Voice Development Board Mode User Guide

Revision: V1.00 Date: August 16, 2017

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1 Quick Start

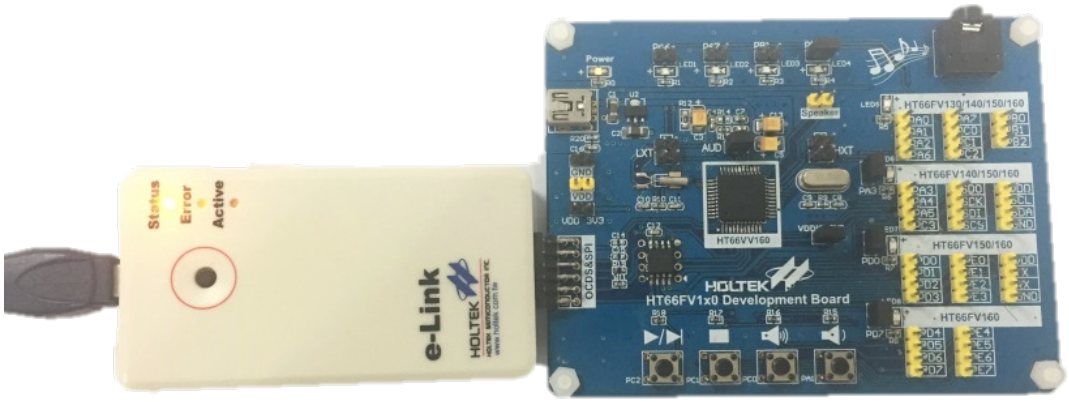
Development Board Mode Introduction

- The development board mode of the Holtek Voice MCU Workshop is used together with the HT66FV1x0 Development Board to emulate the HT66FV130/140/150/160 devices. Using this method enables users to quickly debug their software and hardware at the preliminary stage. It also allows programs to be easily transferred from the emulation devices to the user real mass production devices at a later stage, thus greatly improving development efficiency as well as reducing overall development costs.
- On the development board, all of the MCU I/O lines are bonded out to pins on the right hand side, which are classified and labeled according to the four device type shared conditions. The I^2C/SPI/UART interfaces are especially marked out and are used to implement easy communication with other ICs. There also exists 4 keys and 9 LEDs for simple debugging.

Hardware and Software Development Environment

Hardware

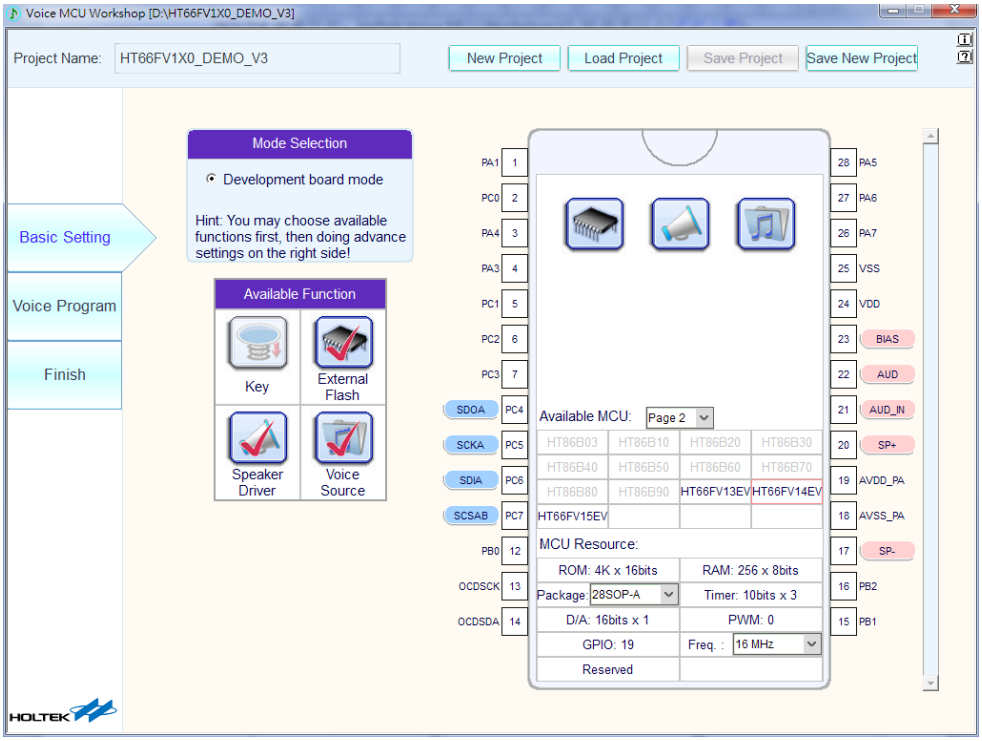
- PC with Windows XP operating system or later versions
- HOLTEK emulation tool – HT e-Link
- HT66FV1x0 Development Board – Model: ESK-FV160-200



HT e-link and Development Board Connection Diagram

Software

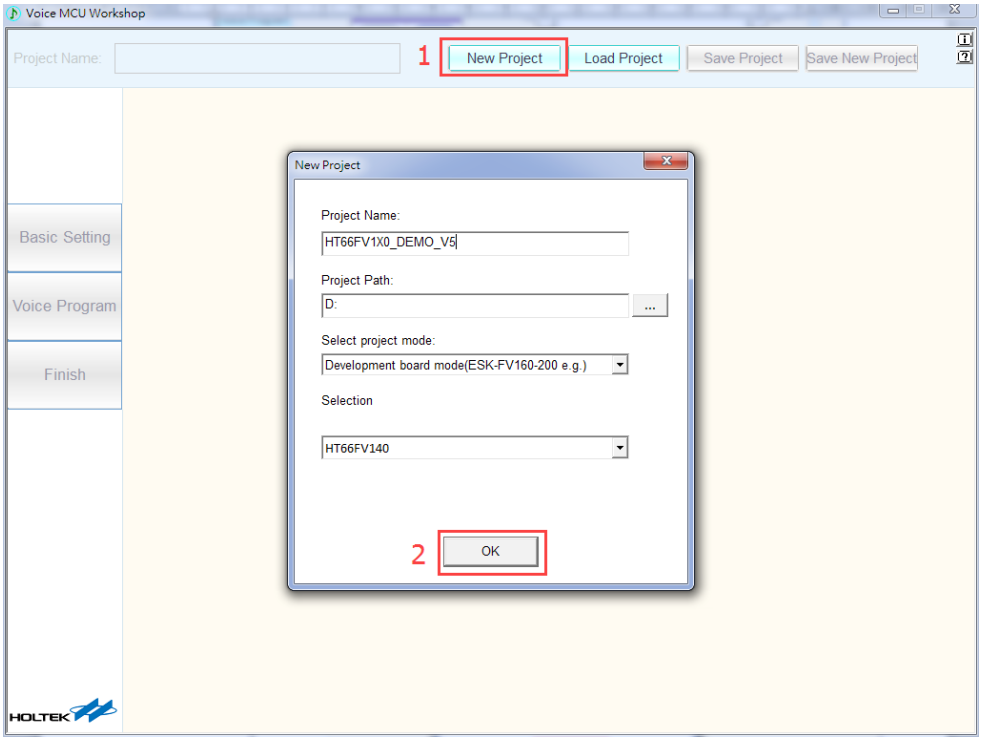
The Holtek Voice MCU Workshop V2.30 or later versions (click to download)



Detailed Operating Steps

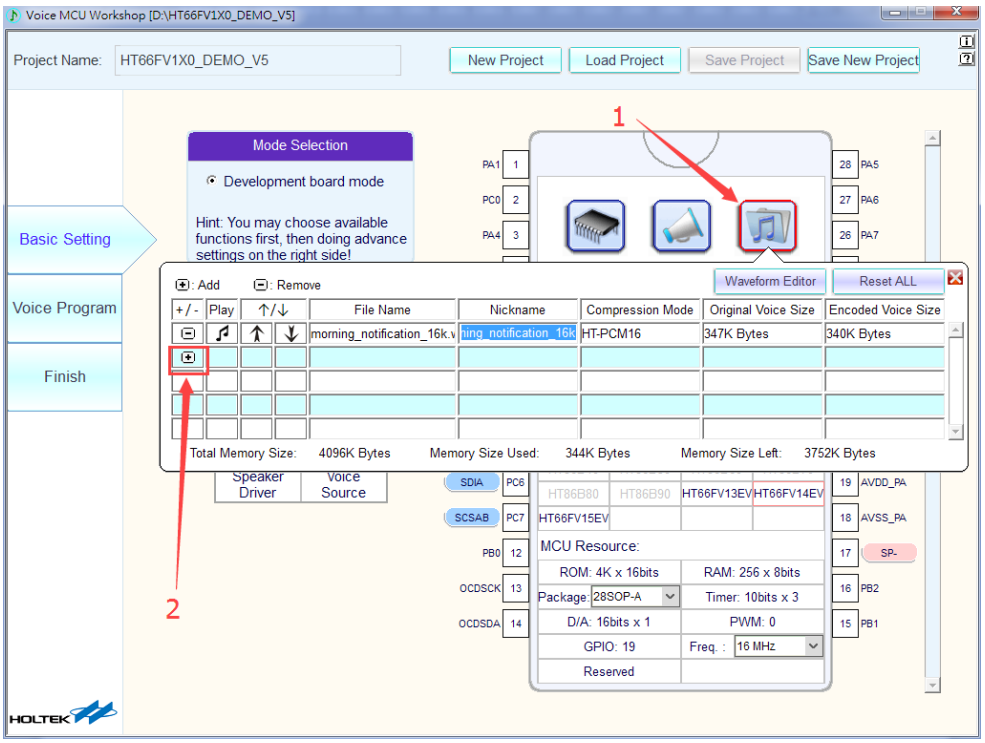
■ Create a new project

Click “New Project” → Fill in project name → Setup project storage path → Select project mode → Select program → Click “OK”



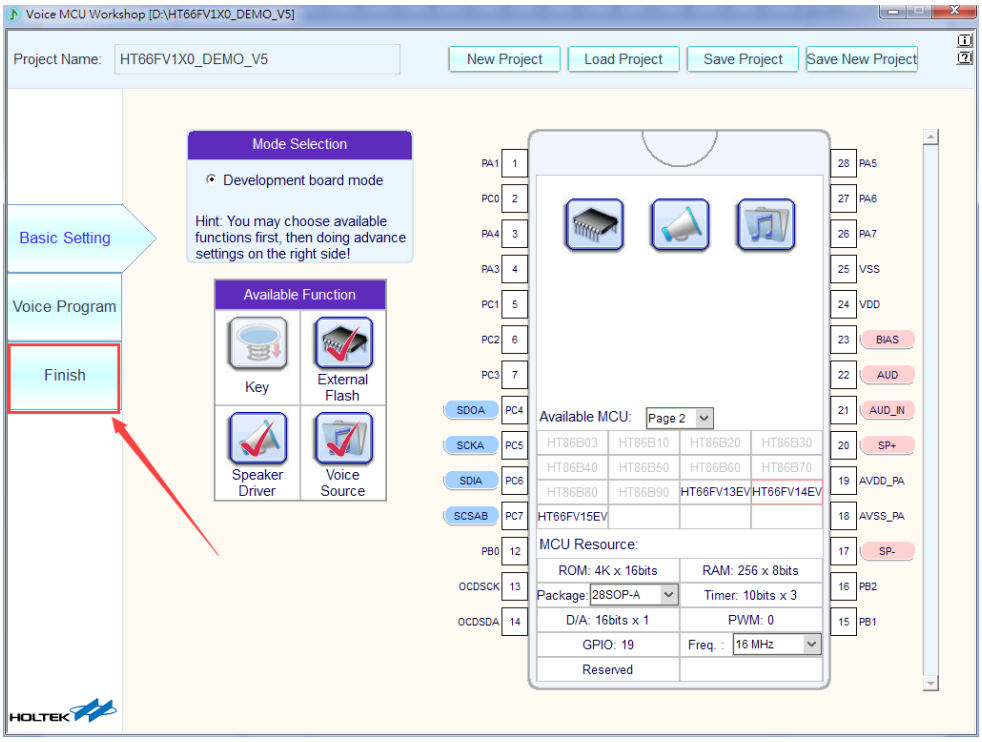
■ Import sound source

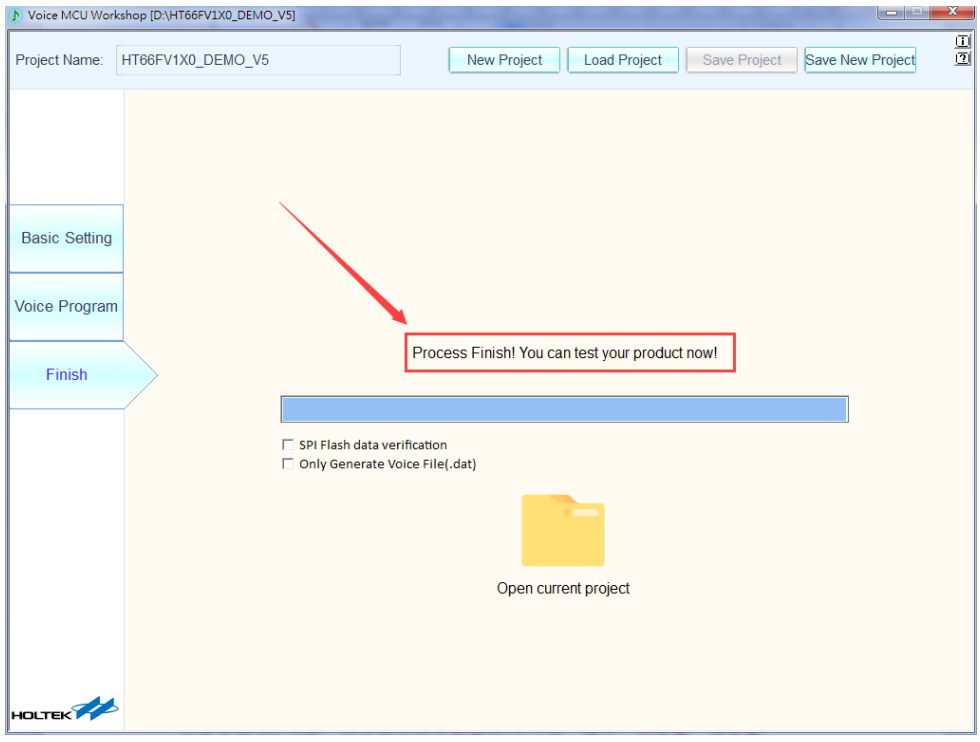
Users can directly use the 16-bit WAV sound source placed in the default project or import other 16-bit WAV sound sources from their own PC. This is done by clicking on the corresponding icon shown by the two arrows with the specific order shown in the following diagram. Note that the total sound source capacity should not exceed the 32M-bit SPI Flash capacity or the Voice MCU Workshop will generate a prompt message.



■ Programming the sound source

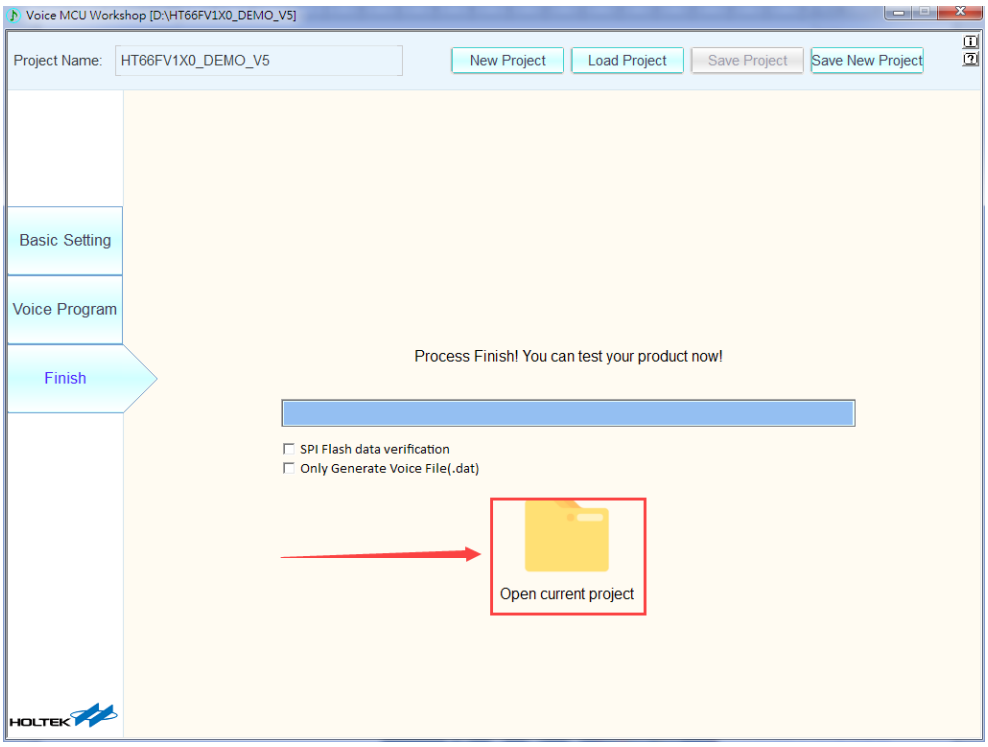
After importing the sound source, click “Finish” and the sound source will then be programmed into the device. During this time the yellow LED and blue LED on the HT e-Link will flash continuously. When finished the evaluation window will indicate that the procedure has successfully completed.





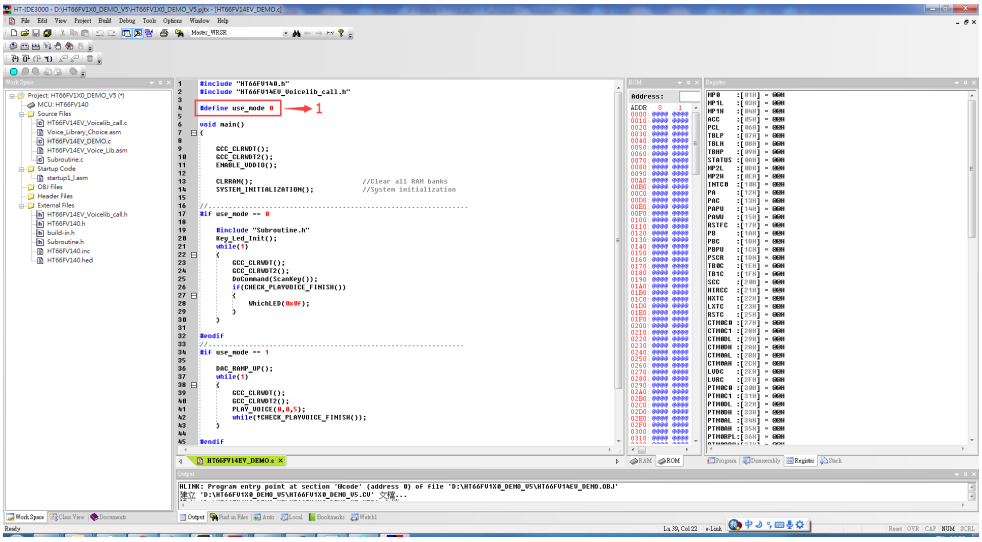
■ MCU code online simulation

Click the “open current project” button to open and locate the required IDE3000 pjtx project file. The main loop is placed in the HT66FV14EV_DEMO.C file, online simulation and debugging can be implemented after compiling the program. When used together with the development board hardware, the program will have four key functions, namely “Play/Next”, “Stop”, “Volume up” and “Volume down”, placed in an order from left to right.



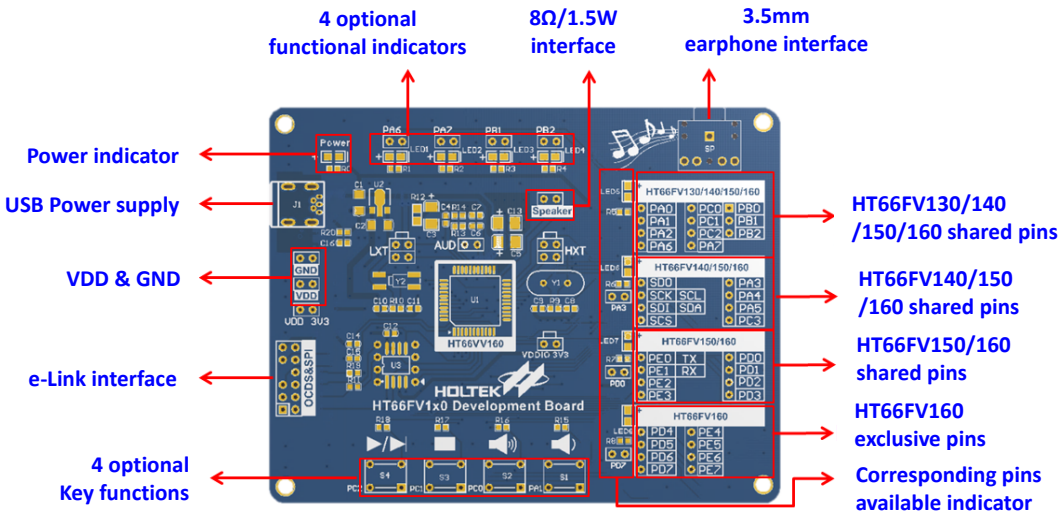
Example Project → User Project

It is suggested that users copy the example project and then modify it according to their own project requirements. Users can change the "#define use_mode 0" to "#define use_mode 1" of the define function in the HT66FV14EV_DEMO.C file to implement a power-on sound play function or refer to the Voice MCU Workshop user manual example programs to program the power-on sound play function.



2 Hardware Description

Development Board Circuit Block Description

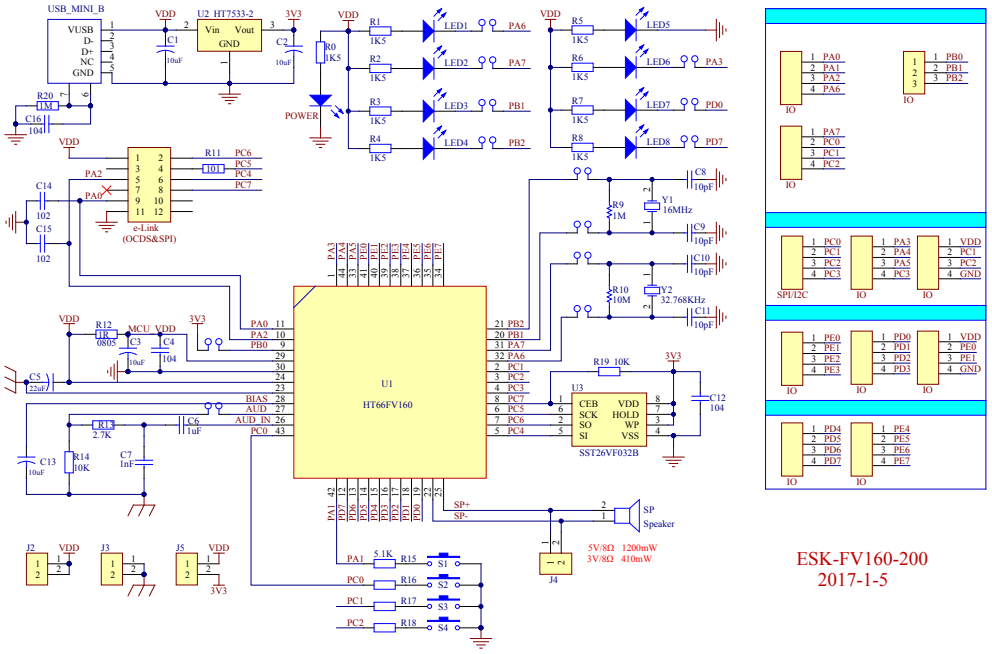


Circuit supplementary description:

- Power supply modes: The device power can be supplied by the USB interface, the VDD&GND interface or the e-Link interface. As the VDD&GND interface has no hardware fool-proofing mechanism or diode protection, care must be taken not to reverse connect to prevent the device from damage.
- USB power supply interface: This is only used as power supply and not as an interface for SPI Flash programming. As the USB power supply may have significant noise, it is only suitable for debugging but not for sound quality audition.
- e-Link interface: When used together with the Voice MCU Workshop, the Holtek emulation programming e-Link tool can program the voice data into the SPI Flash. When used together with the Holtek program compile software in the HT-IDE3000, the e-Link can be used for online debugging.
- Speaker interface: It is recommended to connect a speaker with an impedance of at least 8Ω as the MCU can drive a 1.5W speaker with the 5V power supply. If the speaker load is less than 8Ω, an over current condition will occur which will result in the MCU overheating or being damaged.
- Earphone interface: This interface is compatible with three-segment and four-segment earphones and is used for sound quality audition. The four-segment earphone includes the international and non-international versions. Attention must be given to ground ring connector matching conditions. If there is poor sound quality, users can adjust the insertion depth to match the ground ring to achieve normal sound quality.

- LEDs and Keys: There are 9 LEDs on the development board. Here the power indicator LED and LED5 are illumed by hardware while the rest are controlled by the I/O pins. When these 7 I/O pins are used for other functions, users can remove the corresponding jumper caps directly without having to worry about affecting debugging. Note that the 4 keys have no jumper caps, therefore if the corresponding shared I/O pins are used for other functions during debugging, the operation of these keys should be forbidden. Each Key and LED shared with a specific I/O pin is all labeled at the corresponding positions on the PCB. Care must be taken with these pins to avoid any pin-shared function conflict conditions from occurring.
- MCU I/O pins: The MCU I/O pins are subdivided into four blocks, namely the HT66FV130/140/150/160 shared pins, the HT66FV140/150/160 shared pins, the HT66FV150/160 shared pins and the HT66FV160 exclusive pins. For examples, the former 2 blocks pins are available if the HT66FV140 device is selected and all of the 4 blocks pins are available if the HT66FV160 device is selected.
- Alternate function – External crystal oscillator: The development board has reserved interfaces for the external HXT high speed crystal oscillator and the external LXT low speed crystal oscillator. Users can connect suitable crystals and relevant peripherals according to their own requirements. As the crystal pins are shared with I/O pins, there are 4 jumper caps reserved for user convenience to open circuit the connection even if the crystal is connected.
- Alternate function – External power amplifier: The on-board MCU, the HT66FV160, has an integrated a 1.5W/5V amplifier. If a higher power output amplifier is required, users can connect an external power amplifier by removing the AUD jumper cap and connecting the D/A converter output pin and the ground pin to their external power amplifier.
- Alternate function – 3.3V power supply: The HT66FV1x0 device series have an integrated VDDIO function. If the device needs to communicate with external 3.3V systems using their 5V power supply, the PC0~PC3 pins, which are pin-shared with the I^2C and SPI functions, can be used for communication. If more pins are required, the system power can be changed to 3.3V, in which case the VDDIO input pin PB0 can be used for other functions by removing the VDDIO-3V3 jumper cap at the bottom right of the MCU. As the development board uses a 3.3V LDO, a 3.3V voltage input will not be sufficient therefore it is recommended to short out the VDD-3V3, which is located below the VDD&GND interface. This allows the system to directly provide a 3.3V voltage to the SPI Flash to guarantee system stability.

Development Board Circuit Schematic

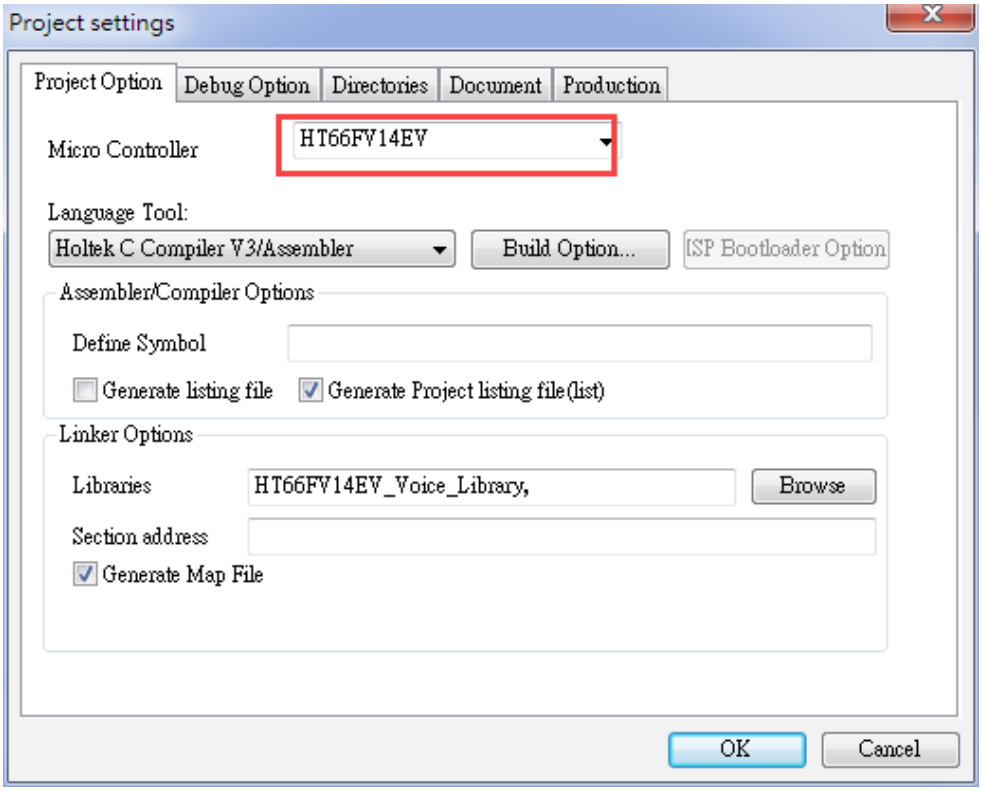


3 Emulation MCU → Real MCU

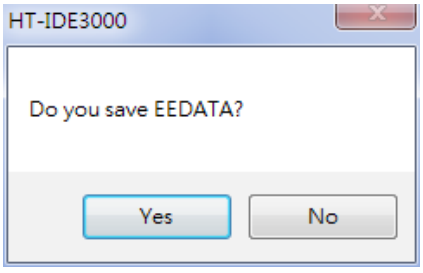
When the debugging process is finished using the emulation MCU development board, users can change the emulation MCU to the real MCU device, such as the HT66FV130EV → HT66FV130, HT66FV140EV → HT66FV140, HT66FV150EV → HT66FV150.

Detailed Operating Steps – Take the HT66FV140 as an example

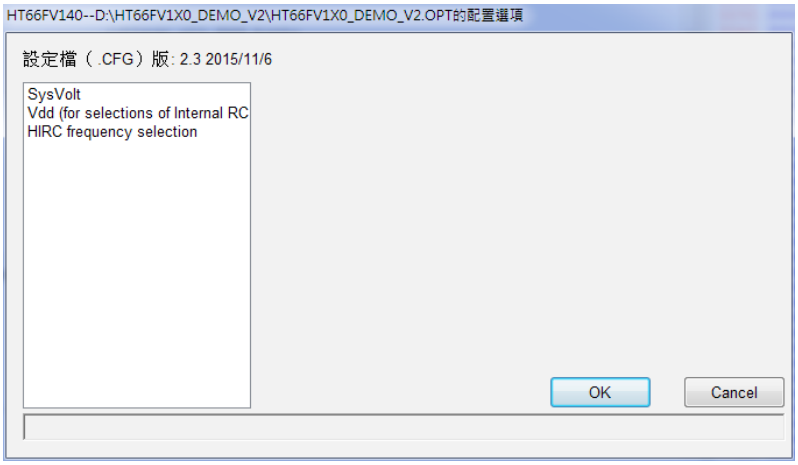
Step 1. Click the HT-IDE3000 menu: Option → Project settings; Change the HT66FV140EV to HT66FV140.



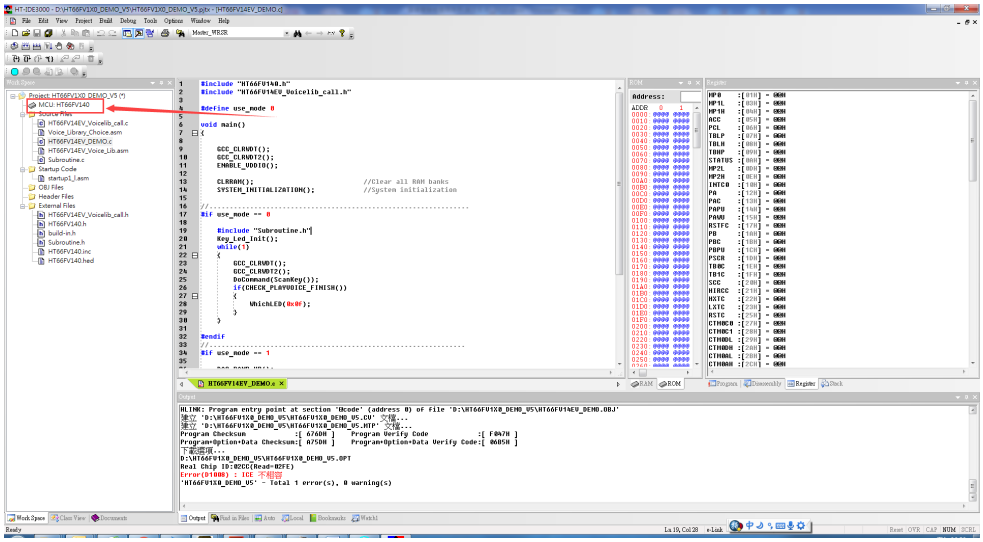
Step 2. An EEDATA prompt dialog box will pop up, select "No".



Step 3. A configuration option box will pop up, click “OK”.



Step 4. Recompile the new HT66FV140 project, now users can debug using the real HT66FV140 device.



Special note: It should be noted that when changing the HT66FV130EV to the HT66FV130 device, in addition to the above steps, the “Simulate.c” file should also be removed from the project.