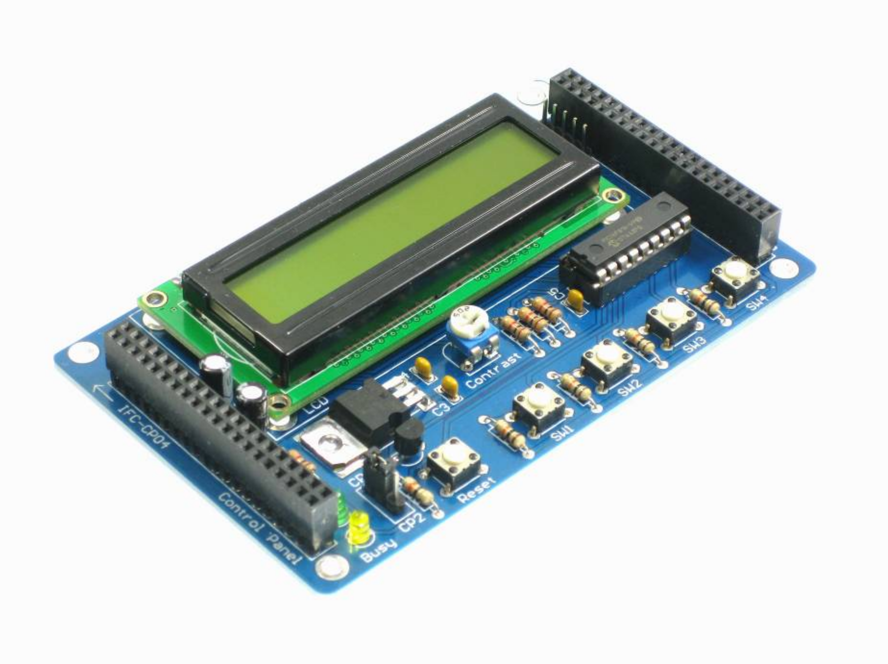
IFC-CP04
Interface Free Controller
Control Panel



Card Library Functions

V1.1

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IFC-CP04 Card Technical Info

This document will explain the function prototype for CP04 when controlling it using MB00. User can also double click on iic_cp.h for the details of function prototype. The function prototype will be called in main program for MB00 in order to control/communicate with CP04. There are 2 communication addresses on IFC-CP04, which are CP1 and CP2 (Control Panel 1 and Control Panel 2). User can use mini jumper on IFC-CP04 to choose either one of the communication addresses to display message. The function prototype shown here are mainly for communication address, CP1. For user who wants to use Control Panel 2 (CP2), user can simply change the number '1' to '2' in the function prototype. For example, cp2_char, cp2_str, etc. Table 1 shows the function for CP04.

Function Prototype	Remark	Parameter Description
void cp1_char(unsigned char **data**)	cp1_char('A')	**data**= character to be display on LCD ('A')
void cp1_str(static const rom char ***s**)	cp1_str("Cytron")	***s**= string to send ("Cytron").
void cp1_dec(unsigned long **data**, unsigned char **num_dig**)	cp1_dec(1234,4)	**data** = number(1234), **num_dig** = number of digit to display (4).
Void cp1_bin(unsigned short **data**, unsigned char **num_dig**)	cp1_bin(0b1010,4)	**data** = number (0b1010), **num_dig** = number of digit to display (4).
void cp1_config(unsigned char **data**)	cp1_config(44)	**data** = configuration byte for LCD(44).
unsigned char cp1_sw(unsigned char **button_number)**	cp1_sw(1)	**button_number** = switch to be test **0** = read all switch in one byte (0000DCBA)[D=SW4 C=SW3 B=SW2 A=SW1, active low] **1** = read switch 1(return 1 or 0, active low) **2** = read switch 2(return 1 or 0, active low) **3** = read switch 3(return 1 or 0, active low) **4** = read switch 4(return 1 or 0, active low)
void cp1_blight(unsigned char **data**)	cp1_blight(100)	**data**=backlight brightness (0-255)
void cp1_clr(void)	cp1_clr()	
void cp1_goto(unsigned char **r**, unsigned char **c**)	cp1_goto(1,2)	**r** (1) and **c** (2) is the location the cursor go

Table 1 Function Prototype for Control Panel

void cp1_char(unsigned char **data**)

This function is used to display character on LCD screen. Only one character will display for each function called. For example, when user wants to send a character 'A' to be display on LCD screen, user can call this function prototype like this:

cp1_char ('A')

Then a character 'A' will displayed on LCD as shown in Figure 1 below.

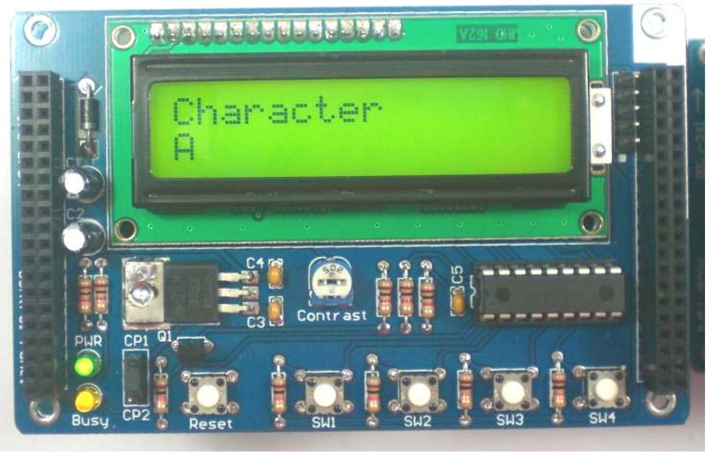


Figure 1

void cp1_str(static const rom char ***s**)

This function is used to send a string to display on LCD screen. Send string means send more than one character. It will be useful if user wants to display a sentence on LCD screen. For example, when user wants to send a sentence "Thanks for using Cytron Product" which to be displayed on LCD screen, user can call this function prototype like this:

cp1_str ("Thanks for using");
cp1_str ("Cytron Product");

Then, the sentence "Thanks for using Cytron Product" will displayed on LCD as shown in Figure 2. To send string ("Cytron Product") to another row, user needs to set the location first. How to set location will discuss later.

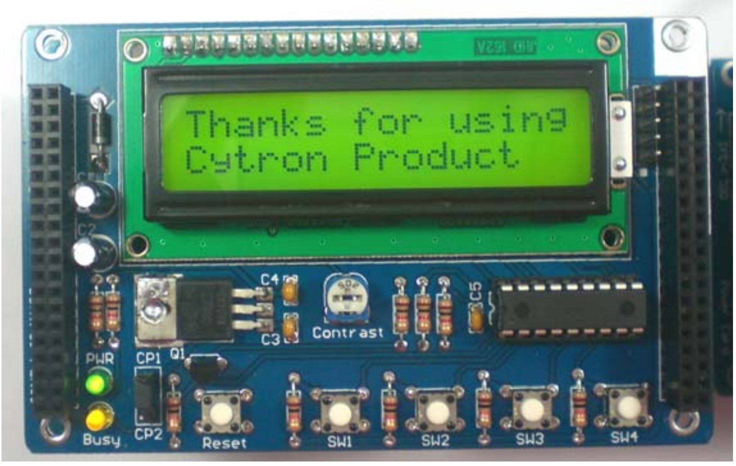


Figure 2

- Note: Please be reminded that the method to send string and character is different, to send string, double quotation mark **“ ”** is used, as for character, single quotation mark **‘ ’** is used. For example:

I. To send string: cp1_str(“ Welcome ”);
II. To send character: cp1_char (‘ A’);

void cp1_dec(unsigned long **data**,unsigned char **num_dig**)

This function is used to send decimal number to display on LCD screen. The decimal number that user wish to send has to be defined as unsigned long data in the function and unsigned char num_dig refer to the number of digit to display on LCD screen. It is advised for user to set the unsigned char num_dig as the same with the number of digit for the decimal number that wish to display on LCD, if unsigned char num_dig is less than the number of digit for data to send, than only the last few decimal number will be displayed. Please refer table below for more details:

Function called	**unsigned long data**	**unsigned char num_dig**	**Display on LCD**
cp1_dec(123456,6)	123456	6	123456
cp1_dec(123456,5)	123456	5	23456
cp1_dec(123456,4)	123456	4	3456

Table 2

Example:
Users want send a long decimal number 123456 to be display on LCD screen. User can call this function prototype as below:

cp1_dec (123456, 6)

Then LCD screen will display as shown in Figure 3 below.

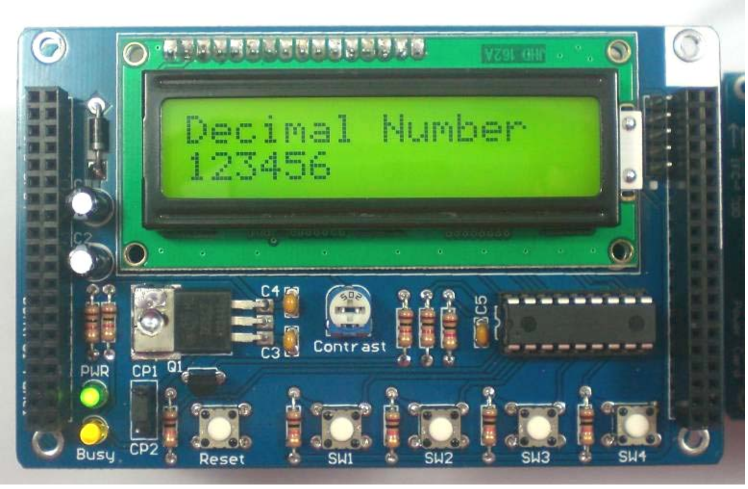


Figure 3

Void cp1_bin(unsigned short **data**, unsigned char **num_dig**)

This function is similar with function cp1_dec(), but the different is, this function is specially use for binary number. For example, user can call this function prototype like a sample code below to send a binary number (0b10101010) to LCD screen. Please be reminded that user needs to include ‘0b’ in front of the binary number that wish to be displayed on LCD.

cp1_bin (0b11101100, 8);

Then LCD screen will display as shown in Figure 4 below.

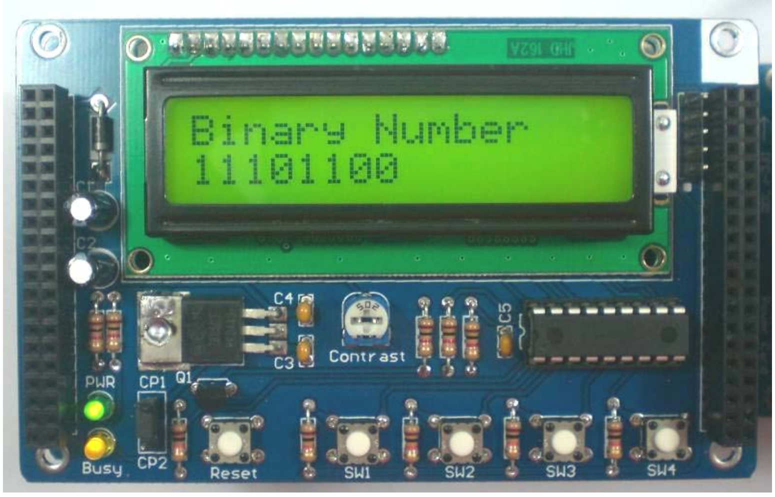


Figure 4

```
void cp1_config(unsigned char data)
```

It is an advance function for user to set the LCD configuration. For more information about LCD configuration please refer to our website www.cytron.com.my to download the LCD datasheet or go to http://www.epemag.com/lcd1.PDF. However, user can control the LCD by using the other function without set the configuration by self. This is a function for advance development. The examples for this function prototype are shown below:

```
cp1_config(44);
```

```
unsigned char cp1_sw(unsigned char button_number)
```

This function is used to define which switch will be tested. Button number is number of switch to be tested. All the switches on IFC-CP04 are active low, which mean give value '0' to microcontroller when it is being pressed. For example user wants to test whether SW4 on IFC-CP04 is pressed and ON a LED when SW4 was pressed, the function can be called as below:

```
If (cp1_sw(4)= =0)
{
  led1 = 1;
}
```

User can also read all switch value in one byte (0000DCBA, D=SW4 C=SW3 B=SW2 A=SW1) by calling this function as below:

```
cp1_sw(0)
```

```
void cp1_blight(unsigned char data)
```

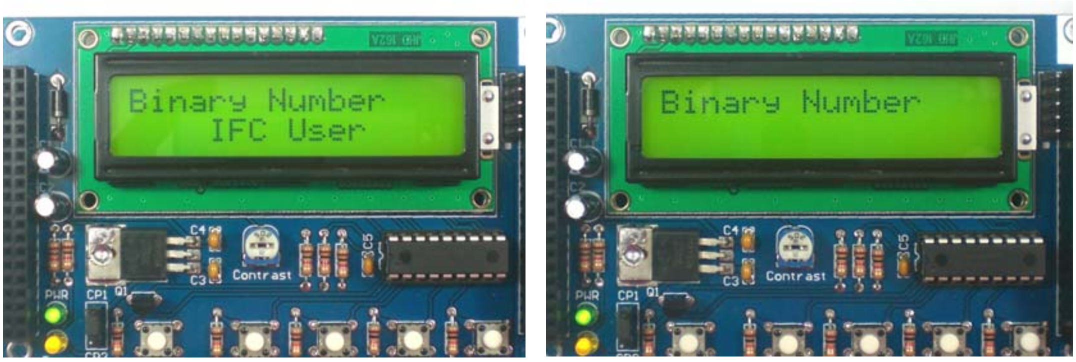
This function is used to adjust the backlight of LCD screen. Maximum backlight brightness is 255. User can adjust the brightness at the range 0 to 255. The examples for this function prototype are shown below.

```
cp1_blight (255);       for maximum brightness
cp1_blight (10);        for minimum brightness
```

void cp1_clr(void)

This function is used to clear LCD display. It is recommended for user to call this function when want to display new message on LCD screen. If this function not used, user can see previous massage on the LCD screen. For example, previous massage is “IFC User” and user want to display new massage “Binary Number”. Figure 5 will shows the different if user use and not use this function. Below is a sample code to call this function.

```
cp1_clr();
```



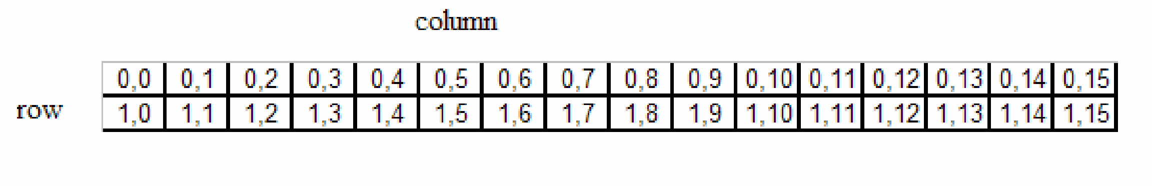
(a) Not use (b) **Use**

Figure 5

From the Figure 5(a), previous massage (IFC User) is also display on LCD screen when user send new sentence (Binary Number). It is because user did not clear the sentences before send new massage.

void cp1_goto(unsigned char **r**,unsigned char **c**)

This function is used to define cursor location to start up a sentence, character or decimal number. Char r is defined as row and char c is defined as column. Table below is an example for 2x16 LCD Display locations.



column

row	0,0	0,1	0,2	0,3	0,4	0,5	0,6	0,7	0,8	0,9	0,10	0,11	0,12	0,13	0,14	0,15
	1,0	1,1	1,2	1,3	1,4	1,5	1,6	1,7	1,8	1,9	1,10	1,11	1,12	1,13	1,14	1,15

Table 3 2x16 LCD location

Example:
User want display “Thanks for using Cytron Product” at the LCD screen. To display this sentence on LCD screen, user needs to set the location first. 2x16 LCD Display means they are 2 rows on LCD screen and every row can allocate 16 characters. Sample code below will show you how to set the location to send the sentence “Thanks for using Cytron Product”.

```
cp1_goto(0,0);                 ←———   1st row. 1st column
cp1_str(“Thanks for using”);
cp1_goto(1,0);                 ←———   2nd row. 1st column
cp1_str(“Cytron Product”);
```

(0,0) is a position to display a sentence “Thanks for using” and (1,0) is a position to display sentence “Cytron Product”. Figure 6 is a result for the example.

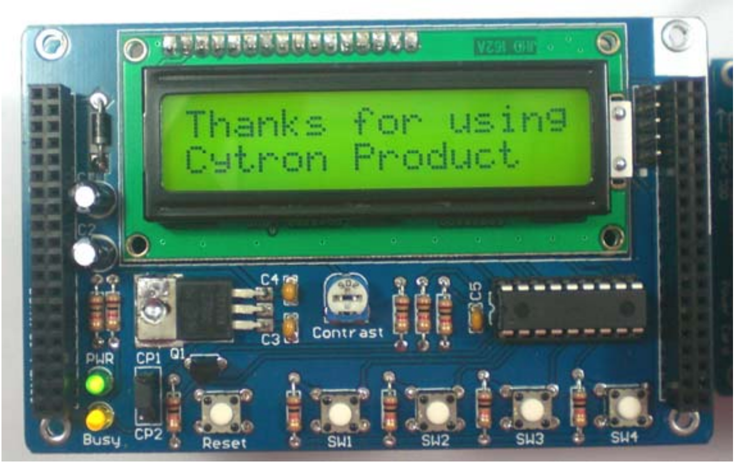


Figure 6

Note: User is reminded to add header file (iic.h and iic_cp.h) and object file (iic.o and iic_cp.o) for IFC-MB00 and IFC-CP00 each time opening a new project for IFC. User also needs to include card h file at the beginning of the program. Please refer sample source cod e for the example to include card h file.

Prepared by
Cytron Technologies Sdn. Bhd.
19, Jalan Kebudayaan 1A,
Taman Universiti,
81300 Skudai,
Johor, Malaysia.

Tel: +607-521 3178
Fax: +607-521 1861

URL: www.cytron.com.my
Email: support@cytron.com.my
sales@cytron.com.my