

1. PIB Commands

The PIB itself has seven commands that can be sent to it. Three commands allow for the user to set the sensor configuration on the PIB, and one allows the user to read back the current sensor configuration on the PIB. The user can also set the board ID and the delay after a power down notification and read these values back. These commands are all case-insensitive.

These commands are sent as a “Write Console Script” command in WGMS. The task ID for the PIB is 0x00. Any commands must be sent one at a time.

Each personality module will have its own associated task running on the PIB (unless it is set to Payload Communications or SMC, in which case no task will be run for that personality module). Commands for these tasks should be addressed appropriately (personality module 1 has task ID 0x01, module 2 has task ID 0x02, and module 3 has task ID 0x03). If a command is sent to the wrong address (i.e., a PIB command to a non-zero task ID, or a sensor command to task ID 0x00), the command will NAK.

1.1 Configuring Personality Modules

There are three commands, one for each personality module, used to configure sensors.

Syntax

PIB -1 | --pm1 *[sensor]*

PIB -2 | --pm2 *[sensor]*

PIB -3 | --pm3 *[sensor]*

Summary

Sets the designated personality module to the designated sensor.

Semantics

These commands allow the user to individually set the sensor configuration for each personality module. The sensor parameter can be a number or a string (case-insensitive).

Setting	String	Number
Empty Sensor	EMPTY	0
Payload Communications	COMM	1
SMC	SMC	2
Seabird 37SI CTD	37SI	3
Seabird GPCTD	CTD	4
Turner C3	C3	5
Power On/Off	POWER	6
Teledyne ATM-88X Modem	ATM	7
MBARI CO2	CO2	8

For example, sample commands are:

```
PIB --pm1 0  
PIB --pm2 SMC  
PIB -3 ctd
```

The dummy sensor should be used for a personality module that is not connected. A dummy sensor can only respond to an id command.

Power On/Off should be used if the only functionality needed is to set power on or off to the personality module.

Upon receiving the command, the PIB will compare the current setting for that personality module to the desired setting. If they are the same, no action will be taken. If they are different, the PIB will clear that task's allotted EEPROM and end the task. The desired setting is stored in the PIB's nonvolatile memory. When the PIB next boots, the assigned task will run for the designated personality module.

Finally, if successful, the PIB will send an Ack Console Data back to shore with the current sensor configuration. Note that this configuration does not reflect what is currently running on the PIB, but rather which tasks will be loaded the next time the PIB is started.

If unsuccessful for any reason, the PIB will NAK the command. The most common cause of a NAK is trying to set an invalid sensor.

Notes

This command will NOT start the assigned task. Changes will not fully take effect until the PIB is restarted (i.e., power cycle the payload port).

1.2 Reading the PIB Configuration

Syntax

```
PIB -c | --cfg
```

Summary

Sends back the current sensor configuration.

Semantics

The PIB will send back an Ack Console Data with the sensor configuration that is stored in the PIB's nonvolatile memory. This is not necessarily the current setting, but rather what will run the next time the PIB is started. The format of the response is:

```
PM1=[Sensor] PM2=[Sensor] PM3=[Sensor]
```

For example, a response could be:

```
PM1=C3 PM2=SMC PM3=CTD
```

1.3 PIB boardID

Syntax

PIB -b | --boardID [*boardID*]

Summary

Sets the board ID for the PIB.

Semantics

This command will set the board ID for the PIB. This ID must be between 0x00 and 0xFF, exclusive; otherwise the command will NAK. This board ID is stored in the PIB's nonvolatile memory. The PIB will respond with an Ack Console Data containing an empty message.

Notes

This command will NOT take effect until the PIB is restarted (i.e., power cycle the payload port). Commands sent to the PIB or any of its tasks should still be addressed to the original board ID.

1.4 PIB setDly

Syntax

PIB -d | --setDly [*delayTime*]

Summary

Sets the power down delay time for the PIB.

Semantics

This command will set the power down delay time for the PIB. This delay time is in seconds and must be between 0 and 255, inclusive. The delay time will be sent to the float the next time the PIB receives a power down notification. It is stored in the PIB's nonvolatile memory.

1.5 PIB id

Syntax

PIB -d | --id

Summary

Sends back identification information for the PIB.

Semantics

This command will respond with an Ack Console Data that contains identification information, including the board ID and the power delay time. Note that the board ID will not necessarily be the current board ID, but rather the board ID that is used when the PIB is next power cycled. For example, a sample response is:

PIB ver. 2.0.341. Board ID = 0x01. Power Down Delay = 1 sec.

2. Empty Sensor

The dummy sensor is used when a personality module is not connected to anything. It can serve as a place holder.

2.1 *EMPTY ID*

Syntax

EMPTY -i | --id

Summary

Sends back information for this sensor.

Semantics

A dummy sensor will return an Ack Console Data containing the string "Dummy sensor." This is the only command that the dummy sensor will not NAK.

3. Power On/Off

This configuration can be used when the only requirement is to power on or power off the personality module.

3.1 Power On

Syntax

POWER -o | --on

Summary

Power on the personality module.

Semantics

This command will turn on the personality module. It will then return an Ack Console Data indicating whether power is on or off.

3.2 Power Off

Syntax

POWER -f | --off

Summary

Power off the personality module.

Semantics

This command will turn off the personality module. It will then return an Ack Console Data indicating whether power is on or off.

3.3 Power AutoRun [mode]

Syntax

POWER -a | --autorun [mode]

Summary

Sets the Autorun mode.

Semantics

This command will turn the AutoRun feature On or Off. When AutoRun is On, the personality module will be powered on when the PIB starts up. When Autorun is Off, the personality module will not be powered on when the PIB starts. After the PIB is running, the power state can always be changed by sending a On or Off command. Valid parameters for the AutoRun command are On, Off, Yes, No, 1, or 0.

3.4 *Power Status*

Syntax

POWER -s | --status

Summary

Sends back whether power is on or off.

Semantics

This command will return an Ack Console Data indicating whether power is on or off.

3.5 *Power ID*

Syntax

POWER -i | --id

Summary

Sends back identification.

Semantics

This command will return an Ack Console Data containing identification.

4. Seabird 37SI CTD

The Seabird 37SI CTD has four commands. In addition, the user is able to bypass the PIB and send commands directly to the device - the equivalent of having the CTD plugged into a serial terminal on a computer and controlling it directly.

4.1.1 37SI on

Syntax

37SI -o | --on

Summary

Directs PIB to power on the CTD.

Semantics

This will apply power to the CTD. The return data will include the serial number of the CTD and the default sampling parameters (sample interval, report block size, and destination address).

Notes

This command will NOT start CTD sampling.

4.1.2 37SI off

Syntax

37SI -f | --off

Summary

Directs PIB to power down the CTD

Semantics

This will power down the CTD.

Notes

If the CTD was currently sampling data, the last packet will be sent with whatever data has been collected at this point, regardless of whether or not the number of samples specified in the report block size has been reached.

4.1.3 37SI run [period][report block size][destination]

Syntax

37SI -r | --run [period][report block size][destination]

Summary

Directs PIB to start the CTD sampling with either default settings or the given parameters.

Semantics

Sends the start command to the 37SI CTD in order to begin autonomous sampling on the CTD. The return will include serial number and the parameters used for the sampling (either default values or echoes back the new parameters). The parameters are as follows:

Period: This is the time between successive samples in seconds. The value must be between 1 and 3600 (1 second up to 1 hour). It is recommended not to run a sample rate faster than 30 seconds to avoid saturating the Iridium SBD bandwidth. Initial default value is 1 minute if never set by the user. The value is stored in EEPROM and will be maintained through PIB reboots.

Report Block Size: This is the number of samples that are packed into a single data report. The value must be between 1 and 10. Initial default value is 1 minute if never set by the user. The value is stored in EEPROM and will be maintained through PIB reboots.

Destination: This is a 2-byte hex address indicating where the data should be sent (shore, another payload, etc.) This uses the standard BoardID-TaskID nomenclature where address 0x0000 is sent to shore via the default communication channel. The value is stored in EEPROM and will be maintained through PIB reboots.

Notes

All parameters are optional, but if they are entered, they must be entered in the order specified. If you want to specify Destination address, you must also specify period and block size. If only the period needs to be specified, the block size and destination do not need to be sent in the command. If the CTD is currently off when this command is sent, it will power on the CTD and then start sampling. If the CTD is currently sampling data when this message is received and the parameters are different from the current sampling mode, the data collected up to this point will be transmitted and the CTD will be reset to use the new parameters for sampling, otherwise a "Sampling in progress" message will be returned in the ACK/NACK

4.1.4 37SI stop

Syntax

```
37SI -x | --stop
```

Summary

Directs PIB to stop the CTD sampling but leave the CTD powered on.

Semantics

Sends the stop command to the 37SI CTD in order to end autonomous sampling on the CTD. The data collected since the last report will be transmitted back to the desired destination at this point, regardless of whether the report block size has been reached.

4.1.5 CTD period

Syntax

```
CTD -p | --period [period]
```

Summary

Directs PIB to set the default sample period (in seconds) for use when the next start command is received.

Semantics

Sets the default sample period to use – valid values range from 1 second to 3600 seconds (1 hour). Sample rates faster than 30 seconds are not recommended since the amount of data collected has the potential to completely saturate the Iridium SBD communications at that point. The initial default value is 60 seconds.

Notes

This will not change the current sample interval if sampling is already in progress when the command is received, but will set the new default for the next time sampling is started. This value is stored in the PIB EEPROM and will be maintained through power cycles/reboots of the system.

4.1.6 37SI report block size

Syntax

37SI -z | --size [report block size]

Summary

Sets the default report block size (the number of samples that get packed up in a single data report).

Semantics

Sets the default report block size. Valid values range from 1 to 10 and the initial default value is 10.

Notes

This will not change the current block size if sampling is already in progress when the command is received, but will set the new default for the next time sampling is started. This value is stored in the PIB EEPROM and will be maintained through power cycles/reboots of the system.

4.1.7 37SI destination

Syntax

37SI -d | --dest [destination]

Summary

Sets the default destination where the data reports are sent.

Semantics

Sets the default destination where the data reports are sent. The destination is specified in the standard 2 byte BoardID-TaskID nomenclature where address 0x0000 is the default communication channel to shore. Values must be specified as a HEX value. Initial default value is 0x0000 (i.e. send data to shore via default communication channel).

Notes

This will not change the current block size if sampling is already in progress when the command is received, but will set the new default for the next time sampling is started. This value is stored in the PIB EEPROM and will be maintained through power cycles/reboots of the system.

4.1.8 37SI status

Syntax

37SI -s | --status

Summary

Directs PIB to return the current state of the CTD.

Semantics

This command will generate a response from the PIB indicating the current state of the CTD. This will include Power on/off, sampling in progress or not, and the parameters that are used for sampling (period, report block size, and destination).

4.1.9 37SI id

Syntax

37SI -i | --id

Summary

Directs PIB to return serial number and version information for the CTD.

4.1.10 37SI cmd [command]

Syntax

37SI -c | --cmd [*command*]

Summary

This will pass through a user-generated command string .

Semantics

This command will pass through a user entered command to the 37SI CTD. Commands must be formatted appropriately for the CTD as specified in the CTD documentation. Data will be returned as best as possible from the CTD.

Notes

It must be noted that some configuration commands may leave the CTD in a state where behavior is not optimal for the PIB to interact with the CTD (examples are changing the baud rate or setting auto-run to Yes) so this command should be used with care.

5. Seabird GPCTD

The Seabird 37SI CTD has four commands. In addition, the user is able to bypass the PIB and send commands directly to the device - the equivalent of having the CTD plugged into a serial terminal on a computer and controlling it directly.

5.1 CTD on

Syntax

CTD -o | --on

Summary

Directs PIB to power on the CTD.

Semantics

This will apply power to the CTD. The return data will include the serial number of the CTD and the default sampling parameters (sample interval, report block size, and destination address).

Notes

This command will NOT start CTD sampling.

5.2 CTD off

Syntax

CTD -f | --off

Summary

Directs PIB to power down the CTD

Semantics

This will power down the CTD.

Notes

If the CTD was currently sampling data, the last packet will be sent with whatever data has been collected at this point, regardless of whether or not the number of samples specified in the report block size has been reached.

5.3 CTD AutoRun [mode]

Syntax

POWER -a | --autorun [mode]

Summary

Sets the Autorun mode.

Semantics

This command will turn the AutoRun feature On or Off. When AutoRun is On, the personality module will be powered on when the PIB starts up. When Autorun is Off, the personality module will not be powered on when the PIB starts. After the PIB is running, the power state can always be changed by sending a On or Off command. Valid parameters for the AutoRun command are On, Off, Yes, No, 1, or 0.

5.4 CTD run *[period][report block size][destination]*

Syntax

CTD -r | --run *[period][report block size][destination]*

Summary

Directs PIB to start the CTD sampling with either default settings or the given parameters.

Semantics

Sends the start command to the GPCTD in order to begin autonomous sampling on the CTD. The return will include serial number and the parameters used for the sampling (either default values or echoes back the new parameters). The parameters are as follows:

Period: This is the time between successive samples in seconds. The value must be between 1 and 3600 (1 second up to 1 hour). It is recommended not to run a sample rate faster than 30 seconds to avoid saturating the Iridium SBD bandwidth. Initial default value is 1 minute if never set by the user. The value is stored in EEPROM and will be maintained through PIB reboots.

Report Block Size: This is the number of samples that are packed into a single data report. The value must be between 1 and 10. Initial default value is 1 minute if never set by the user. The value is stored in EEPROM and will be maintained through PIB reboots.

Destination: This is a 2-byte hex address indicating where the data should be sent (shore, another payload, etc.) This uses the standard BoardID-TaskID nomenclature where address 0x0000 is sent to shore via the default communication channel. The value is stored in EEPROM and will be maintained through PIB reboots.

Notes

All parameters are optional, but if they are entered, they must be entered in the order specified. If you want to specify Destination address, you must also specify period and block size. If only the period needs to be specified, the block size and destination do not need to be sent in the command. If the CTD is currently off when this command is sent, it will power on the CTD and then start sampling. If the CTD is currently sampling data when this message is received and the parameters are different from the current sampling mode, the data collected up to this point will be transmitted and the CTD will be reset to use the new parameters for sampling, otherwise a "Sampling in progress" message will be returned in the ACK/NACK

5.5 CTD stop

Syntax

CTD -x | --stop

Summary

Directs PIB to stop the CTD sampling but leave the CTD powered on.

Semantics

Sends the stop command to the GPCTD in order to end autonomous sampling on the CTD. The data collected since the last report will be transmitted back to the desired destination at this point, regardless of whether the report block size has been reached.

5.6 CTD period

Syntax

CTD -p | --period [*period*]

Summary

Directs PIB to set the default sample period (in seconds) for use when the next start command is received.

Semantics

Sets the default sample period to use – valid values range from 1 second to 3600 seconds (1 hour). Sample rates faster than 30 seconds are not recommended since the amount of data collected has the potential to completely saturate the Iridium SBD communications at that point. The initial default value is 60 seconds.

Notes

This will not change the current sample interval if sampling is already in progress when the command is received, but will set the new default for the next time sampling is started. This value is stored in the PIB EEPROM and will be maintained through power cycles/reboots of the system.

5.7 CTD report block size

Syntax

CTD -z | --size [*report block size*]

Summary

Sets the default report block size (the number of samples that get packed up in a single data report).

Semantics

Sets the default report block size. Valid values range from 1 to 10 and the initial default value is 10.

Notes

This will not change the current block size if sampling is already in progress when the command is received, but will set the new default for the next time sampling is started. This value is stored in the PIB EEPROM and will be maintained through power cycles/reboots of the system.

5.8 CTD destination

Syntax

CTD -d | --dest [destination]

Summary

Sets the default destination where the data reports are sent.

Semantics

Sets the default destination where the data reports are sent. The destination is specified in the standard 2 byte BoardID-TaskID nomenclature where address 0x0000 is the default communication channel to shore. Values must be specified as a HEX value. Initial default value is 0x0000 (i.e. send data to shore via default communication channel).

Notes

This will not change the current block size if sampling is already in progress when the command is received, but will set the new default for the next time sampling is started. This value is stored in the PIB EEPROM and will be maintained through power cycles/reboots of the system.

5.9 CTD duty cycle

Syntax

CTD -y | --cycle [sensor off time]

Summary

This command sets up a duty cycle for the GPCTD. When told to run (start sampling), the firmware will collect one full packet of samples (as specified by the report block size parameter) at the specified sample period (as specified by the sample period). Once a full packet of data has been collected, the sensor will stop sampling for the amount of time specified by this command. After the wait period has elapsed, the sequence will repeat. As an example, if you want the CTD to sample at a 10 second interval, put 10 samples into a packet, and get one packet every 10 minutes (600 seconds), the sample period would be set to 10 seconds, the report block size would be set to 10 samples per packet (10 samples * 10 seconds per sample = 100 seconds to get one packet's worth of data) and this parameter would need to be set at 500 seconds (100 seconds for the sampling time and 500 seconds off = 600 seconds (or 10 minutes) for the whole duty cycle).

Semantics

Sets the amount of time the sensor will wait between blocks of samples (1 block of samples is specified by the report block size parameter). Valid values range from 0 seconds to 43200 seconds (12 hours)

Notes

This will not change the current cycle time if sampling is already in progress when the command is received, but will set the new default for the next time sampling is started. This value is stored in the PIB EEPROM and will be maintained through power cycles/reboots of the system.

5.10 CTD flush

Syntax

CTD -l | --flush [pre-pump time to flush plumbing]

Summary

This command when used in conjunction with the duty cycle will indicate how far in advance of starting the sampling for the data block that the pump should be turned on. The purpose of turning on the pump ahead of the sampling period is so that the plumbing lines can be flushed out before any measurements are taken. How long the pump needs to run depends on how much plumbing is involved in the system.

Semantics

This sets the amount of time the in advance of the sampling that the pump should run in order to flush out the plumbing. Valid values are $0 \leq \text{flush time} \leq 110$ seconds

Notes

This feature is only used in conjunction with the duty cycle. If this parameter is greater than the off time specified in the duty cycle, then the duty cycle time will take precedence when calculating the timing and the pump will run as long as possible before sampling start, even if it is less than the specified flush time. This value is stored in the PIB EEPROM and will be maintained through power cycles/reboots of the system.

5.11 CTD status

Syntax

CTD -s | --status

Summary

Directs PIB to return the current state of the CTD.

Semantics

This command will generate a response from the PIB indicating the current state of the CTD. This will include Power on/off, sampling in progress or not, and the parameters that are used for sampling (period, report block size, and destination).

5.12 CTD id

Syntax

CTD -i | --id

Summary

Directs PIB to return serial number and version information for the CTD.

5.13 CTD cmd [command]

Syntax

CTD -c | --cmd [command]

Summary

This will pass through a user-generated command string .

Semantics

This command will pass through a user entered command to the GPCTD. Commands must be formatted appropriately for the CTD as specified in the CTD documentation. Data will be returned as best as possible from the CTD.

Notes

It must be noted that some configuration commands may leave the CTD in a state where behavior is not optimal for the PIB to interact with the CTD (examples are changing the baud rate or setting auto-run to Yes) so this command should be used with care.

6. TeledyneATM-88X

The TeledyneATM-88X has six commands. In addition, the user is able to bypass the PIB and send commands directly to the device - the equivalent of having the device plugged into a serial terminal on a computer and controlling it directly.

6.1 *ATM On*

Syntax

ATM -o | --on

Summary

Power on the modem.

Semantics

This command will enable power to the personality module. The response will be an Ack Console Data containing the message "OK".

6.2 *ATM Off*

Syntax

ATM -f | --off

Summary

Power off the modem.

Semantics

This command will disable power to the personality module. If sampling is on, it will be turned off. The response will be an Ack Console Data containing the message "OK".

6.3 *ATM Run*

Syntax

ATM -r | --run [*samplePeriod*]

Summary

Starts sampling the modem.

Semantics

This command will start sampling the modem and sending back telemetry information. If the modem has not previously been turned on, this command will respond with an Ack Console Data instructing the user to turn it on.

The sample period (in minutes) determines how often the modem is sampled and reports back with telemetry. This parameter is required and must be positive. Each sample generates its own telemetry information. The response will be an Ack Console Data containing the message “OK”.

6.4 *ATM Stop*

Syntax

ATM -x | --stop

Summary

Stops sampling the modem.

Semantics

This command will stop sampling the modem and send back the last telemetry report. The response will be an Ack Console Data containing the message “OK”.

6.5 *ATM ID*

Syntax

ATM -i | --id

Summary

Sends back the modem identification information.

Semantics

This command will respond with an Ack Console Data identifying the modem.

6.6 *ATM Status*

Syntax

ATM -s | --status

Summary

Sends back the modem status.

Semantics

This command will respond with an Ack Console Data with the current status of the modem, indicating whether the modem is powered and if it is sampling.

6.7 ATM Cmd

Syntax

ATM -c | --cmd [*command*]

Summary

Sends the command directly to the device.

Semantics

This will attempt to send the given command to the modem. The command must be of nonzero length; otherwise the response will be a NAK. If the modem is still sampling, the response will be an Ack Console Data instructing the user to stop sampling. If successful, the response will be an Ack Console Data containing the response.

7. Turner C3

The Turner C3 has four commands. In addition, the user is able to bypass the PIB and send commands directly to the device - the equivalent of having the device plugged into a serial terminal on a computer and controlling it directly.

7.1 C3 Run / C3 On

Syntax

C3 -r | --run | -o | --on

Summary

Starts sampling the C3.

Semantics

This command will enable power and then start sampling the C3. The response will be an Ack Console Data containing the message "OK".

7.2 C3 Stop / C3 Off

Syntax

C3 -x | --stop | -f | --off

Summary

Stops sampling the C3.

Semantics

This command will stop sampling the C3 and disable power. Any remaining data reports will be sent back to shore. The response will be an Ack Console Data containing the message "OK".

7.3 C3 AutoRun [mode]

Syntax

POWER -a | --autorun [mode]

Summary

Sets the Autorun mode.

Semantics

This command will turn the AutoRun feature On or Off. When AutoRun is On, the personality module will be powered on when the PIB starts up. When Autorun is Off, the personality module will not be powered on when the PIB starts. After the PIB is running, the power state can always be changed by sending a On or Off command. Valid parameters for the AutoRun command are On, Off, Yes, No, 1, or 0.

7.4 C3 ID

Syntax

C3 -i | --id

Summary

Sends back the C3 identification.

Semantics

This command will respond with an Ack Console Data with identification information.

7.5 C3 Status

Syntax

C3 -s | --status

Summary

Sends back the C3 status.

Semantics

This command will respond with an Ack Console Data with the current status of the C3, indicating whether the C3 is sampling.

7.6 C3 Cmd

Syntax

C3 -c | --cmd

Summary

Sends the command directly to the device.

Semantics

This will attempt to send the given command to the C3. The command must be of nonzero length; otherwise the response will be a NAK. If successful, the response will be an Ack Console Data containing the response.

8. MBARI CO2

The MBARI CO2 Sensor has four commands. In addition, the user is able to bypass the PIB and send commands directly to the device - the equivalent of having the device plugged into a serial terminal on a computer and controlling it directly. Note, this is preliminary only at this point since the sensor and interface is still being developed.

8.1 CO2 On

Syntax

CO2 -o | --on

Summary

Turns on the CO2 Sensor.

Semantics

This command will enable power and then start sampling the sensor. The response will be an Ack Console Data containing the message "OK".

8.2 CO2 Off

Syntax

CO2 -f | --off

Summary

Turns off the CO2 Sensor.

Semantics

This command will disable power and stop sampling the sensor. The response will be an Ack Console Data containing the message "OK".

8.3 CO2 AutoRun [mode]

Syntax

POWER -a | --autorun [mode]

Summary

Sets the Autorun mode.

Semantics

This command will turn the AutoRun feature On or Off. When AutoRun is On, the personality module will be powered on when the PIB starts up. When Autorun is Off, the personality module will not be powered on when the PIB starts. After the PIB is running, the power state can always

be changed by sending a On or Off command. Valid parameters for the AutoRun command are On, Off, Yes, No, 1, or 0.

8.4 CO2 ID

Syntax

CO2 -i | --id

Summary

Sends back the CO2 sensor identification.

Semantics

This command will respond with an Ack Console Data with identification information.

8.5 CO2 Status

Syntax

CO2 -s | --status

Summary

Sends back the CO2 sensor status.

Semantics

This command will respond with an Ack Console Data with the current status of the CO2, indicating whether the CO2 is powered on and sampling.

8.6 CO2 Cmd

Syntax

CO2 -c | --cmd

Summary

Sends the command directly to the device.

Semantics

This will attempt to send the given command to the sensor. The command must be of nonzero length; otherwise the response will be a NAK. If successful, the response will be an Ack Console Data containing the response.