

PLC Connection Guide

TN553D-E

Communication settings between
Adam-4000 ASCII



Designed to be Outstanding

Adam-4000 ASCII

This Tech Note is the instruction about how to connect with Adam-4000 ASCII and the setting notes while using the touch panel.



PLC setting

The driver supports these Adam-4000 series models, list below :

4011	1-ch Thermocouple Input Module	
4012	1-ch Analog Input Module	
4013	1-ch RTD Input Module	
4016	1-ch Analog Input/Output Module	
4017	8-ch Analog Input Module	
4018	8-ch Thermocouple Input Module	
4018+	8-ch Thermocouple Input Module with Modbus	
4019	8 Channel Universal Analog Input Module	
4021	1-ch Analog Output Module	
4050	15-ch Digital I/O Module	
4052	8-ch Isolated Digital Input Module	
4053	16-ch Digital Input Module	
4056S	12-ch Sink Type Isolated Digital Output Module with Modbus	
4056SO	12-ch Source Type Isolated Digital Output Module with Modbus	
4060	4-ch Relay Output Module	
4080	2-ch Counter/Frequency Module	

The driver integrates variant kinds PLC devices. The PLC memory definition taking the maximum size was applied to all Adam PLC devices. Please choose the correct PLC memory size according to the hardware definition of PLC devices.

PLC Memory Definition:

Item	R / W	Size	Description	Applied Model
AI0~7	R	32 bits	Get analog input of Current/Voltage/thermocouple.	4011, 4012, 4013, 4016, 4017, 4018, 4018P, 4019
AO0~7	R/W	32 bits	Output analog data of Current/Voltage/thermocouple.	
M0	R	32 bits	Get the measured value of the Current/Voltage	4021,4016
M1	R/W	32 bits	Specify a value for the Current/Voltage output	4021,4016
WDI	R	16 bits	Digital input	4050,4052,4053, 4011,

				4012
WDO	R/W	16 bits	Digital Output	4056S,4056SO, 4060, 4011, 4012,4016
CF0~1	R	32 bits	Get the counter/frequency input	4080
CFG0~ 8	R/W	32 bits	Setup the input range code & data format. Only for debugging. TTFF (T:Type, F:Data Format)	4011, 4012, 4013, 4016, 4017, 4018, 4018P, 4019, 4021,4080

Table 1.1: PLC Memory Definition

Data Format:

For analog IO device, there are three data format definition in Adam-analog input devices. The display format of the “Engineering Unit” data format depends on the input range code. Different input range code has its display format. Please reference the table of specific device.

User has to use a software tool **AdamApax.NET Utility** to configure the data format of ADAM device, the software tool and its user manual can download from Advantech’s support portal, http://support.advantech.com.tw/support/DownloadSRDetail_New.aspx?SR_ID=1-2AKUDB&Doc_Source=Download

Adam-4011 Input Range Code under Engineering Unit:

Input Range Code(Hex)	Input Range for 4011	Response Format	Remark
00	± 15mV	±xx.yyy	2 integer, 3 fraction
01	± 50mV	±xx.yyy	2 integer, 3 fraction
02	± 100mV	±xxx.yy	3 integer, 2 fraction
03	± 500mV	±xxx.yy	3 integer, 2 fraction
04	± 1V	±xxxx.y	4 integer, 1 fraction
05	± 2.5V	±xxxx.y	4 integer, 1 fraction
06	± 20mA	±xx.yyy	2 integer, 3 fraction
0E	Type J Thermocouple 0 ~ 760 °C	±xxx.yy	3 integer, 2 fraction
0F	Type K Thermocouple 0 ~ 1370 °C	±xxxx.y	4 integer, 1 fraction
10	Type T Thermocouple -100 ~ 400 °C	±xxx.yy	4 integer, 1 fraction
11	Type E Thermocouple 0 ~ 1000 °C	±xxxx.y	4 integer, 1 fraction
12	Type R Thermocouple 500 ~ 1750 °C	±xxxx.y	4 integer, 1 fraction
13	Type S Thermocouple 500 ~ 1750 °C	±xxxx.y	4 integer, 1 fraction

14	Type B Thermocouple 500 ~ 1800 °C	±xxxx.y	
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Adam-4012 Input Range Code

Input Range Code (Hex)	Input Range	Format	
08	± 10V	±XX.YYY	2 integer, 3 fraction
09	± 5V	±X.YYYY	1 integer, 4 fraction
0A	± 1V	±X.YYYY	1 integer, 4 fraction
0B	± 500 mV	±XXX.YY	3 integer, 2 fraction
0C	± 150 mV	±XXX.YY	3 integer, 2 fraction
0D	± 20 mA	±XX.YYY	2 integer, 3 fraction

Adam-4013 Input Range Code under Engineering Unit:

Input Range Code(Hex)	Input Range for 4013	Response Format	Remark
20	Platinum, -100 ~ 100°C, a=0.00385	±xxxx	4 digitals
21	Platinum, 0 ~ 100°C, a=0.00385	±xxxx	4 digitals
22	Platinum, 0 ~ 200°C, a=0.00385	±xxxx	4 digitals
23	Platinum, 0 ~ 600°C, a=0.00385	±xxxx	4 digitals
24	Platinum, -100 ~ 100°C, a=0.003916	±xxxx	4 digitals
25	Platinum, 0 ~ 100°C, a=0.003916	±xxxx	4 digitals
26	Platinum, 0 ~ 200°C, a=0.003916	±xxxx	4 digitals
27	Platinum, 0 ~ 600°C, a=0.003916	±xxxx	4 digitals
28	Nickel, -80 ~ 100°C	±xxxx	4 digitals
29	Nickel, 0 ~ 100°C	±xxxx	4 digitals

Adam-4016 Input Range Code under Engineering Unit:

Input Range Code(Hex)	Input Range for 4016	Response Format	Remark
00	± 15mV	±xx.yyy	2 integer, 3 fraction
01	± 50mV	±xx.yyy	2 integer, 3 fraction
02	± 100mV	±xxx.yy	3 integer, 2 fraction
03	± 500mV	±xxx.yy	3 integer, 2 fraction
06	± 20mA	±xx.yyy	2 integer, 3 fraction

Adam-4017 Input Range Code

Input Range Code (Hex)	Input Range	Format	Remark
08	± 10V	±XX.YYY	2 integer, 3 fraction
09	± 5V	±X.YYYY	1 integer, 4 fraction
0A	± 1V	±X.YYYY	1 integer, 4 fraction

0B	$\pm 500 \text{ mV}$	$\pm\text{XXX.YY}$	3 integer, 2 fraction
0C	$\pm 150 \text{ mV}$	$\pm\text{XXX.YY}$	3 integer, 2 fraction
0D	$\pm 20 \text{ mA}$	$\pm\text{XX.YYY}$	

Adam-4018 Input Range Code under Engineering Unit:

Input Range Code(Hex)	Input Range for 4018	Response Format	Remark
00	± 15 mV	±xx.yyy	2 integer, 3 fraction
01	± 50 mV	±xx.yyy	2 integer, 3 fraction
02	± 100mV	±xxx.yy	3 integer, 2 fraction
03	± 500mV	±xxx.yy	3 integer, 2 fraction
04	± 1V	±x.yyyy	1 integer, 4 fraction
05	± 2.5V	±x.yyyy	1 integer, 4 fraction
06	± 20mA	±xx.yyy	2 integer, 3 fraction
0E	Type J Thermocouple 0 ~ 760 °C	±xxx.yy	3 integer, 2 fraction
0F	Type K Thermocouple 0 ~ 1370 °C	±xxxx.y	4 integer, 1 fraction
10	Type T Thermocouple -100 ~ 400 °C	±xxx.yy	3 integer, 2 fraction
11	Type E Thermocouple 0 ~ 1000 °C	±xxxx.y	4 integer, 1 fraction
12	Type R Thermocouple 500 ~ 1750 °C	±xxxx.y	4 integer, 1 fraction
13	Type S Thermocouple 500 ~ 1750 °C	±xxxx.y	4 integer, 1 fraction
14	Type B Thermocouple 500 ~ 1800 °C	±xxxx.y	4 integer, 1 fraction

Adam-4018+ Input Range Code under Engineering Unit:

Input Range Code(Hex)	Input Range for 4018	Response Format	Remark
00	± 15 mV	±xx.yyy	2 integer, 3 fraction
01	± 50 mV	±xx.yyy	2 integer, 3 fraction
02	± 100mV	±xxx.yy	3 integer, 2 fraction
03	± 500mV	±xxx.yy	3 integer, 2 fraction
04	± 1V	±x.yyyy	1 integer, 4 fraction
05	± 2.5V	±x.yyyy	1 integer, 4 fraction
06	± 20mA	±xx.yyy	2 integer, 3 fraction
0E	Type J Thermocouple 0 ~ 760 °C	±xxx.yy	3 integer, 2 fraction
0F	Type K Thermocouple 0 ~ 1370 °C	±xxxx.y	4 integer, 1 fraction
10	Type T Thermocouple -100 ~ 400 °C	±xxx.yy	3 integer, 2 fraction
11	Type E Thermocouple 0 ~ 1000 °C	±xxxx.y	4 integer, 1 fraction
12	Type R Thermocouple 500 ~ 1750 °C	±xxxx.y	4 integer, 1 fraction
13	Type S Thermocouple 500 ~ 1750 °C	±xxxx.y	4 integer, 1 fraction
14	Type B Thermocouple 500 ~ 1800 °C	±xxxx.y	4 integer, 1 fraction

Adam-4019 Input Range Code under Engineering Unit:

Input Range Code(Hex)	Input Range for 4019	Response Format	Remark
02	± 100mV	±xxx.yy	3 integer, 2 fraction
03	± 500mV	±xxx.yy	3 integer, 2 fraction
04	± 1V	±xxxx.y	1 integer, 4 fraction
05	± 2.5V	±xxxx.y	1 integer, 4 fraction
08	± 10V	±xx.yyy	2 integer, 3 fraction
09	± 5V	±x.yyyy	1 integer, 4 fraction
0D	± 20mA	±xx.yyy	2 integer, 3 fraction
0E	Type J Thermocouple 0 ~ 760 °C	±xxx.yy	3 integer, 2 fraction
0F	Type K Thermocouple 0 ~ 1370 °C	±xxxx.y	4 integer, 1 fraction
10	Type T Thermocouple -100 ~ 400 °C	±xxx.yy	3 integer, 2 fraction
11	Type E Thermocouple 0 ~ 1000 °C	±xxxx.y	4 integer, 1 fraction
12	Type R Thermocouple 500 ~ 1750 °C	±xxxx.y	4 integer, 1 fraction
13	Type S Thermocouple 500 ~ 1750 °C	±xxxx.y	4 integer, 1 fraction
14	Type B Thermocouple 500 ~ 1800 °C	±xxxx.y	4 integer, 1 fraction

Adam-4021 Output Range Code:

Output Range Code (Hex)	Output Range
30	0 ~ 20 mA
31	4 ~ 20 mA
32	0 ~ 10 V

Adam 4080 Data Format Definition:

Code	Item	Data Type	Display Type	Response Format	Range
50	Counter	32 bit unsigned integer	32 bit Hexadecimal	XXXXXXXX	0~ 4294967295
51	Frequency	32 bit unsigned integer	32 bit Hexadecimal	XXXXXXXX	0~ 4294967295

Memory Mapping:

Adam-4011 Memory mapping:

Memory		Type	R/W
AI	0	32 bit floating point	Read-Only

Adam-4012 Memory mapping:

Memory		Type	R/W
AI	0	32 bit floating point	Read-Only

Adam-4013 Memory mapping:

Memory		Type	R/W
AI	0	32 bit floating point	Read-Only

Adam-4016 Memory mapping:

Memory		Type	R/W
AI	0	32 bit floating point	Read-Only
M0	0	32 bit floating point	Read-Only
M1	0	32 bit floating point	R/W

Adam-4017 Memory mapping:

Memory		Type	R/W
AI	0	32 bit floating point	Read-Only
AI	1	32 bit floating point	Read-Only
AI	2	32 bit floating point	Read-Only
AI	3	32 bit floating point	Read-Only
AI	4	32 bit floating point	Read-Only
AI	5	32 bit floating point	Read-Only
AI	6	32 bit floating point	Read-Only
AI	7	32 bit floating point	Read-Only

Adam-4018+ Memory mapping:

Memory		Type	R/W
AI	0	32 bit floating point	Read-Only
AI	1	32 bit floating point	Read-Only
AI	2	32 bit floating point	Read-Only
AI	3	32 bit floating point	Read-Only
AI	4	32 bit floating point	Read-Only

AI	5	32 bit floating point	Read-Only
AI	6	32 bit floating point	Read-Only
AI	7	32 bit floating point	Read-Only

Adam-4019 Memory mapping:

Memory		Type	R/W
AI	0	32 bit floating point	Read-Only
AI	1	32 bit floating point	Read-Only
AI	2	32 bit floating point	Read-Only
AI	3	32 bit floating point	Read-Only
AI	4	32 bit floating point	Read-Only
AI	5	32 bit floating point	Read-Only
AI	6	32 bit floating point	Read-Only
AI	7	32 bit floating point	Read-Only

Adam-4021 Memory mapping:

Memory		Type	R/W
M1	0	32 bit floating point	R/W

Adam-4050 Memory mapping:

Memory		Type	R/W
DI	0	1 bit	Read-Only
	1	1 bit	Read-Only
	2	1 bit	Read-Only
	3	1 bit	Read-Only
	4	1 bit	Read-Only
	5	1 bit	Read-Only
	6	1 bit	Read-Only
DO	0	1 bit	R/W
	1	1 bit	R/W
	2	1 bit	R/W
	3	1 bit	R/W
	4	1 bit	R/W
	5	1 bit	R/W
	6	1 bit	R/W
	7	1 bit	R/W
WDI	0	16 bits	Read-Only
WDO	0	16 bits	R/W

Adam-4052 Memory mapping:

Memory	Type	R/W	
DI	0	1 bit	Read-Only
	1	1 bit	Read-Only
	2	1 bit	Read-Only
	3	1 bit	Read-Only
	4	1 bit	Read-Only
	5	1 bit	Read-Only
	6	1 bit	Read-Only
	7	1 bit	Read-Only
WDI	0	16 bits	Read-Only

Adam-4053 Memory mapping:

Memory	Type	R/W	
DI	0	1 bit	Read-Only
	1	1 bit	Read-Only
	2	1 bit	Read-Only
	3	1 bit	Read-Only
	4	1 bit	Read-Only
	5	1 bit	Read-Only
	6	1 bit	Read-Only
	7	1 bit	Read-Only
	8	1 bit	Read-Only
	9	1 bit	Read-Only
	10	1 bit	Read-Only
	11	1 bit	Read-Only
	12	1 bit	Read-Only
	13	1 bit	Read-Only
	14	1 bit	Read-Only
	15	1 bit	Read-Only
WDI	0	16 bits	Read-Only

Adam 4056SO Memory mapping:

Memory	Type	R/W	
DO	0	1 bit	R/W
	1	1 bit	R/W
	2	1 bit	R/W
	3	1 bit	R/W

	4	1 bit	R/W
	5	1 bit	R/W
	6	1 bit	R/W
	7	1 bit	R/W
	8	1 bit	R/W
	9	1 bit	R/W
	10	1 bit	R/W
	11	1 bit	R/W
WDO	0	16 bits	R/W

Adam 4060 Memory mapping:

Memory		Type	R/W
RO	0	1 bit	R/W
	1	1 bit	R/W
	2	1 bit	R/W
	3	1 bit	R/W
WRO	0	16 bits	R/W

Adam 4080 Memory mapping:

Memory		Type	R/W
CF	0	32 bit unsigned integer	Read-Only
CF	1	32 bit unsigned integer	Read-Only

HMI Setting:

Driver:

Link Properties

General Parameter

Link Number: 1

Link Name: 連線1

Link Type: Direct Link (COM)

Device/Server: Advantech ADAM-4000 (ASCII)

Link Port: COM1 (連線1) Sub-links

Communication Parameter:

Link Properties

General Parameter

Transmission

Baud Rate: 9600

Data Bits: 8

Parity: None

Stop Bits: 1

Others

Panel Address: 1

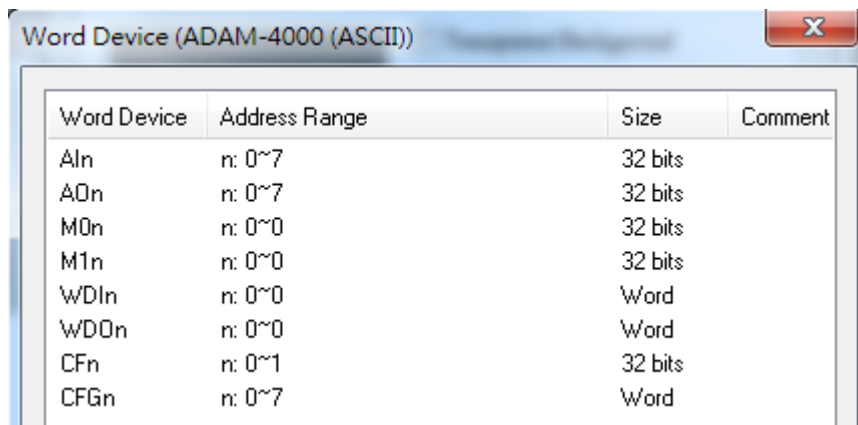
PLC Address: 1

Timeout Time: 0 (x 0.1 Sec.)

Command Delay: 0 (x 0.1 Sec.)

Retry Count: 0

Word Device:



The screenshot shows a software window titled "Word Device (ADAM-4000 (ASCII))". Inside the window is a table with four columns: "Word Device", "Address Range", "Size", and "Comment". The table lists several word devices with their respective address ranges and sizes.

Word Device	Address Range	Size	Comment
AI _n	n: 0~7	32 bits	
AO _n	n: 0~7	32 bits	
MO _n	n: 0~0	32 bits	
M1 _n	n: 0~0	32 bits	
WDI _n	n: 0~0	Word	
WDO _n	n: 0~0	Word	
CF _n	n: 0~1	32 bits	
CFG _n	n: 0~7	Word	

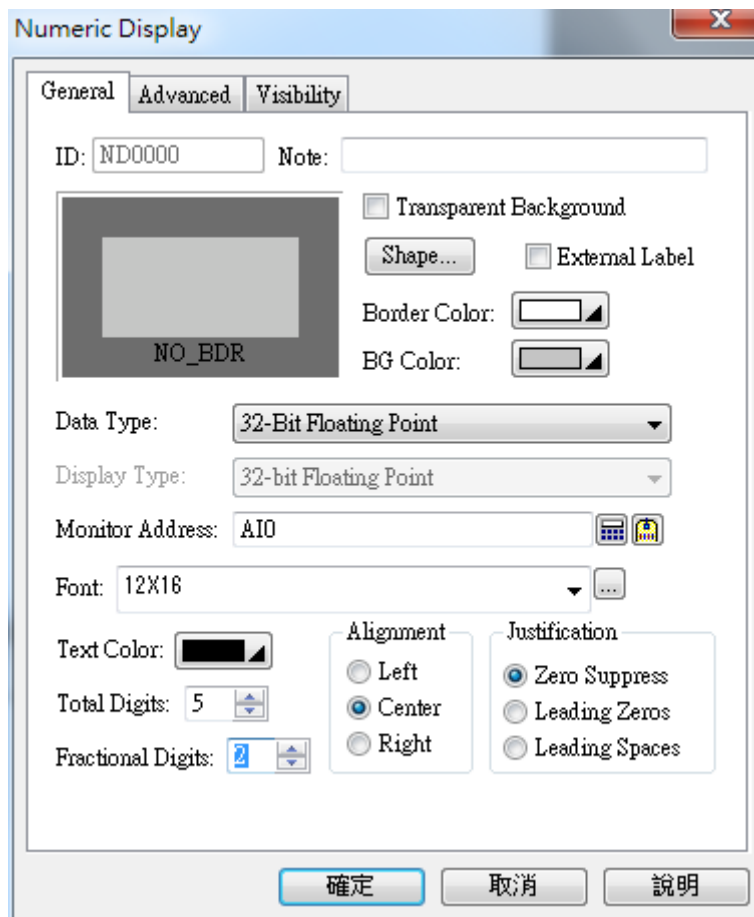
Bit Device:

Bit Device	Address Range	Block Address	Conn
DIn	n: 0~15	Any address	
DOn	n: 0~15	Any address	

Example 1: For Adam-4018

±500mV analog input “Engineering Unit” data format display.

- Choose “Numeric Display” component (Read Only).
- 8 “Numeric Display” Address=AI0 ~ AI7. Data Typ: 32 bit Floating Point.
- ±500mV Input Range Code : 0x03 ,
- Engineering Unit: Data format code: 0x00. Format is ±xxx.yy, so Total digits: 5 Fractional digit: 2.



Picture 1: Setting for ±500mV and Engineering Unit format

Adam-4018

AI0 ~ AI7

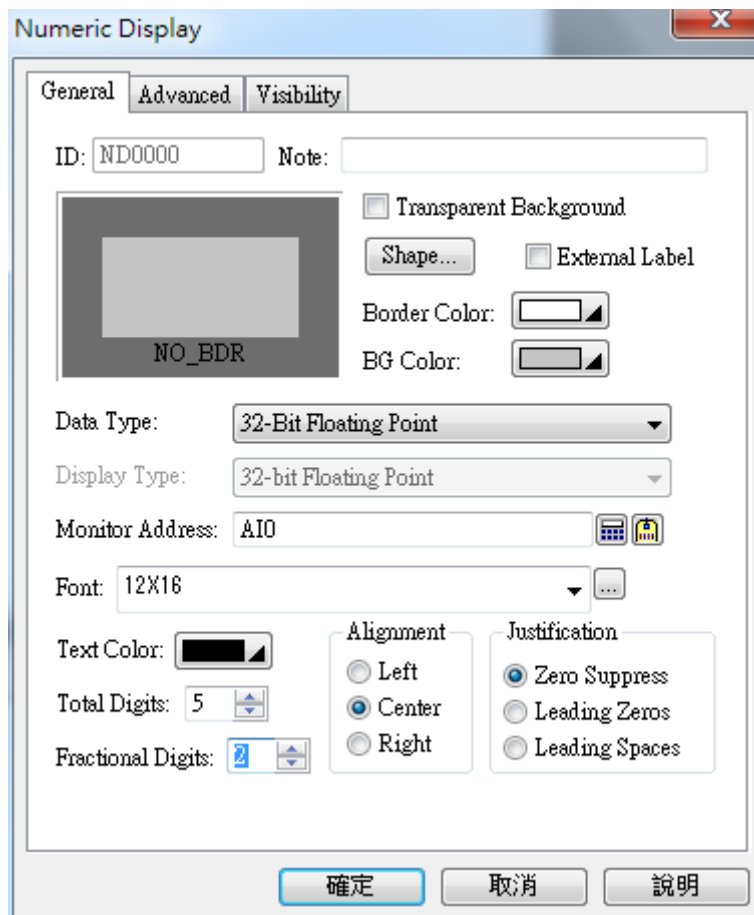
±500mV

0.36	0.34	0.34	0.36	0.34	0.36	0.32	0.40
------	------	------	------	------	------	------	------

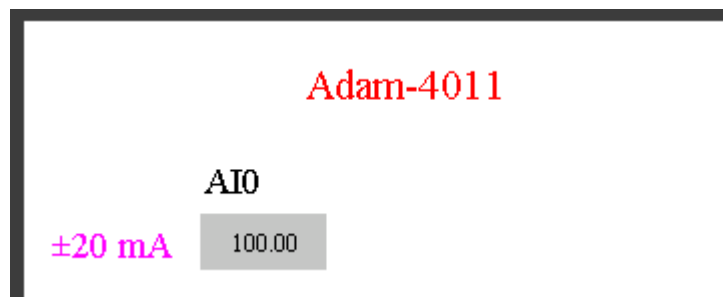
Picture 2: Result for ±500mV and Engineering Unit format

Example 2: For Adam-4011 ±20mA analog input “FSR” data format display.

- Choose “Numeric Display” component (Read Only).
- 1 “Numeric Display” Address=AI0. Data Type: 32 bit Floating Point.
- ±20mA Input Range Code : 0x06 ,
- FSR: Data format code: 0x01. Format is ±xxx.yy, so Total digits: 5 Fractional digit:2.



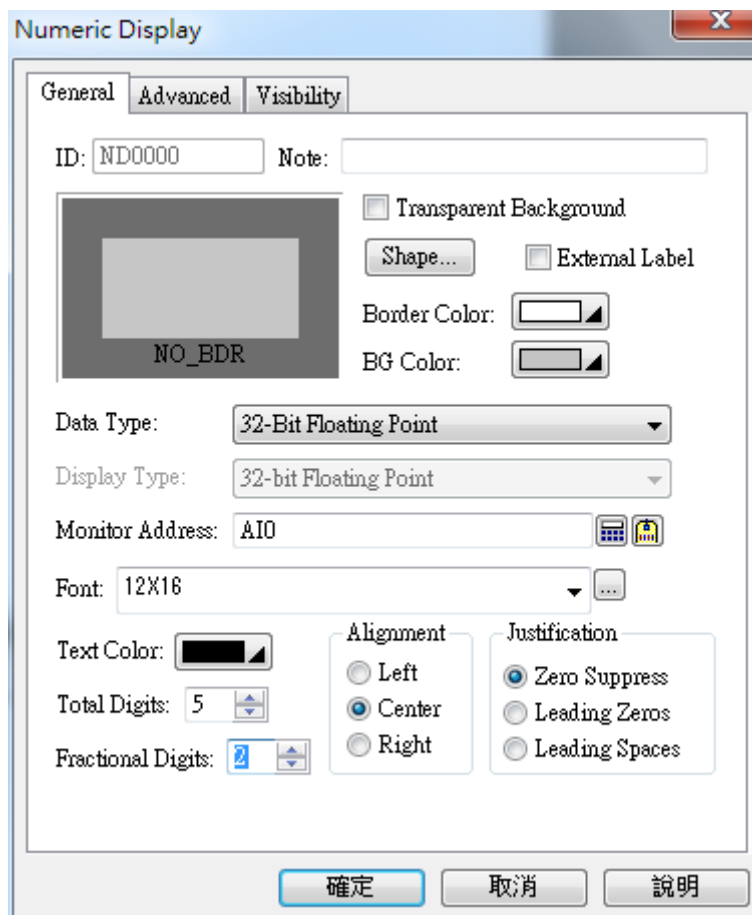
Picture 3: Setting for ±20mA and FSR data format Display



Picture 4: Result for ±20mA and FSR data format Display

Example 3: For Adam-4016 ±15mV analog input “Engineering Unit” data format display, and get/set current output

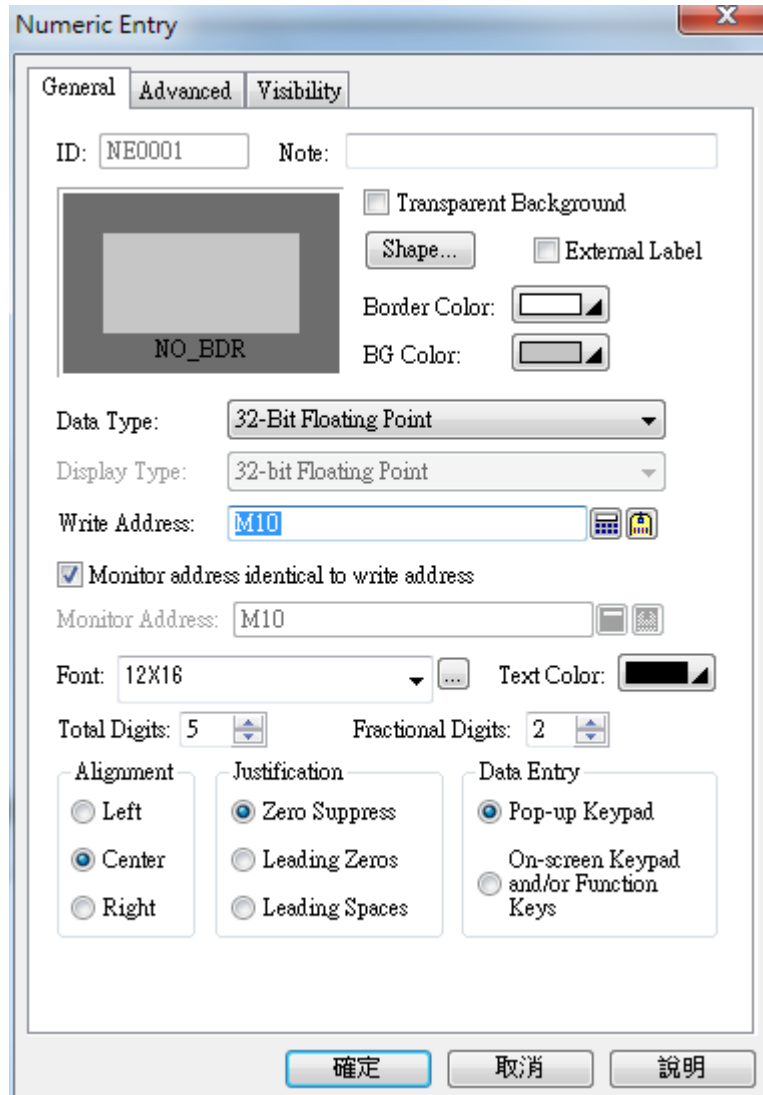
- Choose “Numeric Display” component (Read Only)
- 1 “Numeric Display” for AI0. Address=AI0. Data Type: 32 bit Floating Point.
- ±15mV Input Range Code: 0x00, format is ±xx.yyy, so Total digits: 5 Fractional digit:2.
- Engineering Unit : Data format code : 0x00



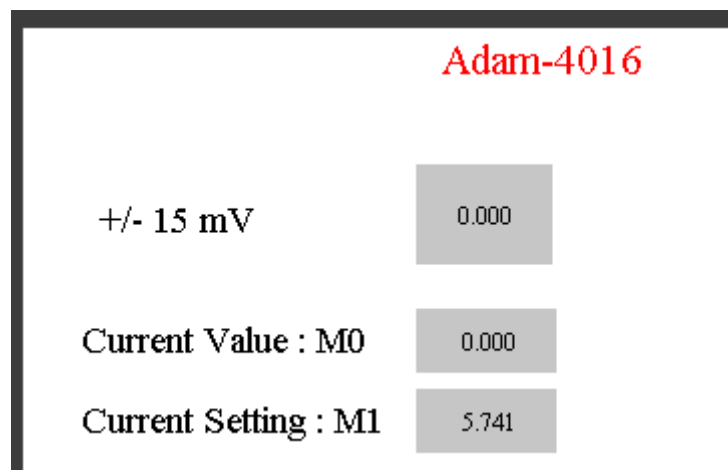
Picture 5: Setting for ±15mV Analog input (Engineering Unit format)

- Choose “Numeric Display” component (Read Only)

- 1 “Numeric Display” , Address = M00.。 1 “Numeric Entry”, Address=M10. Data Type: 32 bit Floating Point.



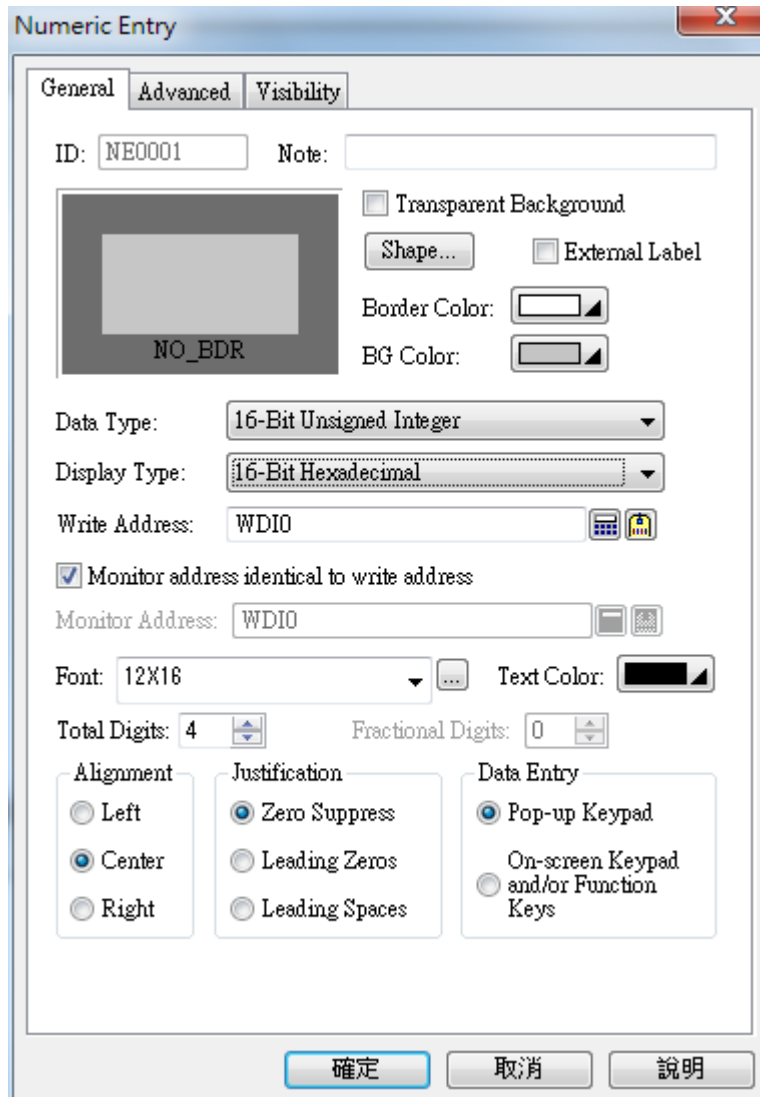
Picture 6: Setting for current getting



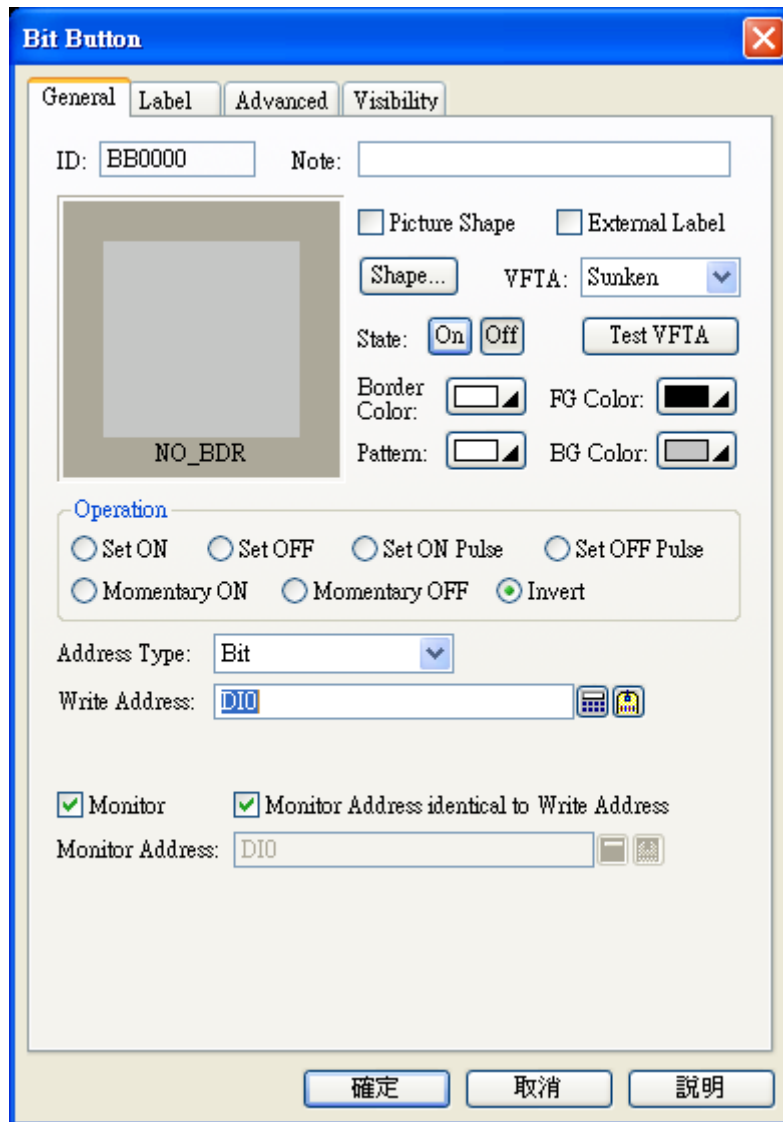
Picture 7: Result for $\pm 15\text{mV}$ analog input (Engineering Unit format)

Example 4: For Adam-4053 16-channel digital input.

- Choose “Numeric Display” component (Read Only)
- 1 “Numeric Display”, Address=WDI0. Data Type: 16 bit hexadecimal.
- 16 “Bit Lamp”, Address = DI0 ~ DI15,



Picture 8: Setting for 16 channel digital input



Picture 9: Setting for 16 channel digital input

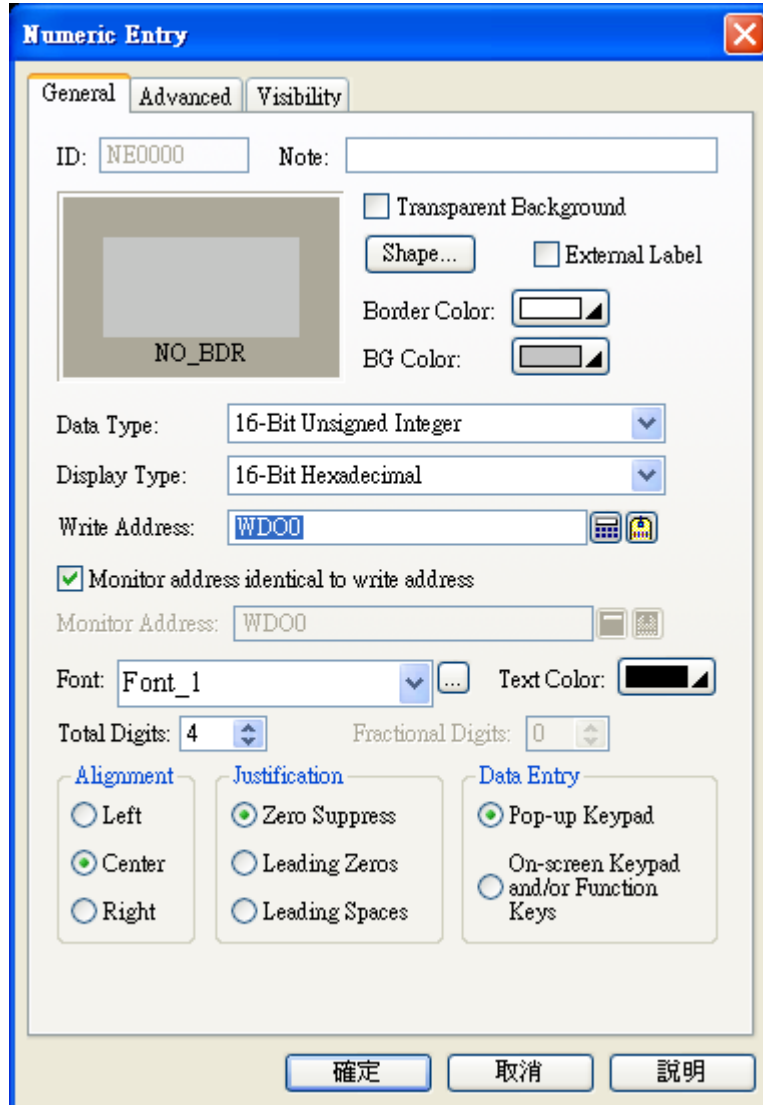
Adam-4053

FFF7	ON	ON	ON	OFF	ON	ON	ON	ON
	ON	ON	ON	ON	ON	ON	ON	ON

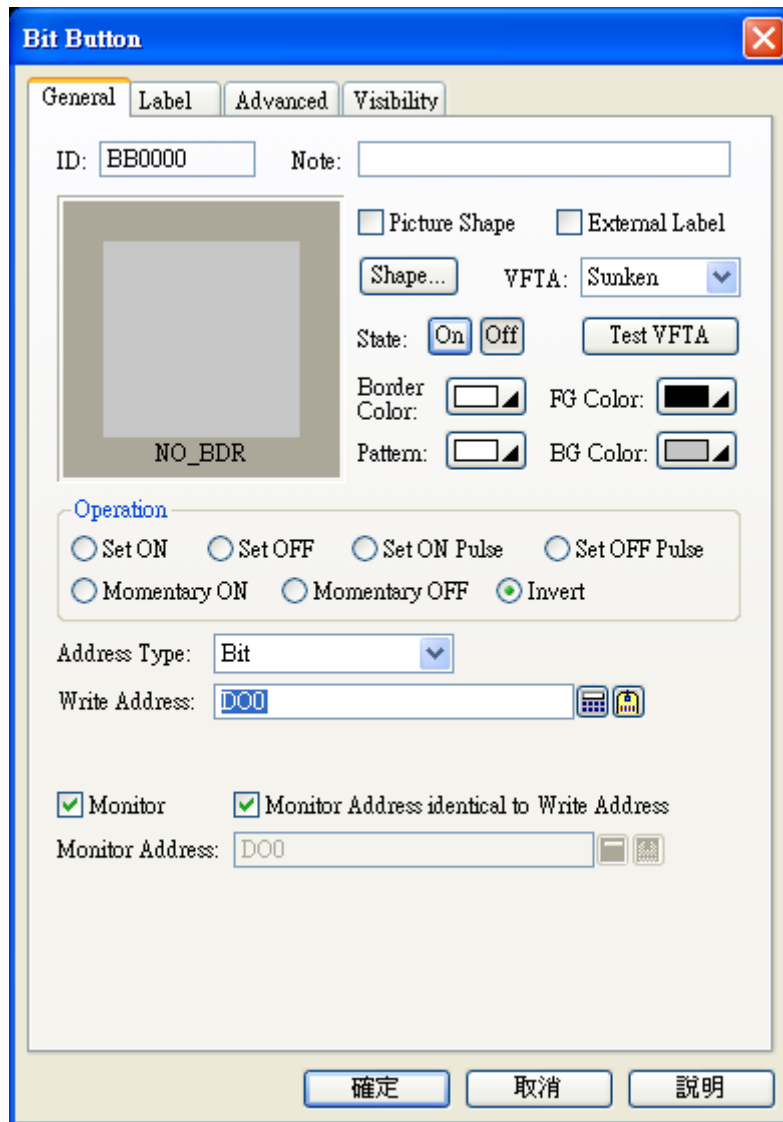
Picture 10: Result for 16 channel digital input

Example 5: For Adam-4056S 12-channel digital output.

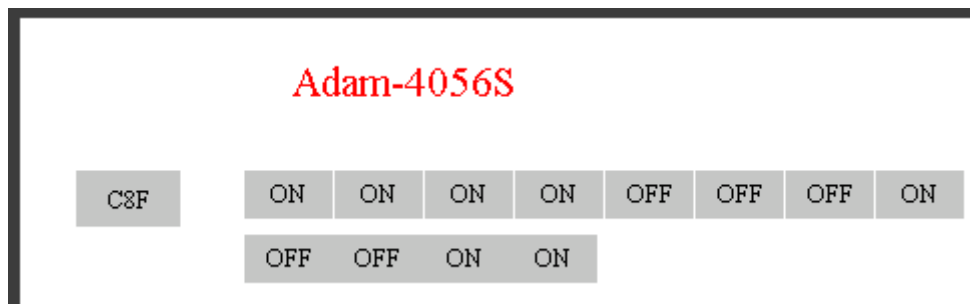
- Choose “Numeric Entry” component
- 1 “Numeric Entry”, Address=WDO0. Data Type: 16 bit hexadecimal.
- 12 “Bit Button”, Address = DI0 ~ DI11,



Picture 11: Setting for 12 channel digital input



Picture 12: Setting for 12 channel digital input



Picture 13: Result for 12 channel digital input

Example 6: For Adam-4080 2-channel Counter/Frequency input

- Choose “Numeric Display” component (Read Only)
- 2 “Numeric Display”, Address=CF0~CF1. Data Type: 32 bit unsigned integer.

