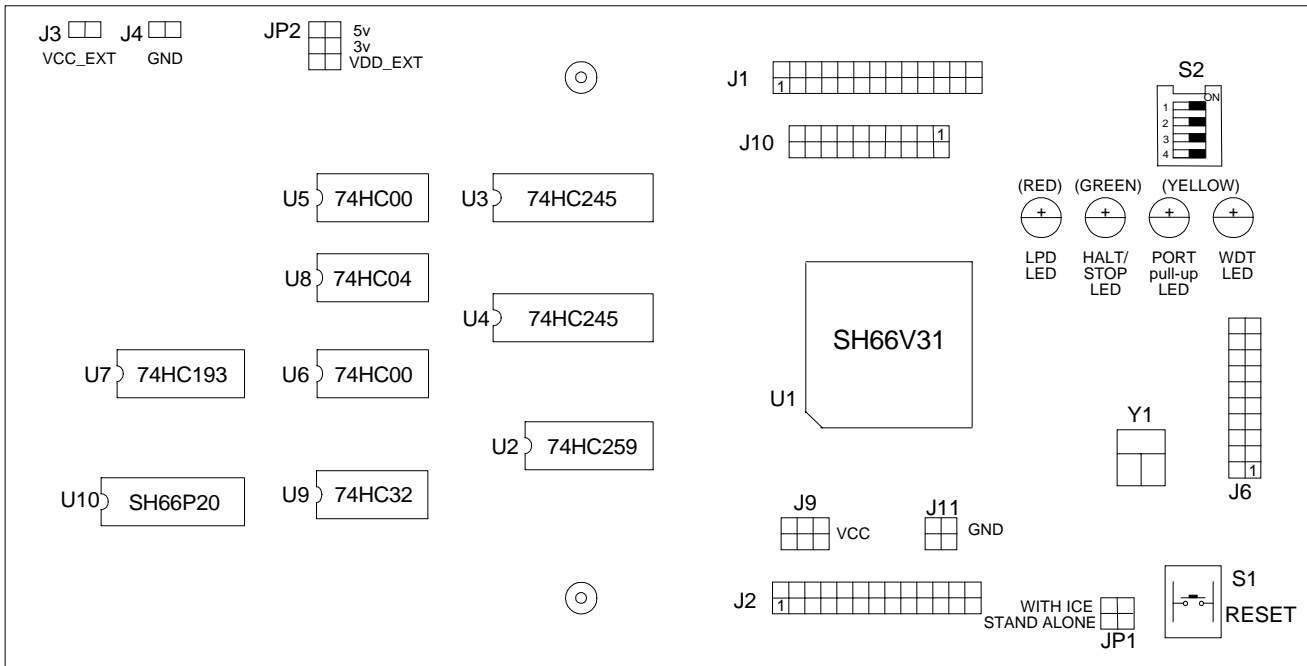# SINO WEALTH

SH6631 EVB

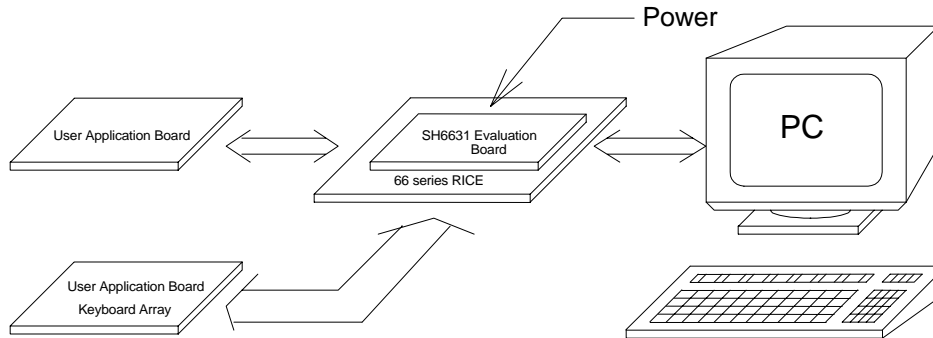## Application Notice for SH6631 EVB

SH6631 EVB

The SH6631 EVB is used to evaluate the SH6631 chip's function for the development of application program. It contains of a SH66V31 chip to evaluate the functions of SH6631 including the infrared remote control transmitter function. The following figure shows the placement diagram of SH6631 EVB.
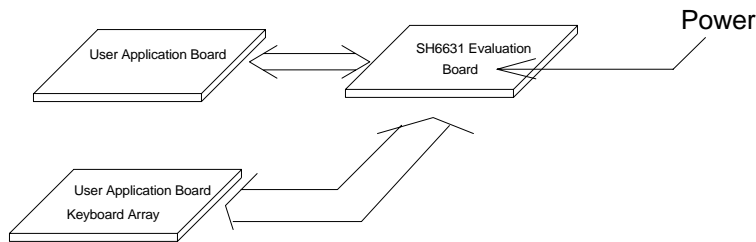
SH6631 Evaluation Board

There are two configurations of SH6631 EVB in application development: ICE mode and stand-alone mode.
In the ICE mode, the SH66xx ICE (motherboard) is connected to the SH6631 EVB by the ICE interface.

(a) ICE mode

In the standalone mode, the SH6631 EVB is no longer connected to the motherboard. But the EPROM board has must be connected to the SH6631 EVB by the EPROM interface. The EPROMs which may be the 27512 or 27256store the application program.

(b) Stand-alone mode

The process of your program's evaluation on SH6631 EVB

Uasm66.exe: assemble the program, and get binary (*.obj) file and the other files.
Depart the one 16 bits obj file to the two 8 bits files by convert.exe.

Usage example (for example: aaa.asm):
    1.Run the SH66 series assemble program:
     C: >uasm66 aaa.asm ; to produce the obj file: aaa.obj
    2. Depart the aaa.obj to two 8 bits files aaah.obj and aaal.obj, for example:
     C: > convert
            Input the 16 bits (.obj) file aaa.obj
            Then aaah.obj and aaal.obj will be created.
    3. Write the aaah.obj to EPROM (ROMH)
     Write the aaal.obj to EPROM (ROML)
    4. Put the two EPROMs (ROML and ROMH) on the EPROM board.
    5.Then put the EPROM board on the EVB by J9, J10 and J11.

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SH6631 EVB Programming Notices:

1. Clear data RAM and initialize all system registers at the beginning.
2. Do not perform logical operation with I/O ports. Especially when the I/O ports have external connections.
3. Do not perform arithmetic operation with those registers only have 1, 2 or 3 bit. This kind of operation may not get the result you expected.
4. Never use reserved registers.
5. If "IE" instruction (interrupt enable) is set outside the interrupt processing program and there is "HALT" or "STOP" instruction, this two instructions should be followed "IE" instruction closely.
6. After CPU responding to an interrupt, IRQ should be cleared before resetting IE in order to avoid many responses to one interrupt.
7. Interrupt Enable instruction will be automatically cleared after entering interrupt-processing program. If setting IE too early, there is a possibility of re-entry the interrupt. So the Interrupt Enable instruction should be placed at the end and followed closely by two instructions include "RTNI".
8. During the two successive instruction cycles next to Interrupt Enable instruction, CPU will not respond to any interrupts.
9. After CPU responding to interrupts, each bit of IE will be cleared by hardware while IRQ should be cleared by software.
10. It is necessary to add NOP before or after the HALT instruction, else the CPU will execute error instruction when it wakes up from the HALT.
    .
    . .
    NOP
    HALT
    NOP
    .
    . .
11. It is wise to set Interrupt Enable flag before you return from subroutine in two instructions.
    .
    . .
    LDI   IE, 04H   ; Enable timer0 interrupt
    LDA   Temp, 0
    RTNI
12. When you set interrupt enable flag as the following and your subroutine do not set Interrupt Enable flag, then your system will never wake up if an interrupt entered between the NOP.
    .
    . .
    LDI   IE, 1111B; IE = Interrupt enable flag
    NOP
    NOP
    NOP
    HALT
    .
    . .
13. To add "p=66xx" and "romsize=xxxx" at the beginning of a program. If found problem in compiling the program. Check if the SH6566.dev is located at the program directory.
14. When setting Timer Counter, first fill TOL, then TOH.
15. After setting TM0, TOL, TOH, it is unnecessary to reset them after interrupt each time. If TM0, TOL, TOH are reset after each TIMER interrupt, interrupt interval time will not equal because the interrupt timing is not successive.
16. Any instruction containing writing to or reading form memory, it should not be used to operate with I/O Port. It is best to avoid using those instructions such as "SUB, ADD " which do not contain Write operation with I/O Port but have computation operation.
17. "1" must be written to I/O Port before Reading.
18. Writing "1" to I/O Open Drain and then entering "STOP" will cause current leakage ranging from tens to hundreds micro-ampere. So pull up or pull down resistors value from 1 to 2 MΩ must be used to prevent I/O Float when I/O in Open Drain mode.
19. Directly reading PORT states ensure the count is correct.
20. Interrupt activating from STOP at the first time can save power.
21. When the Compiler of old version compiles program, the last line will be read twice. So, if the last line is an instruction, two same operations will be occurred. If there is Label in the last line, compiler will give an error named 'repeated definition'. This will happen in main program or included files and it is recommended that the last line should be a blank line or END.

SH6631 Evaluation Board

22. The stack has four layers, if an interrupt is enabled, there only have three layers can be used. Otherwise, if an interrupt comes, the stack will be overflowed that will cause CPU Reset or other errors.
23. Key De-bounce time is recommended to be 50ms. If a user use Rubber Key, it is best to test Rubber Key's De-bounce time.
24. Index register DPH and DPM both have three bits only, so pay attention to the referred address when using them.
25. The "NOP" instruction should be added at the beginning of the program to ensure the IC is stability.

SH6631 Evaluation Board

SH6631 interface connector: J6 (Top View from EVB)

PA0			RESET
PA1			GND
PA2			EXOSC_IN
PA3			
PB0			VDD_EXT
PB1			REMO
PB2			PD1
PB3			PD0
PC0			PC3
PC1		1	PC2

External Vcc input: J3, J4 (The external power input when the EV. Board worked in stand alone mode. The voltage of Vcc_Ext must be 5V±5%)

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Jumper setting:

JP1 (SH6631 EVB ICE/Stand-alone mode select):
- If you short the "with ICE" positions (only for ICE mode), the clock of SH6631 EVB is fed from the SH6631 ICE.
- If you short the "Stand alone" positions (only for stand-alone mode), the clock (CERAMIC 400K~4MHz) of SH66V31 is put on Y1 on board by yourself.

JP2 (SH66V31 chip power select):
- Short the 5V positions, the voltage (5V) of SH66V31 is internal source.
- Short the 3V positions, the voltage (3V) of SH66V31 is internal source.
- Short the EXT positions, the external power (2.0~5.5V, refer to SH66311 spec) of SH66V31is input from VDD_EXT(J6/9).

Switch setting:

S1:
Reset the whole system when push the button.

S2:
1. If you turn on bit 1 (OPT_PINT) of this switch (pull high), then portA.1~3, port B, portC.0 as the port interrupt source; else port B & port C as the port interrupt source.
2. If you turn on bit 2 (RESET PULL-UP Res.) of this switch, then enable the pull-high resistor of reset pin; else disable it.
3. If you turn off bit 3 (WARM-UP SKIP) of this switch, and then the warm-up counter could be reduced, else disable the function.
4. If you turn on bit 4 (STACK ON/OFF) of this switch, then enable the stack function in ICE mode; else disable it.

LED declare:

HALT or STOP indicates:
D4 is lighted when the system has gone into the HALT or STOP mode.
LPD indicate:
D3 is lighted when low power voltage detected.
Port pull -up indicate:
D5 is lighted when port pull-up enable; else unlighted when pull-up disabled.

Notice:

Evaluate your program with ICE indicate:
1. After enter to RICE66 and successfully download the user program, push the F5 (Reset) on PC keyboard before run your program when you evaluate your program with ICE. If there were abnormal response, the user should power off the ICE, quit RICE66 and wait for a few seconds before restart.
2. First time run RICE66, need to select an appropriate MCU type, clock frequency ... save the settings and restart RICE66 again.
3. Can't Step (F8) or Over (F9) a HALT and STOP instruction.
4. When you want to escape from HALT or STOP (in ICE mode), you should press the F5 key on PC keyboard twice.
5. The maximum current limit of the 3V power is 100mA, when the user uses internal 3V power to drive external device such as LED.
6. When EV. Board worked in "with ICE" mode, you can input the clock from EXOSC_IN (J6/15) as the system clock. (refer to the RICE66 User's Guide)