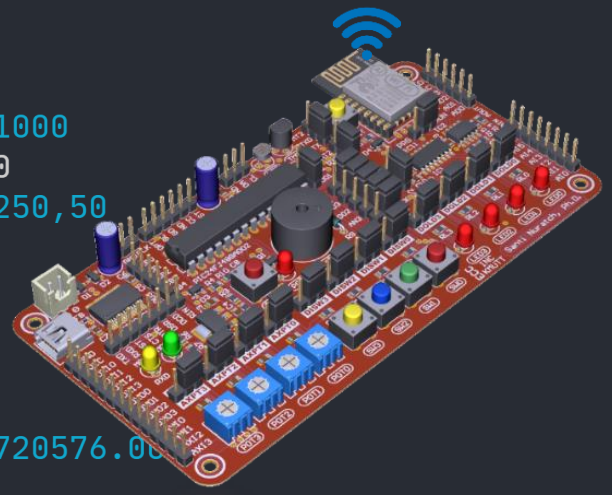
ECC-Cmdex User Manual V1.0.5

This document is written for programmers who desire to control the microcontroller board, provided by the ECC-Lab, using text-based (AT) commands.

If you are an Embedded C programmer or C developer for embedded systems, please refer to the "ECC-RTOS" document.

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

```
blk,2,0,100
ok: led,2,0,100
beep,100
err: beep,100
beep,100,1000
err: beep,100,1000
buz,100,1250,50
ok: beep,100,1250,50
psw,1
ok: psw,1,0
adc,2
ok: adc,2,102
clk,0
ok: time,0,175720576.00
clk,1
ok: time,1,178780.766
clk,2
ok: time,2,0:3:0 500
```



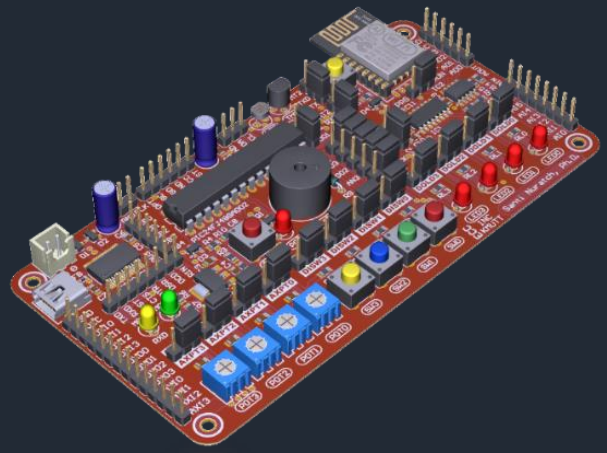
- If you can make communication through the serial port, you can control and monitor all peripherals of the board.
- If you can make communication through the internet, you can control and monitor all peripherals of the board anywhere around the world.

What is the ECC-Cmdex?

- The ECC-Cmdex is a special firmware developed for remote control and monitoring applications.
- It is a special embedded text processor, receiving, processing and executing the command.
- The firmware can receive the text-based commands through the serial port, WiFi and another communication channels, e.g., SPI and I2C.

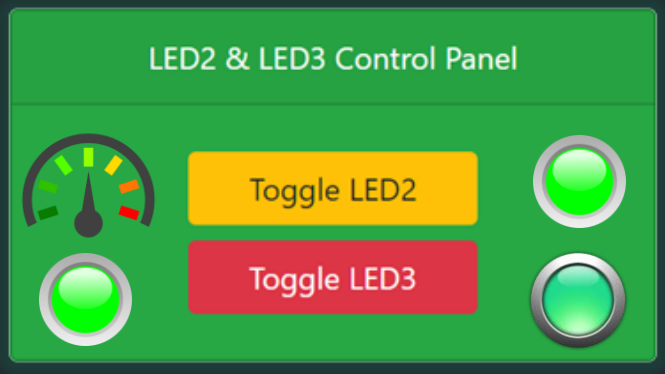
Industrial Application Example

"adc,1\r\n"
"pwm,1,0,100\r\n"
"time,1\r\n"

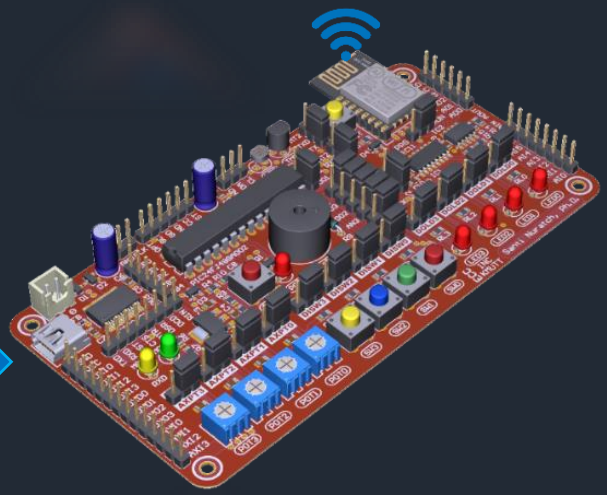


IoT Application Example

"led,0,2\r\n"
"psw,1\r\n"
"adc,2\r\n"



HTTP
WebSockets
MQTT



ECC-Cmdex (UART & WiFi)

Commands

(for general control and monitoring applications)
(support both Serial-port-based and WiFi-based applications)

CMD	Full Name	Description
led	LED	Basic LED (Do) control command
fls	Flash	LED (Do) Flashing command
blk	Blink	LED (Do) Blinking command
cps	Continuous Pulse Signal	LED (Do) Pulse-Width modulation output command
buz	Buzzer	Buzzer/Speaker sound generating command
pwm	Pulse Width Modulation	High-Frequency PWM signal generation command
psw	Push Button Switch	PSW (Di) reading command
adc	Analog-to-Digital	ADC (Ai) reading command
det	ADC Detector	ADC (Ai) changing detector setting command
clk	Clock or Time	System Click and System Time reading command
jap	Join Access Point	Make the WiFi module to connect to the AP
rst	Restart MCU and WiFi	MCU and WiFi Restarting command

Note: The jap and rst are not allowed in this version, for safety reasons.

led commands

Clear, Set, Toggle and Read

CMD:

led,id,functionCRLF

id:
- 0 - LED0 (DX00)
- 1 - LED1 (DX01)
- 2 - LED2 (DX02)
- 3 - LED3 (DX03)

function:
- 0 - clear
- 1 - set
- 2 - toggle
- 3 - read

RET: (ok)

ok: led,id,function,DCRLF

D is the status of the target LED after the command is executed:
- 0 - OFF
- 1 - ON

RET: (error)

err: <wrong command>CRLF

Change status of LED0 to OFF

led,0,0CRLF

ok: led,0,0,0CRLF

Change status of LED1 to ON

led,1,1CRLF

ok: led,1,1,1CRLF

Changed status of LED2 to opposite status

led,2,2CRLF

D is the status of the LED2, 0 is OFF, 1 is ON

ok: led,2,2,DCRLF

Read status of the LED3

led,3,3CRLF

D is the status of the LED3, 0 is OFF, 1 is ON

ok: led,3,3,DCRLF

fls commands

Set then Clear automatically

CMD:

fls,id,intervalCRLF

id:
- 0 - LED0 (DX00)
- 1 - LED1 (DX01)
- 2 - LED2 (DX02)
- 3 - LED3 (DX03)

interval:
- 1 to 65535 (milliseconds)

RET: (ok)

ok: fls,id,intervalCRLF

RET: (error)

err: <wrong command>CRLF

Flash the LED0 for 10 mS

fls,0,10CRLF

ok: led,0,10CRLF

Flash the LED1 for 123 mS

fls,1,125CRLF

ok: led,1,125CRLF

Flash the LED2 for 1 Sec

fls,2,1000CRLF

ok: led,2,1000CRLF

Flash the LED3 for 5.5 Sec

fls,3,5500CRLF

ok: led,3,5500CRLF

blk commands

Wait then Set and Clear automatically

CMD:

blk,id,delay,intervalCRLF

id:
- 0 - LED0 (DX00)
- 1 - LED1 (DX01)
- 2 - LED2 (DX02)
- 3 - LED3 (DX04)

interval:
1 to 65535 (milliseconds)

delay:
1 to 65535 (milliseconds)

RET: (ok)

ok: blk,id,delay,intervalCRLF

RET: (error)

err: <wrong command>CRLF

Blink the LED0 with 10 mS delay and 20 mS interval

blk,0,10,20CRLE

ok: blk,0,10,20CRLE

Blink the LED0 with 50 mS delay and 100 mS interval

blk,1,50,100CRLE

ok: blk,1,50,100CRLE

Blink the LED0 with 1 Sec delay and 50 mS interval

blk,2,1000,50CRLE

ok: blk,2,1000,50CRLE

Blink the LED0 with 500 mS delay and 2 Sec interval

blk,3,500,2000CRLE

ok: blk,3,500,2000CRLE

cps commands

Continuous Pulse (PWM) Generation

CMD:

cps,id,delay,width,periodCRLF

id:
- 0 - LED0 (DX00)
- 1 - LED1 (DX00)
- 2 - LED2 (DX00)
- 3 - LED3 (DX00)

width:
- 1 to 65535 (milliseconds)

delay:
- 1 to 65535 (milliseconds)

period:
- 1 to 65535 (milliseconds)

RET: (ok)

ok: cps,id,delay,width,periodCRLF

RET: (error)

err: <wrong command>CRLF

Generate continuous pulse for LED0 with
10 mS delay, 20 mS width, 100 mS period

cps,0,10,20,20CRLF

ok: cps,0,10,20,20CRLF

Generate continuous pulse for LED1 with
0 mS delay, 10 mS width, 500 mS period

cps,1,0,10,500CRLF

ok: cps,1,0,10,500CRLF

Generate continuous pulse for LED2 with
100 mS delay, 50 mS width, 5 Sec period

cps,2,100,50,5000CRLF

ok: cps,2,100,50,5000CRLF

Generate continuous pulse for LED3 with
500 mS delay, 2 Sec width, 3.5 Sec period

cps,3,500,2000,3500CRLF

ok: cps,3,500,2000,3500CRLF

buz commands

Beep sound generation (PWM-based)

CMD:

buz,interval,freq,powerCRLF

interval: 1 to 65535 (milliseconds)

freq: 1 to 65535 (Hertz)

power: 0 to 100 (percent)

buz,interval,freqCRLF

buz,intervalCRLF

RET: (ok)

ok: buz,interval,freq,powerCRLF

RET: (error)

err: <wrong command>CRLF

Generate beep sound for 200 mS, 1 kHz, 50% power

buz,200,1000,50CRLF

ok: buz,200,1000,50CRLF

Generate beep sound for 500 mS, 3.5 kHz (previous power is used)

buz,500,3500CRLF

ok: buz,500,3500CRLF

Generate beep sound for 1000 mS, 3.5 kHz (previous frequency and power are used)

buz,1000CRLF

ok: buz,1000CRLF

Generate beep sound for 500 mS, 5.5 kHz, 90% power

buz,500,5500,90CRLF

ok: buz,500,5500,90CRLF

pwm commands

Full range PWM signal generation

CMD:

pwm,id,function,valueCRLF

id:
- 0 - PWM0 (SCL)
- 1 - PWM1 (SDA)
- 2 - PWM2 (LED2)
- 3 - PWM3 (LED3)

function:
- 0 - set frequency
- 1 - set duty cycle ratio
- 2 - set phase-shift ratio
- 3 - stop/start (0/1)

value:
positive real or integer number depended on the function.

frequency: 0.95Hz-160kHz, ratio: 0.0-1.0

Set frequency of PWM0 to 2 kHz

pwm,0,0,2000CRLF

Set duty cycle ratio of PWM1 to 0.2

pwm,1,1,0.2CRLF

Set phase-shift ratio of PWM2 to 0.5

pwm,2,2,0.5CRLF

Stop PWM3

pwm,3,3,0CRLF

Start PWM3

pwm,3,3,1CRLF

RET: (ok)

ok: pwm,id,function,valueCRLF

RET: (error)

err: <wrong command>CRLF

ok: pwm,0,0,2000CRLF

ok: pwm,1,1,0.2CRLF

ok: pwm,2,2,0.5CRLF

ok: pwm,3,3,0CRLF

ok: pwm,3,3,1CRLF

psw commands

Get Status of Push Button Switch

CMD:

psw,idCRLF

id:
- 0 - PSW0 (0X10)
- 1 - PSW1 (0X11)
- 2 - PSW2 (0X12)
- 3 - PSW3 (0X13)

RET: (ok)

ok: psw,id,DCRLF

D is the status of the target switch:
- 0 - OFF
- 1 - ON

RET: (error)

err: <wrong command>CRLF

Get status of the PSW0

psw,0CRLF

PSW0 is OFF

ok: psw,0,0CRLF

PSW0 is ON

ok: psw,0,1CRLF

Get status of the PSW1

led,1CRLF

PSW1 is OFF

ok: psw,1,0CRLF

PSW1 is ON

ok: psw,1,1CRLF

Get status of the PSW2

led,2CRLF

PSW2 is OFF

ok: psw,2,0CRLF

PSW2 is ON

ok: psw,2,1CRLF

Get status of the PSW3

led,3CRLF

PSW3 is OFF

ok: psw,3,0CRLF

PSW3 is ON

ok: psw,3,1CRLF

adc commands

Get the analog data (ADC) value

CMD:

adc,idCRLF

id:
- 0 - ADC0 (POT0/AXI0)
- 1 - ADC1 (POT1/AXI1/LDR)
- 2 - ADC2 (POT2/AXI2)
- 3 - ADC3 (POT3/AXI3)

RET: (ok)

ok: adc,id,DCRLF

D is the 10-bit data of the target ADC
(0x000 to 0x3FF or 0 to 1023)

RET: (error)

err: <wrong command>CRLF

Get status of the ADC0

adc,0CRLF

ADC0 value is 64

ok: psw,0,64CRLF

Get status of the ADC1

adc,1CRLF

ADC0 value is 128

ok: psw,1,128CRLF

Get status of the ADC2

adc,2CRLF

ADC0 value is 256

ok: psw,2,256CRLF

Get status of the ADC3

adc,3CRLF

ADC0 value is 512

ok: psw,3,512CRLF

clk commands

Get the system time

CMD:

clk,typeCRLF

type:
- 0 - HH:MM:SS:xxx
- 1 - Microseconds
- 2 - Milliseconds

RET: (ok)

ok: clk,type,DCRLF

D is the system time information

RET: (error)

err: <wrong command>CRLF

Get system time in format of HH:MM:SS:xxx

clk,0CRLF

ok: clk,0,hh:mm:ss:xxxCRLF

Get system time in format of microseconds

clk,1CRLF

ok: clk,1,xxx.xxxCRLF

Get system time in format of milliseconds

clk,2CRLF

ok: clk,2,xxx.xxxCRLF

det commands

Set ADC Changed Detection

CMD:

det,id,threshold,intervalCRLF

id:
- 0 - ADC0 (POT0/AXI0)
- 1 - ADC1 (POT1/AXI1/LDR)
- 2 - ADC2 (POT2/AXI2)
- 3 - ADC3 (POT3/AXI3)

threshold:
0 to 1023

interval:
0 to 65535

RET: (ok)

ok: det,id,threshold,intervalCRLF

RET: (error)

err: <wrong command>CRLF

Set auto-detected threshold of the ADC0 to 50

det,0,50CRLF

ok: det,0,50CRLF

Set auto-detected threshold and interval of the ADC0 to 50 and 500 respectively

det,0,50,500CRLF

ok: det,0,50,500CRLF

Set auto-detected threshold of the ADC3 to 100

det,3,100CRLF

ok: det,3,100CRLF

Set auto-detected threshold and interval of the ADC3 to 100 and 2000 respectively

det,3,100,2000CRLF

ok: det,3,100,2000CRLF

jap commands

Connect to the Network (Access Point)

CMD:

```
jap,ssid,pass,CRLF
```

ssid:
The Service Set Identifier

pass:
The password of Wi-Fi network

RET: (ok)

```
ok: jap,ssidCRLF
```

RET: (error)

```
err: <wrong command>CRLF
```

Connect to the network with the given ssid and pass

```
jap,ecc-lab,@eccpasswCRLF
```

```
ok: jap,ecc-labCRLF
```

Note: The jsp is not allowed in this version, for safety reasons.

rst commands

Restart the MCU and/or WiFi module

CMD:

rst,idCRLF

id:
- 0 - MCU
- 1 - WiFi

RET: (ok)

ok: rst,idCRLF

RET: (error)

err: <wrong command>CRLF

Restart the MCU

rst,0CRLF

NO RETURN

Restart the WiFi

rst,1CRLF

ok: rst,1CRLF

Note: The rst is not allowed in this version, for safety reasons.

THANK YOU!

ECC

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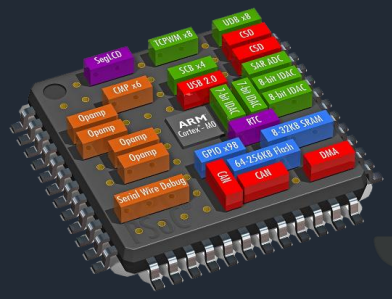

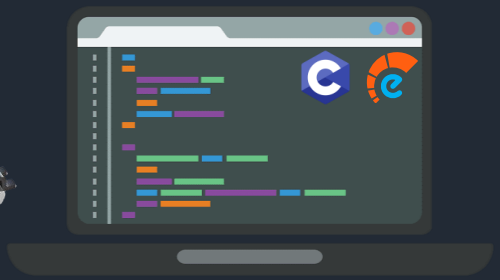

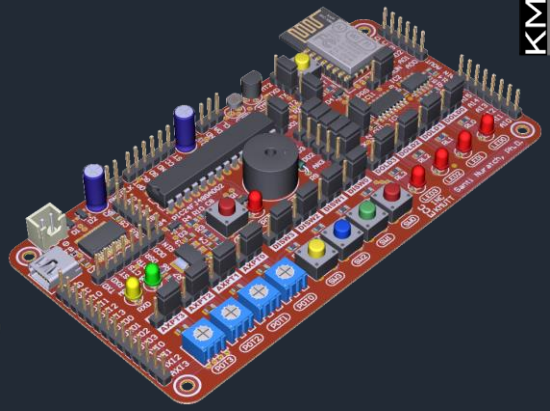

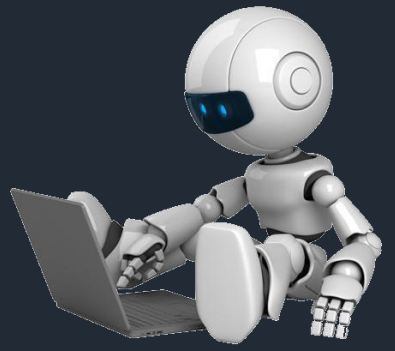

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