



API Motion (OITware)

*Centennial Controllers,
Digital & Intelligent Drives,
Mini Servo & Stepper Drives*

Overview

Maple Systems' 3100/4100 Series Operator Interface Terminals (Maple OITs) communicate with API Motion controllers using the ISAP protocol. When configured with **OITware-200**, the **Maple OIT is the master** in a point-to-point single master, single slave or single master, multiple slave format.

Compatible Controllers	
Family	Model
Centennial Controller Series	PS-3306c, PS-3310c, PS-3320c
Digital Drive Series	PS-3303d, PS-3306d, PS-3310d, PS-3320d
Intelligent Drive Series	PS-3303i, PS-3306i, PS-3310i, PS-3320i
Mini Servo Drives	DS-3402i, DS-3402d, DS-3405i, DS-3405d
Mini Stepper Drives	DM-2403i, DM-2403d, DM-2406i, DM-2406d

Communications Cable

The Maple OIT should be connected via 3-wire RS-232 or 4-wire RS-422 to the serial port on the API Motion controller. A list of communications cables offered by Maple Systems as well as cable assembly instructions to assist you in assembling your own communications cable are available on our website at www.maple-systems.com/cables.htm.

WARNING: If you communications cable is not wired exactly as shown in our cable assembly instructions, damage to the Maple OIT or loss of communications can result.

Controller Settings

Name	Setting	Options	Important Notes
Electrical Interface:	RS-232 (3-wire)	RS-422 (4-wire)	The Controller has a DIP switch to select the RS-232/RS-485 settings.
Baud Rate:	19200	No options	Must match the OIT Configuration setting. Use the fastest baud rate supported by both.
Data Bits:	8	No options	Must match the OIT Configuration setting.
Parity:	None	No options	Must match the OIT Configuration setting.
Stop Bits:	1	No options	Must match the OIT Configuration setting.
Node Address:	1	1 to 31	Must match the OIT Configuration setting. The Controller has a DIP switch to select the Node address.

Accessible Controller Commands and Memory

Accessible Controller Commands and Memory

The following tables list the Controller commands and memory ranges that Maple's OITs are able to access: (Please note that your Controller's memory range may be *smaller* or *larger* than that supported by Maple's OITs.)

For Register Monitors:

Register	Address	Sub-Element	Preferred Format	Access	Data Range
VAR	1-256	1-32	Long	R/W	999,999,999.99999999
IO	Inputs	1-32	1/0, On/Off or ASCII String	Read	0 = disable 1 = enable
	Outputs	1-32	1/0, On/Off or ASCII String	R/W	0 = disable 1 = enable
	Analog inputs	1-3	Long	Read	±999,999,999.99999999
Motion	Query status	1-32 (1=E 2=F,3=R,4=M)	1/0, On/Off, ASCII String, Bank8, Bank16	Read	0 = false 1 = true
	Fault	1-32	1/0, On/Off, ASCII String, Bank8, Bank16	Read	0 = no fault 1 = fault
	SoftWareEnable drive (SWE)	None	1/0, On/Off or ASCII String	R/W	0 = disable 1 = enable
	SoftWareFault stop (SWF)	None	1/0, On/Off or ASCII String	R/W	0 = disable 1 = enable

For Recipe Presets:

Register	Address	Sub-Element	Preferred Format	Data Range
VAR	1-256	1-32	Long	±999,999,999.99999999
IO	Outputs	1-32	1/0	0 = disable 1 = enable
Motion	SoftWareEnable drive (SWE)	None	1/0	0 = disable 1 = enable
	SoftWareFault stop (SWF)	None	1/0	0 = disable 1 = enable
	Drive reset	None	1/0	1 = reset

For Screen-Dependent Function Keys and Function Keys:

Register	Address	Sub-Element	Action	Data Range
VAR	1-256	None	Latched, Push On/Off, Momentary	0 = on 1 = off
IO	Outputs	1-32	Latched, Push On/Off, Momentary	0 = off 1 = on
Motion	SoftWareEnable drive (SWE)	None	Latched, Push On/Off, Momentary	0 = disable 1 = enable
	SoftWareFault stop (SWF)	None	Latched, Push On/Off, Momentary	0 = disable 1 = enable
	Drive Reset ¹	None	Latched	1 = reset
Program	Run	None	Latched	1 = run
	Stop	None	Latched	1 = stop
Load	1-50	None	Latched	1-50 string names

¹ Not currently supported on the PS-33xxx models.

Load Command Data Table:

The Maple OIT’s Function Keys or Screen-Dependent Function keys have the ability to load programs using the ‘LOAD’ statement. Using the Function Key Editor or Screen-Dependent Function Key Editor, configure the key as a latched key. Then use the drop-down box titled “Command”, select the ‘LOAD’ command, and enter a number 1 to 50 that refers to the program’s name that is (or will be) stored in the OIT’s Load Command Data Table and in the API controller’s Library. The table can be added to and modified using the “Load Command Editor” by selecting “Edit Strings”. Up to 50 names with a maximum of six characters each can be configured.

Important Controller Memory Considerations

If your controller's memory range is smaller than the range supported by Maple's OITs, it is possible to configure the Maple OIT to monitor a memory address which does not exist. Since this can cause unpredictable results, when you configure the Maple OIT please ensure that all selected memory addresses are valid for your controller model.

Do not configure the Maple OIT to write to any memory address which should only be written to by the controller.

When using the Bank 8 or Bank 16 register monitor formats to display information from discrete memory, the bits displayed must start on a byte boundary. The byte boundaries leave no remainder when the following formula is used: $(\text{discrete memory address} - 1) / 8$.

4 digit BCD and 8 digit BCD formats do not support floating-point.

1/0, On/Off and ASCII string formats will be 0/Off for the following controller values:

Bit: 0 or X

Integer: 0

Floating point: Integer value = 0 (i.e. for 0.123, integer value = 0)

Memory values may be displayed truncated or with zeros added as required by the Decimal Location specified by OITware and the floating point value specified by the Controller. The following examples are with Signed Format and Decimal Location = 2 (displayable range is then 327.67):

Example1: If the controller memory = 0.00123, then the OIT displays "0.00".

Example2: If the controller memory = 0.123, then the OIT displays "0.12".

Example3: If the controller memory = 12.3, then the OIT displays "12.30".

Any memory value specified by the controller that exceeds the displayable range specified by OITware will display the "Data out of Range" message until the value changes to within range or is no longer being read by the OIT (i.e. a screen is called that does not have this condition). The following example is with Signed Format and Decimal Location = 2 (displayable range is then 327.67):

Example1: If the controller memory = 1230.00, then the OIT displays "Data out of Range".

The API controllers do not allow output registers to be written to when a program is running (doing so generates a protocol error). To change the outputs when a program is running, either stop the program or make a provision in the program to transfer a variable's value to the output and then change the variable's value.

The API controllers do not allow individual bits in a variable register to be written to. When a variable is written as a bit, the value equals 1 if set and 0 if cleared. Note that on reading a bit, the subelement points to the bit to be read, therefore when writing to a variable always set subelement=1.

OITware-200 Settings

The following table lists the communications settings that must be configured in OITware-200.

Please note:

- the Settings column lists OITware-200's recommended setting; your controller's default may be different
- the Options column lists OITware-200's options; your controller may not support every option

Name	Settings	Options	Important Notes
Baud Rate	19200	19200, 9600, 4800, 2400, 1200, 600, 300	Must match the controller's configuration settings. Use the fastest baud rate supported by both.
Parity	None	Even, Odd, None, Mark, Space	Must match the controller's configuration settings.
Data Bits	8	7, 8	Must match the controller's configuration settings.
Stop Bits	1	1, 2	Must match the controller's configuration settings.
Address	1	1 to 31	Must match the controller's configuration settings.
Message Request Register (optional)	VAR100	VAR1-256	Must be within the controller's supported memory range.
Current Message Register (optional)	VAR101	VAR1-256	Must be within the controller's supported memory range.
Function Key Coils (optional)	VAR102	VAR1-256, Output, SWE, SWF, Reset, Run, Stop, Load	Must be within the controller's supported memory range.
Screen Dependent Function Key Coils (optional)	VAR103	VAR1-256, Output, SWE, SWF, Reset, Run, Stop, Load	Must be within the controller's supported memory range.

Error Messages

“Can not connect”

The OIT could not communicate with the controller during initial communications. Check for consistent communication parameters between the controller and the OIT. Check the cable and connectors for integrity and correctness. Move cables away from noise sources. Check for proper grounding and power supply.

“Communication Error”

The OIT did not receive a response or a valid response. Check the cable and connectors for integrity. Move cables away from noise sources. Check for proper grounding and power supply.

“Error: Cannot Write!”

A write command was sent to the controller to write data to a register that is read only. Using OITware, make the register read-only access.

“Error: Cannot Read!”

A read command was sent to the controller to read data from a register that is write only. Using OITware, remove the register from the screen. Write-only registers can be accessed in Recipe presets, Function Keys and Screen-Defined Function Keys.

“Protocol Error”

The controller responded that the request was invalid. Check that the register is available and the type of access is allowed for the particular controller.

“Data out-of-range!”

The value received from the controller was too large to display. Using OITware, adjust the format, number of digits and/or the decimal location of the register for proper display.

“Error: Not Signed or Long Format!”

The value received from the controller was signed, but the display format is not a signed type. Using OITware, change the format of the register to Signed or Long.

“Invalid Command”

The protocol driver was requested to perform an invalid command. Contact Maple Systems technical support.