



# Animatics

## SmartMotor Series, RTC Series

### Overview

Maple Systems' OIT Family Operator Interface Terminals (Maple OITs) communicate with Animatics SmartMotor and RTC controllers using the SmartMotor ASCII protocol. The Maple OIT is the master in a point-to-point single-master, single-slave format.

NOTE: since this protocol does not support bit access of user-defined variables, this protocol is only supported in Maple OIT3100 and OIT4100 series models.

Compatible Controllers	
Family	Model
SmartMotor	SM17xx, SM23xx, SM34xx, SM42xx, SM56xx
RTC	RTC3000

### Communications Cable

Connect the Maple OIT via 3-wire RS-232 through the Animatics communications Y-cable (CBL SMA1-10) to the main port on the SmartMotor 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](http://www.maple-systems.com/cables.htm).

**WARNING:** If your OIT 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: main via Y-cable	RS-232	No options	Requires Animatics Y-cable in series with the OIT communications cable
Baud rate	9600	2400, 4800, 9600, 19200	Must match the OIT configuration setting. Use the fastest baud rate supported by both.
Data bits	8	7, 8	Must match the OIT configuration setting
Parity	None	Even, Odd, None	Must match the OIT configuration setting
Stop bits	1	1, 2	Must match the OIT configuration setting

## Accessible Controller Commands and Memory

The following tables list the controller's 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	Recommended Format	Read/Write
AI Local	A-G	None	Long	Read
AIO Remote	A-H	1-4	Long	R/W
DIO Local	A-G	None	Bank8, Decimal	R/W
DIO Remote	A-H	0-1	1/0, On/Off, ASCII String	R/W
Motion	Acceleration	None	Long	R/W
	Distance (Rel.)	None	Long	R/W
	Position (Abs.)	None	Long	R/W
	Position Error	None	Decimal	Read
	Torque	None	Signed	R/W
	Velocity	None	Long	R/W

Register	Address	Sub-Element	Recommended Format	Read/Write
Variable	"a-z"	a-z	Any	R/W
	"aa-zz"	aa-zz	Any	R/W
	"aaa-zzz"	aaa-zzz	Any	R/W
	ab[ ]	0-199	Bank8, signed, decimal	R/W
	aw[ ]	0-99	Signed, decimal	R/W
	al[ ]	0-49	Long	R/W
Misc.x	Clock	None	Decimal, long	R/W
	Counter	None	Decimal, long	Read
	Status Word	0-15	1/0, on/off, ASCII string, Bank8, Bank16	Read

**For Recipe Presets:**

Register	Address	Sub-Element	Recommended Format
AIO Remote	A-H	1-4	Long
DIO Local	A-G	None	Bank8, decimal
DIO Remote	A-H	0-1	1/0, on/off, ASCII string
Motion	Acceleration	None	Long
	Distance (Rel.)	None	Long
	Origin	None	Long
	Position (Abs.)	None	Long
	Torque	None	Signed
	Velocity	None	Long
Variable	"a-z"	a-z	Any
	"aa-zz"	aa-zz	Any
	"aaa-zzz"	Aaa-zzz	Any
	ab[ ]	0-199	Bank8, signed, decimal
	aw[ ]	0-99	Signed, decimal
	al[ ]	0-49	Long
Misc.	Clock	None	Decimal, long

**For Screen-Dependent Function Keys and Function Keys:**

Register	Address	Sub-Element	Preferred Action
DIO Local	A-G	None	Latched, Push, On/Off, Momentary
DIO Remote	A-H	0-1	Latched, Push, On/Off, Momentary
Mode	Follow	0-4	Latched
	Position	None	Latched
	Step & Direction	None	Latched
	Torque	None	Latched
	Velocity	None	Latched
Motion	Go	None	Latched
	Stop Abrupt	None	Latched
	Stop with Decel	None	Latched
Program	Run	None	Latched
	End	None	Latched
	GoSub	0-999	Latched
	GoTo	0-999	Latched
Variable	"a-z"	a-z	Any
	"aa-zz"	aa-zz	Any
	"aaa-zzz"	Aaa-zzz	Any
	ab[ ]	0-199	Any
	aw[ ]	0-99	Any
	al[ ]	0-49	Any

**Important Memory Considerations**

<p>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 that 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.</p>
<p>Do not configure the Maple OIT to write to any memory address that should only be written to by the controller.</p>
<p>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: <math>(\text{discrete memory address} - 1) / 8</math>.</p>

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).

For example, if OITware specified Signed Format (range is +-32767), then, if the controller memory = 123567, the OIT will display “Data out of Range” message.

Before accessing any IO, the port or pin must be initialized as an input or as an output.

The OIT uses the controller’s variable “j” to indirectly access the AIO Local and DIO Local values. Therefore, the variable “j” is reserved and cannot be used if accessing AIO Local or DIO Local values.

DIO Local bits are transferred to and from the controller 8 bits at a time (there is no individual bit access). Therefore, you must read and write all 8 bits at a time. If using function keys, only bit 0 of the 8 bits can be used (bits 1 to 7 are reserved and should remain cleared).

Retentive mode must be enabled if using Function Keys.

## 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	9600	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
Message request register (optional)	z	a - z	Must be within the controller's supported memory range
Current message register (optional)	y	a - z	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.