



## 1 PURPOSE OF DOCUMENT

This document specifies the gyro performance of other gyro ranges than the 400°/s range covered by the STIM300 Datasheet.

Numbering of sections, tables, figures and equations from page 3 refers directly to the corresponding numbering in the STIM300 Datasheet.

## 2 REFERENCE DOCUMENT

- STIM300 Datasheet, TS1524 rev.25 and later

## 3 GYRO RANGES

**Table 3-1: Gyro ranges not covered by STIM300 Datasheet**

1200°/s
2000°/s

## 4 ABBREVIATIONS USED IN DOCUMENT

**Table 4-1: Abbreviations**

ABBREVIATION	FULL NAME
TBD	To Be Defined

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TABLE OF CONTENTS

DOCUMENT HISTORY ..... 1

1 PURPOSE OF DOCUMENT ..... 1

2 REFERENCE DOCUMENT ..... 1

3 GYRO RANGES ..... 1

4 ABBREVIATIONS USED IN DOCUMENT ..... 1

6 SPECIFICATIONS ..... 3

    6.3.3 Configuration datagram ..... 3

8 BASIC OPERATION ..... 4

    8.5.2.2 Gyro output unit = Angular Rate ..... 4

    8.5.2.3 Gyro output unit = Incremental Angle ..... 4

    8.5.2.5 Gyro output unit = Integrated Angle ..... 5

9 CONFIGURATION / ORDERING INFORMATION ..... 6

## 6 SPECIFICATIONS

**Table 6-1: Operating conditions**

Parameter	Gyro range	Min	Nom	Max	Unit	Note
INPUT RANGE, ANGULAR RATE	1200°/s		±1200		°/s	
	2000°/s		±2000		°/s	

**Table 6-3: Functional specifications, gyros**

Gyro range	Full Scale (FS) <sup>1,2</sup>	Resolution	Non-Linearity @800°/s	Non-Linearity @FS	Bias Instability	Angular Random Walk
1200°/s	±1200°/s	0.66°/h	100ppm	TBD	0.3°/h	Ref.datasheet
2000°/s	±2000°/s	1.10°/h	100ppm	TBD	0.4°/h	0.20°/√hr

**Notes:**

Note 1: Output is monotonous and will saturate at maximum value according to data-format, at 28% above range

Note 2: Overload-bit will be set in STATUS-byte at 20% above range

### 6.3.3 Configuration datagram

**Table 6-15: Specification of the Configuration datagram**

15	0	0	1	0	x	x	x	x	High nibble: Gyro range, x-axis - 1200°/s - 2000°/s
	0	1	0	0	x	x	x	x	
	x	x	x	x	0	0	1	0	Low nibble: Gyro range, y-axis - 1200°/s - 2000°/s
	x	x	x	x	0	1	0	0	
16	0	0	1	0	x	x	x	x	High nibble: Gyro range, z-axis - 1200°/s - 2000°/s
	0	1	0	0	x	x	x	x	



**8 BASIC OPERATION**

**8.5.2.2.2 Gyro output unit = Angular Rate**

In the case of STIM300 being configured to output angular rate, Equation 2 shows how to convert to [°/s]. Note that the output data is represented as two's complement.

**Equation 2: Converting output to [°/s]:**

Gyro range	Conversion:
1200°/s	$Output[°/s] = \frac{(AR_1) \cdot 2^{16} + (AR_2) \cdot 2^8 + (AR_3)}{5461}$
2000°/s	$Output[°/s] = \frac{(AR_1) \cdot 2^{16} + (AR_2) \cdot 2^8 + (AR_3)}{3277}$

where AR<sub>1</sub> is the most significant byte of the 24bit output  
 AR<sub>2</sub> is the middle byte of the 24bit output  
 AR<sub>3</sub> is the least significant byte of the 24bit output

Figure 8-7: Not valid

**8.5.2.2.3 Gyro output unit = Incremental Angle**

In the case of STIM300 being configured to output incremental angle per sample, the equations for conversion to [°/sample] can be found in Equation 3. Note that the output data is represented as two's complement.

**Equation 3: Converting output to [°/sample]**

Gyro range	Conversion:
1200°/s	$Output[°/sample] = \frac{(IA_1) \cdot 2^{16} + (IA_2) \cdot 2^8 + (IA_3)}{699051}$
2000°/s	$Output[°/sample] = \frac{(IA_1) \cdot 2^{16} + (IA_2) \cdot 2^8 + (IA_3)}{419430}$

where IA<sub>1</sub> is the most significant byte of the 24bit output  
 IA<sub>2</sub> is the middle byte of the 24bit output  
 IA<sub>3</sub> is the least significant byte of the 24bit output

Figure 8-8: Not valid



#### 8.5.2.2.5 Gyro output unit = Integrated Angle

In the case of STIM300 being configured to output integrated angle, the transmitted data will be the continuously integrated angle since power-on or reset. The integrated angle takes values in the interval:

$\pm 1200^\circ/\text{s}$ :  $[-12^\circ, 12^\circ>$

$\pm 2000^\circ/\text{s}$ :  $[-20^\circ, 20^\circ>$

and will naturally wrap-around with no error-message indication in the Status-byte.

Conversion to  $[\circ]$  is the same as for incremental angle and is described in Equation 3.

**12 CONFIGURATION / ORDERING INFORMATION**

The STIM300 will be delivered according to the configuration code as shown below. All configuration parameters can be changed later in Service Mode, ref. section 8.5.3. A full list of configurable parameters can be found in Table 6-8.

Configuration parameters in **bold** letters show the standard option.

Range		Measurement						Output/RS422			
Prod_ID	-	Sample rate	Filter bandwidth	Gyro output unit	Acc. output unit	Incl. output unit	Gyro g-comp	-	Datagram	Bit-rate	Termination

STIM300		
Prod_ID	Gyro	Acc
84789	1200°/s	5g
84681	1200°/s	10g
84790	1200°/s	30g
84791	1200°/s	80g
TBD	2000°/s	5g
TBD	2000°/s	10g
TBD	2000°/s	30g
TBD	2000°/s	80g

Sample rate:
0 = 125 samples/s
1 = 250 samples/s
2 = 500 samples/s
3 = 1000 samples/s
<b>4 = 2000 samples/s</b>
5 = External Trigger

Filter bandwidth:
0 = 16Hz
1 = 33Hz
2 = 66Hz
3 = 131Hz
<b>4 = 262Hz</b>

Gyro output unit:
<b>0 = Angular Rate [°/s]</b>
1 = Incremental Angle [°/sample]
2 = Average Angular Rate [°/s]
3 = Integrated Angle [°]
8 = Angular Rate [°/s] – delayed
9 = Incremental Angle [°/sample] – delayed
A = Average Angular Rate [°/s] – delayed
B = Integrated Angle [°] - delayed

Acc. output unit:
<b>0 = Acceleration [g]</b>
1 = Incremental Velocity [m/s/sample]
2 = Average Acceleration [g]

Incl. output unit:
<b>0 = Acceleration [g]</b>
1 = Incremental Velocity [m/s/sample]
2 = Average Acceleration [g]

Gyro g-comp				
	Bias		Scale-factor	
	Source	0.01Hz-filter	Source	0.01Hz-filter
<b>0</b>	<b>OFF</b>	-	<b>OFF</b>	-
1 <sup>1)</sup>	OFF	-	ACC	OFF
2	OFF	-	ACC	ON
3 <sup>1)</sup>	ACC	OFF	OFF	-
4	ACC	ON	OFF	-
5 <sup>1)</sup>	INC	OFF	OFF	-
6	INC	ON	OFF	-
7 <sup>1)</sup>	ACC	OFF	ACC	OFF
8 <sup>1)</sup>	ACC	ON	ACC	OFF
9 <sup>1)</sup>	INC	OFF	ACC	OFF
A <sup>1)</sup>	INC	ON	ACC	OFF
B	ACC	ON	ACC	ON
C	INC	ON	INC	ON

Datagram					
	Included data				
	Rate	Acceleration	Inclination	Temperature	AUX
0	YES	NO	NO	NO	NO
1	YES	YES	NO	NO	NO
2	YES	NO	YES	NO	NO
<b>3</b>	<b>YES</b>	<b>YES</b>	<b>YES</b>	<b>NO</b>	<b>NO</b>
4	YES	NO	NO	YES	NO
5	YES	YES	NO	YES	NO
6	YES	NO	YES	YES	NO
7	YES	YES	YES	YES	NO
8	YES	NO	NO	NO	YES
9	YES	YES	NO	NO	YES
A	YES	NO	YES	NO	YES
B	YES	YES	YES	NO	YES
C	YES	NO	NO	YES	YES
D	YES	YES	NO	YES	YES
E	YES	NO	YES	YES	YES
F	YES	YES	YES	YES	YES

Bit-rate:
0 = 374400 bits/s
1 = 460800 bits/s
<b>2 = 921600 bits/s</b>
3 = 1843200 bits/s <sup>2)</sup>
F = User-defined <sup>2+3)</sup>

Termination		
	Line	Datagram
0	OFF	None
<b>1</b>	<b>ON</b>	<b>None</b>
2	OFF	<CR><LF>
3	ON	<CR><LF>

RS422 data configuration	
#Start bit	1
#Data bits	8
#Stop bits	1 <sup>4)</sup>
Parity	None <sup>4)</sup>

- 1) Delayed gyro output unit should be selected with this option
- 2) USB-based evaluation kit works at bit-rates ≤ 1.5Mbit/s + 2Mbit/s and 3Mbits/s
- 3) Bit-rate must be specified. See section 10.5 for limitations
- 4) Configuration can be changed in SERVICEMODE. See section 10.5



NOTES

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