**MLT**

# Fino (Arduino Compatible) Board Manual (Demo)

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# Chapter1. Overview and Board Description

## 1.1. Introduction

Arduino is an open-source based on a simple I/O board and a development environment that implements the processing/wiring language. Arduino can be used to develop stand-alone interactive objects or can be connected to software on your computer.

Fino (Arduino Compatible) Board is a microcontroller board based on the ATmega328 microcontroller with duemilanove bootloader, flash memory 32KB, EEPROM 1KB, SRAM 2KB, clock speed 16MHz. Supports Windows, Mac OS X, Linux. Open source. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs with the standard arduino pin headers will be developed with other arduino boards and use FT232RL drive signal interface with your computer and includes 3.3VDC output for your other developments and includes DIP switch SPST to disable auto reset and the yellow LED (D13).

ATmega328 microcontroller is MCU AVR® Atmel 32K FLASH 28-PDIP, Program memory size 32K x 8, RAM size 2K x 8, Number of I/O = 23, Speed 20MHz, Oscillator type = Internal, Program memory type = FLASH, EEPROM size = 1K x 8, Core processor = AVR, Data converters = A/D 6x10b, Core size 8 bit, Operating temperature -40°C ~ 85°C, Connectivity = $I^2C$, SPI, UART/USART, Peripherals = Brown-out Detect/Reset, POR, PWM, WDT, Voltage Supply (Vcc/Vdd) = 1.8V ~ 5.5 V

## 1.2. Board Feature



**Figure1.2.1**

1.2.1. **ATmega328** 28pin DIP Microcontroller with Duemilanove bootloader.
1.2.2. ATmega328 includes 32KB Memory, 1KB EEPROM, 2KB SRAM.
1.2.3. Quartz crystal 16 MHz.
1.2.4. Standard ICSP 6pins will be developed with AVR ISP.
1.2.5. Interface with computer and upload program via USB port.
1.2.6. The operating voltage of the ATmega328 Microcontroller is 5V.

1.2.7. The operating voltage of the Fino (Arduino Compatible) Board is 7-12V.
1.2.8. The Fino (Arduino Compatible) Board can be powered via the USB
connection or with an external power supply.
The power source is selected automatically.
1.2.9. The Fino (Arduino Compatible) Board has a resettable polyfuse that
protects your computer's USB ports from shorts and over current.
1.2.10. Digital Input / Output are 14 pins (PWM 6 channels).
1.2.11. Analog Input is 6pins.
1.2.12. **DIP Switch SPST** to disable auto reset and the yellow LED (D13).
1.2.13. FT232RL drives the signal interface with computer.
1.2.14. Includes the Standard Arduino Pin Header - 8 pins & 6 pins
(Female) will be stacked with external devices or other arduino boards.
1.2.15. Includes 3.3VDC output from FT232RL for your other developments.
1.2.16. Board Dimension is 53.3mm(Width) * 68.6mm(Long) * 15.0mm(High).
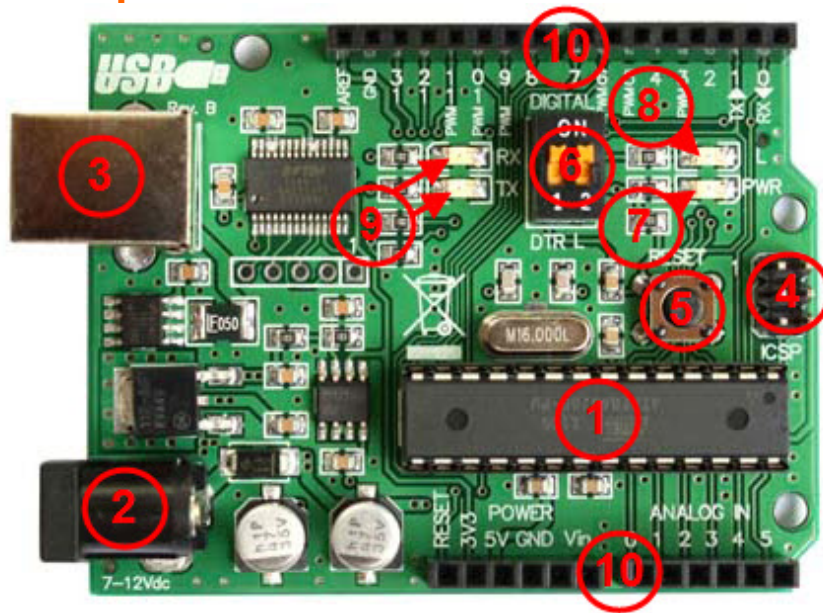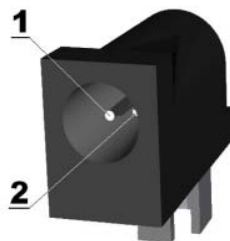
## 1.3. Board Description



**Figure1.3.1**

**No.1** is **ATmega328** Microcontroller.
**No.2** is DC Jack pole will be supplied power into the Fino (Arduino Compatible) Board which operating voltage is 7-12VDC as figure 1.3.2 (Outer pole is negative pole and Inner pole is positive pole).



| PIN # | Signal Name |
|-------|-------------|
| 1     | 7-12Vdc     |
| 2     | GND         |

**Figure1.3.2**

**No.3** is USB port will be connected with computer and upload program into the Fino (Arduino Compatible) Board.
**No.4** is Standard ICSP 6pins will be programmed bootloader with AVR ISP.
**No.5** is Reset switch will be reset operation of microcontroller.

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Tel. 081-027-0918
www.mlt-group.com
Email: mlt@windowslive.com

**No.6** is DIP Switch SPST to disable auto reset (Position1: DTR) and Green
LED (Position2: L).
    a) Position1 (DTR) will be set "**ON**" to write program to develop
       the Fino (Arduino Compatible) Board.
    b) Position1 (DTR) will be set "**OFF**" to run program after completely
       wrote program and to protect the Fino (Arduino Compatible) Board is
       reset by itself while run program which may be cause come from
       RS232 signal.
    c) Position2 (L) will be set "**ON**" to enable Yellow LED (D13).
    d) Position2 (L) will be set "**OFF**" to disable Yellow LED (D13).

**No.7** is LED-PWR (Green LED) will be lighted when power is supplied into
the Fino (Arduino Compatible) Board.

**No.8** is Yellow LED (D13) will be tested operation of the Fino (Arduino
Compatible) Board.

**No.9** RX and TX LED will be lighted when upload program.

**No.10** is the Standard Arduino Pin Header - 8 pins & 6 pins (Female)
will be stacked with external devices or other arduino boards.

# Chapter2. Getting Started

## 2.1. Safety Instruction

Observe the following safety guideline when connection and using your Fino (Arduino Compatible) Board as follow:

2.1.1. Place your Fino (Arduino Compatible) Board on an insulation surface and treat it carefully. The Fino (Arduino Compatible) Board can be damaged if dropped.

2.1.2. Put your Fino (Arduino Compatible) Board in a location with low humidity and a minimum of dust.

2.1.3. Never use your Fino (Arduino Compatible) Board if the DC Jack cable has been damaged. Do not allow anything to rest on the DC Jack cable, and keep the cable away from where people could trip over it.

2.1.4. Never insert anything metallic into the Fino (Arduino Compatible) Board. Doing so may create the danger of electric shock.

2.1.5. To avoid electric shock, never touch the inside of the Fino (Arduino Compatible) Board.

2.1.6. Fino (Arduino Compatible) Board is provided for ventilation. To prevent overheating, these openings should not be blocked or covered. Also, avoid using the Fino (Arduino Compatible) Board on a bed, sofa, rug, or other soft surface.

2.1.7. Do not expose the Fino (Arduino Compatible) Board to rain or use it near water. If the Fino (Arduino Compatible) Board accidentally gets wet, unplug (DC Jack cable, USB cable) it and you can clean the exterior of the Fino (Arduino Compatible) Board with a dry cloth when necessary, but be sure to unplug (DC Jack cable, USB cable) the Fino (Arduino Compatible) Board first.

## 2.2 Install the USB driver to PC

2.2.1. Connect the USB port of the Fino (Arduino Compatible) Board to PC then the window will be found new hardware as follow.



**Figure2.2.1**

2.2.2. Then information will be shown the found new hardware wizard then choose **"No, not this time"** and click **"Next"** as follow.
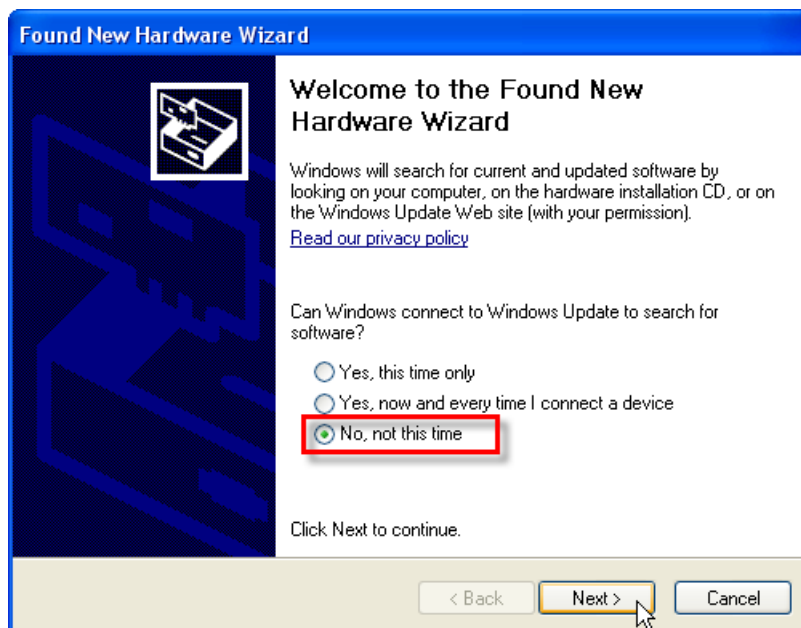


**Figure2.2.2**

## 2.3. Install the Arduino Software

The software to development is contained in a free CD. The software name is "arduino-1.0.1". If user need to more information or the latest version program you can be downloaded on website arduino.cc.

## Install the Arduino Software as the following:

2.3.1. Insert a free CD into the CD-ROM Drive.

2.3.2. Copy the Arduino Software from a free CD is choose folder "Arduino Software\Windows\arduino-1.0.1" into drive "C:\Program Files" as figure2.3.1.
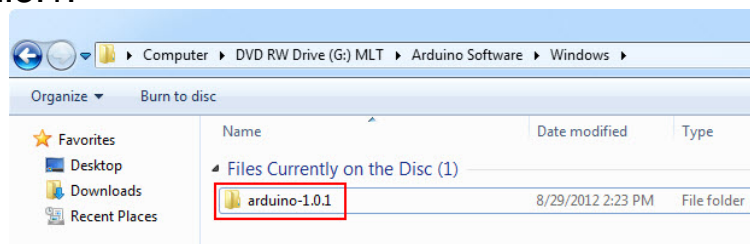


**Figure2.3.1**

2.3.3. After already copied this folder "arduino-1.0.1" then create shortcut of this program "arduino-1.0.1" on your desktop is right-click on icon

**"arduino**  **"** then select "Send To>Desktop (create shortcut)" as figure2.3.2
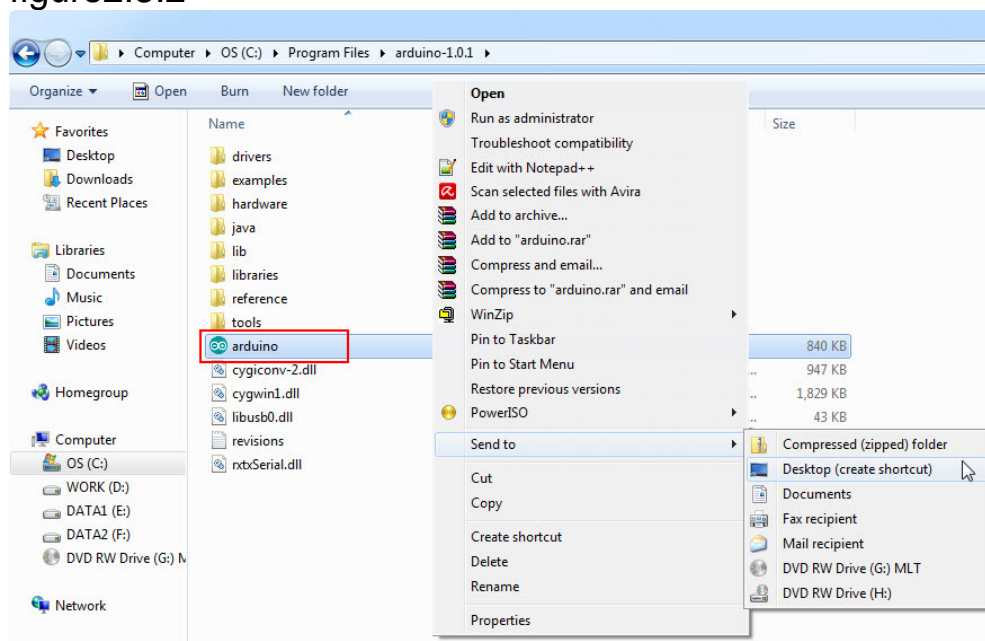


**Figure2.3.2**

2.3.4. After already created the shortcut then it will be shown

 **"Shortcut to arduino"** on your desktop.

## 2.4. Starting Fino (Arduino Compatible) Board with Blink Program

After completely installed the Arduino Software then will be tested the Fino (Arduino Compatible) Board is open an example program (Blink program) then compile and upload program into the Fino (Arduino Compatible) Board as following:

2.4.1. Connect the Fino (Arduino Compatible) Board to your computer via USB cable and power supply 7-12VDC via DC Jack pole **(Outer pole is negative pole and Inner pole is positive pole)** then LED-PWR (Green LED) will be lighted as figure2.4.1 and choose DIP switch position1 (DTR) & position2 (L) are "**ON**" as figure2.4.1.
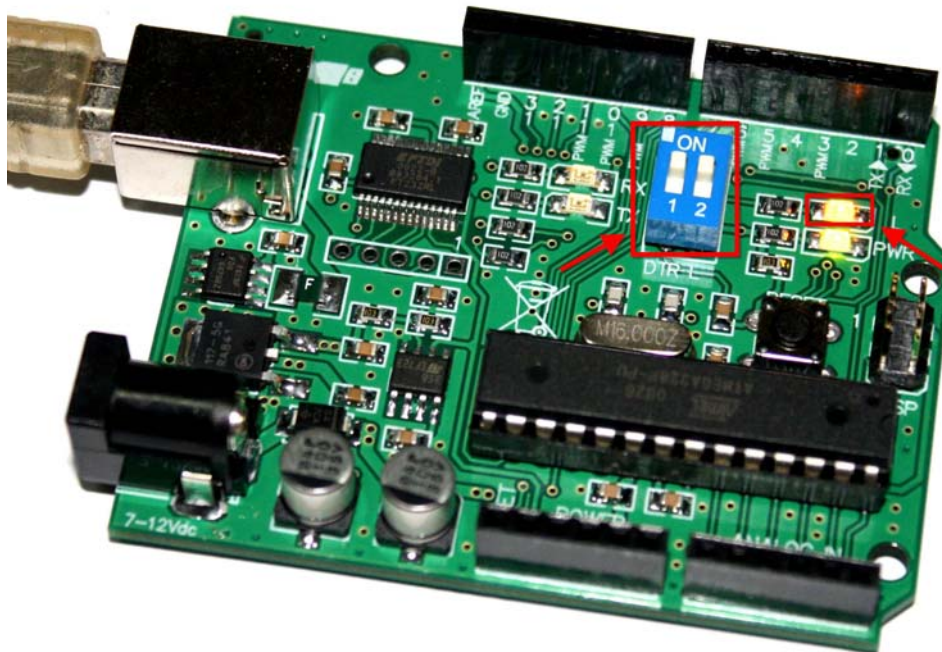


**Figure2.4.1**

2.4.8. If the C language code is correct and not found data error then information will be shown **"Done compiling"** and "Binary sketch size" as figure2.4.9.
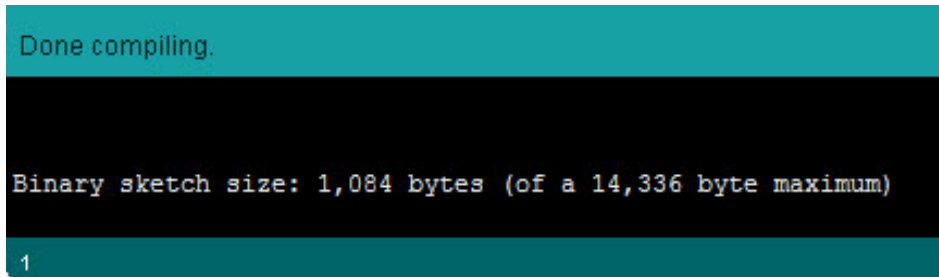


**Figure2.4.9**

2.4.9. Choose **"File > Upload"** or click Icon as figure2.4.10 to upload program into the Fino (Arduino Compatible) Board.
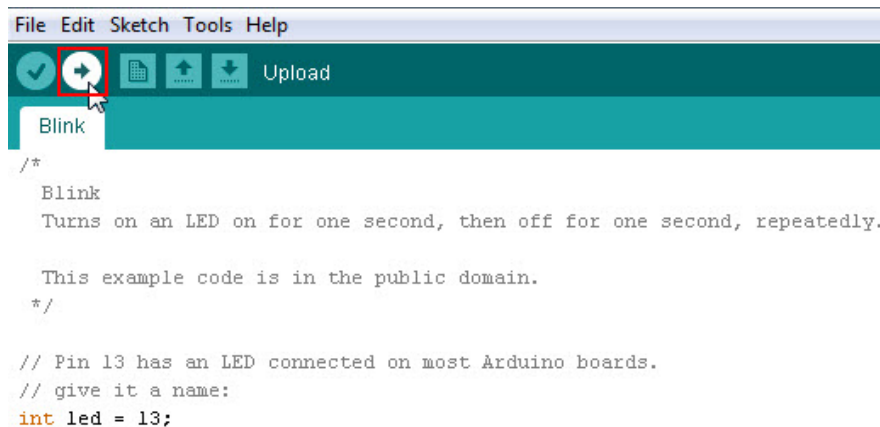


**Figure2.3.10**

2.4.10. If completely uploaded an example program (Blink Program) then information will be shown **"Done uploading"** and "Binary sketch size" as figure2.4.11 then Yellow LED (D13 port) will be displayed blink with the rate is ON=1sec. and OFF=1sec. continuously.
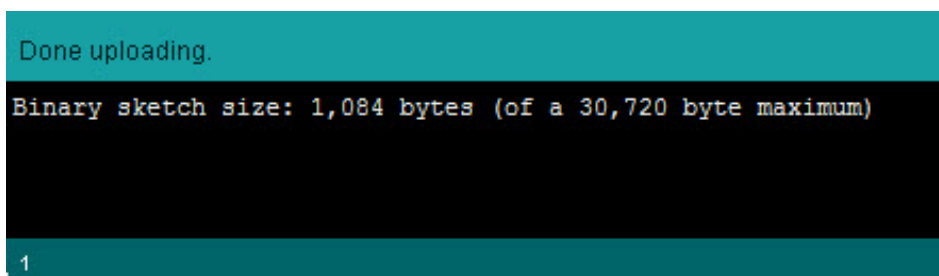


**Figure2.4.11**

# Chapter3. Index

## 3.1. Arduino Software Versions

3.1.1. Arduino 1.0.1 version (The latest version includes in a Free CD) support Windows, Mac OS X, Linux (32 bit/64 bit)

3.1.2. Arduino 1.0 version support Windows, Mac OS X, Linux (32 bit/64 bit)

3.1.3. Arduino 0023 version support Windows, Mac OS X, Linux (32 bit/64 bit)

3.1.4. Arduino 0022 version support Windows, Mac OS X, Linux (32 bit/64 bit)

3.1.5. Arduino 0021 version support Windows, Mac OS X, Linux (32 bit)

3.1.6. Arduino 0020 version support Windows, Mac OS X

3.1.7. Arduino 0019 version support Windows, Mac OS X, Linux (32 bit)

3.1.8. Arduino 0018 version support Windows, Mac OS X, Linux (32 bit)

3.1.9. Arduino 0017 version support Windows, Mac OS X, Linux (32 bit)

3.1.10. Arduino 0016 version support Windows, Mac OS X, Linux (32 bit)

3.1.11. Arduino 0015 version support Windows, Mac OS X, Linux (32 bit)

3.1.12. Arduino 0014 version support Windows, Mac OS X

3.1.13. Arduino 0013 version support Windows, Mac OS X, Linux (32bit)

3.1.14. Arduino 0012 version support Windows, Mac OS X, Linux (32bit), Linux (AMD 64bit)

3.1.15. Arduino 0011 version support Mac OS X, Windows, Linux

3.1.16. Arduino 0010 version support Mac OS X, Windows, Linux

3.1.17. Arduino 0009 version support Mac OS X (>= 10.3.9): PPC (10.4, 10.3.9), Intel. Windows. Linux

3.1.18. Arduino 0008 version support Mac OS X (>= 10.3.9) PPC, Intel. Windows

3.1.19. Arduino 0007 version support Mac OS X (>= 10.3.9): PPC, Intel. Windows, Linux

3.1.20. Arduino 0006 version support Mac OS X (>= 10.3.9): PPC, Intel. Windows

3.1.21. Arduino 0005 version support Mac OS X (>= 10.3.9), PPC, Intel. Windows

3.1.22. Arduino 0004 version support Mac OS X (>= 10.3.9). Windows

3.1.23. Arduino 0003 version support Mac OS X PPC / Mac OS X Intel, Windows

3.1.24. Arduino 0002 version support Mac OS X, Windows

3.1.25. Arduino 0001 version support Mac OS X, Windows (with Java / without Java)

## 3.2. References

3.2.1. www.mlt-group.com

3.2.2. www.arduino.cc

3.2.3. www.atmel.com

3.2.4. www.ftdichip.com

3.2.5. www.es.co.th

3.2.6. www.ece.com.tw

3.2.7. www.wealthmetal.com

3.2.8. www.freeduino.org

3.2.9. www.gold-tek.com.tw

3.2.10. www.st.com

3.2.11. www.ligitek.com

3.2.12. www.mecquartz.com

## 3.3. Contact us

3.3.1. ML-Technology (MLT) sells products on Ebay.
   If you will buy our product via Ebay.
   Seller ID is **mlt2009.**



3.3.2. ML-Technology (MLT) accepts Paypal payment.
   If you will buy our product via Paypal.
   Paypal account is mlt@windowslive.com



3.3.3. www.mlt-group.com
   Email is mlt@windowslive.com
   **Tel. 081-027-0918**

## 3.4. Funds Transfer (Bank Transfer)

3.4.1. Kasikorn Bank  ; Wangnoi branch , Savings account ,
   The account no. 469-2-18796-8

3.4.2. Siam Commercial Bank  ; Future Park Rangsit branch ,
   Savings account , The account no. 383-2-09377-2