IFC-EB02
Interface Free Controller
Extension Board
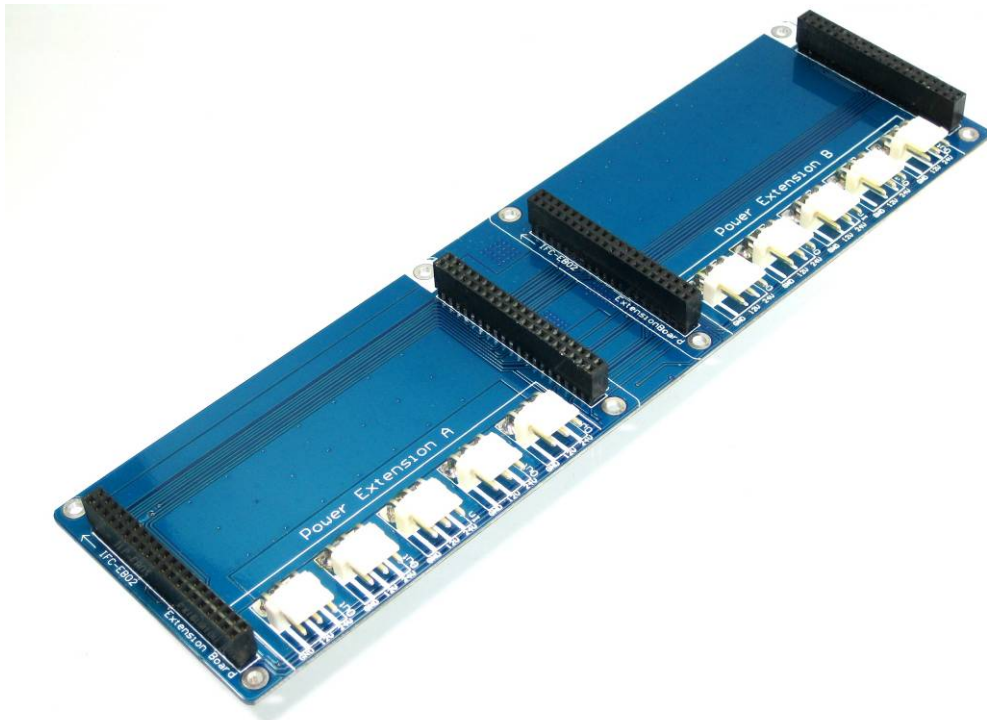
User's Manual

V1.1

Apr 2008

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1. INTRODUCTION AND OVERVIEW

1.0 Introduction of Interface Free Controller

IFC (Interface Free Controller) offer a new concept of developing microcontroller embedded system and also robotics system. With IFC, no more frustration in determine hardware interface and configuring peripheral in software. Checking few hundreds pages of data sheet can be waved. With the concept of interfacing card, user may stack as many as 64 cards in a system to get infinite combination of peripherals. The design aim is to offer 3 simple steps in microcontroller system development – Configure card's address, Stack IFC cards, Write Program and Run!
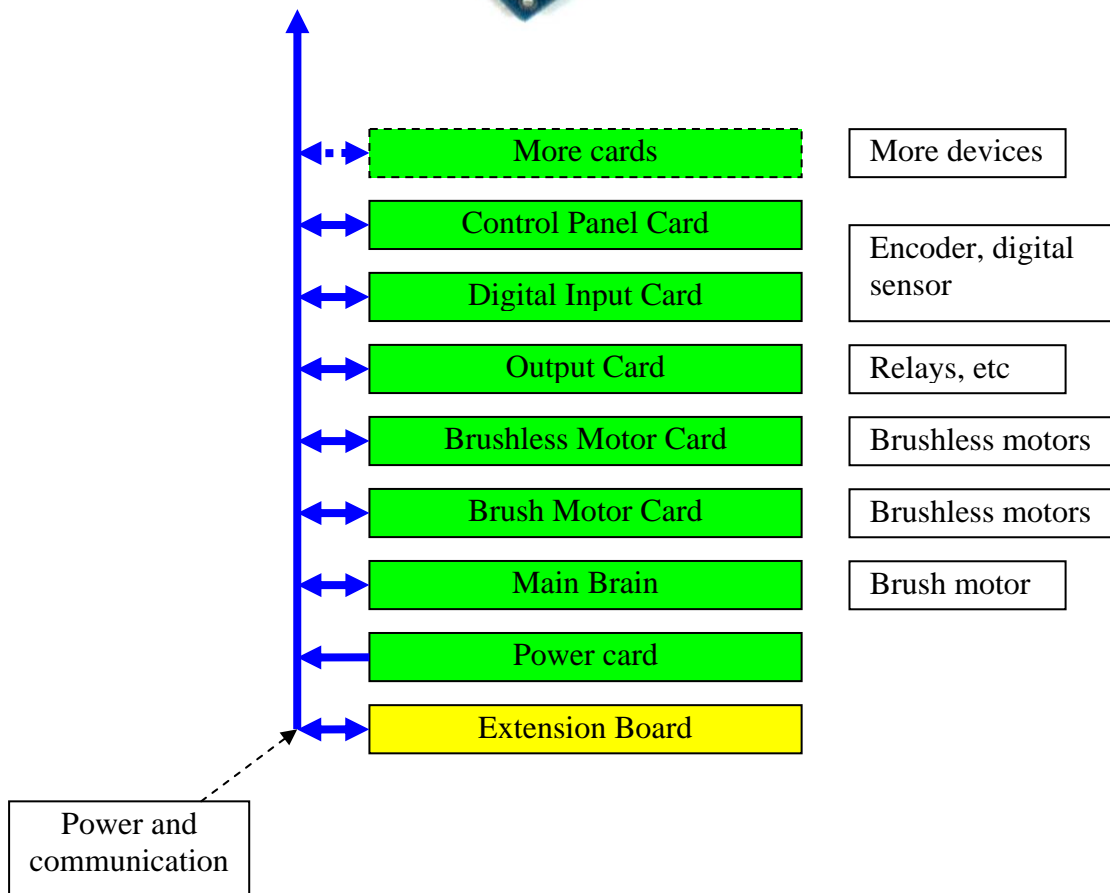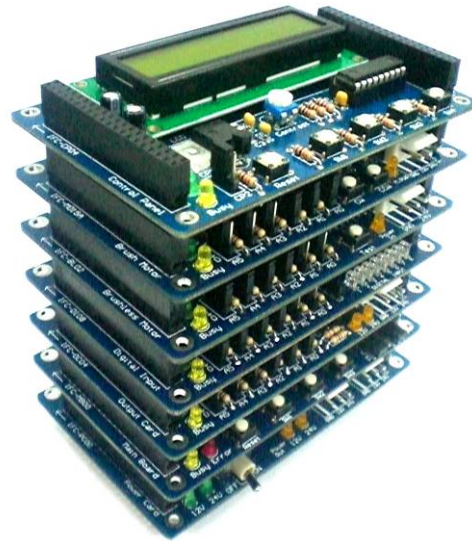
Furthermore, with functions based software library, user save valuable time during software development by concentrating on algorithm development. No more flipping or scrolling PIC data sheet looking for ADCON0, T1CON or even TRISA. With just a programming hand book, user may simply copy the header file, call comprehensive functions and it's ready to rock.

IFC come with a brain card (main controller) where the main program is loaded. There are several cards available for robotics development such as control panel, 15A brush motor driver, brushless motor controller, counter and digital input, output card and power card. This document will focus on the Extension board, IFC-EB02. This card has been designed with capabilities and features of:

- Industrial grade PCB.
- Every component is soldered properly and tested before board is shipped.
- 2 x External Power In terminal.
- 8 x External Power Out terminal.
- Provide a platform for IFC user to stack more IFC cards within a system and reduce the height of IFC system if there are too many cards in the system.
- Provide 2 power extension (Power Extension A and Power Extension B) for user to supply external power source to IFC slave card.
- Dimension: 23.9cm x 6.9cm

1.1 System Overview

With serial communication perception, IFC offer million of possibilities to develop embedded system creatively and easily. In IFC, several cards are stacked to get a complete embedded system. The minimum card requires is Power card and Main Board.

More cards		More devices
Control Panel Card		
Digital Input Card		Encoder, digital sensor
Output Card		Relays, etc
Brushless Motor Card		Brushless motors
Brush Motor Card		Brushless motors
Main Brain		Brush motor
Power card		
Extension Board		

Power and communication

This document explains the method to use IFC-EB02.

2. PACKING LIST

Please check the parts and components according to the packing list. If there are any parts missing, please contact us at <u>sales@cytron.com.my</u> immediately.
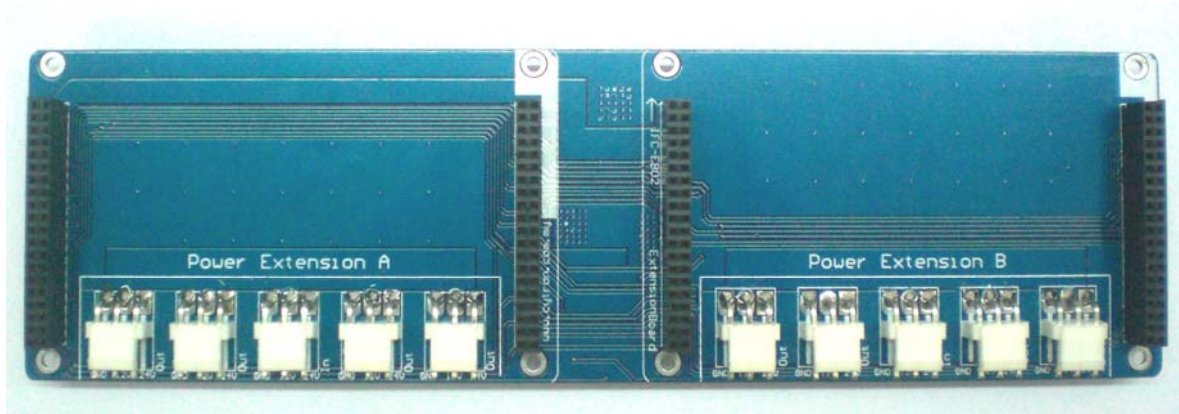
1. 1 x IFC Brushless Motor Card ,IFC-EB0202 with:
    - 8 x power out terminal.
    - 2 x power in terminal.
    - Female connector for every terminal.
    - Other electronics components soldered on board.

3. PRODUCT SPECIFICATION

3.1 Input and Output device

The output devices on EB02 are as below:
- 8 Power Out terminal which allow user to provide 12V or 24V power source to other IFC slave cards, for example, Brush Motor card (IFC-MD15A), Brushless Motor card (IFC-BL02) and Output card (IFC-OC04).

The input devices on EB02 are as below:
- 2 Power In terminal which need to connect to 12V or 24V power supply.

3.2 Operating Voltage

The operation voltage of IFC-EB02 is 12V. User needs to connect 12V or 24V power supply to the Power In terminal of EB02, it is depends on the application. The 12V or 24V power supply can come from Power card (IFC-PC00) or external battery. Please refer hardware setup in chapter 5.0 Installation (hardware) for connecting power to Extension Board.

Absolute Maximum Rating

Symbol	Parameter	Min	Max	Unit
V_{CC}	Operating voltage	-	12	V

4. BOARD OR PRODUCT LAYOUT
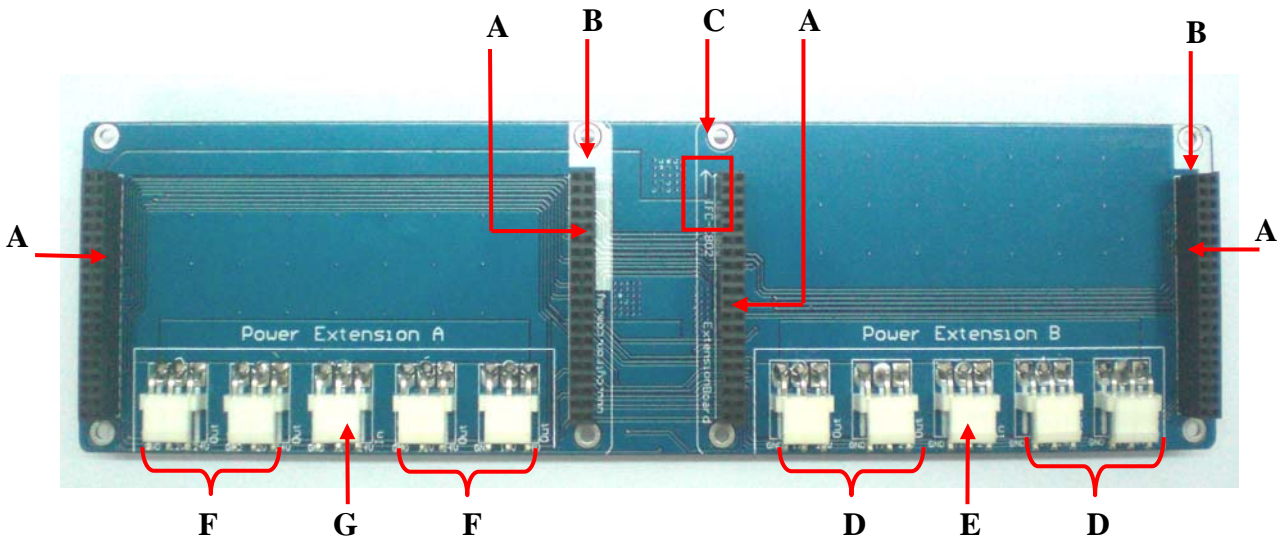
Label	Function	Label	Function
A	Side connector	E	External Power In terminal for Power Extension B
B	Orientation marking	F	External Power Out terminal for Power Extension A
C	Arrow	G	External Power In terminal for Power Extension A
D	External Power Out terminal for Power Extension B		

A – are side connector for stack card and communication between cards.

B – is the orientation marking on IFC-EB02. Every IFC card will have this orientation marking, this is to help user in ensuring the cards are stack correctly.

C – is a arrow to help user in ensuring the cards are stack correctly. Every IFC card will have this arrow; user needs to ensure that the arrow points to the same direction when IFC cards are stack together.

D – are four External Power Out connector from Power Extension B for user to connect external power source.

E– is a External Power In connector from Power Extension B for user to connect external power source.

F – are four External Power Out connector from Power Extension A for user to connect external power source.
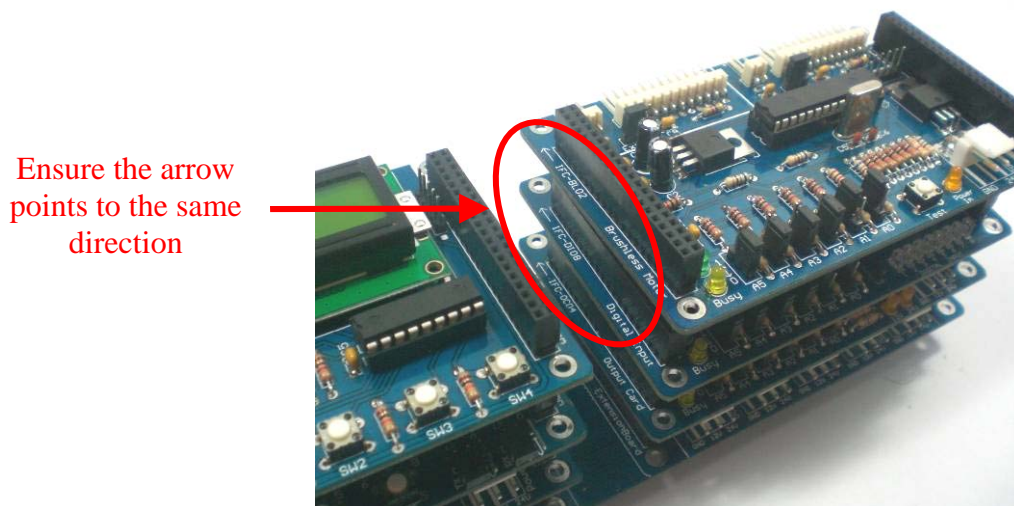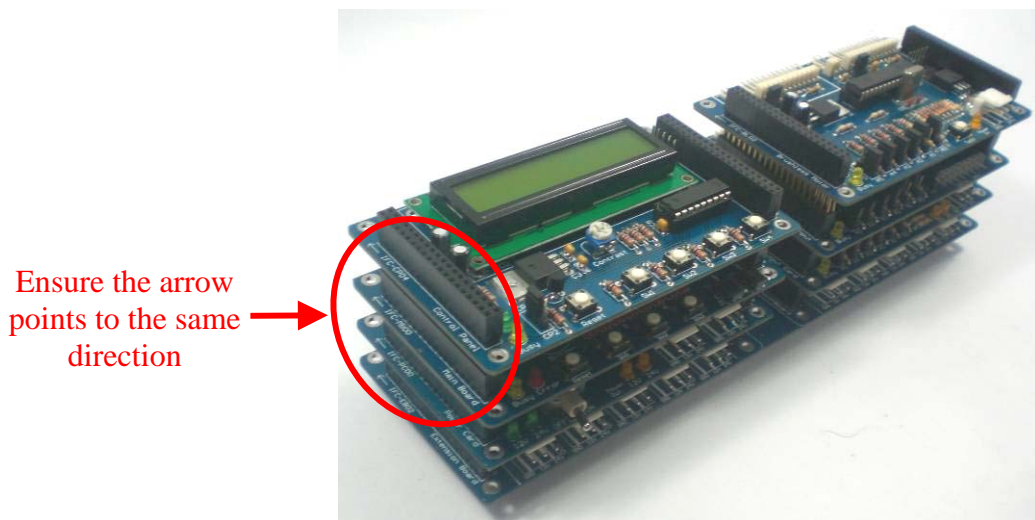
G – is a External Power In connector from Power Extension A for user to connect external power source.
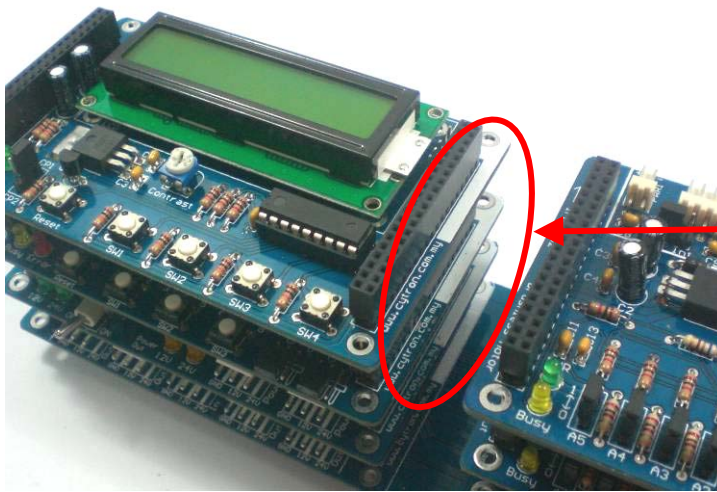
5. INSTALLATION (HARDWARE)

IFC-EB02 provides a platform for IFC user to stack more IFC cards within a system and reduce the height of IFC system if there are too many cards in the system. There are 2 separated power extension on IFC-EB02, which are Power Extension A and Power Extension B. However, these 2 power extensions share the communication bus on EB02. This allows the cards stack on Power Extension A and Power Extension B to communicate through the communication bus and side connector.

For the hardware installation of IFC-EB02, user may first stack the Main Board card (IFC-MB00) and Power Card (IFC-PC00) on either Power Extension A or Power Extension B. IFC-MB00 is the main controller of the IFC system while IFC-PC00 is the main power supply of the system. For the installation of IFC-MB00 and IFC-PC00 please refer to the user's manual of IFC-MB00.

Next, user can stack other IFC slave cards on any side of Power extension (IFC-EB02). User needs to make sure all the IFC cards are being stacked properly in correct orientation. **Each slave card stack on IFC-EB02 must have unique address.** Figure shows the example of stack IFC cards on IFC-EB02.

Ensure the arrow points to the same direction

Ensure the arrow points to the same direction

Ensure the orientation marking at the same side.
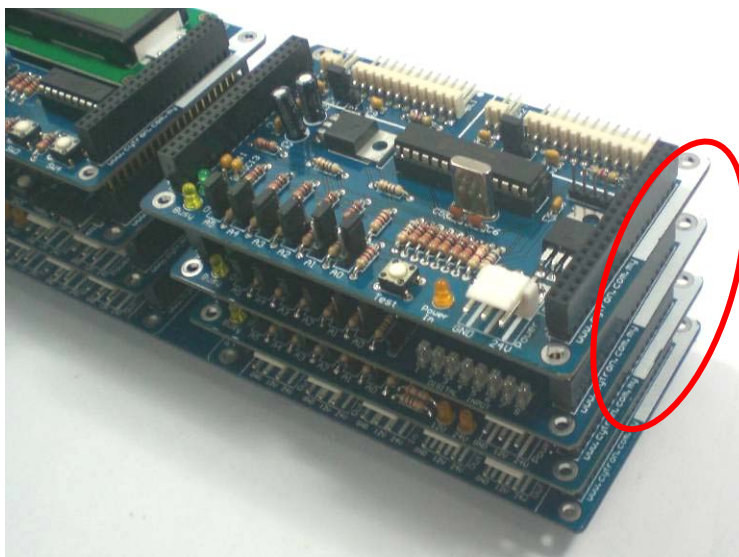
Ensure the orientation marking at the same side.

Cautions: Please ensure that every card is being stacked properly in correct orientation. Whole IFC system will be damaged if one of the cards is being stacked wrongly when it is powered up.

Besides stack every card in correct orientation, user must also require to ensure all card pins are not shifted when stacking. Figures show the example of stacking cards in proper location and example of stacking cards with shifted pins.

Ensure that all card pins are not shifted when stacking.
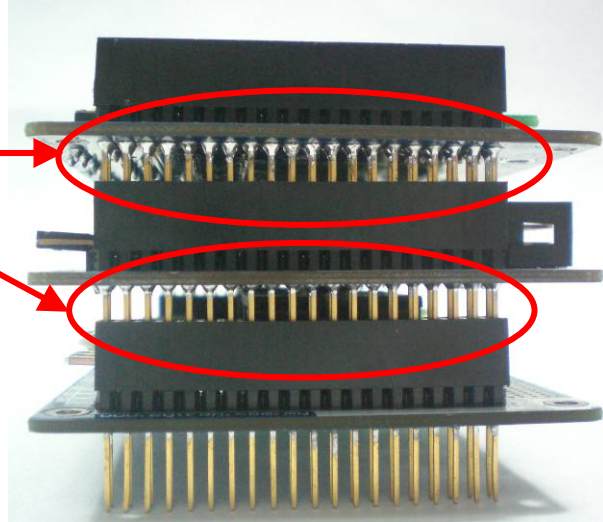
Examples of stacking cards with shifted pins. Please AVOID this!
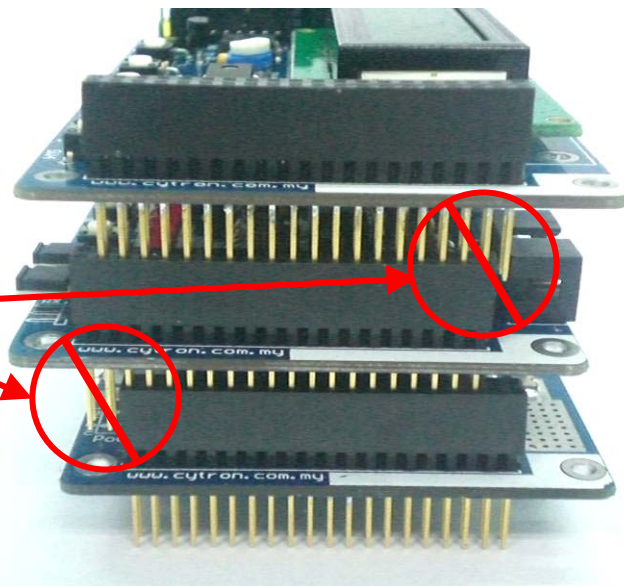
Ensure that all card pins are not shifted when stacking.

Examples of stacking cards with shifted pins. Please AVOID this!
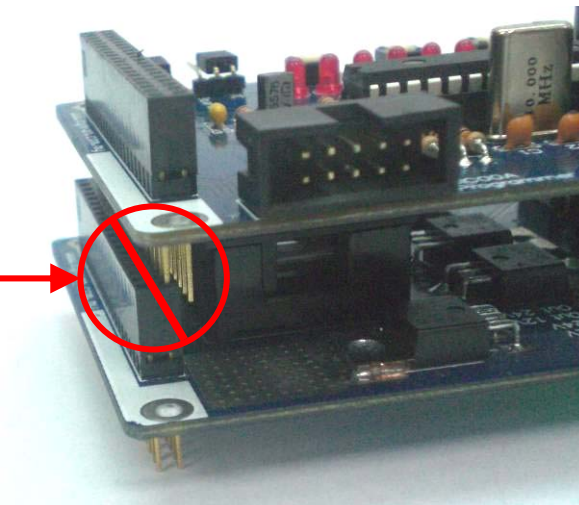
Cautions: Please ensure that all card pins are not shifted when stacking. IFC system will NOT function if the pins are shifted.

After that, connect the battery to Power Card, IFC-PC00. IFC-PC00 is the main power supply. User need to connect IFC-PC00 with 12V battery to supply power to all IFC card. If brushless motor used, 2 x 12V batteries is needed.


Connect 1 x 12V battery to supply operating voltage to IFC**. Ensure the polarity is correct**.
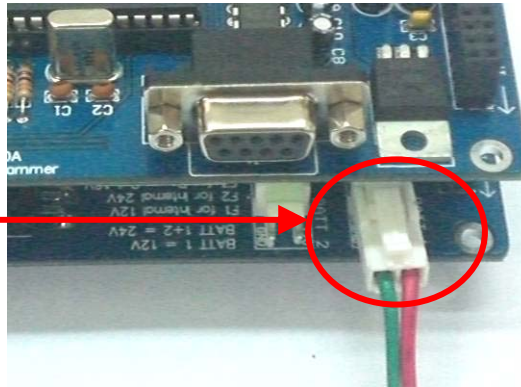
If 24V is needed in the system, connect 2 x 12V batteries to PC00. **Ensure the polarity is correct**.
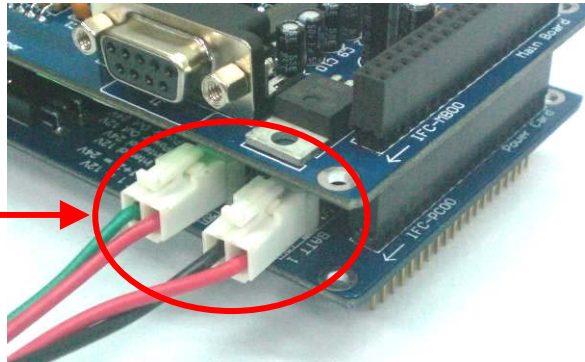
For power supply to EB02 card, user can connect external power source from IFC Power Card (IFC-PC00) to External Power In on Extension Board (IFC-EB02) or connect external battery to External Power In on Extension board (IFC-EB02). Figure below show the connection of External Power from Power card and external battery. **User needs to make sure the polarity is correct when connect external power source for extension board (EB02).**
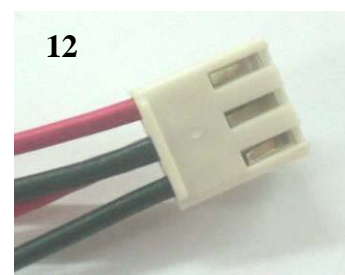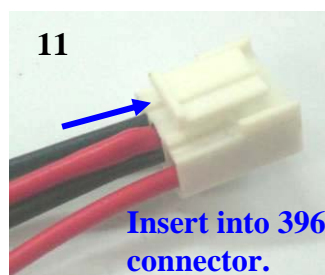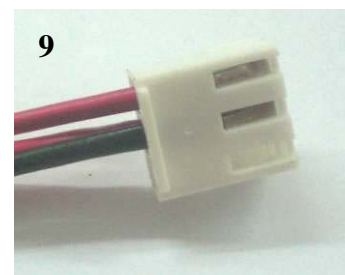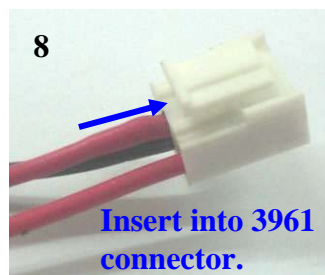

External power source from IFC Power Card.

External power source from 2 x 12V batteries.
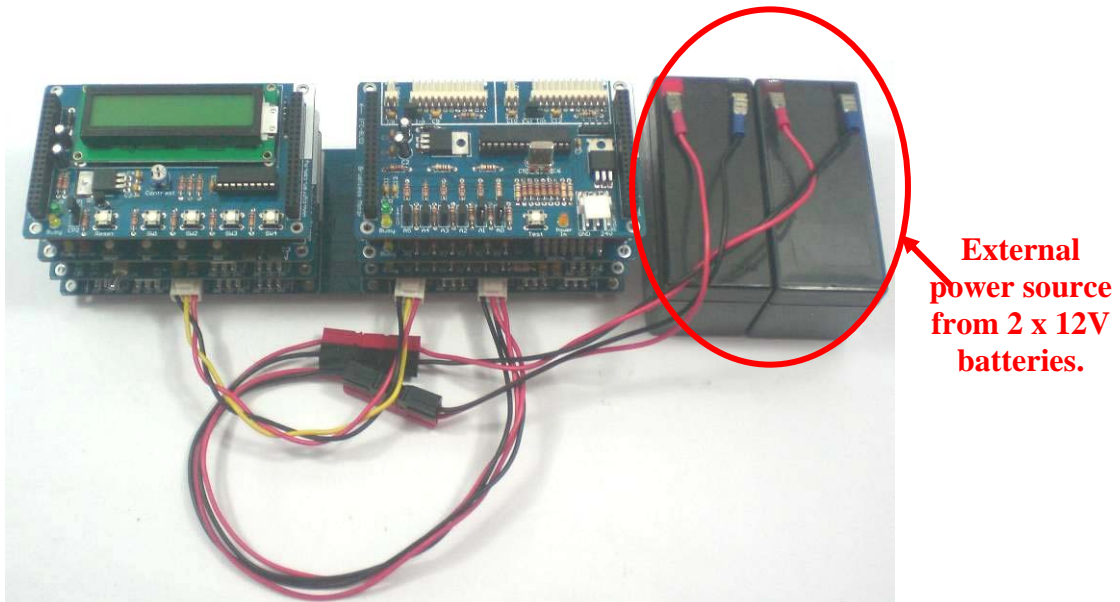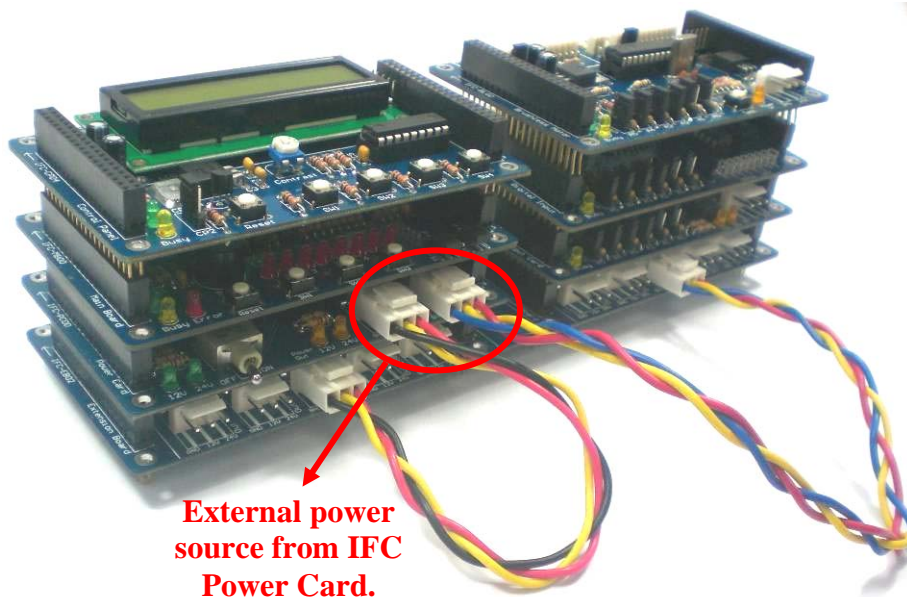
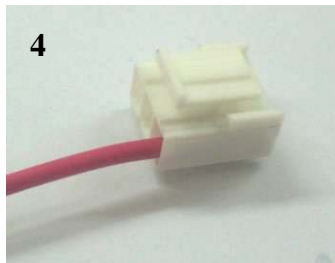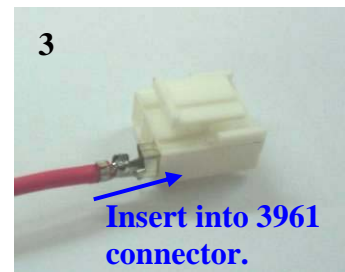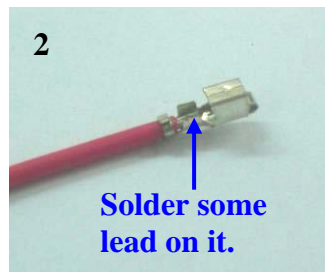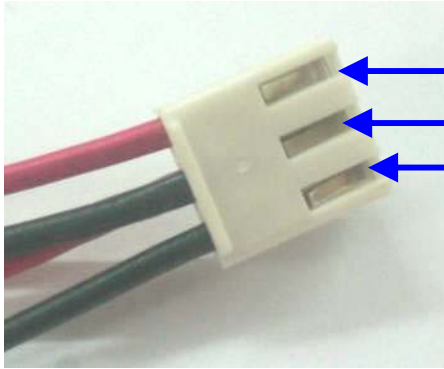User may follow the steps below to build a cable connector for connecting the external power source from 2 extra batteries.

Materials needed:
a. 4 x cable
b. 1 x 3961-3 female connector
c. 3 x 3961 iron pins

1	2	3
	Solder some lead on it.	**Insert into 3961 connector.**

4	5	6
		Solder some lead on it.

7	8	9
Solder another cable on it.	**Insert into 3961 connector.**	

10	11	12
Solder some lead on it.	**Insert into 3961 connector.**	
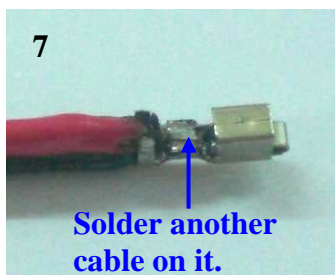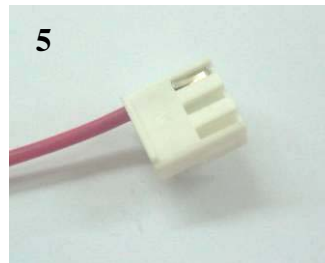
Ensure the iron
pins are fully
inserted to the
connector
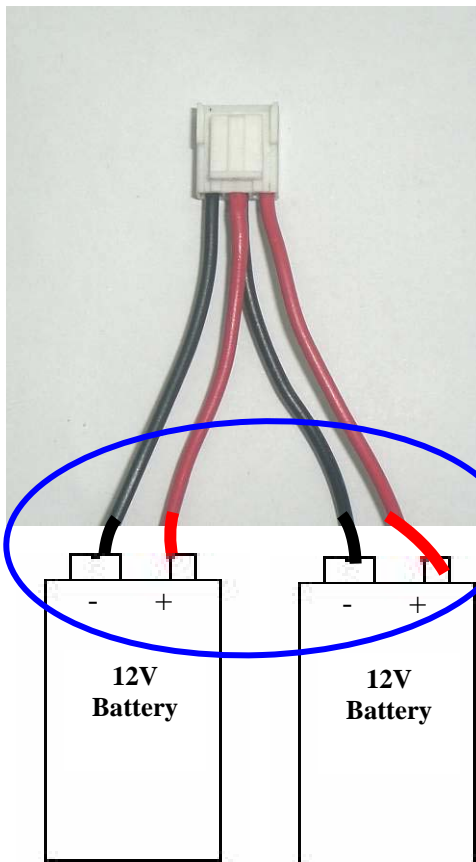
Connect the cable
to batteries. **Please
ensure the
polarity is correct.**
Red for positive
(+) while black for
negative (-).

- +

12V
Battery

- +

12V
Battery

User may supply external power source to IFC slave card by connect the External Power Out Terminal from any side of Power extension (IFC-EB02). Figure show the example connection from External Power Out to IFC slave card.

External power source from IFC-PC00

External power source from 2 x 12V batteries.
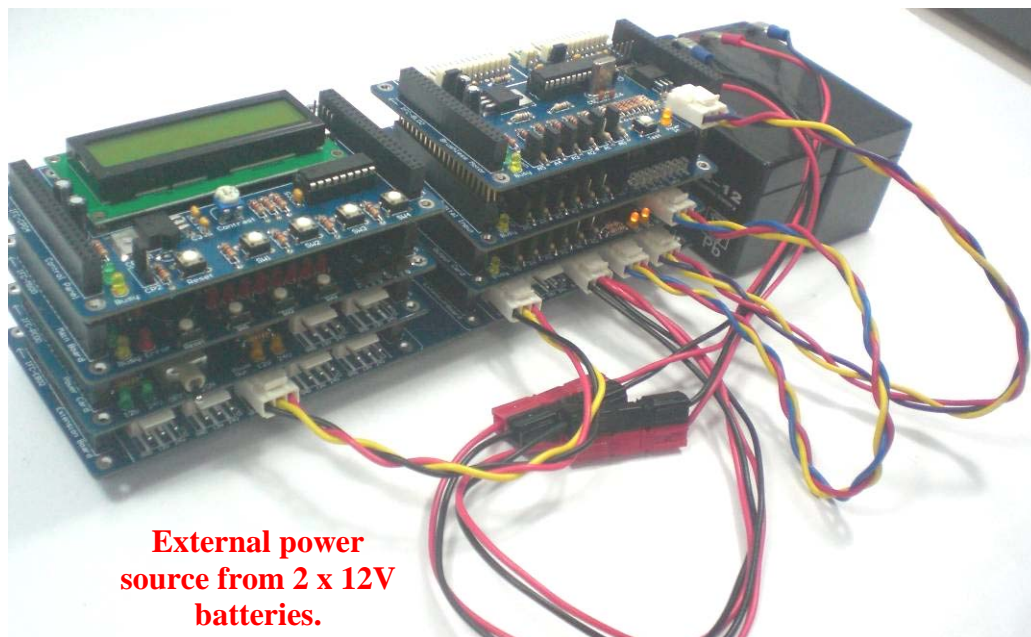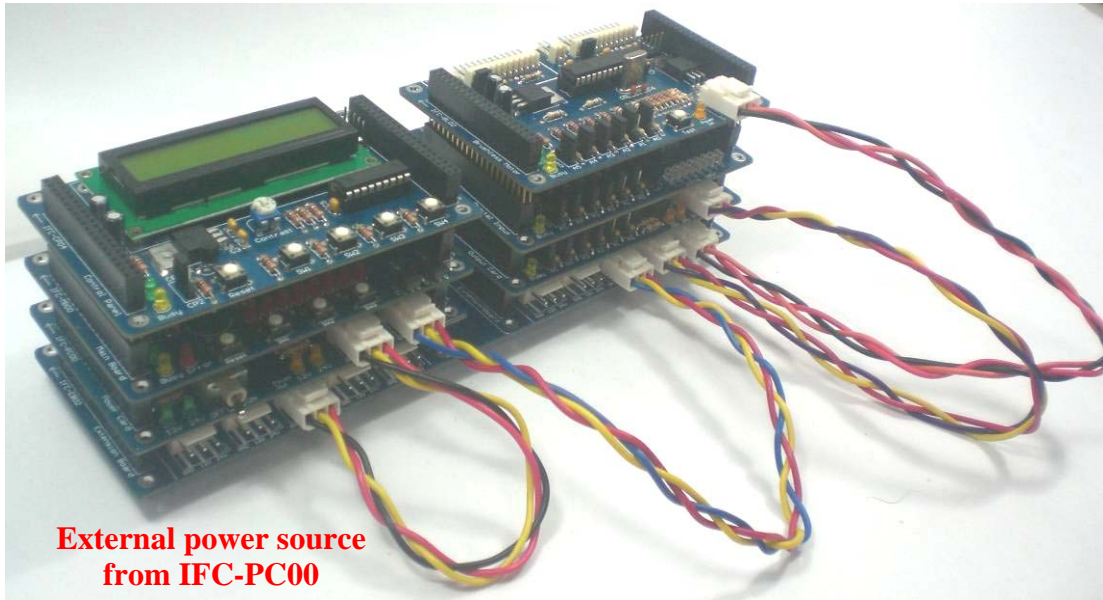
Note: The voltage connected to Power In Terminal on Power extension is equal to the voltage supply to Power Out Terminal. For example, supply 12V to Power In Terminal on Power Extension A, the output voltage from 4 x Power Out Terminal on Power Extension A are equal to 12V. When connect external power source for IFC slave cards from IFC-EB02, please ensure the voltage supply to Power In Terminal on Power Extension is compatible with the require external power source of the slave card.

To open the cards, user can use the IFC card's opener to open the stacked cards. Figure shows the method to open cards with the opener.
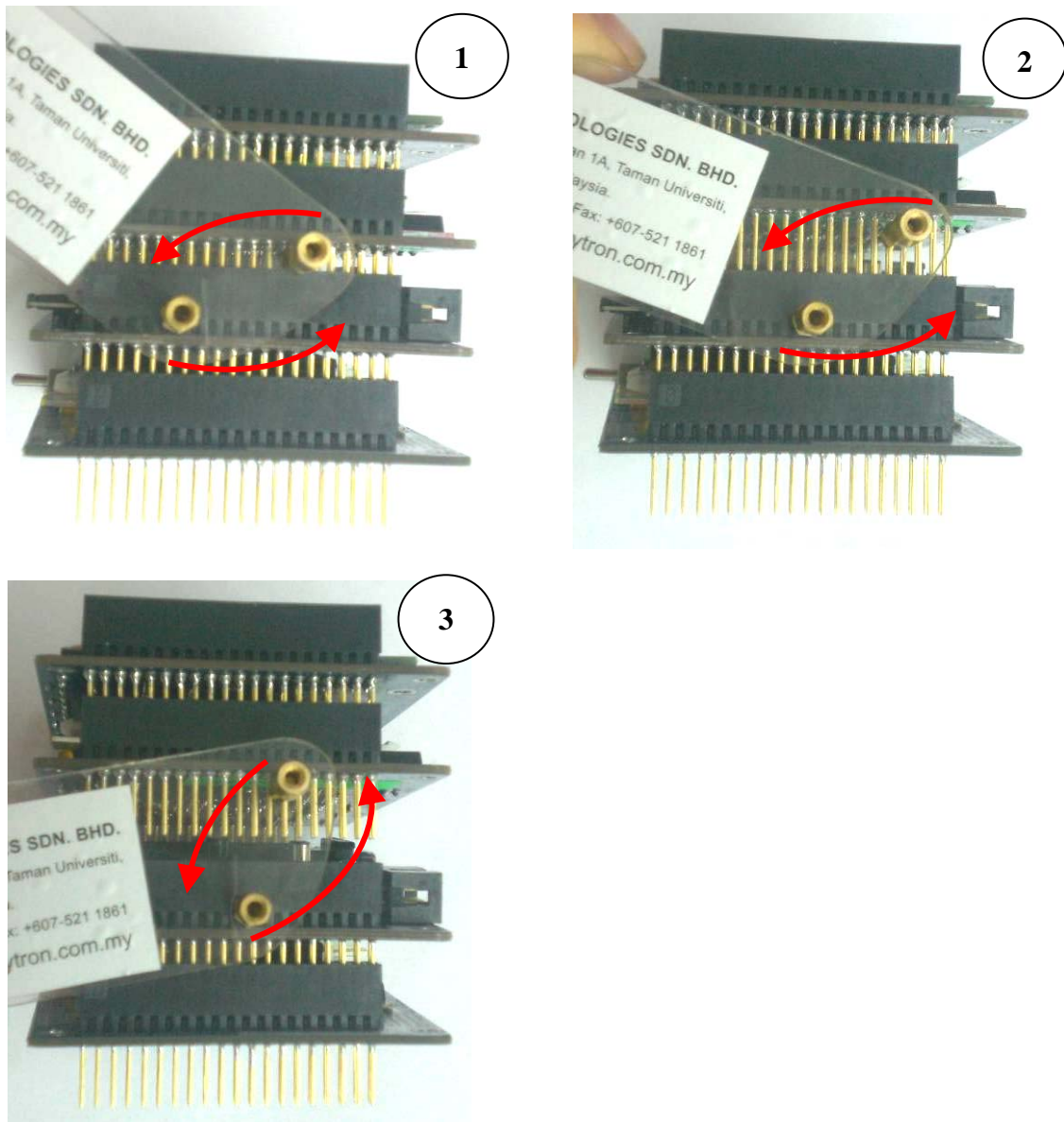
Caution: Please use the opener to open IFC cards to avoid damage of the pins or cards.

7. WARRANTY

- ➢ Product warranty is valid for 6 months.
- ➢ Warranty only applies to manufacturing defect.
- ➢ Damage caused by miss-use is not covered under warranty.
- ➢ Warranty does not cover freight cost for both ways.

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