ISD1900-1600 Evaluation System

User's Manual

1. Description

ISD1900-1600 evaluation system is a GUI-based Windows application system. It consists of one *ISD-ES1900_USB_PROG* board and a GUI software *ISD-VPE1900-1600*.

The system can be used for evaluating and programming ISD1900 series SOIC-28 pin device or ISD1600 series SOIC-16 pin devices. At a time only one ISD1900 or one ISD1600 device shall be installed into the socket for evaluating/programming.

The system works under two working modes: standalone mode or USB mode.

- Standalone mode: for ISD1900 only, and it is DIRECT mode only for ISD1900. After plug in USB, user can use push buttons to record from MIC and play to PWM speaker or AUX speaker.

- USB mode: for ISD1900 and ISD1600. User can launch GUI software *ISD-VPE1900-1600* to evaluate/program the device.

The complete toolkit contains the following:

- GUI software *ISD-VPE1900-1600.* It is downloadable from Nuvoton website http://www.nuvoton.com, or send request to ChipCorder@nuvoton.com.
- A USB evaluation board (ISD-ES1900_USB_PROG).
- A mini-USB cable.
- An 8-ohm speaker.
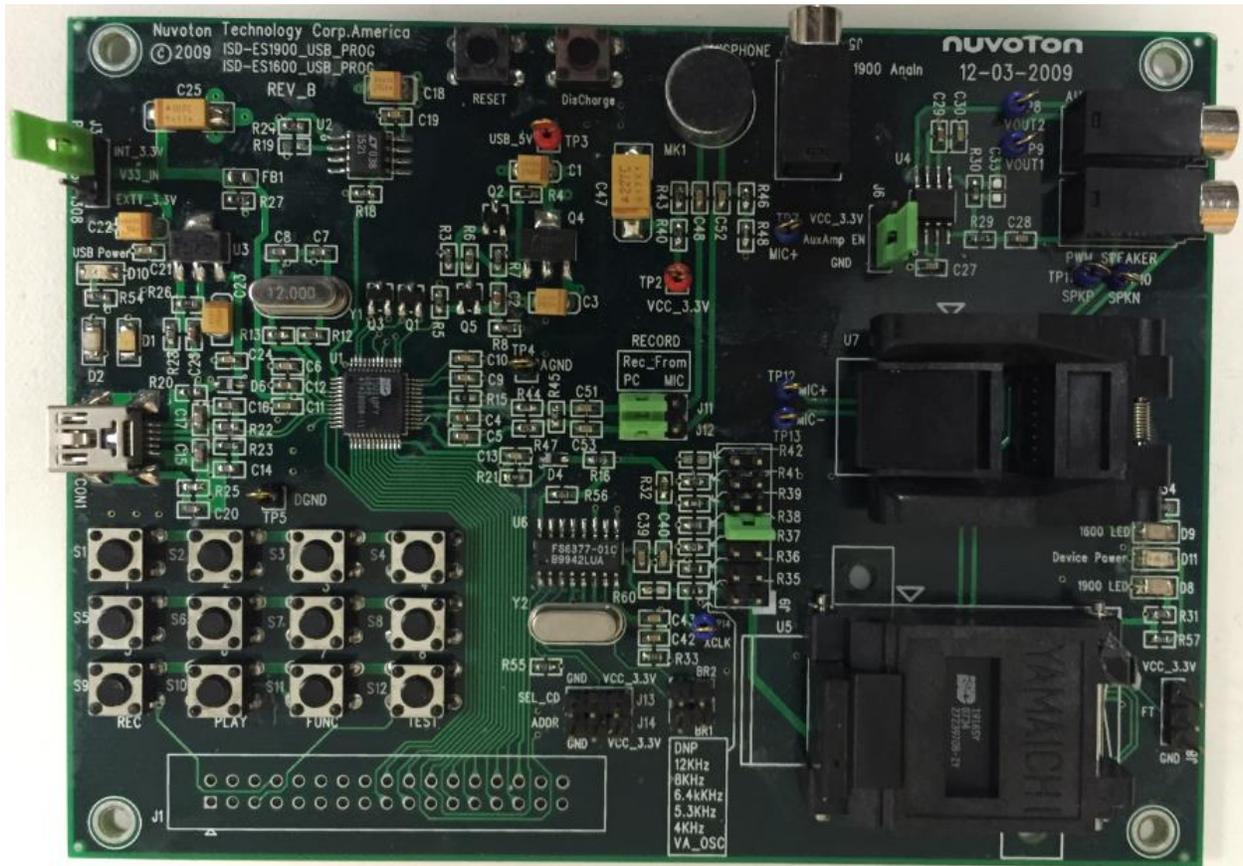
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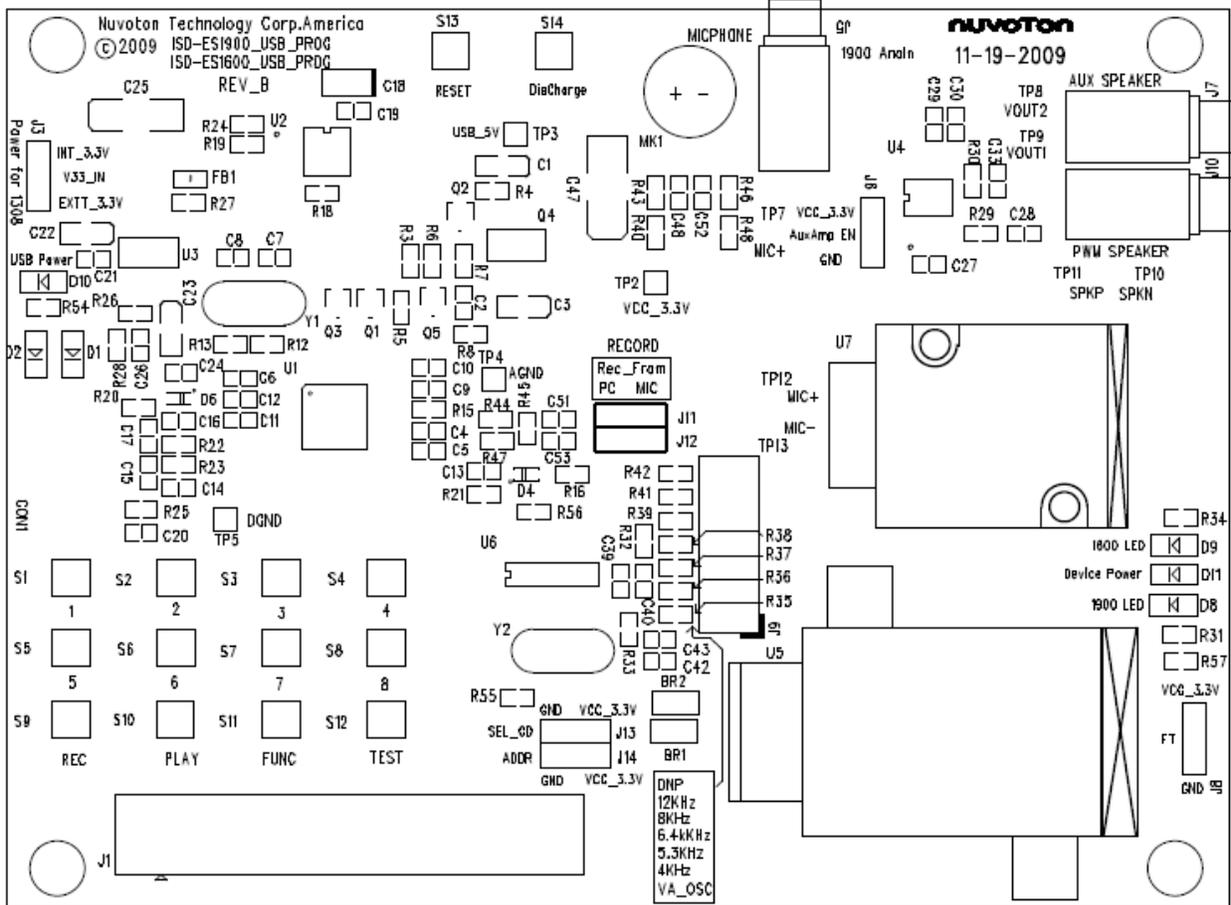# 2. Board Overview

Figure 2-1 ISD-ES1900_USB_PROG Rev-B

Figure 2-2 ISD-ES1900_USB_PROG Rev-B Silk Label
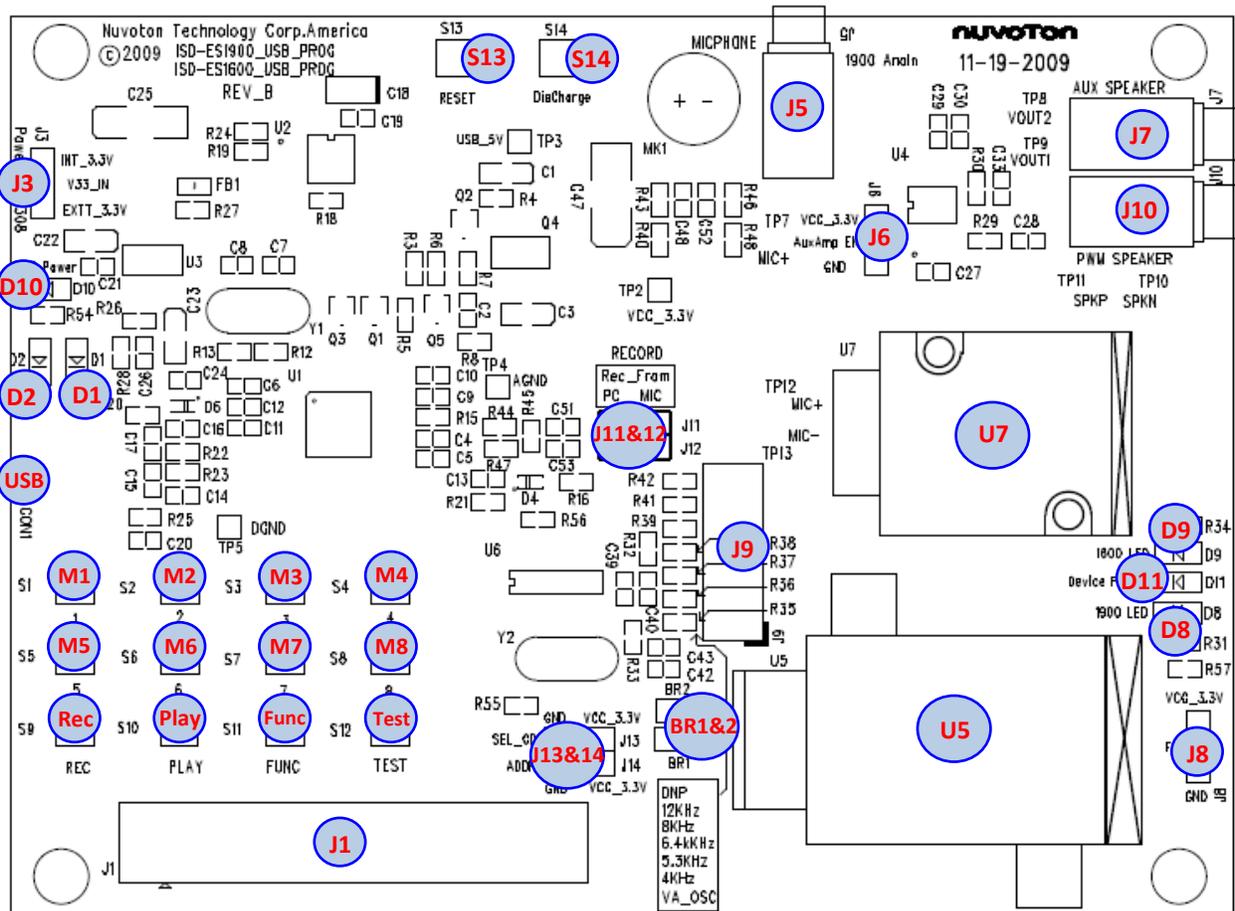
3. Board Configuration

Figure 3-1 ISD-ES1900_USB_PROG Rev-B Top View Components

J1: Reserved for on board MCU I/O port expansion.

J3: Choose the power supply for on board MCU W681308. Install jumper at position V33_IN and Ext_3.3V to choose 3.3V supply from external regulator (U3 SPX1117); install jumper at V33_IN and INT_3.3V to choose 3.3v supply regulated by W681308 REGL pin.

J5: AnaIn input for ISD1900 device.

J6: Install jumper at VCC_3.3V and AuxAmp_En to enable audio power amplifier TS4990. Install jumper at AuxAmp_EN and GND to disable TS4990.

J7: Speaker jack for on board audio amplifier TS4990, after amplifying the Aux output from ISD1900.

J8: ISD1900 FT mode selection. Install jumper at FT and GND to enable the FT mode; Install jumper at FT and VCC_3.3V to Disable the FT mode.

J9: ISD1900/1600 oscillator resistor selection. Refer to the sample rate table on the lower side of the board to choose desired sample rate.

J10: Speaker jack for ISD1900 PWM direct driving.

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J11&J12: Choose the input signal source for ISD1900 and ISD1600. Install both J11 and J12 jumpers to left to choose input signal from PC USB audio; install both J11 and J12 jumpers to right to choose input signal from on board microphone.

J13&J14: Reserved for random clock speed implementation.

D1: Yellow color function LED. Press Func Key once (1st time), this LED will blink twice and turn off the device power – D11 will be off which means now ISD1900 or ISD1600 is now powered off. D1 will return to off state after blinking twice.

D2: Blue color function LED. Press Func Key twice (2nd time), this LED will blink once and D11 will be on, which means now on board device IS1900 or ISD1600 is powered on.

D8: Green color ISD1900 LED, showing ISD1900 activity.

D9: Green color ISD1600 LED, showing ISD1600 activity.

D10: Red color USB power indicator. Once USB cable is plugged in, this LED should light to indicate main power is on.

D11: Red color device power on LED. When it is lit, ISD1900 or ISD1600 device has power.

USB: Mini USB connector.

BR1&2: Reserved for random clock speed implementation.

U5: ISD1900 SOIC-28 clam shell socket.

U7: ISD1600 SOIC-16 clam shell socket.

M1~M8: push button for message #1 to #8 for ISD1900 direct mode.

S13: Reset button. Push to reset on board MCU W681308.

S14: Discharge button. Push to discharge ISD1900 device. Only push this button when device power is off, i.e. when D11 is off. When switching between ISD1900's DIRECT mode and ADDRESS mode, a complete discharging is needed.

Rec: In standalone mode, press Rec to change the current mode to Record.

Play: In standalone mode, press Rec to change the current mode to PlayE (Edge play for ISD1900).

Func: In standalone mode,

- press Func key once to initialize the board: LED D1 (yellow color) will blink twice and LED D11 will turn off. MCU will set ISD1900 as DIRECT mode via GPIO level. At this state user can press Discharge button to fully discharge the device. Then when power is re-applied, ISD1900 will work under desired DIRECT mode.
- Press Func key again will make LED D2 (green color) blink once and then re-apply power to device ISD1900 (or ISD1600). If in socket device is ISD1900, it is supposed to work under DIRECT mode.

Test: Reserved for QA purpose.

4. Operation Description

4.1 Standalone Operation on ISD19xx Devices

After USB plug in and board power on,

The standalone operation is for ISD1900 only. And in standalone mode, ISD1900 works only under DIRET messaging mode.

The operation sequence is as below:

- In standalone mode it can only record message from microphone. So install jumper J11 and J12 both to right position.

- Plug in USB. USB power D10 red color LED should be lit.

- Press Func button, D1 yellow LED blinks twice which stands for initialization finished, and device power D11 red color LED is off → now device has no power.

- When device power is off, press Discharge button to fully discharge the device. Note: powering on device when device is not fully discharged cannot guarantee the RIRECT mode being setup successfully.

- Press Func button again. D2 green color LED should be on for 2 seconds then off → self check is completed. And D11 device power red LED is on again. Now device is ready for buttom operations.

- Record and/or play a message:

  • For record: press Rec button to set the current function as Record function. Then press and hold one of the M1 to M8 buttons to record a message. D8 ISD1900 green LED will be on indicating it is recording.

  • For playback: Press Play button to set the current function as Playback_E (edge play) function. Then press one of the M1 to M8 buttons to playback a message. D8 ISD1900 green LED will flash once when playback is finished.

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4.2 GUI Operation under GUI

4.2.1 ISD-VPE1900-1600 overview
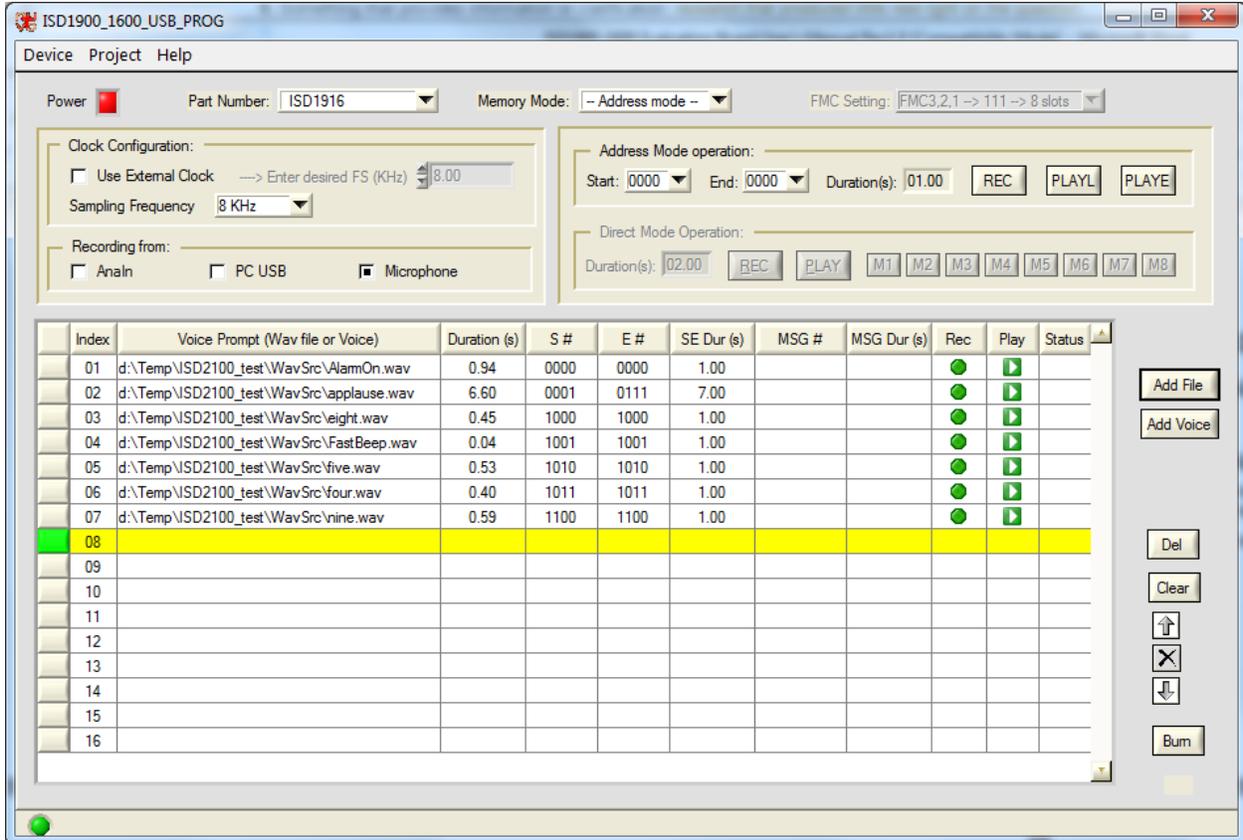
4.2.2 ISD1900 operation under GUI

- **Route the Audio Signal from PC to EVB**

Assume the target operation is to burn one or several wave files into the device under ADDRESS mode (the operation sequence for DIRECT mode is essentially the same). To do this the first step is to instead let PC play wave file to its speaker, let PC play the wave files to its USB audio device which is now the ES_ISD1900_USB_PROG board. To make sure PC is routing signal to the EVB (playing to EVB), follow the sequence below:

- Right click the Audio icon on the task bar. Click *Playback devices*.

- In Sound dialog window, under Playback panel choose USB Audio Devices as the default playback device.

  After this, it is recommended doing one more test: play a wave file from PC, no sound from PC speaker should be heard.

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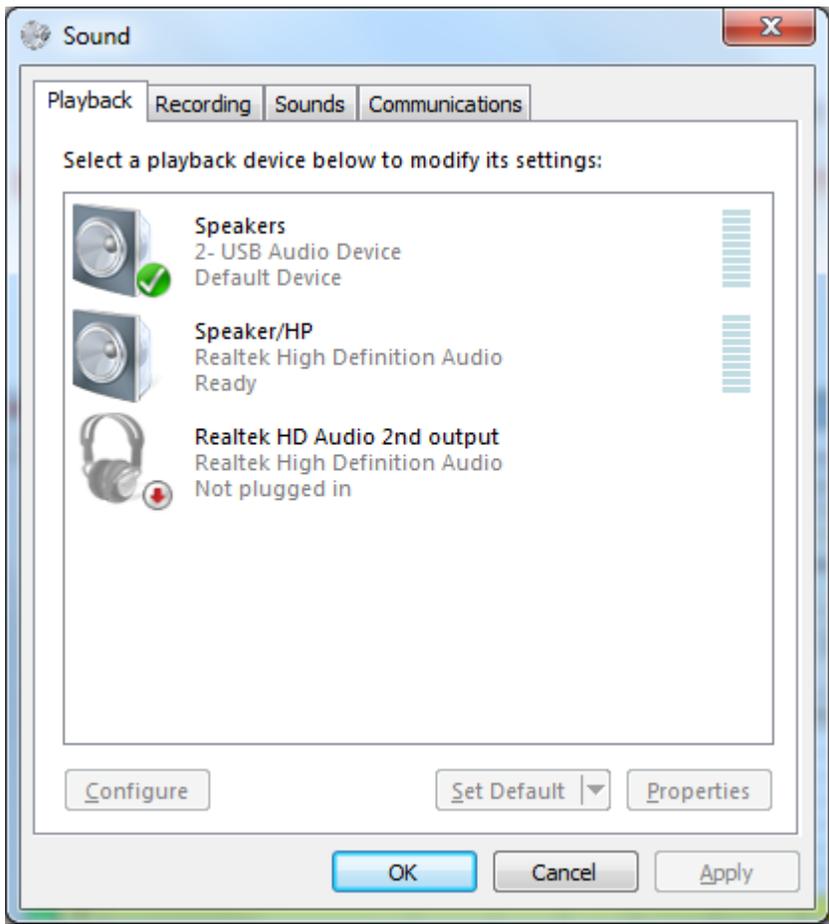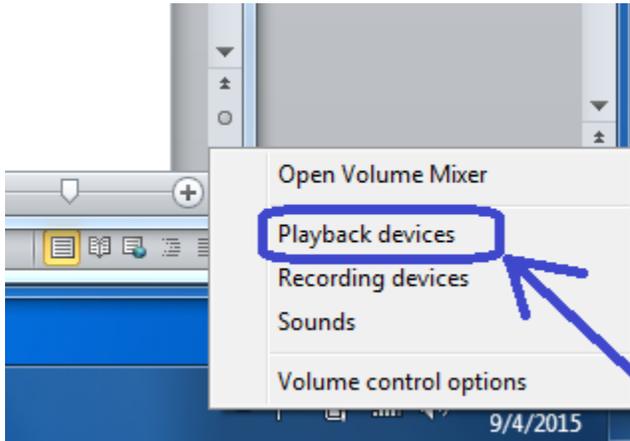
- **Board power on sequence**

ISD1900 can work under two different modes: Address mode or Direct mode. Depends on which mode is chosen, the ISD1900's pin configuration switches from one to another. User shall follow the sequence below to make sure device enter the desired mode, hence further operations can proceed.

Board power on sequence:
- **under GUI operation, when device has no power (on board D11 is off), to power on the device user shall always press the on board "Discharge" button first then on GUI interface click Power LED to turn on device power (then on board D11 will turn on).**

The reason that user should always follow this sequence to setup device working mode is that changing mode pin (pin 27) level alone is not enough to guarantee success of mode setup.

Here below uses two examples to further explain what a clean power up sequence is and what is NOT a clean power on sequence.

Example1: A clean power on sequence – plug in USB cable, launch VPE, press on-board Discharge button (to remove potential voltage residue on ISD1900 VCC pins), on VPE GUI interface select desired mode and then click Power button to

Example2: A not clean power on sequence –

- **Batch programming sequence**

Plug in USB first, and then launch VPE software. Now on GUI screen do the sequence below:

- Choose the memory mode → So GUI can inform the on board MCU to set GPIO correctly.

- Choose part number →So GUI can calculate and assign the memory allocation address correctly.

- Click Power button to apply power to the device. On GUI screen Power LED turns active Red. Meantime on EVB the D11 ISD1900 red LED should synchronize and on. Click GUI power button again, both should be off.

 If the on board D11 is not synchronized as GUI power button, then start over.

- Turn off the board power by clicking GUI power button (D11 Red LED should be off). Press in board Discharge Button to fully discharge the device. Now turn on the power by clicking GUI power button again.

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- Click add File to choose wave files from PC. After files are chosen, GUI will automatically calculate the length and assign the address for each message.

- Click Burn. During programming, Button Burn turns green, Rec LED turns red. After programming is finishes, the Status for the file will be checked. User can click Play arrow to listen the just recorded message. And user can click individual Rec button to Re-record that single file again.

4.2.3 ISD1600 operation under GUI

User can click "Device" drop down menu to choose working on an ISD19xx device or an ISD16xx device.

After switched to ISD16xx GUI interface shown below, user shall first choose the device type, and then select the sample frequency which matches the board setting (J9 external oscillator resistor setting). After this the user can click "Browse…" button to choose a wave file from PC, and then click "Record" to burn it into the device, or click "PLAYE" or "PLAYL" button to play back the sound effect.
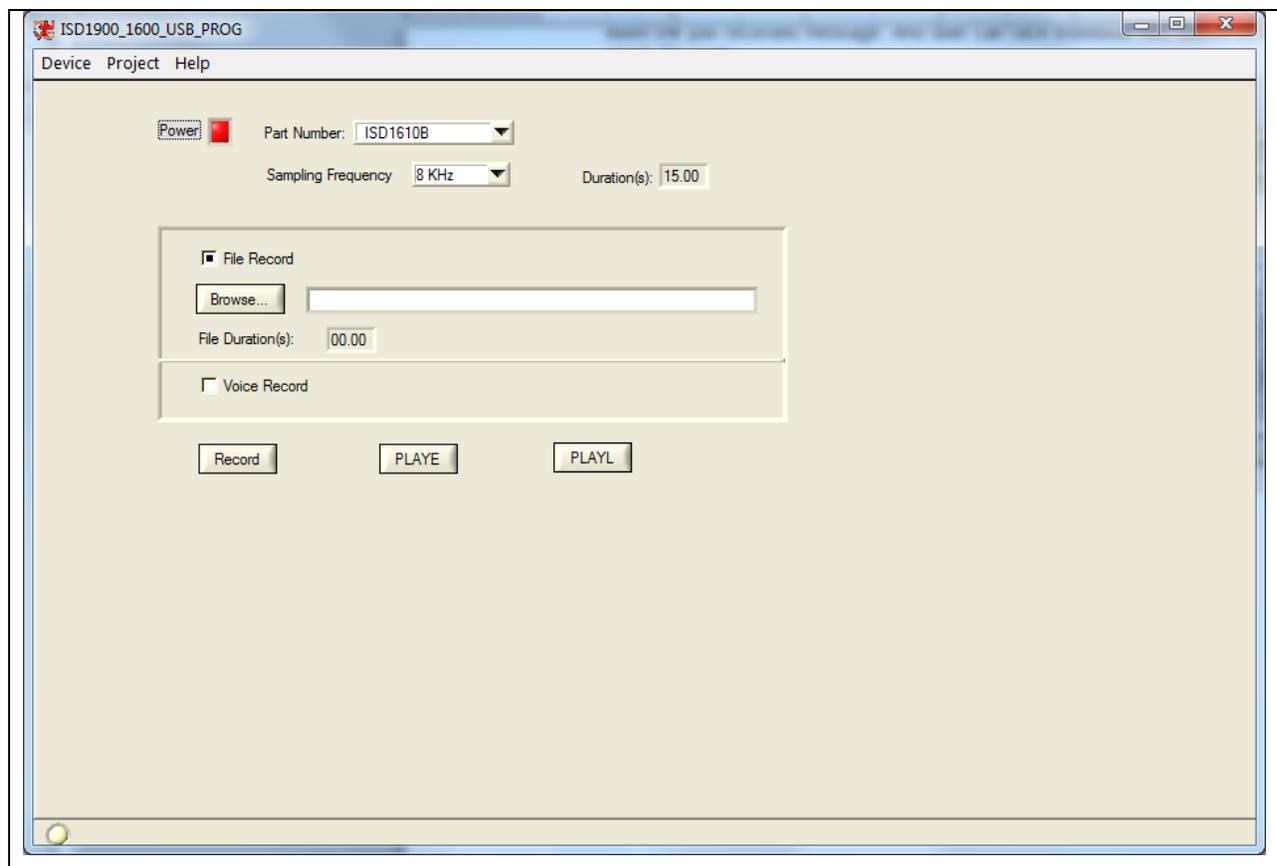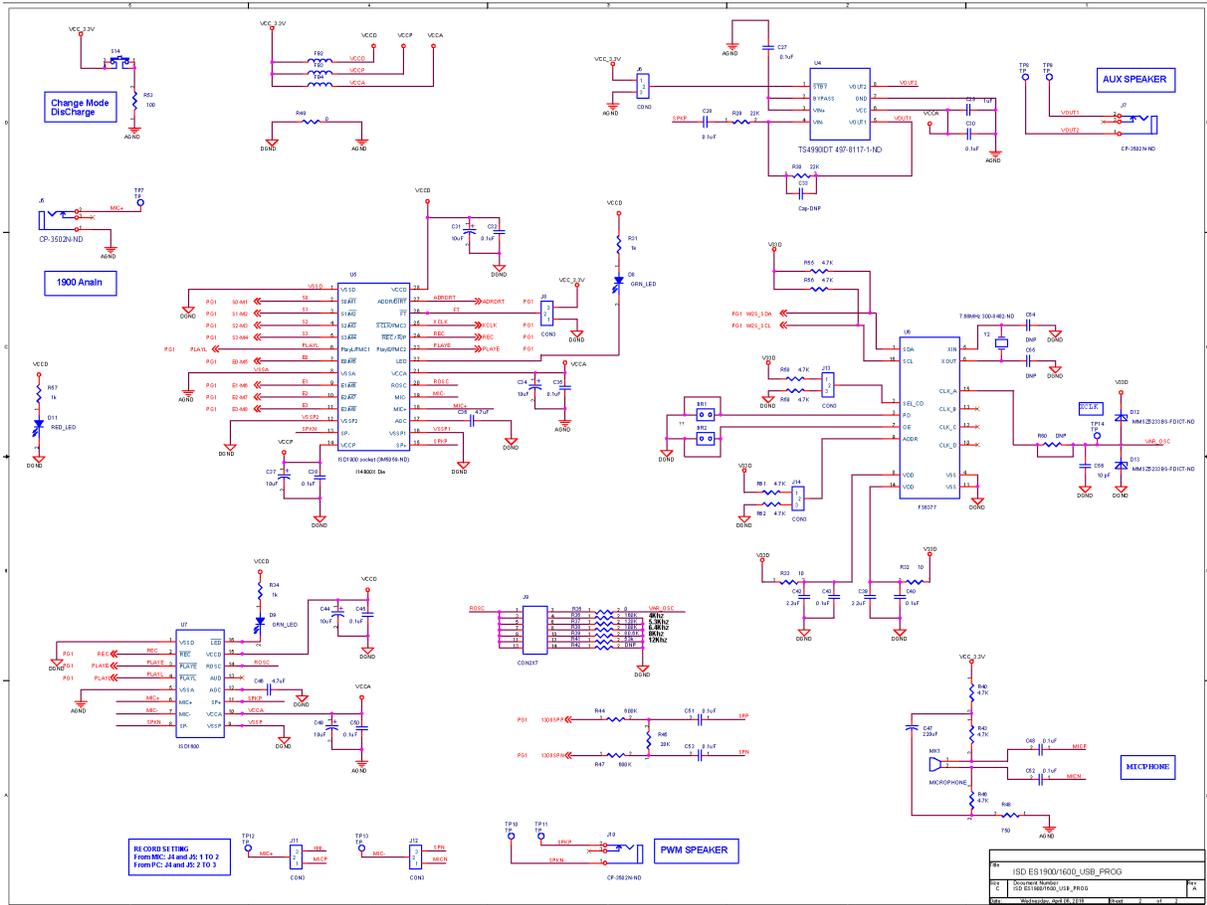
5. Board Schematic.
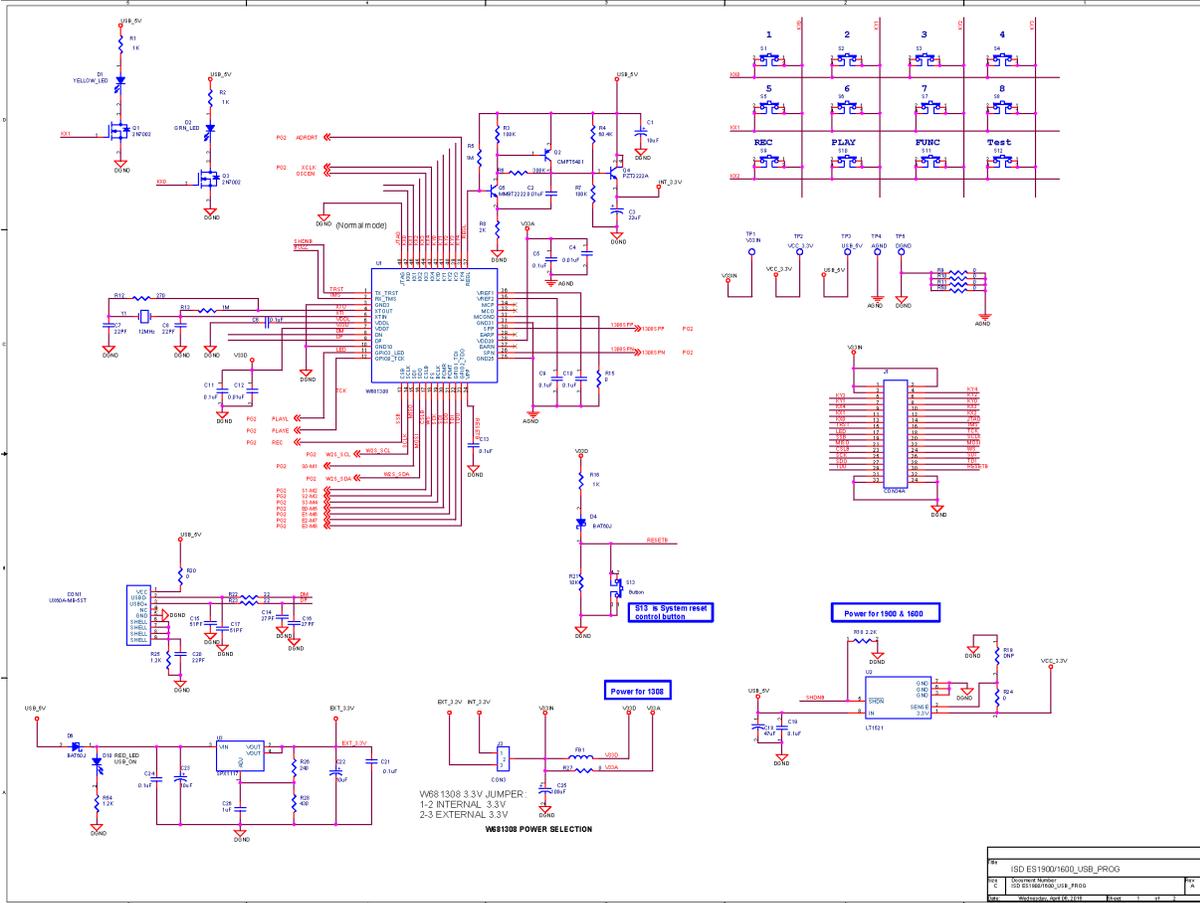
6. Revision History

Version	Date	Description
1.0	09/03	Initial release: