

COMIZOA cPCI System (ST)



*COMputer Innovation
is Zoomed by Our Affection!*



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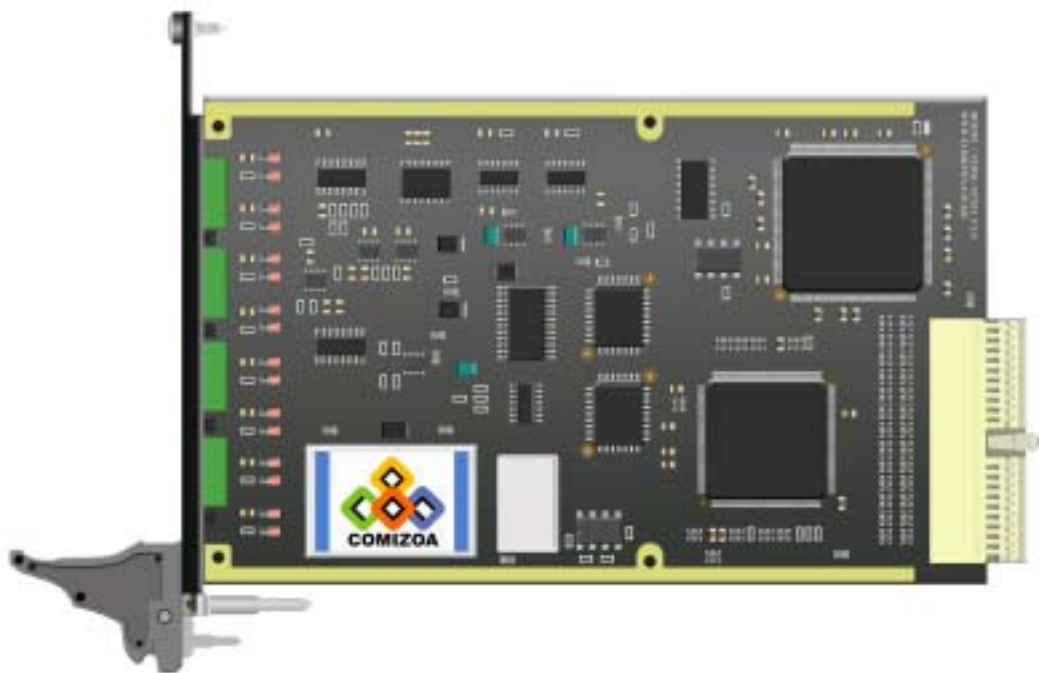
CHAPTER 1. Analog Input Board

Compact PCI

COMI-ST201 12

500KHz

1.COMI-ST201



[1-1] COMI-ST201

1-1. COMI-ST201

..... 160 * 100 mm (3U)
PNP (Plug &Play)

1-1-1.

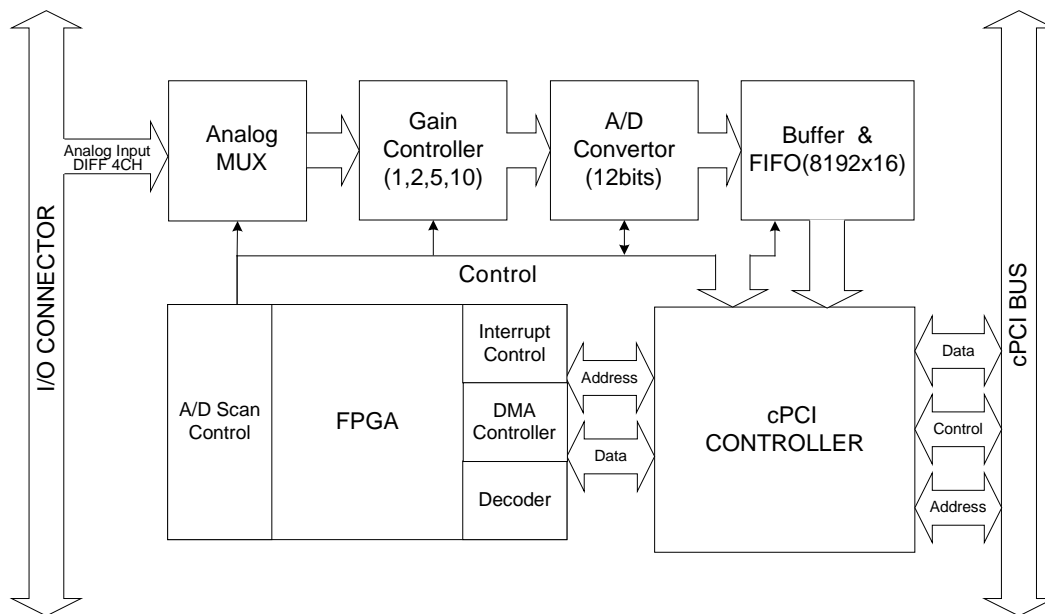
..... Differential 4

1-1-2. A/D Conversion

Complete 12 bit A/D Conversion

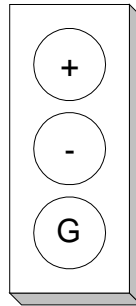
A/D Converter	.....	AD7892
Type of ADC	.....	Successive Approximation
A/D Channels	.....	Differential 4 channels
Input Voltage Range	.....	$\pm 10V$, $\pm 5V$, $\pm 2V$, $\pm 1V$ 0~10V, 0~5V, 0~2V, 0~1V
Resolution	.....	12 bits, 1 in 4096
Maximum Sampling Rate	.....	500KHz
Streaming to Disk Rate	.....	500KHz (Tested on Pentium 700)
Input Impedance	.....	10M Ohm
A/D Trigger Mode	.....	Programmable Timer, Software
Data Transfer	.....	Programmed I/O, Interrupt, DMA
Channel Configuration	.....	Gain, Channel No
Over voltage protection	.....	$\pm 17V$
DC Relative accuracy	± 1 LSB

1-2. COMI-ST201



[1-2] COMI-ST201 Hardware

1-3. COMI-ST201 PIN



[1-3] COMI-ST201

COMI-ST201	4	Differential	.
1-3		+, -, GND	가 COMI-
ST201	4	가	.
Single Ended		가 Differential	

CHAPTER 2. Analog Output Board

Compact PCI

COMI-ST301 16

4

2.COMI-ST301



[2-1] COMI-ST301

2-1. COMI-ST301

..... 160 * 100 mm (3U)
PNP (Plug &Play)

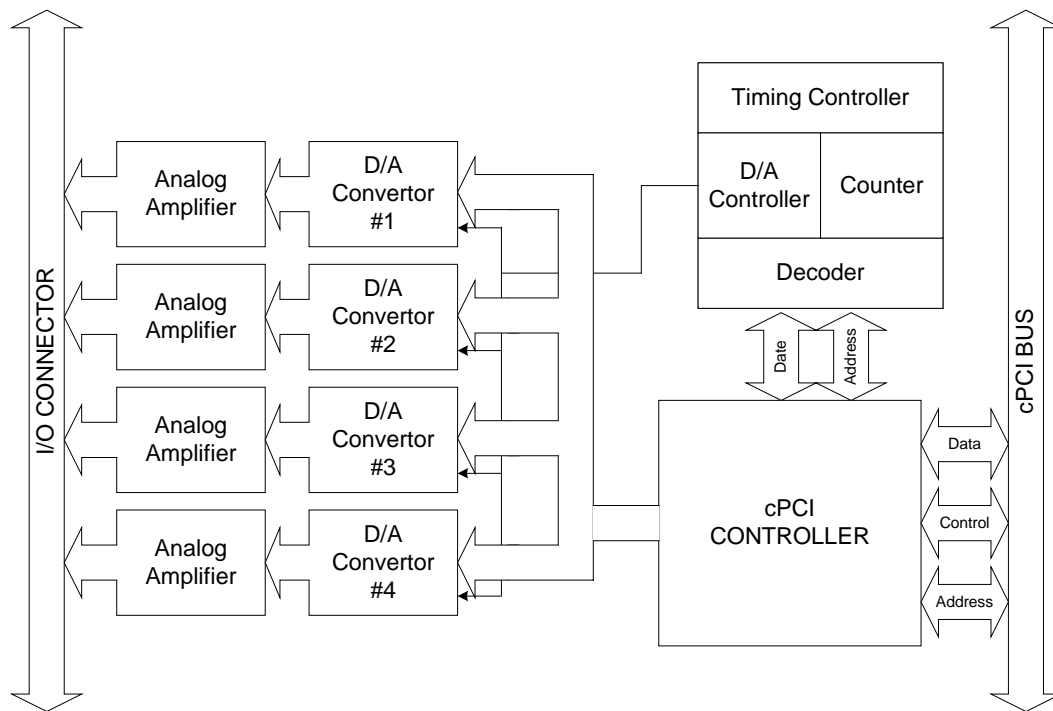
2-1-1.

..... Differential 4

2-1-2. D/A Conversion

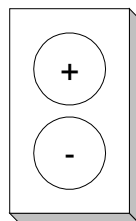
D/A Converter	.....	DAC7641
Output Voltage Range	.....	±10V
Resolution	.....	16 bits, 1 in 65535
Settling Time	.....	10μ sec
Streaming to Disk Rate	.....	100KHz (Tested on Pentium 700)
Data Transfer	.....	Programmed I/O, Interrupt
Output Current	.....	±1.25 mA
Differential Linearity Error	....	±2 LSB

2-2. COMI-ST301



[2-2] COMI-ST301 Hardware

2-3. COMI-ST301 PIN



[2-3] COMI-ST301

CHAPTER 3. Digital In/Out Board

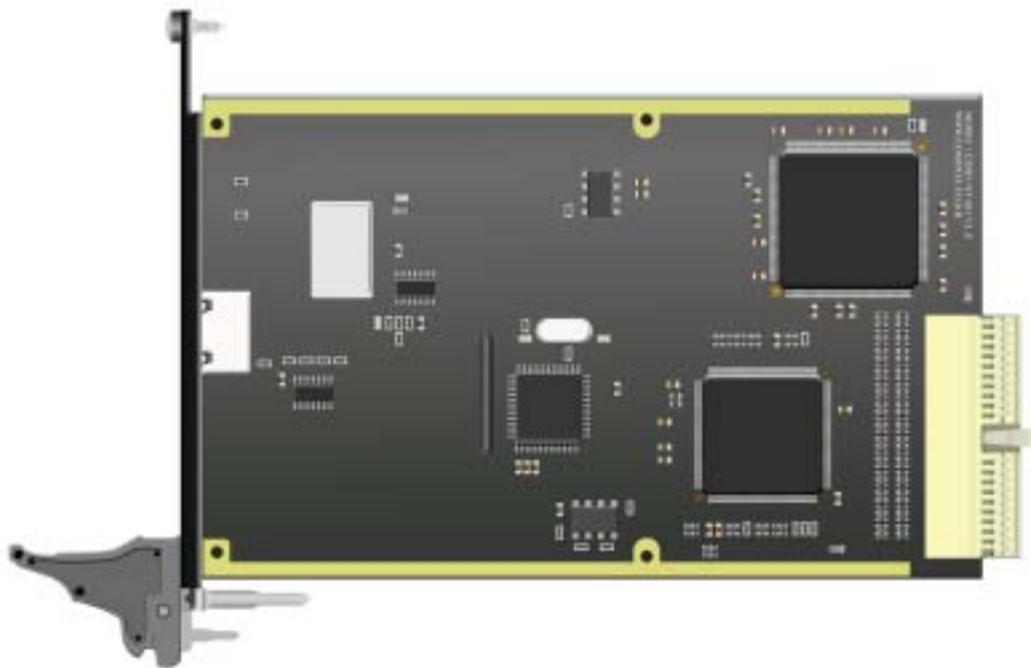
Compact PCI

COMI-ST401

COMI-STM4A

16

3.COMI-ST401



[3-1] COMI-ST401

3-1. COMI-ST401

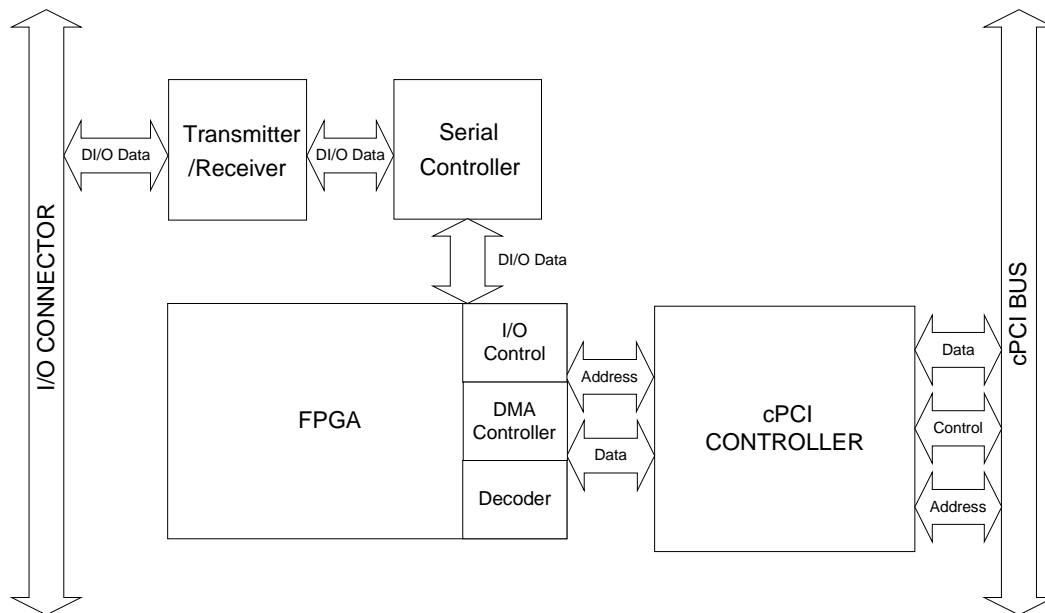
..... 260 * 100 mm (3U)
PNP (Plug & Play)

3-1-1.

COMI-STM4A

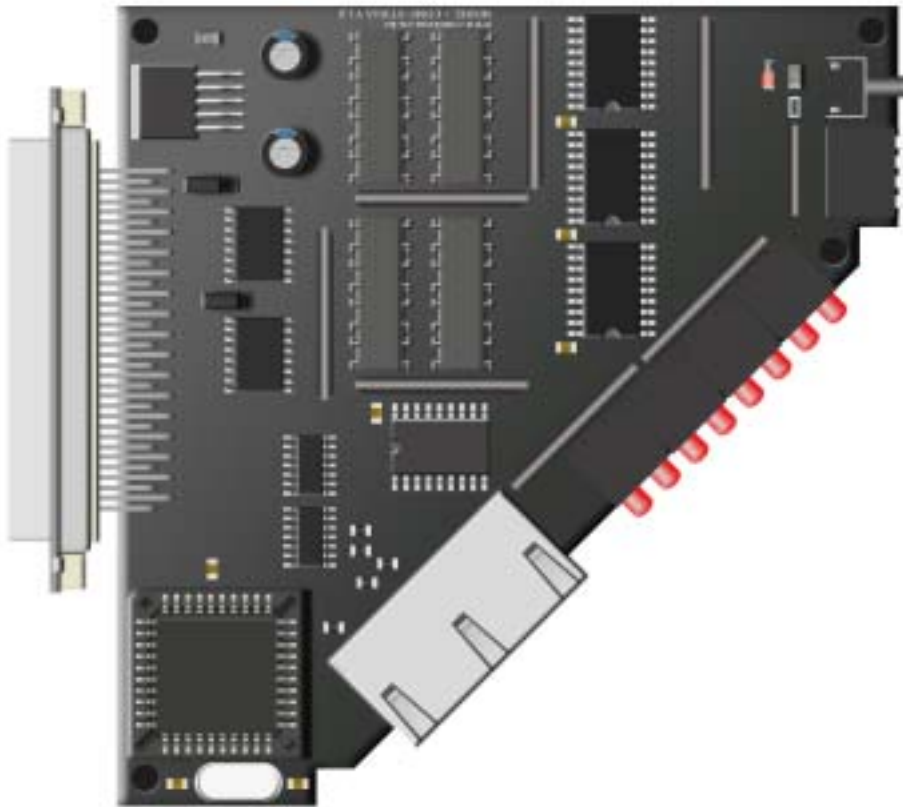
16 가

3-2. COMI-ST401



[3-2] COMI-ST401 Hardware

4.COMI-STM4A



[4-1] COMI-STM4A

4-1. COMI-STM4A

..... 115 * 120 mm

PNP (Plug &Play)

4-1-1.

/ 16

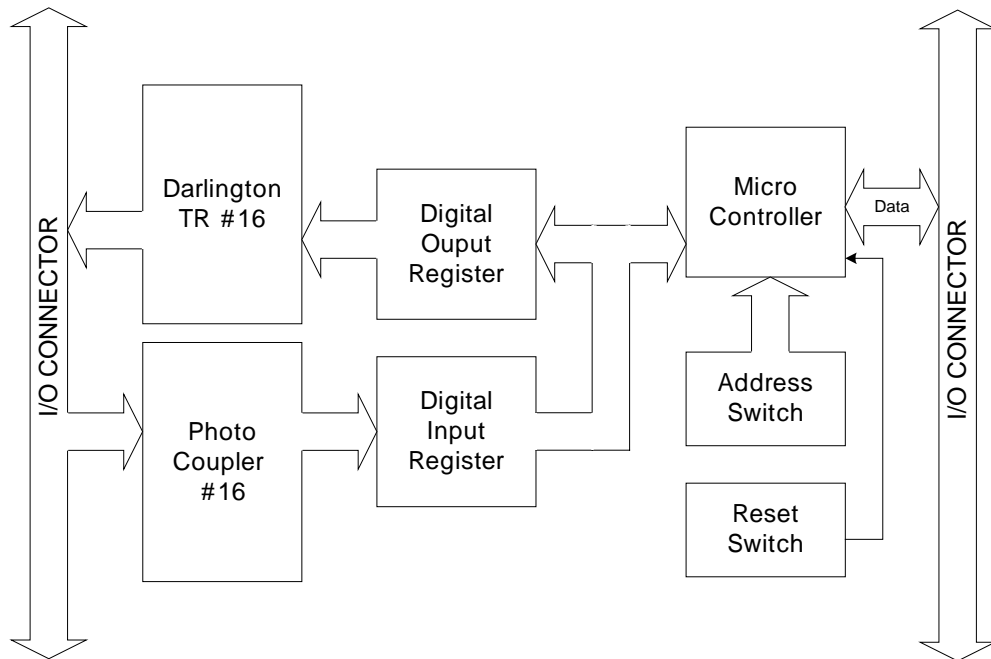
4-1-2.

Input type Photocoupler
Current Transfer Ratio CTR : Min.50% at $I_F=5\text{mA}$, $V_{CE}=5\text{V}$.
High Isolation Voltage between Input and Output $V_{iso} = 5000 V_{rms}$
Input Forward Current 50mA
Input Peak Forward Current 1A
Input Reverse Voltage 6V
Input Power Dissipation 70mW
Output Collector-Emitter Voltage 35V
Output Emitter-Collector Voltage 6V
Output Collector Current 50mA
Output Collector Power Dissipation 150mW
Total Power Dissipation 200mW

4-1-2.

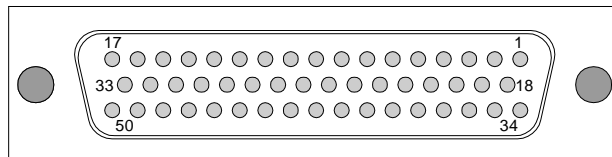
Output type NPN Darlington TR
Interface TTL,CMOS, higher voltage/current
Max Output Voltage 50V
Max Output Current 500mA
Input Capacitance 25pF
Turn On/Off Delay Time 1.0μsec

4-2. COMI-STM4A



[4-2] COMI-STM4A Hardware

4-3 COMI-STM4A PIN

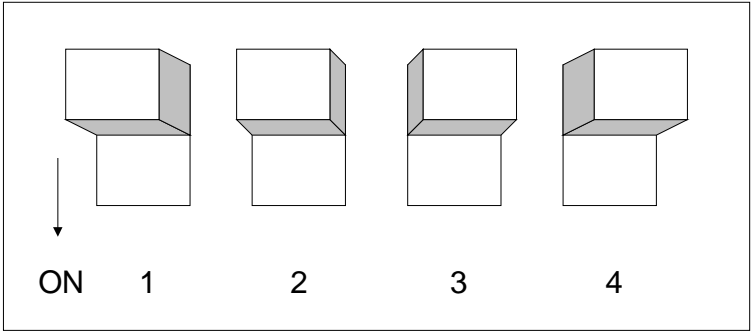


Vcc Pin1	Vcc Pin18	DI/O 15 Pin34
Vcc Pin2	DI/O 0 Pin19	GND Pin35
Vcc Pin3	DI/O 1 Pin20	GND Pin36
Vcc Pin4	DI/O 2 Pin21	GND Pin37
Vcc Pin5	DI/O 3 Pin22	GND Pin38
Vcc Pin6	DI/O 4 Pin23	GND Pin39
Vcc Pin7	DI/O 5 Pin24	GND Pin40
Vcc Pin8	DI/O 6 Pin25	GND Pin41
Vcc Pin9	DI/O 7 Pin26	GND Pin42
Vcc Pin10	DI/O 8 Pin27	GND Pin43
Vcc Pin11	DI/O 9 Pin28	GND Pin44
Vcc Pin12	DI/O 10 Pin29	GND Pin45
Vcc Pin13	DI/O 11 Pin30	GND Pin46
Vcc Pin14	DI/O 12 Pin31	GND Pin47
Vcc Pin15	DI/O 13 Pin32	GND Pin48
Vcc Pin16	DI/O 14 Pin33	GND Pin49
Vcc Pin17		GND Pin50

[4-3] COMI-STM4A

Signal Name	Reference	Pin	Description
Vcc	GND	<1..18>	DC 12V, DC 24V Input
DI/O <0..15>		<19..34>	
GND		GND	

4-4 COMI-STM4A SWITCH



[4-4] COMI-STM4A

COMI-STM4A 4 가

4

4-4 가 OFF

0

Pin1	Pin2	Pin3	Pin4	Address
OFF	OFF	OFF	OFF	0
ON	OFF	OFF	OFF	1
OFF	ON	OFF	OFF	2
ON	ON	OFF	OFF	3
OFF	OFF	ON	OFF	4
ON	OFF	ON	OFF	5
OFF	ON	ON	OFF	6
ON	ON	ON	OFF	7
OFF	OFF	OFF	ON	8
ON	OFF	OFF	ON	9
OFF	ON	OFF	ON	10
ON	ON	OFF	ON	11
OFF	OFF	ON	ON	12
ON	OFF	ON	ON	13
OFF	ON	ON	ON	14
ON	ON	ON	ON	15

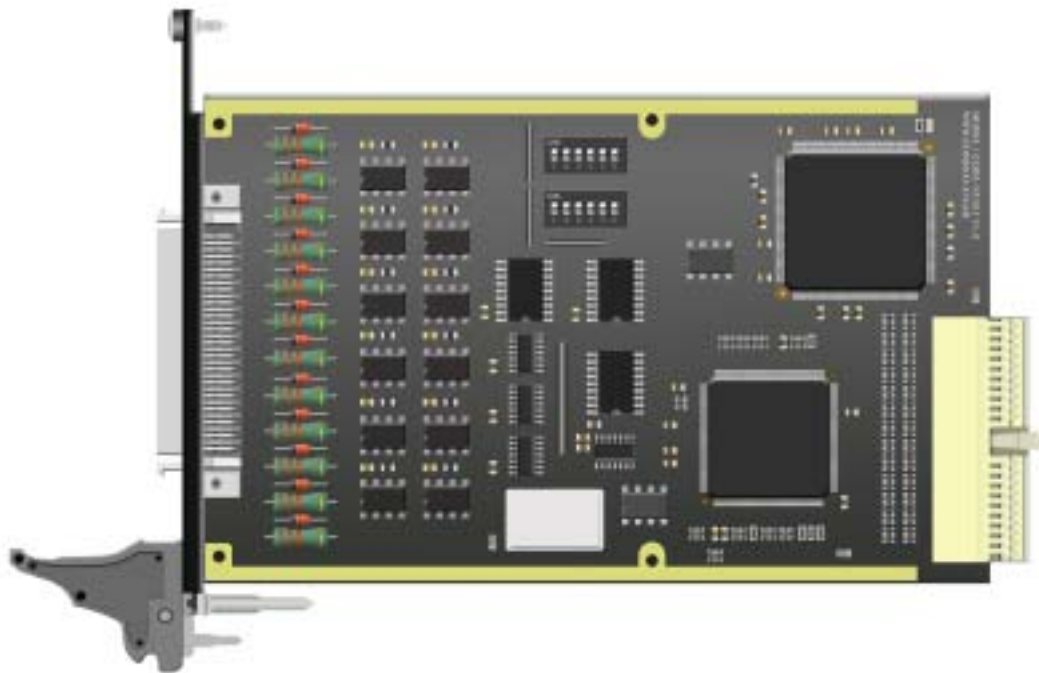
CHAPTER 4. Motion Control Board

Compact PCI

COMI-ST501, COMI-ST502

H/W, S/W

5.COMI-ST501



[5-1] COMI-ST501

5-1. COMI-ST501

..... 160 * 100 mm (3U)
PNP (Plug &Play)

5-1-1.

/ 4
..... 4
..... 5

5-1-2. Encoder/Counter

Encoder A Counter 24Bits Counter, Up/Down Binary, BCD, 24 Hour Clock
Encoder Z Counter 16Bitss Up/Dn Counter (Auto Direction)
X1,X2,X4 Quadrature User selectable
Channel Number 4 Channels
Input Impedance 1.2 KOhm
Data Transfer Programmed I/O, Interrupt

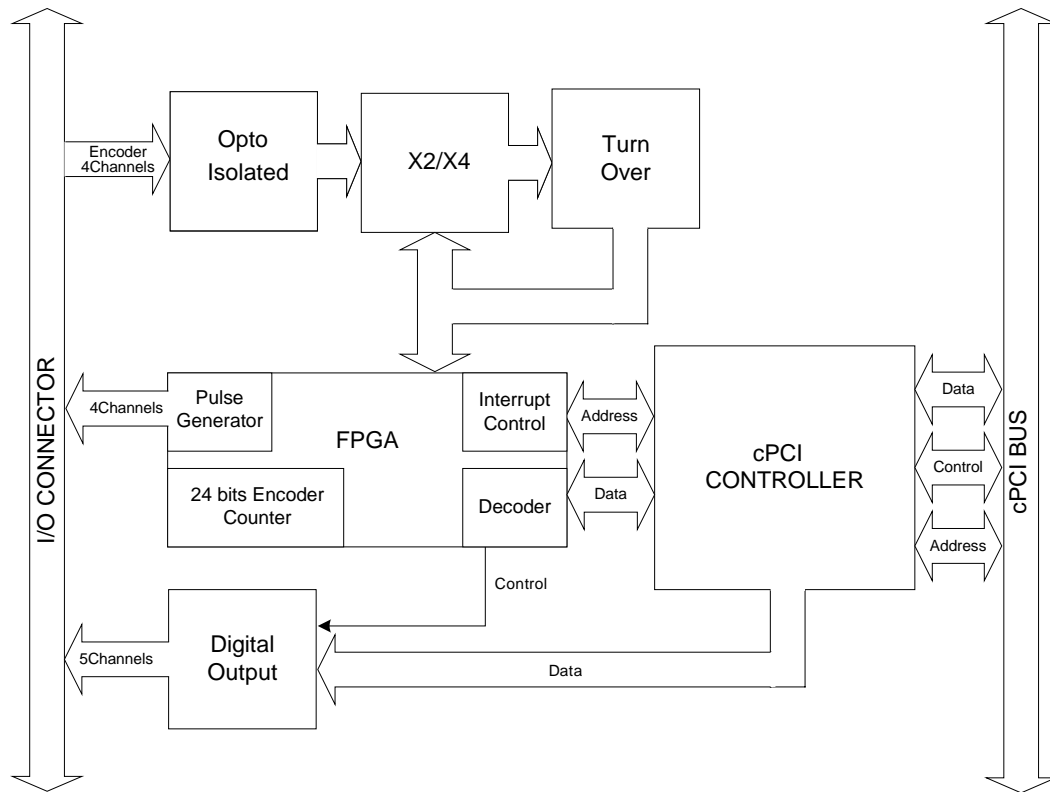
5-1-3. Digital Output

TTL Compatible Output
Channel 5 Channels
Voltage Level Low(0 ~ 0.4V), High(2.4V ~)
Input Load Low 0.5V(0.2mA), High 2.7V(0.4mA)
Data Transfer Programmed I/O

5-1-4. Pulse Generator

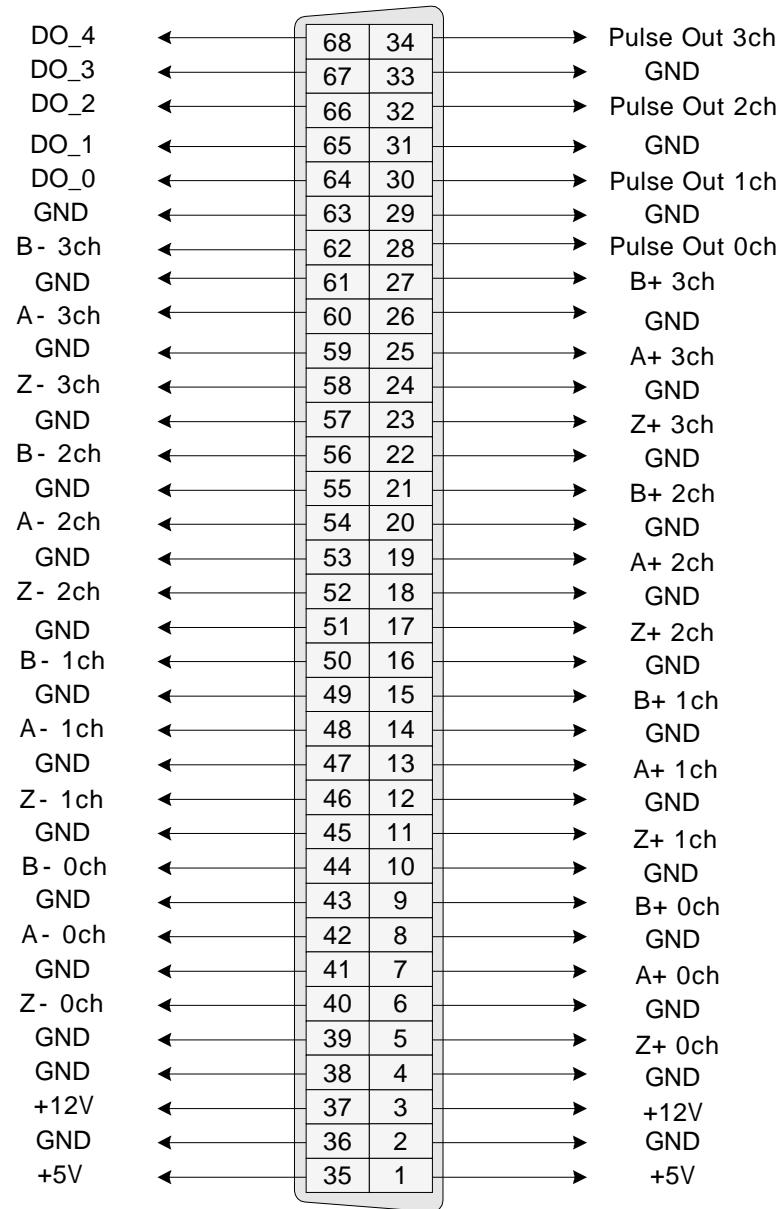
Channel	4 Channels
Resolution	32 Bits
Base Clock Available	10MHz
Programmable Rate Generator / Programmable Pulse Count Limitation	
Pulse Generator	16Bitss Counter X 2 (One for Frequency, the Other for Number Setting)

5-2. COMI-ST501



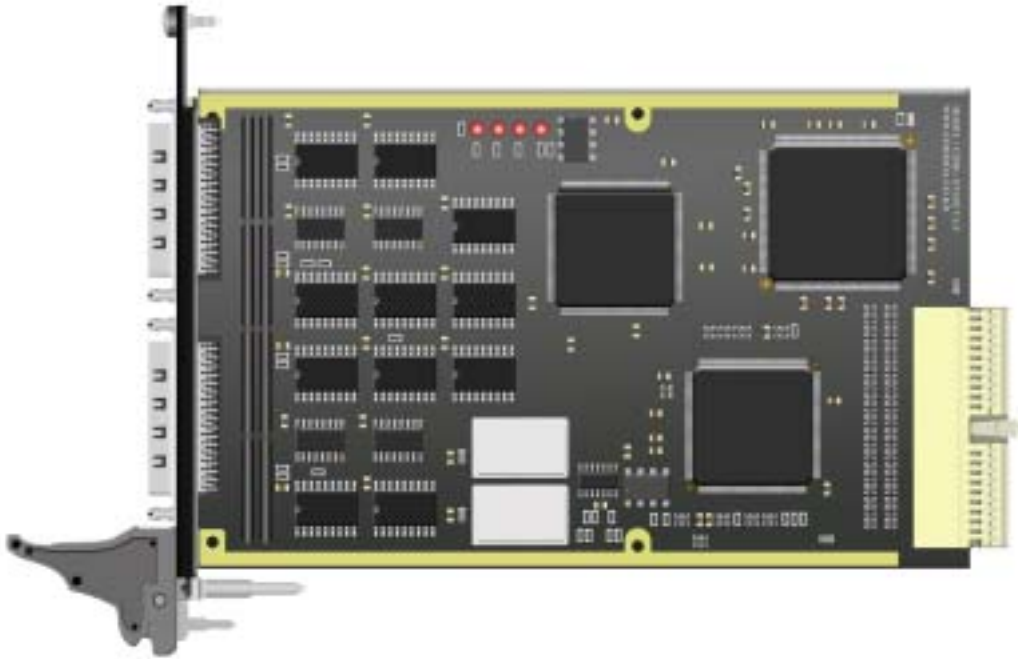
[5-2] COMI-ST501 Hardware

5-3. COMI-ST501 PIN



[5-3] COMI-ST501

6.COMI-ST502



[6-1] COMI-ST502

6-1. COMI-ST502

..... 160 * 100 mm (3U)

PNP (Plug & Play)

S-curve (sine wave) 7|/

Microstep control with resolution ranging from 1 to 1/256

Out-of-step detection by counting feedback pulses

Idling pulse output (0 to 7 pulses)

Simultaneous start/stop of multiple axes

Boost-up signal output

6-1-1.

X,Y,Z,U 4	.....	Stepping motors/Pulse train input servomotors
	.....	16
	.....	16
	.....	4

6-1-2. Motion Control

Reference Clock	.....	20MHz
In-position Control Range	.....	-134,217,728 to +134,217,727
Ramping-down Point Setting Range	.....	0 to 16,777,215 (24Bits)
Pulse Rate Setting	.....	3 step (lower,higher,interpolation) 16Bits
Acceleration/Deceleration Modes	.....	Linear and S-curve ()
Acceleration Rate Setting Range	.....	0.1 ~ 100 (16 Bits)
Deceleration Rate Setting Range	.....	0.1 ~ 100 (16 Bits)
Automatic Ramping-down Point Setting	.....	Possible in a range of deceleration time < (acceleration time x 2)
Automatic Pulse Rate Adjustment	.....	Pulse rate is automatically lowered for in- positioning operation with little moving amount
Manual Operation	.....	Possible through manual pulser input and push button switch
Counters	.....	Counter1 : 28Bits command position counter Counter2 : 28Bits mechanical position counter Counter3 : 16Bits deviation counter Counter4 : 28Bits multi-purpose counter
Comparators	.....	Five 28Bits comparator circuits provided
Interpolation	.....	Linear interpolation among desired two to four axis

Circular interpolation between desired two axes

6-1-3. Motion Control

6.5 Mpps

, S 가

PTP , (2, 4),

Count

Encoder (1 Up/Down, 2 1, 2, 4)

13 가

()

Trigger

H/W Limit

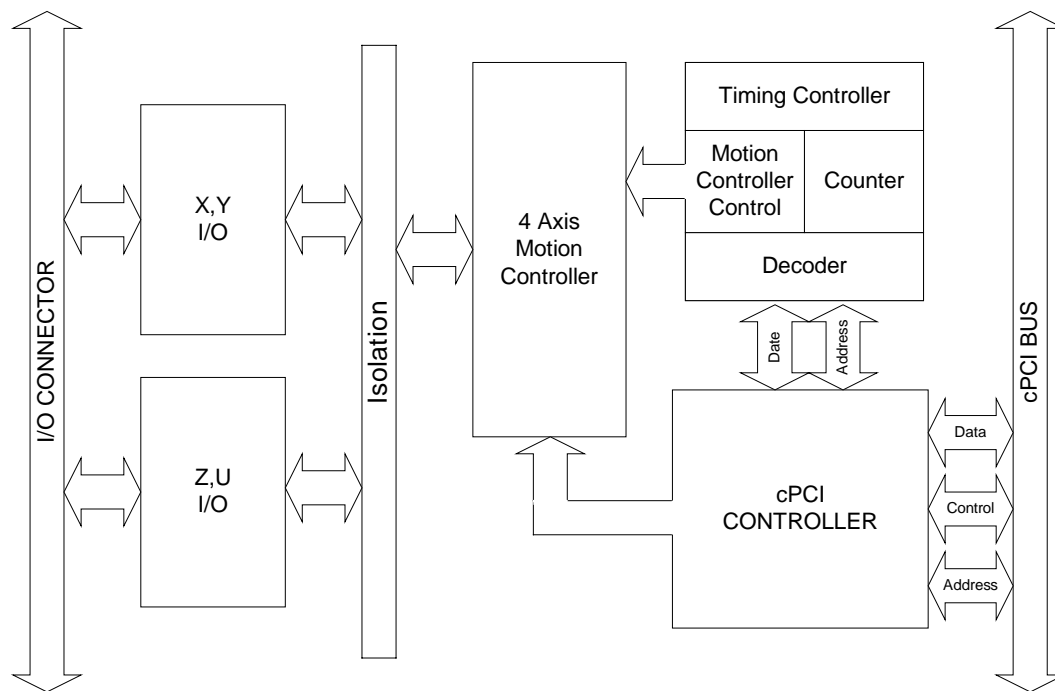
Level

, , ,

Slow Down Stop, Emergency Stop

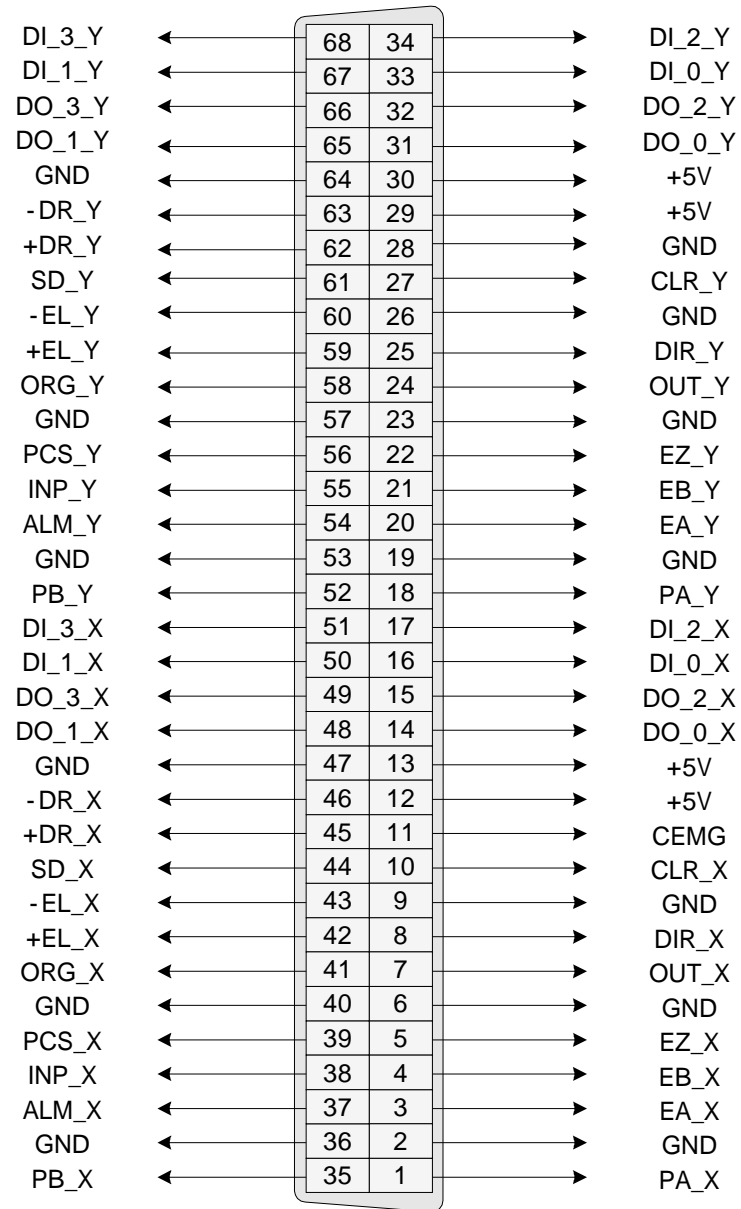
Stepping Servo Driver

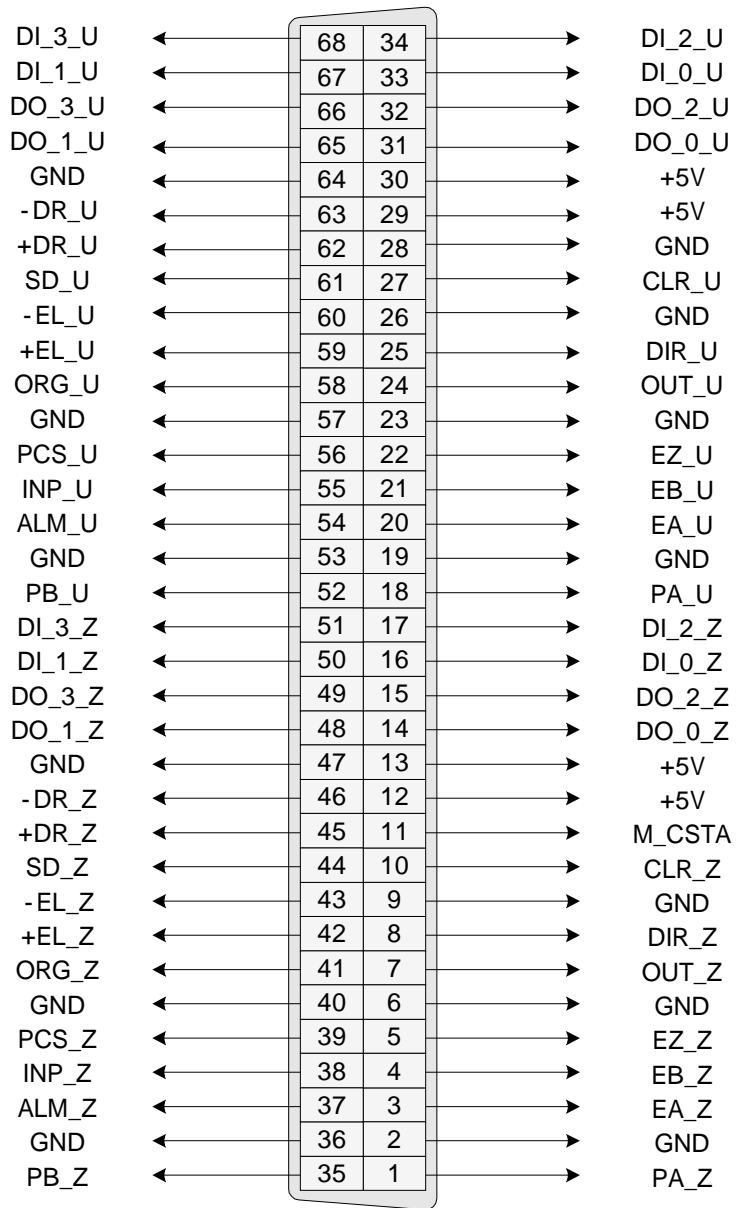
6-2. COMI-ST502



[6-2] COMI-ST502 Hardware

6-3. COMI-ST502 PIN

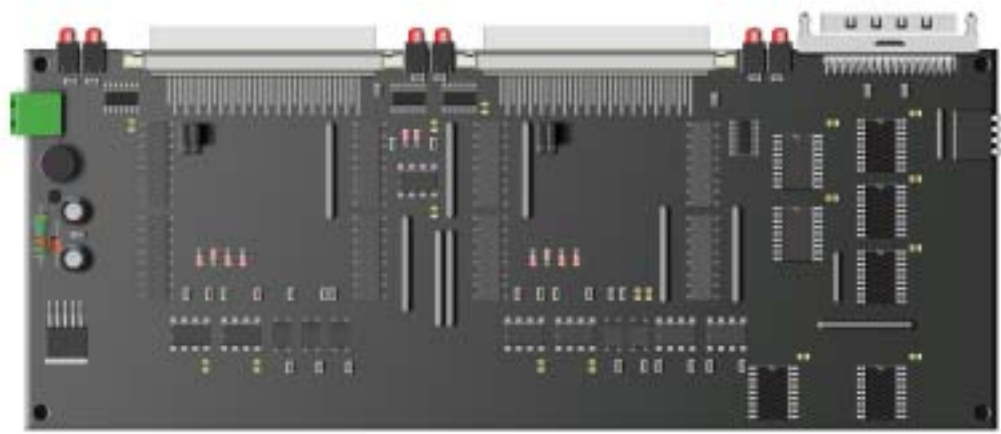




[6-4] COMI-ST502 2

Signal Name	Description
DI_#_(X,Y,Z,U)	# (X,Y,Z,U 4)
DO_#_(X,Y,Z,U)	# (X,Y,Z,U 4)
+DR_(X,Y,Z,U)	
-DR_(X,Y,Z,U)	
SD_(X,Y,Z,U)	
CLR_(X,Y,Z,U)	
+EL_(X,Y,Z,U)	+
-EL_(X,Y,Z,U)	-
DIR_(X,Y,Z,U)	Motor Driver
ORG_(X,Y,Z,U)	
OUT_(X,Y,Z,U)	
PCS_(X,Y,Z,U)	Start in positioning
INP_(X,Y,Z,U)	in positioned
ALM_(X,Y,Z,U)	
EZ__(X,Y,Z,U)	Z
EA_(X,Y,Z,U)	A
EB_(X,Y,Z,U)	B
PA_(X,Y,Z,U)	MauaI Pulser
PB_(X,Y,Z,U)	MauaI Pulser
CEMG	
M_CSTA	

7.COMI-STT5B



[7-1] COMI-STT5B

7-1. COMI-STT5B

.....	295 * 91 mm
.....	COMI-ST502 2 Motion Control Terminal

7-1-1.

X,Y or Z,U 2	.....	Stepping motors/Pulse train input servomotors
	.....	8
	.....	8
	.....	2
Pulser	.....	2

7-1-2. Power Requirement

$\pm 24\text{V DC} \pm 5\%$, 500mA max. for external supply

7-1-3.

4

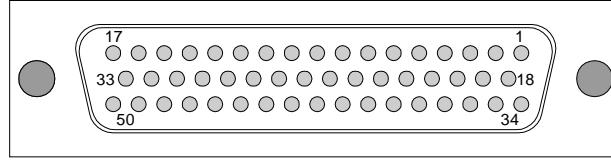
4

\pm

Start in positioning

Manual Pulser

7-2. COMI-STT5B PIN



Pin50	VCC	Pin33	Vcc	Pin17	Vcc
Pin49	GND	Pin32	GND	Pin16	GND
Pin48	CLR_X	Pin31	-EL_X	Pin15	-EL_Y
Pin47	PCS_X	Pin30	+EL_X	Pin14	+EL_Y
Pin46	+EB_X	Pin29	ORG_X	Pin13	ORG_Y
Pin45	-DR_X	Pin28	GND	Pin12	GND
Pin44	+DR_X	Pin27	-EA_X	Pin11	-EA_Y
Pin43	SD_X	Pin26	+EA_X	Pin10	+EA_Y
Pin42	GND	Pin25	CEMG	Pin9	CEMG
Pin41	DL_3_X	Pin24	ALM_X	Pin8	ALM_Y
Pin40	DL_2_X	Pin23	GND	Pin7	GND
Pin39	DL_1_X	Pin22	GND	Pin6	GND
Pin38	DL_0_X	Pin21	-PB_X	Pin5	-PB_Y
Pin37	GND	Pin20	-CCW_X	Pin4	-CCW_Y
Pin36	DO_3_X	Pin19	+PB_X	Pin3	+PB_Y
Pin35	DO_2_X	Pin18	+CCW_X	Pin2	+CCW_Y
Pin34	DO_1_X	Pin17	GND	Pin1	GND
	DO_0_X		GND		GND

Pin50	VCC	Pin33	Vcc	Pin17	Vcc
Pin49	GND	Pin32	GND	Pin16	GND
Pin48	CLR_Y	Pin31	-EL_Y	Pin15	-EL_Y
Pin47	PCS_Y	Pin30	+EL_Y	Pin14	+EL_Y
Pin46	+EB_Y	Pin29	ORG_Y	Pin13	ORG_Y
Pin45	-DR_Y	Pin28	GND	Pin12	GND
Pin44	+DR_Y	Pin27	-EA_Y	Pin11	-EA_Y
Pin43	SD_Y	Pin26	+EA_Y	Pin10	+EA_Y
Pin42	GND	Pin25	CEMG	Pin9	CEMG
Pin41	DL_3_Y	Pin24	ALM_Y	Pin8	ALM_Y
Pin40	DL_2_Y	Pin23	GND	Pin7	GND
Pin39	DL_1_Y	Pin22	GND	Pin6	GND
Pin38	DL_0_Y	Pin21	-PB_Y	Pin5	-PB_Y
Pin37	GND	Pin20	-CCW_Y	Pin4	-CCW_Y
Pin36	DO_3_Y	Pin19	+PB_Y	Pin3	+PB_Y
Pin35	DO_2_Y	Pin18	+CCW_Y	Pin2	+CCW_Y
Pin34	DO_1_Y	Pin17	GND	Pin1	GND
	DO_0_Y		GND		GND

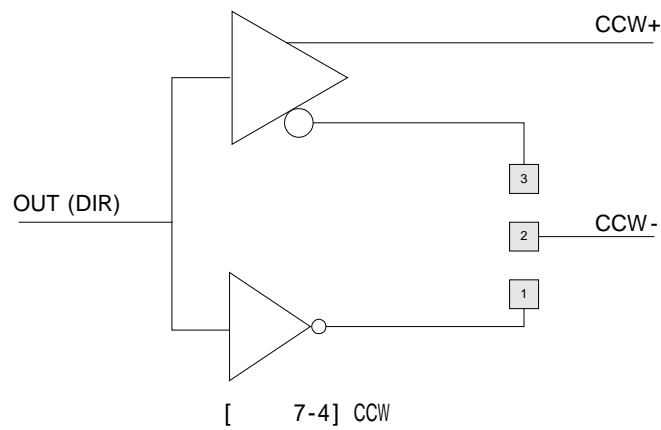
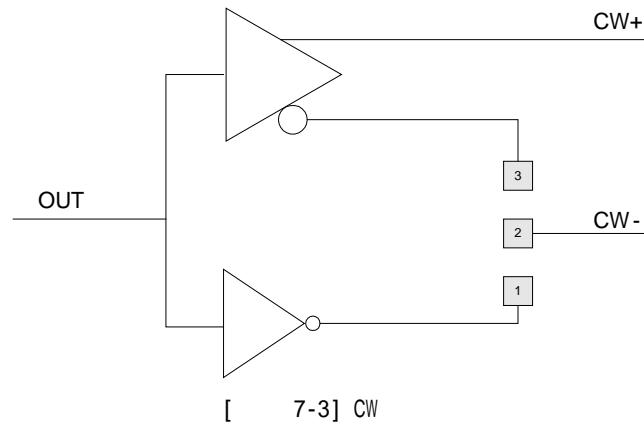
[7-2] COMI-STT5B

No.	Name	I/O	Description
1	GND		Ext. ground
2	CW+	I	CW pulse (+)
3	CW-	I	CW pulse (-)
4	GND		Ext. ground
5	CCW+	I	CCW pulse (+) or direction
6	CCW-	I	CCW pulse (-) or direction
7	GND		Ext. ground
8	GND		Ext. ground
9	ALM	I	Alarm signal
*10	GND	I	Ext. ground(X,Y), EMG(Z), STA(U)
11	INP	I	In-position signal
12	GND		Ext. ground
13	ORG	I	Home return signal
14	+EL	I	End limit signal (+)
15	-EL	I	End limit signal (-)
16	GND		Ext. ground
17	+5V	0	Ext. power
18	GND		Ext. ground
19	PA+	I	Pulser A phase (+)
20	PA-	I	Pulser A phase (-)
21	GND		Ext. ground
22	PB+	I	Pulser B phase (+)
23	PB-	I	Pulser B phase (-)
24	EZ+	I	Encoder Z phase (+)
25	EZ-	I	Encoder Z phase (-)
26	GND		Ext. ground
27	EA+	I	Encoder A phase (+)

28	EA-	I	Encoder A phase (-)
29	GND		Ext. ground
30	EB+	I	Encoder B phase (+)
31	EB-	I	Encoder B phase (-)
32	GND		Ext. ground
33	+5V	0	Ext. power
34	D00	0	Digital output 0
35	D01	0	Digital output 1
36	D02	0	Digital output 2
37	D03	0	Digital output 3
38	GND		Ext. ground
39	D10	I	Digital input 0
40	D11	I	Digital input 1
41	D12	I	Digital input 2
42	D13	I	Digital input 3
43	GND		Ext. ground
44	SD	I	Ramping down
45	+DR	I	Hard start by switch (+)
46	-DR	I	Hard start by switch (-)
47	PCS	I	Start In-position(override of target position 2)
48	CLR	I	Counter clear
49	GND		Ext. ground
50	+5V	0	Ext. power

7-3. COMI-STT5B

7-3-1. CW,CCW



7-3	COMI-ST502	OUT	COMI-STT5B	CW	
CW					COMI-ST502
OUT			COMI-STT5B		
	Open Collector	Line Drive			

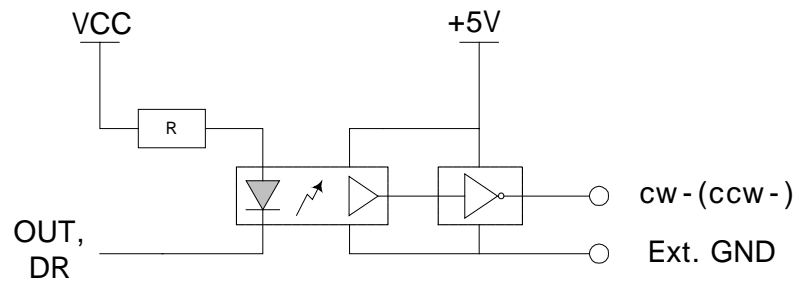
7-4 COMI-ST502 OUT DIR COMI-STT5B CCW
 . CCW CW
 COMI-STT5B Open Collector Line Drive

	OPEN COLLECTOR	LINE DRIVE (Default)
-CW_X	JP1 (1,2)	JP1 (2,3)
-CCW_X	JP2 (1,2)	JP2 (2,3)
-CW_Y	JP3 (1,2)	JP3 (2,3)
-CCW_Y	JP4 (1,2)	JP4 (2,3)

COMI-STT5B COMI-ST502 X,Y
 Z,U

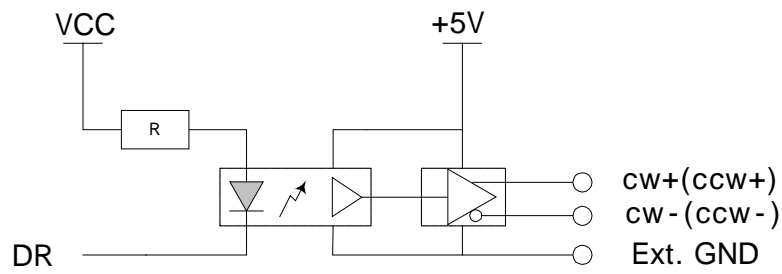
Dual Pulse Output Mode Single Pulse Output Mode
 CCW COMI-ST502 OUT DIR 가

	CW	CCW
Dual Pulse Output Mode	+	-
Single Pulse Output Mode		



[7-5] Open Collector

7-5 CW,CCW Open Collector . 30V,
40mA .



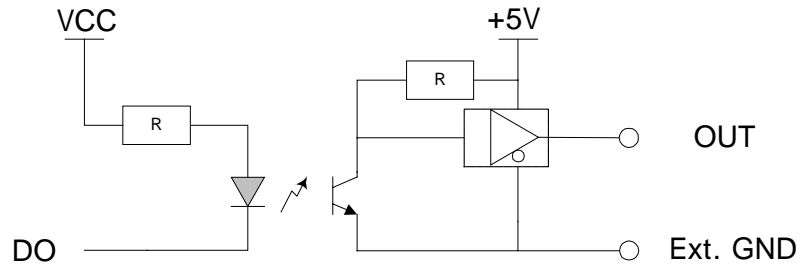
[7-6] Line Drive

7-6 CW,CCW Line Drive .

7-3-2.

7-7 COMI-ST502 DO COMI-STT5B DO

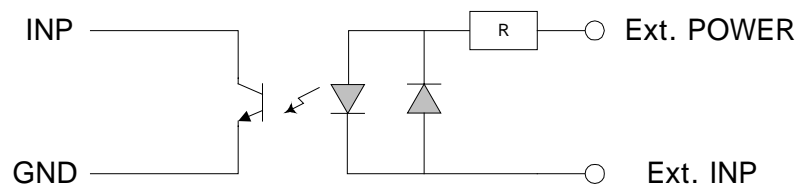
30V, 400mA



[7-7]

7-8 COMI-ST502 DI

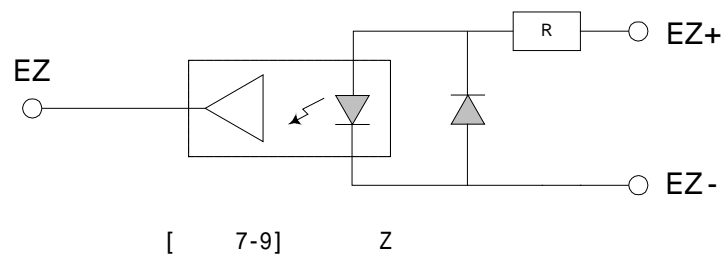
COMI-STT5B



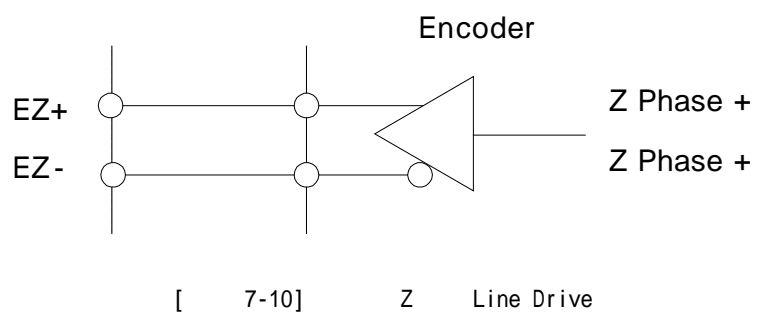
[7-8]

24V R 2.2Kohm, 12mA
가 INP Low

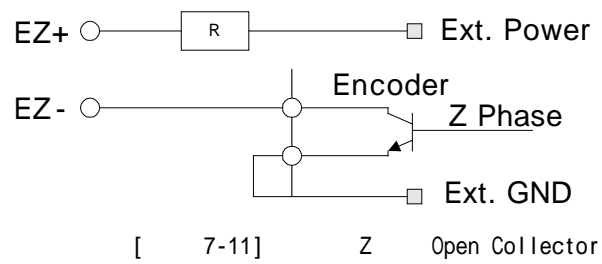
Z	가	.
RPM		.



7-9	Z	가 COMI-STT5B	COMI-ST502
.	가	COMI-ST502	EZ High



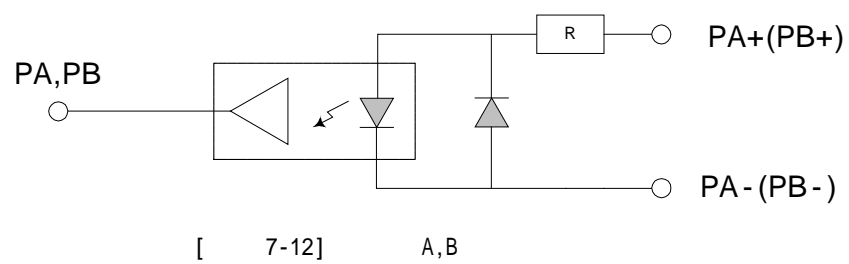
7-10	Line Drive	Z	EZ+	EZ-
	3.5V	.		

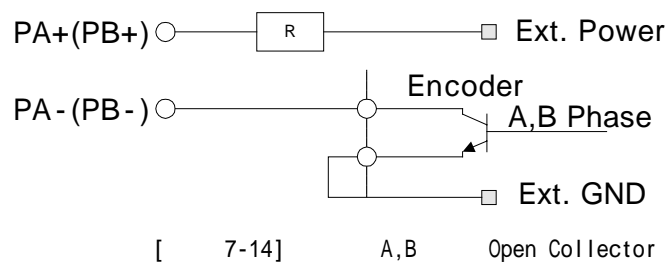
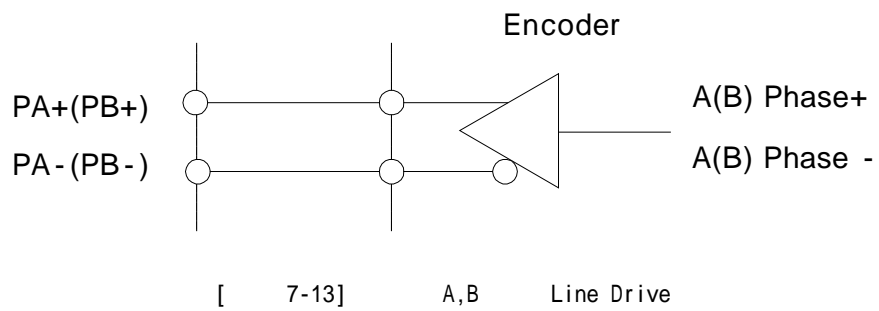


7-11 Open Collector

	R
+5V	0
+12V	1.8K ohm
+24V	4.3K ohm

A,B 90 가
가



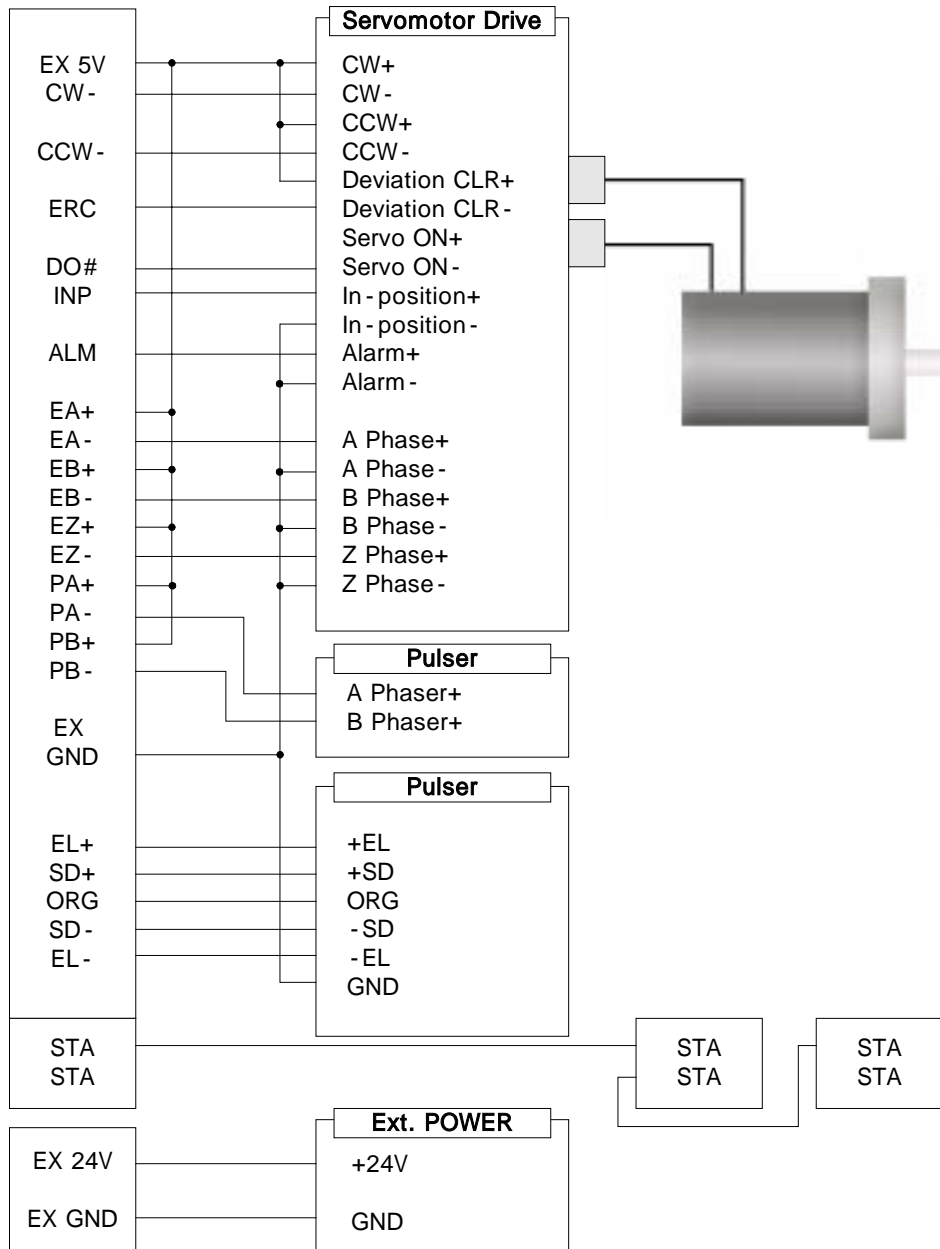


Z 가 Open Collector

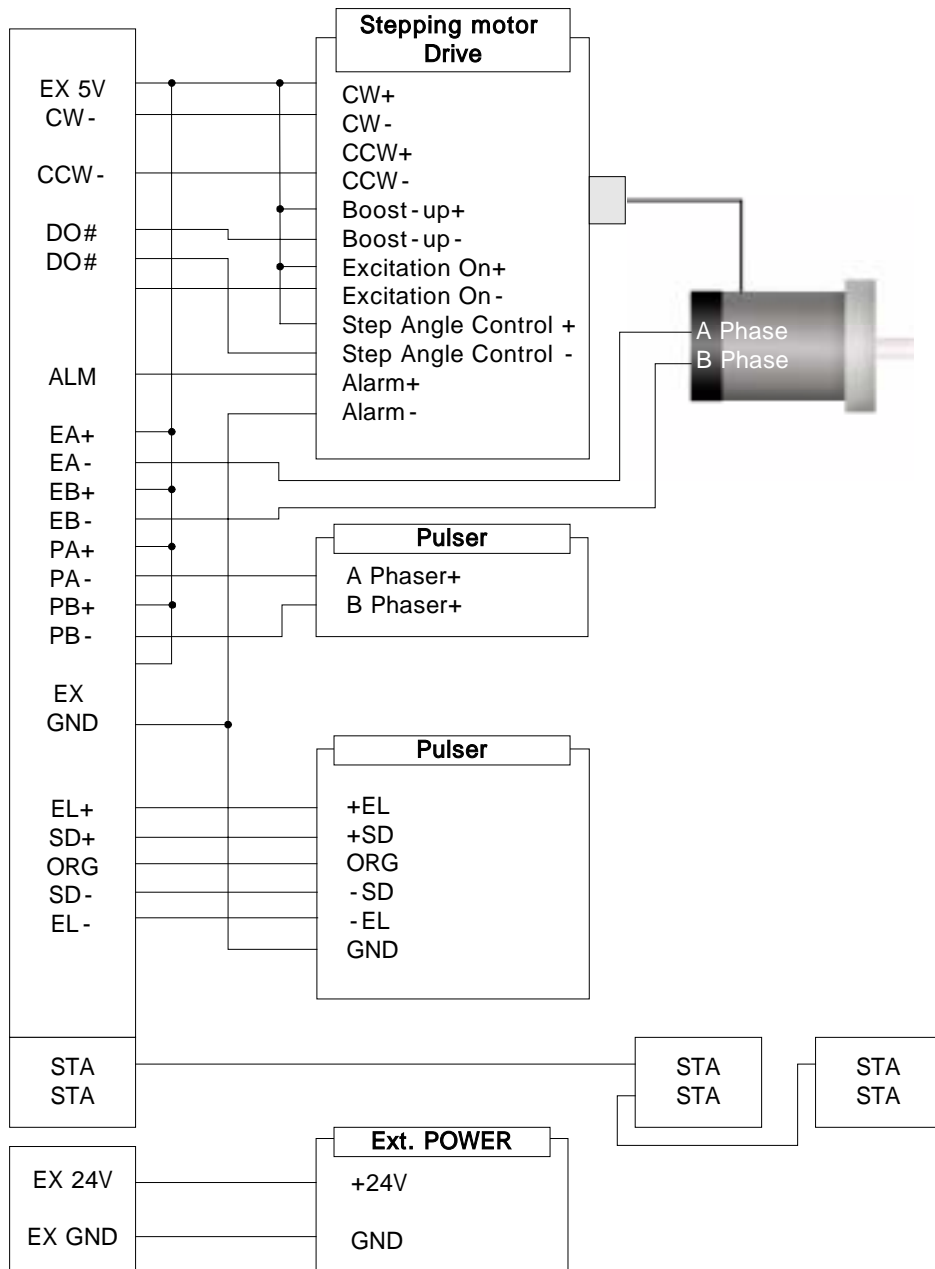
	R
+5V	0
+12V	1.8K ohm
+24V	4.3K ohm

7-4.

7-4-1.



7-4-2.



1. DAS

1.

COMI-ST201

Ground-Referenced Signal Source : (-) 가
SD 가
가

Floating Signal Source : (-) 가
(+, -) . Optical
Isolator .

1-1.

♣ Single Ended

1

Ground-Referenced Signal Source

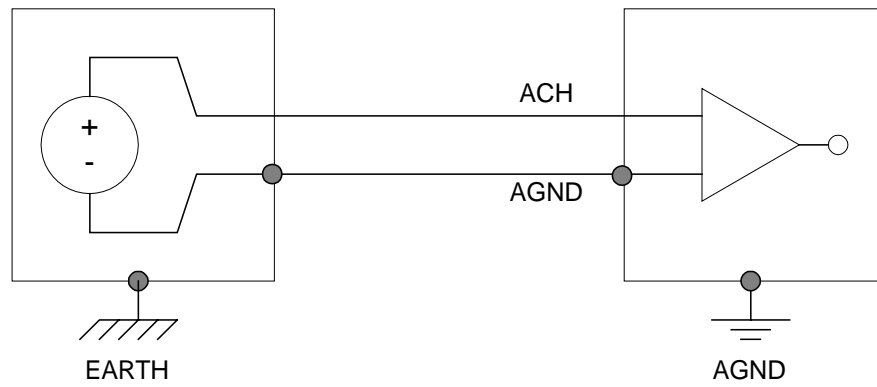
Single Ended

[1]

Differential Input

Shield

Shield



[1] Single Ended

1

♣ Single Ended

2

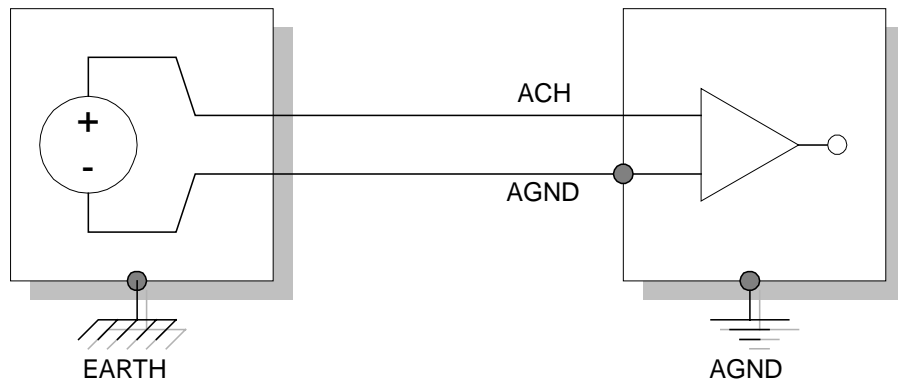
Floating Signal

Single Ended

가

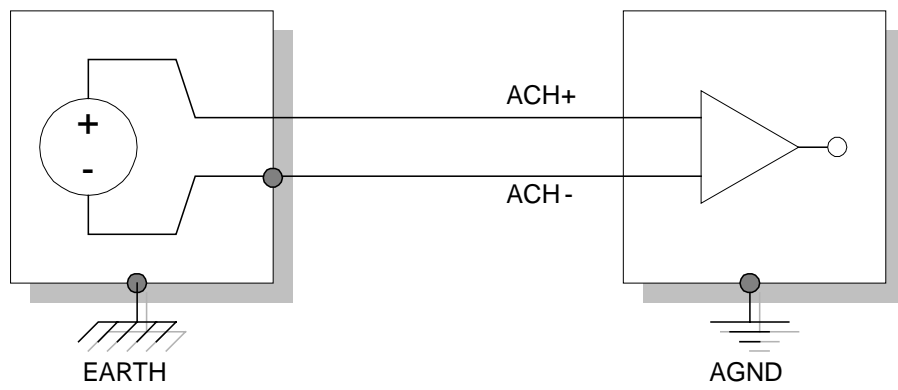
[2]

Shield



[2] Single Ended 2

♣ Differential 1
Ground-Referenced Signal Source Differential
[3] .



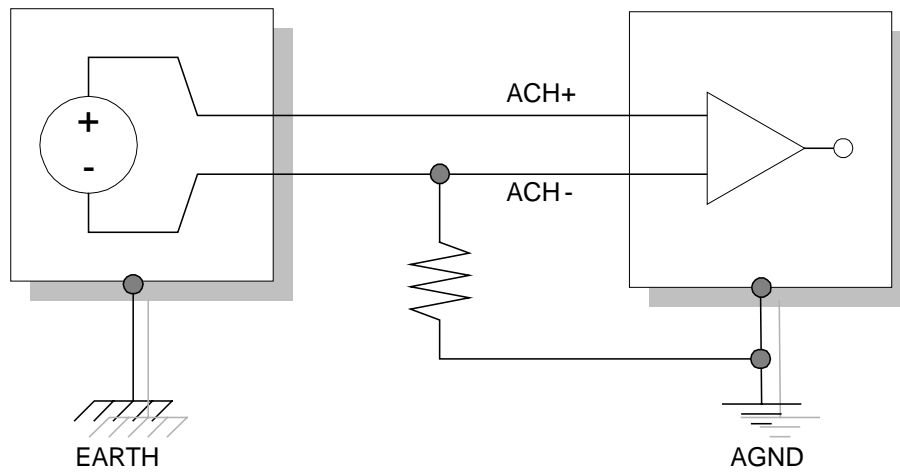
[3] Differential 1

♣ Differential 2
Floating Signal Differential [4]
4]

가

가 Floating

[4]



[4] Differential

2

♣ Shielded Differential

1

[4]

Shield

[5]

Shield

[1]

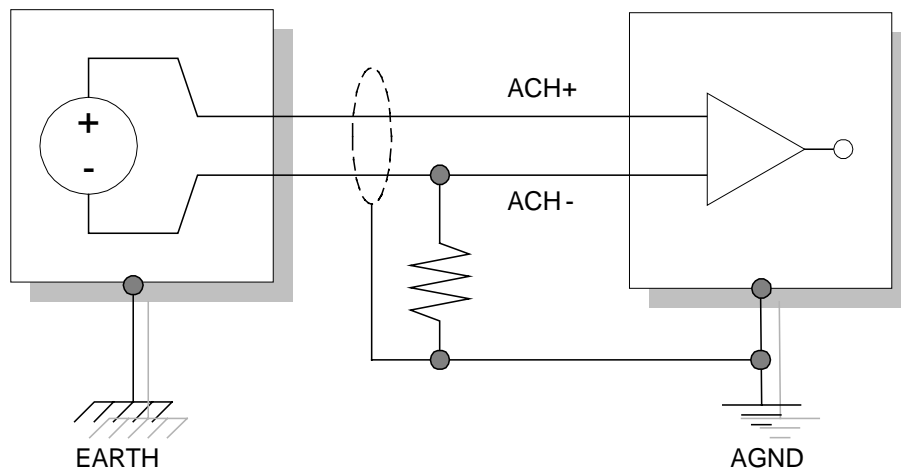
가

Gain Error

Shield

Magnetic Noise 가 Shield

가



[5] Shielded Differential

가 Differential Mode

- 가
- Noise 가
- 가 1 Volt
- 가 COMIZOA 3m

[3] Ground-Referenced Signal Source Differential

Picked-up Noise

Common-mode Noise Rejection

가

(-)

가

Single Ended

(-)

가

가

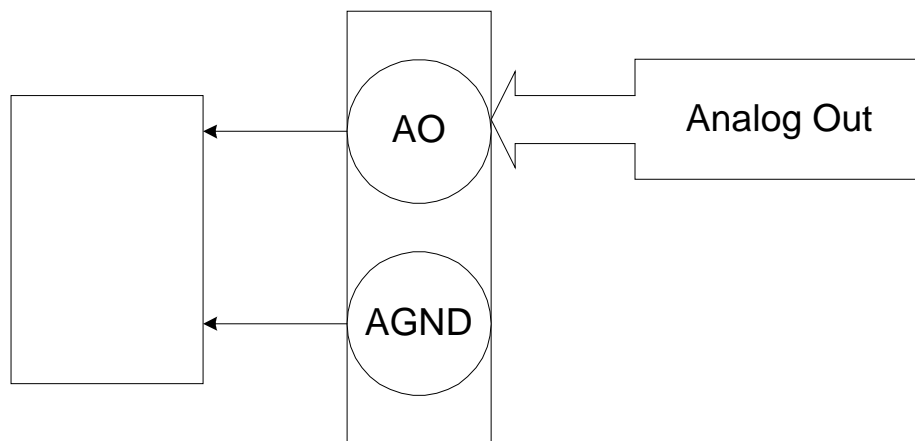
Differential

(-

1-2.

[6]

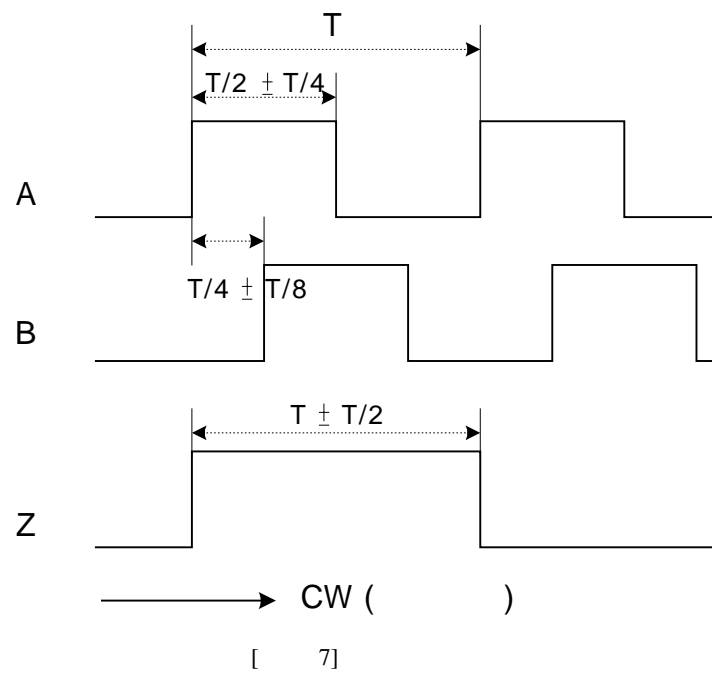
+10V ~ -10V
가



[6]

1-3.

COMI-ST501



[7]

A B 가

Z

A 가

A B

Z Up/Dn

가

가

A,B

2

Totem Pole : [8]

Q1

가

Active

Pull-up

가

가

가 High

Q1

ON, Q2 가 OFF

가 Low

Q1 OFF

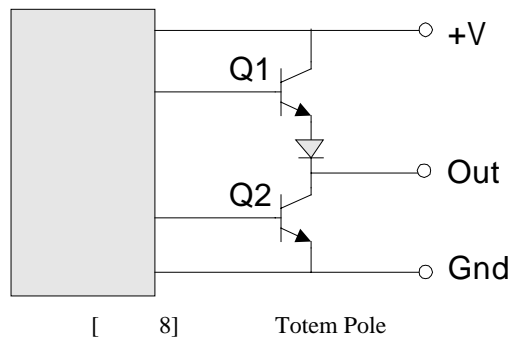
Q2 가 ON

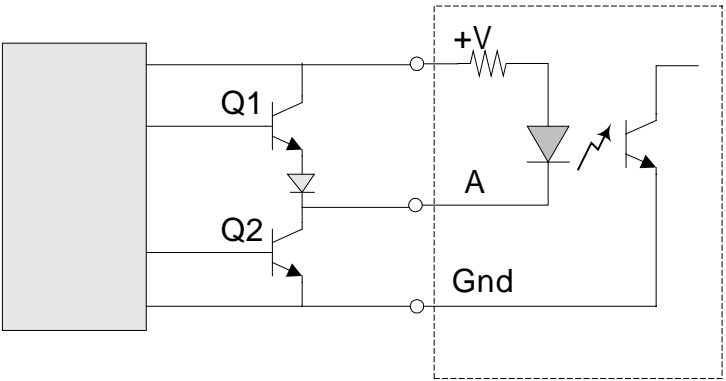
A-,B-,Z-,P(5V),G(GND)

A+,B+,Z+ P

[9]

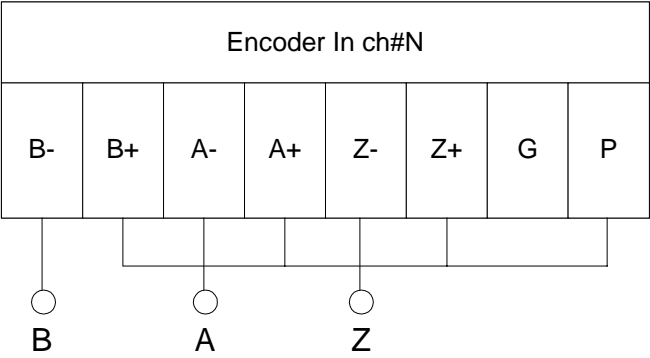
가





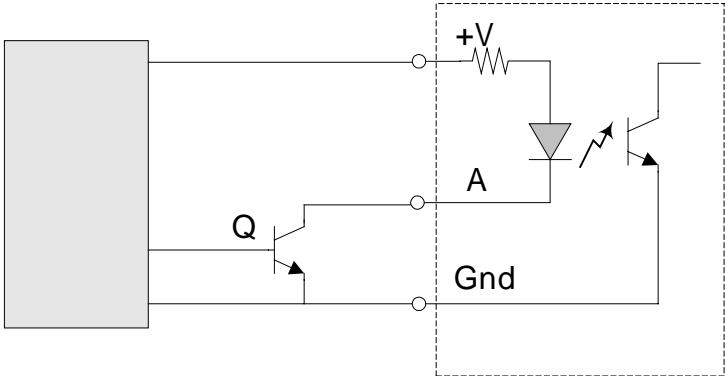
[1-9] COMI-ST501

[10] Totem Pole COMI-ST501



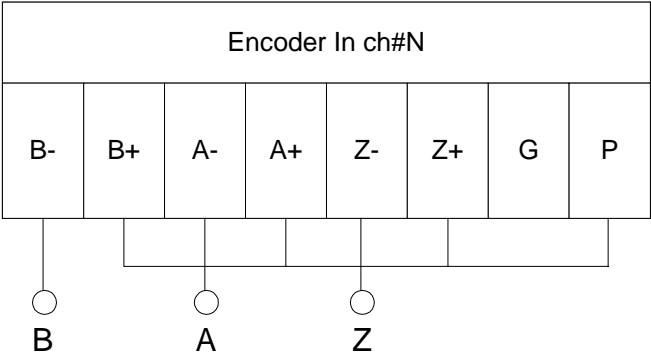
[10] ST501

NPN Often Collector : [11] , Collector
 Open Collector .
 가 .



[11] ST501

[11] .
 ST501 A-,B-,Z-,P(Vcc),G(GND)
 A+,B+,Z+ 5V . [12] .



[12] ST501 2

가

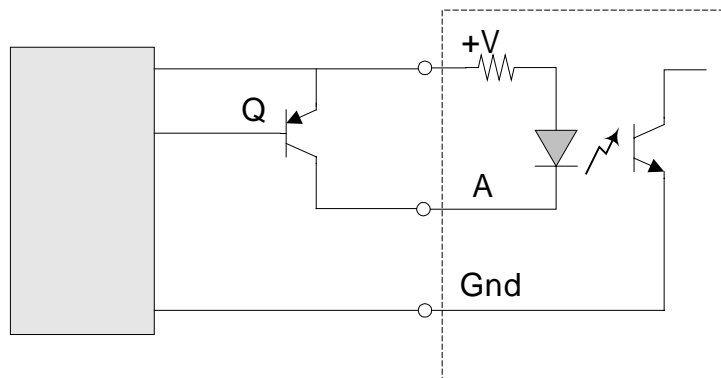
PNP

COMI-SD501

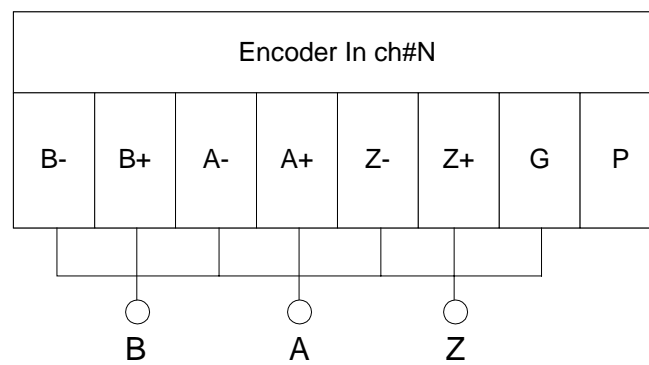
A+,B+,Z+,P(V_{cc}),G(GND)

A-,B-,Z- G

[14]



[13] ST501



[14] ST501

3

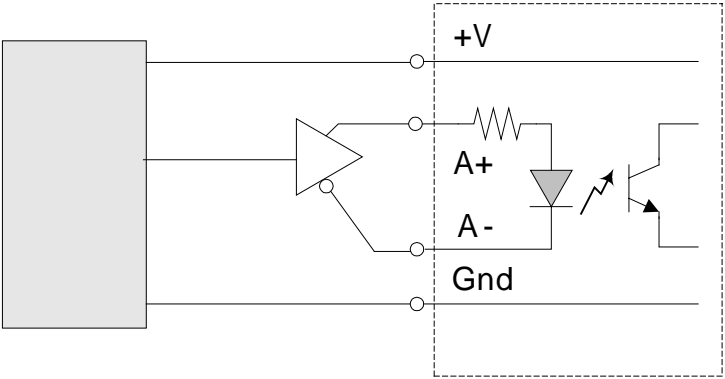
Line Driver : [15]

Line Driver IC

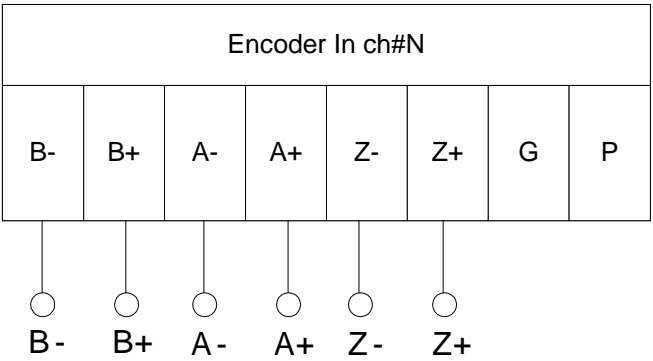
ST501

A+,B+,Z+,A-,B-,Z-,P(5V),G(GND)

[16]

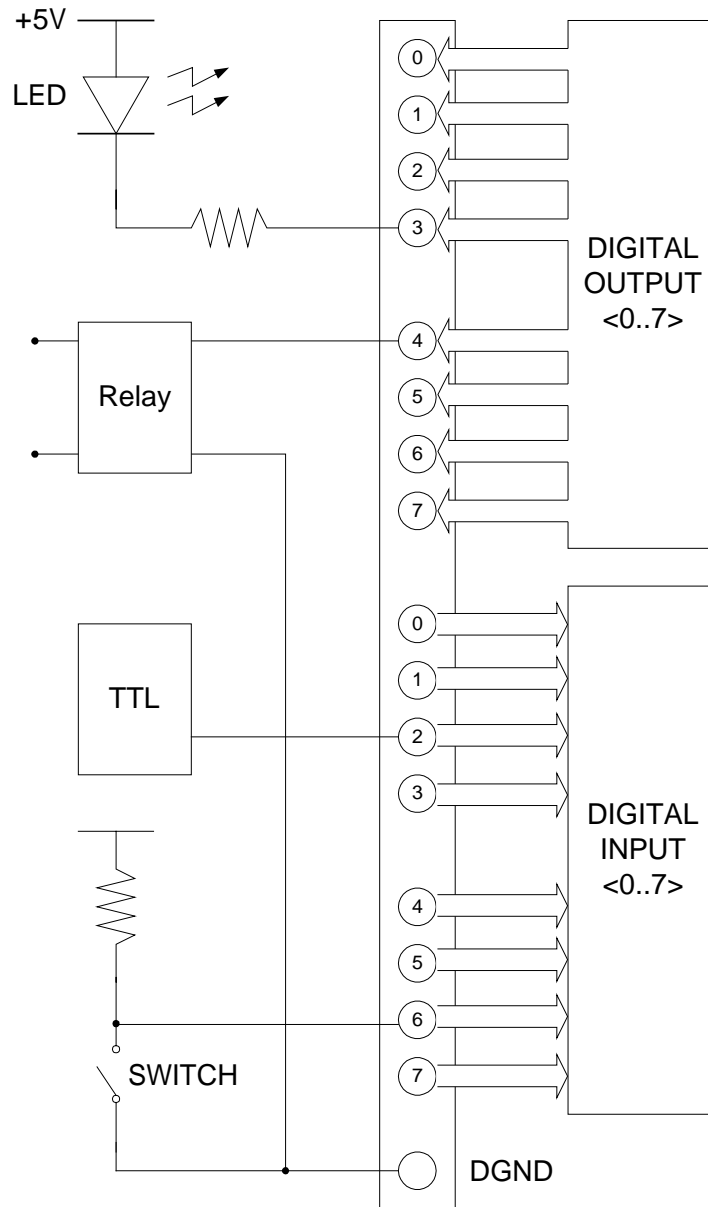


[15] ST501



[16] ST501

1-4.



[17]

=====

[17] 8 , 8 .
가
[17] LED
ON/OFF Relay .
LED LED
LED ON/OFF ON/OFF Relay
ON/OFF ON/OFF .
[17] TTL
.

2. A/D

Analog To Digital

A/D

♥ Simultaneous A/D Converter (Flash Conversion)

Differential Comparator 가

Encoder

Binary

Comparator 가

♥ Stairstep-ramp A/D Converter (Digital Ramp or Counter)

Digital Ramp

Counter

D/A Converter

Binary

Counter 가

가

가

D/A Converter

가

Comparator

A/D

Simultaneous

가

가

♥ Tracking A/D Converter (Up/Down Counter)

Staitstep-ramp

가

Latch

Binary Counter 가

가

Comparator 가 가,

♥ Single-slope A/D Converter

Voltmeter

가

D/A

Converter

Linear Ramp Generator

Comparator

가

♥ Dual-Slope A/D Converter

Voltmeter

Single-slope

Ramp Generator

♥ Successive-Approximation A/D Converter

가

A/D

A/D

가

D/A Converter, SAR(Successive Approximation Register), Comparator

MSB(Most Significant Bit)

LSB(Least Significant Bit)

D/A

♥ A/D Converter

