

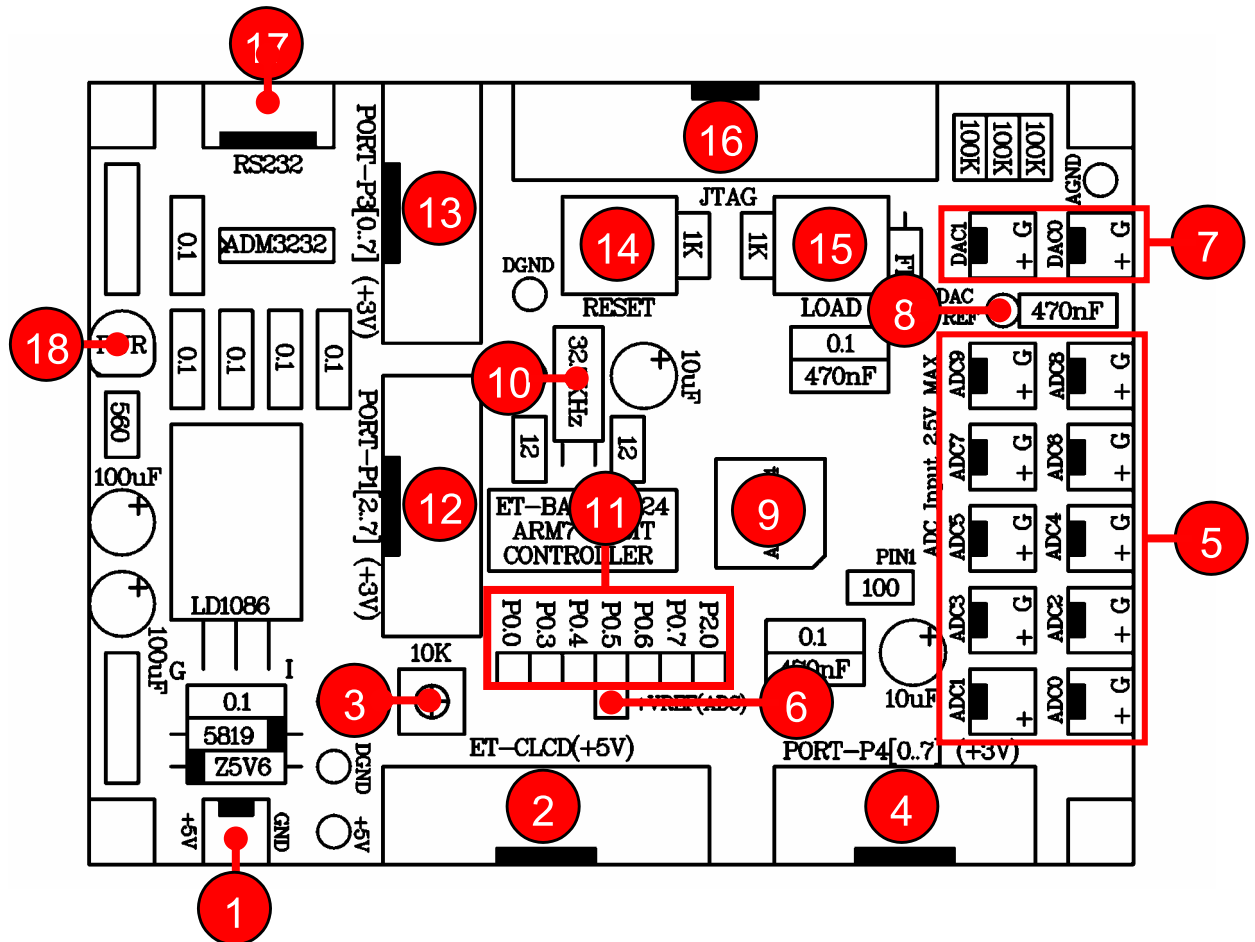
ET-BASE ARM7024 (ADUC7024)

ET-BASE ARM7024 which is Board Microcontroller ARM7 64PIN family uses Microcontroller No.ADUC7024 from Analog Device to be permanent MCU on Board. The MCU is contained in DIP 64PIN LQFP. It can connect with signal Analog both ADC 12Bit 10 Channel and DAC 12Bit 2 Channel. Moreover, it can collect data maximum 41.78 MHz by using XTAL 32.768 KHz and circuit Phase Lock Loop internal MCU. Additionally, there are fully components such as Flash Memory 62 Kbyte and RAM 8 Kbyte, SPI, UART, Watchdog Timer, Timer/Counter, and PWM. Board is designed to be a small size, so we can apply board and develop program for various project works easily.

Specifications

- Use MCU ARM7 TDMI Core No.ADUC7024 form Analog Device to be permanent MCU on board, XTAL 32.768 KHz and can be configured to use with Phase Lock Loop, in this case, CPU can collect data maximum high speed 41.78 KHz. Moreover, MCU has other interesting specifications as following;
 - Flash Memory 62KByte and RAM 8KByte
 - 5 Port I/O; P0(6Bit), P1(8Bit), P2(1Bit), P3(8Bit) and P4(8Bit)
 - 1 UART Port Communication, 1 SPI Port Communication
 - 4 Circuit Timer/Counter
 - Circuit ADC 12Bit 10 Channel and Circuit DAC 12BIT 2 Channel
 - Circuit Watchdog, Power-ON Reset, PWM
- 3 Connector I/O TTL Header 2x5 (P1, P3, and P4)
- Connector LCD Header 2x7 to support the connection with LCD Character
- Connector Rs232 for usage and download through RS232
- Power Supply +5VDC with Regulate 3.3V on Board with LED to display status of Power
- PCB size 8 x 6 cm.

Structure of Board ET-BASE ARM7024 (ADUc7024)



- **No.1** is Connector Power Supply +5VDC on Board.
- **No.2** is Port-LCD Character Type for connecting as 4 Bit type through Port-P4[0..6].
- **No.3** is VR for Contrasting brightness of LCD.
- **No.4** is Port-P4 8 Bit; P4[0..7].
- **No.5** is Connector ADC 10 Channel; ADC[0..9].
- **No.6** is Connecting Point of external Reference Voltage for ADC.
- **No.7** is Connector DAC 2 Channel; DAC[0..1].
- **No.8** is Connecting Point of external Reference Voltage for DAC.
- **No.9** is MCU No.ADUc7024 which is MCU ARM7TDMI family from Analog Device.
- **No.10** is Crystal 32.768 KHz.
- **No.11** is Port-P0 6 Bit; P0[0,3,4,5,6,7] and Port-P2 1 Bit; P2[0].
- **No.12** is Port-P1 6 bit; P1[2..7].

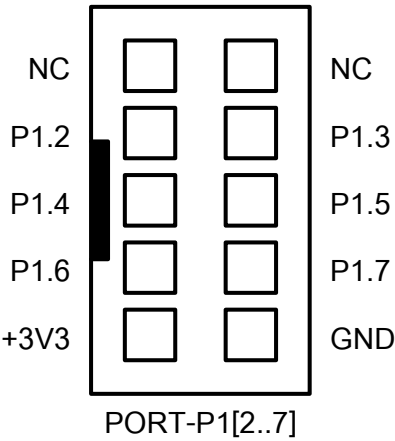
- **No.13** is Port-P3 8 Bit; P3[0..7].
- **No.14** is Switch RESET to reset operation of CPU.
- **No.15** is Switch LOAD and using with Switch RESET to Download Hex into MCU.
- **No.16** is Connector ARM-JTAG to debug program.
- **No.17** is Connector RS232 for general usage and Download Hex into MCU.
- **No.18** is LED Power to display status of Power supply +5VDC.

Connectors

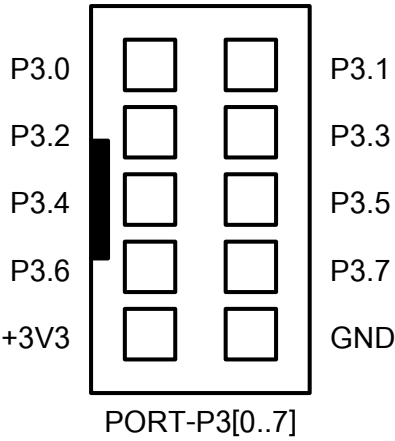
For Connector Port I/O from MCU, it is designed and is provided through 3 Connector IDE Header 10PIN (2x5); PORT-P1, PORT-P3 and PORT-P4 respectively. In the part of PORT-P0 and PORT-P2 are interfaced to be Header 1x7. For each Connector consists of Signal I/O that is connected directly from Pin of MCU. The connecting point with external signal of board is shown as following;

- Connector Power Supply +5VDC.
- Connector PORT-P0 6 Bit; P0[0,3,4,5,6,7].
- Connector PORT-P1 6 Bit; P1[2,3,4,5,6,7]. In the part of P1.0 and P1.1 are interfaced through Circuit Line Driver (MAX232) to transform TTL signal level of MCU to be standard RS232 Voltage level. Signal RS232 that has already transformed is interfaced with Connector CPA 4 PIN (RS232).
- Connector PORT-P2 1 Bit; P2.0.
- Connector PORT-P3 8 Bit; P2[0,1,2,3,4,5,6,7].
- Connector PORT-P4 8 Bit; P4[0,1,2,3,4,5,6,7]. It is interfaced into Connector LCD 7 Bit; P4[0,1,2,3,4,5,6] respectively
- Connector ADC 10 Channel; ADC0-ADC9 and can receive signal Analog 0-2.5V.
- Point for receiving external 0-3V Reference Voltage of DAC (DAC Reference).
- Connector DAC 2 Channel; DAC0, DAC1 and can create signal Analog 0-2.5V.
- Point for receiving Reference Voltage of external DAC (DAC Reference) 0-2.5V
- Connector ARM-JTAG
- Connector RS232

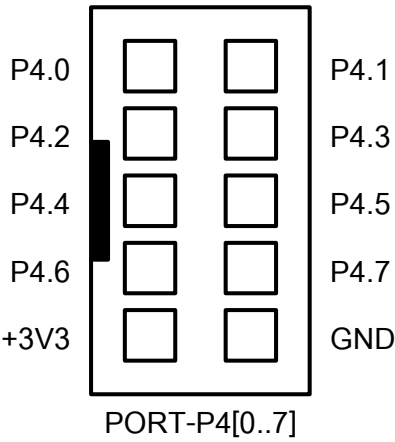
Port P1 6 Bit



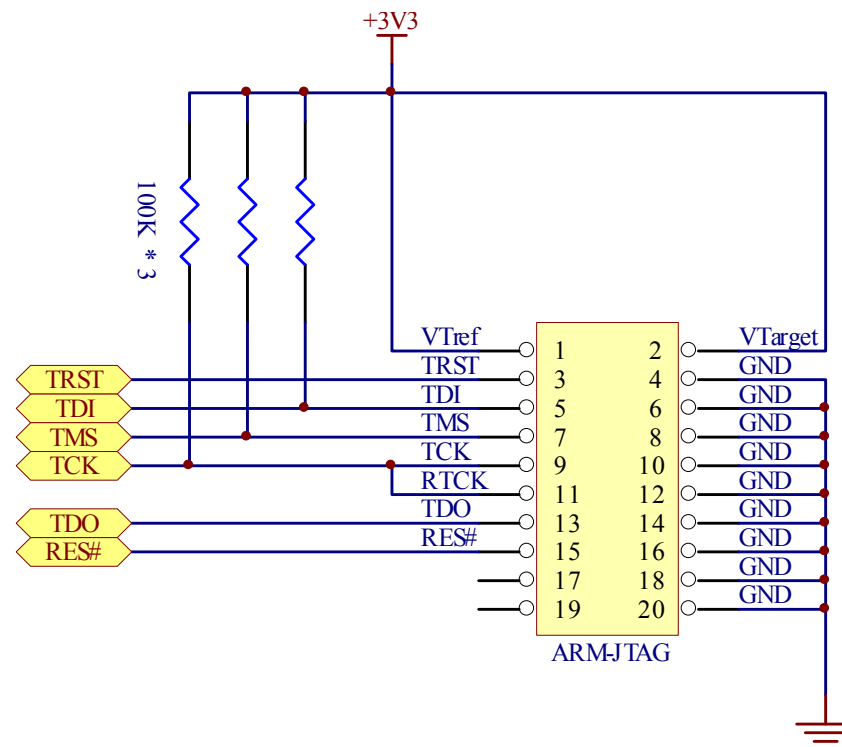
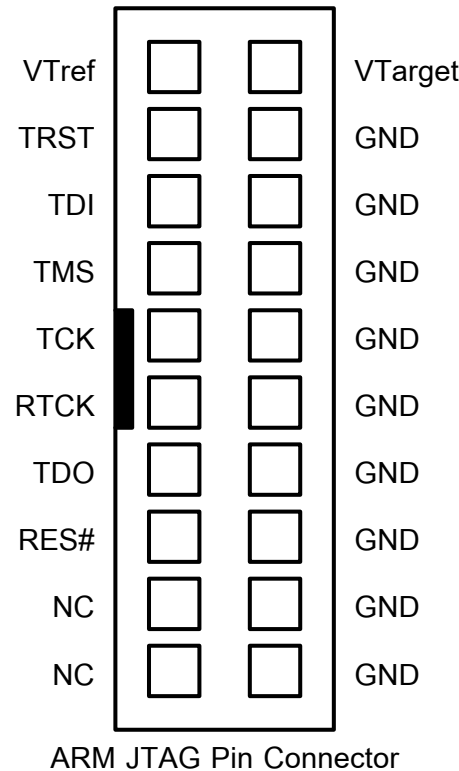
Port P3 8 Bit



Port P4 8 Bit

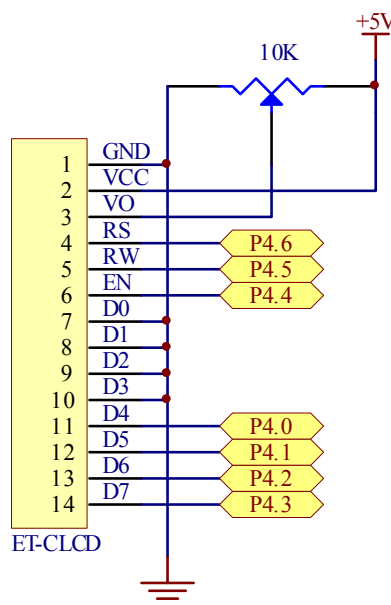
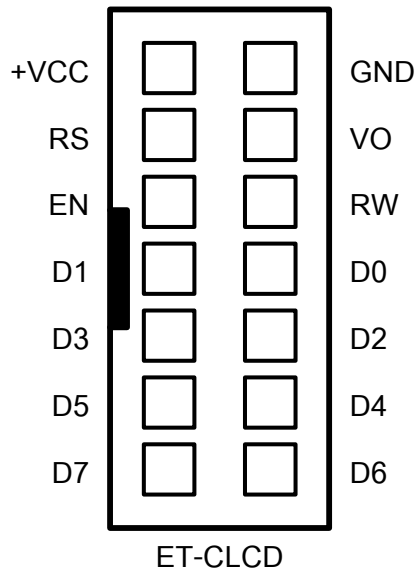


Port ARM-JTAG



Picture Show circuit for connecting with ARM-JTAG.

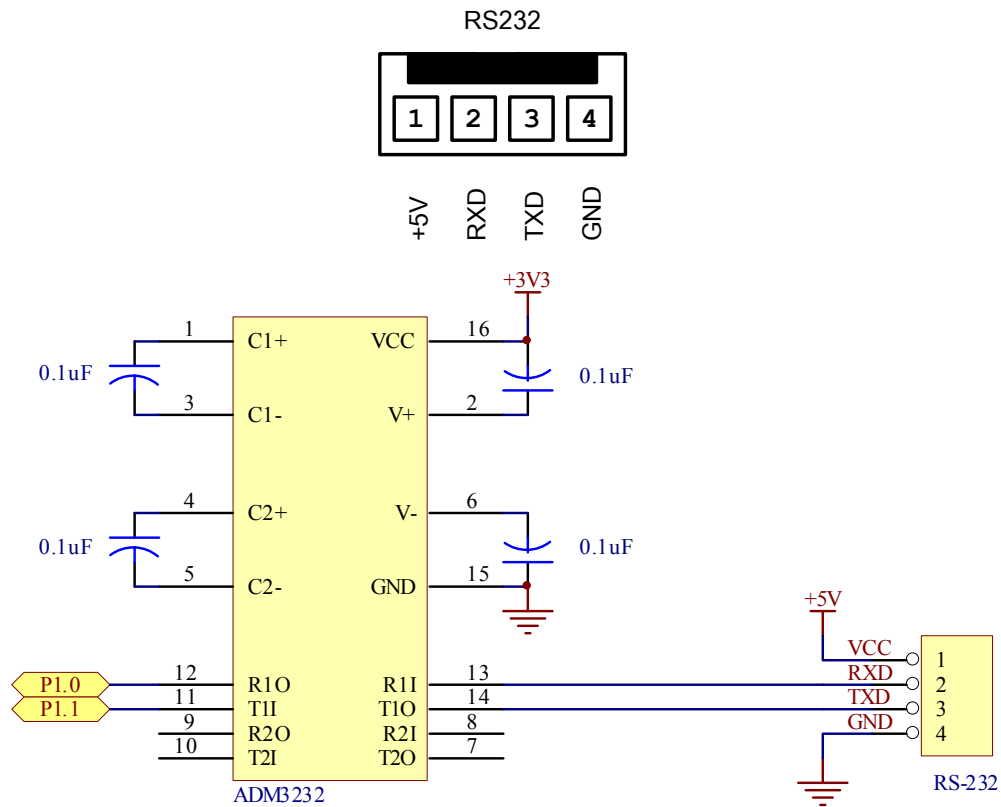
Port CLCD is used with Character LCD for connecting as 4 Bit type. It uses the same signal that is connected to Connector PORT-P4 to connect with LCD. We interface cable form Connector Port LCD into LCD Display Monitor. In this case, we must use the signal name to be reference and must interface all 14 cables corresponding with the truly name on the Connector.



1	2	3	4	5	6	7	8	9	10	11	12	13	14
GND	+VCC	VO	RS	RW	EN	D0	D1	D2	D3	D4	D5	D6	D7

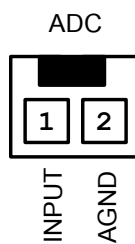
Show Pin Arrangement of Character LCD Standard.

Port RS232 is signal RS232 that is transformed signal level by circuit MAX232 completely. We connect it with signal RS232 for sending/receiving data; moreover, it can be used with Switch PSEN and Switch RESET to Download as Manual Type.

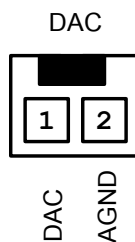


Picture displays circuit for connecting with RS232.

Connector ADC0-ADC9



Connector DAC0 and DAC1



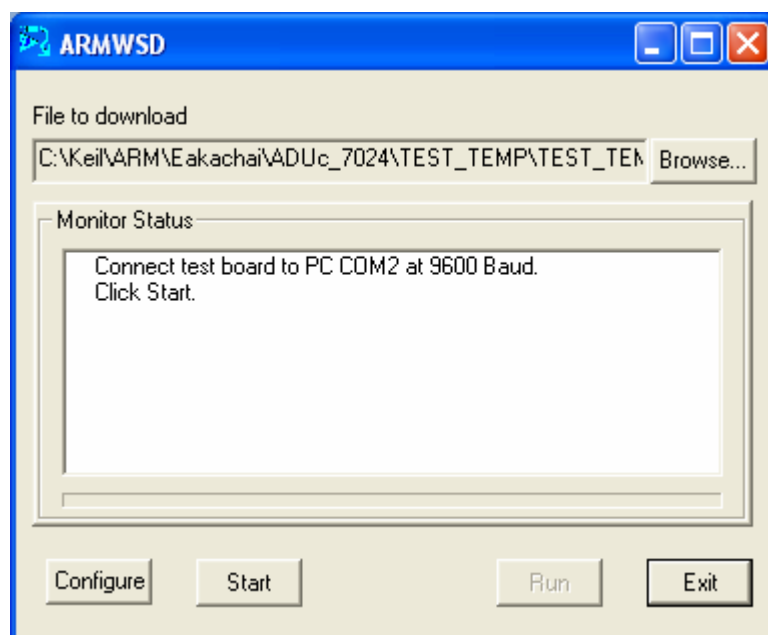
To Download Hex File into MCU of Board

We use program "ARMWSD" of Analog Device to download Hex File into Flash Memory of MCU on Board through Serial Port of computer PC. In this case, we can download this program from WWW.ANALOG.COM free without any charge and in case purchase from ETT Co., Ltd. this program is provided in CD-ROM completely.

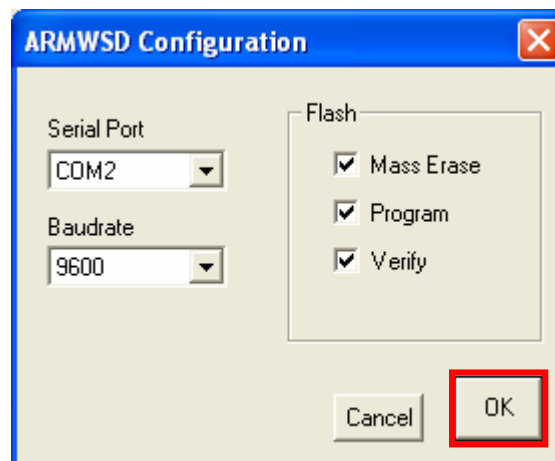
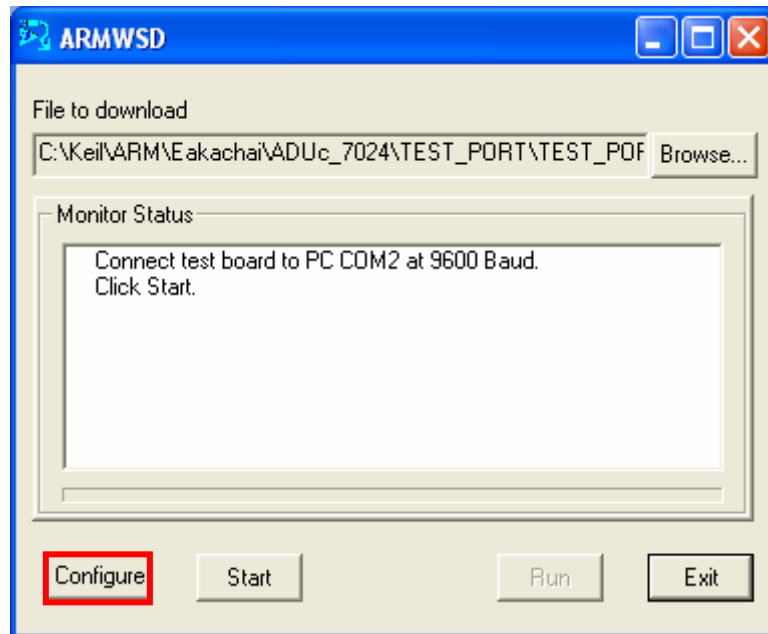
Program ARMWSD (ARM Windows Serial Download) is a program for development system of Microcontroller ARM family from Analog Device. It can support development program of Microcontroller ARM family from Analog Device for various number including ADUc7024. It can run under Window9X/Me/NT/2000 and Windows XP and support the connection with Hardware system as RS232 type. In this case, we use program ARMWSD to download data into memory of Microcontroller that run on Monitor Mode.

For Board ET-BASE ARM7024 (ADUc7024), we can Reset CPU to run in Monitor Mode for downloading HEX File from PC into Board as following;

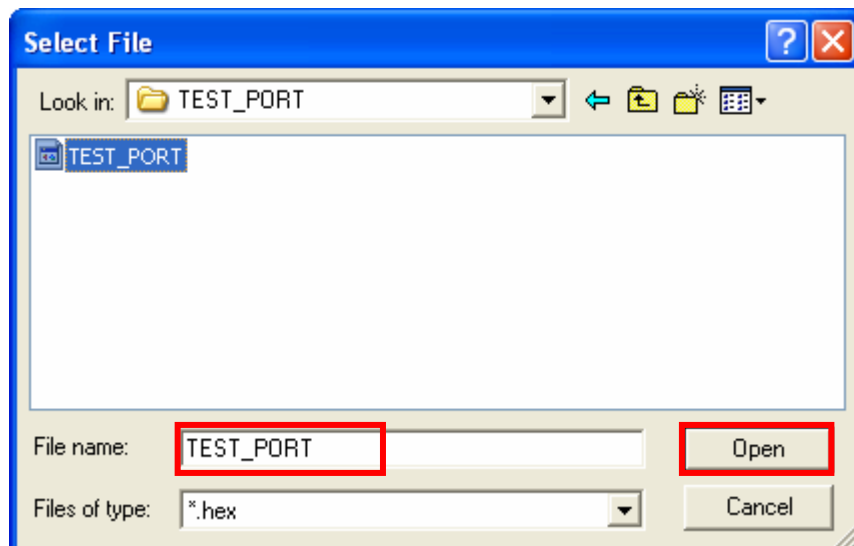
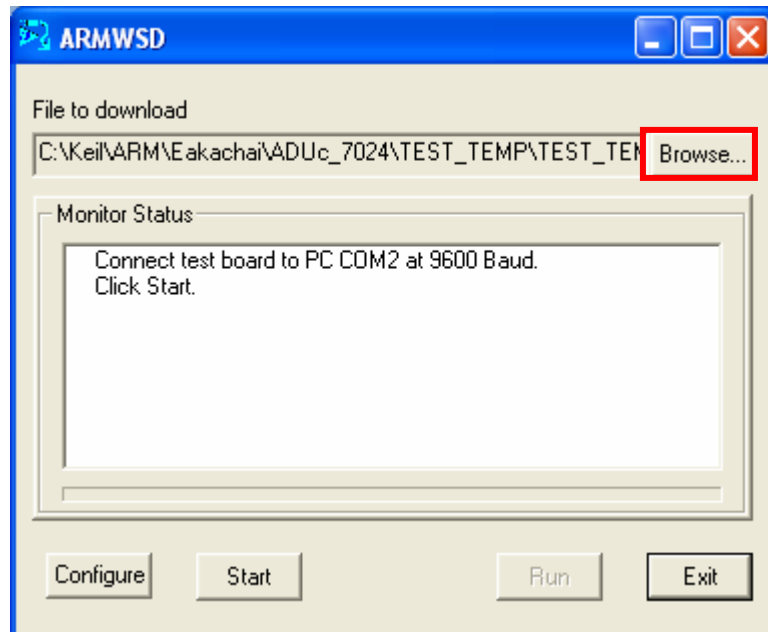
1. Interface Cable RS232 from Com Port of computer PC with Connector RS232 4PIN of Board.
2. Supply power into circuit of board and we can see red LED displaying status of PWR is in status ON.
3. Run Program "ARMWSD" and it will display window as in the picture below.



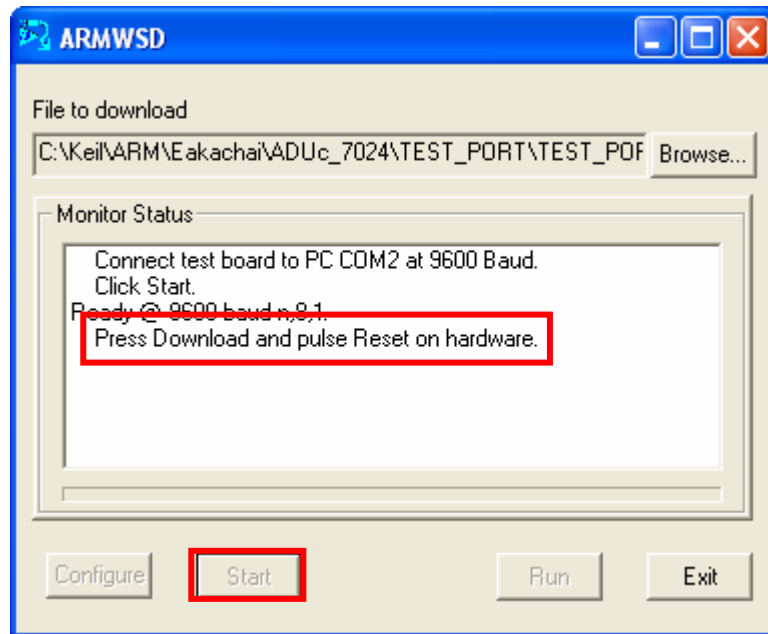
4. We configure default value for connecting with RS232 Serial Port Communication as truly usage, click button **"Configure"** and then select the truly usage of Comport number as in the sample below.



5. Open Hex File that we want to download into MCU into Buffer of Program, click button **"Browse..."** and then assign name of Hex File as in the sample below.



6. Click button **"Start"** to start downloading, program will respond operation and display message to us as in the picture below. It notices us to RESET MCU to run in Monitor Mode as in the picture.



7. Reset MCU to run in Monitor Mode as following;
- a) Press Switch LOAD for a while to configure Pin P0.0 (BM) to be "0".
 - b) Press Switch RESET to send signal RESET into MCU but we remain pressing Switch LOAD.
 - c) Let Switch RESET to configure MCU is out of REST status but we remain pressing Switch LOAD.
 - d) Finally, let Switch LOAD.

8. If there's no error, program will start downloading HEX File into MCU instantly. In this step, we must wait for the proceeding completely first and then click Button **"Run"** or press Switch RESET on board to configure MCU to run as the downloaded program as in the picture below.

