

# OLED SmartSwitch & SmartDisplay

## Evaluation Kit / Operating Manual

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Read operating manual carefully before using OLED SmartSwitch & SmartDisplay Evaluation Kit.

### I. Outline of OLED SmartSwitch & SmartDisplay Evaluation Kit

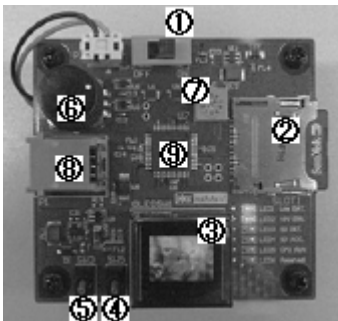
The Evaluation Kit allows users to input custom images or moving pictures and display them on the OLED SmartSwitch or SmartDisplay. The images can be created or edited by “IS Color Editor,” which is supplied as a freeware.

### II. Included in the Kit

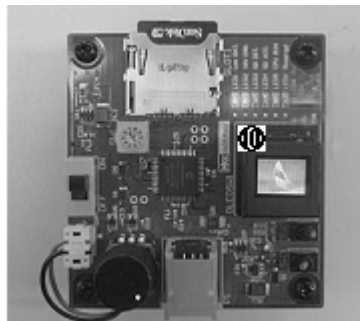
1. OLED SmartSwitch & SmartDisplay Evaluation Kit main board (double-decker style), 1 unit
2. OLED SmartSwitch (mounted on the main board), 1 pc
3. OLED SmartDisplay with custom socket, 1 pc
4. miniSD card (with sample data) 1 pc (inserted in the card slot on the board)
5. Evaluation Kit Operating Manual (Simplified bi-lingual version)

Note: Three AA alkaline batteries are needed, but not included with kit

### III. Names and Functions of Parts



With OLED SmartSwitch  
(as delivered)



With OLED SmartDisplay



Bottom side

- ① Power switch (right ON)
- ② miniSD card slot
- ③ OLED SmartSwitch
- ④ Switch for changing color mode (Up: 256 colors, Down: 65,536 colors)
- ⑤ Switch for selecting image type between SmartSwitch or SmartDisplay (Up: SmartDisplay; Down: SmartSwitch)
- ⑥ Rotary encoder  
In manual mode, users can cycle through images.
- ⑦ DIP rotary switch adjusts the time the images are displayed  
0: shortest; 8: longest; 9: manual mode  
(In manual mode, image is displayed until either rotary encoder or SmartSwitch is actuated)

- ⑧ RJ-11 jack (for downloading firmware)
- ⑨ Microchip PIC24FJ32GA004 microcontroller
- ⑩ OLED SmartDisplay

SmartDisplay's viewing direction is 90 degrees clockwise to the SmartSwitch.

- ⑪ Battery box

Insert three AA alkaline batteries into battery holders, aligning positive terminals to positive markings (+) on the board.

## IV. Operation

### 1. Displaying Sample Graphics

- (1) Insert included miniSD card (if not inserted) into the miniSD card socket.
- (2) Mount SmartSwitch or SmartDisplay on the kit. (SmartSwitch is mounted at the delivery.)
- (3) Set switch ⑤ down for SmartSwitch and up for SmartDisplay.
- (4) Set switch ④ down for 65,536 colors and up for 256 colors.
- (5) Adjust DIP rotary switch ⑦ and set the time for displaying each image. (Recommended: 0 or over for 256 colors, and 2 or over for 65,536 colors. 9 is for manual mode.)
- (6) Turn switch ① ON by moving to right.
- (7) In manual mode, cycle images by rotating rotary encoder, or pressing SmartSwitch if mounted.

### 2. Displaying Custom Graphics

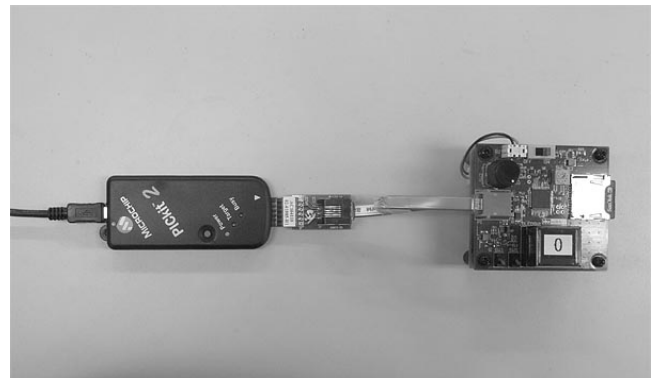
- (1) Install blank miniSD card into miniSD card reader/writer (not included) and connect them to PC.
- (2) Create the following four folders in root directory of miniSD card: "65536", "256", "65536d", "256d"
- (3) Start IS Color Editor program on PC and create or edit image data. See IS Color Editor help for more details.
- (4) Save the image data to miniSD card. Use the folders and file names as shown in the following table. Designate the file extension as numbers from "001" to "999". The image data are displayed on the SmartSwitch or SmartDisplay from the file with the extension "001" to "999" in series. To display simplified moving pictures, use sequential numbers for file extensions. Do not skip numbers, or images following the skip will be displayed with delay.
- (5) See numbers (1) through (7) under "Displaying Sample Graphics" above and follow the steps.

Types of Graphics	Folders for Storage	File Names
For switch: 65,536 colors	"65536"	image16.001, image16.002,...,image16.999
For switch: 256 colors	"256"	image08.001, image08.002,...,image08.999
For display: 65,536 colors	"65536d"	image16.001, image16.002,...,image16.999
For display: 256 colors	"256d"	image08.001, image08.002,...,image08.999

## V. Sources for Firmware, Circuit Diagrams, and Parts List

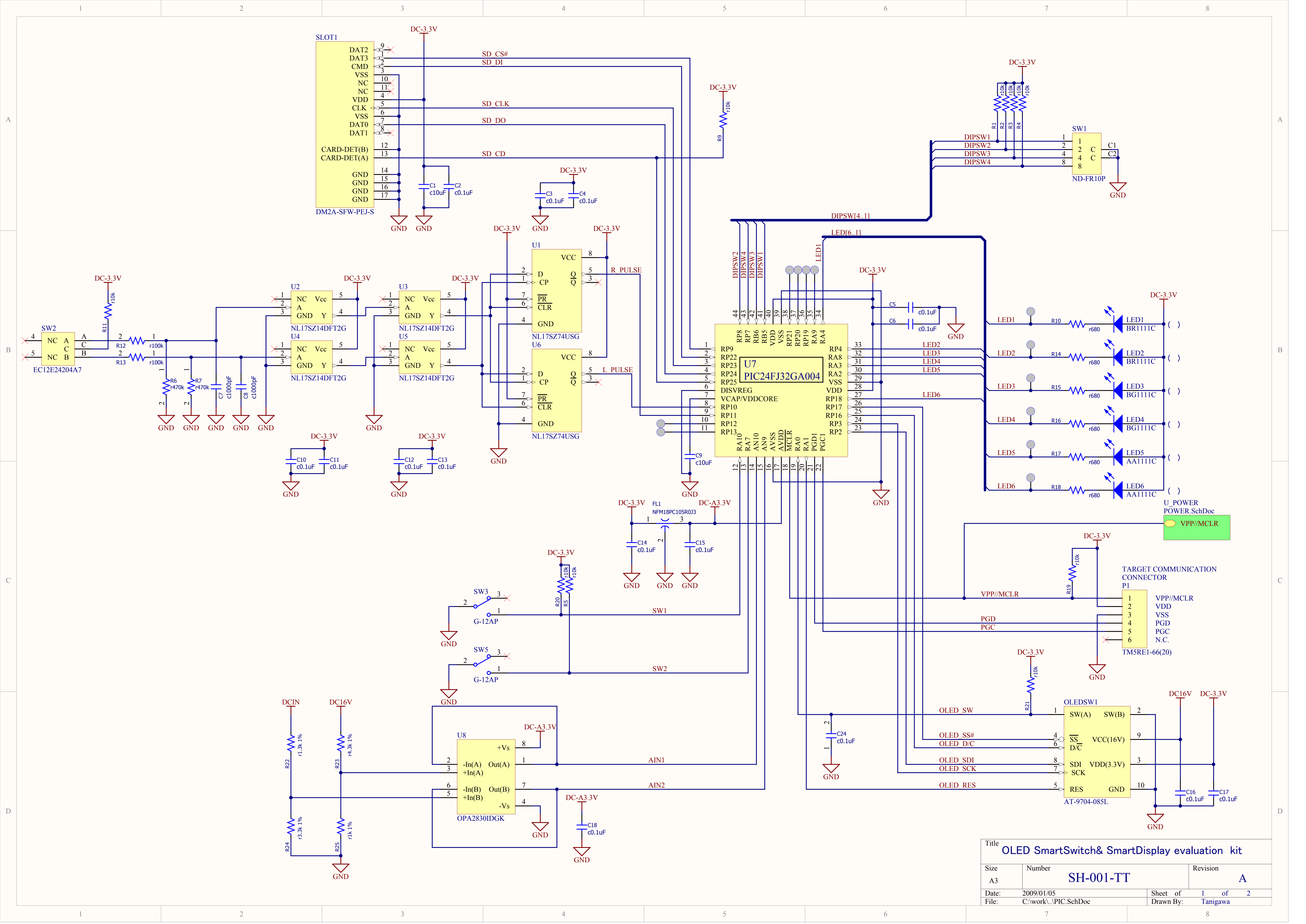
1. The firmware (for PIC24F, C language), the circuit diagrams, and the parts list for the OLED SmartSwitch & SmartDisplay Evaluation Kit can be downloaded from the following URL:  
<http://www.nkksmartswitch.com/support/>. Registration is required.
2. Tools and software needed for modifying the firmware:
  - (1) Microchip MPLAB IDE  
[http://www.microchip.com/stellent/idcplg?IdcService=SS\\_GET\\_PAGE&nodeId=1406&dDocName=en019469&part=SW007002](http://www.microchip.com/stellent/idcplg?IdcService=SS_GET_PAGE&nodeId=1406&dDocName=en019469&part=SW007002)
  - (2) MPLAB C Compiler for PIC24 v3.11(b) Student Edition (Version may change in future.)  
[http://www.microchip.com/stellent/idcplg?IdcService=SS\\_GET\\_PAGE&nodeId=1406&dDocName=en535364](http://www.microchip.com/stellent/idcplg?IdcService=SS_GET_PAGE&nodeId=1406&dDocName=en535364)
  - (3) Programmers for PIC24F  
PICkit™ 2 + AC164110 (RJ-11 to ICSP Adapter), MPLAB REAL ICE, or others

Photo at right shows PICkit™ 2 + AC164110 (RJ-11 to ICSP Adapter) connected to the evaluation kit.

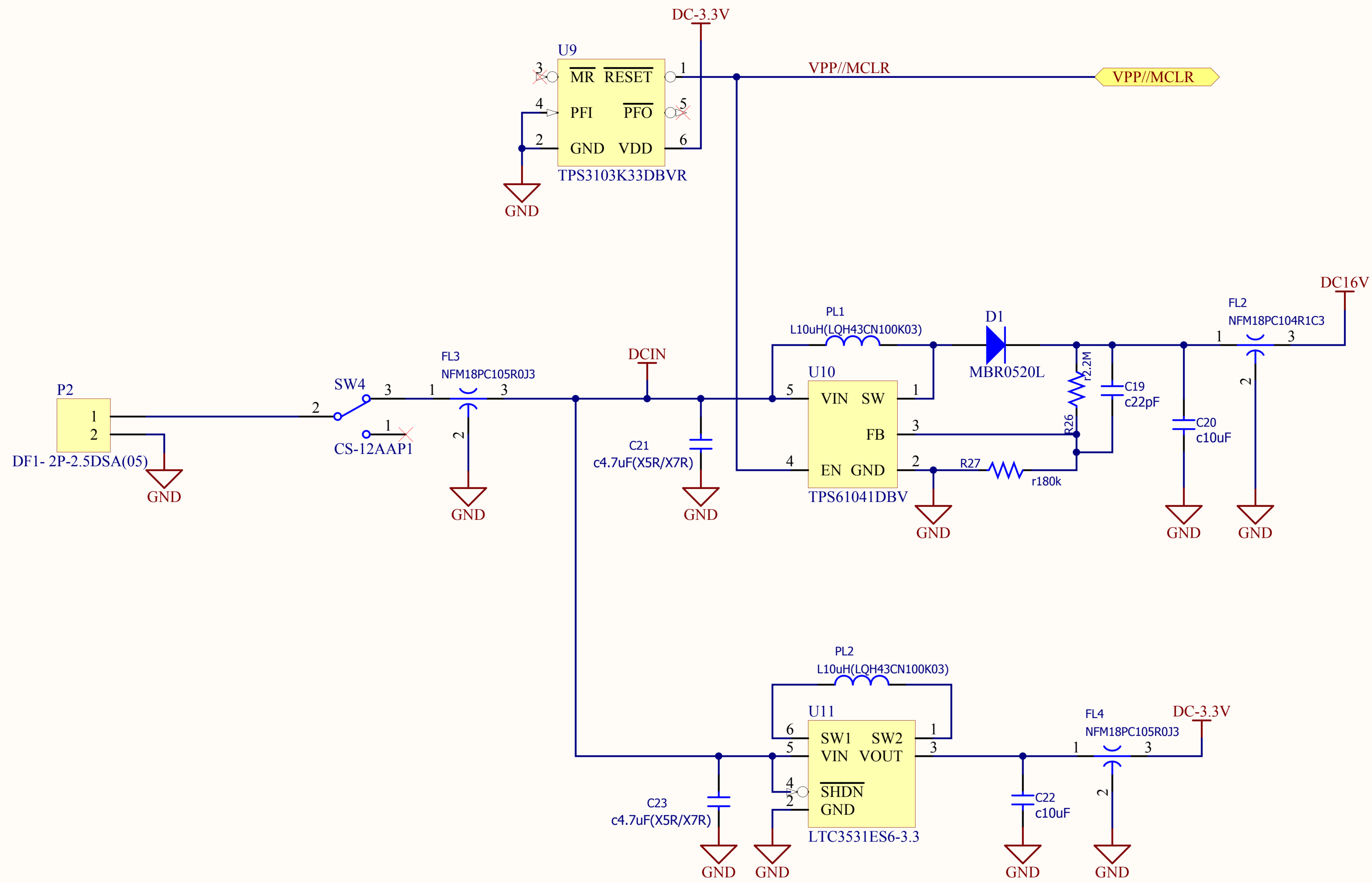


## VI. Precautions for Use

1. This kit is electrostatic sensitive. To avoid damage to this kit, do not touch the kit unless properly isolated from static electricity.
2. This kit is for evaluation purpose only and it shall not be used for actual appliances.
3. Do not insert batteries into the wrong direction.
4. Use only three AA alkaline batteries as power supply.
5. Pay enough attention when inserting OLED SmartSwitch or SmartDisplay not to bend terminals.
6. Recommended temperature range: 0°C to 40°C. Avoid dew condensation.
7. If the color mode and switch type settings for SmartSwitch and SmartDisplay are incorrect, some operations may fail. To correct, turn off the power and set the color mode and switches appropriately and then turn on the power.
8. Refer to the specification sheets of OLED SmartSwitch or SmartDisplay on their own specifications.
9. The Evaluation Kit is not guaranteed if the firmware has been modified or if any parts have been altered by the user.
10. Firmware can be used only for PIC24F of Microchip.
11. Some programs and header files in the firmware are copyrighted works of Microchip. Use them by following the terms and conditions provided by Microchip.



Title			
OLED SmartSwitch & SmartDisplay evaluation kit			
Size	Number	Revision	
A3	SH-001-TT	A	
Date:	2009/01/05	Sheet of	1 of 2
File:	C:\work\...PIC.SchDoc	Drawn By:	Tanigawa



Title			
OLED SmartSwitch & SmartDisplay evaluation kit			
Size	Number	Revision	
A4	SH-001-TT	A	
Date:	2009/01/05	Sheet of	2 of 2
File:	C:\work\...\POWER.SchDoc	Drawn By:	Tanigawa

# Components list

Source Data From: AS-001-TT.PrjPCB  
 Project: AS-001-TT.PrjPCB  
 Variant: None

Creation Date: 2008/11/11 10:51:48  
 Print Date: 30-Jan-09 2:54:58 PM

Manufacturer Part Number	Part Name	MFG	Designator	Description	Quantity
C1206C106K9PACT	Ceramic Capacitors	Kemet	C1, C9, C20, C22		4
GRM155B11A104K	Ceramic Capacitors	Murata	C2, C3, C4, C5, C6, C10, C11, C12, C13, C14, C15, C16, C17, C18, C24		15
GRM1552C1H102J	Ceramic Capacitors	Murata	C7, C8		2
GRM1552C1H220J	Ceramic Capacitors	Murata	C19		1
LMK107BJ475KA-T	Ceramic Capacitors	Taiyo Yuden	C21, C23		2
MBR0520L	Schottky Rectifier	Fairchild	D1		1
NFM18PC105R0J3	EMI Suppression Filters	Murata	FL1, FL3, FL4		3
NFM18PC104R1C3	EMI Suppression Filters	Murata	FL2		1
BR1111C	Surface Mount LED	STANLEY	LED1, LED2	Red	2
BG1111C	Surface Mount LED	STANLEY	LED3, LED4	Pure Green	2
AA1111C	Surface Mount LED	STANLEY	LED5, LED6	Orange	2
AT-9704-085L	OLED Smartswitch socket	NKK/Nikkai	OLED5W1		1
TM5RE1-66(20)	MODULAR JACK PC MOUNT	Hirose	P1		1
DF1- 2P-2.5DSA(05)	2.5mm Pitch Connector	Hirose	P2		1
LQH43CN100K03	Chip Coil	Murata	PL1, PL2	10uH	2
RK73B1JTTD103J	Surface Mount Thick Film Resistor	KOA	R1, R2, R3, R4, R5, R9, R11, R19, R20, R21		10
RK73B1JTTD474J	Surface Mount Thick Film Resistor	KOA	R6, R7		2
RK73B1JTTD681J	Surface Mount Thick Film Resistor	KOA	R10, R14, R15, R16, R17, R18		6
RK73B1JTTD104J	Surface Mount Thick Film Resistor	KOA	R12, R13		2
RK73H1JTTD1301F	Surface Mount Thick Film Resistor	KOA	R22		1
RK73H1JTTD4301F	Surface Mount Thick Film Resistor	KOA	R23		1
RK73H1JTTD3301F	Surface Mount Thick Film Resistor	KOA	R24		1
RK73H1JTTD1001F	Surface Mount Thick Film Resistor	KOA	R25		1
RK73B1JTTD225J	Surface Mount Thick Film Resistor	KOA	R26		1
RK73B1JTTD184J	Surface Mount Thick Film Resistor	KOA	R27		1
DM2A-SFW-PEJ-S	miniSD Card Connector	Hirose	SLOT1		1
ND-FR10P	Rotary Switch	NKK/Nikkai	SW1		1
EC12E2420A7	ENCODER	ALPS	SW2		1
G-12AP	Toggle Switch	NKK/Nikkai	SW3, SW5		2
CS-12AAP1	Slide Switch	NKK/Nikkai	SW4		1
NL17SZ74USG	Single D Flip Flop	ON Semiconductor	U1, U6		2
NL17SZ14DFT2G	Single Inverter with Schmitt Inputs	ON Semiconductor	U2, U3, U4, U5		4
PIC24FJ32GA004	PIC24 16-bit Microcontroller	Microchip	U7		1
OPA2830IDGK	Operational Amplifier	Texas Instruments	U8		1
TPS3103K33DBVR	Supervisory Circuit	Texas Instruments	U9		1
TPS61041DBV	DC/DC Boost Converter	Texas Instruments	U10		1
LTC3531ES6-3.3	Buck-Boost DC/DC Converter	Linear Technology	U11		1

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Approved	Notes