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NKK<sup>®</sup>  
SWITCHES

Demonstration Kit  
User Guide

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## NOTES

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## INTRODUCTION

This User Guide will assist you in using the IS Demonstration Kit (DEM KIT), consisting of an IS switch or IS display module mounted on PC board. A sub-miniature controller manages 64 bitmaps and backlight data.

Bitmap data is controlled by 6-bit parallel TTL level signal and is edited by the "IS Easy Editor," downloaded to the kit via USB Type A-mini B cable (required for connection to a PC).

"IS Easy Editor" is the software to create and edit graphics. A variety of tool functions allows you to customize bitmap images as well as change the setting of the backlight.

Transfer of graphic data is simple with IS Easy Display Controller. An assortment of samples is available, allowing customization of graphic images with ease for your applications.

## PRECAUTIONS FOR HANDLING & STORAGE

### Handling

1. The IS Series devices are electrostatic sensitive.
2. Avoid excessive force to protect the LCD.
3. Do not exceed 60°C at the LCD level.
4. If the LCD is accidentally broken, avoid contact with the liquid and wash off any liquid spills to the skin or clothing.
5. Do not connect to PC via USB when IS Easy Display Kit is mounted on battery box.
6. Deviation of drive current and temperature may change LCD contrast. Control contrast via contrast adjustment on backside of IS Controller.
7. The IS series devices are not process sealed.
8. Clean cap surface with dry cloth. If further cleaning is needed, wipe with dampened cloth using neutral cleanser and dry with clean cloth. Do not use organic solvent.



### Storage

1. Store away from direct sunlight.
2. Keep away from static electricity.
3. Avoid extreme temperatures, high humidity, gaseous substances, and all forms of chemical contamination.

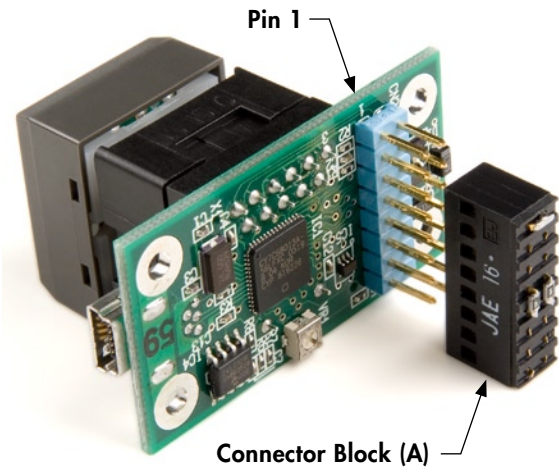
## SHIPPING CONTENTS

1. Demonstration Kit User Guide
2. CD for "IS Easy Editor" Software and Manual
3. SMARTDISPLAY™ Mounted on Controller Board  
or
4. SMARTSWITCH™ Mounted on Controller Board
5. Connector Block
6. USB Type A-Mini B Cable
7. (Optional) Battery Box (Batteries not included)



## HARDWARE INSTALLATION

The Connector Block (A) is required to illuminate the backlight of the DEM KIT while programming through the USB Type A-mini B cable.



Connect as shown, **prior to connecting to the USB cable.**

Note the orientation of the Connector Block to that of the DEM KIT.

The Connector Block is used **ONLY** during the programming phase; it is not used with the Battery Box option.

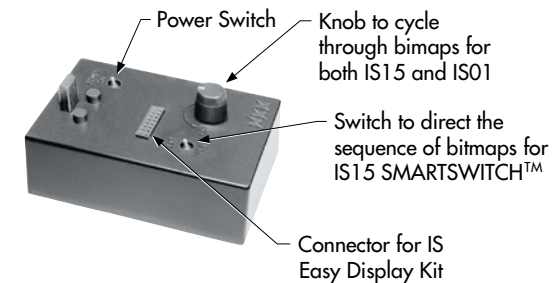
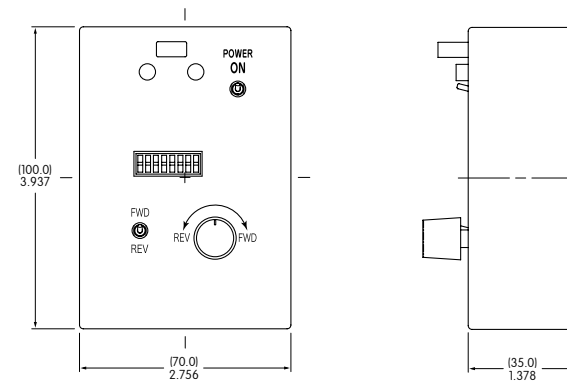
## (OPTIONAL) BATTERY BOX SPECIFICATIONS

The Battery Box provides portability to demonstrate functionality without any system connections.

- Power Switch activates power
- FWD/REV Switch directs sequences of bitmaps for IS15 SMARTSWITCH™
- Knob for cycling bitmaps may also simulate animation
- Socket to mount IS Easy Display Controller
- Battery holder accommodates four (4) AA alkaline batteries (not included)



Note: Orientation of DEM KIT-1 or DEM KIT-2 to Battery Box





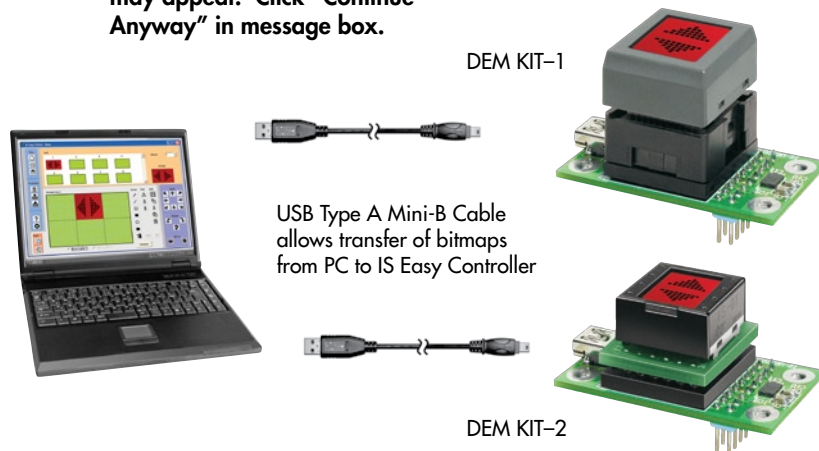
## SOFTWARE INSTALLATION (CONTINUED)

- Installation window opens again (Figure A). Continue to install drivers.
- Click on "Installation of Drivers" and follow the onscreen instructions. After installing drivers, follow directions as shown in Figure B.



Figure B

**NOTE: If using Windows XP, a warning message "has not passed Windows Logo testing" may appear. Click "Continue Anyway" in message box.**



### Uninstall

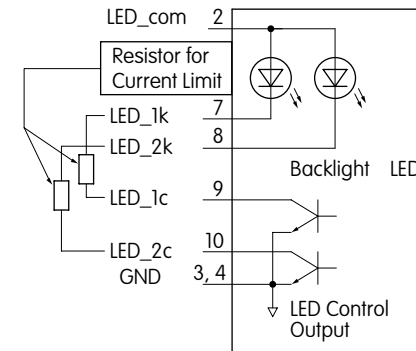
- To uninstall "IS Easy Editor", locate "Add or Remove Programs" in Start/Control Panel.
- Select "IS Easy Editor" and click "Change/Remove".

## CONTROLLING INFORMATION (CONTINUED)

### Control of Backlight LEDs

For LED control, settings of "IS Easy Editor" are transferred to IS Display Controller via switching transistors connected to LED\_1c/LED\_2c.

- To activate LED backlight, supply power to LEDs and insert resistor for current limitation.
- Drive backlight LEDs at voltage two (2) times greater than forward voltage of LEDs.
- Between LED\_1k-LED\_1c or LED\_2k-LED\_2c, insert resistors for current limitation as displayed in diagram below.



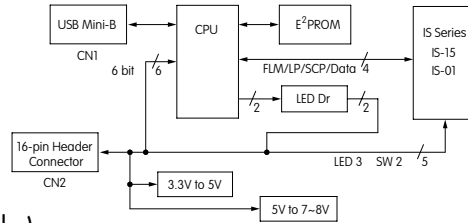
**NOTE: Consult factory if using IS Switch or Display other than what is included in DEM KIT.**



## BLOCK DIAGRAM

### Functions of IS Easy Display Controller

- CN1 Connector (USB Mini-B Connector)  
Transfers bitmaps created on PC to IS Easy Controller via USB Type A Mini-B Cable
- CN2 Connector (2.54mm pitch 16-pin header)  
Connector for power supply, GND, switch operation, backlight LED control and selection of bitmaps



## CONTROLLING INFORMATION

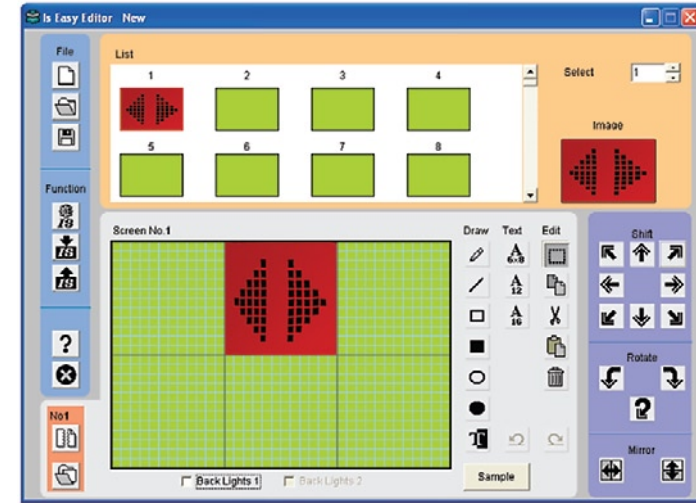
### Control of Data

Bitmap data is transferred to IS Easy Display Controller by setting the 6-bits parallel TTL level signals (terminals 11~16).

To display desired bitmaps in "IS Easy Editor", refer to diagram below and set appropriate values to terminals.

Bitmap Number	Connector CN2 Terminal Number/Logic Level						Values
	16	15	14	13	12	11	
1	L	L	L	L	L	L	Low (L) Level = 0 ~ 0.8V
2	L	L	L	L	L	H	
3	L	L	L	L	H	L	
•	•	•	•	•	•	•	
•	•	•	•	•	•	•	
•	•	•	•	•	•	•	
62	H	H	H	H	L	H	High (H) Level = 2 ~ 5.25V
63	H	H	H	H	H	L	
64	H	H	H	H	H	H	

## PROGRAMMING BITMAPS



Note: Bitmap image for reference only.

Run "IS Easy Editor" and open "sample.isl" for test. File contains samples of created bitmaps.

Read and print "Graphic Editing Software Operating Manual" from the computer. See instructions below.

1. Go to "Start" on Windows screen
2. Select "Programs"
3. Find "IS Easy Editor"
4. Select Manual

## DEMONSTRATION KIT SPECIFICATIONS

SMARTSWITCH™			SMARTDISPLAY™		
ATTENTION ELECTROSTATIC SENSITIVE DEVICES			ATTENTION ELECTROSTATIC SENSITIVE DEVICES		
Standard LED Backlighting			Super Bright LED Backlighting		
Part Number	LCD Mode	LED Color	Part Number	LCD Mode	LED Color
IS15AACP4CF	Yellow STN Positive	Red/Green	IS01BCCF	Yellow STN Positive	Red/Green

### Typical Electrical Characteristics (Temperature at 25°C)

Backlight Color	Symbols	Red/Green	Unit
Forward Current	$I_F$	15/15	mA
Forward Voltage	$V_F$	2.1/2.2	V

### Ratings (Temperature at 25°C)

Items	Symbols	Ratings	Description
Supply Voltage for Logics	$V_{DD}$	5.0V ±10%	Supplied by USB while connected to PC
Input Voltage	$V_i$	0 ~ 5.25V	Header connector pins 11 ~ 16
		0 ~ 28V	Header connector pin 2
Current	$I_{DD}$	~ 150mA	
Operating Temperature Range	$T_{OP}$	0 ~ 40°C	
Storage Temperature Range	$T_{ST}$	0 ~ 60°C	

## PIN CONFIGURATIONS

Pin No.	Symbol	Name	Function
①	$V_{DD}$	Power	Supply +5.0V (When connected to PC via USB, do not supply the controller with another external power.)
②	LED_com	LED common (anode)	Common anode of backlight LEDs of IS External power supply terminal for drive of LEDs
③④	$V_{SS}$	Ground	GND terminal
⑤	SW 1	Switch 1	IS15: Connected to switch terminal 1; IS01: no connection
⑥	SW 2	Switch 2	IS15: Connected to switch terminal 2; IS01: no connection
⑦	LED_1k	LED 1 (cathode)	Cathode terminal of backlight LED 1
⑧	LED_2k	LED 2 (cathode)	Cathode terminal of backlight LED 2
⑨	LED_1c	LED 1 Control (Open Collector)	Output terminal for backlight control set by "IS Easy Editor" * Connected to LED_1k terminal via resistor for current limitation
⑩	LED_2c	LED 2 Control (Open Collector)	Output terminal for backlight control set by "IS Easy Editor" * Connected to LED_2k terminal via resistor for current limitation
⑪	Disp_1	Bitmap number set bit1 LSB bit	} 0; Low (L) Level = 0 ~ 0.8V 1; High (H) Level = 2 ~ 5.25V
⑫	Disp_2	Bitmap number set bit2	
⑬	Disp_3	Bitmap number set bit3	
⑭	Disp_4	Bitmap number set bit4	
⑮	Disp_5	Bitmap number set bit5	
⑯	Disp_6	Bitmap number set bit6 MSB bit	

\* See **Control of Data** on next page