

Bios Integrator™ 110 Communication Interface Protocol

To enable Bios customers to integrate their Integrator™110 Command, Control and Readout Device and Met Lab® Series primary piston provers with their unique applications, these products come standard with a bi-directional communication protocol (see related document, "Bios Met Lab® Series Bi-Directional Communications Protocol").

Using ASCII commands sent through your Met Lab base unit's RS-232 serial port, this protocol enables you to control and customize your Integrator 110's operation (serial cable supplied by Bios). For your convenience, the ASCII commands are referenced in the following tables.

Commands

\$GET FLOW MFC X	
Purpose	Reads the flow of the MFC
Syntax	\$GET FLOW MFC<cr>
Parameters	X=0-255, 0=0-20ma; 1=4-20ma; 2=0-5v; 3=1-5v
Query Reply	
Remarks	Reads the MFC's flow in units or % of Full Scale from the MFC connector
Example	\$GET FLOW MFC 3<cr>
Reply	12.43

\$SET FLOW MFC Y XXX.XX	
Purpose	Sets the flow of the MFC
Syntax	\$SET FLOW MFC Y XX.XXX<cr>
Parameters	Y=0-255; 0=0-20ma; 1=4-20ma; 2=0-5v; 3=1-5v; X=up to 5 Digit # and decimal pt.
Query Reply	ACK 9
Remarks	Sets the flow of the MFC in % of Full Scale from the MFC connector
Example	\$SET FLOW MFC 2 50.000<cr>
Reply	None

\$GET FLOW MFM X	
Purpose	Reads the flow of the MFM
Syntax	\$GET FLOW MFM X<cr>
Parameters	X=0-255, 0=0-20ma; 1=4-20ma; 2=0-5v; 3=1-5v
Query Reply	
Remarks	Reads the flow from the MFM in % of Full Scale from the MFM connector
Example	\$GET FLOW MFM 1<cr>
Reply	32.34



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\$GET PI CB	
Purpose	Reads the product information from the Integrator
Syntax	\$GET PI CB<cr>
Parameters	None
Query Reply	!NAK 12
Remarks	None
Example	\$GET PI CB<cr>
Reply	Future Feature

\$SET DRIVER ON X	
Purpose	Turns on Driver 1 on P6
Syntax	\$SET DRIVER ON X<cr>
Parameters	X=1-8
Query Reply	ACK 12
Remarks	None
Example	\$SET DRIVER ON 2<cr>
Reply	None

\$SET DRIVER OFF X	
Purpose	Turns off Driver 1 on P6
Syntax	\$SET DRIVER OFF X<cr>
Parameters	X=1-8
Query Reply	ACK 13
Remarks	None
Example	\$SET DRIVER OFF 2<cr>
Reply	None

\$GET PI PM1	
Purpose	Reads the product information from the Personality Module connected to the MFC connector
Syntax	\$GET PI PM1<cr>
Parameters	None
Query Reply	!NAK 12
Remarks	Gets information from Personality Module 1
Example	\$GET PI PM1<cr>
Reply	Future Feature



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\$GET PI PM2	
Purpose	Reads the product information from the Personality Module connected to MFM connector
Syntax	\$GET PI PM1<cr>
Parameters	None
Query Reply	!NAK 12
Remarks	Gets information from Personality Module 2
Example	\$GET PI PM1<cr>
Reply	Future Feature

\$GET PI EM	
Purpose	Reads the product information from the Extension Module, if connected
Syntax	\$GET PI EM<cr>
Parameters	None
Query Reply	
Remarks	None
Example	\$GET PI EM<cr>
Reply	Future Feature

\$SET STROBE ON	
Purpose	Sets the STROBE/DO "1". Used in latching a signal in Personality or Extension Modules
Syntax	\$SET STROBE ON<cr>
Parameters	X=0-7
Query Reply	ACK 17
Remarks	None
Example	\$SET STROBE ON<cr>
Reply	None

\$SET STROBE OFF	
Purpose	Sets the STROBE/DO "0". Used in latching a signal in Personality or Extension Modules
Syntax	\$SET STROBE OFF<cr>
Parameters	X=0-7
Query Reply	ACK 18
Remarks	None
Example	\$SET STROBE OFF<cr>
Reply	None

\$SET DXCS ON	
Purpose	Sets the DX/CS to "1". Used in decoding Personality or Extension Modules
Syntax	<code>\$SET DXCS ON<cr></code>
Parameters	X=0-7
Query Reply	ACK 19
Remarks	None
Example	<code>\$SET D5CS ON<cr></code>
Reply	None

\$SET DXCS OFF	
Purpose	Sets the DX/CS to "0". Used in decoding Personality or Extension Modules
Syntax	<code>\$SET DXCS OFF<cr></code>
Parameters	X=0-7
Query Reply	ACK 20
Remarks	None
Example	<code>\$SET D5CS OFF<cr></code>
Reply	None

\$SET VALVESHUT ON	
Purpose	To shut the MFC valve, sends a signal to bypass the valve control signal
Syntax	<code>\$SET VALVESHUT ON<cr></code>
Parameters	None
Query Reply	ACK 21
Remarks	VALVEOPEN should be off while VALVESHUT is on
Example	<code>\$SET VALVESHUT ON<cr></code>
Reply	None

\$SET VALVESHUT OFF	
Purpose	To allow normal operation, clears the signal in order to bypass the valve
Syntax	<code>\$SET VALVESHUT OFF<cr></code>
Parameters	None
Query Reply	ACK 22
Remarks	None
Example	<code>\$SET VALVESHUT OFF<cr></code>
Reply	None

\$SET VALVEOPEN ON	
Purpose	To open the MFC valve, sends a signal to bypass the valve control signal
Syntax	\$SET VALVEOPEN ON<cr>
Parameters	None
Query Reply	ACK 23
Remarks	VALVESHUT should off while VALVEOPEN is on.
	\$SET VALVEOPEN ON<cr>
Reply	None

\$SET VALVEOPEN OFF	
Purpose	To allow normal operation, clears the signal in order to bypass the valve
Syntax	\$SET VALVESHUT OFF<cr>
Parameters	None
Query Reply	ACK 24
Remarks	None
Example	\$SET VALVESHUT OFF<cr>
Reply	None

\$GET PI MFC	
Purpose	Reads the product information from the MFC
Syntax	\$GET PI MFC<cr>
Parameters	?
Query Reply	!NAK 12
Remarks	Future Command; Not Yet Available
Example	\$GET PI MFC<cr>
Reply	Future Feature for digital MFC

\$GET PI MFM	
Purpose	Reads the product information from the MFM
Syntax	\$GET PI MFC<cr>
Parameters	?
Query Reply	!NAK 12
Remarks	Future Command; Not Yet Available
Example	\$GET PI MFC<cr>
Reply	Future Feature for digital MFC



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Command Not Recognized

If a command is not recognized, you'll receive a return of "!NAK 12".

Cable

The RS-232 serial cable connecting your Met Lab piston prover to the PC should be a 1 to 1 connection, 9-pin d-sub female. A **Null Modem** cable should not be used.

Serial Interface

Baud Rate	9600
Data Bits	8
Parity	None
Stop Bits	1
Flow Control	None

Using Windows HyperTerminal

The Windows HyperTerminal program is an excellent tool for checking and troubleshooting your Bios bi-directional communication interface. With HyperTerminal, commands can be sent to and data received from your Met Lab. HyperTerminal is included with the Microsoft Windows operating system and is usually located under **Accessories**.

For assistance with HyperTerminal, please contact Microsoft.

Step One

Be sure you are disconnected before entering the Properties menu. To disconnect, click on the raised "Phone" icon, then click on the Properties icon located to the right.

Step Two

Under the **Connect To** tab, set up HyperTerminal for a direct connection to Com1 (as your PC's communication port may vary, attempt using other ports if Com1 does not work).

Step Three

Press **Configure** and set the settings to the serial interface above. After set, click **OK** to return.



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Step Four

Click on the **Settings** tab. Emulation should be set to Auto Detect; Telnet Terminal ID should be set to ANSI; and back scroll buffer lines should be set to 500.

Step Five

Press the **ASCII Setup** button. Then, check that the "Send" line ends with line feed, and check the Echo type characters locally. Both Line delay and Character delay should be set to 100 milliseconds.

Step Six

Check that the Append line feeds to incoming line ends, and check the Wrap lines that exceed the terminal width. However, do not check the Force incoming to 7-bit ASCII.

Step Seven

Click **OK** to return to Properties; click **OK** to return to the Communications window; then, click the "Phone" icon to start the process.

HyperTerminal Examples

To read the flow from a 0-5 volt MFM:

Type into the HyperTerminal: **\$GET FLOW MFM 2<cr>**

This will read the flow from an MFM in % of Full Scale.

To set the flow of a 4-20ms MFC to 51.3%:

Type into the HyperTerminal: **\$SET FLOW MFC 2 51.3<cr>**

This will set the flow to 51.3 % of Full Scale.

Troubleshooting

There appears to be no communication.

1. Check cable for connections
2. If user-designed interface, check using HyperTerminal
3. If using HyperTerminal, make sure the correct port is selected

When using HyperTerminal, data appears strange.

1. Check communication setup
2. Check cable

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