EVKLCD101 evaluation kits

The EVKLCD100 and EVKLCD101 evaluation kits, hereby known as EVKLCD10X kits, consist of a LCD mounted to a PCB. The headers on the PCB match the expansion headers on the NGW100, which makes assembling them easy. See Figure 2-1 for a picture of the EVKLCD100 kit.

Figure 2-1. EVKLCD100 evaluation kit

2.1.1 AC97 codec specifications

The AC97 codec on the EVKLCD10X kits is from Wolfson® Microelectronics, model number WM9712. Users wanting more information about the AC97 codec should visit the web page http://www.wolfsonmicro.com/products/WM9712.

2.1.2 LCD panel specifications

Technical specifications for the Kyocera® LCD panels used in the EVKLCD10X kits are available from the web page http://americas.kyocera.com/kicc/lcd/specs.html. The model numbers for the two kits are as follows:

* *TCG057QVLAD-G00* for EVKLCD100.
* *TCG057VGLAD-G00* for EVKLCD101.

2.1.3 Audio and touch panel connectors

On the right hand side of the EVKLCD10X kits there are a collection of two header connectors and two audio jacks. See Figure 2-2 and description in Table 2-1.

More detailed description about the audio outputs connector is in Table 2-2 and the detailed description of the touch panel connector are in Table 2-3.

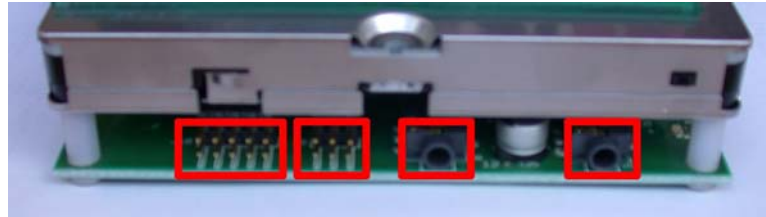**Figure 2-2.** Audio and touch panel connectors

Table 2-1. Audio and touch panel connectors from left to right

Audio outputs	Touch panel	Stereo headphones 3.5" jack	Mono microphone 3.5" jack

Table 2-2. Audio output connector layout

Ground	OUTPUT_L	Ground	Ground	OUTPUT_R
VCC_3V3	HEADPHONE_L	Ground	Ground	HEADPHONE_R

Table 2-3. Touch panel connector layout

Ground	TOUCH-XP	TOUCH-YP
VCC_3V3	TOUCH-XN	TOUCH-YN

2.1.4 TWI/SPI/UART extension connector

On the left hand side of the EVKLCD10X kits there are one TWI/SPI/UART header connector. See Figure 2-3 and description in Table 2-4.

**Figure 2-3.** TWI/SPI/UART connector

Table 2-4. TWI/SPI/UART connector layout

Ground	SPI_0_MISO	SPI_0_CS2	USART2_RXD	TWI_SDA
VCC_3V3	SPI_0_SCK	SPI_0_MOSI	USART2_TXD	TWI_SCL

2.2 NGW100 reference design

The reference design NGW100 is used as a base for the EVKLCD10X kits. Although, other kits with similar expansion headers should also work fine with EVKLCD10X kits. See Figure 2-4 for a picture of the NGW100 network gateway kit.

Figure 2-4. NGW100 reference design
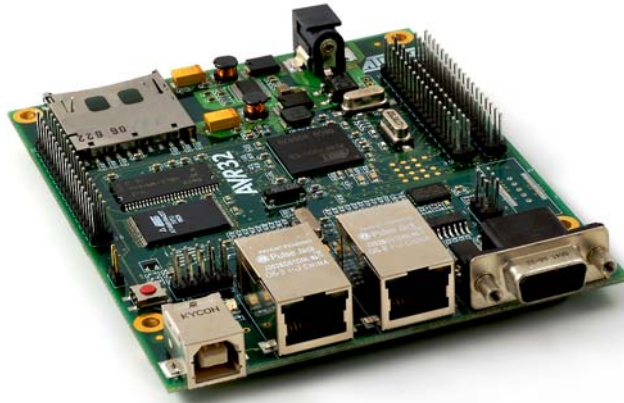
3 Hardware assembly

3.1 Requirements

The following items are necessary to assemble an EVKLCD10X kit to the NGW100, or a board with similar expansion headers.

- Three stack through headers (included in EVKLCD10X kits).
- One soldering iron delivering roughly 25 watt with a fine tip.
- Solder with suitable thickness for the headers.
- Optional solder wick for removing excess solder.

3.2 Soldering stack through headers on NGW100

The stack through headers must be mounted through the bottom side of the PCB, see Figure 3-1. Make sure the header pins go all the way through the PCB. There should be no space between the bottom side of the NGW100 PCB and the plastic insulator of the headers.

Figure 3-1. NGW100 with stack through headers inserted

After inserting the stack through headers into NGW100 they must be soldered to the PCB. This is done by applying heat with the solder iron to the via and header pin and applying solder, see Figure 3-2. The solder should sink into the via to make a firm connection between the via and the header pin, see Figure 3-3 for an example solder.

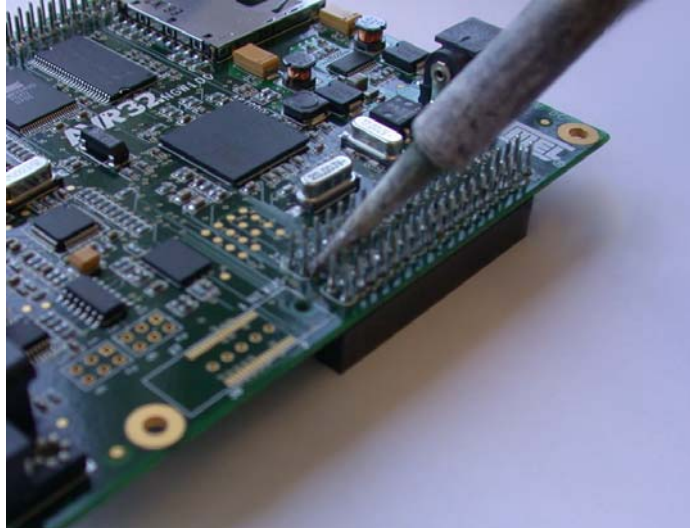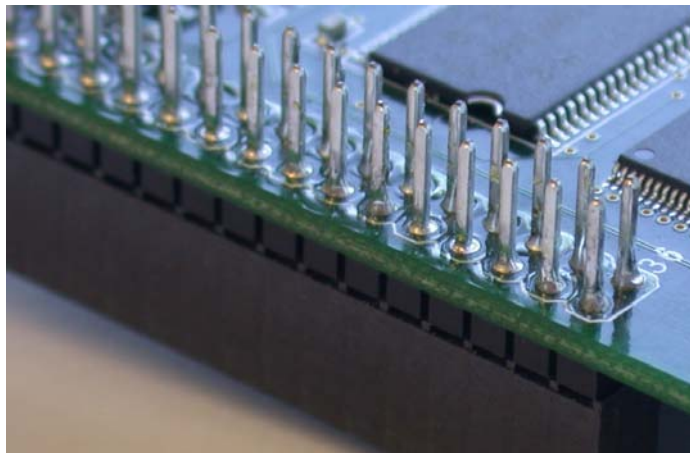**Figure 3-2.** Soldering stack through headers to the NGW100

**Figure 3-3.** Example solder of a header pin to via on NGW100 PCB

After all the pins on each header are properly soldered, the NGW100 is ready for use with the EVKLCD10X kit.

3.3 Connecting NGW100 board to EVKLCD100/EVKLCD101

To connect the EVKLCD10X kit to the NGW100, align the expansion headers as shown in Figure 3-4. The EVKLCD10X kit is mounted on the back side of the NGW100.

Apply an even force close to the expansion headers; make sure not to bend the PCB. See Figure 3-4 for how this could be done. The headers are properly inserted when the pins stops sliding into the header connector and the plastic isolators are in touch.

Figure 3-4. Headers aligned and applying firm pressure
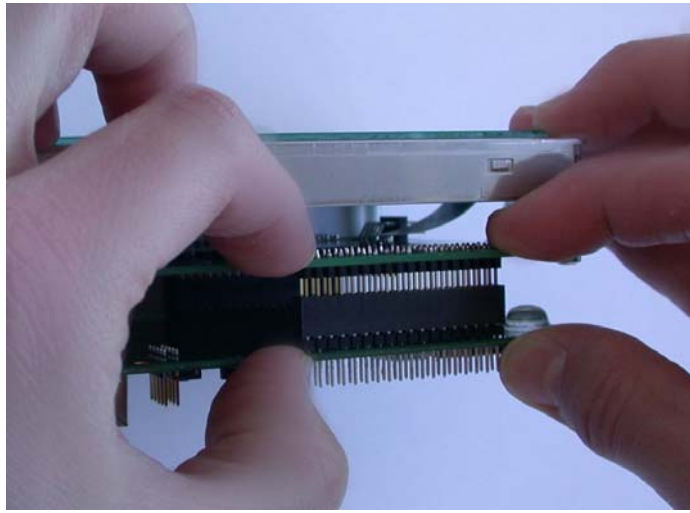
After the EVKLCD10X kit and NGW100 are properly assembled, they will look something similar to Figure 3-5.

Figure 3-5. Assembled EVKLCD100 connected to a NGW100

3.4 Powering up the NGW100 with EVKLCD100/EVKLCD101

When the EVKLCD10X kit is correctly assembled with the NGW100 the user can apply power to the NGW100 board to verify that the boards power up correctly.

There is a green LED on the EVKLCD10X kit which will light up when power is applied, see Figure 3-6. If this green LED is not lighting up, the user must remove power and check the following:

- Soldering of the NGW100 expansion headers, no short circuits.
- Alignment of the expansion headers.
- Expansion headers are inserted fully into each other.
- Power supplied to the NGW100.
- NGW100 works as intended without EVKLCD10X kit connected.

Figure 3-6. Green power LED on EVKLCD100 and EVKLCD101 kits

4 Firmware for EVKLCD100 and EVKLCD101

The EVKLCD10X kits do not need any firmware by itself; everything is controlled by the NGW100. Users will need to program the firmware in the flash on the NGW100 to take advantage of the LCD panel.

4.1 Linux users

For Linux® users it is recommended to start with *Buildroot for AVR®32*. More information about this software package can be found at http://www.atmel.com/dyn/products/tools_card.asp?tool_id=4401.

The application note *AVR32003: AVR32 AP7 Linux Buildroot* describes how to start using *Buildroot for AVR32*. Section 3 in this application note lists the different board targets, and to configure *Buildroot for AVR32* for the EVKLCD10X kits, the user should use one of the following commands:

- *make evklcd100_defconfig* for NGW100 + EVKLCD100 evaluation kit.
- *make evklcd101_defconfig* for NGW100 + EVKLCD101 evaluation kit.

After configuring *Buildroot for AVR32* the user should continue as described in the application note.

4.2 Standalone users

Standalone users can get an introduction to using the LCD controller by reading application note *AVR32114: Using the AVR32 LCD Controller* available at http://www.atmel.com/dyn/products/app_notes.asp?family_id=682.

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