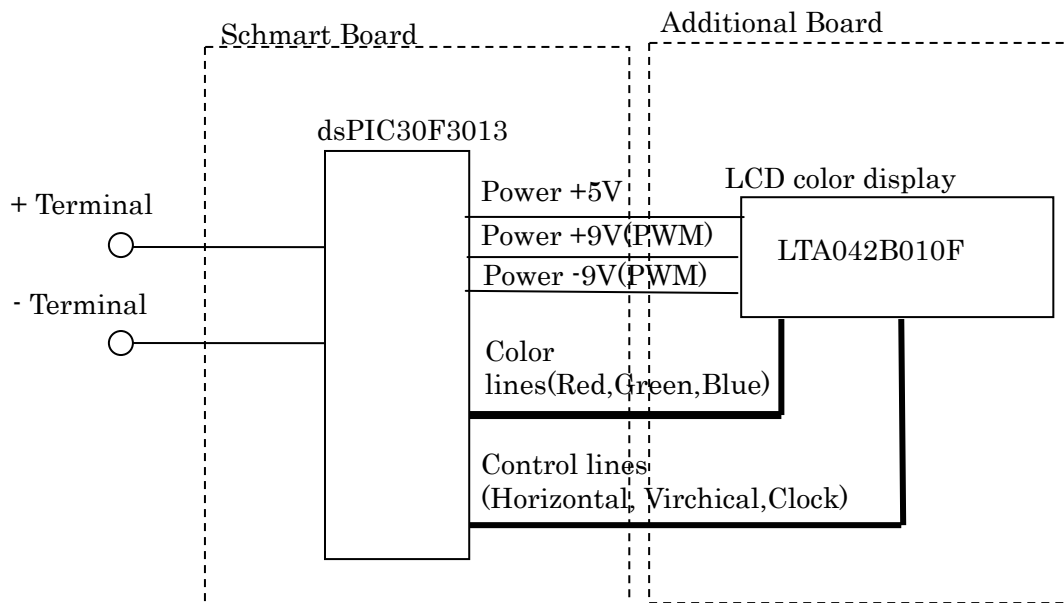## Project Number MP006

Project Description: Digital Animation voltage meter

This device shows voltage value with animation on LCD color display LTA042B010F.

- Voltage range is from 0.00V to 5.00V.　The sampling rate is 20ms interval.
- Additional information such as maximum value, minimum value and average are shown bottom of the LCD display.
- Depend on voltage value, the animation will change, so easy to understand voltage is high or low without seeing the actual voltage value. When the voltage will be higher voltage, the animation will move quickly and become. (That is exactly voltage up.)

Block diagram

dsPIC30F3013 is mounted on SchmartBoard 8 Bit PIC Microcontroller Development SchmartModule board and connected additional board with 28 pin connecter. LCD display is connected with 36 pin connecter and flexible cable. So on additional board, 28 pin socket for SchmartBoard 8 Bit PIC Microcontroller Development SchmartModule connection and 36 pin connecter for LCD display connection. Other parts such as input terminal or contrast voltage generator on additional board

dsPIC is selected for this device, because higher clock rate and bigger memory size to
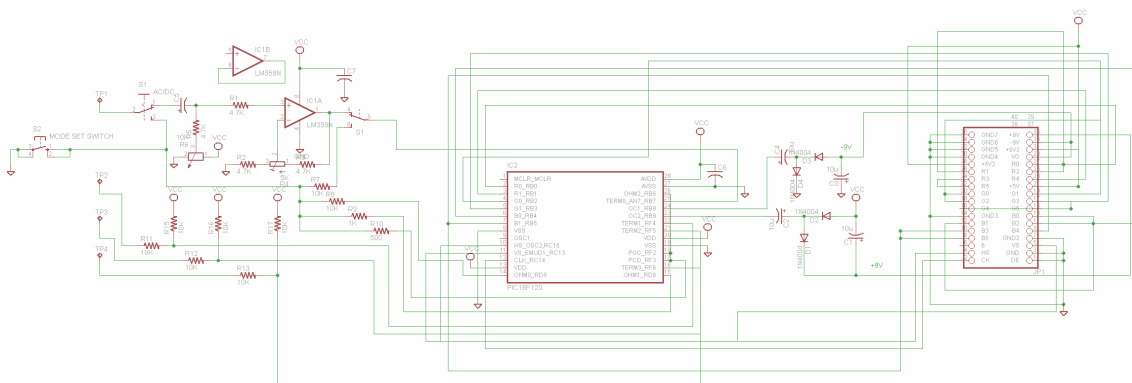
compare with 8 bit PIC such as PIC16F88. dsPIC30F in the dsPIC series is selected, because only 5V chips in dsPIC series to adapt SchmartBoard 8 Bit PIC Microcontroller Development SchmartModule. Power and ground are supplied by the SchmartModule with 28 PIN A Type Configurations. ICSP connection is not allowed by the SchmartModule, so ICSP (PicKit3) connection is supplied by additional board.

The LCD color display is full color 96X400 dots display. This is controlled by 3 control signal lines and RGB lines. 3 control lines are clock signal, horizontal signal and virtual signal. RGB lines are 2 bits each for Red, Green and Blue. The LCD color display require +5V for logic power and +9V and -9V for contrast. Since the SchmartModule is not supply other voltage except +5V though 28 pin connection, +9V and -9V is generated by dsPIC PWM function on two of dsPIC30F3013 OC pins..

Schematic

Schmantic is as follows.

There are three parts. Input part, dsPIC30F3013 and LCD display LTA042B010F. dsPIC30F3013 is mounted on Schmart Board, input part and LCD display connector is mounted additional board.
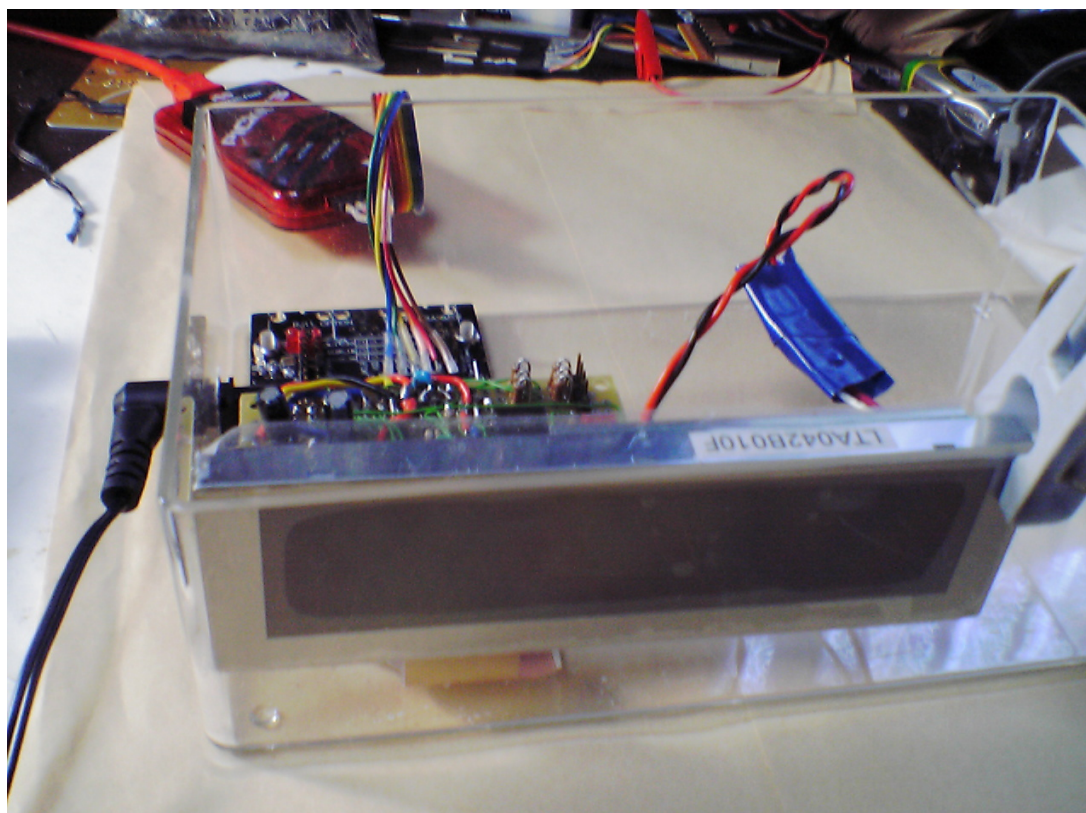
Picture

The following is the picture of the display showing voltage. Upper part of left side is voltage value and right side is animation. animation is change two picture which are SchmartBoard men having solder iron on right hand and change left hand. The bottom part is for additional information such as maxmum value, minimum value and average value.
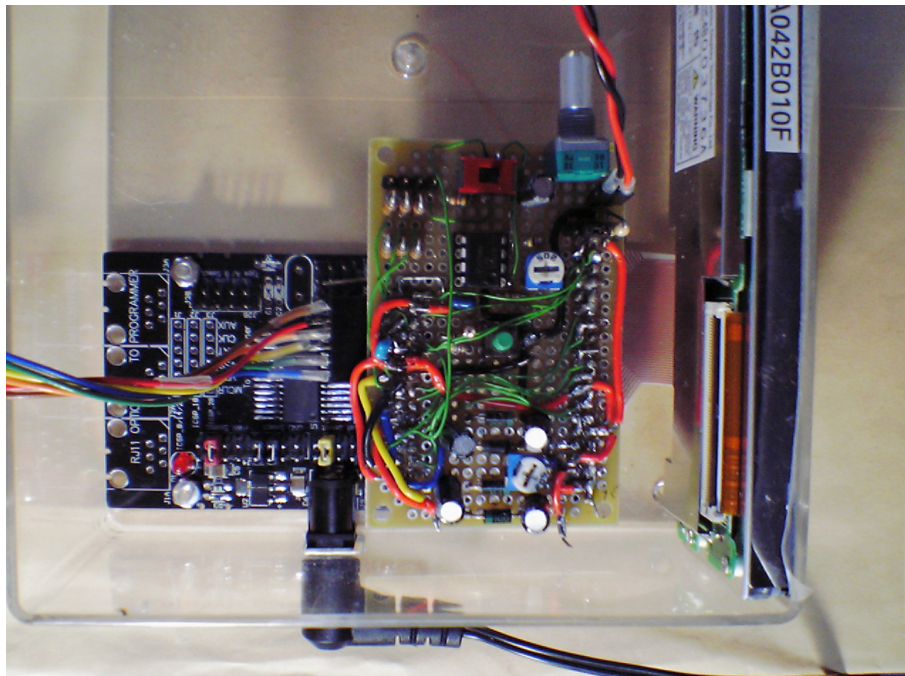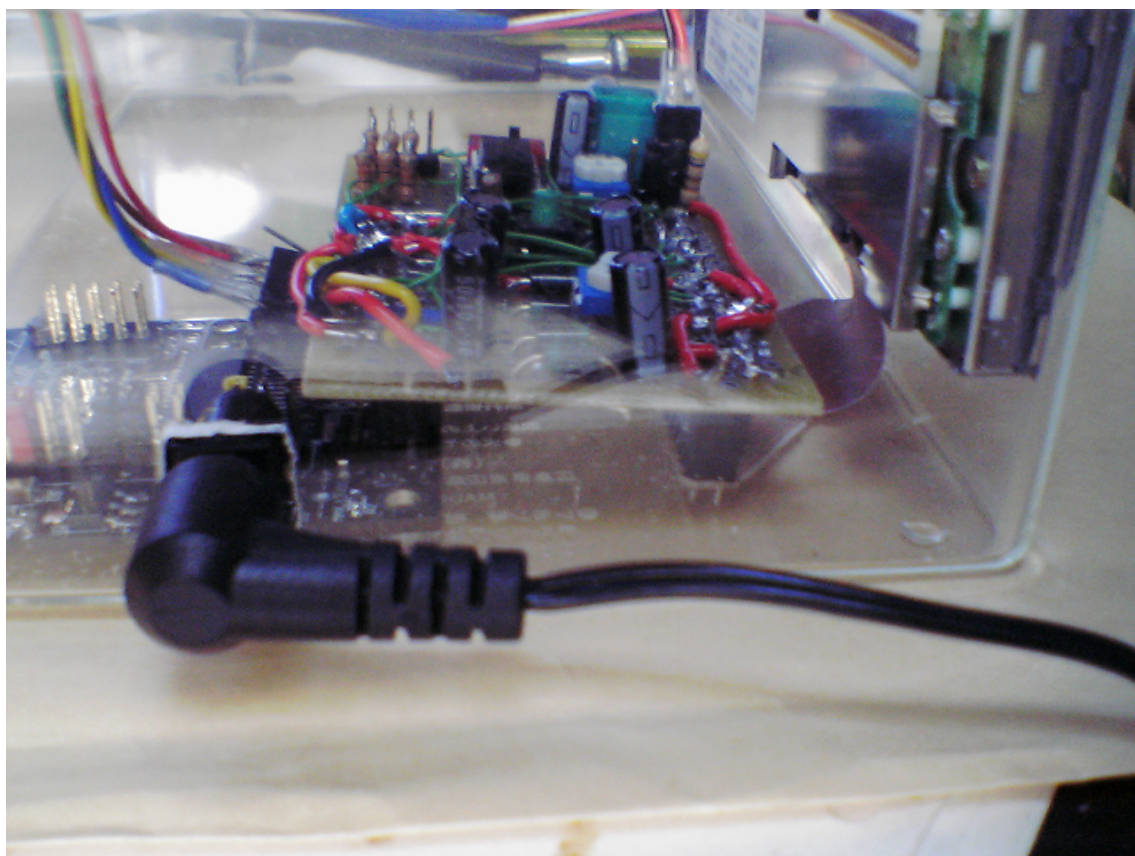
The following is picture of upper front side.

MP006
Digital Animation Voltage meter

The following is from top. SChmartBoard, Additional board and LCD disply from the
left.

The following is from left side. SChmartBoard, Additional board and LCD disply from
the left.

MP006
Digital Animation Voltage meter

MP006
Digital Animation Voltage meter

Bill of Materials

Part	Value	Device	Package	
C1	10u	CPOL-USE1.8-4	E1,8-4	
C2	10u	CPOL-USE1.8-4	E1,8-4	
C3	10u	CPOL-USE1.8-4	E1,8-4	
C4	10u	CPOL-USE1.8-4	E1,8-4	
C5	0.1u	CPOL-USE1.8-4	E1,8-4	
C6	0.1u	C-US025-025X050	C025-025X050	
C7	0.1u	C-US025-025X050	C025-025X050	
D1	1N4004	1N4004	diode	
D2	1N4004	1N4004	diode	
D3	1N4004	1N4004	diode	
D4	1N4004	1N4004	diode	
IC1	LC662	LM358N	DIL08	
IC2	dsPIC40F3013	DIL28-3	28PIN	
JP1		PINHD-2X20	2X20	LTA042B010F
R1	4.7K	R-US_0204/7	0204/7	
R2	4.7K	R-US_0204/7	0204/7	
R3	4.7K	R-US_0204/7	0204/7	
R4	5K	R-TRIMM64P	RTRIM64P	
R5	4.7K	R-US_0204/7	0204/7	
R6	10K	POTENTIOMETER_PT-10	PT-10	
R7	10K	R-US_0204/7	0204/7	
R8	10K	R-US_0204/7	0204/7	
R9	1K	R-US_0204/7	0204/7	
R10	500	R-US_0204/7	0204/7	
R11	10K	R-US_0204/7	0204/7	
R12	10K	R-US_0204/7	0204/7	
R13	10K	R-US_0204/7	0204/7	
R15	10K	R-US_0204/7	0204/7	
R16	10K	R-US_0204/7	0204/7	
R17	10K	R-US_0204/7	0204/7	
S1	AC/DC	A68-A31	A68-A31	switch
S2	MODE SET SWITCH 10-XX		B3F-10XX	PushSW
TP1	TPPAD1-20	TPPAD1-20	P1-20	
TP2	TPPAD1-20	TPPAD1-20	P1-20	

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| TP3 | TPPAD1-20 | TPPAD1-20 | P1-20 |
| TP4 | TPPAD1-20 | TPPAD1-20 | P1-20 |

You Tube URL

http://www.youtube.com/watch?v=vPTvHcFaNyA