HY-IDE Hardware User's Manual

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1. HY-IDE Frame

HY-IDE is composed by USB Control Board, ICE Board and Target Board that can emulate HY OTP Series products' function and features. Through PC connection, HY-IDE can carry out emulation, program…etc. function.

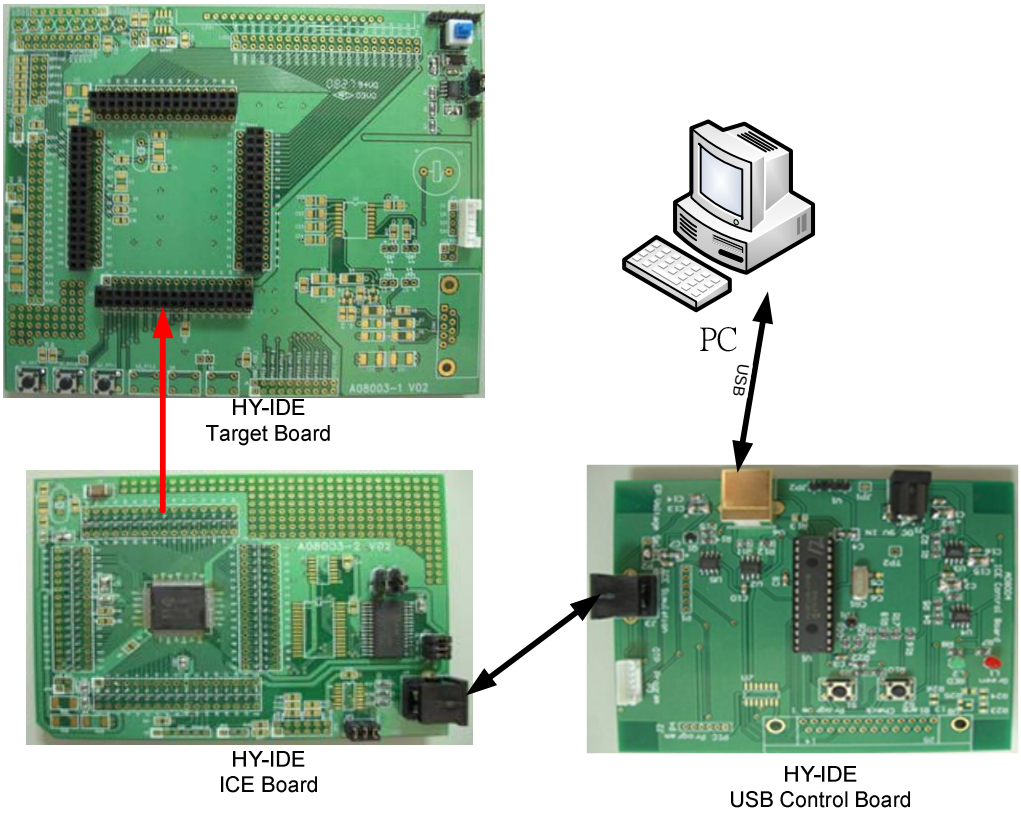


Figure 0-1

2. HY-IDE USB Control Board

HY-IDE USB control board is the bridge that connecting PC and ICE Board. Users can emulate HY MCU products function and program OTP products through control board.

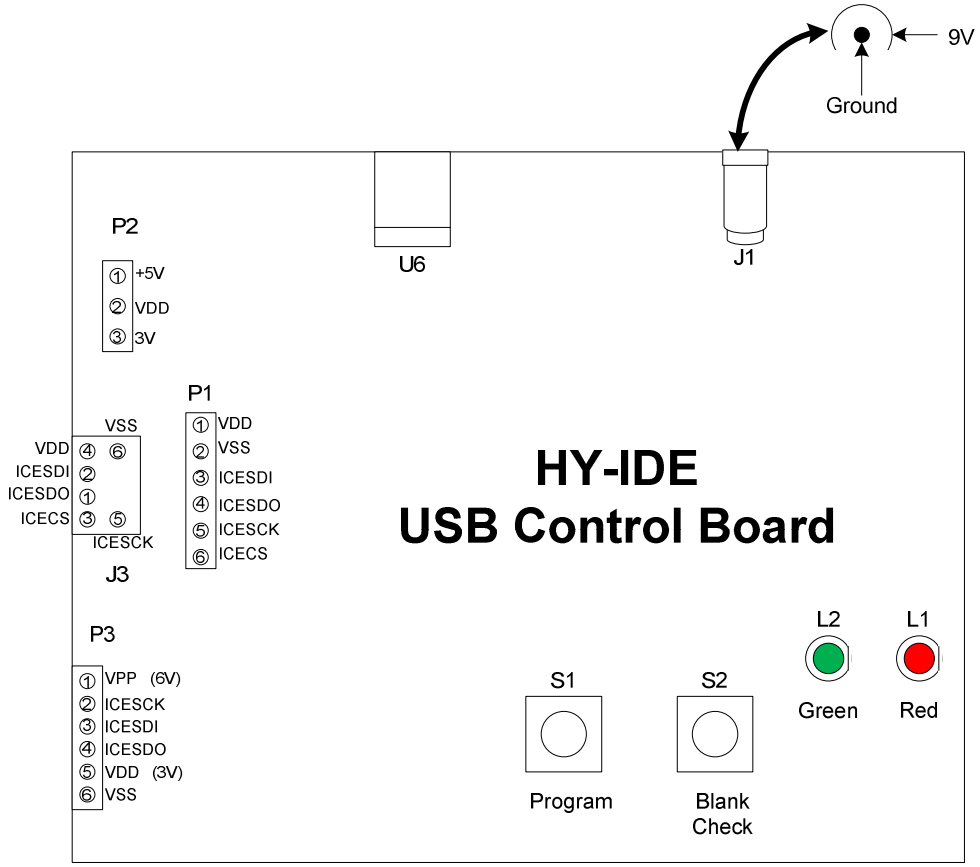


Figure 0-1

In-death description of Figure 0-1:

J1: Adapter 9V input

Positive outside, negative in center. Providing programming power source (must be connected while OTP programming).

U6: USB Port and PC End connector

1. Download program to Program memory of HY-ICE board. HY-ICE board debug function can be implemented through PC emulation program.
2. Download programming program to Flash Memory. Programming HYCON OTP Series products, Blank Check…etc.

P2: Proving HY-IDE Board Power Source

PIN 1 – 2 cannot be shorted. Maximum voltage of HY-ICE Board is 3.6V, PIN 2 – 3 must be shorted or Floating.

J3: HY-ICE Board Control Port

PIN 1 → ICESDO connecting ICE_SDO (PIN 22) of HY11S14.

PIN 2 → ICESDI connecting ICE_SDI (PIN 21) of HY11S14.

PIN 3 → ICESCS connecting ICE_CS (PIN 24) of HY11S14.

PIN 4 → VDD connecting ICE_VCC (PIN 19, if control board power is used) of HY11S14.

PIN 5 → ICESCK connecting ICE_SCK (PIN 23) of HY11S14.

PIN 6 → VSS connecting ICE_VSS (PIN 20) of HY11S14.

P1 : HY-ICE Board Control Port (same function as J3)

PIN 1 → VDD

PIN 2 → VSS

PIN 3 → ICESDI

PIN 4 → ICESDO

PIN 5 → ICESCK

PIN 6 → ICESCS

P6 : HY-OTP Program Control Port

PIN 1 → VPP (6V) connecting OTP VPP (PIN 1)

PIN 2 → ICECK connecting OTP PSCK (PIN 2)

PIN 3 → ICESDI connecting OTP PSDI (PIN 3)

PIN 4 → ICESDO connecting OTP PSDO (PIN 7)

PIN 5 → VDD (3V) connecting OTP VDD

PIN 6 → VSS connecting OTP VSS

S1 : OTP Program Button

S2 : OTP Blank Check Button

L1 : Red LED; OTP Program, Blank Check… execution error display light

L2 : Green LED; OTP Program, Blank Check…execution success display light (display when USB or Adapter is powered on)

3. HY-IDE ICE Board

3.1 HY-IDE Board Diagram

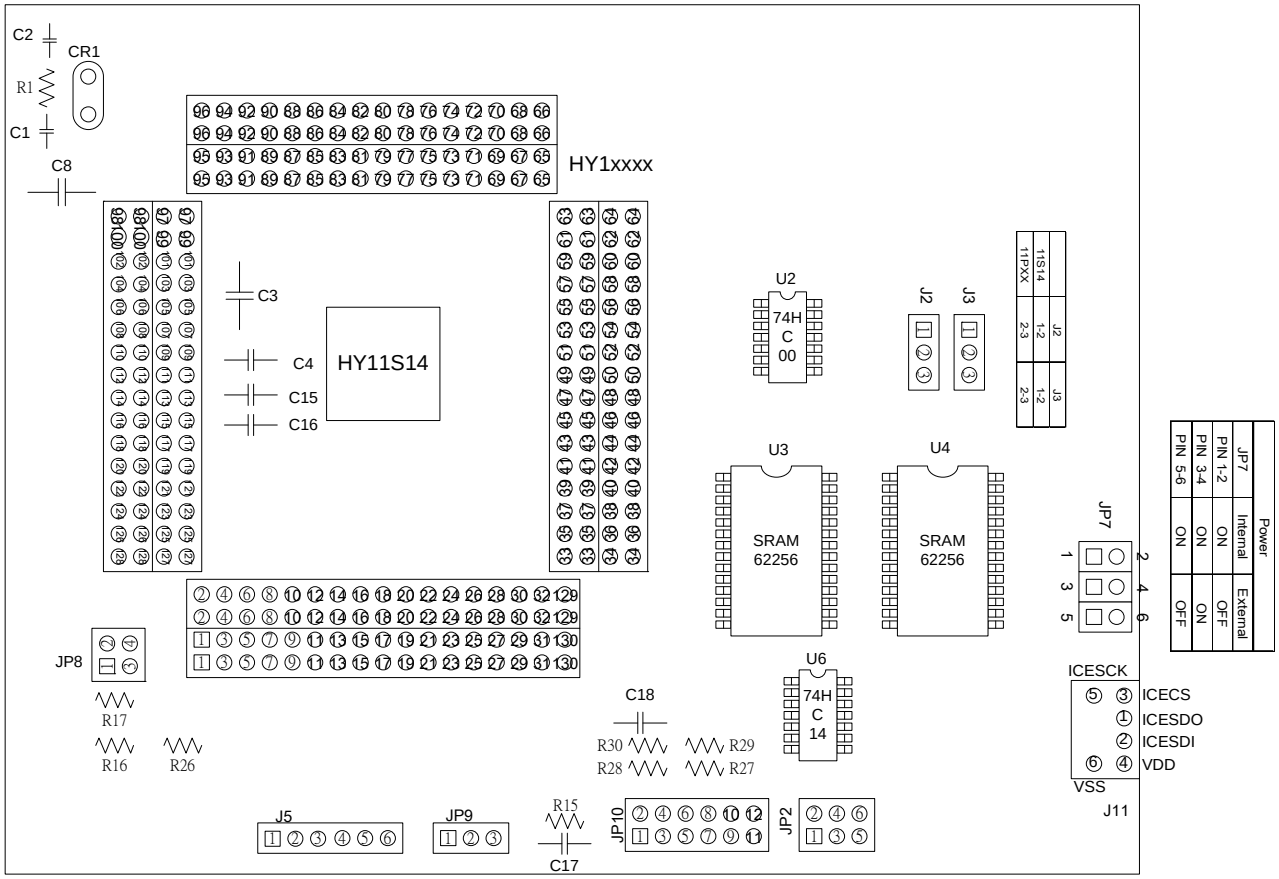


Figure 0-1

3.2 Circuit Description

ICE IC (HY11S14) of HY-IDE ICE board is designed for HY OTP series products emulation. It can directly emulate HY11P14, HY11P13, HY11P12, HY11P21, HY11P24 and HY13P21…products.

Figure 0-1 is further described below:

1. J11, J5: Communication port for connecting J3 or P1of HY-IDE USB Control Board. PC gives commands to HY11S14 through Control Board. J11 and J5 can download program to SRAM62256 and can proceed step into execution, Free RUN…debug function.
2. JP7 : ICE Board Power Selection

Power		
JP7	Control Board Power	Target Board Power
PIN 1-2	ON	OFF
PIN 3-4	ON	ON
PIN 5-6	ON	OFF

ICE Board power can be supplied by PC through USB or from external power sources. If Target Board power is selected, Target Board will be powered by PIN 129 and PIN130 input of HY1xxxx, providing power to the whole ICE Board.

Notice: The input power cannot exceed 3.6V.

If Control Board power is selected, Control Board provides 3V regulated power for the whole ICE Board. When measuring power consumption, JP7 PIN 1-2, PIN 3-4 must be short circuit.

3. JP2, JP3 : emulation IC program capacity choices (SRAM selection)

	J2	J3
11S14	1-2	1-2
11PXX	2-3	2-3

HY11S14 ROM Size is 16k Word (32K Byte). If HY11S14 is selected, U3, U4 SRAM 62256, J2 PIN 1-2 short circuit, J3 PIN 1-2 short circuit.

Maximum ROM of HYCON HY11P Series IC is 8K Word (16K Byte). Only 1 U4, SRAM 62256 is utilized. Thus, 11PXX connected way is to have J2 PIN 2-3 and J3 PIN 2-3 short circuit.

4. U6 and J2 : Selection PIN of HY11S14 communication control

HY11S14		
PIN & U6	Produced Lot No.	
J6	MQ7JJ.01	Later
PIN 1-2	OFF	ON
PIN 3-4	OFF	ON
PIN 5-6	OFF	ON
U6	With	Without

Due to HY11S14 produced lot no.: MQ7JJ.01 does not implement Level Shift in the IC, U6 (74HC14) is necessary to be used as control pin power isolation. JP2 is all open circuit.

Level Shift is equipped in the IC after Laser version. U6 (74HC14) is not necessary; JP2 PIN 1-2, PIN 3-4 and PIN5-6 must be short circuit.

5. JP10, JP9 : uses internal OP pin

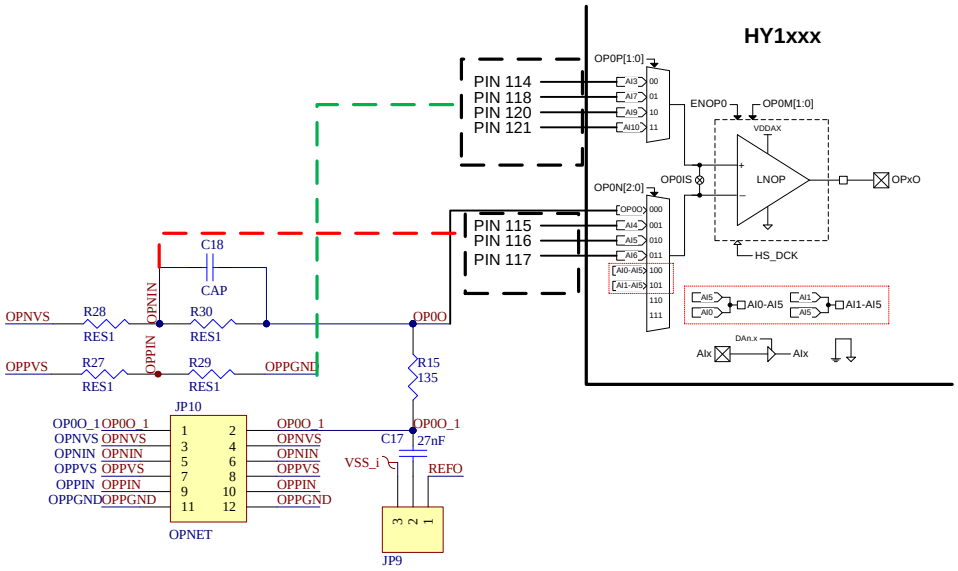


Figure 0-2

OP Input pin has Multiplexer selection, users can based on the circuit design to select

different connectors to OP input Multiplexer in the dotted line.

6. JP8 : ADC Reference Voltage Input

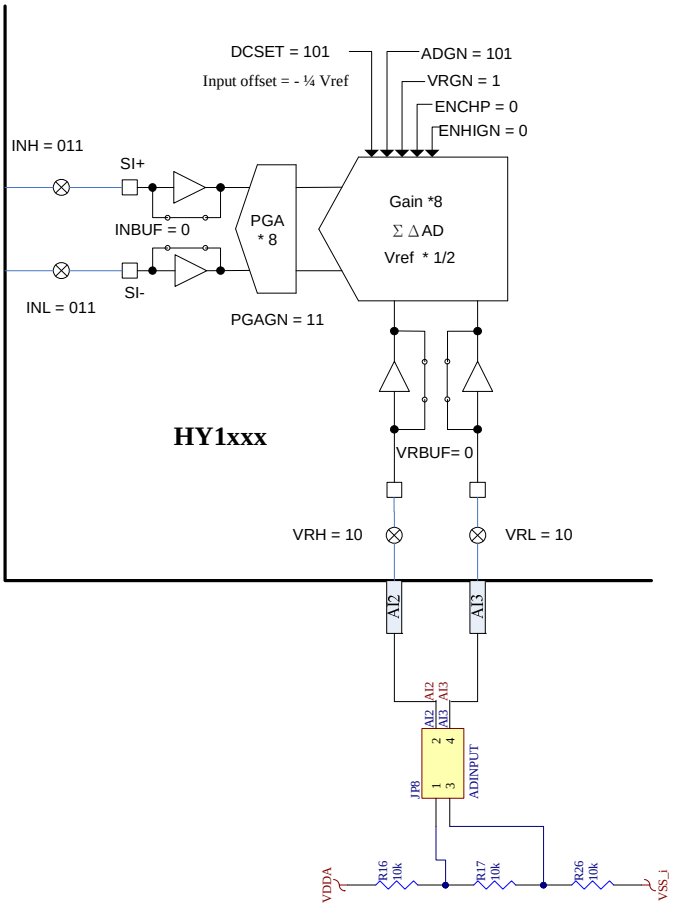


Figure 0-3

JP8 can select if VDDA voltage divider can input to ADC Reference Voltage. If JP8 PIN 1-2 and PIN 3-4 is short circuit, Reference Voltage will be 1/3 VDDA.

7. CR1、R1、C1 and C2 : External Crystal and its peripheral capacitance and resistance.
8. C3、C4、C15 and C16 : ADC Input Capacitance

   In order to enhance ADC operation performance, it is better to place capacitance close to the PIN. Thus, it is advised to connect C3, C4, C15 and C16 to the ICE Board.

   C3 : VDDA Capacitance: 1uF ~10uF.

   C4 : REFO Capacitance: 22nF ~ 100nF(recommended value).

   C15 : ADC Input Capacitance (AI0 – AI1): 0.1uF.

   C16 : ADC Reference Capacitance (AI2 – AI3): 0.1uF.

3.3 Circuit Chart

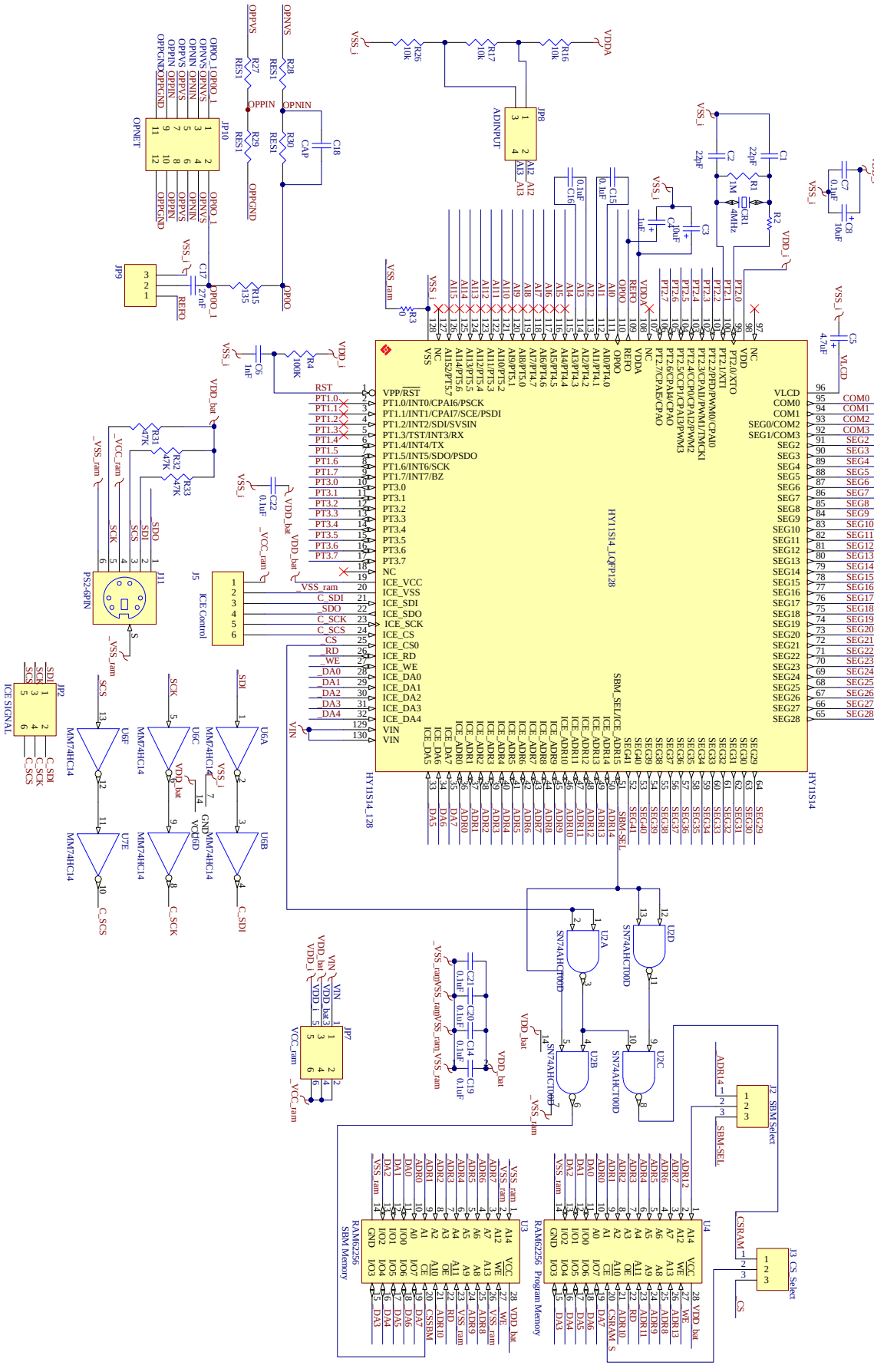


Figure 0-4

4. HY-IDE Target Board

4.1HY-IDE Target Board Diagram

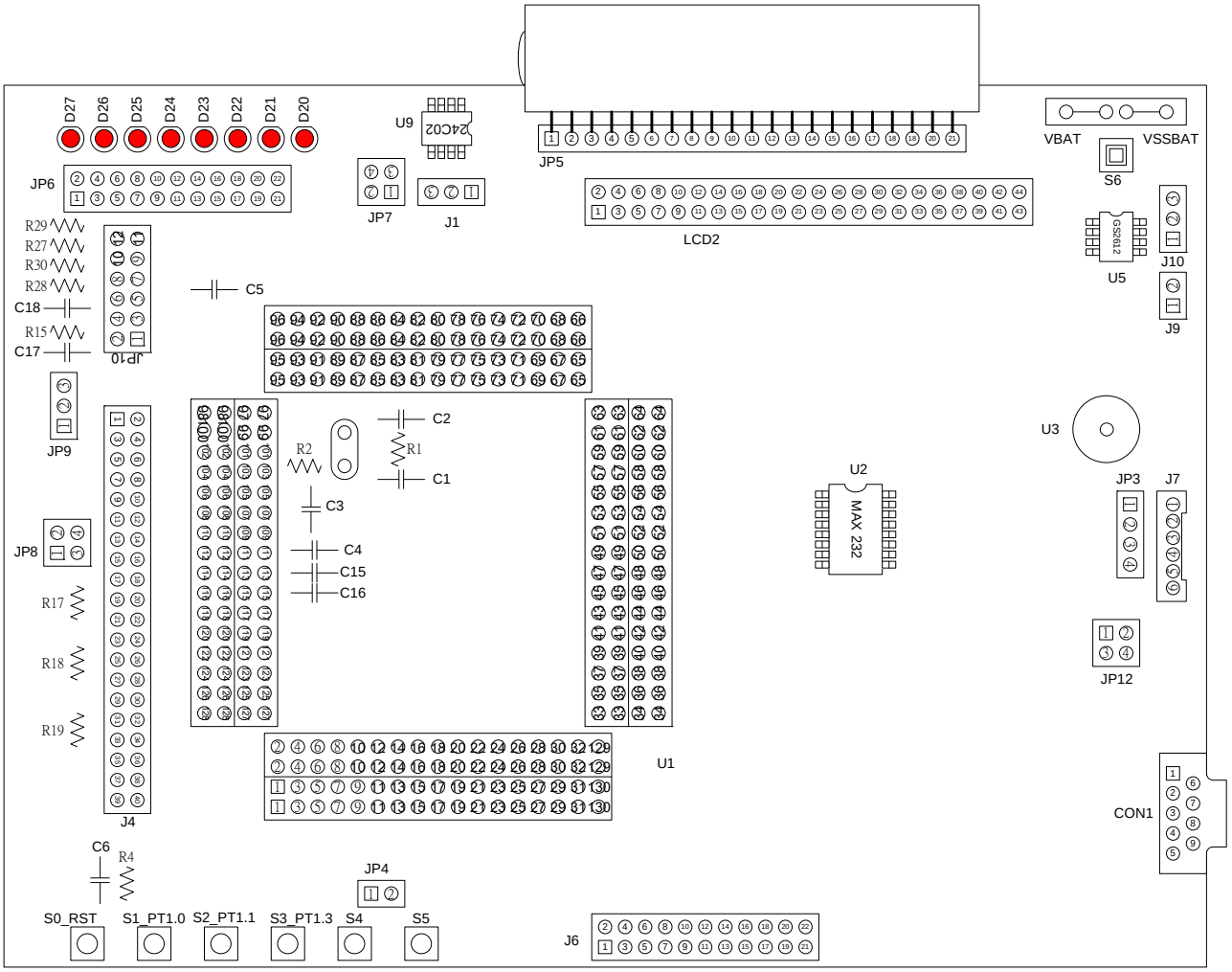


Figure 0-1

4.2 Circuit Description

HY-IDE Target Board facilitates users to design circuit and to connect the circuit to ICE Board. Target Board equips with basic circuit and components, according to circuit requirements, users can connect the circuit and the self-designed PCB through I/O or Analog Port.

Specific circuits are illustrated below:

1. Power System

(1) External Power

Users must make sure to switch the JP7 option of HY-IDE ICE Board to Target Board power when using external power.

S6 switch must be pressed.

Power positive edge is inputted by VBAT, negative edge is inputted by VSSBAT.

J10 can select whether the whole system power will pass through Regulator (U5).

J10 PIN 1-2 is short circuit. Power input to U5 through VBAT. Voltage can be adjusted

to 3V (users can change output voltage by adjusting R5, R6 and R7. Its relation equation is: $V_{OUT} = 1.240V \times (1 + \frac{R5 + R6}{R7})$), to supply VDD_i of the whole system.

J10 PIN 2-3 is short circuit, VBAT power directly inputs to VDD_i **(Notice: the power cannot exceed 3.6V)**.

J9 can bridge current meter to test the whole VDD_i current consumption. It must be short circuit when not connected to current meter.

(2) Use Control Board Power

When using Control Board power, please note the JP7option of HY-IDE ICE Board must be switched to Control Board power. When measuring current consumption is needed, then PIN 1-2 and PIN 3-4 must be short circuit, Control Board power is 3V, if U5 voltage exceeds 2.8V, J10 PIN 2-3 must be short circuit.

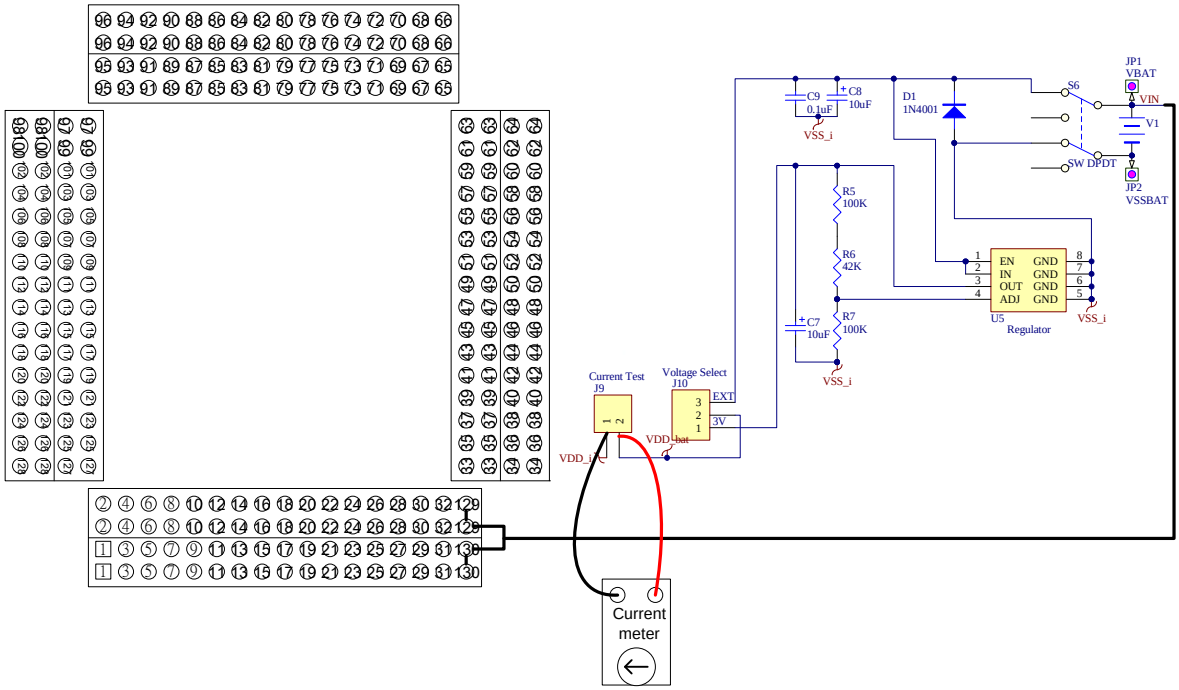


Figure 0-2

2. J7 : OTP Program Port

When U1 transforms to OTP, HY-IDE Control Board can program HY series OTP products.

PIN 1 → VPP (PIN 1)

PIN 2 → (PIN 2)

PIN 3 → (PIN 3)

PIN 4 → PSDO (PIN 7)

PIN 5 → VDD

PIN 6 → VSS

3. JP3 : SPI communication port

PIN1 → PT1.1(CS)

PIN2 → PT1.2(SDI)

PIN3 → PT1.6(SCK)

PIN4 → PT1.5(SDO)

4. UART communication port (RS232)

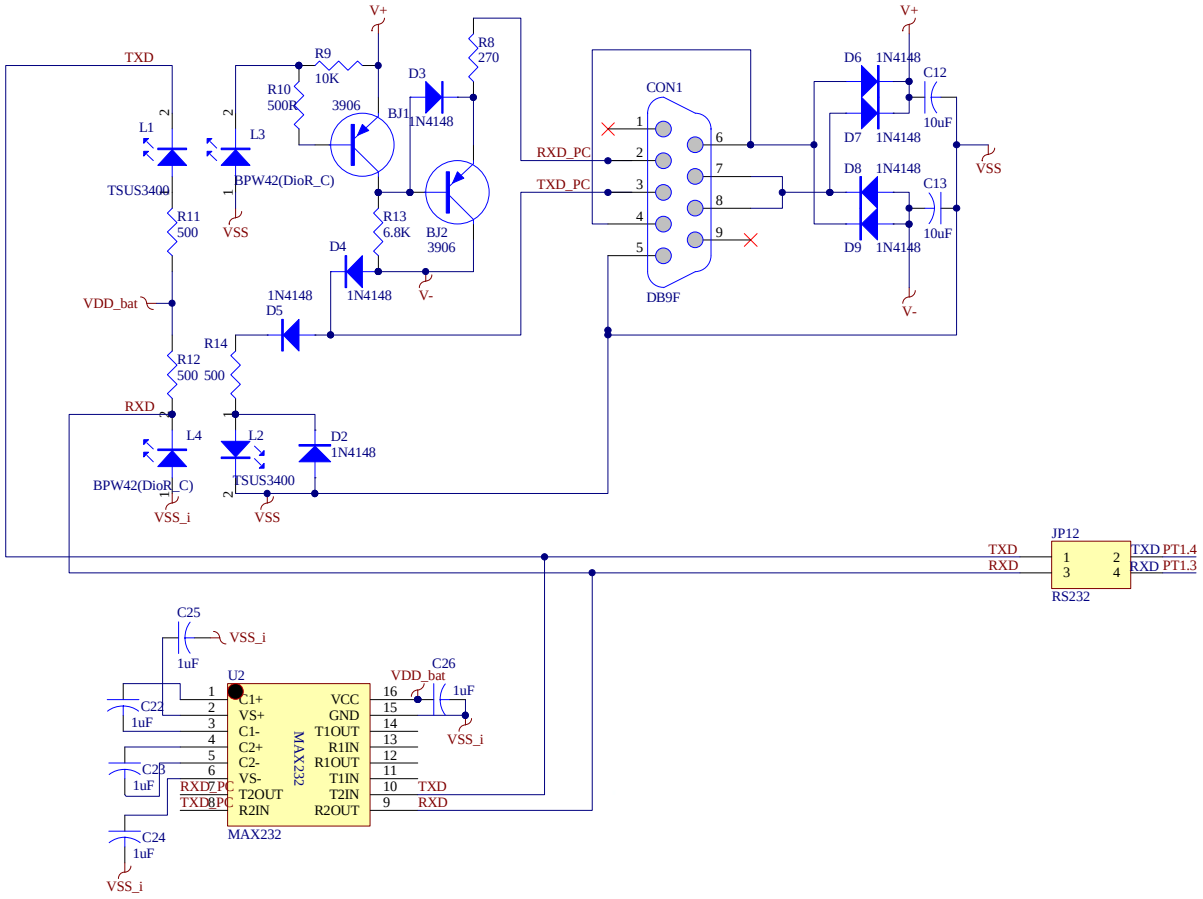


Figure 0-3

When RS232 function is chosen, JP12 PIN 1-2 and PIN 2-3 must be short circuit.

There are 2 communication ways of RS232 of HY-IDE Target Board:

(1) Communicates through optical coupler

L1~ L4 is communication and receiver of optical coupler. The communication interface is composed of resistance/capacitance and diode.

(2) Communicates through opto-MAX232

MAX232 is a signal voltage convertor IC that concerts I/O power signal to standard RS232 potential signal.

5. J6 : PT1 And PT3 I/O Port

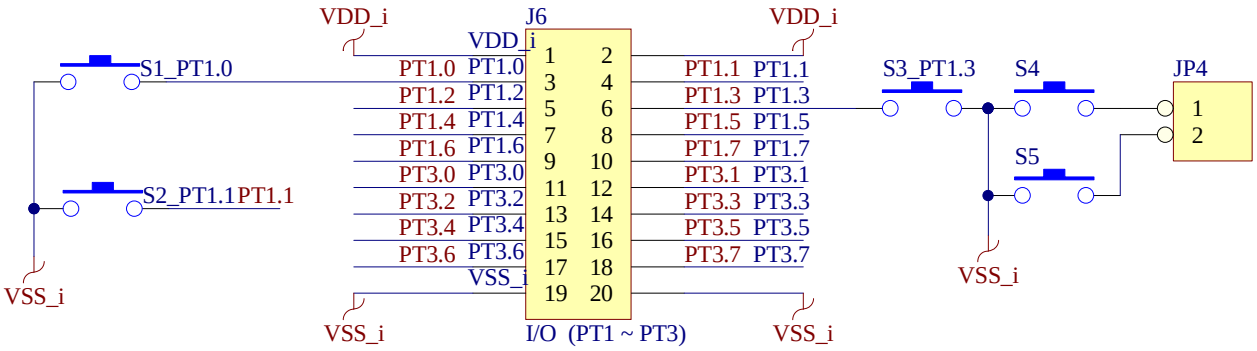
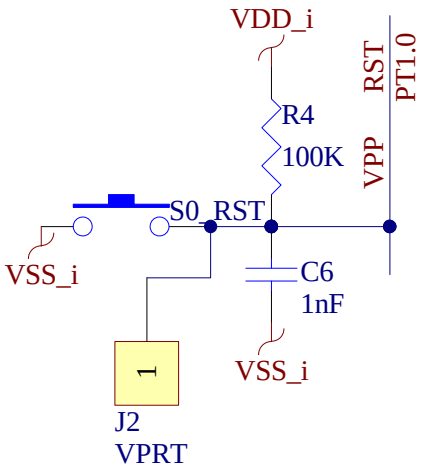


Figure 0-4

S4 and S5 are Expand Button. Users can thread to any Digital I/O Port externally.

6. Reset button



When U1utilizes HYCON OTP Body, R4 and C6 must be located, C6 value cannot exceed 1nF.

Figure 0-5

7. J4 : Analog Port

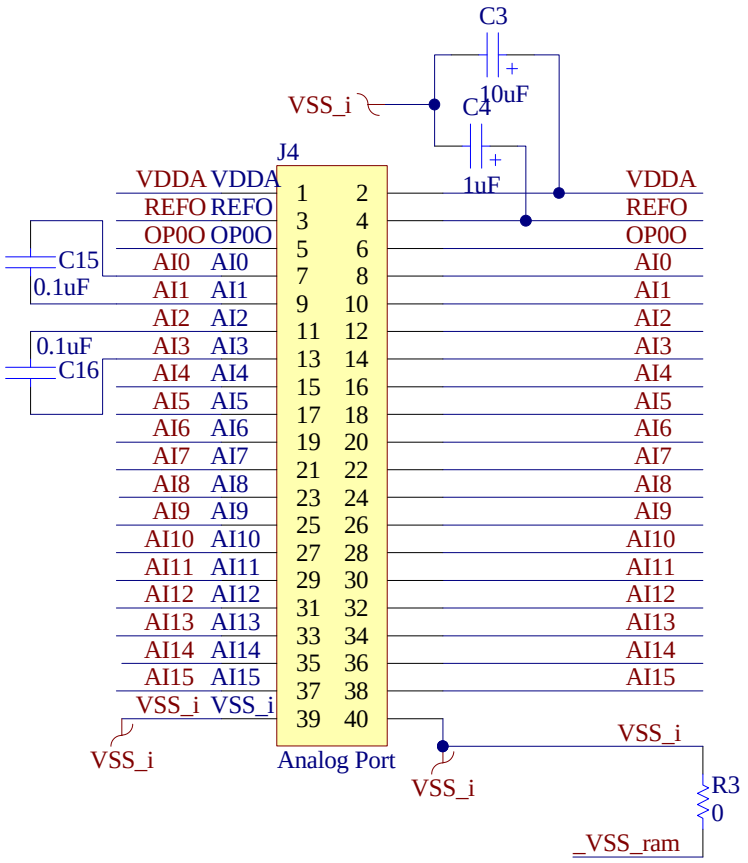


Figure 0-6

C3 → VDDA Capacitance, the suggestion value is 1uF ~ 10uF.

C4 → REFO Capacitance, the suggestion value is 22nF ~ 100nF.

C15 → AI0 – AI1 ADC Input Capacitance (When ADC Input Channel, AI0 and AI1 is selected), the suggestion value is 0.1uF.

C16 → AI2 – AI3 ADC Reference Capacitance (When ADC Reference Channel, AI2 and AI3 is selected), suggestion value is 0.1uF.

If U1 is connected to HY-IDE ICE Board and HY-IDE ICE Board has these capacitance, the above-mentioned capacitance is not a must.

8. JP8, JP9 and JP10 : OP And Reference circuit

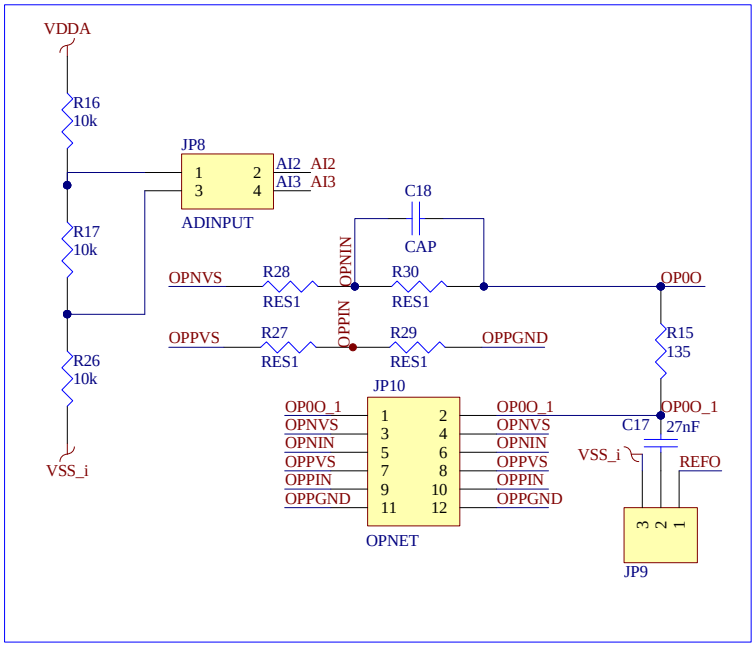


Figure 0-7

This circuit is the same with the fifth and sixth description of HY-IDE ICE Board.

9. JP6 : Peripheral circuit of PT2

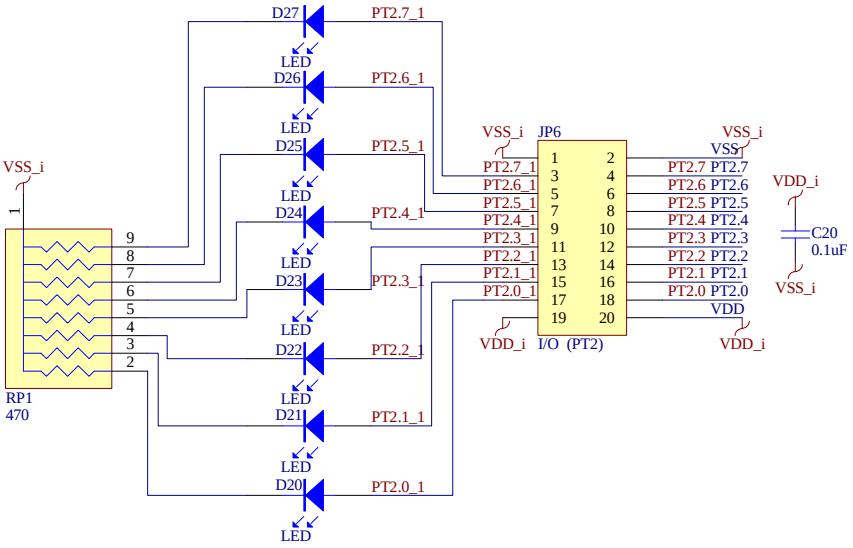


Figure 0-8

When LED display function is enabled, PIN 1-2 and PIN 19-20 of JP6 must be short circuit.

PT2.0 ~ PT2.7 can be selected to be LED driving display I/O according to users' request.

10. EEPROM – 24C02

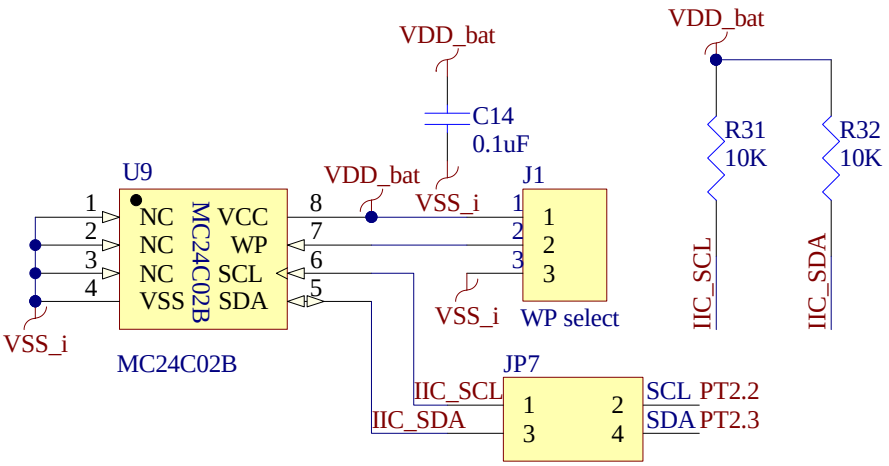


Figure 0-9

If EEPROM 24C02 is utilized to safe calibration parameters, PIN 1-2 and PIN3-4 of JP7 must be short circuit.

If users intend to forbid writing 24C02, PIN 1-2 must be short circuit.

11. LCD Display

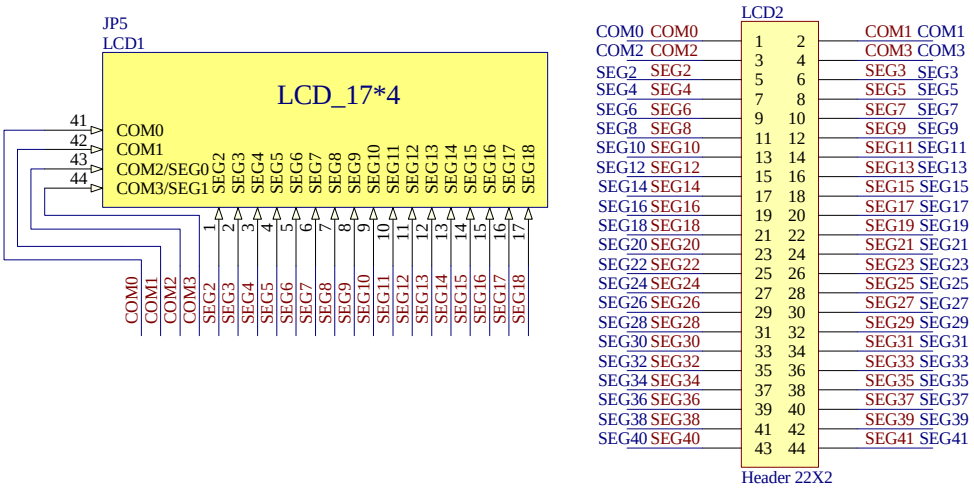


Figure 0-10

4.3 Circuit Chart

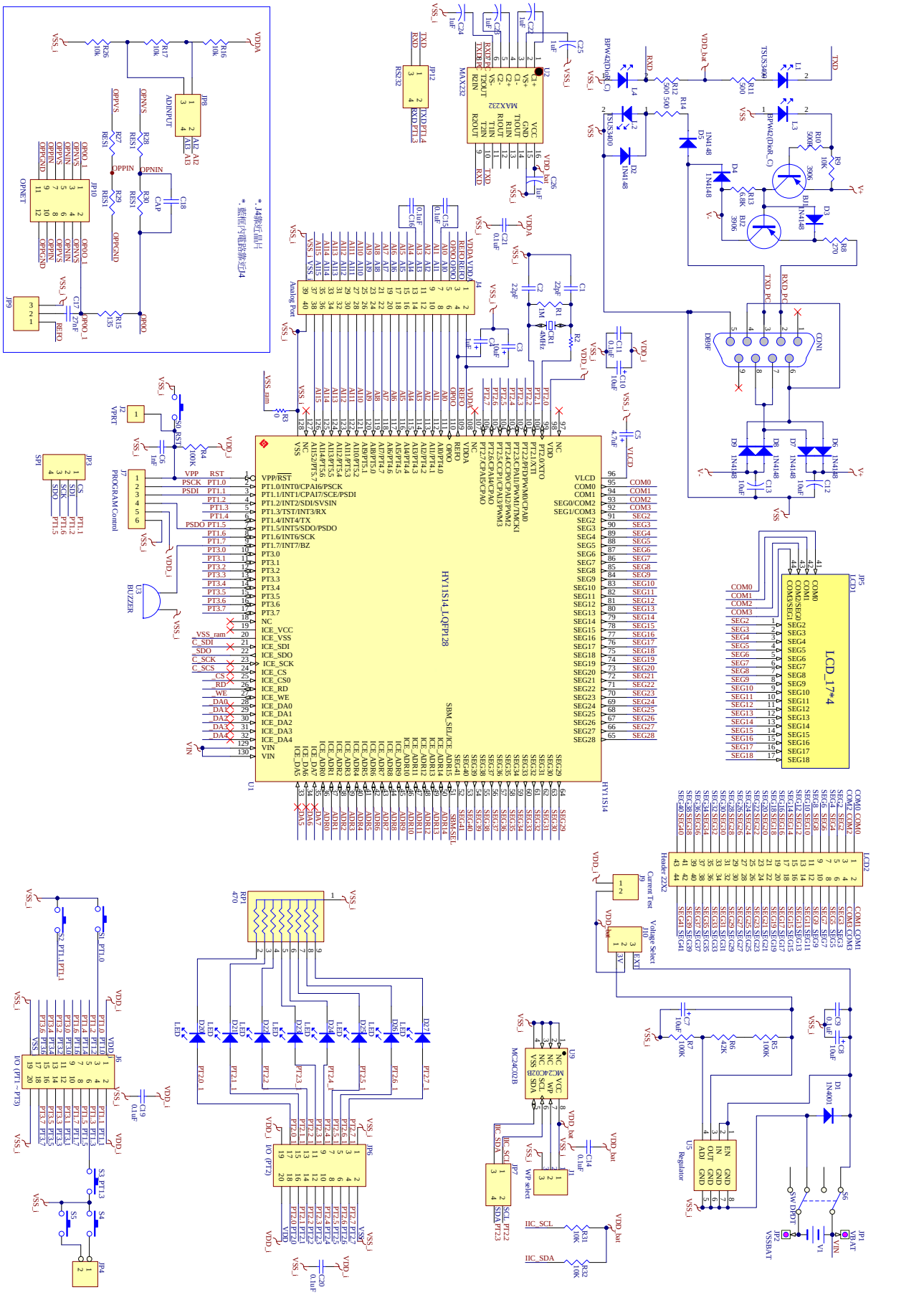


Figure 0-11