SanyoFWS Flash-micro Writing System

Simple Users Manual

V3.12　2014/4/4

ON Semiconductor
Microcontroller & Flash BU.

SanyoFWS Flash-micro Writing System

Overview

The SanyoFWS Flash-micro Writing System (SanyoFWS) is used to program, verify, and erase programming data into and from flash-ROM chips for the one-chip microcontrollers incorporating flash ROM supplied by ON Semiconductor. SanyoFWS has the following features:

(1) Capable of connecting to a maximum of 16 writer units via USB and program all of them at the same time.

(2) Supports proprietary functions of ON Semiconductor microcontrollers such as read protection.

(3) Allows the user to program data repeatedly with no manual intervention from the PC. This feature is provided on the assumption that SanyoFWS be used on the production line. (It is still necessary to connect writer units to PC.)

1. System Configuration

(1)Writer Unit

Writer Unit is used to program into FLASH-ROM micro.

There are three types of writer units, and all types need to be connected to PC via USB.

i)SKK (SKK/SKK Type B/SKK Type C)

SKK is used with an adaptor for each particular series. Place the adaptor on SKK's DIP32 socket and place a FLASH-ROM micro to use. *Type C has different functions. See "About_SKK-TypeC_100705.pdf"

ii) SKK-DBG (SKK-DBG/SKK-DBG Type B/SKK-DBG Type C)

SKK-DBG is used with a micro which has On-Chip Debugger built in, and it programs via the debugger terminals. It enables programming to a micro on user board. SKK-DBG does not supply power to the target micro. Supply the power to the micro from the set board.

*Type C has different functions. See "About_SKK-TypeC_100705.pdf".

(2)SanyoFWS Software

SanyoFWS software controls writer unit from PC.

*It is necessary to install the software from the provided install-CD before connecting writer units.

*The software is updated when a newly supported micro is added. Latest version of the software can be downloaded from the download site.

(http://www.onsemi.com/PowerSolutions/taxonomy.do?id=101533&currentSession=D8CB617E0E39EAC9728C39812191B11D)

(3)Hardware Requirements

A PC to be used with the SanyoFWS must satisfy the following conditions:

-PC type

Must have at least one USB port (version 1.1 or version 2.0 (full-speed compatible)).

-OS

Windows XP

Windows VISTA

Windows 7

Windows 8

-Hardware requirements

The OS-recommended CPU and memory requirements must be satisfied.

The hard disk must have a free disk space of 10MB or more.

2. Starting and Exiting SanyoFWS

(1)Setting up Writer Unit

Before connecting a writer unit to a PC, you need to configure its unit ID. This unit ID is used by the application on the PC to identify the individual writer units. You need to assign unique IDs to the writer units to be connected to the PC. The ID can be configured by setting the rotary DIP switch in the writer unit. You can assign IDs of 0 to F. The PC can accommodate a maximum of 16 writer units.

Note: When connecting more than two writer units, they all must be the same type.

(2)Cabling Writer Unit

The writer units and PC need to be connected via USB cable.

The device driver for the writer units is stored in the subdirectory named "DevDrv" in the directory where the SanyoFWS is installed

(the default installation directory is "C:¥Program Files¥SanyoLsi¥SanyoFWS¥DevDrv"). When Windows

asks you for the subdirectory name when attaching a writer unit to the SanyoFWS, specify this directory name and install the device driver.

The SanyoFWS application program recognizes only the writer units that have been connected at the start time.

Note: Do not put in or out any writer unit while the SanyoFWS application program is running.

Note: Do not put in or out any SKKs as the device is placed on the socket.

Note: Do not put in or out any SKK-DBGs as the device's debugger terminals are connected to the unit.

(3)Starting SanyoFWS

Before starting SanyoFWS, you need to connect and configure the writer unit.

To start SanyoFWS, double-click the shortcut icon named "SanyoFWS" which is created by the installer. You can also start SanyoFWS and have it read in the target HEX file by dragging & dropping the HEX file onto this shortcut icon.

Note: When "Code: 20006" error occurs, update the firmware version of the writer unit following the instruction in "5. Firmware Update".

(4)Exiting SanyoFWS

To exit SanyoFWS, choose "Exit Application" from the [File] menu. You cannot terminate any SanyoFWS application program that is in the process of programming.

3. Operating Procedures

(1)Selecting Units

Select target writer units by choosing [Select Unit] from the [Configure] menu or from checkboxes in the main window.

(2)Selecting Series

There are two ways to select a series.

i) Choose [Select Series] from the [Configure] menu, and manually select a series from the pull-down menu.

ii) Read an Intel Hexadecimal format file (HEX file) generated by Microcontroller Development Tool and it automatically selects a series (It does not automatically select the series when reading a HEX file that is not registered.).

(3)Loading a HEX File

There are two ways to load a HEX file.

i) Choose [Open HEX File] from the [File] menu to load the HEX file on the PC. When loaded, SanyoFWS automatically identifies the series from the data in the HEX file. Nonetheless, you must make sure that the correct series is selected. If SanyoFWS fails to identify the series from the HEX file, manually select a series performing the step (2) Selecting Series.

ii) SanyoFWS reads FLASH-ROM data in a micro placed in the writer unit with the smallest ID. Choose [Read] from [Operation] to read the FLASH-ROM data. This feature is available only with SKK.

(4)Connecting Target Device

i) When using SKK, place an adaptor for each particular series on DIP32 sockets, and place a FLASH-ROM micro on it.

ii) When using SKK-DBG, read Section 4 “About Wiring Target Device to SKK-DBG” first and prepare to connect a target device. First connect SKK-DBG to target device with five wires or three wires, then supply a power to the device. When disconnecting, turn off the target device first and disconnect it from SKK-DBG.

* Supply the power to the micro from the set board.

(5)Program

SanyoFWS performs a sequence of [Erase]-->[Program]-->[Verify] operations. When verifying the data, it also performs margin test.

(6)Remote Operation

By pressing the “START” button on the unit, it can perform variety of operations. To select an operation to be assigned to the button, choose [External Switch] form [Configure] and click on the one of the operations in a pull-down menu. When connecting to a multiple writer units, use a button on the least assigned ID unit recognized by SanyoFWS.

The details of the usage should start application and refer to the help for them.

4. About Wiring Target Device to SKK-DBG

SKK-DBG and target micro are connected using five wires or three wires described below. Terminals to be wired on the target micro vary depending on its series. If there are more than two connection terminals, only one terminal needs to be connected to write.

Power needs to be supplied to the target micro from user set.

Note: Power supply voltage of the target micro needs to be set to a value specified in "F-ROM Programming Characteristics" in its specification sheets.

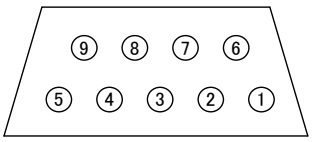
Note: Programming by SKK-DBG does not guarantee its operation when supply voltage to the target micro is less than 3.0V.

Note: If the micro has a LVD, POR function, write with the power supply voltage that is higher than the selected level of LVD, POR.

See the "Table of Wring SKK-DBG and Target Micro" and "Recommended Circuitry of Terminals of Target Micro" to connect the target device and SKK-DBG. For Type B, see the "Table of SKK-DBG D-SUB Connector Pin assignment", and for Type C, see the "SKK-DBG Type C included cables".

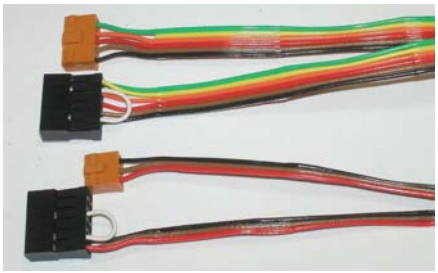
On SKK-DBG, "GND", "RES#", "DBGP0", "DBGP1" and "DBGP2" needs to be wired. Terminals to be wired on the target micro vary depending on its series. Refer to the "Table of SKK-DBG D-SUB Connector Pin Assignment" and "Table of Wiring SKK-DBG and Target Micro" for the wiring of the writer unit and the target micro. It is recommenced to follow the "Recommended Circuitry of Terminals of Target Micro".

Table of SKK-DBG D-SUB Connector Pin Assignment



D-SUB pin number	pin	
①	GND	
②	DBGP0	
③	DBGP2	
④	+5v	←Do not connect wire
⑤	NC	
⑥	RES#	
⑦	DBGP1	
⑧	+3.3v	←Do not connect wire
⑨	NC	

SKK-DBG Type C included cables



←For 3wire communication cable

←For 1 wire communication cable

Table of Wring SKK-DBG and Target Micro (For five wire type)

	SKK-DBG Pins				
TypeB See "Table of SKK-DBG D-SUB Connector Pin Assignment"	GND	RES#	DBGP0	DBGP1	DBGP2
TypeC Use 1 wire communication cable	Black	Brown	Red	Orange	Green

Connect to the specified pins.

Micro Series	V	IV	III	II	I
LC87F05J2A	VSS1,VSS2,VSS3,VSS4,VSSVCO	RES#	PC5	PC6	PC7
LC87F06J2A	VSS1,VSS2,VSS3,VSS4,VSSVCO	RES#	PC5	PC6	PC7
LC87F0908A	VSS1,VSS2	RES#	P05	P06	P07
LC87F0A08A	VSS1,AVSS	RES#	P05	P06	P07
LC87F0L16A	VSS1,VSS2,VSS3	RES#	DBGP0	DBGP1	DBGP2
LC87F10C8A	VSS1,VSS2,VSS3	RES#	PB5	PB6	PB7
LC87F1364A	VSS1	RES#	P02	P03	P04
LC87F14C8A	VSS1,VSS2,VSS3	RES#	P02	P03	P04
LC87F1964A	VSS1,VSS2,VSS3	RES#	P02	P03	P04
LC87F1A32A	VSS1,VSS2,VSS3	RES#	P30	P31	P32
LC87F1D64A	VSS1,VSS2,VSS3	RES#	P30	P31	P32
LC87F1G64A	VSS1,VSS2,VSS3	RES#	P02	P03	P04
LC87F1HC8A	VSS1,VSS2,VSS3	RES#	P02	P03	P04
LC87F1JJ2A /J4A/J8A	VSS1,VSS2,VSS3	RES#	P02	P03	P04
LC87F1K64A	VSS1,VSS2,VSS3	RES#	P02	P03	P04
LC87F1L16A	VSS1,VSS2,VSS3	RES#	P02	P03	P04
LC87F1T64A	VSS1,VSS2,VSS3	RES#	P30	P31	P32
LC87F2416A	VSS1,VSS2	RES#	P05	P06	P07
			P15	P14	P13
LC87F2608A	VSS1	RES#	P30	P31	P10
				P32	P33
LC87F2708A	VSS1	RES#	P30	P31	P10
				P32	P33
			P13	P14	P15
LC87F2832A	VSS1,VSS2,VSS3	RES#	PC5	PC6	PC7
LC87F2924B /32A	VSS1,VSS2,VSS3	RES#	PC5	PC6	PC7
LC87F2C64A	VSS1,VSS2,VSS3	RES#	P32	P33	P34
LC87F2G08A	VSS1	RES#	P05	P06	P07
			P15	P14	P13

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	SKK-DBG Pins				
TypeB See “Table of SKK-DBG D-SUB Connector Pin Assignment”	GND	RES#	DBGP0	DBGP1	DBGP2
TypeC Use 1 wire communication cable	Black	Brown	Red	Orange	Green

Connect to the specified pins.

Micro Series	V	IV	III	II	I
LC87F2H08A	VSS1,VSS2	RES#	P05	P06	P07
			P15	P14	P13
LC87F2J32A	VSS1,VSS2,VSS3	RES#	P30	P31	P32
LC87F2L08A	VSS1,VSS2	RES#	P05	P06	P07
LC87F2R04A	VSS1	RES#	P05	P06	P07
			P15	P14	P13
LC87F40C8A	VSS1,VSS2	RES#	P35	P36	P37
LC87F4164A	VSS1,VSS2	RES#	P35	P36	P37
LC87F5864B	VSS1,VSS2,VSS3	RES#	PC5	PC6	PC7
LC87F5932A	VSS1,VSS2,VSS3	RES#	PC5	PC6	PC7
LC87F5BP6A	VSS1,VSS2,VSS3,VSS4	RES#	PC5	PC6	PC7
LC87F5CC8A	VSS1,VSS2,VSS3,VSS4	RES#	PC5	PC6	PC7
LC87F5DC8A	VSS1,VSS2,VSS3	RES#	PC5	PC6	PC7
LC87F5G32A	VSS1,VSS2,VSS3	RES#	P30	P31	P32
LC87F5JC8A	VSS1,VSS2,VSS3	RES#	PC5	PC6	PC7
LC87F5KP6A	VSS1,VSS2,VSS3,VSS4	RES#	PC5	PC6	PC7
LC87F5LP6A	VSS1,VSS2,VSS3,VSS4	RES#	PC5	PC6	PC7
LC87F5M64A	VSS1,VSS2,VSS3	RES#	PC5	PC6	PC7
LC87F5NC8A /62B/D0C	VSS1,VSS2,VSS3,VSS4	RES#	PC5	PC6	PC7
LC87F5R96B	VSS1,VSS2,VSS3	RES#	PC5	PC6	PC7
LC87F5VP6A	VSS1,VSS2,VSS3,VSS4	RES#	PC5	PC6	PC7
LC87F5WC8A	VSS1,VSS2,VSS3,VSS4	RES#	PC5	PC6	PC7
LC87F6AC8A	VSS1,VSS2	RES#	PA1	PA2	PA3
LC87F6D64A	VSS1	RES#	P05	P06	P07
LC87F7032A	VSS1,VSS2	RES#	P05	P06	P07
LC87F75C8A	VSS1,VSS2,VSS3	RES#	V1	V2	V3
LC87F76C8A	VSS1,VSS2,VSS3	RES#	V1	V2	V3
LC87F7932B	VSS1,VSS2	RES#	P05	P06	P07
LC87F7DC8A /J2B/J2C	VSS1,VSS2,VSS3	RES#	P00	P01	P02
			V1	V2	V3
LC87D7G16A	VSS1	RES#	P00	P01	P02
			V1	V2	V3

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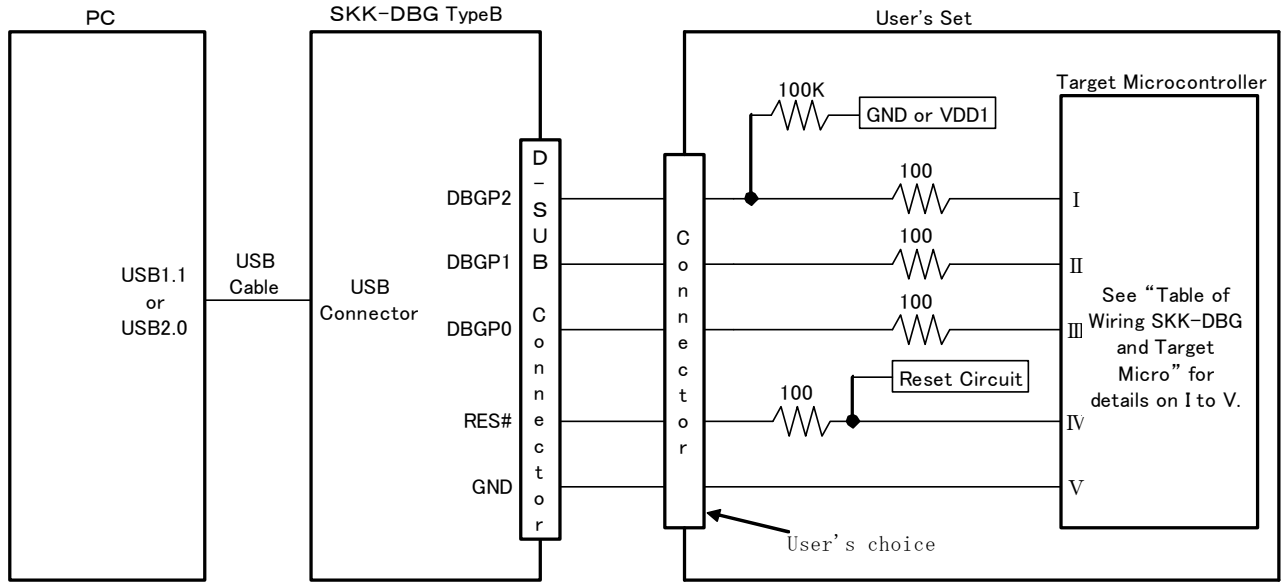
	SKK-DBG Pins				
TypeB See “Table of SKK-DBG D-SUB Connector Pin Assignment”	GND	RES#	DBGP0	DBGP1	DBGP2
TypeC Use 1 wire communication cable	Black	Brown	Red	Orange	Green

Connect to the specified pins.

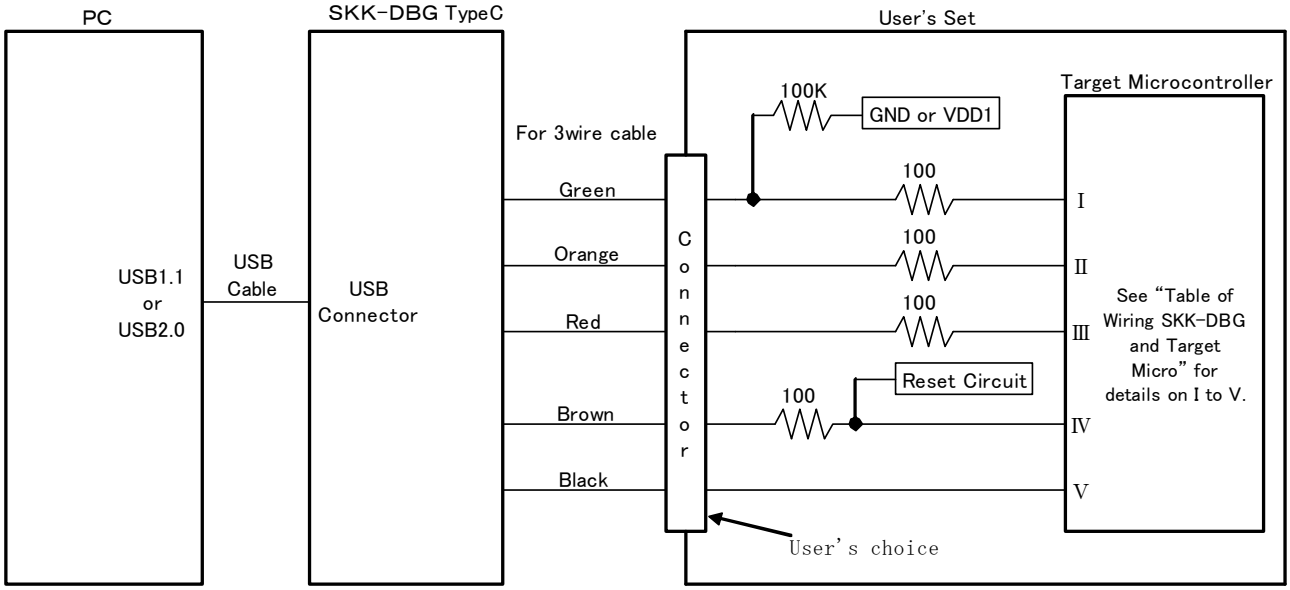
Micro Series	V	IV	III	II	I
LC87F7H32A	VSS1,VSS2	RES#	P05	P06	P07
LC87F7J32A	VSS1,VSS2,VSS3	RES#	V1	V2	V3
LC87F7LC8A	VSS1,VSS2,VSS3	RES#	V1	V2	V3
LC87F7NC8A /J2A/P6A	VSS1,VSS2,VSS3	RES#	P00	P01	P02
			V1	V2	V3
LC87F83P7PA /C8A/96A/64A	VSS1,VSS2,VSS4,AVSS	RES#	PC5	PC6	PC7
LC87FBG08A	VSS1	RES#	P05	P06	P07
			P15	P14	P13
LC87FBH08A	VSS1,VSS2	RES#	P05	P06	P07
			P15	P14	P13
LC87FBK08A	VSS1	RES#	P05	P06	P07
			P15	P14	P13
LC87FBL08A	VSS1,VSS2	RES#	P05	P06	P07
			P15	P14	P13
LC87FC096A	VSS1,VSS2,VSS3	RES#	PC5	PC6	PC7

*Above table lists the pin names to be wired. For pin numbers, please refer to the pin assignment for each series.

Recommended Circuitry of Terminals of Target Micro (five wire type, for Type B)



Recommended Circuitry of Terminals of Target Micro (five wire type, for Type C)



Note: Reset Circuit for the target micro needs to be the one such that SKK-DBG can generate a LOW level on the RES# pin.

Note: Place 100Ω of current-limit resistors as close to the micro as possible.

Note: Use low capacitance cables for connecting a user's set and a SKK-DBG. Its length must be less than 50cm. RS232C cables on the market is not supported.

Note: When two or more debugger ports are available on a micro, unused DBGP2 pin(s) must be pulled low or high with 100KΩ.

Table of Wring SKK-DBG and Target Micro (For three wire type, Type C only)

	SKK-DBG 端子		
TypeC 1 wire communication cable is used	黒	茶	赤 (Note1)

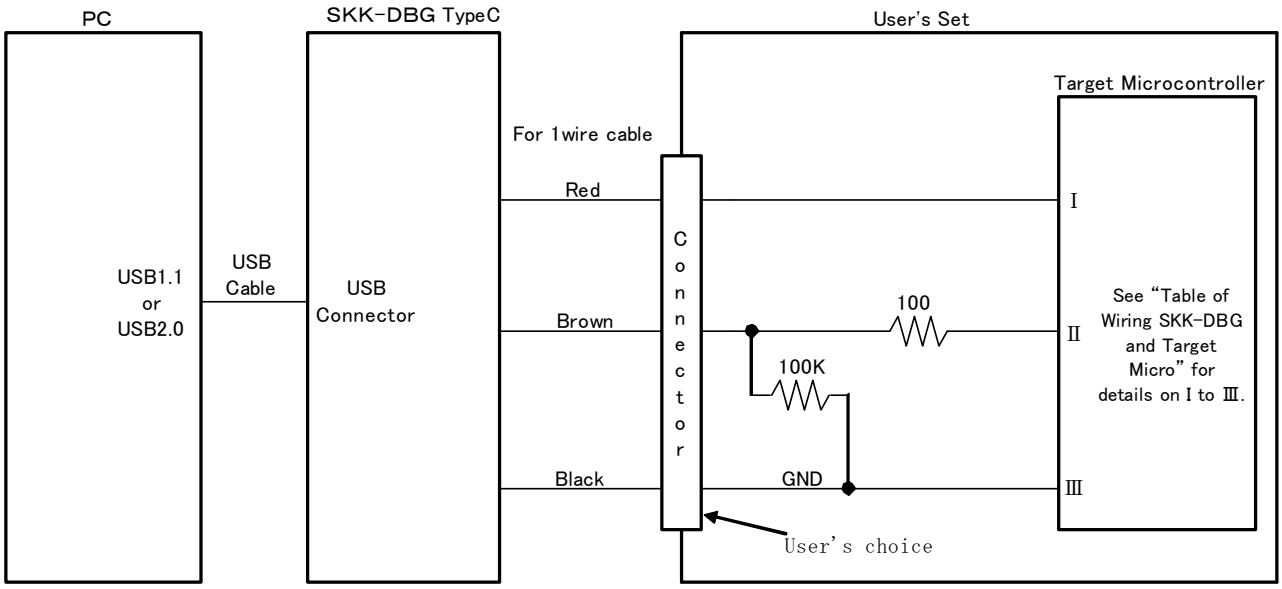
Connect to the specified pins.

Micro Series	Ⅲ	Ⅱ	Ⅰ
LC87F0808A	VSS1,VSS2	OWP0	VDD1,VDD2
LC87F0G08A	VSS1,VSS2	OWP0	VDD1
LC87F0K08A	VSS1	OWP0	VDD1
LC87F0N04A	VSS1	OWP0	VDD1
LC87F17C8A	VSS1,VSS2,VSS3	OWP0	VDD1,VDD2,VDD3
LC87F1M16A	VSS1,VSS2,VSS3	OWP0	VDD1,VDD2,VDD3
LC87F1N16A	VSS1,VSS2,VSS3	OWP0	VDD1,VDD2,VDD3
LC87F2K08A	VSS1,VSS2	OWP0	VDD1
LC87F2W48A	VSS1,VSS2,VSS3	OWP0	VDD1,VDD2,VDD3
LC87F9W48A	VSS1,VSS2,VSS3,AVSS	OWP0	VDD1,VDD2,VDD3,AVDD
LC87DL216A	VSS1	OWP0	VDD1
LC87FTR64Z	VSS1,VSS2,VSS3	OWP0	VDD1,VDD2,VDD3

*Above table lists the pin names to be wired. For pin numbers, please refer to the pin assignment for each series.

(Note1) This pin is an input pin that power is supplied to SKK-DBG from the target micro. This pin goes the level-shifter to match the communication signal level with the target micro's power supply voltage.

Recommended Circuitry of Terminals of Target Micro (three wire type, for Type C)



5. Firmware Update

(1)Reasons to Update Firmware

SanyoFWS Flash-micro writing system is updated regularly to support newly released micros, and those updates include software updates and/or firmware updates. There might be a case that the system does not start under some combinations of software and firmware version.

SanyoFWS automatically checks the compatibility of the firmware. If the firmware update is required, it shows an error message “Code: 20006”. If this error code appears, please update the firmware.

(2)Procedure for Firmware Update

Firmware can be updated by an included application.

i) Disconnect the writer unit from the USB cable.

ii) Double-click on the shortcut “Firmware Update”, which is created upon the SanyoFWS software installation.

iii) Firmware update window appears on the screen. Follow the instruction on the right column of the window to complete the update.

Note: The device driver for the firmware update is different from the device driver for the writer units.

The device driver for the firmware update is stored in the subdirectory named "UpdFirm" in the directory where the SanyoFWS is installed

(The default installation directory is "C:¥Program Files¥SanyoLsi¥SanyoFWS¥ UpdFirm"). When Windows asks you for the subdirectory name when a writer unit is attached, specify this directory name and install the device driver.