Gill Blade Sensor Developer's Guide

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1. Overview

This document serves as an aid towards low-level configuration of the Gill Technology Blade Sensor. The document is applicable to Blade firmware versions 2.xx. The information contained within is meant as a guide and the user is assumed to have a reasonable understanding of embedded systems.

2. Technical overview

All configuration parameters are stored within a single string of hexadecimal values. There are two main types of data that are covered in this document.

- Boolean types that can only take the values 1 or 0.
- 16-bit variables

3. Mapping overview

Below is an example configuration string.

2004 0000 1200 8000 822D 83F4 8067 00FA 000A 8080 7F7F

The string is divided up into hexadecimal quads (groups of 4 hexadecimal digits, space separated). The second quad can be further divided (explained later). The first quad is to be ignored, the second quad contains various configuration Booleans and a filter setting (filter settings are not explained in this revision). All other quads contain single specific settings (i.e. 1200 determines the range of the sensor).

4. Command set

The following commands may be entered using a terminal application configured to 19200 baud, 8 data bits, no parity, 1 stop bit. Each command is directly related to a specific hexadecimal quad in the configuration string with the exception of the following requests. Commands are case sensitive.

Requests

Syntax	Action
C<CR>*	Display current config string.
V<CR>	Display unit identity.
D<CR>	Display debug data.
<CR>	Display sensor position and activator strength

*<CR> = Carriage Return on keyboard.

Commands (full 2-coil instruction set)

Syntax	Range <????>Hex	Action
Cal#<????><CR>*	0000-FFFF	Sets configuration bits held in the second hex quad. Explained below.
CalR<????><CR>	0000-FFFF	Sets the sensor range.
CalS<????><CR>	6001-A000	Sets the sensor analogue/PWM o/p shift. 8000 hex relates to zero offset. Exceeding limits is not recommended.
CalO<????><CR>	6001-A000	Sets the Vee mode output offset. 8000hex relates to zero offset.
CalT<????><CR>	8000-83FF	Sets the upper analogue output limit. 8000hex relates to zero volts. Should be a value greater than the lower limit.
CalB<????><CR>	8000-83FF	Sets the lower analogue output limit. 8000hex relates to zero volts.
CalA<????><CR>	0-1023	Activator strength threshold representing loss of activator.
CalD<????><CR>	0-7FF	Analogue dropout level, representing 0v-4.2v.
CalH<????><CR>	6001-A000	High proximity switch point. 8000hex is zero.
CalL<????><CR>	6001-A000	Low proximity switch point. 8000hex is zero.

*<????> = Hexadecimal quad value that relates to the required configuration.

5. Configuration bit-mapping

The hexadecimal quad for the Cal# command is structured as follows. This is the second quad in the configuration string.

0000 – default state

This quad can be split into a further two sets of bytes.

1 *2*
00 00

The first byte contains configuration bits. The second byte contains other settings and some unused bits. Expanding the hexadecimal coded byte into raw bits (binary) gives.

1
0 0 0 0 0 0 0 0 = 00 Hex

Each one of the above 8 bits controls configuration parameters within the sensor. Modes of operation are selected by setting individual bits to ‘1’ or ‘0’.

The configuration is mapped onto the bit pattern as follows.

1
0 0 0 0 0 0 0 0 Bits
7 6 5 4 3 2 1 0 Bit number

Bit no.	State	Action	State	Action
0	0	Analogue mode	1	PWM mode
1	0	250Hz PWM	1	1KHz PWM
2	0	Normal analogue/PWM output	1	Reversed analogue/PWM output
3	0	Sticky position off	1	Sticky position on
4	0	Vee mode off	1	Vee mode on
5	0	Proximity reverse off	1	Proximity reverse on
6	0	Proximity default low	1	Proximity default high
7	0	Sticky proximity off	1	Sticky proximity on

***1* - Bit settings**

Bit no.	Name	Action
1, 0	Data filter (msb, lsb)	Filter setting level 0 – 3 (BCD)*
2	Not used	Not used
3	Not used	Not used
4	Not used	Not used
5	Not used	Not used
6	Not used	Not used
7	Not used	Not used

*(BCD = Binary Coded Decimal)

***2* – Bit settings**

As an example if a configuration of PWM mode, 1KHz PWM o/p, Reversed o/p is required, the resulting bit pattern would be.

1
0 0 0 0 0 1 1 1 = 07 Hex

The final configuration string would be.

2004 0700 1200 8000 822D 83F4 8067 00FA 000A 8080 7F7F