

USB Current Monitor

20131220

Reference;

USB_Current_Monitor_0.3.1.f

USB Current Monitor display USB-decives-current(mA) and total-current(Ahour).

Displayment is 1second by 1second.

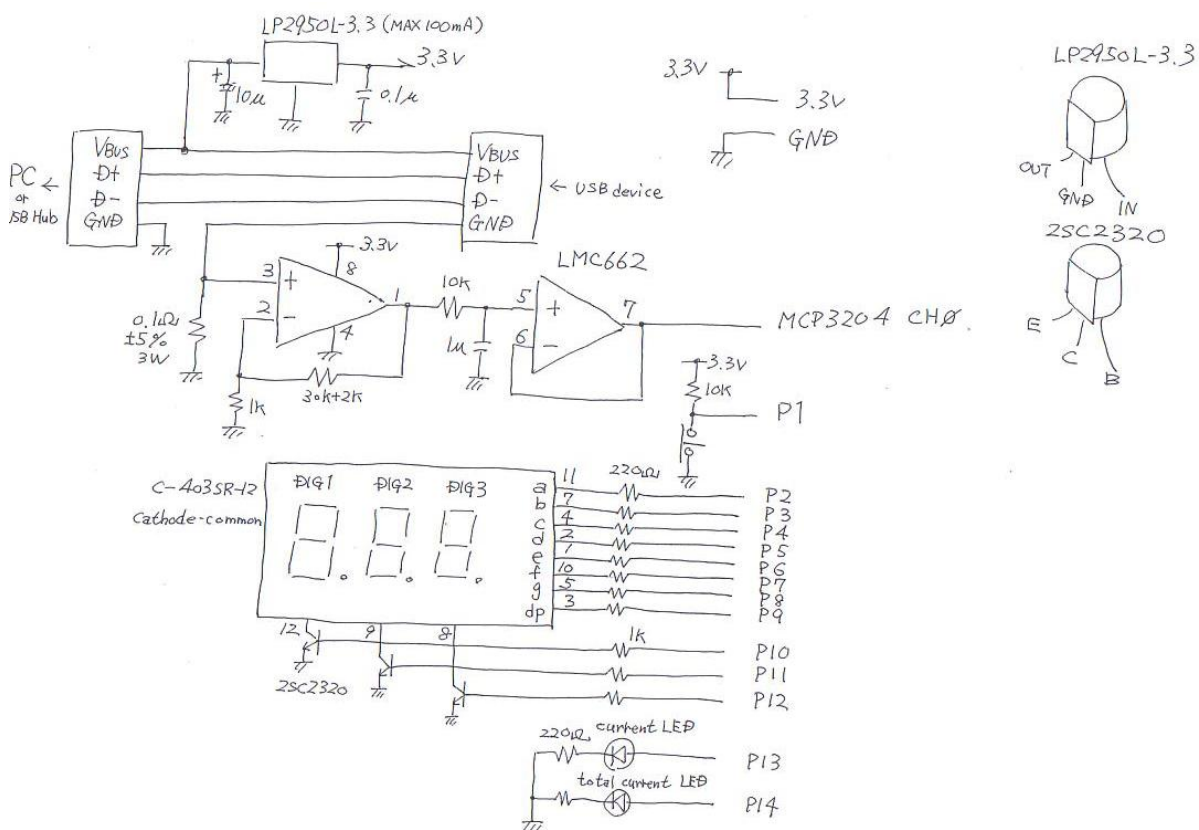
USB-devices-current(mA): 0mA – 999mA [– –]at more than 999mA

USB-total-current(Ahour): 0.00Ahour –

Not displaying more than 192Ahour because bug.

Current is an approximate value.

I/F Curcuit



Power(3.3V) is generated by USB-Vbus.

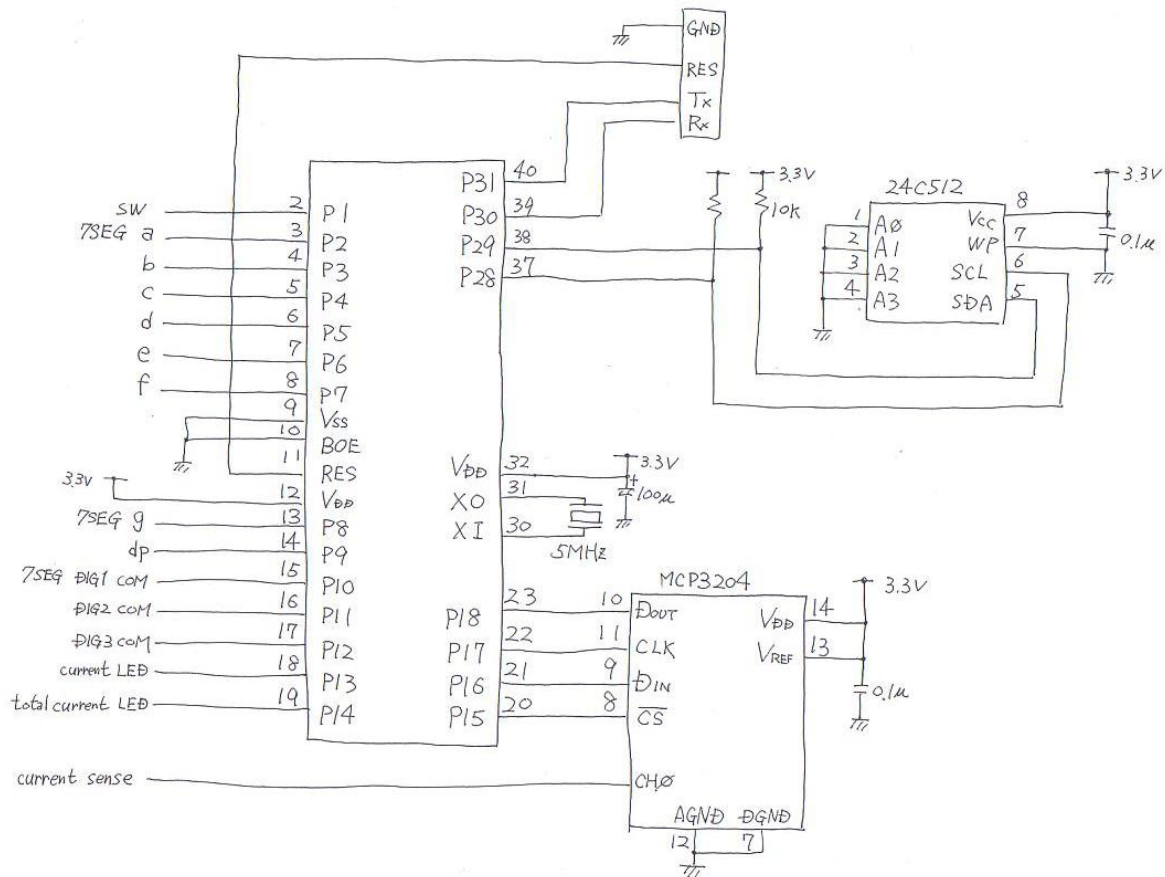
3-digit-7SEG-LED display by Dynamic-drive(400Hz).

USB-device's current is sensed by resistor(0.1ohm).

This resistor has error (max+-5%). Resistor for op^amp is +-5%.

Current-sense-error is max+/-5.25%.

CPU Curcuit



Although using 24C512 as eeprom, using 24C256 is ok.

ADC(MCP3204) is using because converting current-sense-voltage.

Vref for MCP3204 use 3.3V(generated by LP2950L-3.3).

LP2950L-3.3 has error(max+-2%).

So, digital-value has max+-2%.

Error for current-sense-resistor and digital-value is +-5.355%.

USB-current's error is max+-5.355%.

But actually display-value is almost correct.

Using

1. Inserting USB Current Monitor to USB-port for PC or USB-Hub.
2. After "---" on 7SEG-LED, "0" is displayed on it. (zero-adjustment for op-amp)
3. Inserting USB-device to USB Current Monitor
4. When pushig switch, 7SEG-LED display total-current(Ahour).

Install

After built-up circuit, insert USB Current monitor to USB-port.

Load DevKernel.spin connecting prop-plug to 4-pin-port.

Connect to TeraTerm.

Loading USB_Current_Monitor_0.3.1.f.

```
Prop0 Cog6 ok
saveforth
.....
Prop0 Cog6 ok
reboot

CON:Prop0 Cog0 RESET - last status: 0 ok

CON:Prop0 Cog1 RESET - last status: 0 ok

CON:Prop0 Cog2 RESET - last status: 0 ok

CON:Prop0 Cog3 RESET - last status: 0 ok

CON:Prop0 Cog4 RESET - last status: 0 ok

CON:Prop0 Cog5 RESET - last status: 0 ok

CON:Prop0 Cog6 RESET - last status: 0 ok

Prop0 Cog6 RESET - last status: 0 ok
Prop0 Cog6 ok

-- USB_Current_Monitor should operate ----

cog?
Cog:0 #io chan:1      RUNNING 7SEG_drive
Cog:1 #io chan:1      RUNNING read_sw
Cog:2 #io chan:1      RUNNING USB-current
Cog:3 #io chan:1 PropForth v5.5 2013Feb20 11:30 3
Cog:4 #io chan:1 PropForth v5.5 2013Feb20 11:30 3
Cog:5 #io chan:1 PropForth v5.5 2013Feb20 11:30 3
Cog:6 #io chan:1 PropForth v5.5 2013Feb20 11:30 3 6(0)->7(0)
Cog:7 #io chan:1      SERIAL 7(0)->6(0)
Prop0 Cog6 ok

-- Connected MP3-player ---
monitor
A/D   Current[mA]   Total Current[mA*sec]
315   76            750
315   76            826
315   76            902
567   138           1040
681   166           1206
680   166           1372
765   186           1558
709   173           1731
712   173           1904
711   173           2077
746   182           2259
721   176           2435
724   176           2611
640   156           2767
699   170           2937
625   152           3089
624   152           3241
622   151           3392
702   171           3563
703   171           3734
```

A/D	Current[mA]	Total Current[mA*sec]
701	171	3905
596	145	4050
594	145	4195
605	147	4342

Current-measure mode



Total-Current-measure mode

