TGAM1 Spec Sheet

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NeuroSky
Brain-Computer Interface Technologies

The NeuroSky product families consist of hardware and software components for simple integration of this bio-sensor technology into consumer and industrial end-applications. All products are designed and manufactured to meet exacting consumer specifications for quality, pricing, and feature sets. NeuroSky sets itself apart by providing building-block component solutions that offer friendly synergies with related and complementary technological solutions.

Contents

Technical Specifications

General

Classification	Specification	Notes
Product Family	ThinkGear-AM	A = ASIC, M = Module
Model Number	TGAM1	
Revision Number	2.3	
Module Dimension (Max)	27.9mm x 15.2mm x 2.5mm	1.10in x 0.60in x 0.10in (L x W x H)
Module Weight (Max)	130mg	0.0045 ounces
Operating Voltage	2.97V ~ 3.63V	Stuff Option* SP6200 3.0~6.0V MAX1595 1.8~5.5V
Max Input Voltage Noise	10mV Peak to Peak	
Max Power Consumption	15mA @ 3.3V	
ESD Protection	4kV Contact Discharge 8kV Air Discharge	Tested at EEG, REF, GND
Output Interface Standard	UART(Serial)	TX, RX, VCC(+), GND(-)
Output Baud Rate	1200, 9600, 57600	Default set with stuff option
#EEG Channels	1	3 contacts (EEG, REF, GND)

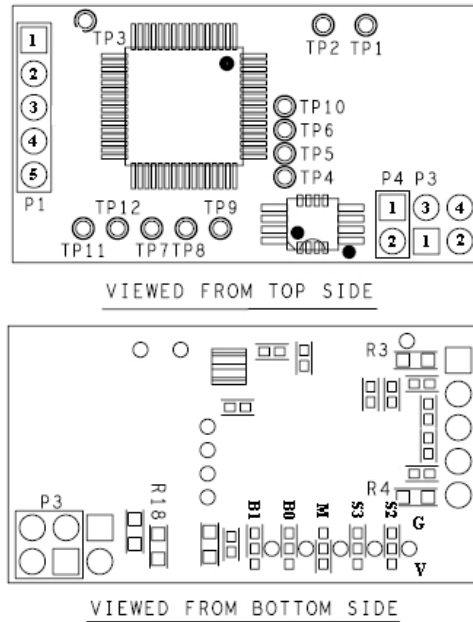*Check with NeuroSky Sales for price addition.*

I/O Pins

Figure 1.1: Board Layout

Header P1 (Electrode)
Pin1: EEG Electrode "EEG"
Pin2: EEG Shield
Pin3: Ground Electrode
Pin4: Reference Shield
Pin5: Reference Electrode "REF"

Header P4 (Power)
Pin1: VCC "+"
Pin2: GND "-"

Header P3 (UART/Serial)
Pin1: GND "-"
Pin2: VCC "+"
Pin3: RXD "R"
Pin4: TXD "T"

Note: Labels in "" indicated on PCB for convenience.

Serial Communication

This section only outlines parts that are different from the standard ThinkGear API[1]. Please refer to the ThinkGear API and Reference Manual for more details.

ThinkGear CODE

The code that may appear in the ThinkGear packets are listed in the following table.

Code	Length	Value	Default Setting
0x02	N/A	Poor Quality (0-200)	On
0x04	N/A	eSense Attention (0-100)	On
0x05	N/A	eSense Meditation (0-100)	On
0x80	2	10-bit Raw EEG	Off
0x83	24	EEG Powers (integer)	On

Command Bytes

The command bytes supported by TGAM1 is listed below.

```
Page  0 (0000____) (0x0_):  STANDARD/ASIC CONFIG COMMANDS* **
    00000000 (0x00): 9600 baud, normal output mode
    00000001 (0x01): 1200 baud, normal output mode
    00000010 (0x02): 57.6k baud, normal+raw output mode
```

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[1] Application Programming Interface

Configurable Default Settings

TGAM1 has configuration pads that can be used to change two default settings that are applied at chip power up. The configuration pads are located on the backside of the TGAM1, as indicated by the red square in Figure 3.1. The BR0 and BR1 pads configure the output baud rate and data content, after the TGAM1 powers up. The M pad configures the notch filter frequency.
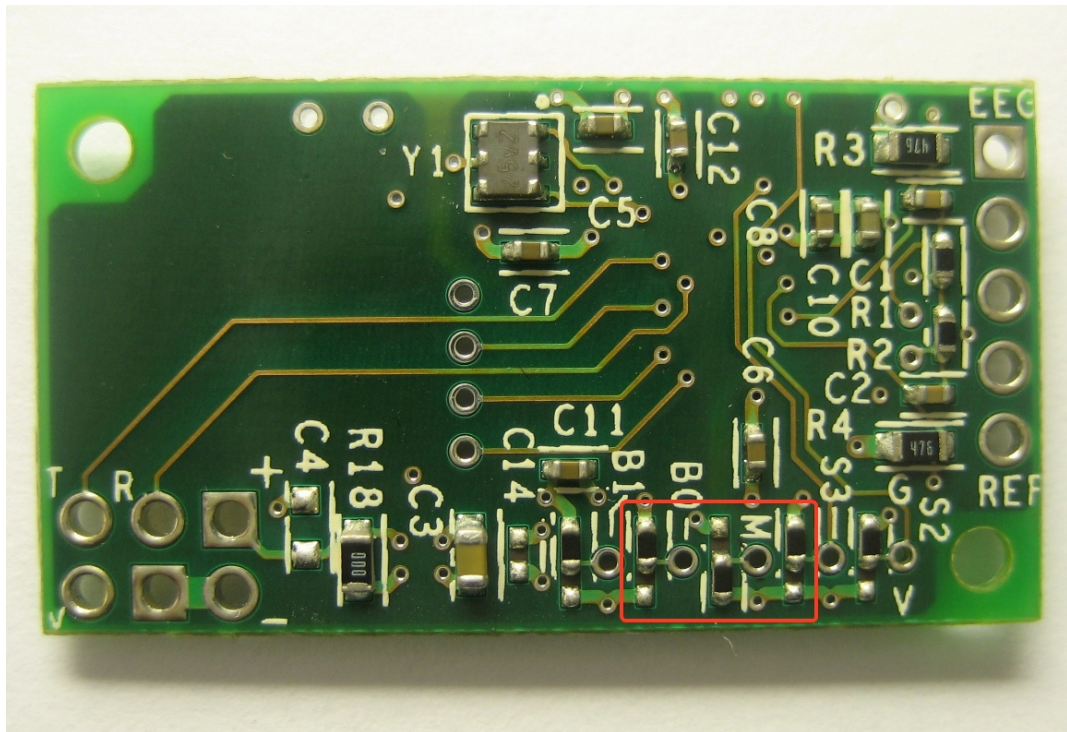

Figure 3.1: TGAM1's Configuration Pads

BR1	BR0	Function
GND	GND	9600 Baud with Normal* Output Mode
GND	VCC	1200 Baud with Normal* Output Mode
VCC	GND	57.6k Baud with Normal* + Raw Output Mode
VCC	VCC	N/A

Normal Output mode includes the following output: poor quality value, EEG value, Attention value and Meditation value.

A magnified picture of the B1 and B0 pads are shown in Figure 3.2. The first row of pads are GND and third row of pads are VCC. The TGAM1 output baud rate and data content after power up behavior

depends on the pad setting as described in table above. For example, the stuff option in the module in Figure 3.1 has both BR1 and BR0 tie to GND pads for a 9600 baud with Normal Output Mode.
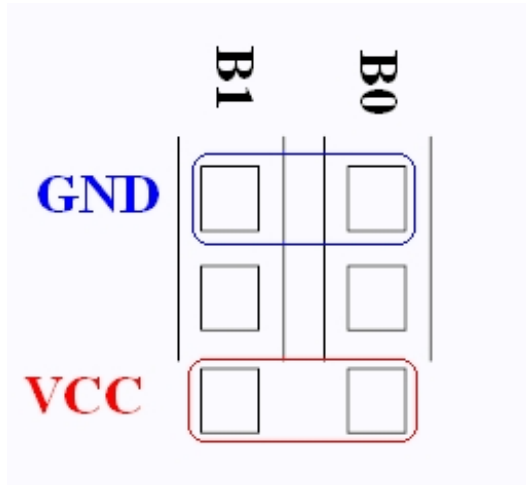

Figure 3.2: B0 and B1 pads

The baud rate can also be configured after the module is powered up by sending commands through the UART interface. The commands are listed in the table below. When the module is reset, the baud rate setting will revert back to the default set by BR0 and BR1.

Command	Function
0x00	9600 Baud with Normal* Output Mode
0x01	1200 Baud with Normal* Output Mode
0x02	57.6k Baud with Normal* + Raw Output Mode

Normal Output mode includes the following output: poor quality value, EEG value, Attention value and Meditation value.
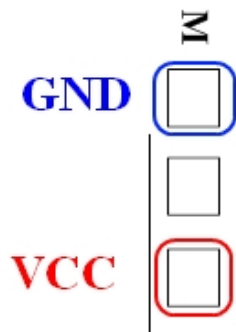

Figure 3.3: M pad

As mentioned earlier, TGAM1's notch filter frequency can be configured with the M configuration

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pads. It is used to select either 50Hz or 60Hz to reduce the AC noise specific to a targeted market. As indicated in Figure 3.3, the top pad is GND and bottom pad is VCC. Tie the M pad to VCC pad to select 60Hz, and to GND pad to select 50Hz notch filtering frequency.

Unlike the BR0, BR1 configuration, there is no equivalent software configuration for the M configuration. The most common stuff option for these configuration pads are illustrated in Figure 3.1, configuring the TGAM1 for 9600 Baud, normal output and 60Hz notch filtering frequency. For other stuffing options, contact NeuroSky Sales to get the correct ordering code.

Mechanical Drawing

The dimensions and major components of the TGAM1 is shown in the mechanical drawing in Figure 4.1. There are two mounting holes at the upper right and lower left corner. They can be used to secure the TGAM1 to your system housing.
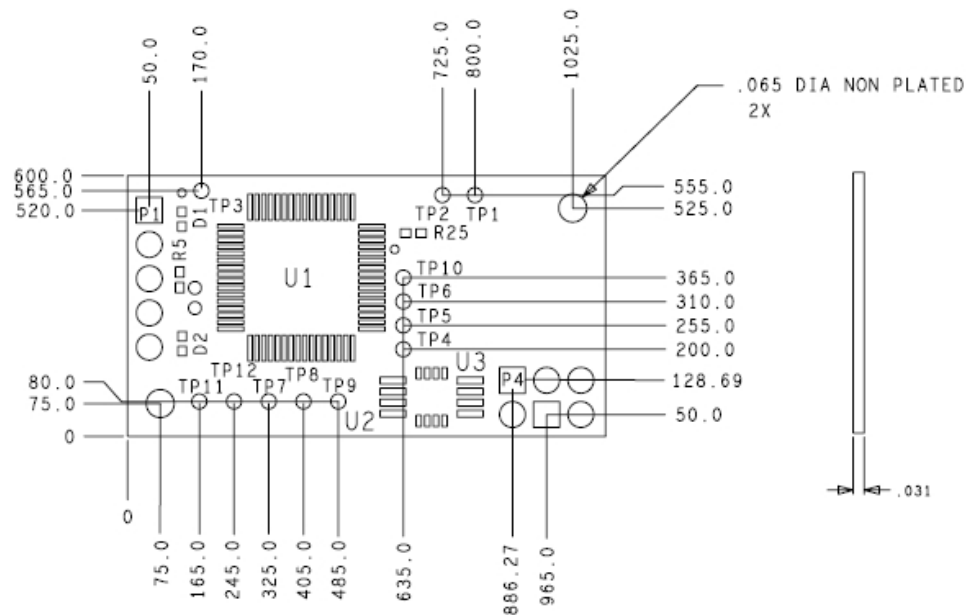

Figure 4.1: Mechanical Drawing & Thickness