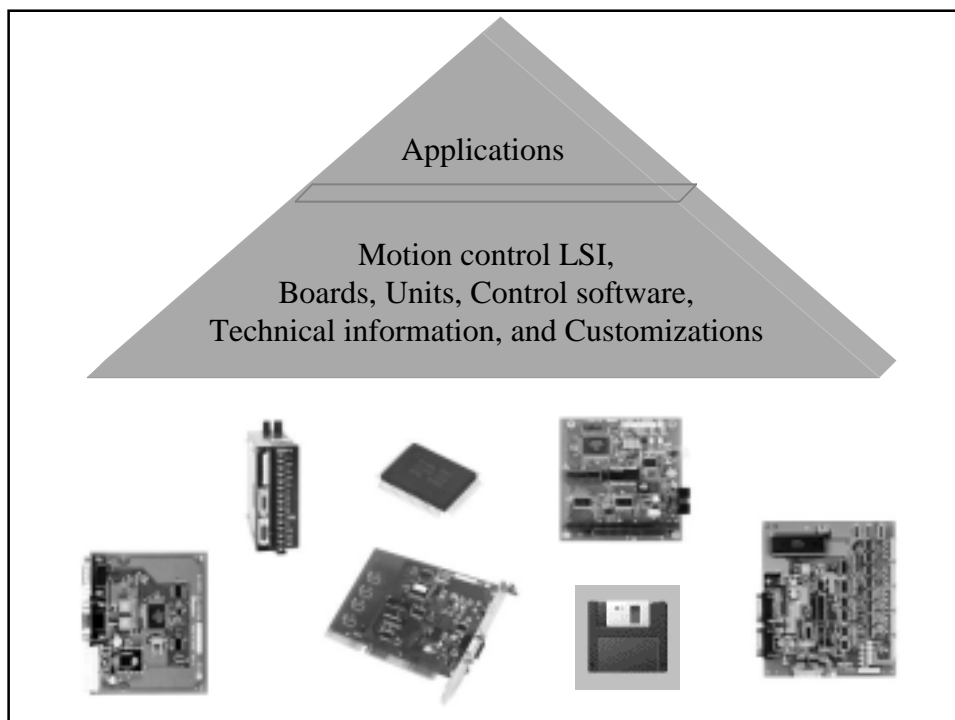


MotionWare

Ampere Inc. has been in business since 1979, manufacturing various motion control products. Our current product line includes many kinds of motion control LSI, boards, units, control software, and their technical information. We also provide customization for various platforms.

These controllers are suitable for precision positioning systems, for example semiconductor manufacturing systems, office automation machines, medical systems and material analysis systems and so on.

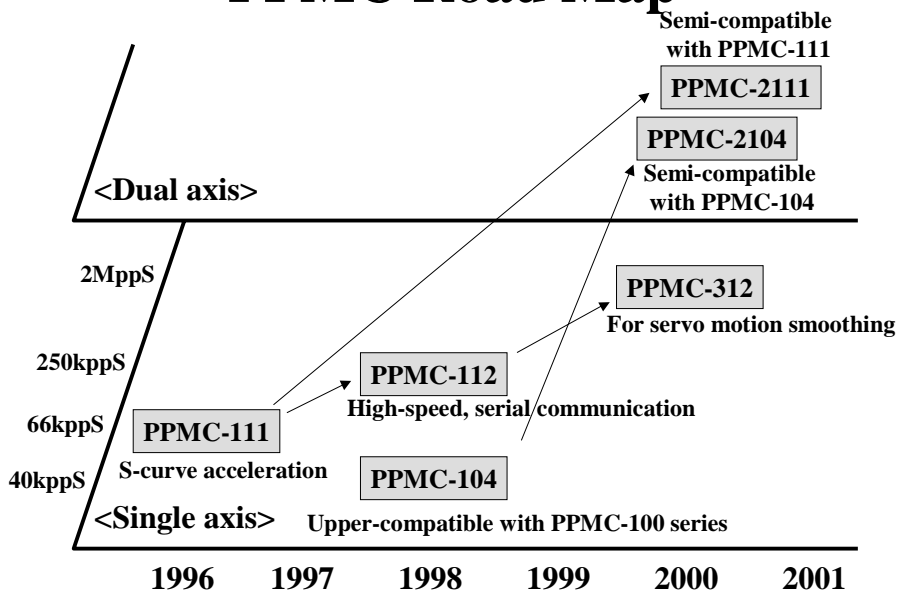
Our goal is to continue providing reliable motion controllers to solve various positioning control difficulties.



Core LSI

Stepper motion control LSI	
PPMC-104BFP	Compatible with PPMC-101C, 102A and 103A/AFP
PPMC-111C/CFP	S-curve acceleration, Low-speed to high-speed smooth motion
PPMC-112CFP	Connections may be selected by parallel mode or serial mode. Max. speed 250kppS
PPMC-2104AFP	Dual axis version of PPMC-104. Available Nov. 2000
PPMC-2111AFP	Dual axis version of PPMC-111. Available Jan. 2001
Servo motion control LSI	
PPMC-312AFP	Adjustable start-speed, operating-speed and finish-speed, and adjustable acceleration and deceleration
MotionWare system control LSI	
MWSC-101	Multi-drop serial communication control LSI. Able to connect up to 16 PPMC and PIOC devices
Remote DI/O control LSI	
PIOC-101	32-bit digital I/O with dual timers/ counters

PPMC Road Map

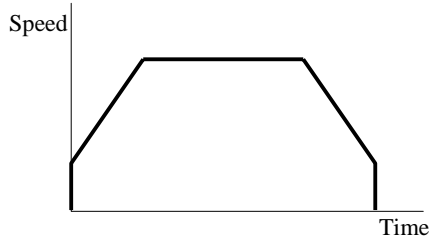


Selection

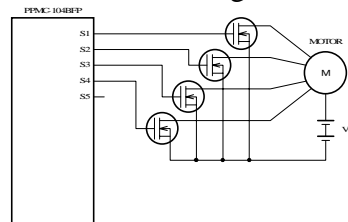
Acceleration & deceleration profile

Model	Acceleration & deceleration profile				Phase drive signals
	Trapezoidal	S-curve	User flexible	Various curve	
PPMC-104BFP	O	-	-	-	O
PPMC-111C/CFP	O	O	O	-	-
PPMC-112CFP	O	O	O	-	-
PPMC-312AFP	O	O	O	O	-
PPMC-2104AFP	O	-	-	-	O
PPMC-2111AFP	O	O	O	-	-

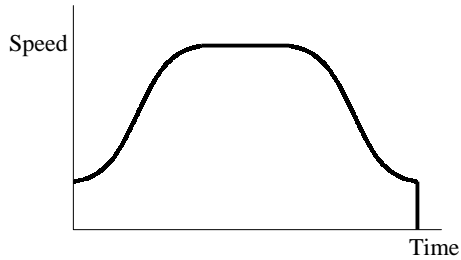
<Trapezoidal profile motion>



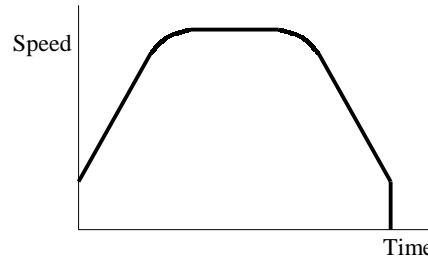
<Phase drive signals>



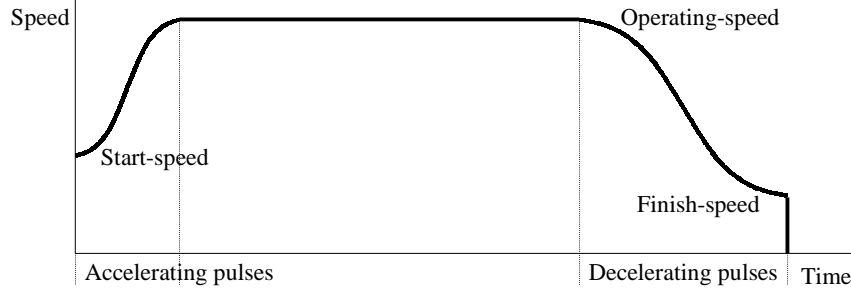
<S-curve profile motion>



<User flexible profile motion>

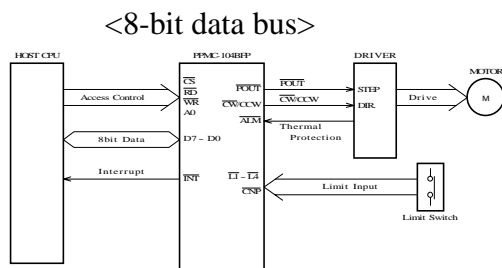


<Various profiles motion>



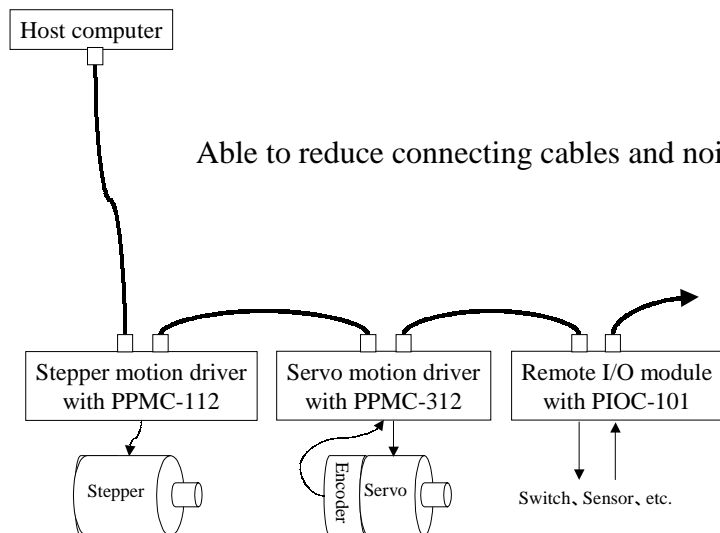
Host computer interface

Model	Host computer interface	
	8-bit data bus	Serial communication
PPMC-104BFP	O	-
PPMC-111C/CFP	O	-
PPMC-112CFP	O	O
PPMC-312AFP	O	O
PPMC-2104AFP	O	-
PPMC-2111AFP	O	-



Suitable for applications that are needed quick response.

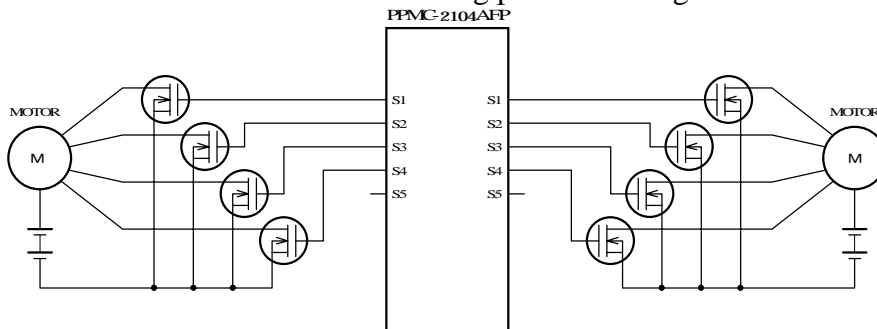
<Serial communication>



Features of Core LSI PPMC-104BFP, 2104AFP

- Algorithm-compatible with PPMC-101C, 102A and 103A/AFP.
- Also data-compatible with PPMC-103A/AFP.
- PPMC-2104 is a dual axis version of PPMC-104.
- Able to control phase drive signals, and to reduce equipping space.

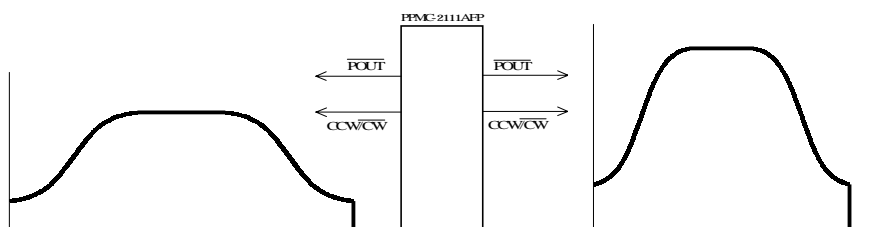
<Dual axis controller using phase drive signals>



PPMC-111C/CFP, 2111AFP

- Reasonable cost & performance for stepper motion control.
- Trapezoidal, S-curve and user flexible acceleration & deceleration.
- PPMC-111C is a 64-pin-SDIP, PPMC-111CFP is a 64-pin-QFP.
- PPMC-2111 is a dual axis version of PPMC-111.

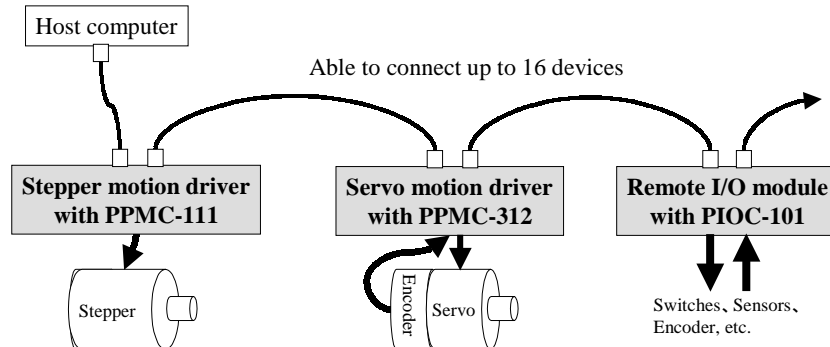
<Dual axis motion control by S-curve>



PPMC-112CFP

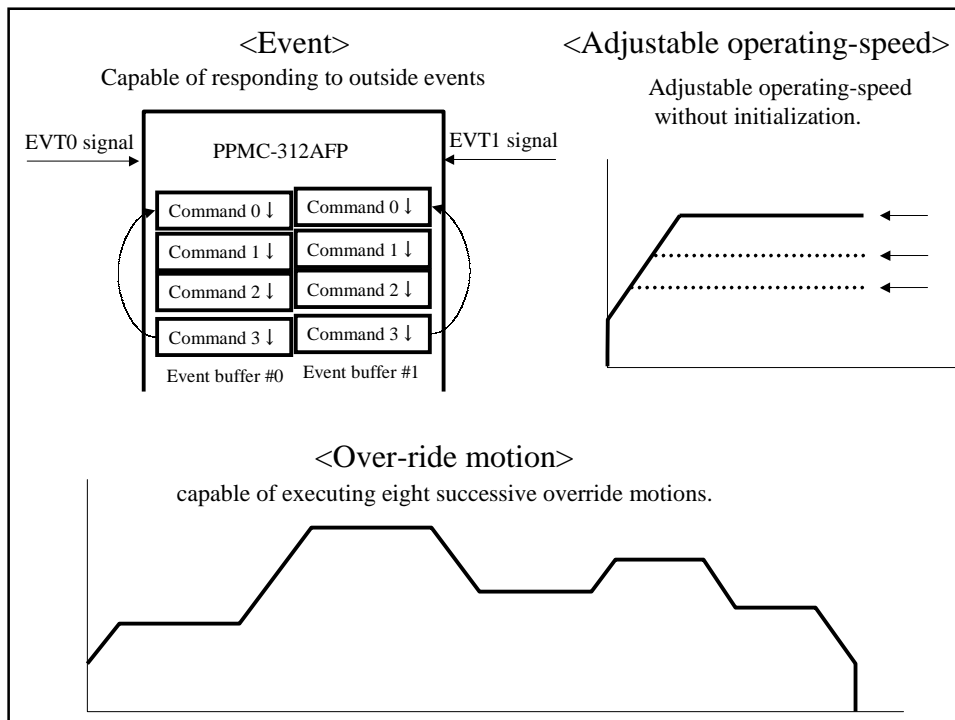
- Connections may be selected by serial mode or parallel mode.
- Able to reduce connecting cables & noise by serial-mode.
- Maximum speed is 250kpps.

<An example system that are reduced cables by serial-mode>



PPMC-312AFP

- Suitable for servo & stepper motion control.
- Connections may be selected between the host computer and PPMC-312 by serial mode or parallel mode.
- Adjustable the five kinds of parameters for motion smoothing: start-speed, operating-speed, finish-speed, accelerating-pulses and decelerating-pulses (parallel mode).
- Two event signals and four event buffers capable of responding to outside events.
- Eight command buffers capable of executing eight successive override motions.
- Adjustable operating-speed without initialization.
- Maximum motion speed is 2Mpps.

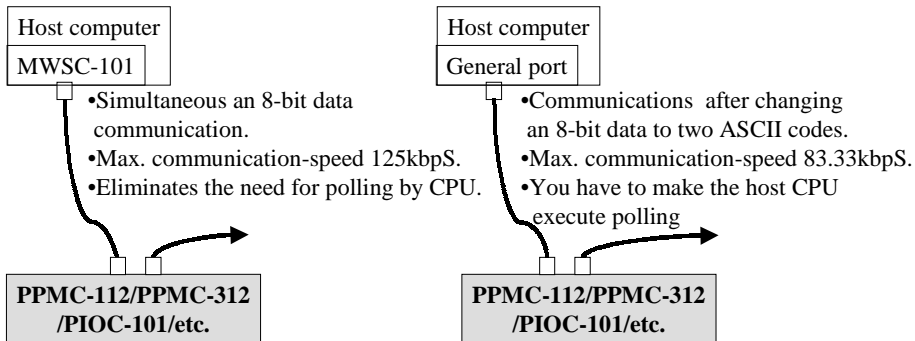


MWSC-101

- Multi-drop serial communication control LSI.
- Able to connect up to 16 PPMC and PIOC devices in serial-mode.
- Simultaneous an 8-bit data communication by an internal 9-bit UART.
- Maximum communication-speed is 125kbpS.
- Eliminates the need for polling by CPU.

<In case of MWSC-101>

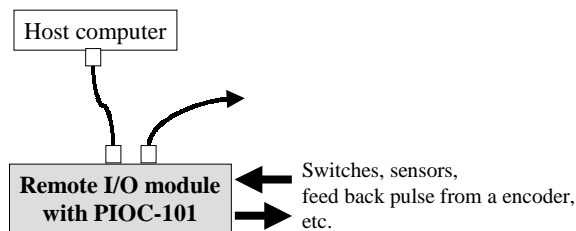
<In case of a general purpose serial port>



PIOC-101

- Remote digital I/O control LSI.
- 32-bit DI/O consisting of four units of an 8-bit port.
- Each port can select input-mode or output-mode.
- Dual 24-bit timers/counters.
- Able to use as an encoder counter for closed loop.

<Remote DI/O control by PIOC-101>



Specifications

PPMC-104BFP

Host computer interface		8-bit data bus
Control functions	Acceleration profile	Trapezoidal
	Command format	Algorithm-compatible with PPMC-101C, 102A and 103A/AFP. Also data-compatible with PPMC-103A/AFP
	Max. speed	27kpps
	Accelerating & Decelerating rate	4 to 11,200 pulses
	Max. operating pulses	±16,777,216 pulses
	Position counter	Remained steps
Command	Modes of motion	Acceleration & deceleration motion, and five other operations
	Modes of stop	Immediately and decelerating stop
	Status read	Finish status and four other status
Phase driving methods		3 phase motor: 2/ 1-2 phase drive 4 phase motor: 2/ 1-2 phase drive 5 phase motor: 2/ 2-3 phase drive
Package		64pin-QFP

- Stepper motion control LSI that are compatible with PPMC-100 series.
- The stepper motor may be controlled by simple motion command and data from the host computer.

Macro5514

- Motion control card that installs directly into the ISA bus.
- Up to 3 axis of motion control.
- Equipped with 3 chips of PPMC-104BFP.
- Almost all technical information is available free of charge.

Motor type		Stepper
Motion control LSI		PPMC-104BFP x 3
# axis / card		Up to 3
ISA bus	I/O address space	8-bytes from 000h to 3FFh
	Interrupt	1-level out of IRQ10, 11, 12, and 15
Size		ISA half size

PPMC-2104AFP

Number of axis			Dual axis	
Host computer interface			8-bit data bus	
Control functions	Acceleration & deceleration curve		Trapezoidal	
	Command format		Semi-Compatible with PPMC-104BFP	
	Max. speed	POUT mode	Single	40kppS
			Dual	20kppS
	Phase drive mode		Single	30kppS
			Dual	15kppS
	Acceleration & deceleration rate		4 to 11,200 pulses	
Max. operating pulses		±16,777,216 pulses		
Position counter		Remained steps		
Command	Modes of motion		Acceleration & deceleration motion, and five other operations	
	Modes of stops		Immediately and decelerating stops	
	Status read		Finish status and four other status	
Phase driving methods			3 phase motor: 2/ 1-2 phase drive 4 phase motor: 2/ 1-2 phase drive 5 phase motor: 2/ 2-3 phase drive	
Package			64pin-QFP	

- Dual axis version of PPMC-104.
- Semi-compatible with PPMC-104.
- Able to reduce the equipping space by half that of using PPMC-104, because 2104 has dual axis's motion control functions although either chips are the quite same size.

Macro5516

- Motion control card that installs directly into the ISA bus.
- Capable of up to 4 axis motion control.
- Equipped with 2 chips of PPMC-2104AFP.
- Almost all technical information is available free of charge.

Motor type		Stepper
Motion control LSI		PPMC-2104AFP x 2
# axis / card		Up to 4
ISA bus	I/O address space	4-bytes from 000h to 3FFh
	Interrupt	1-level out of IRQ10, 11, 12, and 15
Size		ISA half size

PPMC-111C/CFP

Host computer interface		8-bit data bus
Control functions	Acceleration & deceleration curve	Trapezoidal, S-curve and user flexible
	Range of operating speed	30.5ppS to 66.67kppS
	Acceleration & deceleration rate	8 to 65,534 pulses
	Max. operating pulses	±16,777,215 pulses (Indefinite operation on command.)
	Position counter	3-bytes (absolute)
Command	Modes of motions	Acceleration & deceleration motion, and five other operations
	Modes of stops	Immediately and decelerating stops
	Status read	Finish status and five other status
Package		PPMC-111C is 64pin-Shrink DIP, PPMC-111CFP is 64pin-QFP

- Stepper motion control LSI that was developed to meet various application systems.
- Able to control stepper motion smoothly, because customers can choose the acceleration profiles to match their applications.

- The maximum speed is 66.67kppS.
- Able to change the operating-speed and to read the status even if it's during motion.

Macro5521

- Motion control card that installs directly into the ISA bus.
- Capable of up to 3 axis motion control.
- Macro5521A equipped with 3 chips of PPMC-111CFP.
- Macro5521B equipped with one PPMC-111C.
- Almost all technical information is available free of charge.

Motor type		Stepper
# axis / card	Macro5521A	Up to 3. Equipped with PPMC-111CFP x 3
	Macro5521B	1. Equipped with PPMC-111C x 1
ISA bus	I/O address space	8-bytes from 000h to 3FFh
	Interrupt	1-level out of IRQ10, 11, 12, and 15
Size		ISA half size

PPMC-2111AFP

Number of axis		Dual axis
Host computer interface		8-bit data bus
Control functions	Acceleration & deceleration curve	Trapezoidal, S-curve
	Max. speed	X-axis 83.33kpps Y-axis 41.67kpps
	Acceleration & deceleration rate	
	Max. operating pulses	±16,777,215 pulses (Indefinite operation on command.)
	Position counter	3-bytes (absolute)
Command	Modes of motions	Acceleration & deceleration motion, and five other operations
	Modes of stops	Immediately and decelerating stops
	Status read	Finish status and five other status
Package		64pin-QFP

- Dual axis version of PPMC-111
- Semi-compatible with PPMC-111.

- Able to reduce the equipping space by half that of using PPMC-111, because 2111 has dual axis's motion control functions although either chips are the quite same size.

Macro55xx

- Motion control card that installs directly into the xxx bus.
-
-
- Almost all technical information is available free of charge.

Motor type	Stepper	
# axis / card		
Size		

PPMC-112CFP

Host CPU interface		8-bit data bus or serial communication
Control functions	Acceleration & deceleration curve	Trapezoidal, S-curve and user flexible
	Range of operating speed	30.5ppS to 250kppS
	Acceleration & deceleration rate	8 to 65,535 pulses
	Max. operating pulses	±16,777,215 pulses (Indefinite operation on command.)
	Position counter	3-bytes (absolute)
Command	Modes of motions	Acceleration & deceleration motion, and five other operations
	Modes of stops	Immediately and decelerating stops
	Status read	Finish status and six other status
	Auxiliary function	Inter-lock control
Package		64pin-QFP

- Stepper motion control LSI that can reduce connecting cables and noise by serial mode.

- Connections may be selected between the host computer and PPMC-112 by parallel mode or serial mode to match customers' applications.

Macro8005

- Motion control card that connects the host computer via serial communication.
- Each port can be used to connect up to 16 devices.
- Independent from the buses of host computers.
- Almost all technical information is available free of charge.

Motor type	Stepper
# axis / card	1
Motion control LSI	PPMC-112CFP
Host computer interface	Multi-drop serial communication (9-bit binary mode or ASCII mode)
Size	100W x 120H x 22T mm

PPMC-312AFP

Motor type	Servo & stepper	
Host computer interface	8-bit data bus or serial communication	
Control Functions	Acceleration & deceleration curve	Trapezoidal, S-curve, user flexible and various curve
	Max. operating speed	2Mpps
	Acceleration & deceleration rate	256 to 16,777,215 pulses
	Max. operating pulses	±4,294,967,296 pulses (Indefinite operation on command.)
	Position counter	4-bytes (absolute)
Command	Modes of motions	Acceleration & deceleration motion, and six other operations
	Modes of stops	Immediately and decelerating stops
	Status read	Finish status and six other status
	Auxiliary function	Inter-lock control, 8 sets of event controls
Package	64pin-QFP	

- Servo & stepper motion control LSI that can reduce connecting cables and noise by serial mode.

- Adjustable start-speed, operating-speed and finish-speed, and acceleration and deceleration.
- Connections may be selected between the host computer and PPMC-312 by parallel mode or serial mode to match customers' applications.

Macro8009

- Servo & stepper motion control card that connects the host computer via serial communication.
- Each port can be used to connect up to 16 devices.
- Independent from the buses of host computers.
- Almost all technical information is available free of charge.

Motor type	Servo & stepper
# axis / card	1
Motion control LSI	PPMC-312AFP
Host interface	Serial communication (9-bit binary mode & ASCII mode)
Size	160W x 120H x 16T mm

MWSC-101

Host computer interface		8-bit data bus
Control Functions	Serial communication	Simultaneous an 8-bit data communication by an internal 9-bit UART
	Communication mode	Binary mode
	Max. communication rate	125kbpS
Command	System command	Initialization polling Busy list Polling start Direct communication Polling stop Interlock configuration Emergency stop Error counter read
	Slave command	Slave motion Slave data set Slave data read
Package		64pin-QFP

- Multi-drop serial communication control LSI that was developed to make the best of what PPMC-112 and PPMC-312 could do when customers used their devices by serial mode.
- Able to connect up to 16 PPMC and PIOC devices.

- Maximum communication speed is 125kbpS.
- Communication data is reduced by half that of using general serial port.
- Eliminates the need for polling by CPU by using its polling function.

Macro5520A, Macro6755, Macro7000

- Multi-drop serial communication control cards.
- Macro5520A installs directly into the ISA bus.
- Macro6755 installs directly into the I/O channel.
- Macro7000 installs directly PC/104.
- Almost all technical information is available free of charge.

Connectable controllers	Modules which equipped with PPMC-112, PPMC-312 and PIOC-101
On board control LSI	MWSC-101
Host computer interface	8-bit data bus
Communication function	Simultaneous an 8-bit data communication by an internal 9-bit UART
Size	Macro5520A ISA(PC/AT) half size Macro6755 3U size Macro7000 PC/104 size

PIOC-101

Host computer interface		Serial communication (9-bit binary mode or ASCII mode)
Control Functions	Digital I/O	32-bit (8-bit x 4ports) Each port can select input-mode or output-mode.
	Timers/ counters	Dual 24-bit timers/ counters One of them can use as encoder counter for closed loop.
	Max. communication rate	125kbpS
Command	Initialization	Input/ output mode setting Timer/ counter function-mode setting
	Control	Input ports & timer/counter status read Output ports & timer/counter parameter set Input port status sample & timer/ counter start Extended commands
Package		64pin-QFP

- Remote digital I/O control LSI that has four 8-bit ports and two counters/ timers.

- Each port can be used as input mode or output mode.
- Able to use as an encoder counter for closed loop.

Macro8400

- Remote input & output control card.
- Opto-isolated dual (8-bit x 2) input ports and dual output ports.
- Able to count a pair of 2-phase feed back pulses from an encoder.
- Almost all technical information is available free of charge.

Host computer interface	Serial communication (9-bit binary mode & ASCII mode)
On board control LSI	PIOC-101
Input	8-bit x 2ports
Output	8-bit x 2ports
Timer/counter	24-bit timer/ counter x 2
Size	150W x 160H x 16T mm