

Bitrelle Inertial Sensor Module

Manual

1 Specifications

Bitrelle Tech SCHAEFER Rapid Prototyping and Development Inertial Sensor Module.

Gyro Sensors

Analog Devices high precision MEMS gyros x 3

Precisely angular arrangement

Measurement Range: selectable 80°/sec, 160°/sec or 320°/sec

Resolution: 0.018 °/sec @ 80°/sec

Nonlinearity: 0.1%

In-run bias stability: 0.016°/sec

Temperature Coefficient: 0.005°/sec

Angular random walk: 3.6°/sqrt-hour

Sensor 3dB Bandwidth: typ. 50Hz

Acceleration Sensor

ST MEMS 3-axis accelerometer

Measurement range: selectable 2g or 6g

Resolution: 1mg @ 2g

Nonlinearity: 2% on x, y-axis, 3% on z-axis @2g

In-run bias stability: 1.8% on x, y-axis, 2.2% on z-Axis @6g

Temperature Coefficient: 0.2mg/°C

Sensor Bandwidth: min. 40Hz

Dimensions

Length x Width: 50,8mm x 50,8mm

Height: 17,5 mm

Stacking Height: 5mm

Bores

Bore Diameter: 3,2mm

Distance: 44,8mm

Operating Voltage

Gyro Voltage: stabilized 5V from Expansion Port

Accelerometer Voltage: stabilized 3.3V from Expansion Port

Operating Current

Gyro Current normal mode: typ. 18mA each

Gyro Current fast mode: typ. 44mA each

Accelerometer Current: max. 1mA

Inertial Sensor Module Current with 3 Gyros in fast mode: typ. 133mA

Operating Temperature

Ambient Temperature: -40°C .. 85°C

Expansion Ports

Number of Ports: 2

Length x Width: 17,2mm x 3,8mm

Stacking Height: 5mm

Number of Pins: 60

12 Pins used by Inertial Sensor Module: 11, 12, 14, 15, 16, 39, 40, 41, 42, 48, 49, 50

Pins used by Accelerometer:

Pin 11: RDY/INT-signal

Pin 12: CS-signal

Pin 14: MOSI1 (SPI1)

Pin 15: MISO1 (SPI1)

Pin 16: SCK1 (SPI1)

Pins used by Gyroscope:

Pin 39: /RST-signal

Pin 40: /CS-Z-axis

Pin 41: /CS-Y-axis

Pin 42: /CS-X-axis

Pin 48: MOSI0 (SPI0)

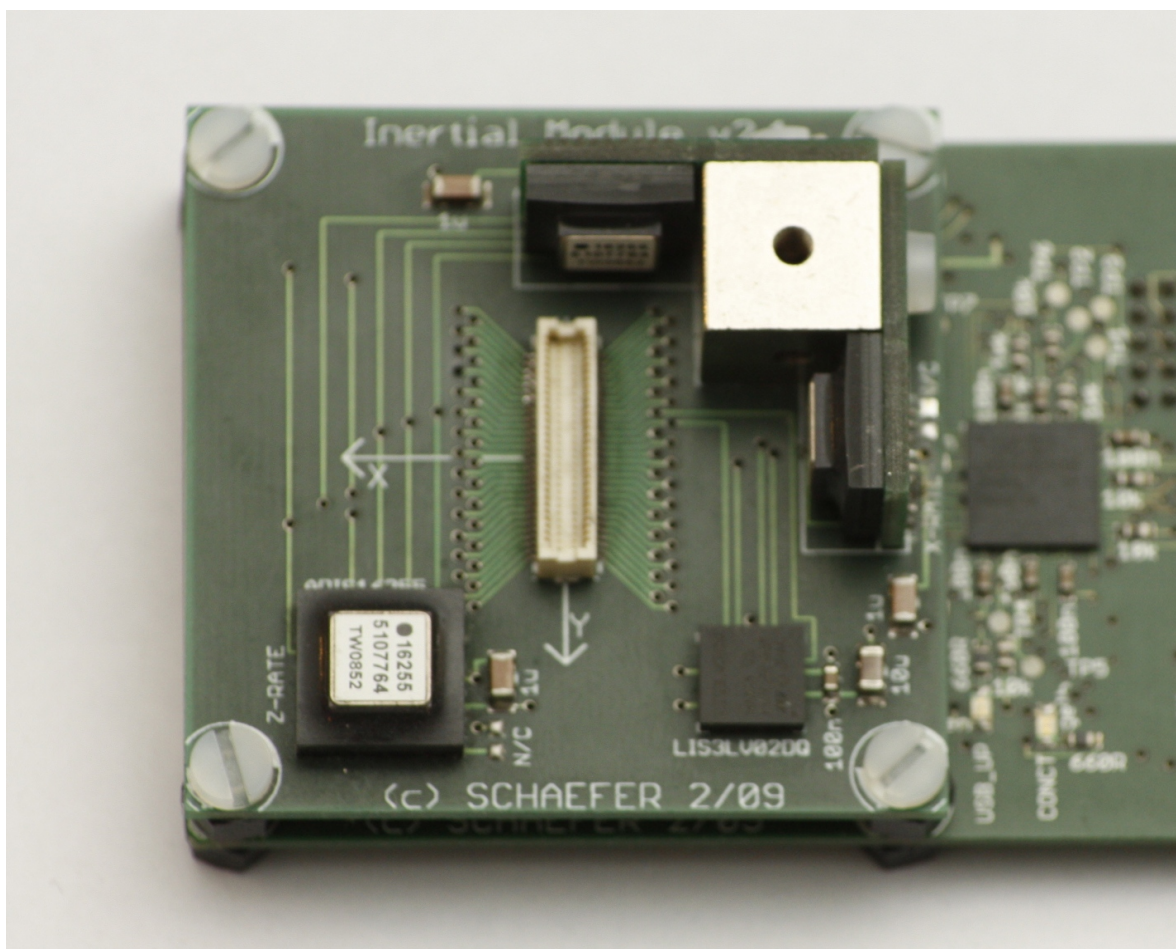
Pin 49: MISO0 (SPI0)

Pin 50: SCK0 (SPI0)

2 Operation

To operate our Bitrelle Tech SCHAEFER Rapid Prototyping and Development Inertial Sensor Module:

1. Connect board with the microcontroller board.
2. Check for correct polarities, localize Expansion Port Pin 1
3. Start microcontroller board operation procedure
4. Start software development with tutorial Tut62_GYRO_USB



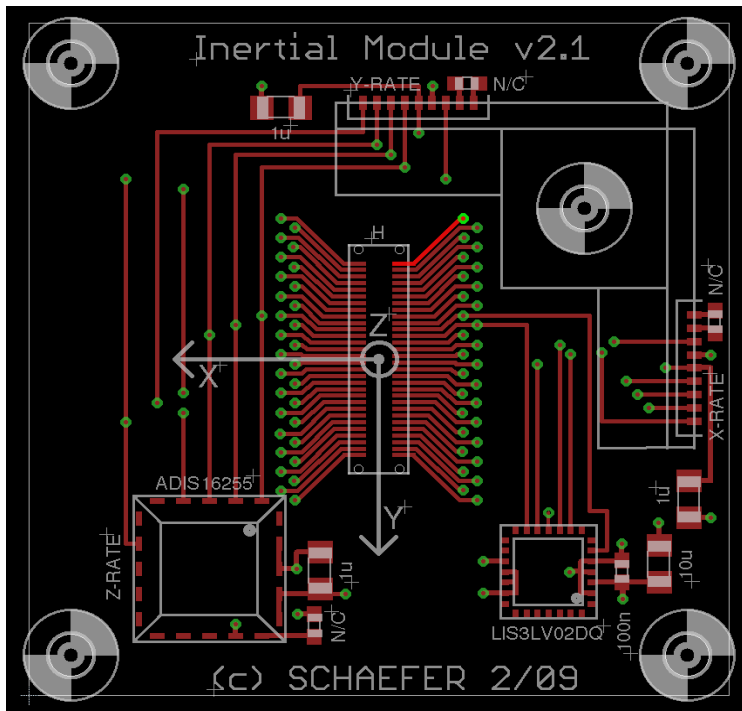
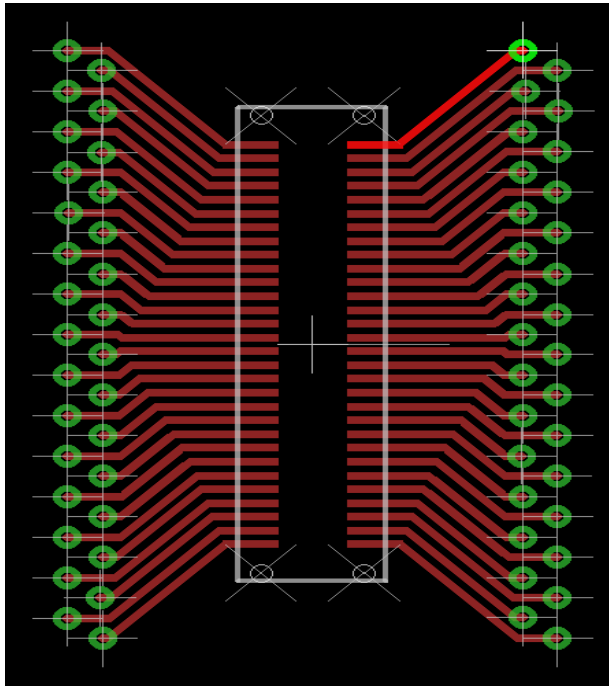
3 Expansion Port

If You look from above on Your Inertial Module and the board lies normal upside on the desk, with the labeling normal upside, You see the upper expansion port with the following polarities:

Pin Description		Pin Numb	Pin Numb		Pin Description
VDD	Supply voltage	60	1	Global reset	nRST
VDD		59	2	SWITCH MODULE	P0.30
+5V	5V stabilized	58	3	SWITCH MODULE	P0.29
+5V		57	4	SWITCH MODULE	P0.28
+3V3	3.3V stabilized	56	5	SWITCH MODULE	P0.27
+3V3		55	6	CAN1	TD1
TXD0	UART0	54	7		RD1
RXD0		53	8	Ground	GND
SCL	I2C	52	9		GND
SDA		51	10		GND
SCK0	SPI0	50	11	INERTIAL MODULE	P0.22
MISO0		49	12	INERTIAL MODULE	P0.21
MOSI0		48	13	SPI1	SSEL1
SSEL0		47	14		MOSI1
P1.16		46	15		MISO1
P1.17		45	16		SCK1
P1.18		44	17		USER0
P1.19		43	18		USER1
P1.20	INERTIAL MODULE	42	19		USER2
P1.21	INERTIAL MODULE	41	20		USER3
P1.22	INERTIAL MODULE	40	21		P0.13
P1.23	INERTIAL MODULE	39	22		P0.12
GND	Ground	38	23		P0.11
GND		37	24		P0.10
RTCK	JTAG	36	25	Ground	GND
TDO		35	26		GND
TDI		34	27		GND
TCK		33	28		GND
TMS		32	29		GND
nTRST		31	30		GND

Pins number 11, 12, 14 .. 16, 39 .. 42 and 48 .. 50 are used by the Inertial Sensor Module

If You look from above on Your Inertial Sensor Module and the module lies normal upside on the desk, with the labeling normal upside, You see the upper expansion port with the pin number 1 on the upper right side:



The second expansion port lies on the reverse side of the board, and since all connectors are plated-through it is easy to assign the pin numbers mirror-inverted, if You look on the board from below.

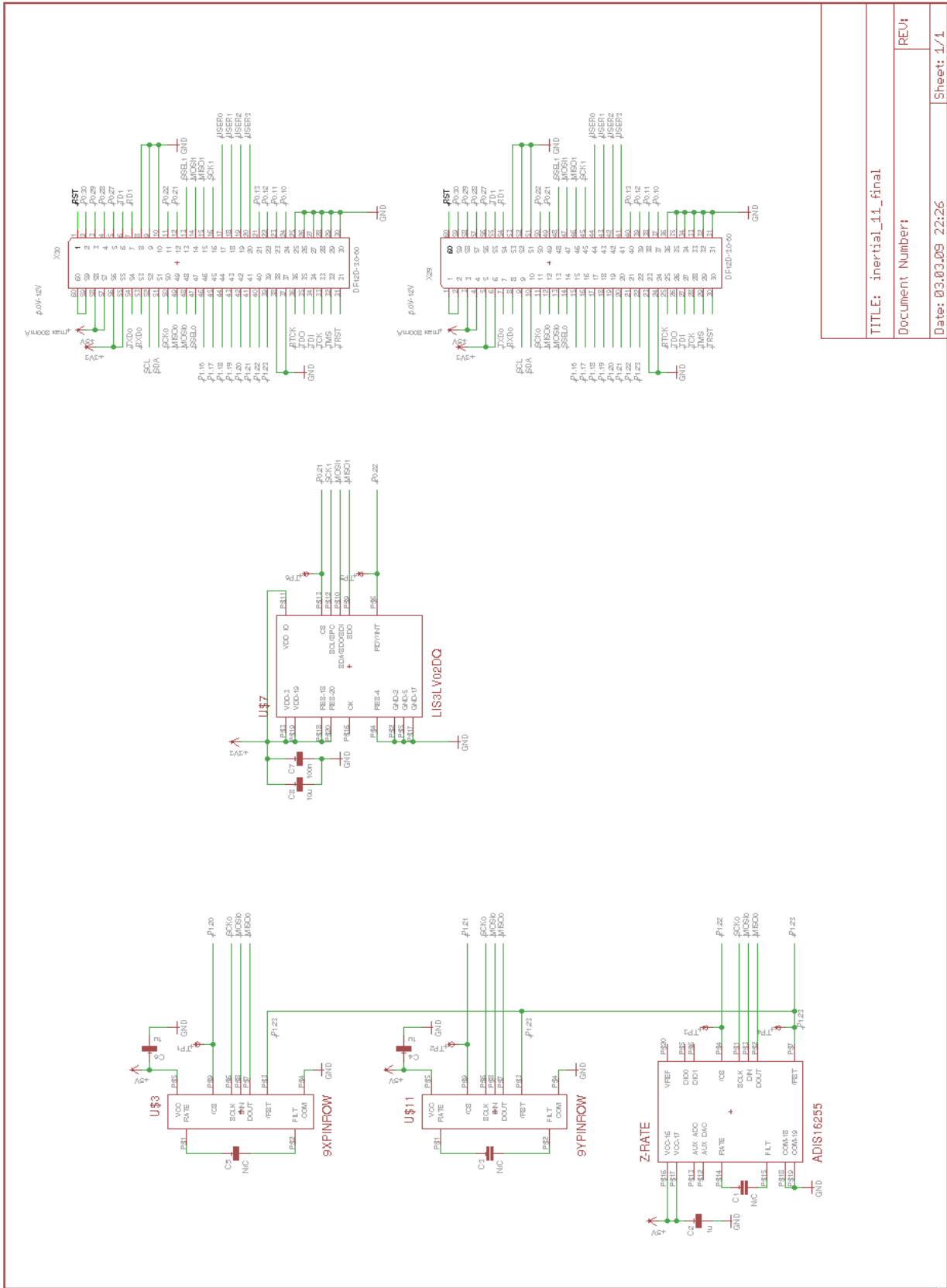
4 Legal Annotation

The Bitrelle Tech SCHAEFER Rapid Prototyping and Development Inertial Sensor Module is a typical prototyping board. You get schematics and part lists (see annexes) with it. As though the board works very well and is tested several times we give absolutely no warranties.

5 Document History

Date	Description	Revision Number	Author(s)
4.6.2012	Initial Revision	1.0	R. Schaefer

6 Annex Schematics



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7 Annex Partlist

Part	Value	Package
C2	1u	C1206
C4	1u	C1206
C6	1u	C1206
C7	100n	C0603
C8	10u	C1206
U\$7	LIS3LV02DQ	QFPN-28
Z-RATE	ADIS16255	LGA20
X29	DF12D-3.0-60	DF12-3.0-60
X30	DF12D-3.0-60	DF12-3.0-60