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# **ISD-DEMO15100/15C00/3900**

## **User Manual**



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## Overview

This manual is for ISD-DEMO15100/15C00/3900 Rev\_A.



**Figure 1 – Top view of ISD-DEMO15100/15C00/3900 Rev-A board**

Please note that ISD15100, ISD15C00 and ISD3900 series devices basically are the same device except that ISD15C00 and ISD3900 use external flash but ISD15100 has internal flash; and ISD15C00 is automotive certified while ISD15100 and ISD3900 are not.

Because of this similarity, the same PCB board is used for ISD-DEMO15100, ISD-DEMO15C00 and ISD-DEMO3900 boards. Depends on the different parts populated, board names differentiate. Also because of this similarity, this manual applies for all demo boards, including ISD-DEMO15100, ISD-DEMO15C00 and ISD-DEMO3900.

The board shown above has part ISD15102 populated as U2, so it is an ISD-DEMO15100 board. For ISD-DEMO15C00 or ISD-DEMO3900 board, a flash memory must be populated at U1 position, and U2 part should be ISD15C00 or ISD3900 respectively.



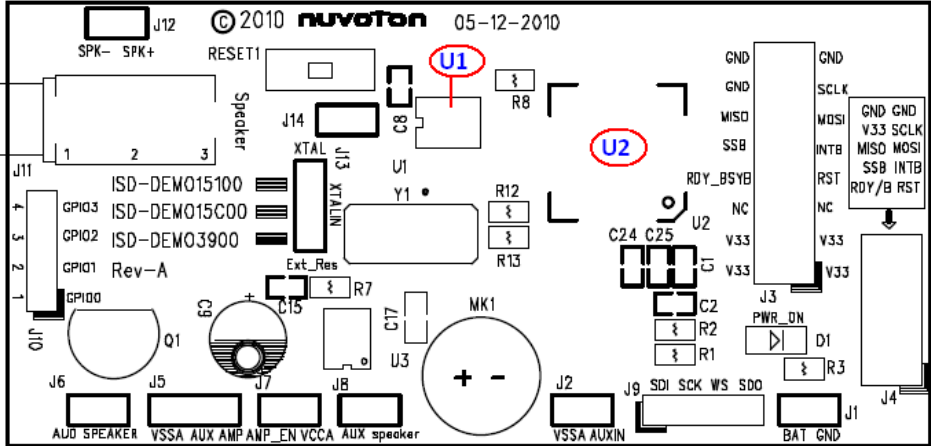


Figure 2 – Top side layout view of the ISD-DEMO15100/15C00/3900 Rev-A board

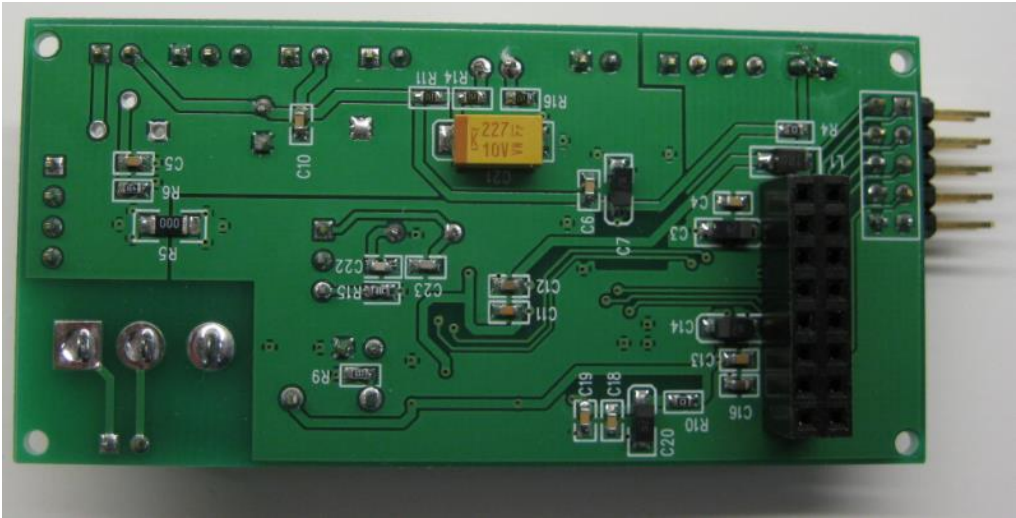


Figure 3 – Bottom view of ISD-DEMO15100 Rev-A board

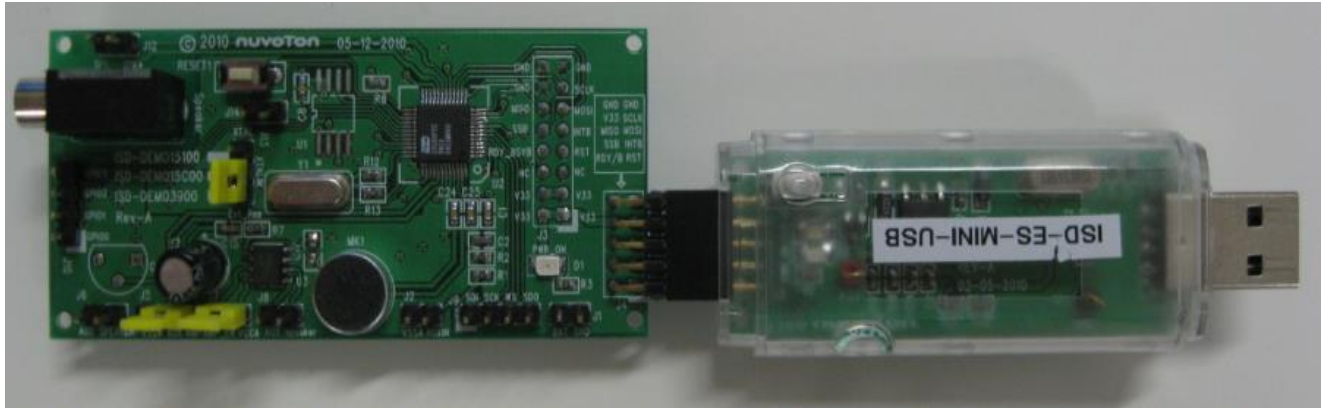


Figure 4 – ISD\_DEMO15100 connected with ISD-ES\_MINI\_USB (dongle) board

## Introduction

ISD\_DEMO15100/15C00/3900 is to be used with ISD-ES\_MINI\_USB dongle. The complete evaluation kit for ISD-DEMO15100 consists of the following:

- Hardware
  - o ISD\_DEMO15100 board  
(Or ISD-DEMO15C00 board for ISD15C00 demo kit)  
(Or ISD-DEMO3900 board for ISD3900 demo kit)
  - o ISD-ES\_USB\_MINI board
- Software
  - o ISD-VPE15100 can be downloaded from website:  
<http://www.nuvoton-usa.com/ISD15100/vpe>. ISD15100, ISD15C00 and ISD3900 share the same GUI software suite ISD-VPE15100 as their common evaluation software.

User needs to fill out and submit the form on the website to request the username and password. Unfortunately, this registration process is not fully automatic yet when this manual is created. Instead, Nuvoton staff will generate the username and password based on the information received, and send them to user via email.

## System Requirements

- PC running Windows Vista, XP, NT, or 2000.
- Support for Windows 7 will be available soon.

**Figure 5** below shows a complete evaluation environment for ISD15100 series devices. The ISD USB dongle provides the communication link between ISD-DEMO15100 board and host PC. All the operations are initiated from VPE, a GUI application which runs on Windows PC.



Figure 5 – A complete evaluation environment for ISD15100 device





# Board Configuration

## Board Layout

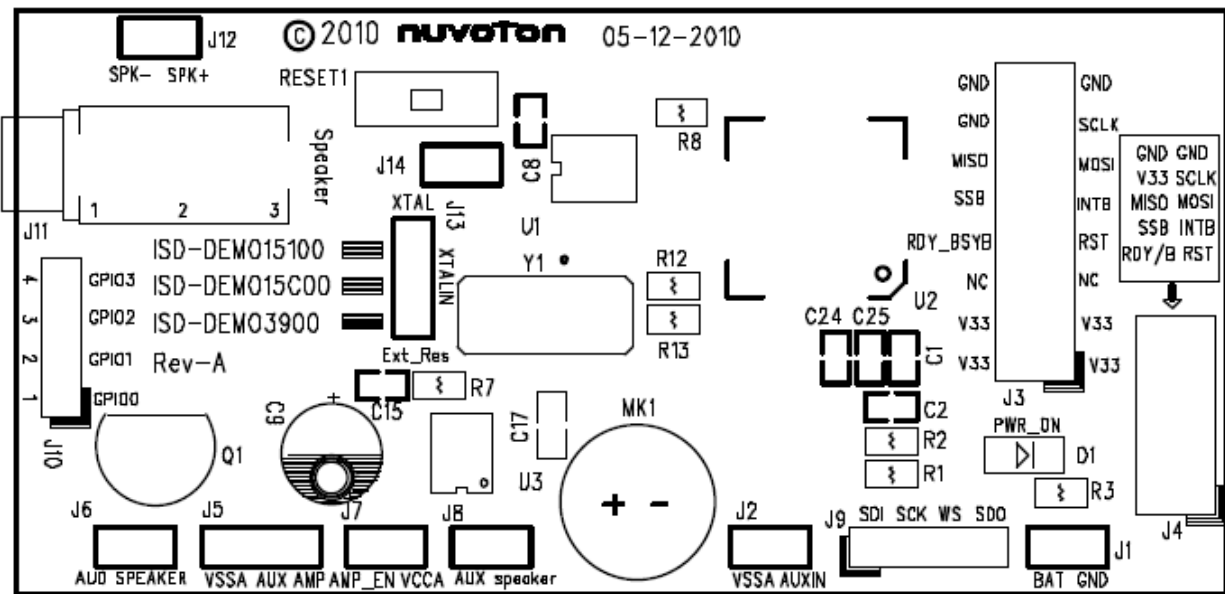


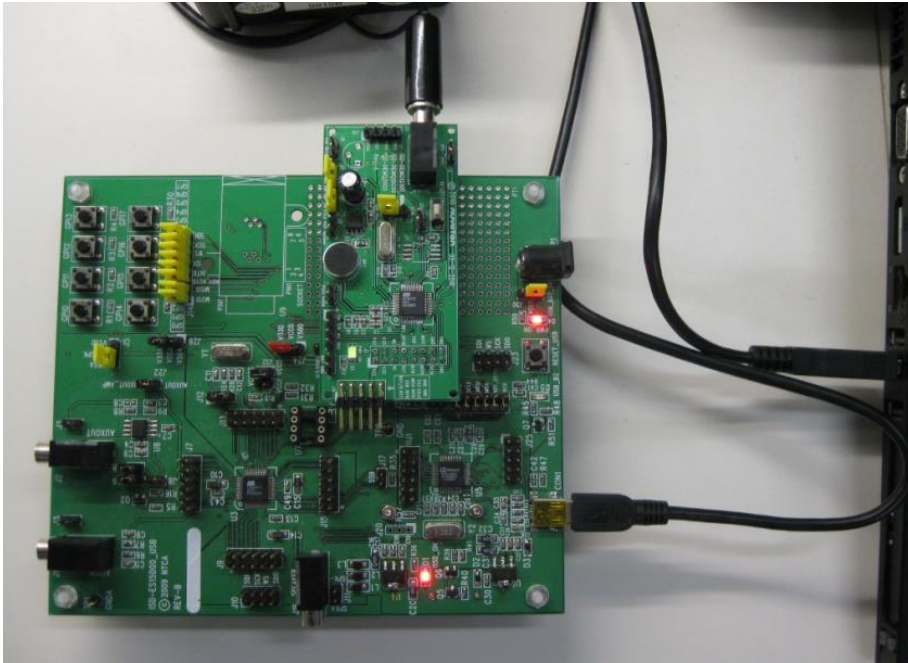
Figure 6 – top View of silk label for ISD-DEMO15100 board

## Jumper settings

J1: Battery power connector.

J2: AUXIN vs. VSSA → user can use J2 to feed AUXIN input to ISD15100 from here.

J3: 2x8 connection header for connecting with ISD-ES15D00\_USB board or ISD-ES15100\_USB mother board, shown in **Figure 7**.



**Figure 7 – ISD-DEMO15100 is connected onto ISD-ES15D00\_USB mother board**

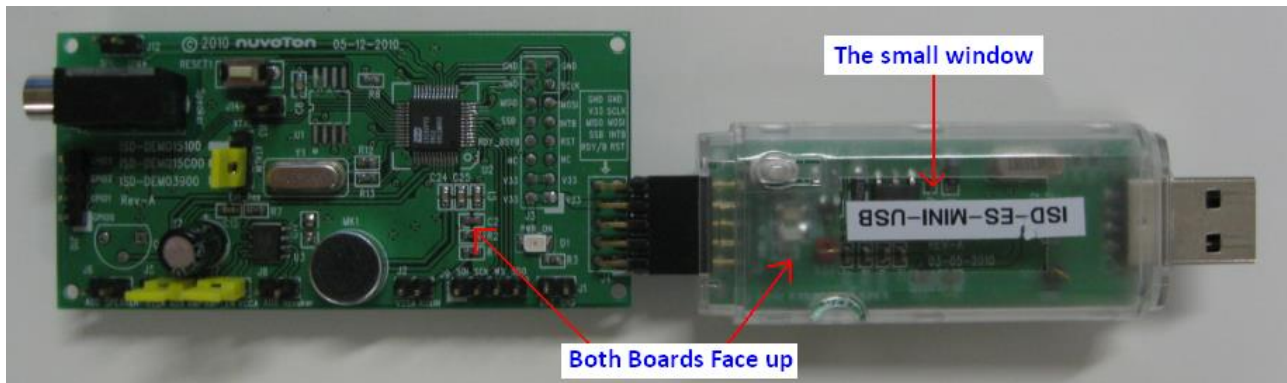
So users have two options to use the ISD-DEMO15100 board:

- ISD-DEMO15100 + the big ISD15XXX evaluation board, shown in **Figure 7**.
- ISD-DEMO15100 + Mini USB board, shown in **Figure 8**.

Both combinations can achieve roughly the same functionalities. Combination shown in **Figure 8** is more recommended because of the much lower cost.

J4: 2x5 header for connecting ISD-ES\_MINI\_USB dongle. Please note: two boards must connect each other with both top side up. For USB dongle board, it has a small window at its top side.

Please note: It could cause hardware damage if the two boards are not connected correctly.



**Figure 8 – connect ISD15D00 demo board with the USB dongle.**

## J5: Aux Output

- Installing jumper at right position will connect AUX and AMP → feed AUX output from ISD15100 to onboard audio amplifier ISD8101
- User should not install jumper at left position, which will connect AUX and VSSA together. The Left two pins of J1 are for the purpose of further evaluation. User can use these two pins as input to feed his/her own amplifier.

J6: AUD speaker. This is the output of the on-board AUD amplifier. User can connect an 8 Ohm speaker from this header to evaluate the AUD output of ISD15100.

J7: Install Jumper at J7 will connect AMP\_EN with VCCA, thus enable the on board audio amplifier ISD8101. To disable ISD8101, remove the J7 jumper.

J8: 2-pin connector for speaker. This is the output from audio amplifier ISD8101.

J9: 4-pin header for ISD15100 I2S output.

J10: 4-pin GPIO expand header for ISD15100.

J11: speaker jack for ISD15100 PWM output.

J12: 2-pin speaker header for ISD15100 PWM output.

J13: Clock source selection.

- Install a jumper at top position to connect the top two pins → ISD15100 device clock can be from internal oscillator with external resistor.



- Install a jumper at bottom position to connect the bottom two pins → ISD15100 device clock can be from external crystal.

Please note: the silk label on board for J14 XTAL “XTALIN” and “Ext\_Res” should switch the position on Rev-A board. Please bear this mind to avoid confusion.

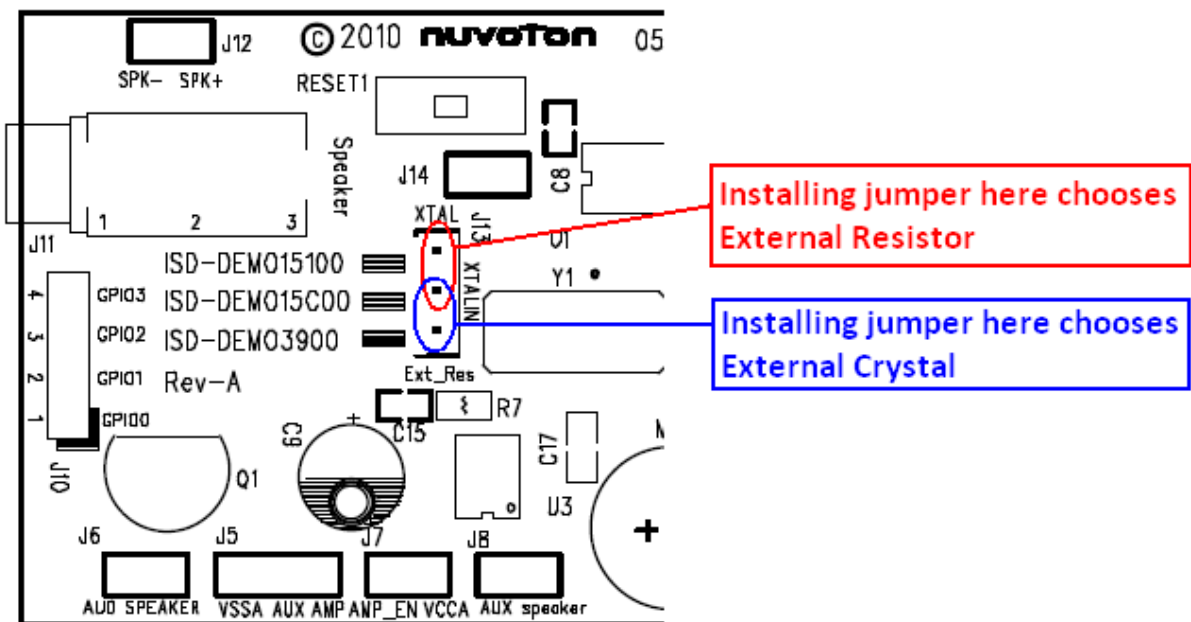


Figure 9 – Clock source selection

J14: for the purpose of unlocking device; please refer to the appendix for the usage of this jumper.

## Operations under VPE

- Connect a ISD15100 demo board to USB dongle
- Plug in USB dongle into a PC USB port
- Launch ISD-VPE15100.



These operations do not have to follow a special order. USB dongle is hot pluggable, and so is the demo board. However, during digital programming, demo board needs to be connected otherwise the integrity of flash image cannot be guaranteed.

User can refer VPE user manual for the operation guide. VPE user manual can be found in VPE installation folder; i.e. usually it is under: C:\program files\ISD-VPE15100.

## Appendix – Recover the locked device

Due to the nature of ISD15100 series device, sometimes the device may get itself locked. The symptom of lockup is that device stops to respond. For example, under VPE GUI, after power on device status cannot be read, i.e. the device is always Power Down. On customer's target board, device can no longer be powered up and it also stays at Power Down mode. In short, device appears to be "dead".

Often device Lock up is caused by "bad" memory content. Here are some examples in which device will get locked.

- In POI VM there is a command to set device to the external crystal as the clock source, but hardware wise there is no external crystal soldered, then this device will lock up after power on.
- In POI VM if user chooses to loop play a sound effect forever, then this device will fall to respond to outside after power on;
- Due to any unpredictable reason – such as a glitch during flash programming, the device memory content is not intact and it causes device Power On or Power Up failure.

For these lockups caused by "bad" flash image, there is a way to recover the device without hardware fix.

### Steps to unlock ISD-DEMO15100 board

- Without powering the board, pull down the ISD15100 pin 28 to ground, i.e. install jumper J14.
- Power the board – connect USB cable,
- Launch ISD-VPE15100, send power-up command and wait till power-up finishes.
- Leave the ISD15100 pin 28 floating, i.e. remove jumper J14.
- Chip-erase the ISD151xx.

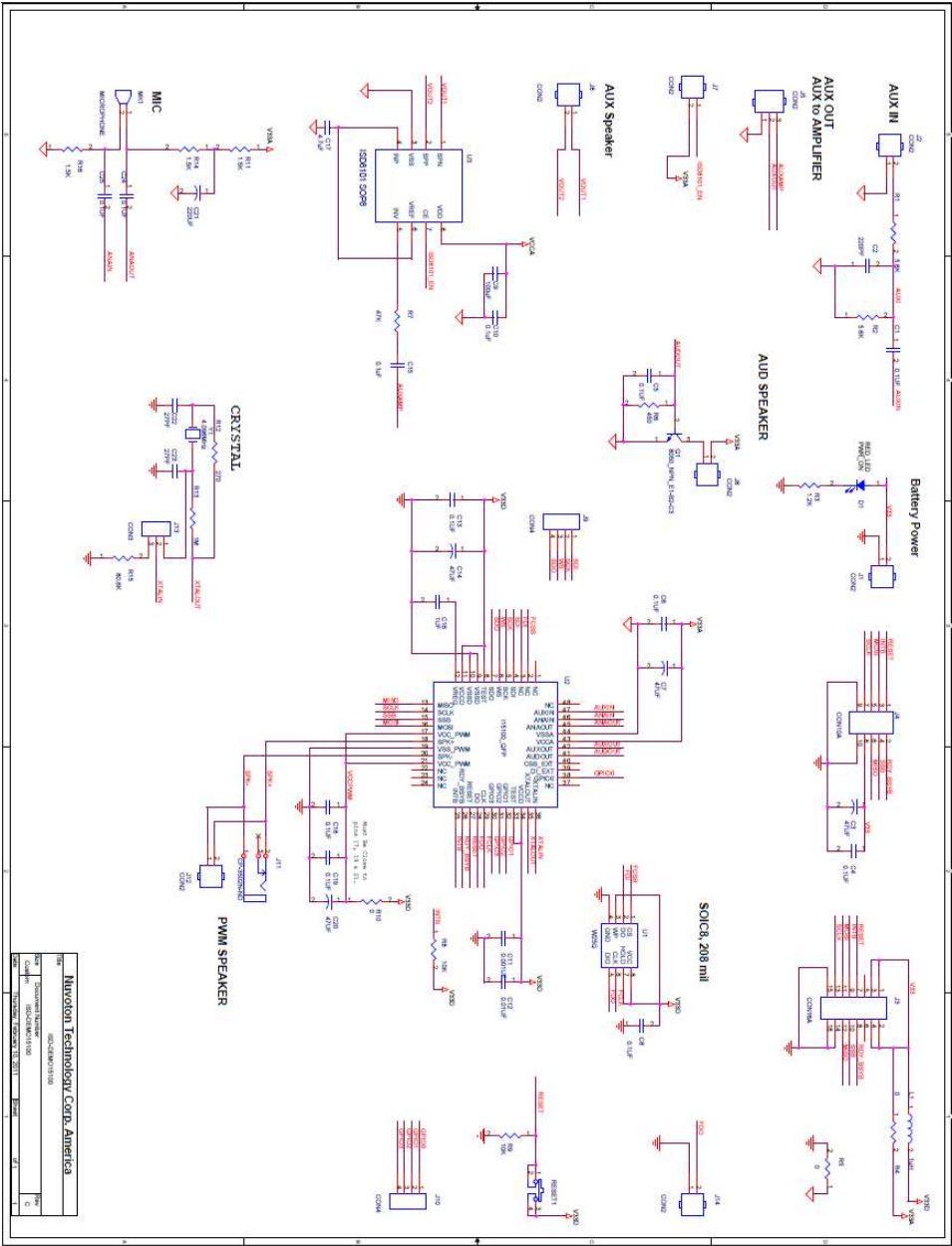




The mechanism behind this recovery sequence is that do NOT let the flash memory participate the device power on and power up initialization; and after device powered up, put flash back under control and erase the “bad” content.



# Board Schematic



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Issue Date	2016/04/08
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