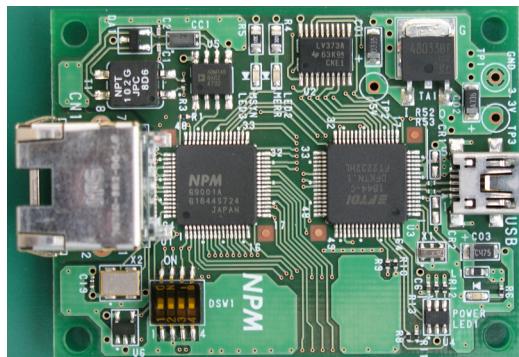


# Motionnet Starter Kit

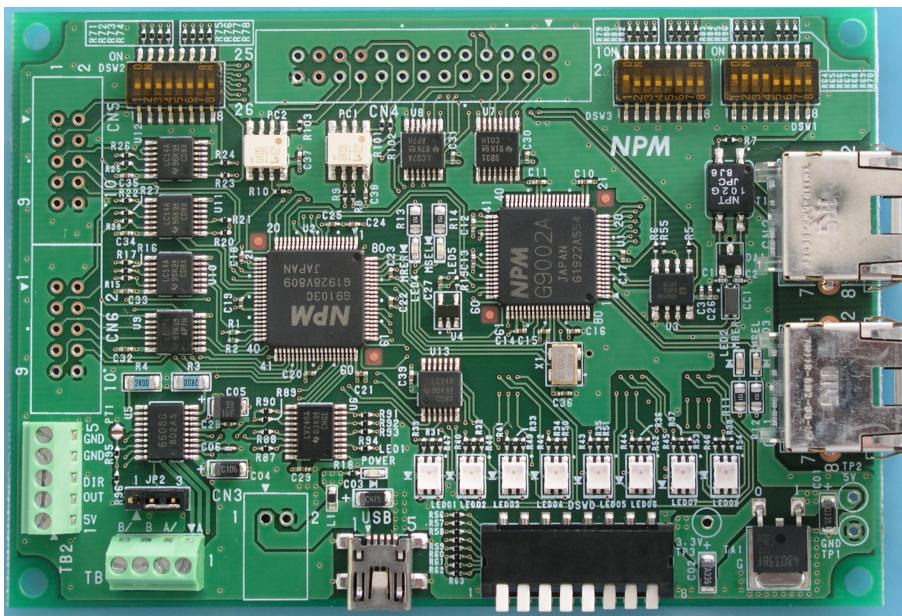
## G9001A-EV, G9002A\_G9103C-EV

### User's Manual

### Hardware



**G9001A-EV**



**G9002A\_G9103C-EV**

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# 1. Introduction

Thank you for choosing our Motionnet Starter Kit (G9001A-EV,G9002A\_G9103C-EV).

This manual describes the specifications, functions, connections, and usages of our Motionnet Starter Kit.

Be sure to read this manual thoroughly and keep it handy in order to use the product appropriately.

## 1.1 How to use this manual

1. Reproduction of this manual in whole or in part without permission is prohibited by the Copyright Act.
2. The contents of this manual are subject to change without the prior notice along with the improvement of performance and quality.
3. Although this manual is produced with the utmost care, please contact our sales representative if there are any questions, errors or omissions.

## 1.2 Notice

This document aims to describe the details of the functions of this product. It does not warrant fitness for a particular purpose of the customer. Also, the examples of applications and circuit diagrams in this manual are included only for your reference.

Please confirm the features and safety of device or equipment before use.

## 1.3 Confirmation

Please do not use this product in the following conditions. If you need to use in the following conditions, please contact our sales representatives:

1. Any equipment that may require a high reliability or a safety, such as nuclear facilities, electricity or gas supply systems, transportation facilities, vehicles, various safety systems, medical equipment, etc.
2. Any equipment that may directly affect human survival or property.
3. Usages under conditions or circumstances that are not specified in the catalog, manual, etc.

For applications that may cause serious damage to a human life or property due to failure of this product, ensure high reliability and safety by redundant design.

## 2. Information

This manual shows how to use Motionnet Starter Kit (G9001A-EV, G9002A\_G9103C-EV) with learning the Motionnet communication specifications, I/O, and motor control functions using the center device G9001A, local devices G9002A and G9103C.

Please refer to the following manuals along with this manual.

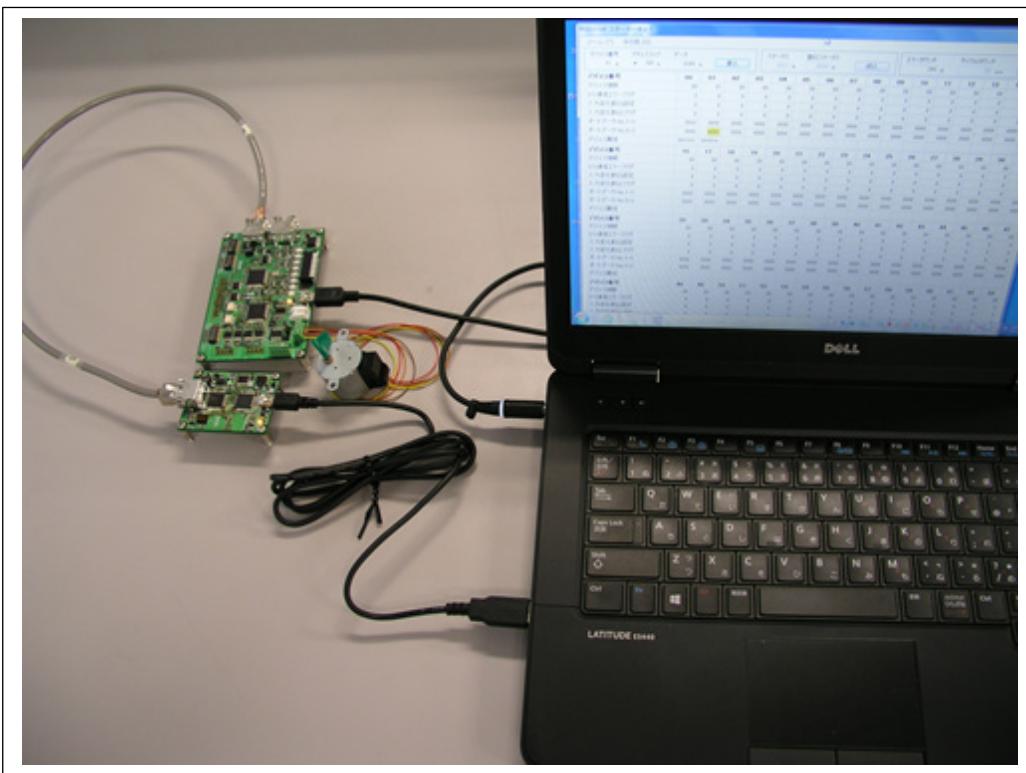
(x: revision)

	Manual Name [Outline]	Document File name	Software File name	Document No.
Hardware Manual	Motionnet Starter Kit User's Manual (Hardware)	MotionnetStarterKit _HardwareManual_VerxE.pdf	—	TA600036-ENx/x (This document)
	Motionnet Starter Kit User's Manual (Simple Manual)	MotionnetStarterKit _SimpleManual_VerxE.pdf		TA600035-ENx/x
Application Software Manual	Motionnet Starter Kit User's Manual (Application Software) [Display all registers]	MotionnetStarterKit _ApplicationManual_VerxE.pdf	MotionnetStarterKit_A pplication_VxxxJE.zip	TA600037-ENx/x
Reference	G9001A/G9002A User's Manual		-	DA70109-4/xE
	G9103C User's Manual			DA70143-1/xE

Please download application software and related materials from our NPM website.

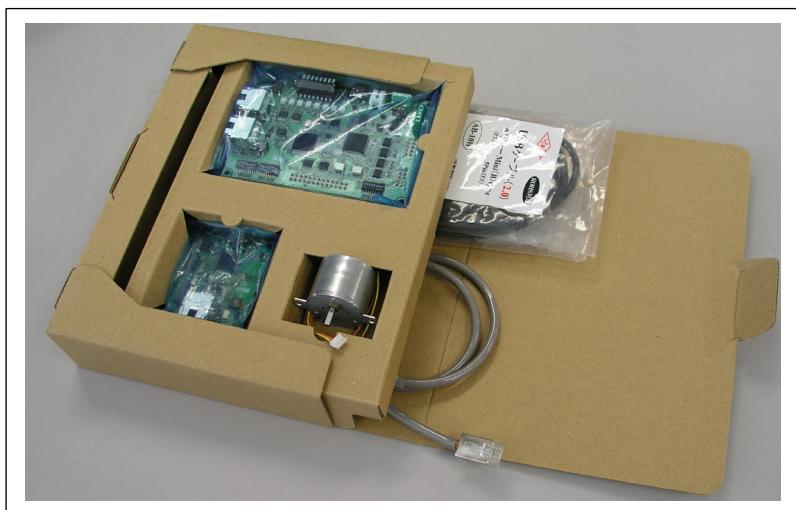
## 2.1 Outline

This product can be connect to a PC (personal computer) via USB 2.0, and controls G9001A-EV by the application software (MNET-STK.exe). It turns ON and OFF the I/O (3-color LED) of G9002A\_G9103C-EV and operates a stepping motor, PFCU30-24V4GM (1/12).



## 2.2 Notes

- When unpacking the Motionnet starter kit box, please check that G9001A-EV board, G9002A\_G9103C-EV board and accessories are included.
- The board can be replaced by a new one only in the initial failure.



## 2.3 About warranty

Since this product is provided free to charge, we are not in position to guarantee a defect or failure in the use of this product.

### 3. Specification

G9001A-EV board connects a USB-Parallel interface IC (FT2232HL [FTDI]) and the center device (G9001A) with parallel bus interface specifications.

G9002A\_G9103C-EV board is connected to G9001A-EV board with a Motionnet cable. The local device LSI (G9002A) performs I/O controls by system communication, I/O communication (cyclic transmission), and data communication of the center device LSI (G9001A). The local device LSI (G9103C) controls a stepping motor driver IC (TB6608FNG [TOSHIBA]) using pulse output signals, direction determination output signals and general-purpose output signals.

#### 3.1 Specification summary

##### 3.1.1 Motionnet communication common specifications

Item	Specification	Remarks
Motionnet Communication	Communication speed : 2.5/5.0/10.0/20.0 Mbps Communication code : NRZ code Communication protocol : NPM original method Communication method : Half-duplex communication Communication interface : RS-485, Pulse transformer Connection method: Multi-drop connection Number of local devices: 64 devices max. Transmission method: cyclic transmission (I/O), transient transmission (data) Communication data length: Cyclic transmission (I/O) 4byte / local fixed length Transient transmission (data) 1 to 128 words / frame variable length [G9103C communication data length: 1 to 64 words / frame] Communication time: Cyclic transmission (I/O) 15.1 µs / local Transient transmission (data) 19.3 µs (3 words / frame)	

##### 3.1.2 G9001A-EV Board

Item	Specification	Remarks
USB-Parallel interface	Convert USB2.0 Hi-speed (480 Mb/s) to parallel bus (8-bit)	U3: FT2232HL
Motionnet Communication line	1ch	U1: G9001A
Motionnet communication settings	Communication speed: 2.5/5.0/10.0/20.0 Mbps (Set with DSW1)	
Display	Power supply is ON: Yellow Motionnet communication is activated (MSYN): Green Motionnet communication error (MERR): Red	
Connector	USB: mini B type CN1: Motionnet communication modular connector 8P	
G9001A clock	80 MHz	
Power supply	USB bus power 5 V	
Current consumption	50 mA max.	
External diameters	W58 × D44 × H15 [mm]	

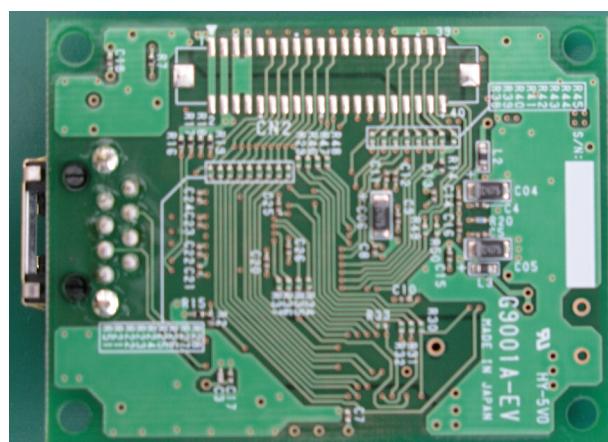
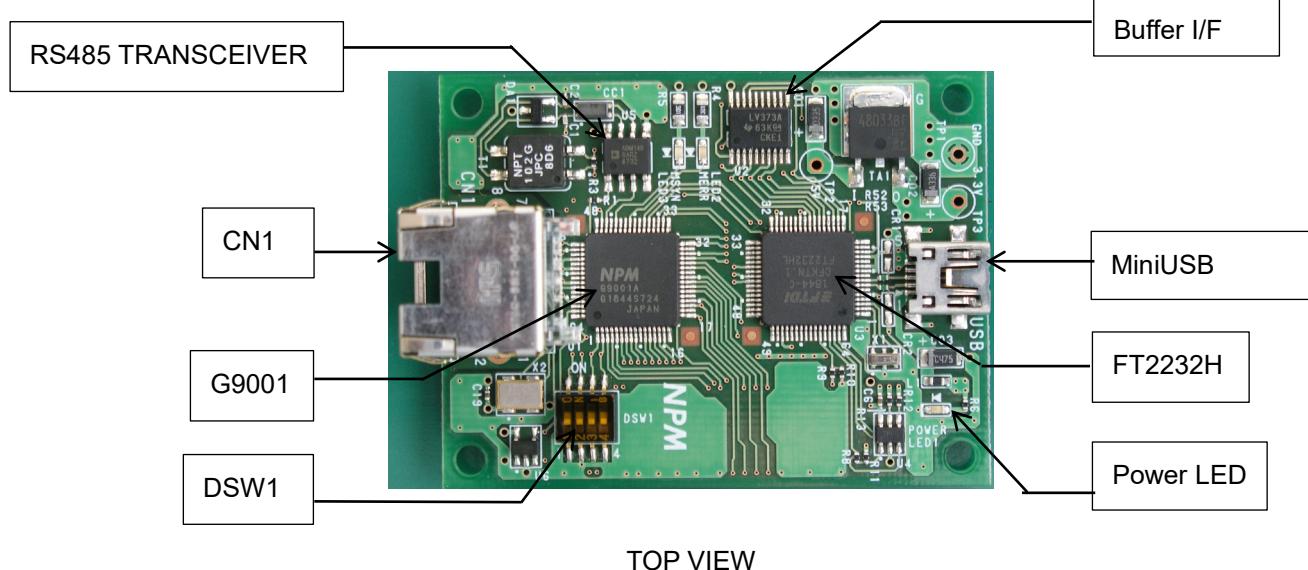
### 3.1.3 G9002A\_G9103C-EV Board

Item	Specification	Remarks
Motionnet Communication line	1ch Connected to I/O device: G9002A and PCL device: G9103C on the board	
Motionnet communication settings	Communication speed : 2.5/5.0/10.0/20.0 Mbps (Set by DSW2) Device number (0-63) (Set by DSW2) Sending Break (Set by DSW1) Watchdog timer (Set by DSW1)	
Motionnet Local I/O	I/O device: G9002A 32-point I/O control 8-point/port x 4-port Set I/O per port	U1: G9002A
G9002A I/O port connection	Port 0 (P0): 8-point input Connect to 8-point switch (DSW0) Port 1 (P1): 8-point output Connected to red color in 3-color LED (LED01-08) Port 2 (P2): 8-point output Connects to green color in 3-color LED (LED01-08) Port 3 (P3): 8-point output Connects to blue color in 3-color LED (LED01-08)	
G9002A I/O port logic setting	Port 0-3, positive/negative logic setting (Set with DSW1)	
Motionnet Local PCL	PCL device: G9103C 1-axis motion control	U2: G9103C
G9103C motion control	Speed /Position control ·Linear acceleration/deceleration, S-curve acceleration/deceleration ·Positioning range -134,217,728 to +134,217,727 (28 bits) ·Pulse output frequency 0.1 to 5,000,000 pps ·Slow-down point Automatic setting ·Counter 3 pieces Position control counter (28 bits) / Machine position counter (28 bits) / General-purpose deviation counter (28 bits)	
G9103C motion control input	Simultaneous start (STA) / Simultaneous stop (STP) / Counter latch (LTC) / Counter clear (CLR) / In-position (INP) / Alarm (ALM) / General-purpose input (RDY) / Encoder A-phase (EA) / Encoder B-phase (EB) / Encoder Z-phase (EZ) / ± End limit (+EL, -EL) / Slow-down (SD) / Origin point (ORG)	
G9103C motion control output	Pulse output (OUT) / Direction output (DIR) / Deviation counter clear (ERC) / General-purpose output (OUT1, OUT2) / Pulsar A-phase (PA) / Pulsar B-phase (PB) / During operation (BSY) / Accelerating (FUP) / Decelerating (FDW) / Constant speed (MVC) / Comparator 1 (CP1) / Comparator 2 (CP2) / Comparator 3 (CP3)	
G9103C motion control logic settings	± End limit (ELL), positive/negative logic setting (Set with DSW3)	
Stepping motor driver	Applicable motor: 2-phase bipolar stepping motor · Bipolar constant current drive · Micro-stepping 1/1, 1/2[1-2 phase], 1/4[W1-2 phase], 1/8[2W1-2 phase]	U5: TB6608FNG
Display	Power supply is ON: Yellow Motionnet communication is activated (MSYN): Green Motionnet communication error (MERR): Red	
Terminal pin block	TB1: Stepping motor connection 4P TB2: OUT/DIR output 5P	

Item	Specification	Remarks
Connector	USB: USB miniB type CN1,2: Motionnet communication modular connector 8P CN3: DC5V input, 2.54 pitch 2P (not mounted) CN4: I/O, 2.54 pitch connector 26P (not mounted) CN5: Input, 2.54 pitch connector 10P (not mounted) CN6: I/O, 2.54 pitch connector 10P (not mounted)	
Clock	80 MHz	
Power supply	USB bus power 5 V	
Current consumption	420 mA max. [when connecting with a stepping motor, starting frequency 10 pps]	
External diameters	W105 × D72 × H15 [mm]	

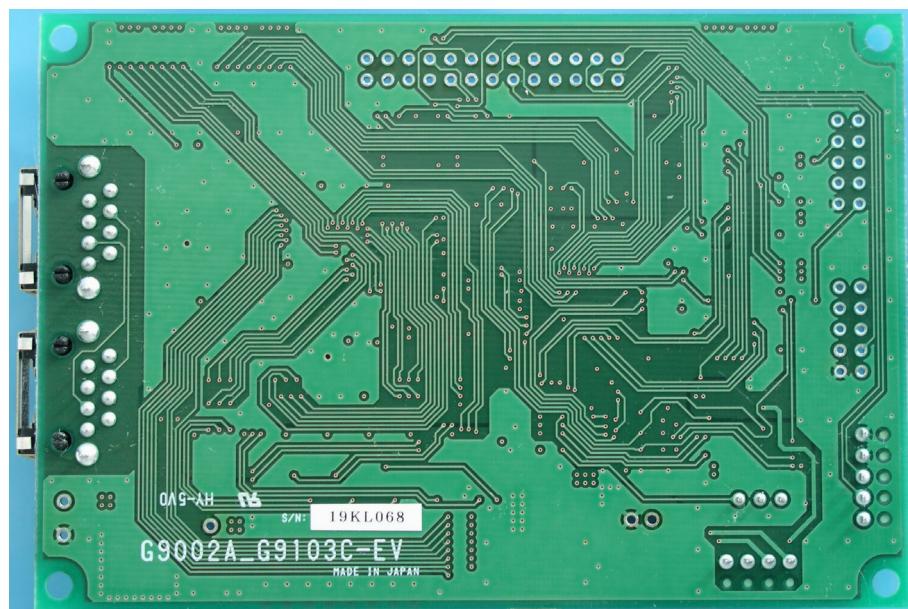
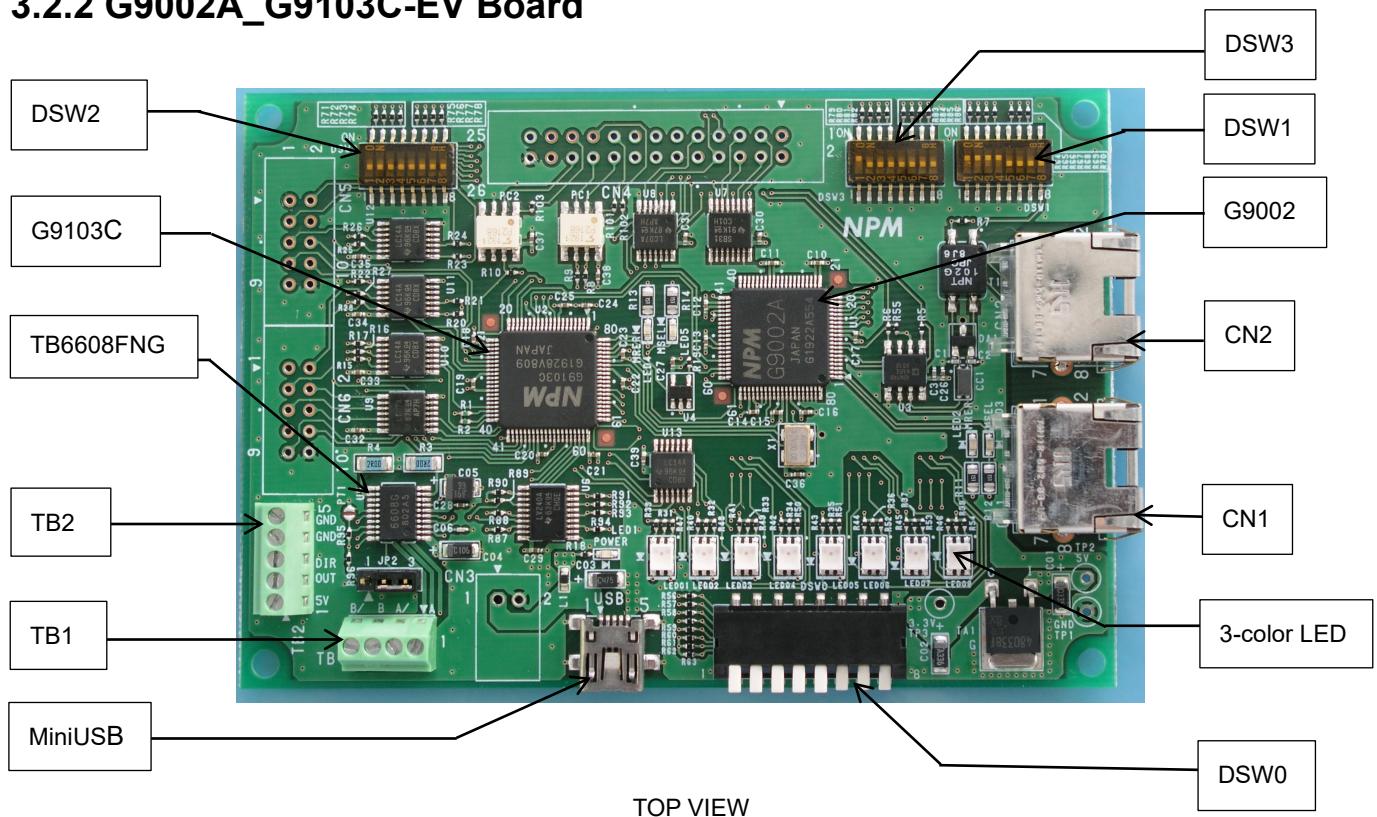
## 3.2. Outline specification

### 3.2.1 G9001A-EV Board



BOTTOM VIEW

### 3.2.2 G9002A\_G9103C-EV Board



BOTTOM VIEW

## 3.3 G9001A-EV connector pin assignment

### 3.3.1 G9001A-EV USB

Mini USB interface connector UB-M5BR-G14-4S [JST]

Pin No.	Pin Symbol	Pin Name	Note
1	VBus	5V Power	Power supply
2	-Data(D-)	-Data	Sent/Received data [-]
3	+Data(D+)	+Data	Sent/Received data [+]
4			
5	GND	GND	Power supply ground

### 3.3.2 G9001A-EV CN1

LAN interface connector TM11R-5M2-88-LP[HIROSE]

Pin No.	Pin Symbol	Pin Name	Note
1			
2			
3	RS485+	+Data	Sent/Received data [+]
4			
5			
6	RS485-	-Data	Sent/Received data [-]
7			
8			
FG		Frame ground	

## 3.4 G9002A\_G9103C-EV connector pin assignment

### 3.4.1 G9002A\_G9103C-EV USB

Mini USB interface connector UB-M5BR-G14-4S [JST]

Pin No.	Pin Symbol	Pin Name	Note
1	VBus	5 V Power	Power supply
2			
3			
4			
5	GND	GND	Power supply ground

### 3.4.2 G9002A\_G9103C-EV CN1,CN2

LAN interface connector TM11R-5M2-88-LP [HIROSE]

Pin No.	Pin Symbol	Pin Name	Note
1			
2			
3	RS485+	+Data	Sent/Received data[+]
4			
5			
6	RS485-	-Data	Sent/Received data[-]
7			
8			
FG		Frame ground	

### 3.4.3 G9002A\_G9103C-EV CN3

5V power connector DF1B-2P-2.5DS[HIROSE] (not mounted)

Pin No.	Pin Symbol	Pin Name	Note
1	5 V	5 V Power	Power supply
2	GND	GND	Power supply ground

### 3.4.4 G9002A\_G9103C-EV CN4

I/O connector PS-26PE-D4T1-B1E [JAE] (not mounted)

Pin No.	Pin Symbol	Pin Name	Note
1	5 V	5 V	5 V Power
2	3.3 V	3.3 V	3.3 V Power
3	OUTP	OUT[+] signal	OUT signal line driver [+] output
4	OUTM	OUT[-] signal	OUT signal line driver [-] output
5	DIRP	DIR[+] signal	DIR signal line driver [+] output
6	DIRM	DIR[-] signal	DIR signal line driver [-] output
7	OUTO	OUT signal	OUT signal open drain output
8	DIRO	DIR signal	DIR signal open drain output
9	ERC	ERC signal	ERC signal open drain output
10	OUT1	OUT1 signal	OUT1 (P0) signal open drain output
11	OUT2	OUT2 signal	OUT2 (P1) signal open drain output
12			
13			
14	LTC/CLR	LTC/CLR signal	LTC/CLR signal input
15	STP	STP signal	STP signal input
16	STA	STA signal	STA signal input
17	EAP	EA[+] signal	EA signal line receiver [+] input
18	EAM	EA[-] signal	EA signal line receiver [-] input
19	EBP	EB[+] signal	EB signal line receiver [+] input
20	EBM	EB[-] signal	EB signal line receiver [-] input
21	EZP	EZ[+] signal	EZ signal line receiver [+] input
22	EZM	EZ[-] signal	EZ signal line receiver [-] input
23	INP	INP signal	INP signal input
24	ALM	ALM signal	ALM signal input
25	RDY(P4)	RDY (P4) signal	RDY (P4) signal input
26	GND	GND	Ground

### 3.4.5 G9002A\_G9103C-EV CN5

I/O connector PS-10PE-D4T1-B1E[JAE] (not mounted)

Pin No.	Pin Symbol	Pin Name	Note
1	5V	5V Power	Power supply
2	+EL	+EL signal	End limit (+) direction
3	-EL	-EL signal	End limit (-) direction
4	SD	SD signal	Deceleration (Deceleration stop)
5	ORG	ORG signal	Origin input signal
6	ALM	ALM signal	Alarm input signal
7	EA	EA signal	Encoder phase A input signal
8	EB	EB signal	Encoder phase B input signal
9	BSY	BSY signal	Operations status monitor output signal
10	GND	GND power	Power supply ground

### 3.4.6 G9002A\_G9103C-EV CN6

I/O connector PS-10PE-D4T1-B1E[JAE] (not mounted)

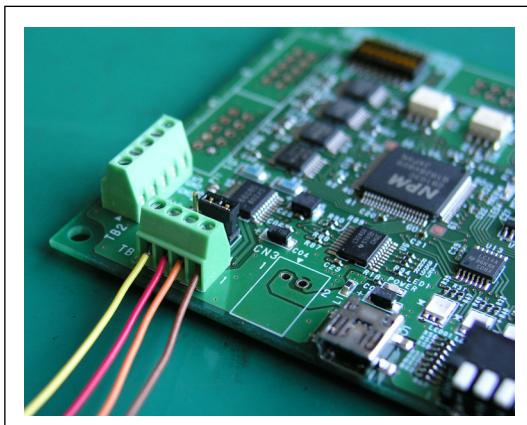
Pin No.	Pin Symbol	Pin Name	Note
1	5 V	5 V	5 V Power
2	PA	PA signal	PA input signal
3	PB	PB signal	PB input signal
4	FUP	FUP signal	FUP output signal
5	FDW	FDW signal	FDW output signal
6	MVC	MVC signal	MVC output signal
7	CP1	CP1 signal	CP1 output signal
8	CP2	CP2 signal	CP2 output signal
9	CP3	CP3 signal	CP3 output signal
10	GND	GND	Ground

### 3.4.7 G9002A\_G9103C-EV TB1

PCB Terminal block for stepping motors 790-1102 [RS Pro]

Pin No.	Pin Symbol	Pin Name	Note
1	A	A-phase 1	Motor cable color (Brown)
2	/A	A-phase 2	Motor cable color (Orange)
3	B	B-phase 1	Motor cable color (Red)
4	/B	B-phase 2	Motor cable color (Yellow)

Connect the accessory stepping motor, PFCU30-24V4GM (1/12) to TB1.

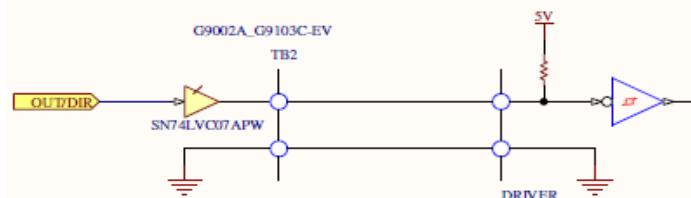


### 3.4.8 G9002A\_G9103C-EV TB 2

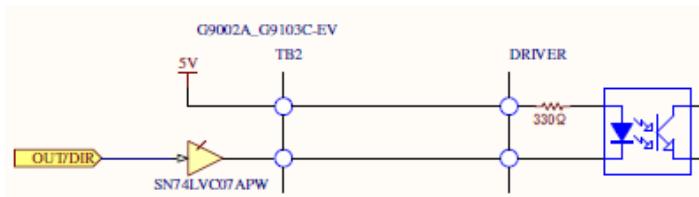
PCB Terminal block for Clock/Direction output signals 790-1105 [RS Pro]

Pin No.	Pin Symbol	Pin Name	Note
1	5 V	5 V Power	Power Supply
2	OUT	OUT signal	Clock signal (Open-Drain output)
3	DIR	DIR signal	Direction signal (Open-Drain output)
4	GND	GND Power	Power Supply Ground
5	GND	GND Power	Power Supply Ground

[Driver side TTL input]



[Driver side Photocoupler input]



## 3.5 G9001A-EV Slide switch setting

### 3.5.1 G9001A-EV DSW1

CFP-0482 [COPAL]

Pin No.	Pin Symbol	Pin Name	Note		
1	SPD0	Communication speed setting 0	1:OFF(H)	2:OFF(H)	20 Mbps (default)
			1:ON(L)	2:OFF(H)	10 Mbps
2	SPD1	Communication speed setting 1	1:OFF(H)	2:ON(L)	5 Mbps
			1:ON(L)	2:ON(L)	2.5 Mbps
3	IF0	CPU-Interface mode setting 0	3:OFF(H)	4:OFF(H)	I/F mode 4 (fixed)
			3:ON(L)	4:OFF(H)	I/F mode 3
4	IF1	CPU-Interface mode setting 1	3:OFF(H)	4:ON(L)	I/F mode 2
			3:ON(L)	4:ON(L)	I/F mode 1

## 3.6 G9002A\_G9103C-EV Slide switch setting

### 3.6.1 G9002A\_G9103C-EV DSW0

CFP-0812 [COPAL]

Pin No.	Pin Symbol	Pin Name	Note
1	P00	Bit 0 of Port 0	Port 0: Bit 0 Input signal
2	P01	Bit 1 of Port 0	Port 0: Bit 1 Input signal
3	P02	Bit 2 of Port 0	Port 0: Bit 2 Input signal
4	P03	Bit 3 of Port 0	Port 0: Bit 3 Input signal
5	P04	Bit 4 of Port 0	Port 0: Bit 4 Input signal
6	P05	Bit 5 of Port 0	Port 0: Bit 5 Input signal
7	P06	Bit 6 of Port 0	Port 0: Bit 6 Input signal
8	P07	Bit 7 of Port 0	Port 0: Bit 7 Input signal

### 3.6.2 G9002A\_G9103C-EV DSW1

CFP-08B2[COPAL]

Pin No.	Pin Symbol	Pin Name	Note
1	P0N	Port 0 logical setting	OFF(H): Positive logic ON (L): Negative logic (Default)
2	P1N	Port 1 logical setting	OFF(H): Positive logic ON (L): Negative logic (Default)
3	P2N	Port 2 logical setting	OFF(H): Positive logic ON (L): Negative logic (Default)
4	P3N	Port 3 logical setting	OFF(H): Positive logic ON (L): Negative logic (Default)
5	BRK	Break frame transmission request	For G9002A
6	TUD	Watchdog timer operation setting	OFF(H): Maintenance ON (L): Reset
7	TMD	Watchdog timer setting	OFF(H): 20 ms (20M) ON (L): 5 ms (20M)
8	T.R.	End point resistance setting	ON: With termination resistor

### 3.6.3 G9002A\_G9103C-EV DSW2

CFP-08B2[COPAL]

Pin No.	Pin Symbol	Pin Name	Note		
1	DN0	Device number setting Bit 0	OFF(H): 0	ON (L): 1 [0x01]	
2	DN1	Device number setting Bit 1	OFF(H): 0	ON (L): 2 [0x02]	
3	DN2	Device number setting Bit 2	OFF(H): 0	ON (L): 4 [0x04]	
4	DN3	Device number setting Bit 3	OFF(H): 0	ON (L): 8 [0x08]	
5	DN4	Device number setting Bit 4	OFF(H): 0	ON (L): 16 [0x10]	
6	DN5	Device number setting Bit 5	OFF(H): 0	ON (L): 32[0x20]	
7	SPD0	Communication Speed Setting 0	7:OFF(H) 7:ON(L)	8:OFF(H) 8:ON(L)	20 Mbps (default) 10 Mbps
8	SPD1	Communication Speed Setting 1	7:OFF(H) 7:ON(L)	8:ON(L)	5 Mbps 2.5 Mbps

G9103C (Device number:0[0x00]), G9002A (Device number: 1[0x01]) [Default]

### 3.6.4 G9002A\_G9103C-EV DSW3

CFP-08B2[COPAL]

Pin No.	Pin Symbol	Pin Name	Note
1	ELL	+EL/-EL input logic setting	OFF(H): Negative logic ON (L): Positive logic (Default)
2	EMG	Emergency stop signal	ON(L): Operation prohibited, immediate stop during operation
3	BRK	Break frame transmission request	For G9103C
4	TUD	Watchdog timer operation setting	OFF(H): Maintenance ON (L): Reset
5	TMD	Watchdog timer setting	OFF(H): 20 ms (20M) ON (L): 5 ms (20M)
6	GRP0	Group number setting Bit 0	OFF(H): 0 ON (L): 1 [0x01]
7	GRP1	Group number setting Bit 1	OFF(H): 0 ON (L): 2 [0x02]
8	GRP2	Group number setting Bit 2	OFF(H): 0 ON (L): 4 [0x04]

## 3.7 G9002A\_G9103C-EV Jumper setting

### 3.7.1 G9002A\_G9103C-EV JP1

Jumper connector for current setting at motor stopping XJ8B-0311[OMRON], Short-circuit socket XJ8A-0241[OMRON]

Short-circuit No.	Pin Name	Note
1-2	No current down	When a motor stopped, a current of about 250 mA always flows.
2-3	Automatic current down	When a motor stopped, a current of about 125 mA flows. (Default setting)

### 3.7.2 G9002A\_G9103C-EV PT1

Solder (short) the pattern for current attenuation mode setting (PT1) or remove solder (open)

PT1	Name	Note
Short	DCY_L	Current decay mode setting "L"
Open	DCY_H	Current decay mode setting "H" (Default setting)

## 3.8 G9002A\_G9103C-EV Stepper motor driver IC interface

### 3.8.1 Output pulse specification

OUT and DIR output signals of G9103C are connected to CK and CW/CCW input signals of the stepping motor driver IC (TB6608FNG).

OUT(CK)	DIR(CW/CCW)	Motor rotation direction
↓↑	L	CW (Output shaft clockwise direction)
↓↑	H	CCW (Output shaft counterclockwise direction)

The output pulse specification (PMD2 to 0) of the environment setting 1 register (RENV1) of G9103C is 0x02.

### 3.8.2 Excitation setting method

P3 and P4 general-purpose output signals of G9103C are connected to M2 and M1 input signals of stepping motor driver IC (TB6608FNG). The following shows the maximum speed and movement amount of one rotation when connecting to the stepping motor PFCU30-24V4GM (1/12).

P4(M1)	P3(M2)	Excitation mode	Max speed	Movement amount per rotation
L	H	1-2 phase	375 pps	576
H	L	W1-2 phase	750 pps	1152
L	L	2W1-2 phase	1500 pps	2304

The default setting is 2W1-2 phase excitation mode. The setting contents can be checked with the general-purpose input/output Pin data (IOPW) of G9103C.

### 3.8.3 Operation mode

P5, P6, and P7 general-purpose output signals of G9103C are connected to STBY, RESET and ENABLE input signals of stepping motor driver IC (TB6608FNG).

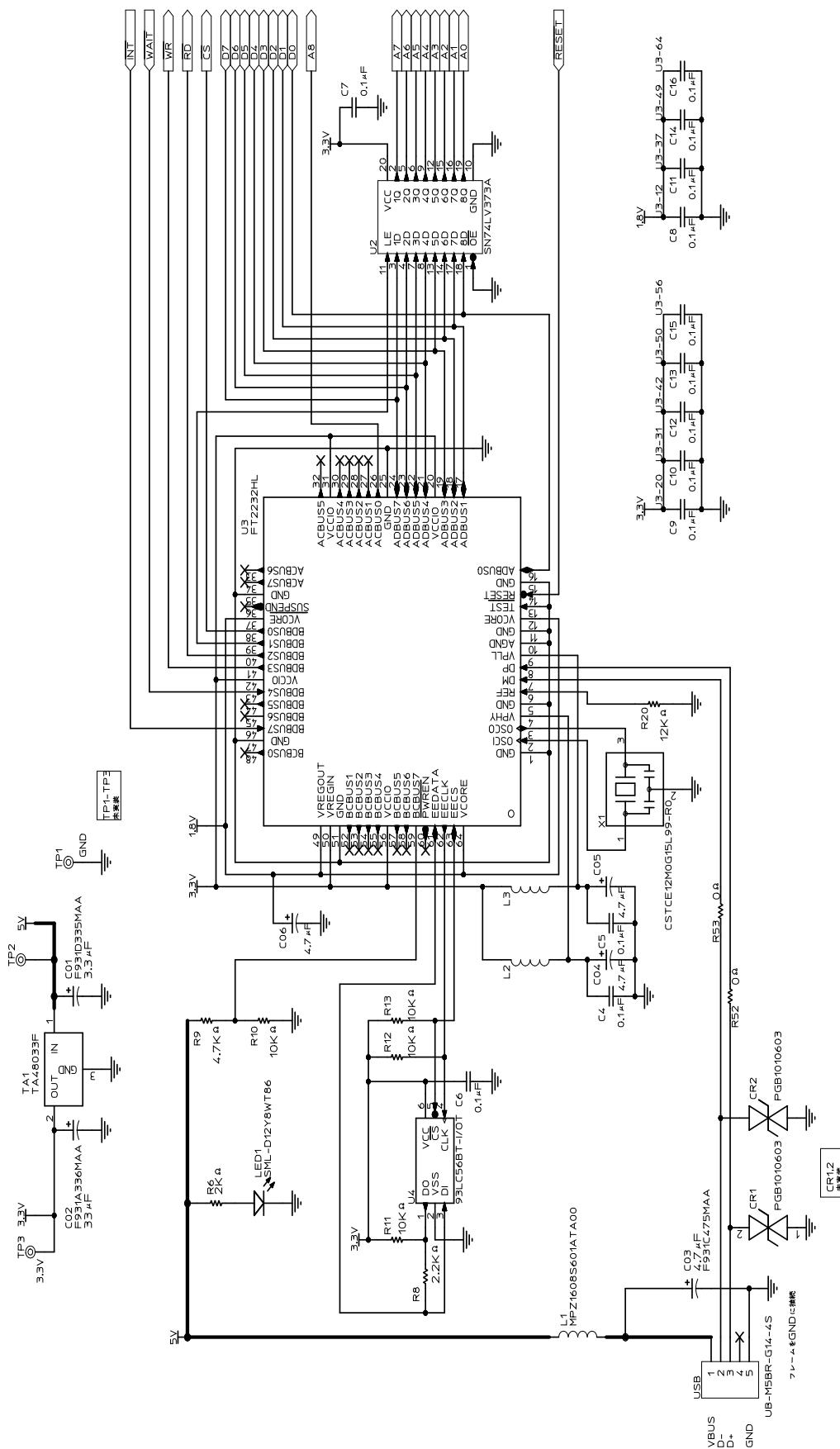
P6(RESET)	P7(ENABLE)	P5(STBY)	Operation mode
L	L	L	Operable mode
H	L	L	Initial mode (MO output [EZ input] Low level)
x	H	L	Enable stand-by mode (Output OFF, Hi-impedance)
x	x	H	Stand-by mode (Output OFF, Hi-impedance)

The initial setting is the operable mode.

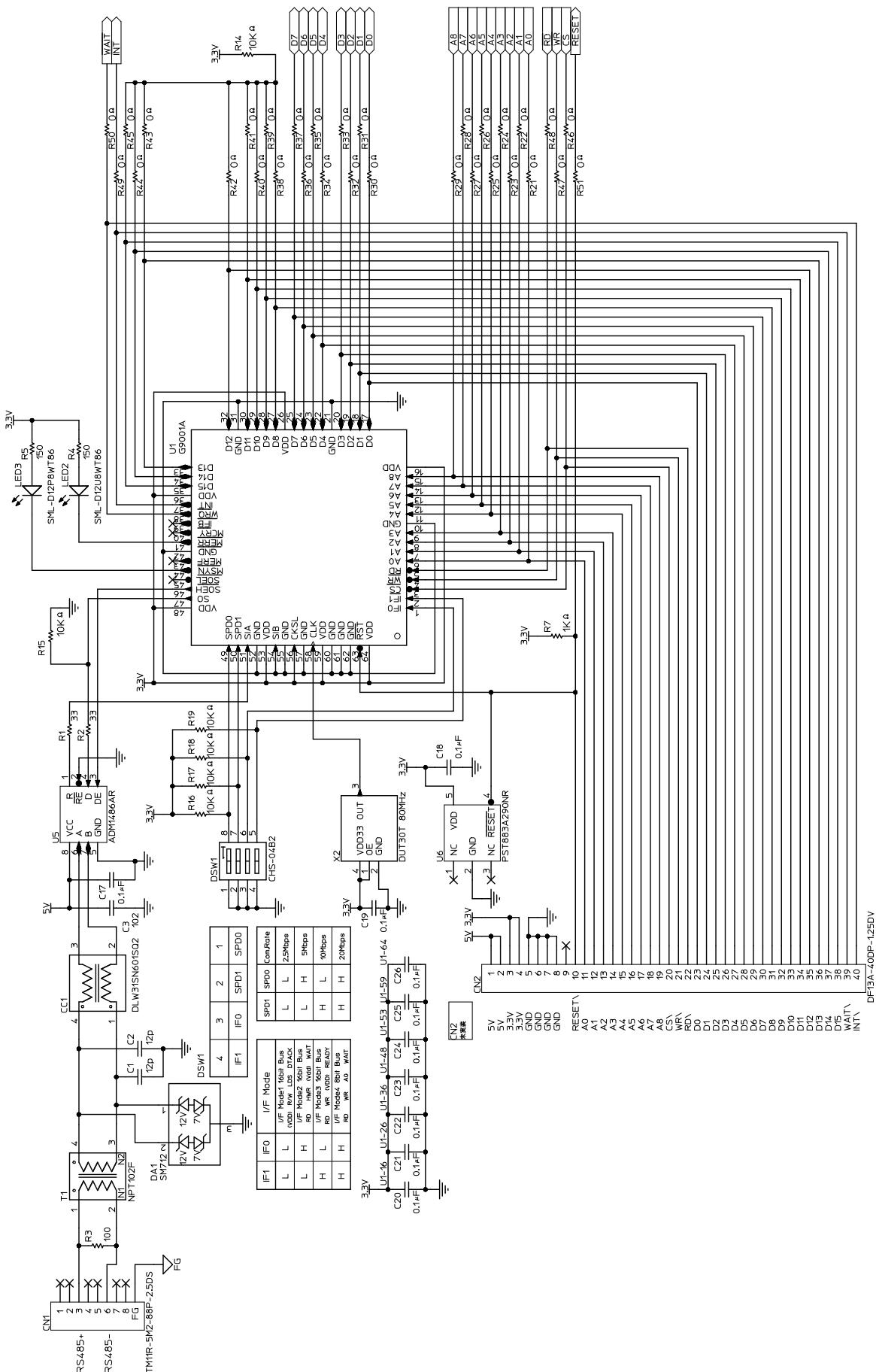
The setting contents can be checked with the general-purpose input/output Pin data (IOPW) of G9103C.

## 3.9 G9001A-EV Circuit diagram

### 3.9.1 G9001A-EV Circuit No.1



### 3.9.2 G9001A-EV Circuit No.2



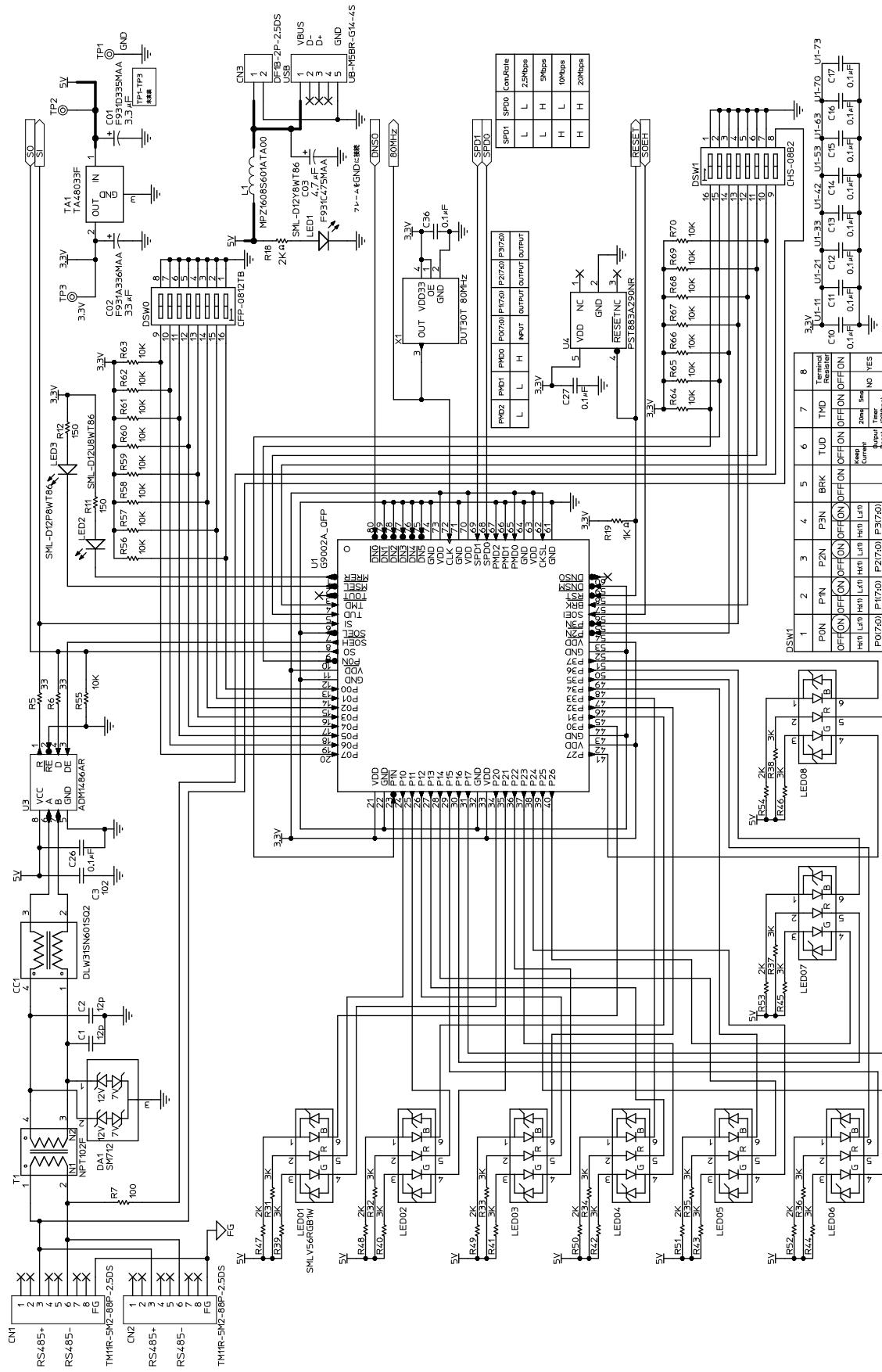
DF13A-40DP-125DV

### 3.9.3. G9001A-EV Parts List

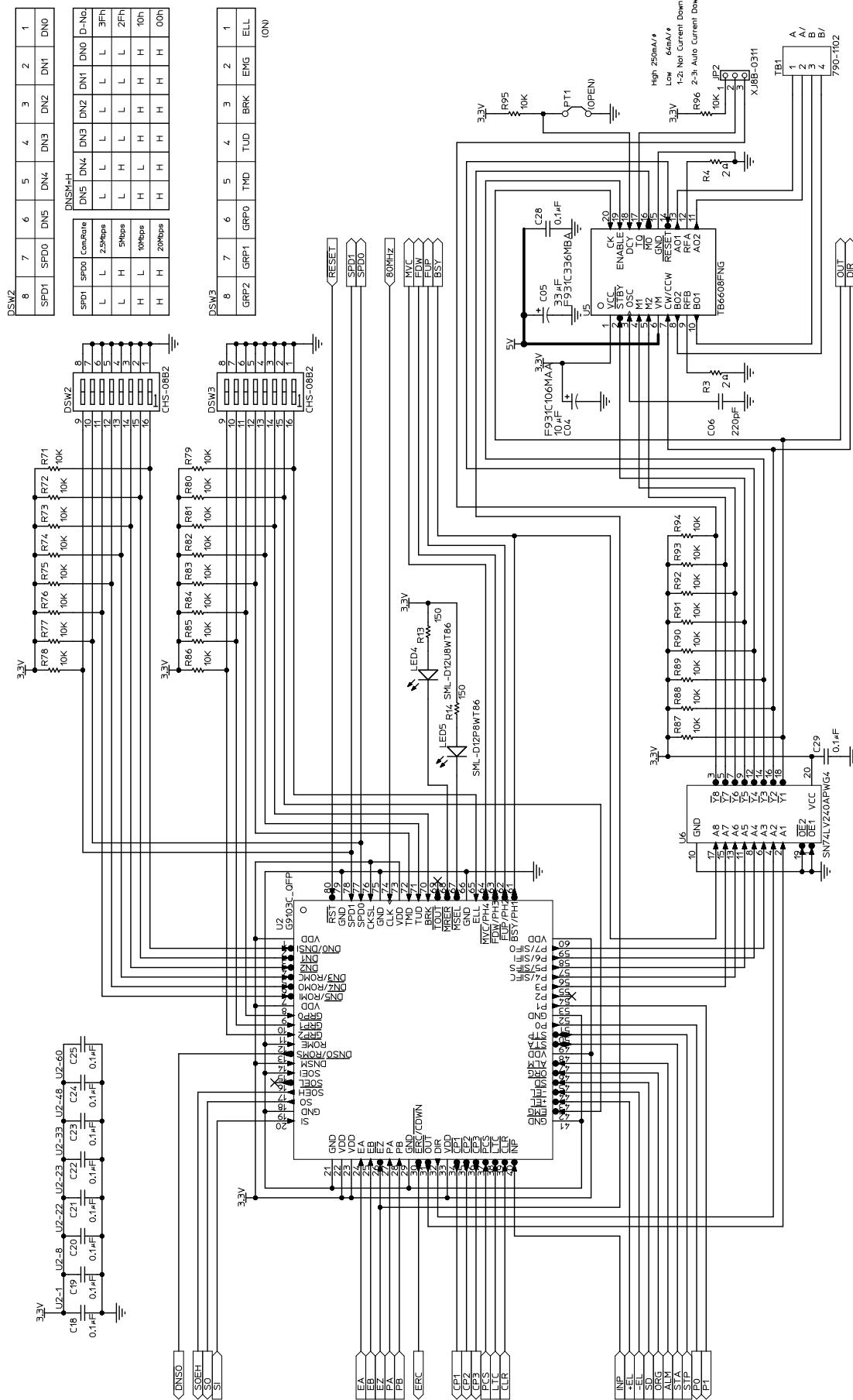
No.	Part Name	Manufacture	Model	Qty	Part No.	Remark
1	LSI	NPM	G9001A	1	U1	
2	IC	TI	SN74LV373APW	1	U2	
3	LSI	FTDI	FT2232HL	1	U3	
4	EEPROM	MicroChip	93LC56BT-I/OT	1	U4	
5	RS-485 Transceiver	AnalogDevices	ADM1486AR	1	U5	
6	Reset IC	IMITSUMI	PST883A290NR	1	U6	
7	Oscillator	MURATA	CSTCE12M0G15L99-R0	1	X1	
8	Oscillator	EPSON	SG-8002CB-80MHz-PCB	1	X2	
9	Regulator	TOSHIBA	TA48033BF	1	TA1	
10	EMC Part	TDK	MPZ1608S601ATA00	3	L1,L2,L3	
11	LED	ROHM	SML-D12Y8WT86	1	LED1	
12	LED	ROHM	SML-D12U8WT86	1	LED2	
13	LED	ROHM	SML-D12P8WT86	1	LED3	
14	Choke Coil	MURATA	DLW31SN601SQ2	1	CC1	
15	ESD Suppressors	SETECH	SM712	1	DA1	
16	Pulse Transformer	NPM	NPT102G	1	T1	
17	Slide Switch	COPAL	CHS-04B2	1	DSW1	
18	PULSE-GUARD	Littelfuse	PGB1010603	2	CR1,CR2	Not mounted
19	Check Pin	Mac8	LC-2-S White	2	TP2,TP3	Not mounted
20	Check Pin	Mac8	LC-2-S Black	1	TP1	Not mounted
21	Resistor	KOA	RK73Z1ETTP	33	R21-R53	
22	Resistor	KOA	RK73B1ETTP330J	2	R1,R2	
23	Resistor	KOA	RK73B1ETTP101J	1	R3	
24	Resistor	KOA	RK73B2ATTD301J	2	R4,R5	
25	Resistor	KOA	RK73B1ETTP102J	2	R6,R7	
26	Resistor	KOA	RK73B1ETTP222J	1	R8	
27	Resistor	KOA	RK73B1ETTP472J	1	R9	
28	Resistor	KOA	RK73B1ETTP103J	10	R10-R19	
29	Resistor	KOA	RK73H1ETTD1202F	1	R20	
30	Capacitor	Nichicon	F931D335MAA	1	C01	
31	Capacitor	Nichicon	F931A336MAA	1	C02	
32	Capacitor	Nichicon	F931C475MAA	4	C03-C06	
33	Capacitor	MURATA	GRM155C2A120JA01D	2	C1,C2	
34	Capacitor	MURATA	GRM1552C1H221JA01D	1	C3	
35	Capacitor	MURATA	GRM155B31E104KA87D	23	C4-C26	
36	USB Connector	JST	UB-M5BR-G14-4SH	1	USB	
37	LAN Connector	HIROSE	TM11R-5M2-88-LP	1	CN1	

## 3.10 G9002A\_G9103C-EV Circuit diagram

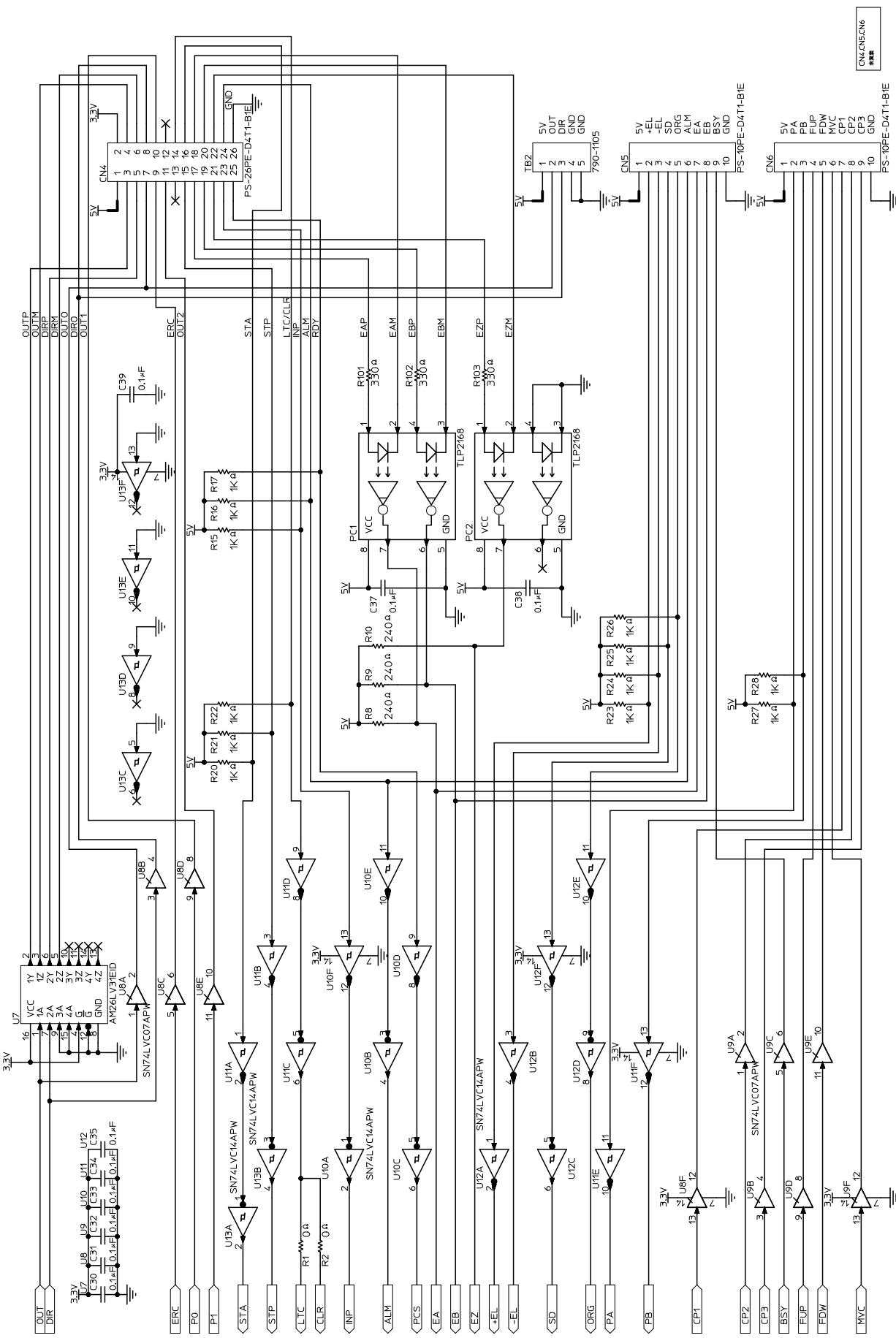
### 3.10.1 G9002A\_G9103C-EV Circuit No.1



### **3.10.2 G9002A\_G9103C-EV Circuit No.2**



### 3.10.3 G9002A\_G9103C-EV Circuit No.3

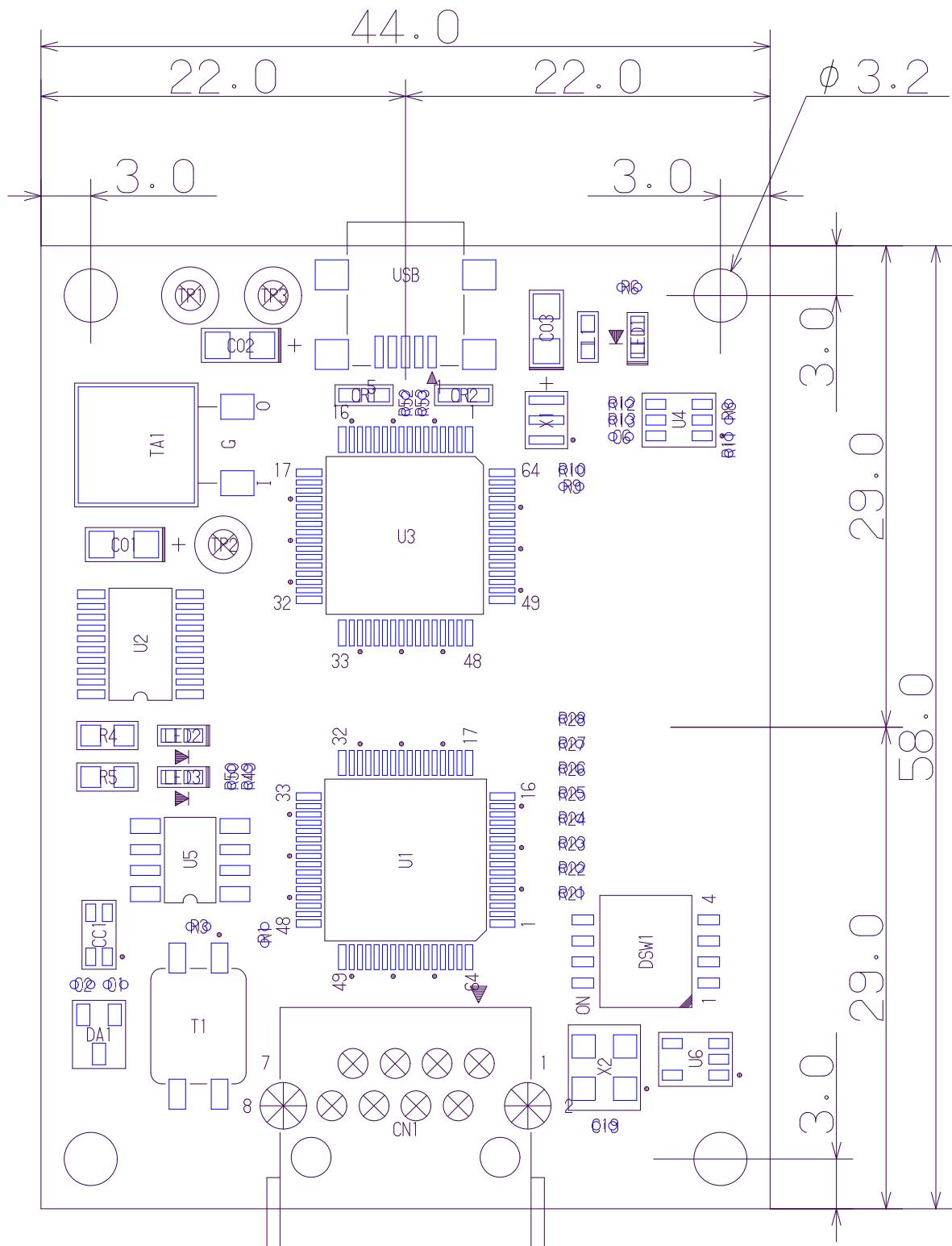


### 3.10.4. G9002A\_G9103C-EV Parts List

No.	Part Name	Manufacture	Model	Qty	Part No.	Remark
1	LSI	NPM	G9002A	1	U1	
2	LSI	NPM	G9103C	1	U2	
3	RS-485 Transceiver	AnalogDevices	ADM1486AR	1	U3	
4	Reset IC	MITSUMI	PST883A290NR	1	U4	
5	Driver IC	TOSHIBA	TB6608FNG	1	U5	
6	IC	TI	SN74LV240APWR	1	U6	
7	Line Driver	TI	AM26LV31EIPWR	1	U7	
8	IC	TI	SN74LVC07APW	2	U8,U9	
9	IC	TI	SN74LVC14APW	4	U10-U13	
10	LED	ROHM	SML-D12Y8WT86	1	LED1	
11	LED	ROHM	SML-D12U8WT86	2	LED2,LED4	
12	LED	ROHM	SML-D12P8WT86	2	LED3,LED5	
13	LED	ROHM	SMLV56RGB1W	8	LED01-LED08	
14	Oscillator	EPSON	SG-8018CB-80MHz	1	X1	
15	Regulator	TOSHIBA	TA48033BF	1	TA1	
16	EMC Part	TDK	MPZ1608S601ATA00	1	L1	
17	Choke Coil	MURATA	DLW31SN601SQ2	1	CC1	
18	ESD Suppressors	SETECH	SM712	1	DA1	
19	Pulse Transformer	NPM	NPT102G	1	T1	
20	Photo Coupler	TOSHIBA	TLP2168	2	PC1,PC2	
21	Slide Switch	COPAL	CFP-0812TB	1	DSW0	
22	Slide Switch	COPAL	CHS-08B2	3	DSW1-DSW3	
23	Jumper	OMRON	XJ8B-0311	1	JP2	
24	Socket	OMRON	XJ8A-0241	1		
25	Resistor	KOA	RK73Z1ETTP	2	R1,R2	
26	Resistor	KOA	RK73H2BTTD2R00F	2	R3,R4	
27	Resistor	KOA	RK73B1ETTP330J	2	R5,R6	
28	Resistor	KOA	RK73B1ETTP101J	1	R7	
29	Resistor	KOA	RK73B1ETTP241J	3	R8-R10	
30	Resistor	KOA	RK73B2ATTD151J	4	R11-R14	
31	Resistor	KOA	RK73B1ETTP102J	13	R15-R17 R19-R28	
32	Resistor	KOA	RK73B1ETTP103J	42	R55-R96	
33	Resistor	KOA	RK73B1ETTP202J	9	R47-R54,R18	
34	Resistor	KOA	RK73B1ETTP331J	3	R101-R103	
35	Resistor	KOA	RK73B1ETTP302J	16	R31-R46	
36	Capacitor	nichicon	F931D335MAA	1	C01	
37	Capacitor	nichicon	F931A336MAA	1	C02	
38	Capacitor	nichicon	F931C475MAA	1	C03	
39	Capacitor	nichicon	F931C106MAA	1	C04	
40	Capacitor	nichicon	F931C336MBA	1	C05	
41	Capacitor	MURATA	GRM1552C1H221JA01D	1	C06	
42	Capacitor	MURATA	GRM1552C2A120JA01D	2	C1,C2	
43	Capacitor	MURATA	GRM1552C1H102JA01D	1	C3	
44	Capacitor	MURATA	GRM155B31E104KA87D	30	C10-C39	
45	USB Connector	JST	UB-M5BR-G14-4SH	1	USB	

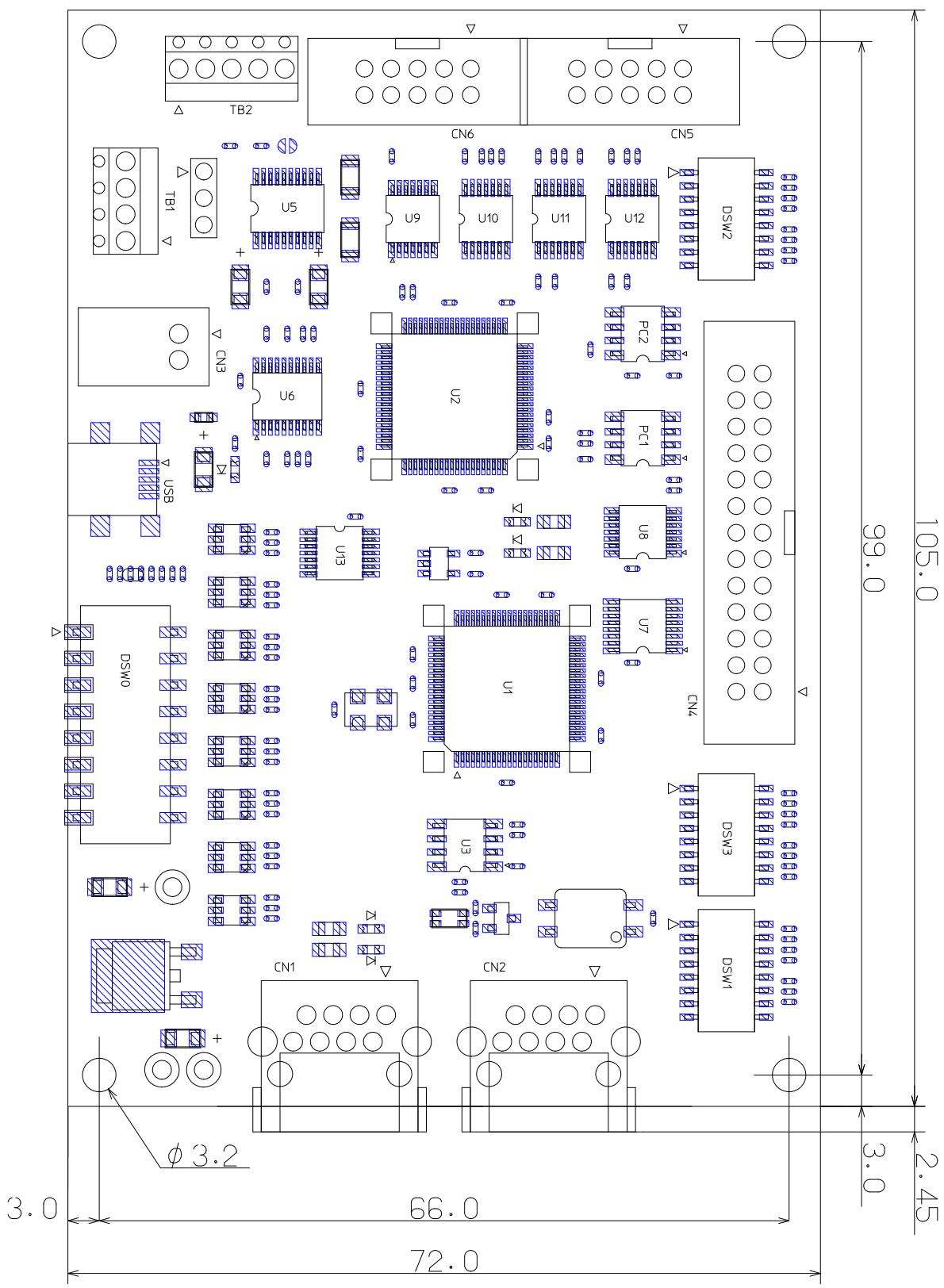
No.	Part Name	Manufacture	Model	Qty	Part No.	Remark
46	LAN Connector	HIROSE	TM11R-5M2-88-LP	1	CN1	
47	Connector	JAE	DF1B-2P-2.5DS	1	CN3	Not mounted
48	Connector	JAE	PS-26PE-D4T1-B1E	1	CN4	Not mounted
49	Connector	JAE	PS-10PE-D4T1-B1E	2	CN5,CN6	Not mounted
50	Terminal block	RS Pro	790-1102	1	TB1	
51	Terminal block	RS Pro	790-1105	1	TB2	
52	Check pin	Mac8	LC-2-S White	2	TP2,TP3	Not mounted
53	Check pin	Mac8	LC-2-S Black	1	TP1	Not mounted

### **3.11 G9001A-EV External dimensions**



Unit: mm

### 3.12 G9002A\_G9103C-EV External dimensions



Unit: mm

### 3.13 G9002A\_G9103C-EV External driver connection

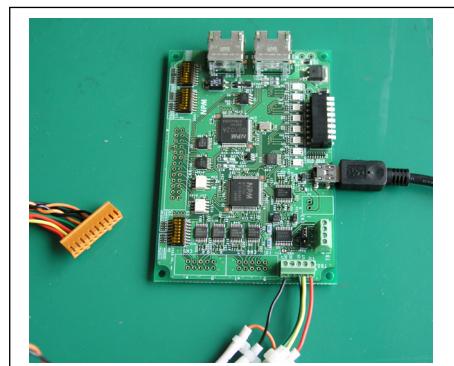
You can connect and operate an external driver using TB2 connector terminal (clock, direction output signal) of 9002A\_G9103C-EV with the application software.

[Products connected]

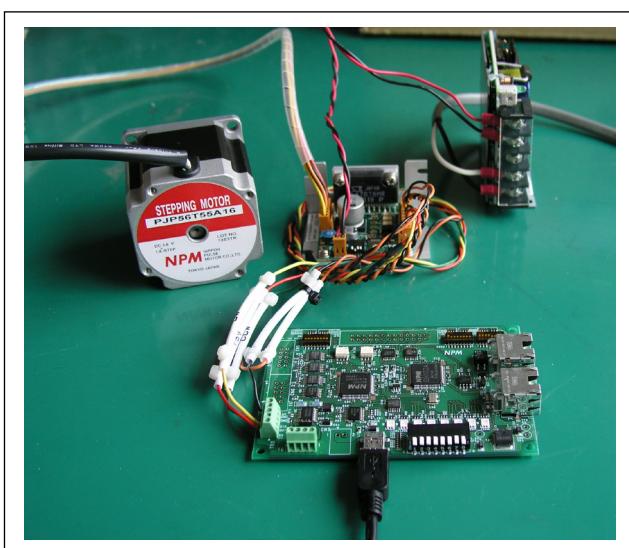
Driver: AD1231 [NPM] (Unipolar constant current drive, micro step excitation)

Stepping motor: PJP56T44A16 [NPM] (2 phase hybrid type, 1.8 degrees/pulse)

Power supply: 24V



[Connection example]



Do not connect the stepping motor PFCU30-24V4GM (1/12) (accessory).

[Application software setting example]



Output pulse specification (PMD2 to 0) of the environment setting 1 register (RENV1): 0 x 03.

Setting value of PRMV: 2304 (200 pulses per rotation, 1/16 micro step).

## 4. Accessories

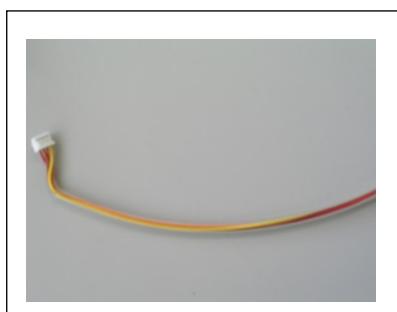
### 4.1 Stepping motor

PFCU30-24V4GM (1/12)[NPM] (1 piece)



### 4.2 Lead wire for the motor

PFCU30 lead wire (E000016-885A) [NPM] 0.2 m (1 piece)



CAUTION: When inserting the connector into the motor, do not insert it obliquely or do not apply too much load.

After inserting the connector, please do not pull strongly the harness or apply too much load.

### 4.3 USB cable

Mini USB cable (AB-10H) A-miniB type 1m (2 pieces)



## 4.4 LAN cable

Cable RJ-RJ (K-SP-10493-001) 0.6 m (1 piece)



## 4.5 Simple user's manual

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**Revision**

Revision	Date	Contents
1st	January 31. 2020	Initial Release.



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