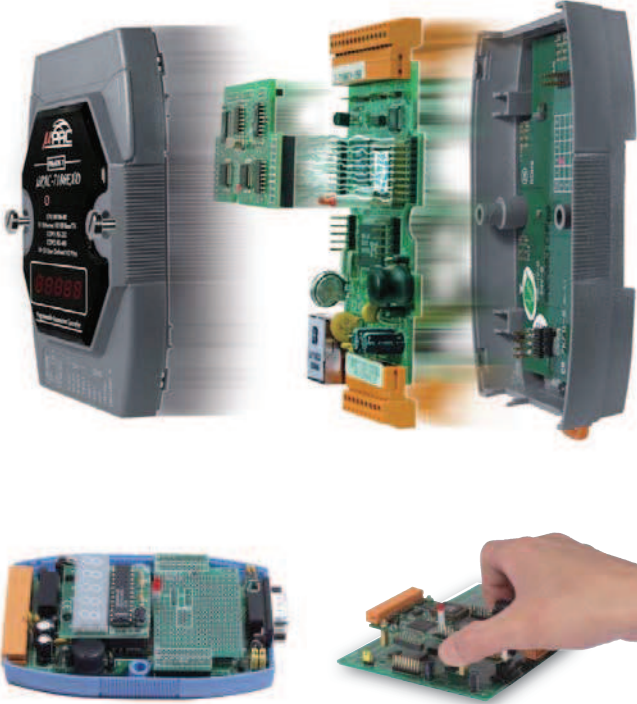


7.2. I/O Expansion Boards for 7188/7186 Series

• Overview

X-Board is a small I/O expansion board inserted in μ PAC (μ PAC-7186 Series & I-7188 series) for expanding I/O functions. Most μ PACs (except some modules like I-7188 & I-7188D) support one I/O expansion bus. Each bus can be plugged in one X-Board. The X-Board allows users to implement various I/O functions such as DI, DO, A/D, D/A, Timer/Counter, UART, flash memory, battery backup SRAM, AsicKey & other I/O functions.

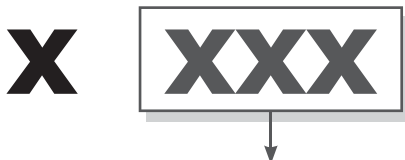


Users may choose our functioned X-Boards (model number X1xx ~ X7xx) or design their own I/O expansion boards (module number X0xx). We have designed several X-Boards for expanding the μ PAC's features. If users choose a small size X-Board, then they can mount this I/O expansion board directly onto the μ PAC. Customized I/O Expansion Boards can be ordered through ODM project.

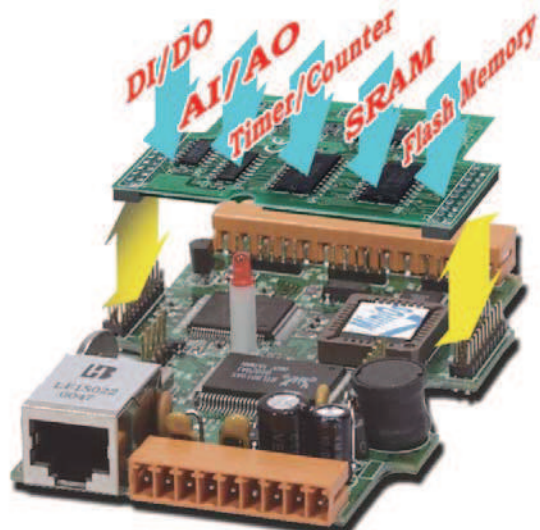
Pin Assignment of I/O Expansion Bus

J1				J2			
GND	01	02	GND	MA0	01	02	AD0
CLKOUTA	03	04	ARDY	MA1	03	04	AD1
INT0	05	06	INT1	MA2	05	06	AD2
VCC	07	08	RESET	MA3	07	08	AD3
GND	09	10	RESET\	MA4	09	10	AD4
TO0	11	12	TO1	MA5	11	12	AD5
TI0	13	14	TI1	MA6	13	14	AD6
SCLK	15	16	DIO9	MA7 (or NC)	15	16	AD7
DIO4	17	18	DIO14	INT4 (or NC)	17	18	WRITE\
VCC	19	20	VCC	CS\	19	20	READ\
CON20A JDIP20P				CON20A JDIP20P			

• Selection Guide



- 1XX: For DI, DO Expansion
- 2XX: For A/D, D/A, DI, DO Expansion
- 3XX: For A/D, D/A, DI, DO Expansion
- 5XX: For RS-232/422/485, DI, DO Expansion
- 6XX: For Memory Expansion
- 7XX: For Motion Control Expansion



Following μPAC supports I/O Expansion Bus, can mount one X-Board

- For C language solution: I-7188XB(D), I-7188EX(D),
μPAC-7186EX(D), μPAC-7186PEX(D), μPAC-7186EX(D)-FD,
μPAC-7186EX(D)-SM
- For ISaGRAF solution: I-7188XG(D), μPAC-7186EG(D)

X-Board is Series has following common specifications

- DI channel: Dry contact, sink type, non-isolated
- DO channel: Open Collector, sink type, 100 mA/channel load current, non-isolated

 **DI, DO Expansion**



Model Name	DI (Dry Contact)	DO (Open Collector)
X107	6	7
X110	14	-
X111	-	13

 **AI, AO, DI, DO Expansion**



Model Name	AI (12-bit)		AO (12-bit)		DI (Dry Contact)	DO (Open Collector)
	Ch	Range	Ch	Range		
X202	7	0 ~ 20 mA	-	-	-	-
X203	2	0 ~ 20 mA	-	-	2	6
X303	1	+/-5 V _{DC}	1	+/-5 V _{DC}	4	6
X304	3	+/-5 V _{DC}	1	+/-5 V _{DC}	4	4
X305	7	+/-5 V _{DC}	1	+/-5 V _{DC}	2	2
X308	4	0 ~ 10 V _{DC}	-	-	-	6
X310	2	0 ~ 20 mA 0 ~ 10 V _{DC}	2	0 ~ 10 V _{DC}	3	3
X324	-	-	4	0 ~ 5 V _{DC}	-	4

 **RS-232/422/485, DI, DO Expansion**



Model Name	Serial Port			DI (Dry Contact)	DO (Open Collector)	EEPROM
	Type	Channel	Wire			
X503	RS-232	1	5-wire	-	-	-
X504	RS-232	2	5-wire and 9-wire			
X505	RS-232	3	5-wire			
X506	RS-232	6	3-wire			
X507	RS-422/485	1	4/2-wire	4	4	-
X508	RS-232	1	5-wire	4	4	
X509	RS-232	2	3-wire	4	4	
X510	RS-232	1	3-wire	5	5	
X510-128	RS-232	1	3-wire	5	5	128 KB
X511	RS-485	3	2-wire	-	-	-
X518	RS-232	1	5-wire	-	8	-

Memory Expansion



Model Name	Memory Type	Size	Data Retention	Endurance
X603	NAND Flash	256 MB	40 years	100,000 erase cycles
X607	Battery Backup SRAM	128 KB	9 years	No erase cycle limitation
X608		512 KB		

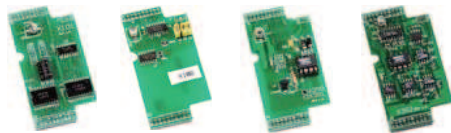
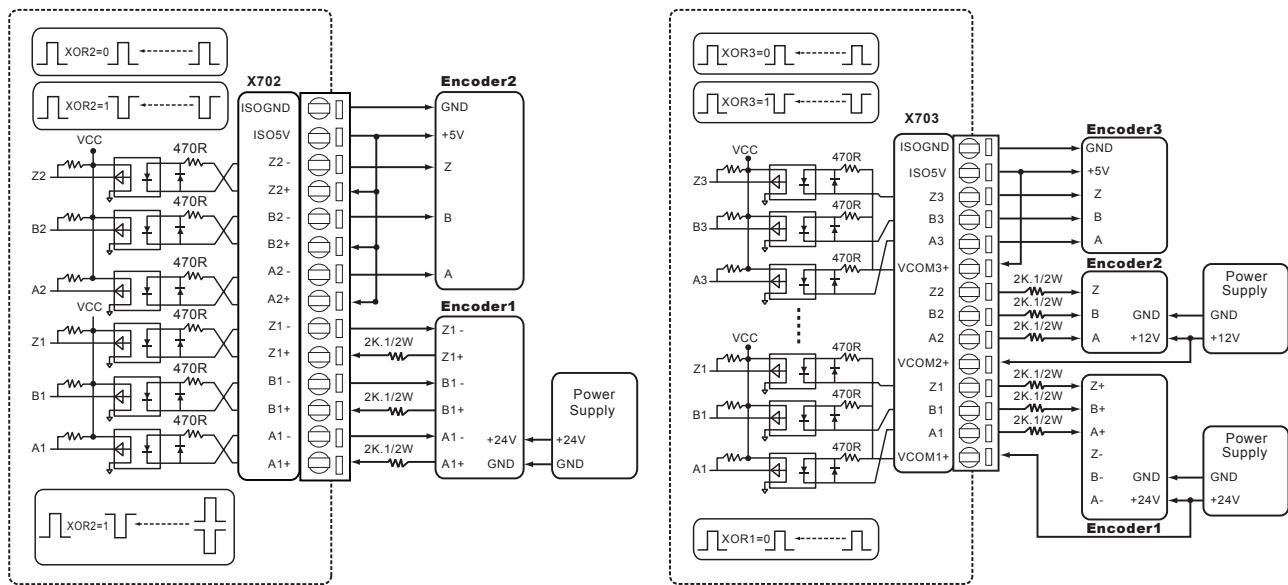
Encoder Expansion



Model Name	Axis	Counter	Mode	Max. Speed	5V Input Level	12V Input Level (with 1 K Ω external resistors)	24V Input Level (with 2 K Ω external resistors)
X702	2	32-bit	Quadrant, CW/CCW, Pulse/Direction	1 MHz	3.5 ~ 5 V	5 ~ 12 V	7 ~ 24 V
X703	3					0 ~ 2 V	0 ~ 2 V

Note1: ISaGRAF doesn't support X702 and X703.

Wiring



7188XC only						
Model Name	DI (Dry Contact)	DO (Open Collector)	AI (12-bit)		AO (12-bit)	
			Channel	Range	Channel	Range
X101	-	8	-	-	-	-
X106	DI \times 3 or DO \times 2		-	-	-	-
X200	-	-	1	0 ~ 2.5 V _{dc}	-	-
X302	-	-	1	+/- 5 V _{dc}	1	+/- 5 V _{dc}