

PIB MPI

1. Summary

This document describes how to program the PIB and then configure it for any set of sensors or devices.

2. Requirements

- Communication Channel to the Float (preferably an Xbee Relay)
- Access to WGMS

3. Preparation

- Establish communication with the vehicle through WGMS
- Get the PIB binary file

4. Procedure

4.1 Upload PIB firmware

The PIBfirmware must be uploaded through WGMS and sent to the PIB.

First, the binary file must be written to the float. This is done with a "File Write Init" command. Make sure the board address is set correctly. For the PIB, the board ID is typically 0x01, which means a board address of 256.

Date 10/7/2011

Author: ArashUshani

Related Record - Google Chrome

gliders.liquidr.com/related/relatedDialog.aspx?id=&entitytype=44&orgid=1&newl

Related Record

Select a related record. Simple Command Form

Vehicle Command Related Info

Vehicle Command Info

Command R... Upload PiB firmware.

Vehicle  Command T... File Write Init

Command St... Created Target Wayp... 

From Waypoi...  To Waypoint 

Heading (deg)  Status 

Course  Vehicle Rudd... 

Storage Address 0 Board Address 256

File Type Code File Operation Ty... Default and Curri

Com Channel Xbee Communica Upload File  FullPiB.bin 

Copy ... Send Cancel

WMGS will then send the file to the float with a series of “File Write Block” commands. Over Xbee, this process will typically take about 20 minutes. Once this is completed, WGMS will automatically send a “Program Select” command. This initiates a File Write from the Float to the PIB. On an Xbee Console window, there will be messages indicating this transfer (messages like “File Write offset 40200/122192 to 0x0100”). This will take another 10 to 20 minutes.

Once this is completed, the PIB will restart itself, loading the new firmware.

4.2 Configure the PIB

The PIB itself has a few settings of its own that should be set properly.

Commands to the PIB and other devices and sensors are generally sent using the Write Console Script command. The function value should be 0, and the board address should be set according to the board ID of the PIB. The script buffer will contain the command itself. If a command is successful, the response will be an AckConsoleData that will contain an appropriate response as indicated in the LRI PIB User Guide.

By default the board ID of the PIB should be 0x01 or 0x02 (the task ID for the PIB is always 0x00). To verify this, request the PIB ID information. This is done by sending a Write Console Script command with the message “pib -id” to the board address 256(which is decimal for 0x0100) or 512 (which is decimal

Date 10/7/2011

Author: ArashUshani

for 0x0200), as shown below (all examples below assume a board ID of 0x01 with a task ID of 0x00 for an address of 0x0100 or 256 in decimal).

Verify the board address by watching the enumeration of the PIB in the XBee console window after powering it on.

Related Record - Google Chrome

gliders.liquidr.com/related/relatedDialog.aspx?id=&entitytype=44&orgid=1&newEntity=0&

Related Record

Select a related record. Simple Command Form

Vehicle Command **Related Info**

Vehicle Command Info

Command Rea... PiB ID Request

Vehicle  Command Type Write Console Script

Command Stat... Created Target Waypoint 

From Waypoint  To Waypoint 

Heading (deg) Status 

Course Vehicle Rudder... 

Function 0 Board Address 256

File Type Unspecified Operation Type Current Image

Com Channel Xbee Communication Upload File 

Read File Name Security Manif... 

Script Buffer pib -id

Copy ... Send Cancel

Send this command. If it does not Ack, it is likely because the PIB was turned off or the board address has been changed.

Once the command is Acked, double click on the command in the WGMS command history. Switch to Command Form, and look under Raw Outputs. There should be an AckConsoleData listed. Scroll to the right and expand the "Console Ack" column to read the message, as shown.

Date 10/7/2011

Author: ArashUshani



This message includes some information for the PIB, including version, board ID, and a power down delay time.

To change the board ID, send a Write Console Script command to the appropriate board address. The command is "pib-boardID", followed by the new board ID. For example, to set the board ID to 0x02, the command is "pib-boardID 0x02". This is shown in the following picture.

Date 10/7/2011

Author: ArashUshani

Related Record - Google Chrome

gliders.liquidr.com/related/relatedDialog.aspx?id=&entitytype=44&orgid=1&newEntity=0&Vel

Related Record

Select a related record. Simple Command Form

Vehicle Command Related Info

Vehicle Command Info

Command Rea... Set PiB board ID to 0x02

Vehicle  Command Type Write Console Script

Command Status Created Target Waypoint 

From Waypoint  To Waypoint 

Heading (deg) Status 

Course  Vehicle Rudder ... 

Function 0 Board Address 256

File Type Unspecified Operation Type Current Image

Com Channel Xbee Communication Upload File 

Read File Name Security Manifest 

Script Buffer pib --boardID 0x02

Copy ... Send Cancel

After the command Acks, navigate to the Console Ack as previously described. The response will be something like "OK -- Board ID will be 02 after payload reboot".

To finish setting the board address, power cycle the PIB by turning the payload power off and then back on. Remember that the board address for the PIB (and any other devices and sensors) will now have changed according to the new board ID.

The PIB's power down delay time can also be set. This is the time that the PIB requests the float to wait after it receives a power off request. This value should be set according to the longest time needed by any of the devices or sensors that are connected to the PIB to power down. This value is sensor specific and more often than not, the default value of 1 will be appropriate

To set the power down delay time, send a Write Console Script command to the PIB. The command is "pib--setDly" followed by the time, in seconds. For example, to set the delay time to 10 seconds, the command would be "pib --setDly 10". The response will be an AckConsoleData with a message that looks like "OK -- Power down delay set to 10 seconds".

Date 10/7/2011

Author: ArashUshani

4.3 Configure the PIB's Personality Modules

The PIB's Personality Modules need to be configured accordingly to what sensors are connected.

To read the current configuration, send a Write Console Script command as previously described to the PIB. The command is `"pib --cfg"`. The response is an AckConsoleData that will indicate the current configuration for each personality module, in addition to the current setting for the power down delay time. The message will look something like `"PM1=37SI PM2=SMC PM3=EMPTY Power Down Delay = 10 seconds"`.

The default configuration for the PIB is for all personality modules to be set to empty. This setting can be used if nothing is connected to a personality module. An empty sensor will only respond to an ID command (`"empty -id"`) to identify itself.

Each personality module for the PIB should be configured one a time. There are three commands, `"pib --pm1"`, `"pib --pm2"`, `"pib --pm3"`, each of which should be followed by the setting. Possible sensor settings are described in the following table.

Sensor Setting	Command String
Empty Module	EMPTY
Power On/Off	POWER
Payload Communications	COMM
SMC	SMC
Seabird 37SI CTD	37SI
Seabird GPCTD	CTD
Turner C3	C3
Teledyne ATM-88X Modem	ATM
MBARI CO2 Sensor	CO2

For example, possible configuration commands are:

```
pib --pm1 37SI
pib --pm2 SMC
pib --pm3 EMPTY
```

Each command will result in an AckConsoleData. The response will contain a message indicating the current configuration of the PIB (this is the same message as returned by `"pib --cfg"`).

Once the correct configuration is set, the PIB must be powered off and then powered back on. It is only after the PIB has been power cycled that the correct tasks will be running.

5. Test

To test if the PIB configuration is correct, simple commands can be sent to the tasks for the sensors connected to the personality modules. Other than SMC and COMM, each setting will run an associated task on the PIB that will respond to a "Write Console Script" command.

Date 10/7/2011

Author: ArashUshani

These commands must be addressed appropriately. The board ID is the same as the PIB's. Each personality module will have its own task ID (0x01 for personality 1, 0x02 for personality 2, and 0x03 for personality 3). For example, if the board ID for the PIB is 0x01, a command for personality 2 should be addressed to 0x0102, or 258.

Every task will respond to an ID command. This command will be the sensor setting followed by "--id". For example, a command could be "empty --id" or "ctd--id". The response will be an AckConsoleData. The message will contain identifying information and a serial number, if available. If the command Nacks, it is likely due an incorrect address or a command for the wrong sensor. If the command Acks but indicates it was unsuccessful at reading the serial number of the device, it is likely that the sensor is not connected properly, the sensor is connected through the umbilical/rudder module and needs Sub Payload Power to be turned on, or that the sensor setting is incorrect.

6. Debug

If a command Nacks, possible reasons are:

- The appropriate payload port has not been powered on or the PIB has not yet enumerated.
- The board address is incorrect. If changing the board address, recall that the address change does not take effect until the PIB is restarted. Also recall that each personality module will have its own board address.
- The command is invalid. Check for typos or missing parameters. Recall that a command always starts with the device or sensor it is for. For example, "--id" is not a valid command and "ctd --id" is an invalid command if being sent to the PIB even though the PIB has a corresponding command.

7. Compatibility with older versions

The following table provides a mapping from previous versions of PIB firmware to a similarly configured version of the new PIB firmware. The left hand column indicates the previous version of the PIB firmware and the 3 right hand columns indicate the configuration of the 3 personality modules in the new PIB firmware to mimic the set-up of the original firmware.

PIB Set-Up With Firmware Version >=2.1.368

Old PIB Firmware Version	PM #1	PM #2	PM #3
PIB FW Version 1.0.182 (Arena #02637-00)	Power or Comm (Autorun On if power and PIB >= 2.1.384)	Power or Comm (Autorun On if power and PIB >= 2.1.384)	Power or Comm (Autorun On if power and PIB >= 2.1.384)
PIB FW Version 1.0.6182 (Arena #02637-01)	Power or COMM (Autorun On if power and PIB >= 2.1.384)	SMC	Empty

Date 10/7/2011

Author: ArashUshani

PIB FW Version 1.0.5182 (Arena #02637-02)	Power or COMM (Autorun On if power and PIB >= 2.1.384)	SMC	Empty
PIB FW Version 1.0.184 (Arena #02637-03)	37SI	37SI	37SI
PIB FW Version 1.0.192 (Arena #02637-04)	ATM	ATM	ATM
PIB FW Version 1.0.240 (Arena #02637-05)	C3	C3	C3
PIB FW Version 2.0.325 (Arena #02637-06)	CTD	CTD	CTD
PIB FW Version 2.0.340 (Arena #02637-07)	CTD	SMC	Empty
PIB FW Version 2.0.342 (Arena #02637-11)	CTD	SMC	Empty
PIB FW Version 33.005 (Arena #02637-08)	Not yet supported	Not yet supported	Not yet supported
PIB FW Version 33.010 (Arena #02637-09)	Not yet supported	Not yet supported	Not yet supported