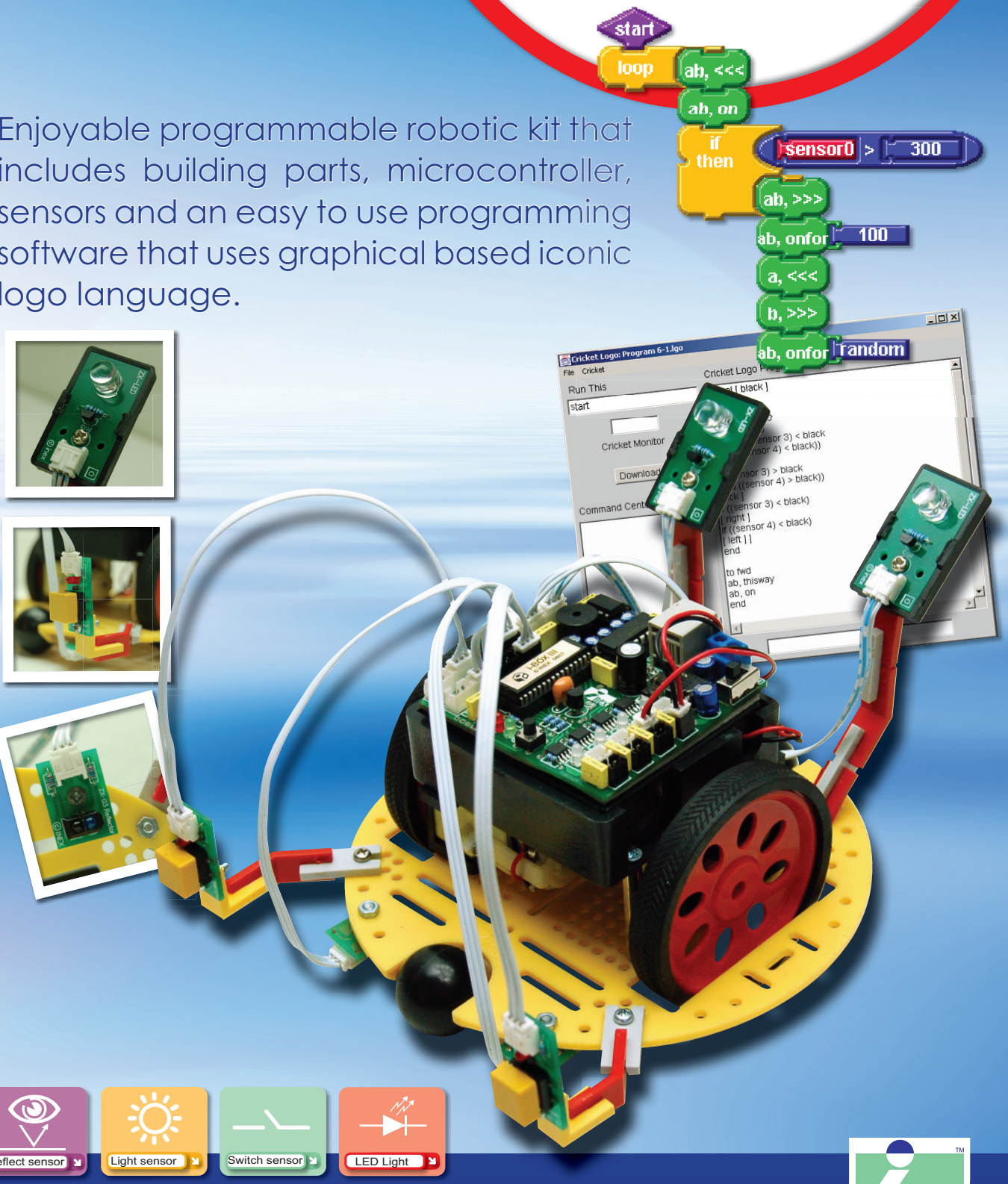
Robo-CIRCLE

The basic programmable robotic kit for everyone

Enjoyable programmable robotic kit that includes building parts, microcontroller, sensors and an easy to use programming software that uses graphical based iconic logo language.



Step by step from starting to the intelligent robot with sensors.

inex™ INNOVATIVE EXPERIMENT

System requirements

Hardware

You will need either a PC or laptop computer to run the Robo-CIRCLE software. Getting started with Robo-CIRCLE is easiest if your PC or laptop has the following features:

- Harddisk space 15MB
- 800 x 600 Resolution Color Monitor. 1024 x 768 recommended.
- A serial or USB port (requires USB to serial port converter for USB port - optional)
- A CD-ROM drive, World Wide Web access, or both.

RS-232 serial port may be called COM port. Normally installed at the back of computer. It provides 9-pin male D-type connector (called DB-9 male connector).

Software

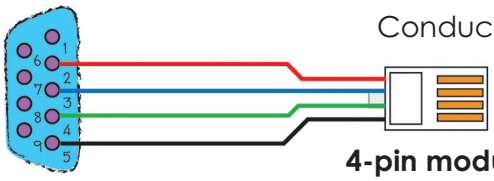
- Install Windows ME or newer operating system.

Windows XP Service-pack2 is highly recommended. Window Vista and Windows 7 is also supported.

Cable information :

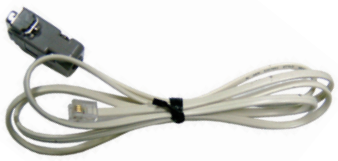
CX-4 cable

COM port interfacing cable between controller board with computer



Female DB-9 connector
Computer's side

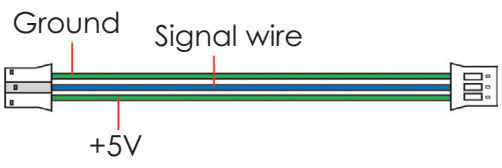
4-pin modular plug
Microcontroller's side

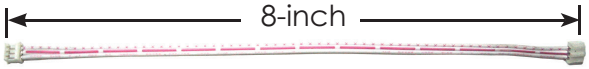


pin 2 - RxD (Serial data receiver pin)
pin 3 - TxD (Serial data transmitter pin)
pin 4 - DTR (Data terminal ready)
pin 5 - GND (Ground)

JST3AA-8 cable

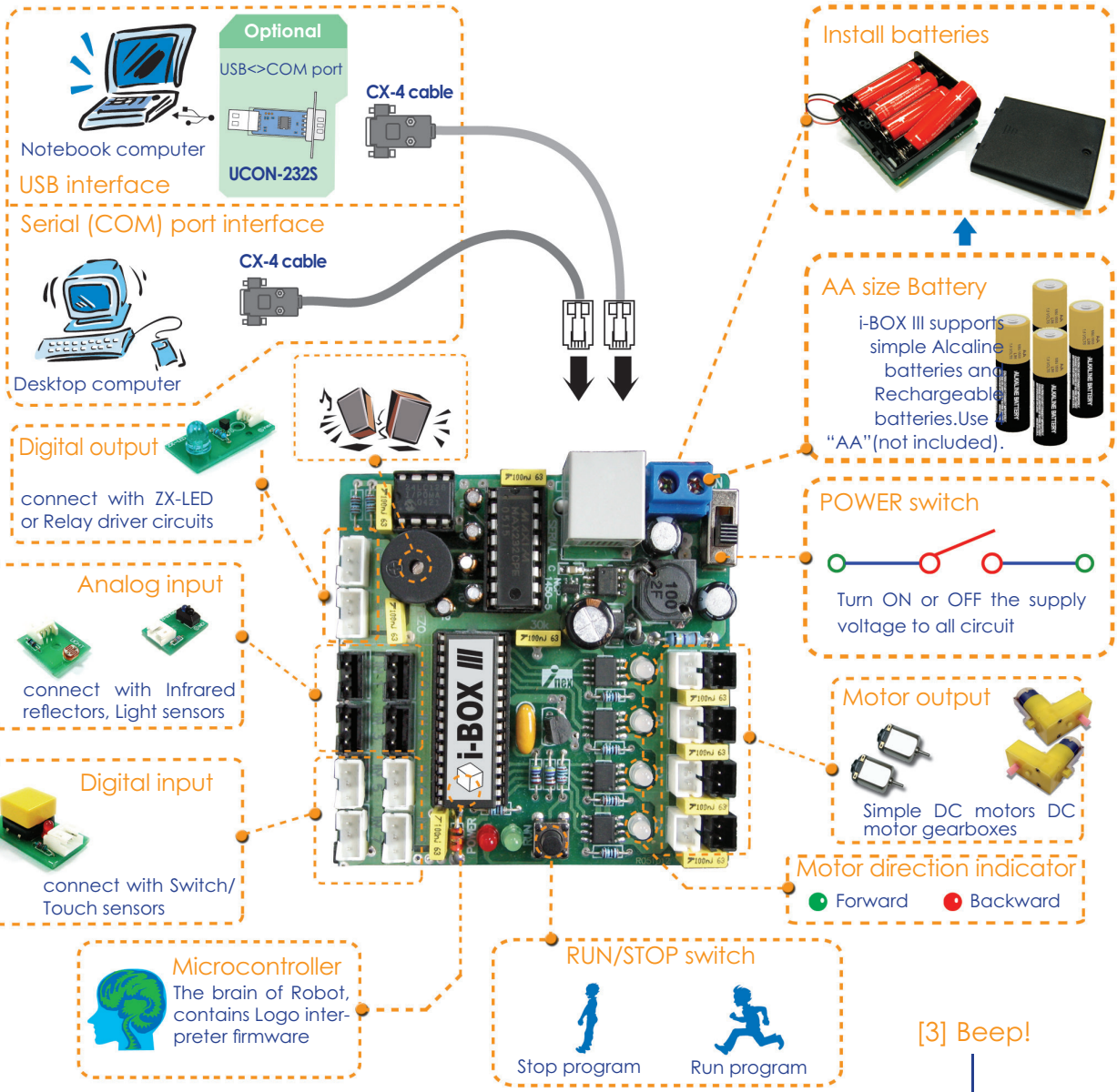
3-wire cable for interfacing the sensor and application module





Getting started with the i-BOX III

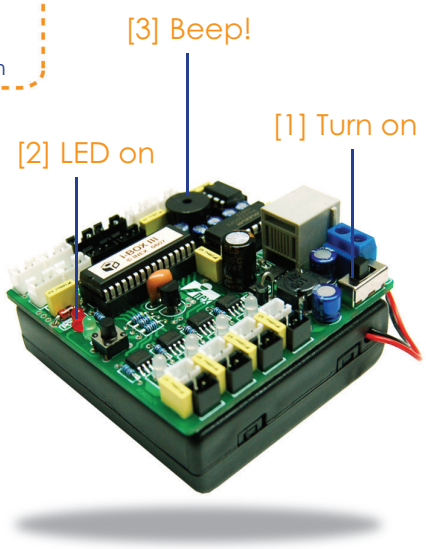
Computer has only USB port



First step with i-BOX III

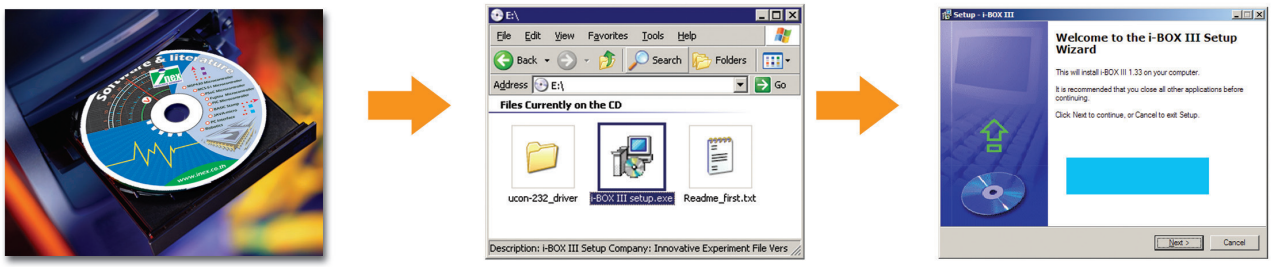
(1) Flip the i-BOX upside down and open the battery cover to place 4 "AA" batteries into the battery holder. Please ensure that the polarity of the placement of your batteries are correct in order for the i-BOX to function.

(2) Turn on POWER switch. The Red LED light will blink a few times followed by a Beeping sound from its speaker

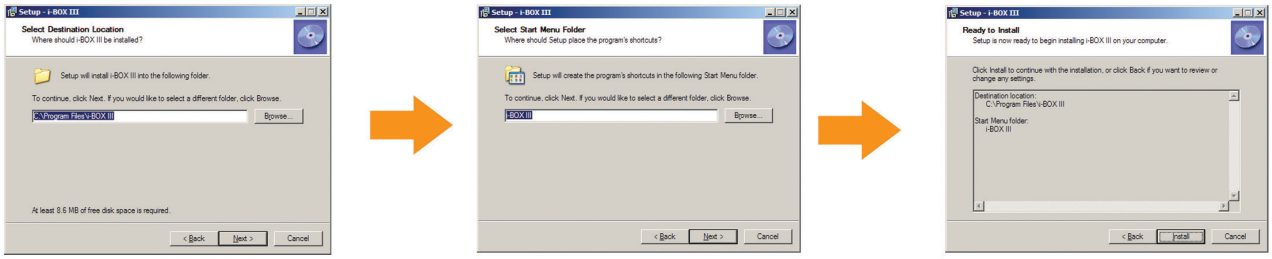


Software installation

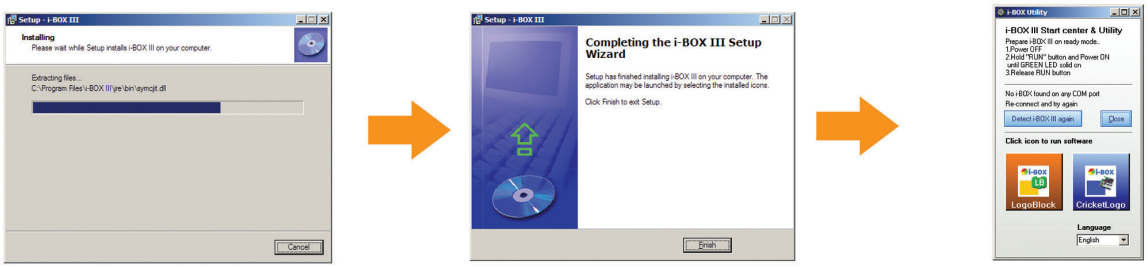
(1) Insert Robo-CIRCLE CD-ROM into your drive. Double-click on i-BOX III V133 setup.exe. You will see the Installation Welcome page. Click on the "NEXT" button to Continue installation.



(2) If do not need to change any specifications, click on the "NEXT" button continue.

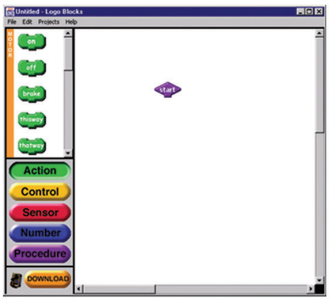


(3) Installation is started. i-BOX Utility window is appeared. Yuo can use it for searching the available COM port for interfacing with i-BOX controller board automatically.

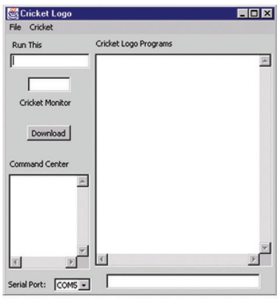


(4) Run the program by clicking on the Start > Programs > i-BOX III LogoBlocks or Criket Logo.

Click Start button



Logo Blocks



Cricket Logo

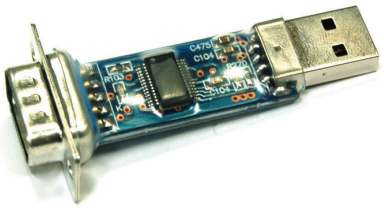
How does the i-BOX interface with my computer

Direct serial connection to COM port of your computer with the CX-4 cable.

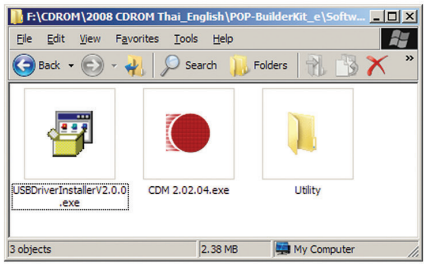
Direct connect to working

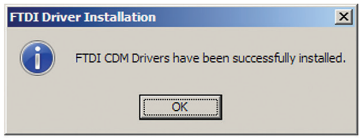
Connect USB port using the UCON-232S USB to Serial converter device.

Using the USB port, you will first need to install the driver provided by the USB to Serial converter device which is optional.



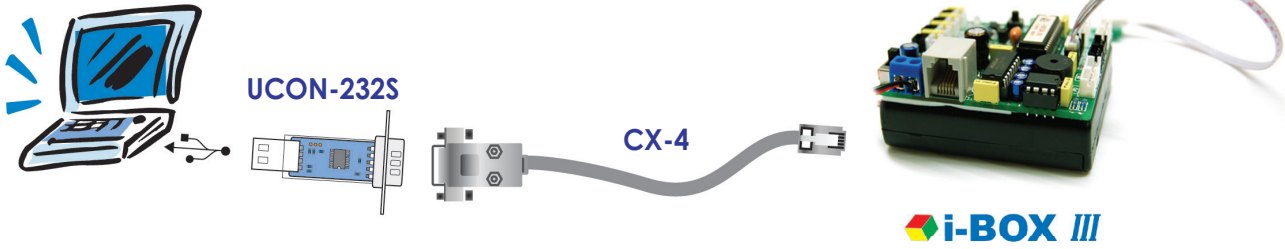
(1) Back to the installation CD-ROM, open UCON-232 USB Driver folder to find the **USBdriverInstallerV2.xx.exe**. Double-click on this file to start installation.





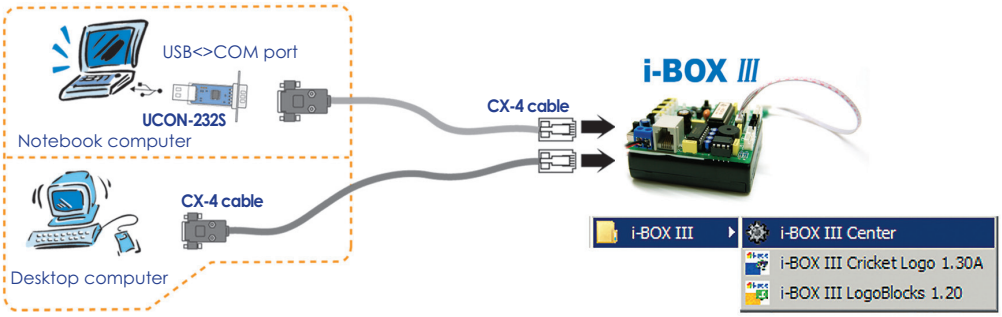
(2) Plug in the UCON-232S to the USB port. The computer will connect with the UCON-232S automatically. The blue LED of UCON-232S turns on to show a READY connection.

(3) Connect the CX-4 cable between the UCON-232S and the i-BOX controller.



How to choose the COM port interfacing

Search and choose by i-BOX III Center software



(1) Connect the CX-4 cable between i-BOX and the computer's COM port.

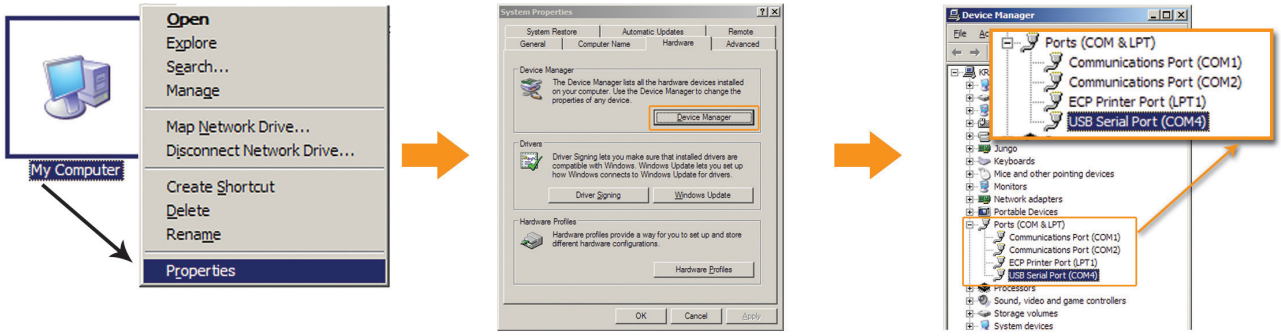
(2) Run the i-BOX III center by clicking on the Start > i-BOX III > i-BOX III Center.

(3) The i-BOX III Center software will search the COM port available of your computer and connect with the i-BOX automatically.

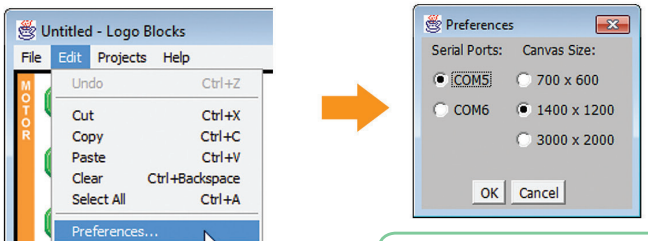
(4) Click on the LogoBlock or the CricketLogo to start the software.

Check and choose with your own

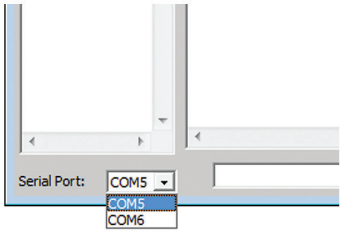
(1) Click the right button mouse on My Computer icon to choose Properties. The System Properties window is appeared. Select Hardware > Device Manager. Choose Ports listing (COM & LPT). Observe the number of Communication port (COMx). If using the UCON-232S device, the port name will display USB Serial Port (COMx) instead. Remember the COM port number to set in the software later.



(2) For the LogoBlocks software, select menu Edit > Preferences.. Choose the COM port interfaced from step (1) and click on the OK button. For Cricket Logo, you can set the COM port interfaced at the Serial port combo box on the main screen.

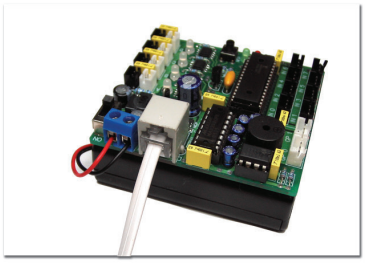


Choosing COM port of LogoBlocks



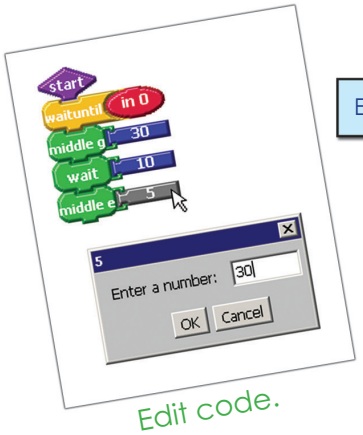
Choosing COM port of CricketLogo

How to develop Robo-CIRCLE programming

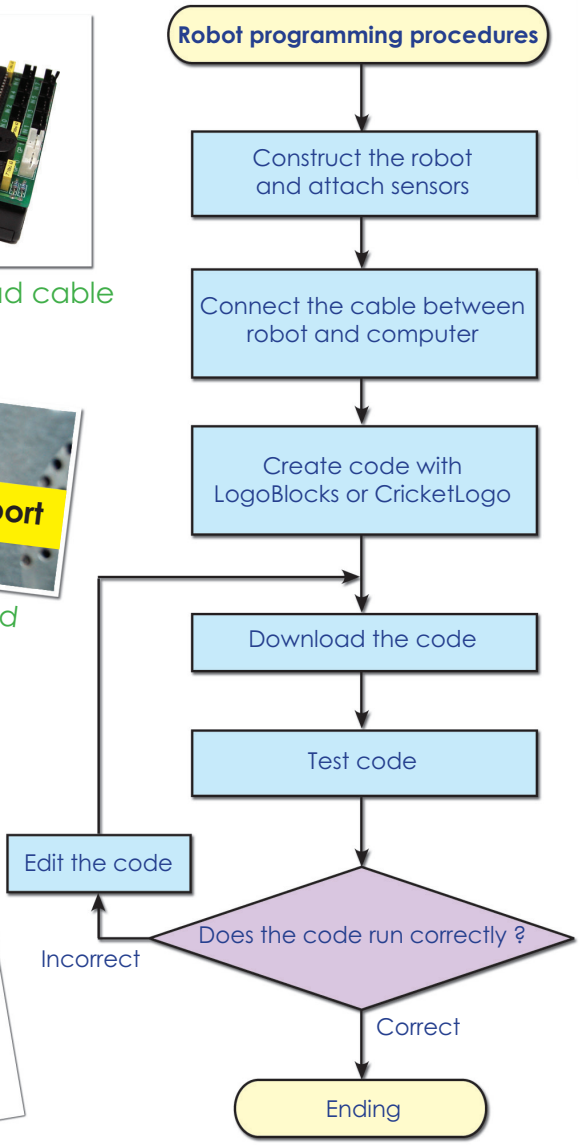


Connect the download cable to i-BOX III controller.

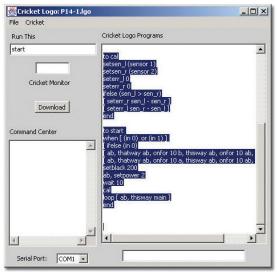
Connect the download cable to COM port.



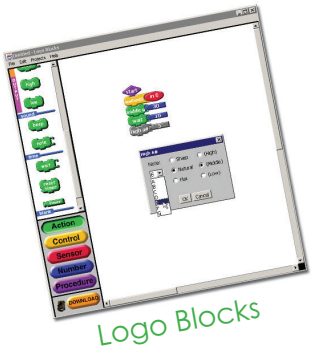
Edit code.



Construct the robot.



Cricket Logo



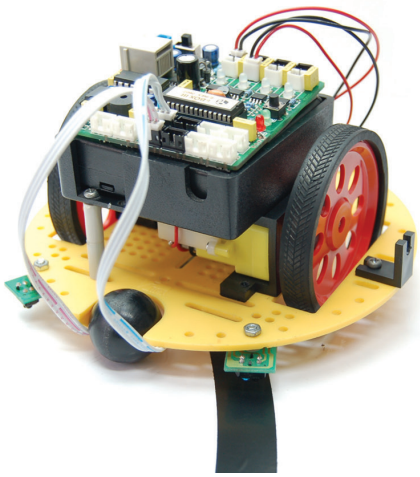
Logo Blocks

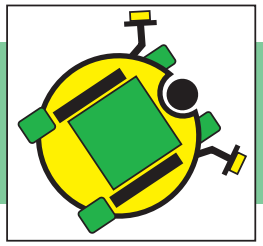
Robo-CIRCLE development is divided into 3 parts.

Part-1 : Prepare and construct the Robot from chassis, motors, wheels and other mechanical parts

Part-2 : Learn about i-BOX controller and Sensors

Part-3 : Controlled program





Command block summary of LogoBlocks

LogoBlocks is a unique software that lets you create iconic programs to control the i-BOX III controller. To create programs, you just drag blocks form the palette (on the bottom left of the screen) and snap them together on the canvas (on the right side of the screen). The buttons on the bottom left let you switch between palettes, each containing a different set of commands.

Action — Motor control, Sound and Timer command

- on — Drive motor
- off — Stop motor
- brake — Brake motor
- thisway — Forward direction
- thatway — Backward direction
- reverse — Reverse direction
- setpower — Set power to motor
- onfor — Set time of motor control
- high — Send HIGH logic
- low — Send LOW logic
- beep — Beep generation
- note — Musical generation
- wait — Set delay time
- reset timer — Reset timer value
- timer — Read timer value
- nop : No operation

Procedure — Procedure functions command

- Set of rules block
- Procedure icon
- beeper — Beep
- start — Start sub procedure

Control — Condition and loops command

- when — Interrupt
- when off — Stop interrupt
- repeat — Repeat loop
- loop — Loop operation
- waituntil — Wait condition
- if then — Check conditions
- if then else — Check additional conditions
- stop — Stop program operation

Sensor — Sensor functions command

- in — Digital input block
- sensor — Sensor block
- newir? — Serial data checking
- ir — Serial data buffer
- send ir — Serial data monitor
- erase — Delete data block
- record — Record value to memory
- reset dp — Clear Data Pointer
- recall — Recall data from memory
- setdp — Set data pointer

Command block summary of LogoBlocks

Number functions and arithmetic command

Declare variable

Set number

Random numerical

Numerical comparison (Less than statement)

Numerical comparison (Equal statement)

Numerical comparison (More than statement)

AND : logical block operation

OR : logical block operation

XOR : logical block operation

NOT : logical block operation

Adding

Subtraction

Multiplying

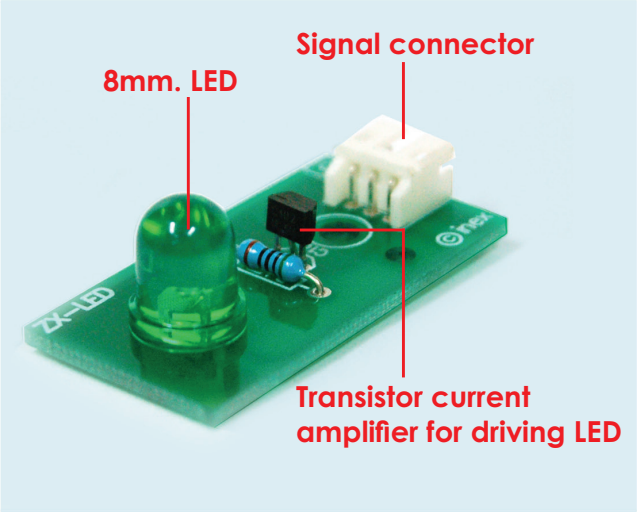
Divided

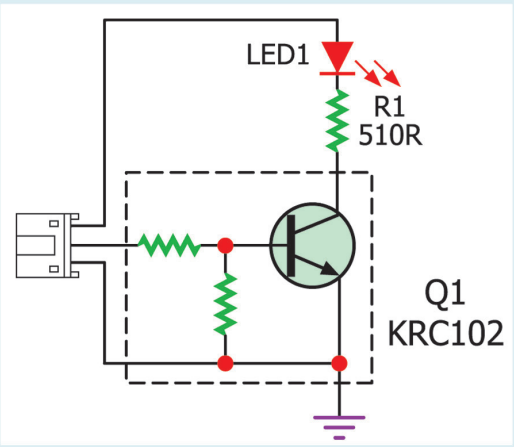
Modulus

ZX-LED : The LED output board introduction

How it work ?

The ZX-LED is digital output device module. The LED will lit when get the logic “1”





ZX-LED schematic diagram

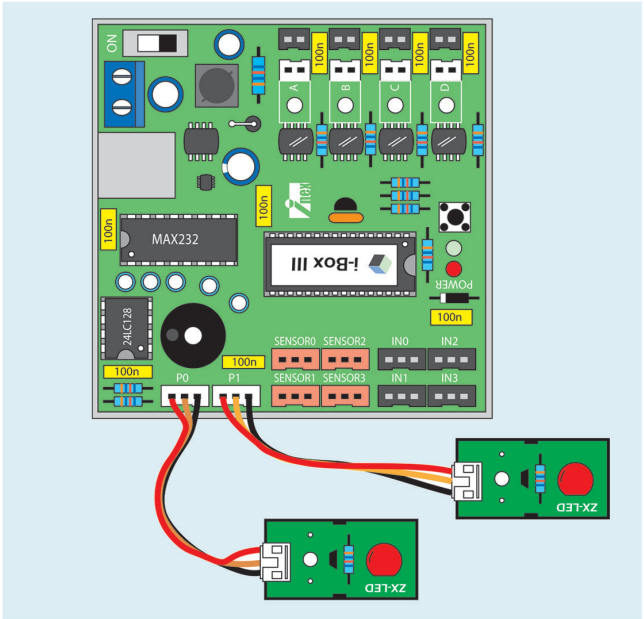
A light emitting diode (LED) emits light when current passes through it. The color of the LED usually just tells you what color it will glow when current passes through it. The important markings on an LED are contained in its shape.

Since an LED is a one-way current valve, you have to make sure to connect it the right way, or it won’t work as intended.

LED has 2 terminals. One is called the anode, and the other is called the cathode. On the schematic symbol, the cathode is the line across the point of the triangle and part drawing. For the part drawing, note that the LED’s leads are different lengths. The longer lead is connected to the LED’s anode, and the shorter lead is connected to its cathode.

ZX-LED includes a transistor to drive current for supporting the low source current output port of microcontroller. It ensures the LED on when the logic “1” applied to input.

Interfacing with i-BOX III



ZX-LED is an output device. This must be connected to P0 and P1; the digital output port of i-BOX III controller following the figure on left. There is a 4 command block for controlling the ZX-LED

Set P0 as logic “1” (+5V)

Set P1 as logic “1” (+5V)

Set P0 as logic “0” (0V)

Set P1 as logic “0” (0V)